POLICIES TO SUPPORT THE DEVELOPMENT OF INDONESIA'S MANUFACTURING SECTOR DURING 2020–2024

A Joint ADB–BAPPENAS Report

JANUARY 2019

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On the cover: Jakarta's heavily urbanized skyline; a student from Batam State Polytechnic learning how to mass-produce printed circuit boards and microchips; and Lina Tati, an embroider, with an employee from Kampung Baro in Aceh. (photos from the ADB Library).

Cover design by Achilleus Coronel.

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Foreword

This report provides a solid basis for Indonesia's policy makers to start thinking about the policies that the country needs to implement to support the nation's development in the medium and long term. Indonesia's experience suggests that the country needs new economic policies if it wants to become an upper-middle-income economy as soon as possible. The analysis in the report shows why Indonesia has not been able to grow beyond 5.5% in recent years. The reason is that the country's potential and balance-of-payment growth rates do not allow faster growth. Analysis of the determinants of these two growth rates shows that the structure of our economy, especially the role played by the manufacturing sector, is fundamental. Therefore, the development of the manufacturing sector is necessary to unlock Indonesia's growth in the medium and long term.

Indonesia underwent significant industrialization (increasing share of the manufacturing sector, diversification) during the 1980s and early 1990s. This explains the country's high growth rates. Industrialization stopped suddenly with the onset of the Asian financial crisis of 1997–1998, with the consequence that the country never achieved the industrialization levels of its more advanced East and Southeast Asian neighbors. Since then, the contribution of the manufacturing sector to gross domestic product has been declining. At the same time, labor has been moving out of agriculture into nontradable sectors such as retail and wholesale trade, hotels and restaurants, and construction more than to manufacturing. These are reasons to be concerned about the country's future.

Given changes in the world economy (i.e., the role of the People's Republic of China, new technologies) Indonesia's industrialization in the 21st century will have to take a route different from that taken by East Asia's successful industrializers several decades ago. To succeed, Indonesia will have to develop niches in complex manufacturing activities, that is, those that create high value added, increase the nation's productivity, support product diversification, and create strong linkages between domestic large firms, and small and medium enterprises, as well as between domestic firms and the international markets.

To achieve the above, Indonesia needs to take immediate policy actions. Our traditional approach to industrial policy, that is, to target and support specific sectors, needs to be replaced with a modern industrial policy, where public and private sectors collaborate to determine whether there are market failures or not, what these are, the type of interventions (public goods) needed, and the conditions under which public assistance is provided.

Moreover, industrial policy will not be effective if it is treated as a sectoral policy. A consistent macroeconomic policy framework is needed to support the development of the manufacturing sector. Indonesia needs to develop a more integrated policy approach for supporting industrial development. Given our current account deficit, a reduction in the budget deficit puts pressure on the financial balance of the private sector. A well-designed macroeconomic policy mix is needed to reduce the financial burden of growth on the firm sector without sacrificing faster growth.

Collaboration between the Asian Development Bank and the Government of Indonesia (Ministry of National Development Planning/BAPPENAS) elaborating this report has been a very fruitful experience that we hope to maintain in the future. Overall, the analysis and the recommendations in the report ought to play an important role as inputs to develop the country's next medium-term program.

BAMBANG P.S. BRODJONEGORO
Minister of National Development Planning/Head of National Development Planning Agency
Jakarta, December 2018

Foreword

Policy advice is central to the partnership of the Asian Development Bank (ADB) with its developing member countries, and demand for policy advice increases with income per capita. The governments of countries that achieve middle-income status, and of those that are close to high income, often approach ADB for advice on a wide range of issues. In recent years, we have engaged policy makers from many countries in discussions around how to achieve inclusive growth, how to avoid the middle-income trap, and how to participate actively in the global knowledge economy. Policy makers are also interested in how to diversify and upgrade economic structures, modernize industrial policy programs, and how to prepare for the Fourth Industrial Revolution. Governments are equally keen to learn from the experience of other countries. Providing answers to these questions in the form of policy advice requires research, particularly as countries seek to implement policies and develop institutions that facilitate structural transformation.

This interaction with our member countries is especially relevant today, as the 21st century development landscape will be significantly different from that in which many countries thrived during the second half of the 20th century. Obvious examples of this are the opportunities and challenges posed by the full incorporation of India and the People's Republic of China (PRC) into the world economy, the emergence of new labor-saving technologies, the push for low-carbon growth paths in the face of climate change, developed countries' reluctance to run current account deficits that facilitate developing countries' export-led growth or the fact that the World Trade Organization places some restrictions on developing countries' space to conduct industrial policy. These ongoing changes make it increasingly important for policy makers from developing countries to understand their options.

In 2017, the Government of Indonesia requested policy advice from ADB on options for faster growth during 2020–2024. Specifically, the government was interested in the role of the manufacturing sector and how to further diversify and upgrade industry, how to modernize industrial policy, and the role of fiscal and monetary policies in supporting higher growth rates.

To shed light on these issues, the Economic Research and Regional Cooperation Department of ADB, together with the Southeast Asia Department of ADB and the Indonesian Ministry of National Development Planning (BAPPENAS), put together a team of researchers. Jesus Felipe, Advisor, Economic Research and Regional Cooperation Department, ADB; and Amalia Widyasanti, Senior Advisor to the Minister of National Development Planning, led this work.

The team worked closely with the Government of Indonesia, with intellectual support from BAPPENAS. The Government of Indonesia has made it clear that it aspires to become an upper-middle-income economy as soon as possible. Hence, the need to grow faster and the recognition that advancing industrialization is key. Indonesia went through an industrialization phase during the 1980s and early 1990s, but the Asian financial crisis, plus problems in diversification and upgrading, typical of resource-dependent economies, did not allow the country to undergo a more significant structural transformation, built around a more diversified and sophisticated manufacturing sector. Herein lies the relevance of this project. It is

based on the premise that this sector can be an important driver of growth in the coming years if both public and private sectors understand what is at stake and deepen collaboration.

We hope this report will be a useful reference in discussions and policy analyses in Indonesia. Taken together, the chapters provide a coherent, comprehensive, and in-depth assessment of key aspects of Indonesia's economy today, and of the challenges it faces to grow faster during the coming years.

STEPHEN P. GROFF
Vice-President (Operations 2)
Asian Development Bank
Manila, December 2018

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The report was designed, organized, and structured by Jesus Felipe and Amalia Widyasanti, and was edited by Jesus Felipe, Neil Foster-McGregor, and Vanessa Sumo.

Jesus Felipe and Amalia Widyasanti

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Abbreviations

4IR	–	fourth industrial revolution
ADB	–	Asian Development Bank
AFC	–	Asian financial crisis
ASEAN	–	Association of Southeast Asian Nations
BAPPENAS	–	Ministry of National Development Planning
BI	–	Bank Indonesia
BKPM	–	Badan Koordinasi Penanaman Modal (Indonesia Investment Coordinating Board)
BOP	–	balance of payments
BOPC	–	balance-of-payments constrained
CA	–	current account
DPB	–	domestic private balance
ECI	–	economic complexity index
ELG	–	export-led growth
FDI	–	foreign direct investment
FX	–	foreign currency
GATT	–	General Agreement on Tariffs and Trade
GB	–	government balance
GDP	–	gross domestic product
GGDC	–	Groningen Growth and Development Centre
GVC	–	global value chain
ICT	–	information and communication technology
IMF	–	International Monetary Fund
ISIC	–	International Standard Industrial Classification
KITE	–	Kemudahan Impor Tujuan Ekspor
KUR	–	Kredit Usaha Rakyat (People's Business Credit)
KURBE	–	Kredit Usaha Rakyat Berorientasi Ekspor (Export-Oriented People's Business Credit)
LPI	–	Logistics Performance Index
MIP	–	modern industrial policy
MRIO	–	multiregion input–output
MSMEs	–	micro, small, and medium enterprises
n/a	–	not applicable
NACE	–	Nomenclature des Activités Économiques dans la Communauté Européenne
NIE	–	newly industrializing economy
O/N	–	overnight rate
OSS	–	Online Single Submission
PLB	–	Pusat Logistik Berikat (Bonded Logistics Center)
PMK	–	Peraturan Menteri Keuangan (Regulation of the Minister of Finance)
PRC	–	People's Republic of China
PTSP Pusat	–	Pusat Pelayanan Terpadu Satu Pintu (One Stop Service - Center)

R&D	–	research and development
RCA	–	revealed comparative advantage
ROIC	–	return on invested capital
ROK	–	Republic of Korea
Rp	–	rupiah
SEZ	–	special economic zone
SFB	–	sector financial balance
SFBM	–	sector financial balances map
SMEs	–	small and medium enterprises
SS	–	shift and share
TPI	–	Inflation Targeting, Monitoring and Control Team
UNCTAD	–	United Nations Conference on Trade and Development
UNIDO	–	United Nations Industrial Development Organization
US	–	United States
VAT	–	value-added tax
WAP	–	working-age population
WBES	–	World Bank Enterprise Survey
WIOD	–	World Input–Output Database
WTO	–	World Trade Organization

Overview

Indonesia's economy was doing very well between the mid-1960s and the mid-1990s, until the Asian financial crisis (AFC) of 1997–1998. The country had achieved a significant degree of economic stability and the economy had transformed substantially by developing an incipient manufacturing sector. The crisis, however, imposed a severe toll on the country, which managed to recover but never returned to the high growth rates of the precrisis years. The crisis also left Indonesia with an unfinished agenda of economic transformation. Indeed, when the crisis hit Indonesia, its manufacturing sector was still very undiversified and unsophisticated—both characteristics still apply to the sector today. Another important consequence of the crisis was that Indonesia's potential and balance-of-payments-constrained (BOPC) growth rates, which together determine how fast an economy can grow, declined significantly after the AFC.

The chapters in this report analyze Indonesia's growth prospects during 2020–2024, particularly whether it can attain growth rates of 6% and above. The analysis is conducted through the lens of Indonesia's potential and BOPC growth rates, and the role of its manufacturing sector as an engine of growth. The framework is based on three components, which jointly provide the rationale for a modern industrial policy: (i) the accumulation of productive capabilities, (ii) structural transformation, and (iii) the joint role of public and private sectors. The idea of structural transformation encompasses the concepts of diversification and upgrading (sophistication) of an economy's productive structure, and acknowledges that not all activities have the same consequences for development.

The chapters document the manufacturing sector's firm-size distribution, employment, value added, exports, and complexity. They also examine the factors that constrain small firms to grow, the options that global value chains (GVCs) can provide, the current system of incentives to the manufacturing sector, and how fiscal and monetary policies can better support higher growth rates. Finally, the report concludes with an analysis of growth during 2020–2024 via different scenarios, and a series of proposals to revive manufacturing and place the economy on a higher growth path during this 5-year period.

The report contains 15 chapters, distributed into four parts. Together, the chapters provide a comprehensive analysis of Indonesia's options to revitalize its manufacturing sector with a view to attaining higher growth rates in the coming years. The chapters in this report reflect moderate optimism about the Indonesian economy during 2020–2024. Barring the possibility of a very negative international scenario that could derail the world economy and consequently Indonesia's, the country will continue growing fast, although not as fast as many would like it to (i.e., 7%–8%). Indonesia needs to pursue policies that lead to its further economic transformation. To do this, Indonesia's policy makers need to continue implementing important policy reforms that allow and support the transformation of the economy in the directions discussed in this report.

For reasons of space, and to focus the analysis, the report has been selective in the choice of topics and issues covered. Surely there are areas not covered in this report that also matter. We hope the topics covered complement other recent analyses of Indonesia's manufacturing sector that also highlight the

relevant role that this sector plays as well as the major challenges Indonesia faces to diversify and upgrade its economy.[1]

Below is a brief summary of the report's contents.

Part I: Structural Transformation and the Relevance of the Manufacturing Sector

Chapter 1, *Indonesia's "New Growth Normal": The Need to Transform the Economy during 2020–2024*, provides the rationale for the analysis in this report: Indonesia needs to attain higher growth rates, and policy makers acknowledge that the manufacturing sector has to play a more important role in driving Indonesia's structural transformation. The sector is undiversified (it exports relatively few products with comparative advantage) and unsophisticated (it exports very standard products, i.e., exported by many other economies). In sum, Indonesia is not a complex economy because it possesses a narrow set of capabilities—mostly related to the production of resource-based products, which only allow Indonesia to produce relatively unsophisticated products. Moreover, the share of manufacturing employment in total employment is small. What this means is that the development of the Indonesian economy appears to be held back by its inability to diversify and to upgrade its production and export structures. Understanding why and what can be done holds the key to the country's future development prospects. The message of the chapter is one of moderate optimism about the Indonesian economy during 2020–2024. Looking into the future, the success of the Indonesian economy will depend largely on its capacity to successfully implement reforms that facilitate and speed up the transformation of its economic structure.

Chapter 2, *Indonesia's Potential and Balance-of-Payments-Constrained Growth Rates: The Role of Manufacturing*, undertakes a growth diagnostics exercise. To do so, the chapter provides estimates and discusses the determinants of Indonesia's potential and BOPC growth rates. These two growth rates set the ceiling to how fast Indonesia can grow persistently without creating domestic (inflation) and external (balance of payments) macro-imbalances. Analysis of these two growth rates provides a framework for understanding at the macroeconomic level why Indonesia does not grow faster today (its potential growth rate is about 5.3% and the BOPC growth rate is barely 3%—consistent with a current account deficit), and what policy makers must do if they want to place the country on a higher growth path. The performance of the manufacturing sector appears to be a significant determinant of both growth rates.

Chapter 3, *Manufacturing as the Engine of Growth*, discusses the historical role of manufacturing as an engine of growth, and why the sector continues to be fundamental for fulfilling Indonesia's growth and development aspirations. The chapter documents how, after the AFC, the sector ceased to be the engine of growth that it was prior to the crisis.

Chapter 4, *A Historical Note on the Difficult Transformation of an Oil-Rich Economy*, provides a historical overview of Indonesia's efforts to diversify and upgrade its economy, and the obstacles that it has faced to transform the economy since the 1960s. Apart from the fact that the shift toward manufacturing took place later than in other East Asian economies, the country's industrial policies were also poorly designed. The AFC of 1997–1998 hit Indonesia hard, contributing to the underperformance of the manufacturing sector.

[1] For example, World Bank (2012a, 2012b, 2012c, 2012d, 2012e, 2012f, 2012g) and International Monetary Fund (2018a).

Part II: Indonesia's Manufacturing Sector

Chapter 5, *Indonesia's Manufacturing: A Sectoral Overview*, and Chapter 6, *Indonesia's Manufacturing: A Firm-Level Perspective*, provide an overview of the current structure of the Indonesian economy and its manufacturing sector. The aim of these two chapters is to provide an understanding of Indonesia's current situation with regard to its economic structure at both the aggregate and firm levels. Combined, the two chapters describe the current structure of the Indonesian economy and recent developments in its structure, and thus provide the baseline from which progress toward reviving the Indonesian manufacturing sector can be evaluated. Chapter 5 analyzes employment trends, value added, labor productivity, and exports of Indonesia's manufacturing sector in comparison with other Asian economies. Agriculture is still Indonesia's largest single employer, and both the productivity level and productivity growth rate of the sector are very low. Chapter 6 provides an analysis of the manufacturing sector from a firm-level perspective. About 99% of Indonesia's manufacturing firms are micro (up to 4 workers) and small (between 5 and 19 workers), with the food sector as the largest employer. Large firms, joint ventures, and firms in Java are the most productive.

Chapter 7, *Indonesia's Reform Packages, Incentives to the Manufacturing Sector, and Industry 4.0*, discusses how Indonesia's government supports the manufacturing sector through a series of major reforms implemented since 2015, a system of incentives, and a new strategy, Industry 4.0. First, the Jokowi government has introduced 16 major reform packages since 2015, several of which have implications for revitalizing the manufacturing sector. While the reforms are much needed, there is little evidence of the extent to which they are working and yielding significant results. Second, the country's system of incentives to this sector aims (at least in theory) to solve common market failures (discussed in detail in Chapter 14), especially information and coordination problems, that limit investment in certain manufacturing sectors deemed important and necessary. The analysis indicates that the system needs rethinking, as some types of incentives are hardly utilized. Finally, the government has recently introduced a new strategy (Industry 4.0) to make manufacturing the engine of growth. It shows the government's awareness of the importance of this sector for the country's development. Industry 4.0 is an ambitious strategy that targets five priority sectors (food, garments, automotive, electronics, and chemical) but its implementation faces challenges.

Chapter 8, *Constraints to Firm Growth: Evidence from Indonesian Manufacturing Firms*, examines barriers to the development and growth of Indonesia's manufacturing sector, and sheds light on growth drivers. First, the chapter provides descriptive evidence on the constraints that manufacturing firms in Indonesia claim to face in doing business (measured by employers' perceptions), and compares Indonesia with other Southeast Asian countries. These alleged constraints refer to the practices of the informal sector, political instability, labor regulations, corruption, electricity, and the tax administration. Second, the analysis tests whether firms' reported barriers are real constraints to firm growth (employment growth and sales growth). The analysis is very detailed insofar as it tests these claims by different types of firm characteristics. Results indicate that the reported constraints to doing business have, on average, no discernible effects on employment growth. When the analysis of employment growth is disaggregated by firm characteristics, some complaints do appear to be significant constraints. The analysis of sales growth reveals that electricity, institutional factors, labor regulations, and licensing burdens are significant constraints (i.e., negatively impact sales growth).

Chapters 9 and 10 analyze Indonesia's participation in GVCs and the manufacturing sector's diversification and upgrading opportunities. Chapter 9, *Developments in Indonesia's Participation in Global*

Value Chains, discusses Indonesia's involvement in GVCs. The chapter finds that this involvement relies mostly on providing primary and raw materials to other economies that then assemble these into final products (i.e., upstream participation). Indonesia also participates in the final assembly of products, receiving intermediate inputs and raw materials from upstream suppliers from different economies (i.e., downstream participation). Overall, Indonesia's participation upstream is higher than downstream, that is, Indonesia is more involved in supplying intermediates or raw materials to other economies' value chains than it is in receiving such inputs from other economies for their (inputs) further transformation. The report also shows that Indonesia is involved in a narrow number of value chains, its participation lacking the diversification found in other countries and biased toward the primary sectors.

Chapter 10, *Complexity, Global Value Chain Participation, and Upgrading in Indonesia*, analyzes the complexity of Indonesia's export basket. The chapter shows that Indonesia supplies products that are low in complexity and mostly resource based to GVCs. This means that the relatively low downstream GVC participation documented in the previous chapter is, to an important extent, caused by the resource-based nature of Indonesian manufacturing. On the one hand, the strong resource-based profile of Indonesian manufacturing contributes to upgrading the output of the primary sectors (agriculture, forestry, fishery, and mining). On the other hand, it means that Indonesia faces strong limits to increasing product complexity because the latter is much lower in resource-based sectors than in manufacturing. Upgrading may also be facilitated by downstream foreign linkages, that is, by sourcing highly complex inputs from abroad to be used by Indonesian GVCs; although as Chapter 9 documented, Indonesia's manufacturing sector is not intensively engaged in such linkages. On the upstream side, Indonesia is also a supplier of low-complexity products to GVCs. Again, this is related to the strong resource-based nature of the Indonesian economy. Resource-based sectors provide low-complexity products. While the complexity of the products supplied to GVCs by the nonresource-based part of Indonesian manufacturing is comparable to the average complexity of global inputs to GVCs, the complexity provided by resource-based sectors is well below the average. During 2012–2014, Indonesia exported 712 products with comparative advantage (in all 3 years) out of a total of 5,111 products. Of these 712 products, only 59 had a complexity level above the average (with revealed comparative advantage greater than 1 in 2012, 2013, and 2014), and 90% of the 59 were in the nonresource-based sectors.

Part III: Prospects for Fiscal and Monetary Policy Coordination to Support Growth and Industrialization in Indonesia

Chapter 11, *How Can Fiscal and Monetary Policy Support Growth and Industrialization in Indonesia?*, and Chapter 12, *Indonesia's Nonfinancial Corporate Sector, Financial Fragility, and Macroeconomic Policy Consistent with Faster Growth*, discuss the role that fiscal and monetary policies should play to support higher growth rates and how higher growth rates can be financed. Two issues motivate the analysis. First, most of the economic literature tends to discuss economic development issues by analyzing long-term development policies (including industrial policy) separate from short-term macroeconomic policy. However, development strategies require a close coordination of the macroeconomic regime with the industrial policy, both oriented to reindustrialization and catching up. The second motivation of these two chapters is the following question: who will bear the burden of financing faster growth? The term "financing" is used here to mean that growth has implications for the financial positions of the private, government, and external sectors of the economy. The three sectors' balances are linked through the national accounting system in such a way that they add up, by construction and by accounting definition,

to zero. What this means is that a reduction in the budget deficit to 1.8% of gross domestic product (GDP) (the government's objective for 2019, well within the limits of the 3% maximum fiscal deficit rule) will automatically have implications for the domestic private and external sectors: together, they will be in surplus of exactly 1.8% of GDP. Moreover, given that Indonesia will surely run a current account deficit of say 2.6% of GDP, this automatically implies that the domestic private sector will have to run a deficit of –0.8%. This is the sector bearing the burden of financing growth. More precisely, it is the nonfinancial corporate component of the domestic private sector that is in significant deficit (not the financial and household subsectors), which has implications for financial fragility.

All this brings to the fore how fiscal and monetary policies are coordinated. Both policies attempt to influence the economy but have opposing effects on the private sector's financial position. A fiscal expansion stimulates spending by directly adding to the incomes of the private sector; but monetary policy stimulates spending by encouraging more spending out of existing income (i.e., lower interest rates encourage borrowing). Therefore, it matters how fiscal and monetary policies are coordinated since they will necessarily affect the sectors' financial positions within the context of preexisting degrees of financial soundness or financial fragility. Which sector will bear the burden of financing growth in the coming years? Will the government increase debt to build infrastructure? This would enable businesses to perhaps increase their own capacity through retained earnings instead of borrowing or issuing equity (frequently to international investors, perhaps in the form of "hot money"). If it is businesses themselves making the added investments, how will they finance them? Will it be through, for example, additional borrowing by households to purchase goods and/or homes, and as such raise business cash flow? Will it be through an increased current account balance that similarly raises net cash flow for businesses? Or is it none of these, with the business sector financing its own growth? If the latter, what are the financing arrangements?

Chapter 11 specifically addresses the question of who will bear the burden of financing faster growth? That growth is financed is not a problem per se, but how growth is financed and who finances it are of interest. Different responses to each of these questions have different effects on the degree of financial fragility of an economy. The degree of financial fragility, in turn, affects the economy's risk of financial instability, whether because of greater sensitivity to "shocks" that affect the economy or from interactions of rising financial fragility itself with the state of the economy and/or macroeconomic policy.

Chapter 12 discusses *what are the implications of financial fragility for the macroeconomy?* As discussed in Chapter 11, Indonesia's corporate sector bears the financial burden of growth. To grow faster, this burden will increase or will have to shift to another sector. These are the only options given the current account deficit plus the fiscal rule. In these circumstances, it is important to understand the financial situation of Indonesia's corporate sector.

Part IV: Growth during 2020–2024 and Recommendations to Transform Indonesia's Economy

Chapter 13, *How Fast Can Indonesia Realistically Grow during 2020–2024? Potential and Balance-of-Payments-Constrained Growth Rate Scenarios*, discusses how fast Indonesia can realistically grow during 2020–2024 by designing scenarios based on the analysis of the determinants of potential and BOPC growth rates in Chapter 2. The question that drives the construction of these scenarios is: can Indonesia improve its long-term growth performance and achieve a growth rate of 7%–8%? The overall conclusion, in the context of the models discussed in this report, is that this is unlikely. Average potential growth rate during 2018–2023 is forecast at 5.65%. Using the models discussed in Chapter 2, three scenarios were

designed—good, moderate, and bad. The analysis concludes that under a good scenario, Indonesia could attain average potential and BOPC growth rates of 6.31% and 5.78%, respectively, during 2020–2024; and under a moderate scenario, attain 5.68% (potential) and 3.71% (BOPC). Attaining higher growth rates would entail very unrealistic assumptions about how much and how fast the Indonesian economy transforms toward the production and export of more complex products, and a significantly more important role for the manufacturing sector. In the moderate scenario, the potential growth rate remains ahead of the BOPC growth rate, and, consequently, Indonesia will continue running a current account deficit during 2020–2024.

Chapter 14, *Modern Industrial Policy*, introduces the notion of Modern Industrial Policy (MIP). The rationale is that the Indonesian government can play an important role in revitalizing the manufacturing sector (e.g., incentives, discussed in Chapter 7). MIP comprises interventions to solve market failures that impede or constrain the development of a modern manufacturing sector. These market failures are mostly coordination and information problems. MIP is also based on the idea that public and private sectors need to collaborate to jointly identify true constraints to the latter's activities (investments and exports), and the correct interventions to relax such constraints. Finally, the implementation of MIP requires a series of principles to avoid rent-seeking. Introducing elements of MIP into Indonesia's public interventions is key to avoiding past mistakes.

Chapter 15, *Recommendations to Transform Indonesia's Economy during 2020–2024*, provides a series of proposals to help the manufacturing sector and, more broadly, to help the economy achieve significantly higher growth rates. These interventions are consistent with what we have defined as MIP. These recommendations are organized into the following categories: (i) increase potential and BOPC growth rates (based on the analyses in Chapters 2 and 13); (ii) interventions to boost the manufacturing sector (based on the analyses in Chapters 6, 7, 8, 9, and 10); and (iii) fiscal and monetary policies to support growth (based on the analyses in Chapters 11 and 12). A brief summary is as follows:

(i) **Increase potential and BOPC growth rates during 2020–2024**. Indonesia's actual growth rate is determined by these two growth rates, which themselves are largely determined by the structure of the Indonesian economy (in particular, the share of manufacturing employment) and the products it exports (characterized by having a low income elasticity of demand). To increase this elasticity, Indonesia needs to diversify and upgrade its economy toward more complex products.

(ii) **Foster the creation of larger firms**. The large majority of firms in the manufacturing sector are micro and small firms. Indonesia needs to create large firms because these are the ones that can diversify, upgrade, and lead the technological advancement of Indonesia.

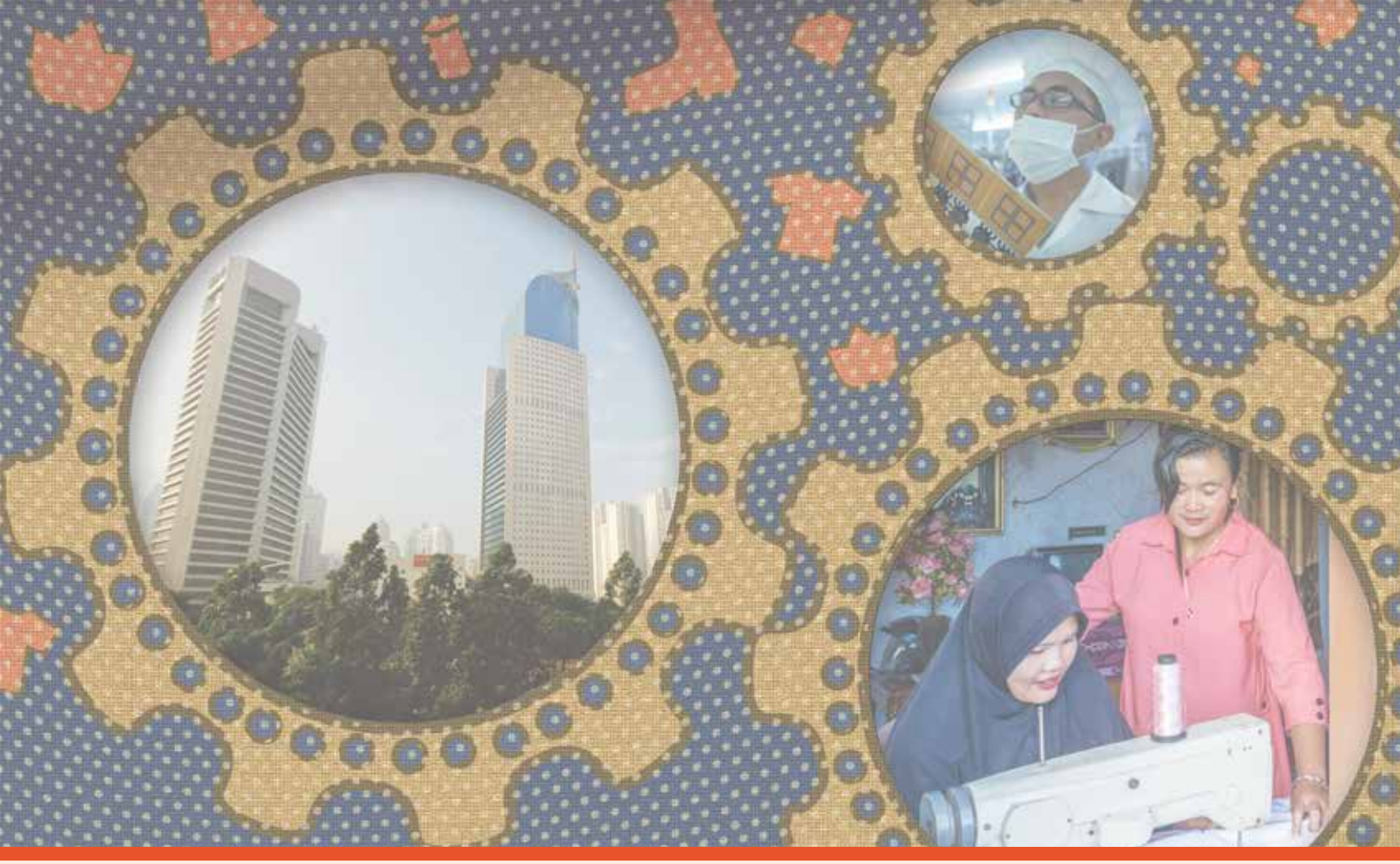
(iii) **Rethink the system of incentives targeted at the manufacturing sector, to better tailor these incentives to the sector's characteristics: mostly small, labor-abundant firms that produce labor-intensive and not highly complex products**.

(iv) **Relax critical constraints (finance and taxes, infrastructure, institutions, access to land and labor, and regulations and licensing) to both employment and sales growth**. As the report has shown, these constraints vary across firm size, age, technology group, ownership, sector, and whether the firm is an exporter.

(v) **Diversify and upgrade manufacturing and move up in GVCs**. Indonesian companies participate in foreign GVCs (upstream). However, they are mostly suppliers of raw materials

and natural resources, and, in general, products with low complexity. Foreign companies also participate in Indonesian GVCs (downstream), but again this participation is, in general, in the production of goods that are not complex. This is related to the resource-based nature of the Indonesian economy. Efforts, by both the public sector and companies themselves, must be made to redress this situation.

(vi) **Rethink fiscal and monetary policies to enhance the financial position of Indonesia's private sector**. Indonesia needs to think of a policy mix to reduce the financial burden of growth on the corporate sector without sacrificing faster growth. This is important because in the coming years, Indonesia will likely continue running a small current account deficit while the fiscal rule allows a maximum 3% fiscal deficit. Currently, the burden of growth falls largely on the corporate sector, and it is inducing financial fragility.



PART 1

Structural Transformation and the Relevance of the Manufacturing Sector

1 Indonesia's "New Growth Normal": The Need to Transform the Economy during 2020–2024

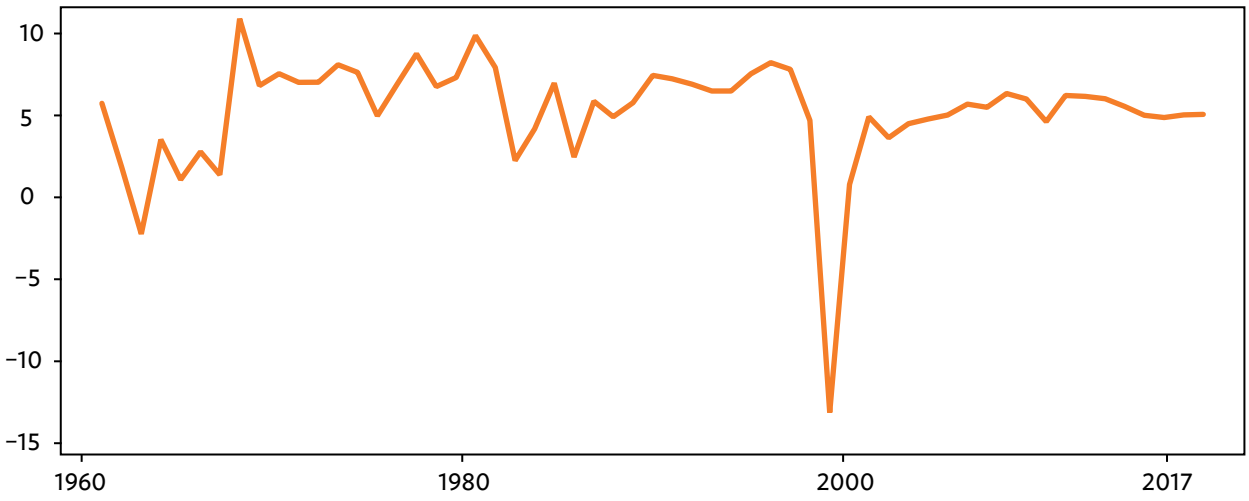
1.1 Introduction

Indonesia is immersed in a challenging situation: after the Asian financial crisis (AFC) of 1997–1998, it has not been able to return to the high growth rates it had attained prior to it, about 17% per year during 1990–1997, against 5.3% during 2000–2017 (Figure 1.1). It seems that after recovering from the AFC, Indonesia entered a "new normal" with gross domestic product (GDP) growth at around 5%–5.5%. While this is high for world standards, the government of the world's fourth most populous nation (over 260 million people) would like to eliminate poverty faster, create good employment, and attain upper-middle-income status as soon as possible. To achieve these goals, growth will need to increase. *Can Indonesia achieve an average GDP growth rate of 7%–8% during 2020–2024?*

This is the first chapter out of a total of 15 that make up this report. Together, the chapters try to provide a coherent answer to the question above, in the context of Indonesia's options for 2020–2024.

The implicit working framework of this report is that development is based on three components. The first is accumulating productive capabilities. This component acknowledges that development is about more than simply increasing income, which could happen as a result of a resource bonanza. Capabilities encompass all inputs that go into the production process; more specifically, they refer to the ability to produce by using and developing new technologies and organizations. However, since some of these inputs are tradable (e.g., machinery) everyone has access to them. What truly differentiates countries is their ability to design and use nontradable capabilities (e.g., a law).

Figure 1.1 Indonesia's Actual Growth Rate, 1960–2017 *(%)*



Source: World Bank. World Development Indicators. http://databank.worldbank.org/data/home.aspx (accessed August 2018).

Second, accumulating capabilities leads to structural transformation, that is, the rise of new industries to replace traditional ones, and to diversification and upgrading (concepts defined precisely in the next section) of the productive structure. The idea of structural transformation encompasses the concepts of diversification and upgrading an economy's productive structure, and acknowledges that not all activities have the same consequences for development. High-technology manufacturing is clearly better than traditional farming in enabling countries to upgrade their productive capabilities.

Despite progress in the 1980s and early 1990s, Indonesia's economy remains less diversified and sophisticated than those of other East Asian economies, and still depends significantly on natural resources. Why does this matter? In today's global economy, differences in living standards among nations remain large. One important reason why such differences continue to exist is the fact that production capabilities are unequally distributed across countries. Indicators of production capabilities can be found in the data on international trade, as the basket of product classes in which developed countries excel in exporting is very different from that found in developing economies, in terms of both *diversification* and *sophistication*. The combination of these two notions results in measures (and rankings) of the *complexity* of economies and of the products they export. The report will discuss these three fundamental concepts, and refer to them in several chapters, especially Chapters 9 and 10. These concepts are essential to understand why Indonesia has not progressed faster, and, consequently, what Indonesia must do to move forward.

Third, in market economies, private firms are the agents of economic transformation, but their actions need to be considered in a framework of public action. In today's world, economic development requires a mix of market forces and public sector support. High-technology manufacturing, for example, does not develop naturally in backward economies. Unless governments promote such activities and help the private sector, the market will pull a backward economy toward the same type of activities that it was doing previously (e.g., agricultural products or simple textiles), activities often based on its comparative advantage of natural resources or cheap labor.

The next two sections introduce in some more detail the concepts of diversification, sophistication, and complexity used in this report to analyze the Indonesian economy. The analysis emphasizes the view that development entails the accumulation of productive capabilities and structural transformation (in the direction of industrialization). The basic argument is that, in recent decades, Indonesia has been slowly transforming its economy and developing more complex sectors. Faster growth during 2020–2024 will be very difficult unless it speeds up this process.

1.2 The Need to Understand the Roles of Diversification, Sophistication, Complexity, and Structural Transformation

This section defines and explains the notions of diversification, sophistication, and complexity used in this report.

Diversification in the modern literature on structural transformation refers to the variety of products that an economy produces. It is measured by the number of products a country exports with revealed comparative advantage (RCA) (Box 1.1). Diversification is documented in Figure 1.2. The People's Republic of China (PRC) and India stand out with very high values (especially the PRC, which exports with comparative advantage almost half of the product classes), reflecting in part their large size. Indeed, with their large population bases, these countries have many producers, and are therefore able to export in more product classes than smaller countries that are at a comparable level of development. Japan, Thailand, Indonesia, and Hong Kong, China have intermediate diversification, while Cambodia and Bangladesh rank low. In the case of Indonesia, the report also highlights the lack of improvement after 2007.

Box 1.1 Revealed Comparative Advantage

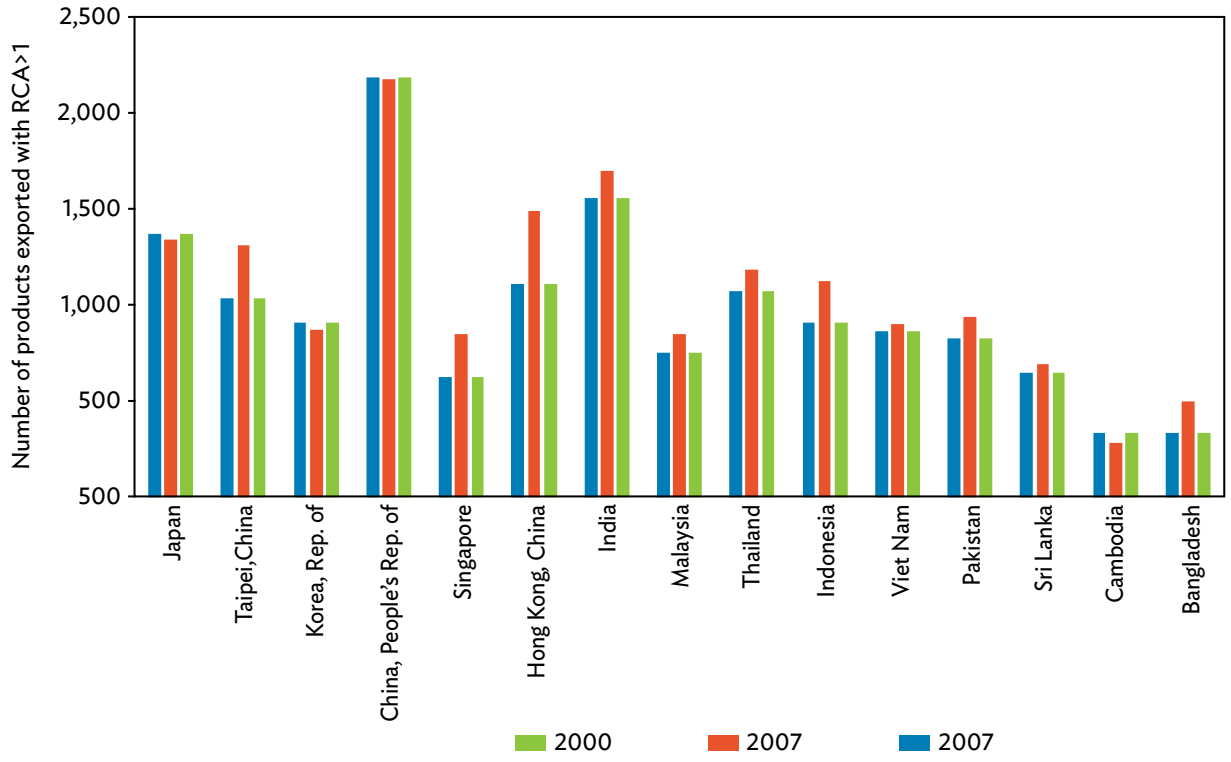
Revealed comparative advantage (RCA) is calculated as the ratio of the share of product X in the country's export basket to the same ratio at the world level. Algebraically:

$$RCA_{cp} = \frac{E_{cp} / \sum_{p' \in P} E_{cp'}}{\sum_{c' \in C} E_{c'p} / \sum_{c' \in C, p' \in P} E_{c'p'}}$$

where E refers to exports, c and p denote economies, p and p' denote products, and P and P are the sets of economies and products, respectively. This equation defines RCA (for an economy and a product) as the proportion of an economy's exports of a certain product divided by the proportion of world exports of that product. A country exports with revealed comparative advantage in product X if the product's RCA>1. In the analysis, the higher the number of products exported with RCA>1, the more diversified an economy. This indicator, shown in Figure 1.2, is based on a database with export data on 5,111 product classes and 149 countries.

Source: Authors.

Figure 1.2 Economic Diversification of a Group of Selected Asian Economies, 2000, 2007, and 2014



Note: The database contains a total of 5,111 products.
Source: Authors' calculations based on CEPII's BACI Database. http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=1 (accessed August 2018).

Economic diversification is of paramount importance for a developing economy such as Indonesia. Generally, a key difference between today's economies and ancient ones is that the former are made of a significantly larger number of different things, many of which were not available in earlier times. This

increase in diversification is probably the most conspicuous aspect of economic development, and a chief difference between the complex process of economic development and the aggregate process of economic growth.

During the Industrial Revolution, England's economy did not grow by simply multiplying its ability to produce the shields and armor of medieval times. It expanded as a result of the introduction of new products and technologies. The steam engine powered locomotives, looms, pumps, and even the world's first computer, known as Babbage's calculating machine. This increase in diversification is also true of more recent "growth miracles," such as those of Japan and the Republic of Korea (ROK). Both these countries have come to dominate markets in which they had little or no participation a few decades before entering them, such as markets for automobiles, ships, medical equipment, industrial machinery, and electronics.

The relevance of economic diversification has increased in recent decades. Prosperous economies differ from those that are not, both in the diversity of the inputs they have available and in the diversity of the outputs they produce. These differences imply that developed countries participate in more industries and in more markets than developing countries do, since the former can perform activities that few other countries can and which are widely demanded. In a world where new activities tend to emerge as a combination of old activities, wealth is not a consequence of having more but of having the right combinations of capabilities and inputs.

Evidence illustrating the importance of diversification has been highlighted in recent work on international and regional development. The evidence shows that the economies and employment levels of countries and regions that export a diverse set of products grow faster, in part because they have a varied set of industries and, through them, a larger number of productive capabilities. A diverse set of industries and capabilities, in turn, creates inter- and intra-industry spillovers that give rise to clusters of productive activities in which a firm's competitiveness is strongly dependent on the existence of other firms in the same or similar sectors.

Understanding the role of diversification in economies has been historically difficult. Why, for example, are natural resources—as in the case of Indonesia—so good at generating income and foreign exchange, but so bad at kick-starting development? The lack of answers to this question can be partly traced to a historical disregard for the diverse and disaggregated nature of the world economy. Aggregate macroeconomic descriptions make little or no difference between capital goods, such as tractors, pumps, and refrigerators, beyond what can be captured through the cost of their parts or through the wages and years of schooling of the workers involved in their production. Moreover, when traditional theories have attempted to incorporate the diversity of the world into their models, they have done so through extremely symmetric assumptions in which goods are represented through a continuum that has no parallel in the real world. The failure to incorporate diversification into theories of economic growth and development is a widely recognized limitation.[1] In recent years, however, new streams of literature are helping to improve the understanding of the role of diversity by highlighting its role at the level of countries and cities.[2]

[1] Krugman (2009), Lucas (1988).

[2] In the standard trade theory, countries that concentrate their production and exports in the products in which they have comparative advantage will reap the gains from trade, and they should therefore avoid trying to produce goods beyond this optimal mix. In the Heckscher–Ohlin model of trade, the source of comparative advantage is relative factor abundance. In this model, comparative advantage is natural and fairly static for natural resources and agricultural products, but it can be induced and is dynamic for industrial and service sectors. Based on this theory, economists have praised the benefits of specialization and advised developing countries to follow their comparative advantage on resource allocation and efficiency grounds. This theory acknowledges that specialization entails restructuring costs (e.g., unemployment), but it argues that these can be solved through compensatory policies.

There are other reasons why economic diversity is important, which go beyond the path dependence intrinsic to development. For example, export diversification matters because it can lower volatility and instability in export earnings. Such portfolio effects can help hedge against the risk inherent in markets with uncertain returns. In fact, economic downturns turn out to be shorter-lived in countries that are more diversified.[3] Another channel is the negative and nonlinear impact of natural resources on growth through their effect on institutional quality.[4] Countries that are rich in natural resources are less likely to implement growth-enhancing reforms or to improve their investment climates.[5] Although resource revenues make a handsome contribution to fiscal coffers, they also pose several challenges: what to do with the revenues earned (spend now or invest—the time profile of consumption); where to invest (foreign assets or domestic assets); and how to balance public and private sector actions (that is, government consumption and investment in relation to private sector consumption and investment). It is therefore important for resource-rich countries like Indonesia to find the right balance between these opposing forces. On the one hand, capital is scarce and therefore returns from investment at home are likely to be higher. On the other hand, the investment might be riskier and run into supply-side constraints causing the economy to overheat.

Probably the strongest argument in favor of diversification is obtained by putting aside any theoretical discussions on its potential merits, and by observing the reality of the world. Despite any theoretical construct, the reality is that developed countries display relatively low levels of export concentration, while countries with low per capita income export a very limited range of goods. In fact, except for commodity booms and other bonanzas, economic growth tends to occur with increased diversification. Hence, arguing whether diversification or specialization makes sense for countries might be a distraction in a world where diversification appears to work strongly.

Finally, some authors have studied empirically the determinants of export diversification using a world dataset spanning 1962–2000.[6] They use several measures of diversification, including the Gini, Herfindahl, and Theil indices. They find that (i) trade openness induces concentration, not export diversification; (ii) financial development helps countries diversify their exports; (iii) real exchange rate overvaluation is negatively related with export diversification; (iv) exchange rate volatility is uncorrelated with diversification; (v) capital accumulation contributes positively to export diversification; (vi) remoteness reduces export diversification; and (vii) improvements in terms of trade tend to concentrate exports, but this effect is lower for countries with higher levels of human capital.

Sophistication refers to how standard (or the opposite, ubiquitous) a country's export basket is. It is proxied by an index of the number of countries that export a product with comparative advantage. The "standardness" indicator is the average ubiquity of commodities exported with comparative advantage by a country. Ubiquity of the product class is the number of countries exporting the product with comparative advantage. Therefore, the indicator of standardness (S) can be interpreted as follows: on average, the products exported by country c are exported by S countries.[7] In the analysis, the lower this number the better. The idea behind this indicator is that some countries specialize in product classes that are rather

[3] Hausmann, Rodriguez, and Wagner (2006).

[4] Sala-i-Martin and Subramanian (2003).

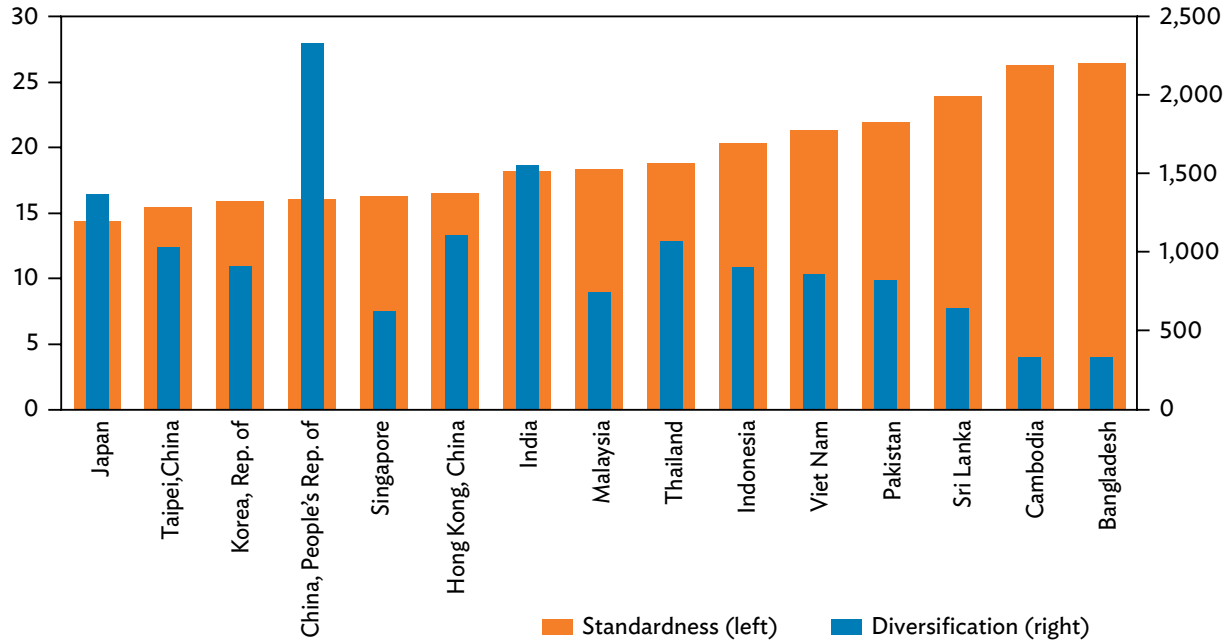
[5] Amin and Djankov (2009).

[6] Agosin, Alvarez, and Bravo-Ortega (2012).

[7] Standardness is the average ubiquity of commodities exported with comparative advantage for each country c, and it is calculated as: $S = \left(\frac{1}{diversification_c} \right) \sum_{ic} ubiquity$, where $diversification$ is the number of products exported by country c with RCA>1, and $ubiquity$ of commodity i is the number of countries exporting commodity i with RCA>1.

unique (i.e., few countries specialize in them), while other countries specialize in common product classes (i.e., many countries specialize in them). Figure 1.3 shows this indicator, along with diversification, for 2014. It is clear that standardness is less sensitive than diversification to country size, as the PRC and India no longer stand out. The economy with the least standardized export basket is Japan, closely followed by Taipei,China; the ROK; and the PRC. The countries with most standardized export baskets are Cambodia and Bangladesh. Indonesia's export basket is of average standardness compared with those of other Asian countries.

Figure 1.3 Standardness and Diversification, Selected Asian Economies, 2014



Notes: Standardness is the number of countries that on average export country *c* export basket. Diversification is the number of products country *c* export with RCA>1.
Source: Authors' calculations based on CEPII's BACI Database. http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=1 (accessed August 2018).

Complexity encapsulates the idea that some products can be produced and successfully exported without much (advanced) knowledge, while other products (or services) can be produced only by those who possess advanced capabilities based on state-of-the-art knowledge. The notion of product complexity reflects the impact of capabilities and knowledge: the higher the complexity of a product, the more capabilities and knowledge are needed to successfully produce and export it. Thus, advanced countries (more complex economies) may produce and export a wide range of products, including complex and not-so-complex products, while countries with a less advanced production system produce and export only products with low complexity. Box 1.2 explains how country and product complexity indices are constructed.

Figure 1.4 shows Indonesia's complexity index for 2000–2014, as well as the indices for a group of other Asian countries. The figure shows that Indonesia's complexity index has not increased during the period considered, and that the Indonesian economy is significantly less complex than the more advanced East Asian and Southeast Asian economies.

Finally, it is worth noting that in the type of structural transformation Indonesia is experiencing today, documented in Figure 1.5, workers are shifting from agriculture (whose employment share declined) to mostly services (whose employment shares increased), particularly nontradable services, more than to manufacturing,

Box 1.2 Construction of Complexity Indices

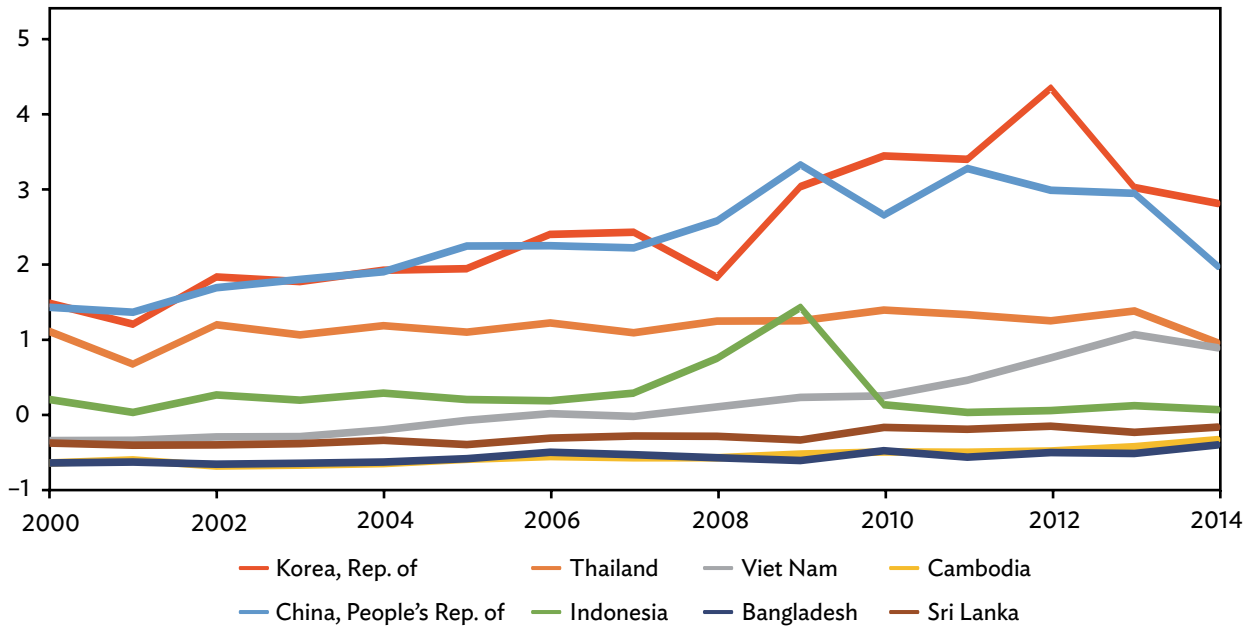
To operationalize empirically these ideas and calculate measures of country and product complexities, the analysis uses a database that contains information on 5,111 exports and 149 countries, including information on the diversification of a country and uniqueness of a product. A product that is exported by only a few countries is more unique, or less ubiquitous. Complex products require more knowledge to produce, so one may expect them to be less ubiquitous. Independently, diversity and ubiquity provide significant information about the variety of capabilities available in a country or required by a product, but when used jointly, they become a more powerful analytical tool.

For example, only a few countries possess diamonds, which may give the impression that these countries are complex economies. However, countries that possess diamonds may not have many other products (i.e., their diversification is low). Another example is two countries that may be equally diversified, but their products differ in terms of ubiquity: one may produce medical devices produced by very few countries, and the other plastic buckets that are very standard and produced worldwide. In these two examples, an index of complexity is constructed iteratively by using diversity to correct the information conveyed by ubiquity, and ubiquity to correct the information that diversity conveys. This is done until the process converges and there is no difference between successive iterations. Specifically, for a country, the method calculates the average ubiquity of the products exported and the average diversity of the countries that export those products. Conversely, for a product, the method calculates the average diversity of the countries that export the product and the average ubiquity of the other products that these countries make.

The result of the iterations between diversity and ubiquity is an economic complexity index for countries, and a product complexity index for products. By construction, the complexity indicator is a dimensionless number, but higher values indicate higher complexity.

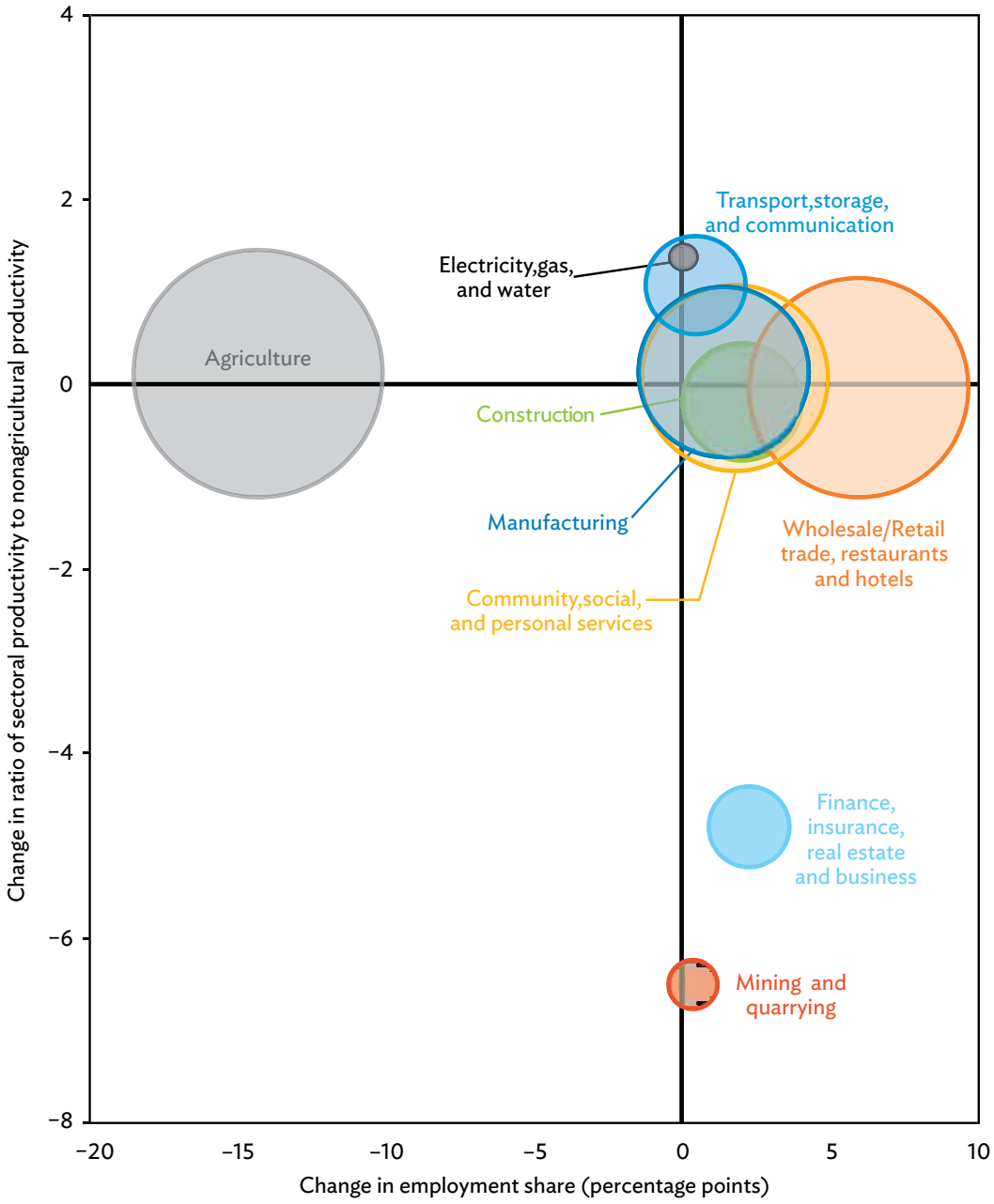
Source: Authors.

Figure 1.4 Complexity of a Selected Group of Asian Economies



Note: The vertical axis shows a standardized measure of the countries' economic complexity index.
Source: Authors' calculations based on Hidalgo and Hausmann (2009) and Tacchella et al. (2012, 2013).

Figure 1.5 Indonesia's Structural Transformation during 1995–2017



Notes: The horizontal axis plots the difference in the sectors' employment shares in 2017 and in 1995. The vertical axis plots the difference between the ratio of a sector's labor productivity to the average labor productivity in nonagriculture, in 2017 and 1995. The size of the circles is proportional to the employment shares in 2017. The changes in the circles in both vertical and horizontal axes are given by the middle point of the circles.
Source: Authors' calculations based on CEIC data (accessed August 2018).

whose share increased only marginally between 1995 and 2017. Indeed, the country's employment share in the tradable sectors of the economy (i.e., those products/services that could be bought from or sold in other countries) has decreased from about 75% in the mid-1970s to about 55% in 2008.[8] This 20 percentage point decline is a reflection of the type of structural transformation that Indonesia is experiencing: workers leave agriculture (which still employs over 30% of all workers) to join the nontradable sectors of the economy (e.g., construction, hotels and restaurants, personal services, and commerce). This means that between 75% and 80% of all Indonesian workers are employed in agriculture and nontradable services, sectors with generally low productivity growth and, consequently, low wage growth. When the manufacturing sector plays a significant role in the economy and sectoral linkages are strong, one should find a statistically significant relationship between the growth rate of manufacturing value added and that of nonmanufacturing value added. This relationship, which was statistically significant in Indonesia in the past, seems to have disappeared since the AFC.

1.3 Moderate Optimism for 2020–2024

Given that Indonesia's current growth rate is significantly lower than that prior to the AFC, and that its export basket is neither well diversified nor unique (both measures of the country's production capabilities), *what are Indonesia's development prospects for 2020–2024? How much faster can it realistically grow during this period? What can Indonesia do to shift to a higher growth path and is this possible?*

The chapters in this report analyze the Indonesian economy with a view to providing answers to the above questions. To do so, they elaborate on a view shared by many analysts: while Indonesia did relatively well during the 1980s and early 1990s, vis-à-vis many other developing nations, its record did not match those of other East Asian nations. The fact is that Indonesia is still today a lower- middle-income economy, with agriculture employing about one-third of all workers. Apart from the fact that the AFC hit Indonesia with a vengeance, one important reason why it has not been more successful is that it never achieved the industrialization levels of its regional neighbors. For purposes of this report, the term "industrialization" refers to three fundamental dimensions and ingredients of a development strategy: (i) a (more) *diversified* manufacturing sector—measured by the number of products exported with revealed comparative advantage; (ii) a (more) *sophisticated* manufacturing sector—measured by how many other countries export the same products Indonesia exports, i.e., how unique its products are; and (iii) a significant manufacturing *employment share*—at least 20% of total employment.

Indonesia's policy makers acknowledge today that it will be very difficult to become an upper-middle-income economy and eventually a high-income economy without achieving substantially higher levels of industrialization. Yet they find it very difficult to diversify and upgrade the manufacturing sector to make it the *engine of growth*.

Historically, it is not possible to understand the very rapid growth achieved by Japan; Hong Kong, China; the ROK; Singapore; and Taipei,China during the 1960s to 1990s without a reference to their industrialization, along the dimensions mentioned above, and the role that manufacturing played as the engine of growth. Industrialization is also fundamental to understand the western nations' development during the 19th and 20th centuries. In fact, there isn't any relevant case of a nation that eventually became a high-income economy that did so without previously attaining a significant degree of industrialization, in particular a manufacturing employment share in total employment above 20%.[9] Indonesia's share is slightly above 14% (14.7% as of August 2018).

[8] Chen, Kam, and Mehta (2018).
[9] Felipe, Mehta, and Rhee (2018).

Indonesia managed to diversify (out of natural resources, especially oil) and upgrade its manufacturing sector during the 1980s and early 1990s. Yet it did not match the records of Malaysia and Thailand, much less those of the ROK; Singapore; or Taipei,China. Indonesia's progress stalled after the AFC of 1997–1998. Despite the gains in diversification and sophistication of the 1980s and 1990s, the reality is that Indonesia still depends significantly on its natural resources. With agriculture still employing about one-third of the labor force, and the nontradable service sectors (e.g., hotels and restaurants and retail trade, many of which are low-productivity activities) the largest employers (accounting for around 45% of total employment), pushing the industrialization drive to achieve a higher growth rate has become an imperative. The country's potential growth rate is about 4 percentage points lower than just before the AFC, 9.5% in 1995–1996 against 5.34% in 2017 (Chapter 2). Moreover, manufacturing appears to have lost its capacity as an engine of growth, and the country's lower potential growth rate is related to this issue.

The problem Indonesia faces to further industrialize is that today's world is very different from the one that allowed the East Asian economies to thrive in the 1970s and 1980s. Indeed, the conditions that allowed the East Asian economies to industrialize and grow fast are gone and cannot be reproduced in today's world. For one, growth in the developed world (the markets for many of the manufactures of developing countries) is much lower. Second, technologies in the manufacturing sector have become much more labor saving. More generally, middle-income countries like Indonesia are likely to be affected by automation trends in high-income countries, and they are themselves trying to catch up with rapid automation. Third, the PRC has been the largest beneficiary by a wide margin of the globalization process during the last decades. As a result, its share of worldwide manufacturing employment increased significantly, much more than any other developing nation.[10] Fourth, while the General Agreement on Tariffs and Trade system was permissive with the use of industrial policies, the World Trade Organization is less so. Finally, 90% of the manufacturing sector's companies in Indonesia employ four workers or fewer. While these companies employ over 40% of all workers in the sector, their share of value added is very small. Besides, these firms do not innovate and have little capacity to upgrade.

Given the country's still relatively low per capita income, and the government's legitimate aspirations to provide all Indonesians with a comfortable living standard, achieving a significantly higher growth rate is an imperative, and industrialization is key to it. There are two obvious questions. *Can manufacturing deliver higher growth today? Should the government play any role?*

It is worth noting that Indonesia's manufacturing sector was on the right track and slowly recovering from the AFC during the early 2000s. The global financial crisis of 2008–2009 was a setback on the sector, but it did not derail the recovery. Foreign direct investment inflows into the sector have increased, showing Indonesia's attractiveness as a low-cost production location and as a rapidly growing domestic market. If Indonesia's manufacturing sector is indeed facing new opportunities, it is important to understand what the opportunities are and what both private and public sectors must do to seize them. Despite being cautious about how fast Indonesia can transform its manufacturing sector, and hence how fast its economy can grow during 2020–2024, this report argues that the new opportunities are real, provided the obstacles to further industrialization are understood and a proper road map to revitalize the sector is designed and implemented.[11]

[10] Felipe and Mehta (2016).

[11] The recent growth projections for the next decade given by the Harvard Center for International Development (http://atlas.cid.harvard.edu/rankings/growth-projections/), based on countries' diversification into more complex sectors, classifies Indonesia as an excellent performer, with 6.13% annual growth. The reason, the authors argue, is that Indonesia has successfully added productive capabilities to enter new sectors that will drive growth over the coming decade.

As noted above, Indonesia's policy makers are well aware of the country's need to further industrialize. Partly for this reason, the country embarked on a series of reform programs after President Jokowi took office in 2014. To date, this has resulted in the promulgation of a total of 16 reform packages, many of which have significant implications for the manufacturing sector. The chapters in this report reflect *moderate optimism* about the Indonesian economy during the next 5-year period. Barring the possibility of a very negative international event that could derail the world economy and consequently Indonesia's, the country will continue growing rapidly, although not as fast as many would like (i.e., 7%–8%). Indonesia needs to pursue policies that lead to further economic transformation. To do this, Indonesia's policy makers need to continue implementing important policy reforms that allow and support the transformation of the economy in the directions discussed in this report.

2 Indonesia's Potential and Balance-of-Payments-Constrained Growth Rates: The Role of Manufacturing

2.1 Introduction

Average gross domestic product (GDP) growth in Indonesia slowed down after the Asian financial crisis (AFC). Average annual GDP growth was 5.3% in 2000–2017, down from 7.2% in 1990–1997 and 5.8% in the 1980s. This worsening growth performance has also weakened the pace of Indonesia's progress toward better living standards, as annual per capita GDP growth decreased to about 4% in 2000–2017, down from 5.5% in 1990–1997. Against this backdrop, the question of whether Indonesia can improve its long-run growth performance and again grow at an average of 6% or more (in the range of 7%–8%) becomes critical. For instance, since annual population growth is projected at about 1% in 2018–2024, average annual GDP growth at 6% rather than 5% would imply a per capita GDP level about 10 percentage points higher in 2024.

The answer to the question above depends on the economy's potential for growth rate and its macroeconomic constraints, i.e., on the conditions that determine whether a country can grow persistently faster without creating domestic or external macroeconomic imbalances, such as inflationary pressures and/or a worsening current account balance. Pursuing these ideas, this chapter carries out a growth diagnostics exercise for Indonesia's economy, and assesses its long-run growth performance and prospects by (i) estimating its potential growth rate, defined as the maximum GDP growth rate sustainable without creating inflationary pressures; (ii) estimating its balance-of-payments-constrained (BOPC) growth rate, i.e., the growth rate consistent with a balanced current account; and (iii) investigating the determinants of both growth rates and the role these play in shaping Indonesia's growth process. The analysis of the determinants of these two growth rates will be the basis for the design of scenarios and the discussion of Indonesia's growth during 2020–2024 in Chapter 13.

The rest of this chapter is structured as follows. Section 2.2 estimates Indonesia's potential GDP growth rate and describes its dynamics with respect to the country's actual growth performance. Section 2.3 decomposes potential growth rate into the contributions of the long-run labor force growth (proxied by working-age population [WAP] growth) and labor productivity growth. The latter turns out to play an increasingly important role in determining the path of the potential growth rate in Indonesia. Given this, the nature of labor productivity growth in Indonesia is further investigated in the chapter. Specifically, relying on a shift and share decomposition methodology, section 2.4 considers the relative impact of structural change and within-sector productivity growth as drivers of aggregate labor productivity growth in the economy. Meanwhile, section 2.5 proposes an empirical investigation of the determinants of labor productivity growth in Indonesia. Section 2.6 is devoted to estimating Indonesia's BOPC growth rate, while section 2.7 carries out an empirical analysis of its determinants. Finally, section 2.8 summarizes the main findings in the chapter and concludes.

2.2 Indonesia's Potential Gross Domestic Product Growth Rate

In the long run, economies tend to grow at a rate that is consistent with the full employment of their productive resources. Deviations from the potential growth rate can occur in the short run, but the divergence from full-employment equilibrium growth will be unstable, in the sense that it will trigger an adjustment process driving the economy back toward equilibrium. The potential growth rate, therefore, is the growth rate consistent with macroeconomic stability.

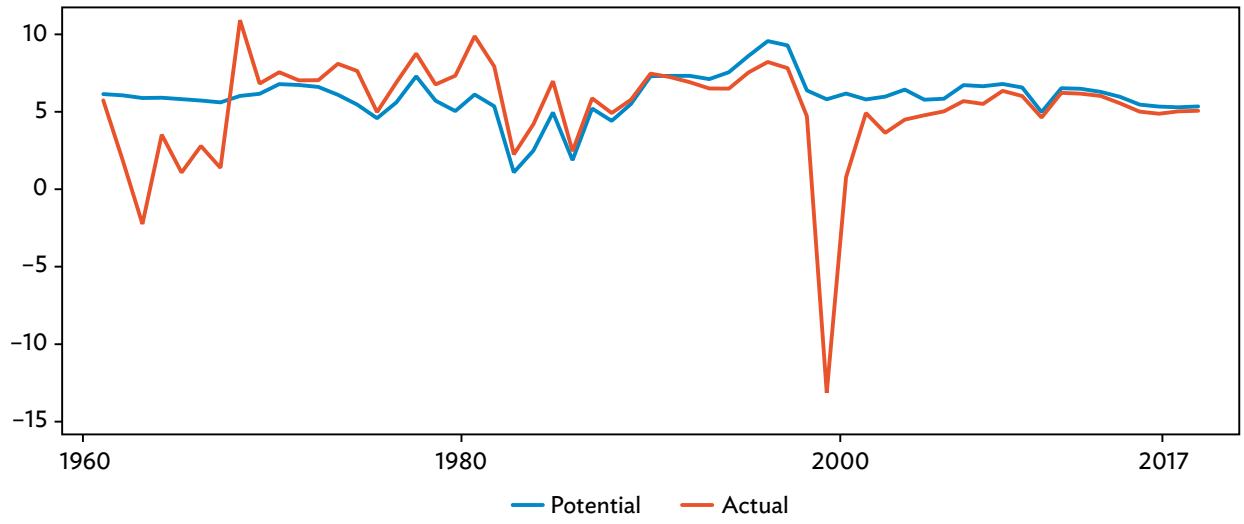
Based on this idea, a typical indicator that can pin down the value of potential growth rate is inflationary pressure. Specifically, in the relationship between actual growth rate, the potential growth rate, and inflation rate, three cases can be distinguished:

(i) If inflation is increasing, the economy is growing faster than its potential.
(ii) If inflation is decreasing, the economy is growing slower than its potential.
(iii) If inflation is stable, the economy is growing at its potential.

The report uses this insight to estimate Indonesia's potential growth rate, using annual data over the period 1961–2017.[12] The result is shown in Figure 2.1.

After remaining relatively stable throughout the 1960s and until the mid-1970s at an average of about 6% per year, Indonesia's potential growth rate started to decline in the early 1980s following the oil price shocks and the associated abrupt decline in actual output growth in 1982 and 1985. From the mid-1980s potential growth increased roughly in step with the actual growth rate, peaking at about 9.5% in 1995–1996. The onset of the AFC cut nearly 3 percentage points off Indonesia's potential growth rate, bringing it down to 6.45% in 1997. In the post-AFC period, Indonesia's potential growth rate never returned to the high values that characterized the 1990s, but instead remained relatively stable, at about 6% in 1998–2017. Since 2010, potential growth has been on a downward trend, from 6.51% that year to 5.34% in 2017.[13] This indicates

Figure 2.1 Actual and Potential Growth Rates, 1960–2017 *(%)*



Source: Authors' calculations based on data from the World Bank, World Development Indicators. http://databank.worldbank.org/data/home.aspx (accessed June 2018).

[12] The empirical methodology is based on a state-space model with time-varying parameters, estimated via the Kalman filter. The technical details are shown in Appendix 2.1.

[13] 2010: 6.51%; 2011: 6.48%; 2012: 6.29%; 2013: 5.97%; 2014: 5.46%; 2015: 5.34%; 2016: 5.29%; 2017: 5.34%.

that Indonesia's current growth performance is consistent with its productive potential, and, as things stand, should not be expected to change significantly in the near future. Such an outlook raises a number of important issues, particularly in terms of the role that economic policy can play to boost potential growth.

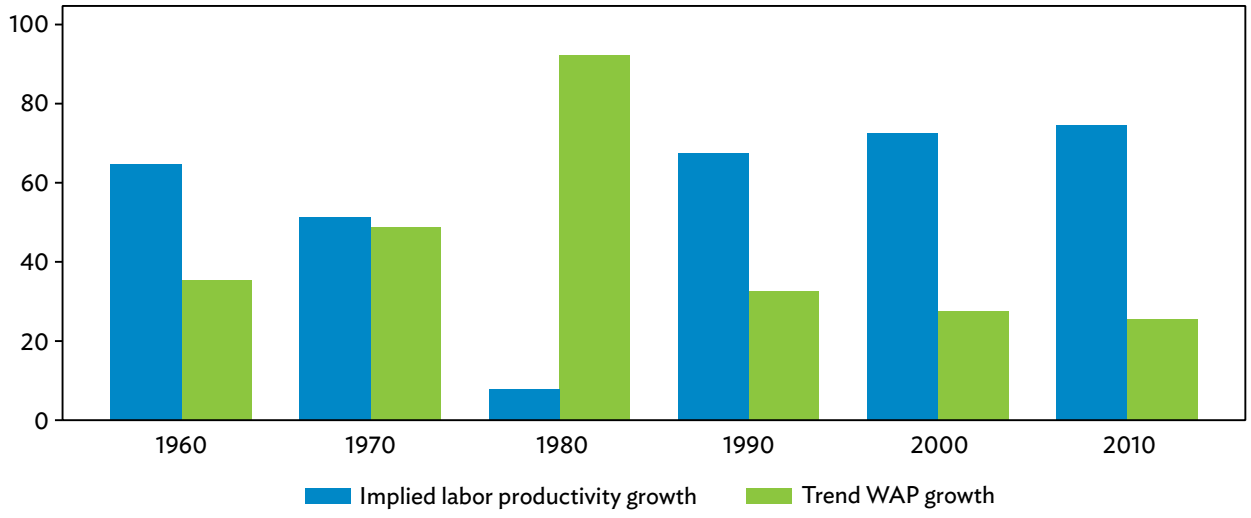
2.3 The Components of the Potential Growth Rate

Ultimately, the productive capacity of an economy depends on the number of employable workers and their productivity. This suggests an alternative way to define the potential growth rate: as the growth rate equal to the sum of the growth rates of the labor force and labor productivity. This, in turn, implies that the dynamics of potential growth over time will result from the interaction of changes in the growth rates of the labor force and labor productivity. The contributions of these two factors to Indonesia's potential growth rate over time are shown in Figure 2.2, where trend WAP growth is used as a proxy for long-term labor force growth, and implied labor productivity growth is obtained as the difference between the potential growth rate and trend WAP growth.[14] Therefore, implied labor productivity growth can be considered a measure of long-run labor productivity growth.[15]

While growth in the labor force (WAP) accounted for slightly more than one-third of potential growth in the 1960s, WAP growth became potential growth's main driver in the late 1970s, and especially in the 1980s. Labor productivity growth, on the other hand, declined significantly in the 1980s, mirroring the potential and actual growth slowdown during this period. From the 1990s onward, this trend reversed and labor productivity growth gradually became the key factor, so much so that it currently explains about three-quarters of potential growth in Indonesia.

This state of affairs is likely to continue in the future, since a new boost to Indonesia's potential growth rate cannot be expected to come via the labor force channel. On the contrary, data on WAP projections indicate that the demographic dividend enjoyed by Indonesia since the early 1970s, with WAP growing

Figure 2.2 Contributions to Potential Growth of Demographics and Productivity *(%)*

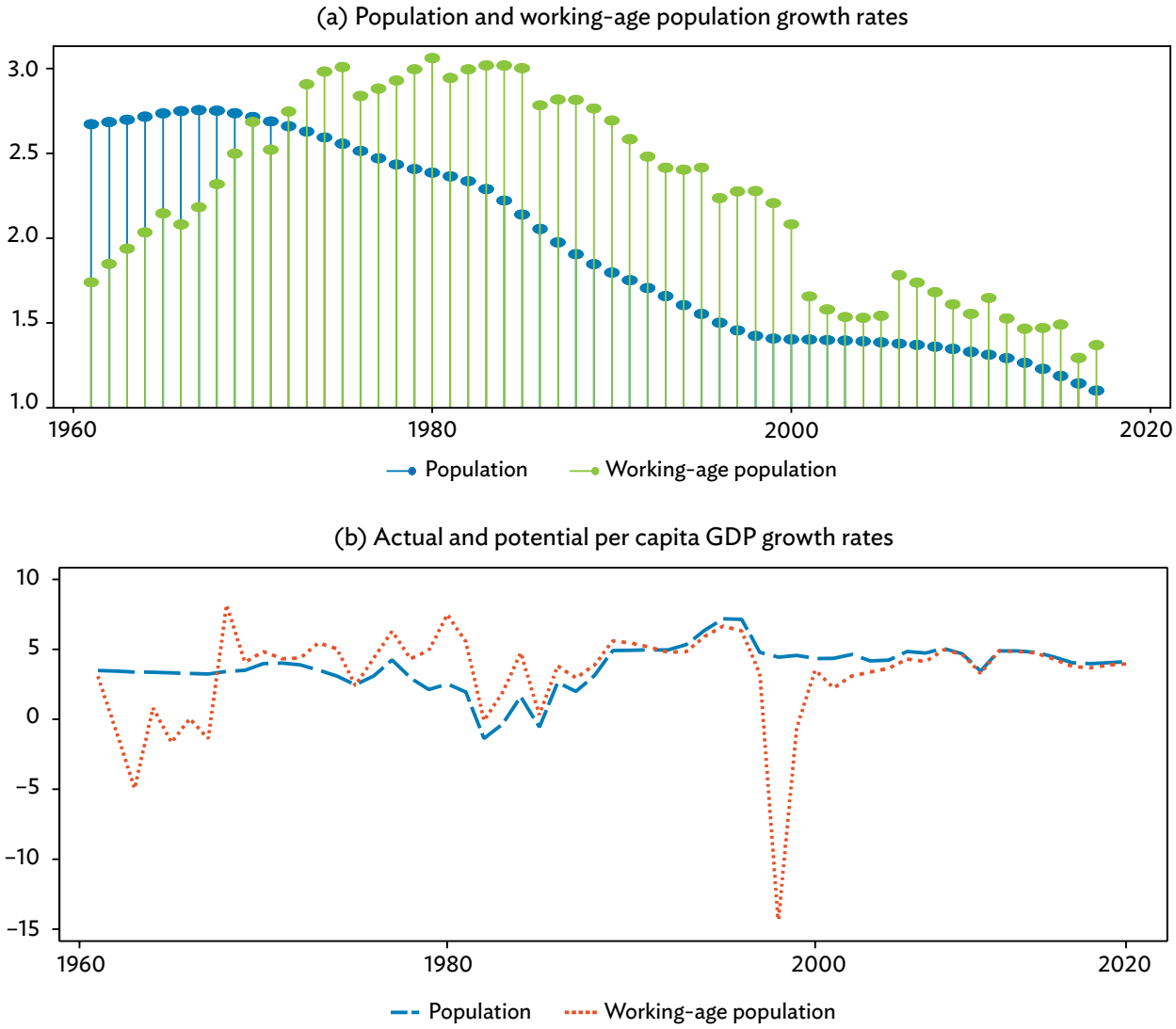


WAP = working-age population.
Source: Authors' calculations based on data from the World Bank, Population Estimates and Projections. https://datacatalog.worldbank.org/dataset/population-estimates-and-projections (accessed June 2018).

[14] This means that implied labor productivity growth will, in general, differ from actual labor productivity growth.
[15] It should be obvious that actual and implied labor productivity growth rates are different.

substantially faster than the overall population, will continue to gradually decline over the medium term (Figure 2.3 [a]). According to World Bank projections, WAP growth will essentially be equal to overall population growth in 2024 (both about 0.9%) and it will average about 1% in 2020–2024, down from an average of about 1.59% during 2000–2017.[16] Taken together, the estimates of Indonesia's potential growth rate and the growth rate of population imply an average growth rate of per capita potential GDP growth of about 4.7% in during 2000–2017. This growth rate can be considered an indicator of how fast standards of living can potentially grow if the country's productive capacity is fully exploited. It is of concern, therefore, that this growth rate declined significantly from the high values recorded in the early 1990s—from 1990 to 1996, before the AFC, the country enjoyed an annual per capita potential GDP growth of about 6.45% on average (Figure 2.3 [b]).

Figure 2.3 Indonesia's Demographics and Potential Per Capita Gross Domestic Product Growth Rate



GDP = gross domestic product.
Source: Authors' calculations based on data from the World Bank, World Development Indicators. http://databank.worldbank.org/data/home.aspx and the World Bank, Population Estimates and Projections. https://datacatalog.worldbank.org/dataset/population-estimates-and-projections (accessed June 2018).

[16] World Bank. Population Estimates and Projections. https://datacatalog.worldbank.org/dataset/population-estimates-and-projections.

This analysis suggests that, going forward, the main questions for Indonesia to achieve a faster long-term growth and improve living standards relate to labor productivity growth and its determinants, much more than to the demographic component (labor force growth). To address these questions, consider that:

(i) Even if productivity growth were zero in all sectors, aggregate productivity in the economy would still grow if workers moved from the low-productivity sectors to the high-productivity sectors of the economy; and productivity would fall if the opposite occurs. That is, aggregate labor productivity can increase (fall) because of the economy's structural change process.

(ii) Even if the share of workers employed in all sectors remained the same, aggregate labor productivity could increase (fall) if average labor productivity growth within the economy's sectors were positive (negative).

The report investigates the role played by these two factors in Indonesia over time by relying on a shift and share (SS) analysis.

2.4 A Shift and Share Analysis of the Change in Labor Productivity

The shift and share (SS) methodology (Box 2.1) decomposes the growth rate of actual labor productivity into the contributions of within-sector productivity growth and the impact of structural change. The latter, in turn, is given by the sum of a static reallocation effect (which indicates whether labor moves to sectors with above-average productivity *levels*) and a dynamic reallocation effect (which indicates whether labor moves to sectors with above-average productivity *growth*).

This approach is applied to annual changes of labor productivity in Indonesia and, subsequently, the results are used to calculate the contributions (in percentage points) of the three SS components to the change in labor productivity between two periods.[17] The analysis covers the period 1971–2017 and relies on data from the Groningen Growth and Development Centre (GGDC) 10-Sector Database for 1971–2012, and data from Badan Pusat Statistik for 2013–2017.[18] The resulting series are plotted in Figure 2.4.[19]

The SS analysis shows that:

(i) The static contribution of structural change to aggregate productivity growth is positive throughout the period—this reflects the reallocation of workers from low-productivity agriculture to industrial and service sectors. However, the contribution of the structural change component declined very rapidly in the 1970s and, following an inverted-U dynamic in the 1990s, started to increase again only after the AFC, albeit at a gradual pace.

(ii) The dynamic contribution of structural change is negative for most of the period, with the exclusion of the late 1970s and most of the 1980s, when the contribution was very close to zero. Together with the evidence relating to the static contribution of structural change, this suggests that labor moved toward sectors with higher productivity levels but lower productivity growth. This is in line with labor going mainly from agriculture to (low-productivity) services, rather than from agriculture to manufacturing/industry (Figure 1.5).

(iii) The within-sector effect was close to zero or negative until the late 1980s, before increasing significantly in the early 1990s and declining drastically in the AFC years, and then recovering to an annual average of about 2.75% in the 2000s.

[17] The series are filtered via the Hodrick–Prescott filter to get rid of cyclical variations and capture long-term trends.

[18] GGDC 10-Sector Database is from Timmer, de Vries, and de Vries (2015).

[19] The two data sources are based on a different sectoral classification, including 10 sectors for the GGDC data and 17 sectors for Badan Pusat Statistik. To make them consistent with each other, the number of sectors was reduced to nine and the 2013 values were interpolated, so as to have a gradual shift from one series to the other. All series are then filtered with the Hodrick–Prescott filter to capture trends and smooth out large deviations.

Box 2.1 The Shift and Share Methodology

The shift and share methodology used is based on the following decomposition:[a]

$$\Delta LP = \underbrace{\sum_i \left(LP_i^T - LP_i^0\right) S_i^0}_{I} + \underbrace{\sum_i \left(S_i^T - S_i^0\right) LP_i^0}_{II} + \underbrace{\sum_i \left(LP_i^T - LP_i^0\right)\left(S_i^T - S_i^0\right)}_{III} \quad (1)$$

where ΔLP is the change in aggregate labor productivity, S_i is the share of sector i in overall employment, LP_i is the labor productivity level of sector i and superscripts 0 and T refer to initial and final periods. Thus, ΔLP is decomposed into a within-sector productivity change (component *I*), and the contributions of two structural change terms: the static term (component *II*) and a dynamic term (component *III*), resulting from the interaction between changes in labor productivity and changes in the shares. The interpretation of these three components is as follows:

(i) The within-sector effect is positive (negative) when the weighted change in labor productivity levels in sectors is positive (negative).

(ii) The static structural change component is positive (negative) when labor moves from less (more) to more (less) productive sectors. It measures the contribution of labor reallocation across sectors.

(iii) The dynamic structural change term is positive (negative) if workers are moving to sectors that are experiencing positive (negative) productivity growth. It represents the joint effect of changes in employment shares and sectoral productivity growth.

Thus, the overall impact of structural change on aggregate labor productivity is given by components *II* and *III*. The structural change term (*II*) measures a static reallocation effect, indicating whether labor moves to sectors with above-average productivity *levels*; and the dynamic term (*III*) measures a dynamic reallocation effect, indicating whether labor moves to sectors with above-average productivity *growth*.

[a] This methodology follows Timmer, de Vries, and de Vries (2015), who introduced the updated and extended Groningen Growth and Development Centre (GGDC) 10-Sector Database.

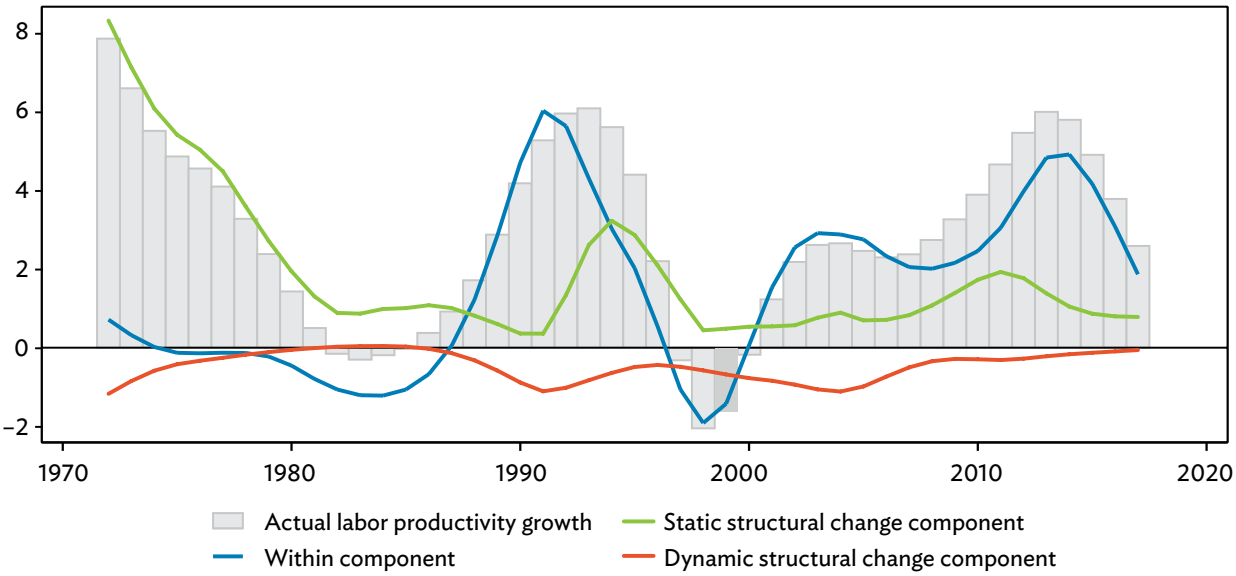
Source: Authors.

Overall, the dynamics of trend labor productivity growth appear to have been driven by the static structural change effects from the early 1970s to about the mid-1980s. From the second half of the 1980s and until the 2000s, the driving force behind aggregate productivity growth was productivity growth within the individual sectors. Finally, from the second part of the 2000s, the static structural change effect seems to have regained a primary role (even though the within contribution is still the dominant component).

2.5 What Determines Indonesia's Implied Labor Productivity Growth?

The decomposition of potential GDP growth in section 2.3 showed that the labor productivity growth component has become significantly more important than the demographic factor (labor force growth). Likewise, the shift and share decomposition of the change in labor productivity in section 2.4 showed that the within-sector contribution is larger than that of the structural change components, although the static structural change component (reallocation effect, indicating whether labor moves to sectors with above-average productivity levels) is nonnegligible. Indeed, productivity-boosting structural change can

Figure 2.4 Contributions to Actual Labor Productivity Growth: A Shift and Share Analysis



Note: All series have been filtered using the Hodrick–Prescott filter methodology.
Source: Authors' calculations based on the Groningen Growth and Development Centre (GGDC) 10-Sector Database and CEIC data (accessed June 2018).

be, as it has been for much of the last 60 years, a significant driver of labor productivity growth and, thus, of potential growth in Indonesia. Consequently, a relevant question for Indonesia is: what type of structural change benefits long-run productivity growth? Likewise, and to understand the dynamics of Indonesia's potential growth, it is important to investigate the determinants of within-sector productivity growth.

The report addresses these issues by relating implied labor productivity growth (the difference between estimated potential GDP growth and trend WAP growth) to changes in sectoral employment shares, to control for the static and dynamic structural change effects, and to several possible determinants of within-sector productivity growth. For the latter, several drivers are considered, such as various measures of human capital (e.g., primary, secondary, and tertiary gross enrollment ratios), innovative activity (e.g., number of patents as a share of population or working-age population), physical capital accumulation, and trade openness, among others.[20] Regression results are shown in Box 2.2.

The table in Box 2.2 focuses solely on the models that consider manufacturing-biased structural change, since this indicator alone appears to consistently boost potential growth in Indonesia. (Out of the three possible indicators used to proxy for the features of structural change, the change in the agricultural employment share enters with the expected negative sign but is only weakly significant, while the change in the services employment share is never statistically significant.) The change in manufacturing employment share has a significant impact on long-run labor productivity growth, which rises by about 0.4–0.5 percentage points when the share of workers in manufacturing increases by 1 percentage point.

On the determinants of within-sector labor productivity growth, the primary gross enrollment ratio turns out to be the only proxy for human capital that significantly affects implied labor productivity growth (several variables were tested). Furthermore, the analysis finds similarly supportive evidence for the role played by foreign direct investment (FDI) and the share of manufacturing exports in total merchandise exports. Note that these factors turn out to be significant determinants of long-run labor productivity growth in Indonesia

[20] Admittedly, some of these variables may also be expected to impact upon the structural change component.

Box 2.2 The Determinants of Indonesia's Implied Labor Productivity Growth

The large number of potential determinants of productivity growth comes at the cost of a shorter time series for some variables. Taking account of this and relying on a general-to-simple methodology to exclude statistically insignificant variables, the analysis focuses on a simple benchmark model based on the drivers of implied labor productivity growth that turn out to be significant. The outcome of this selection process is shown by the specifications reported in the table in this box.[a]

Determinants of Long-Run Implied Labor Productivity Growth

	(1)	(2)	(3)	(4)	(5)
Structural change					
Change in manufacturing employment share	0.511**	0.441**	0.405**	0.502**	0.423**
Within-sector labor productivity growth					
Primary gross enrollment ratio	0.278*	0.257**	0.188*	0.134**	0.210**
FDI as a share of GDP	0.766**	0.607**	0.515**	0.540**	0.689**
Manufacturing exports as a share of total merchandise exports	0.104**	0.069*	0.077**	0.061*	0.048^
ECI+	7.685*	14.009**	11.664**	–	–
High-technology exports as a share of manufacturing exports	–	–	–	0.094**	0.060**
Current account openness	–	2.846*	–	–	–
Exchange rate stability	–	–	1.562*	1.734*	–
Broad money as a share of GDP	–	–	–	–	0.087*
Constant	−35.016*	−36.188**	−26.260*	−15.085*	−25.377**
R^2	0.84	0.89	0.90	0.85	0.85
Observations	18	18	18	22	22

ECI = economic complexity index, FDI = foreign direct investment, GDP = gross domestic product.
Notes: **, *, and ^ indicate significance at the 1%, 5%, and 10% levels, respectively. Regression in column 1 is to be used in Chapter 13, scenarios for potential growth rate.
Source: Authors' estimates.

[a] A larger set of estimations is reported in Appendix 2.2.

Source: Authors.

across all models and specifications considered. The same can be said for "export sophistication," which is measured through the share of high-tech exports and the ECI+ index.[21] ECI+ measures the complexity of an economy's export basket corrected by how difficult it is to export each product. A one standard deviation in ECI+ is correlated with a rise in implied labor productivity growth of 0.37–0.68 percentage points, depending on the specification considered, while a 1 percentage point rise in the share of high-tech exports is associated with 0.06–0.09 percentage points faster labor productivity growth.

The model is also extended by introducing several policy variables. In particular, a de jure index of current account openness, as well as an index of exchange rate stability and a proxy for financial development given by broad money as a share of GDP are included in the model.[22] The results suggest some evidence of significantly positive effects. Though these results are less robust and need to be taken with some caution, the results indicate

[21] The ECI+ indicator has recently been proposed by Albeaik et al. (2017), as an improvement on the well-known ECI (economic complexity index) originally developed by Hidalgo and Hausmann (2009). Data were downloaded from The Observatory of Economic Complexity website at https://atlas.media.mit.edu/en/.

[22] The index of current account openness was developed by Chinn and Ito (2006), while the indices of exchange rate stability and monetary independence were introduced by Aizenman, Chinn, and Ito (2013).

that properly designed trade liberalization and financial deepening measures, as well as effective exchange rate management, can significantly improve Indonesia's economic growth performance in the long run.

2.6 Indonesia's Balance-of-Payments-Constrained Growth Rate

The analysis now moves to the other important growth rate that determines how fast an economy can grow, the BOPC growth rate.[23]

Before achieving its potential growth rate, an economy's actual growth performance can be curtailed by macroeconomic constraints. For emerging economies like Indonesia, the external constraint associated with the current account balance is particularly significant, given these countries' dependence on the availability of foreign exchange to finance their imports. Current account deficits can be sustainable and, indeed, necessary in the short run, especially when they allow faster capital accumulation. But countries cannot finance ever-growing current account deficits in the long run, as there is a limit beyond which the deficit becomes unsustainable (or is perceived as such by financial markets) and a balance-of-payments (BOP) crisis ensues. Thus, countries that find themselves in BOP problems may be forced to constrain growth while the economy still has surplus capacity and surplus labor, that is, while the actual growth rate is still below the potential growth rate.

To formally consider the implications of this constraint for Indonesia's long-run growth performance, the report starts from the contention that in the long run economies cannot grow faster than the rate consistent with current account balance: this rate is the so-called BOPC growth rate.[24] In the long run, actual growth that is faster than the BOPC growth rate results in a persistently worsening current account balance, which puts constant pressure on the exchange rate and the financial system. Evidence shows that flexible exchange rates can support short-run adjustment, but in the long run the adjustment process occurs through slower growth to rebalance the current account. Given this, the long-term constraint associated with the BOPC growth rate is not affected by price elasticities, but rather depends on the income elasticities for exports and imports. The income elasticities capture the non-price competitiveness of a country's goods relative to the alternatives available in international markets. As such, the values of these elasticities depend on the type, quality, and variety of the country's goods, among others, as well on features such as reliability and the speed of delivery of its distribution network.[25] Consequently, the BOPC growth rate will be higher the faster exports grow as a result of the growth in the world economy (i.e., the higher the income elasticity of exports) and the slower imports grow as a result of domestic growth (i.e., the lower the income elasticity of imports). Using these insights, an estimate of the BOPC growth rate can be constructed as the product of (trend) world economic growth and the ratio of income elasticities of exports to imports. The two elasticities can be obtained from the estimation of standard export and import functions. A simpler and equivalent formulation produces the BOPC growth rate as the ratio of a country's trend growth rate of exports with respect to its income elasticity of imports.[26]

This approach is applied to estimate Indonesia's BOPC growth rate using annual data for 1982–2014. The results of this analysis are reported in the six panels in Figure 2.5: (a) the income elasticity of exports, (b) the income elasticity of imports, (c) the ratio of income elasticities of exports to imports, (d) Indonesia's

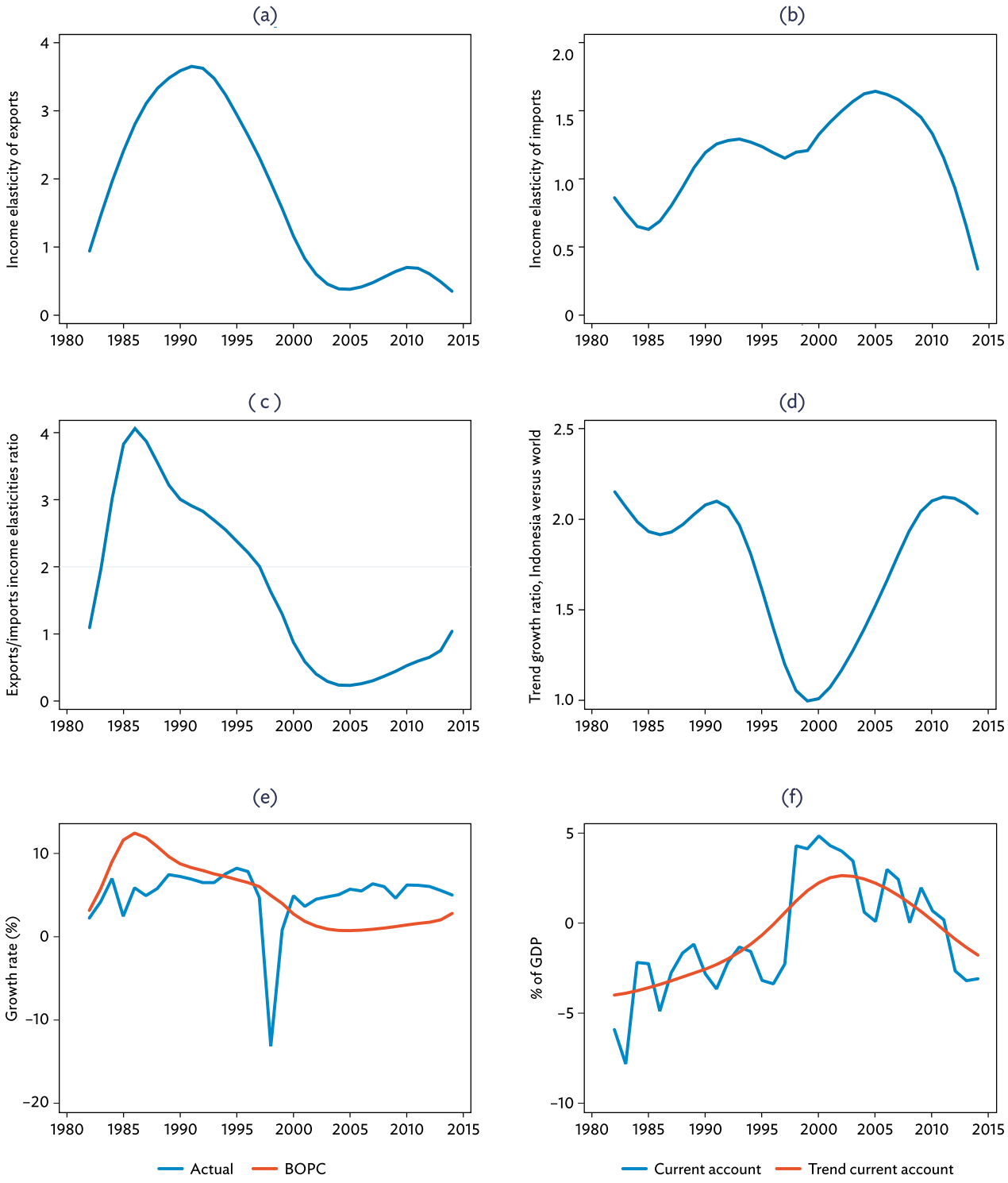
[23] See Juhro (2015, p. 7–8) for a clear statement that Indonesia's growth rate is balance-of-payments constrained. However, he does not pursue this idea empirically as is done here.

[24] The concept of the BOPC growth rate was developed by Thirlwall (1979).

[25] Appendix 2.3 elaborates on these ideas.

[26] As for potential growth, we rely on a state-space model with time-varying parameters, estimated via the Kalman filter, to estimate Indonesia's BOPC growth rate. The technical details of the estimation approach are reported in Appendix 2.4.

Figure 2.5 Indonesia's Income Elasticities of Exports and Imports, and Balance-of-Payments-Constrained Growth Rate



BOPC = balance-of-payments constrained, GDP = gross domestic product.
Source: Authors' calculations based on UNCTAD data. http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=16421 and data from the World Bank, Population Estimates and Projections. https://datacatalog.worldbank.org/dataset/population-estimates-and-projections (accessed June 2018).

trend growth rate as a ratio of the world's trend growth rate, (e) Indonesia's BOPC growth rate and actual growth rate, and (f) the actual and trend current account balance as a share of GDP.

While the two elasticities (panels [a] and [b]) display a fairly similar increasing trend in the 1980s, the income elasticity of exports declined rapidly from the mid-1990s, after peaking at about 3.65 in 1991, before stabilizing at an average of about 0.5 in the 2000s. By contrast, the income elasticity of imports peaked only in 2005 (at about 1.65), but the subsequent decline means that both elasticities are estimated at about 0.34–0.35 in 2014. These different dynamics are reflected in panel (c): the ratio of income elasticities of exports to imports increased from about 1 to 4 in the early 1980s, and then began to fall but still remained above 2 until the late 1990s. This is consistent with the view that the productive diversification and manufacturing development experienced by Indonesia in the 1980s to 1990s (until the AFC) led to gains in relative competitiveness. These gains, however, seem to have been eroded in the subsequent 2 decades, as other countries (chiefly, but not only, the People's Republic of China [PRC]) have outpaced Indonesia in the competitiveness race: the ratio of the two elasticities fell to about 0.26 in the mid-2000s, before a partial recovery to a value of about 1 in 2014. Interestingly, panel (d) shows that with the exception of the AFC recession and the subsequent recovery, Indonesia's growth rate has been, on average, about twice as high as the growth rate of the world economy. But while Indonesia enjoyed a high relative competitiveness (reflected in an income elasticity of exports much higher than the income elasticity of imports) in the 1980s to 1990s, this was not the case after the AFC, when the ratio of the two income elasticities was below or (at most) equal to 1. As a result, Indonesia's BOPC growth (panel [e]) rate was very high (on average, about 8.5% in 1981–1996) and higher than actual growth before the AFC, allowing for fast growth without incurring BOP problems. However, the BOPC growth rate declined significantly and is estimated to be lower than the actual growth rate in the post-AFC years (about 2.8 % in 2014). Panel (f) shows how this translates into the path followed by the current account balance as a share of GDP and its trend: the positive trend of the 1980s and 1990s (when, on average, the BOPC growth rate was higher than the actual growth rate) turns negative after the AFC (when the BOPC growth rate is lower than the actual growth rate).

Since 2012, the worsening current account balance has led to deficits of about 2%–3% of GDP. While far from worrying in the short run, this suggests that Indonesia's growth performance may run up against the BOP constraint in the medium to long term, and indicates that policies to boost the BOPC growth rate may be warranted.

This section on the BOPC growth rate ends with an analysis of the role of the oil sector. Given the importance of oil exports for the country's BOP, a comprehensive analysis of Indonesia's BOPC growth rate should take into account the relative contributions of the oil and non-oil sectors of the economy. Box 2.3 provides such an assessment by relying on the simpler formulation for the BOPC growth rate (Appendix 2.5), where the latter is expressed as the ratio of (trend) exports growth to the income elasticity of imports.

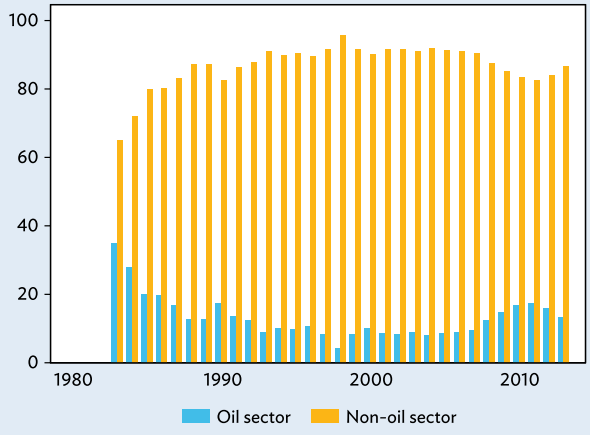
The conclusions in Box 2.3 rest on the key assumption that the dynamics of oil and non-oil sector exports are *independent* of each other. This assumption simplifies the analysis, as it implies that the overall BOPC growth rate results from the simple sum of the contribution of the oil and non-oil sectors, as displayed in the second figure in Box 2.3. In reality, the performance of the oil and non-oil sectors are not independent of each other, so that what happens in one sector impacts the other. Thus, for instance, a decline in oil sector production and exports, which causes the oil sector's contribution to the BOPC growth rate to fall, would free up productive resources for the remaining sectors in the economy and lead to a higher contribution from the non-oil sector to the BOPC growth rate. Conversely, an increased

Box 2.3 The Role of the Oil Sector in the Estimation of Indonesia's Balance-of-Payments-Constrained Growth Rate

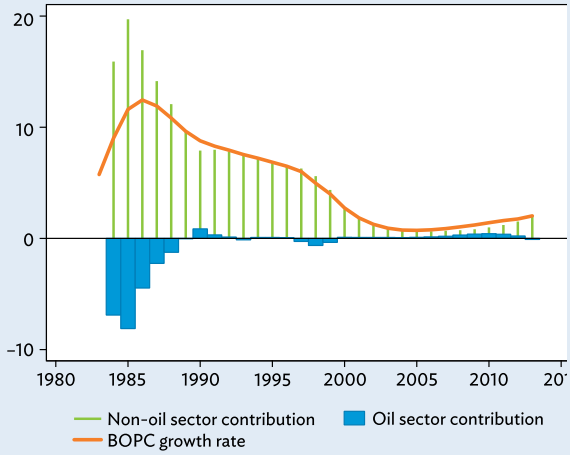
The decomposition of Indonesia's balance-of-payments constrained (BOPC) growth rate is carried out by expressing the aggregate export growth rate as a weighted average of oil and non-oil exports, where the weights are given by the shares of real oil and non-oil exports in total exports.[a] The technical details of the decomposition are reported in Appendix 2.5. Due to data limitations, the time period considered is 1984–2014.

As the first figure below shows, except during the early 1980s, the share of real oil exports during the period analyzed has been less than 20%. This suggests that the path of Indonesia's BOPC growth may, essentially, have been determined by the non-oil sector contribution. This is confirmed by the decomposition in the second figure . In fact, considering the whole period, 1984–2014, the average annual contribution from the oil sector has even been negative (–0.94 percentage points), an outcome almost entirely due to the negative growth rate in real oil exports in the 1980s, which resulted in a negative oil sector contribution to the BOPC growth rate of about 3.8 percentage points per year in the 1980s. Meanwhile, the non-oil sector's contribution averaged a very high 14.7 percentage points over the period 1984–1989, thus pushing the overall BOPC growth rate to an average of 9.3%. Similarly, the gradual decline in Indonesia's BOPC growth rate follows the steady deterioration in the country's non-oil exports growth performance during the 1990s and 2000s. Specifically, the non-oil sector contribution was, on average, 6.8 percentage points in the 1990s, less than half its value in the 1980s and in line with the average BOPC growth rate of the decade (6.8%), given that the oil sector contribution was, on average, zero. During 2000–2014, the contribution of the oil sector was only slightly positive on average, with an annual addition to the BOPC growth rate of about 0.1 percentage points. Thus, once again, the average BOPC growth rate in the 2000s (1.4%) reflects almost entirely the contribution of the non-oil sector (1.3 percentage points).

Shares of Oil and Non-Oil Exports in Total Exports, Indonesia



Decomposition of the BOPC Growth Rate, Oil versus Non-Oil Sector, Indonesia



Source: Authors' calculations based on CEIC data (accessed June 2018).

To sum up, the evidence presented in this box is consistent with the view that the export performance of Indonesia's oil sector has not significantly affected the country's BOPC growth rate, other than in the early 1980s, when it affected the BOPC growth rate negatively. The driving force behind the BOPC growth rate dynamics is the non-oil sector, and given the primary role this sector plays, its progressive loss of relative competitiveness since the 1990s is also reflected in the negative trend displayed by Indonesia's BOPC growth rate.

[a] Here oil exports include oil, gas, and related materials.

Source: Authors.

demand for goods in one part of the economy, such as the oil sector, also generates demand in other parts of the economy through inter-industry linkages. In this latter case, researchers often use input–output analysis to examine these inter-industry linkages and construct input–output multipliers, which indicate how an increase in output in one sector impacts output in other sectors. Results for extractive sectors, such as mining and oil production, often indicate that these sectors are enclave, having few impacts on output in other sectors.[27]

Table 2.1 reports the values of the input–output multipliers for the year 2014 for a number of Indonesian primary and manufacturing sectors. The table reports three sets of figures: (i) the total multiplier, direct, and indirect, which captures the impact of a change in output in a particular sector on the sector itself (the direct effect) and on other sectors due to an increase in intermediate demand; (ii) the direct effect only; and (iii) the indirect effect only.

Table 2.1 Input–Output Multipliers for Indonesia in 2014

Sector	Total Multiplier	Direct	Indirect
Crop and animal production, hunting and related service activities	1.248	1.056	0.192
Forestry and logging	1.200	1.001	0.199
Fishing and aquaculture	1.198	1.017	0.182
Mining and quarrying	1.322	1.113	0.209
Manufacture of food products, beverages and tobacco products	1.887	1.179	0.708
Manufacture of textiles, wearing apparel and leather products	1.534	1.057	0.477
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	1.756	1.097	0.659
Manufacture of paper and paper products	1.910	1.304	0.606
Printing and reproduction of recorded media	1.958	1.002	0.956
Manufacture of coke and refined petroleum products	1.610	1.018	0.591
Manufacture of chemicals and chemical products	1.682	1.126	0.556
Manufacture of basic pharmaceutical products and pharmaceutical preparations	1.858	1.187	0.671
Manufacture of rubber and plastic products	1.796	1.053	0.743
Manufacture of other nonmetallic mineral products	1.792	1.028	0.763
Manufacture of basic metals	1.768	1.037	0.731
Manufacture of fabricated metal products, except machinery and equipment	1.709	1.015	0.693
Manufacture of computer, electronic and optical products	1.703	1.109	0.594
Manufacture of electrical equipment	1.682	1.081	0.601
Manufacture of machinery and equipment not elsewhere classified	1.552	1.187	0.365
Manufacture of motor vehicles, trailers and semitrailers	1.610	1.187	0.423
Manufacture of other transport equipment	1.670	1.032	0.638
Manufacture of furniture; other manufacturing	1.769	1.007	0.762

Source: Authors.

[27] See Calzada Olvera and Foster-McGregor (2018).

The results indicate that primary sectors, including the mining and quarrying sector, tend to have lower total multipliers than other sectors. Moreover, increasing output in these sectors tends to create few indirect linkages in comparison to the manufacturing sectors, making them appear somewhat enclave and providing some support for the approach of splitting up the oil sector from the other sectors of the economy.[28] This means that, in practice, the BOPC decomposition appears valid (in the case of Indonesia, as analyzed here) because the assumption of no feedbacks between the oil and non-oil sectors is a good approximation of reality.

2.7 The Determinants of Indonesia's Balance-of-Payments-Constrained Growth Rate

The analysis of Indonesia's BOPC growth rate naturally raises the policy-relevant question of which factors may be behind its dynamics. To address this issue, the report carries out an evaluation of the drivers of Indonesia's competitiveness in international markets, focusing on the two key elements in the BOPC growth rate framework, the income elasticities of exports and imports.

The empirical analysis relies on the same approach adopted for the investigation of the determinants of potential growth in section 2.5. Specifically, the two elasticities are modeled as a function of changes in sectoral employment shares (to control for structural change effects), as well as several possible additional determinants, e.g., various measures of innovative activity, physical capital accumulation, trade openness, and economic complexity, among others. In the case of income elasticity of demand for imports, the analysis also takes aggregate demand composition effects into account, since the aggregate demand elements are typically characterized by different import intensities. Regression results are shown in Box 2.4.

The first three columns in the table in Box 2.4 report estimates relating to models for the income elasticity of exports. Results indicate that manufacturing-biased structural change boosts exports elasticity significantly, by 0.13–0.35 points for each percentage point increase in the manufacturing employment share (depending on the model specification). Similarly, current account openness, as well as improvements in economic complexity (proxied by ECI+) and exports sophistication (measured by the share of manufacturing exports) are positively associated with the income elasticity of exports, which supports the view that trade expansion can foster Indonesia's BOPC growth rate when complemented by product diversification and enhancement. Finally, the effects of physical capital accumulation and FDI are significant, both positively correlated with the income elasticity of exports, and thus appear to foster Indonesia's relative competitiveness in internal markets.

Turning to the final set of estimates in the table in Box 2.4, the analysis shows that a positive change in ECI+ reduces the income elasticity of imports. All else constant, a one standard deviation in ECI+ is correlated with a very significant fall in import elasticity of about 1.3 percentage points. Thus, the results are consistent with the view that an increase in economic complexity in Indonesia is associated with a boost in exports, a fall in imports, and hence an increasing BOPC growth rate (for any given growth rate of the world economy). Meanwhile, capital accumulation and exports as a share of GDP are positively and significantly correlated

[28] Two caveats to bear in mind: (i) the analysis concentrates only on one dimension, the impact of an increase in demand in the mining sector (say) on demand in other sectors as suppliers, and thus ignores the converse, that is, the impact of an increase in supply in the oil sector on resources available for production in other sectors; and (ii) the analysis ignores induced effects—effects attributable to the ensuing change in compensation of employees and other incomes, which may cause further spending and hence, further changes in final demand. For example, through direct and indirect effects, the level of household income throughout the economy will increase as a result of increased employment, which in turn will generate further demand.

Box 2.4 The Determinants of Indonesia's Income Elasticities of Exports and Imports

The selection of a robust set of determinants and appropriate specifications is carried out via a general-to-simple methodology. The outcome of this selection process is reported in the table in this box. The analysis focuses on the determinants of the income elasticity of exports, given its particular relevance as a proxy for international competitiveness.

Determinants of the Income Elasticities of Exports and Imports, Indonesia

	Exports Income Elasticity			Imports Income Elasticity
	(1)	(2)	(3)	(4)
Change in manufacturing employment share	0.349*	0.128^	0.251*	–
Gross physical capital formation as a share of GDP	–	0.081**	–	–
Change in gross physical capital formation as a share of GDP	–	–	–	0.040*
FDI as a share of GDP	–	–	0.158*	–
Change in manufacturing exports as a share of total merchandise exports	0.118**	0.088**	0.141**	–
Change in ECI+	8.671^	6.285*	5.353	–2.059**
Current account openness	4.998**	5.330*	4.711**	–
Government consumption as a share of GDP				–0.085*
Exports as a share of GDP	–	–	–	0.021^
Constant	–2 .452**	–4.604**	–2.386**	1.434**
R^2	0.92	0.95	0.91	0.79
Observations	20	19	19	27

ECI = economic complexity index, FDI = foreign direct investment, GDP = gross domestic product.
Notes: **, *, and ^ indicate significance at the 1%, 5%, and 10% levels, respectively. Regression in column 3 is to be used in Chapter 13, scenarios for balance-of-payments-constrained growth rate.
Source: Authors' estimates.

Source: Authors.

with the income elasticity of imports, in line with evidence indicating that investment and exports are the two most import-intensive components of aggregate demand. Finally, higher government consumption reduces import elasticity, a result which is consistent with a significant "home bias" effect in public spending.

Overall, therefore, the empirical analysis carried out supports the view that manufacturing expansion can be beneficial in terms of relaxing the BOP constraint on long-term growth in Indonesia—both directly and via its positive effects on such factors as economic complexity, exports sophistication, capital accumulation, and so on. Since our previous analysis showed that these same factors are also positively associated with potential growth in Indonesia, there emerges a fairly consistent message in terms of implications for economic policy making. That is, an appropriate strategy to promote long-term growth in Indonesia should pay particular attention to the role played by the manufacturing sector.

2.8 Conclusions

Indonesia's growth performance deteriorated significantly after the AFC, with average annual GDP growth decreasing to about 5.3% since 2000, from about 7.2% in 1990–1997. This chapter has provided an empirical analysis of the determinants of this growth slowdown.

The analysis has assessed Indonesia's long-run growth performance by estimating its potential growth rate over the period 1961–2017. In particular, the analysis finds that potential growth declined after the AFC, from 6.45% in 1997 to about 5.8% in 1998–2017, reflecting a similar decline in actual growth rates. As things stand, the same trend can be expected in the medium term, and raises the question of which factors may be driving Indonesia's potential growth rate. The investigation carried out in the chapter sheds some light on this issue. In particular, the results show that: (i) though still positive, the demographic boost to potential growth has been declining over time, such that aggregate long-run growth performance in Indonesia has become increasingly dependent on labor productivity growth; (ii) within-sector productivity growth has been the driving force behind aggregate labor productivity dynamics since the second half of the 1980s; (iii) manufacturing-biased structural change boosts labor productivity growth; (iv) human capital accumulation, economic complexity, and exports sophistication are positively and robustly associated with faster potential growth, while there is weaker but still significant evidence that current account openness, exchange rate stability, and financial deepening are also associated with productivity growth.

Though Indonesia's current growth performance is in line with potential growth, it may not be sustainable in the long run if other constraints impose a limit to its trajectory. In particular, such a long-run constraint may arise from the country's current account balance, which has been worsening since 2012 and has led to deficits of about 2%–3% of GDP. This issue is examined in the chapter by estimating Indonesia's BOPC growth rate, which is the growth rate consistent with equilibrium in the current account balance. The estimates indicate that Indonesia's BOPC growth rate—an average of about 8.5% over 1981–1996—was higher than actual growth before the AFC, allowing for fast growth without incurring BOP problems. However, since 1997 the BOPC growth rate embarked on a downward trajectory and is estimated to be lower than the actual growth rate in the post-AFC years (about 2.8% in 2014). This outcome is consistent with the hypothesis that manufacturing development and productive diversification in the 1980s to 1990s were associated with significant improvements in relative competitiveness. These gains, however, seem to have been eroded in the following 2 decades, when Indonesia lagged behind the PRC and other countries in the competitiveness race. Furthermore, this reading of the evidence is reinforced by the empirical analysis of the determinants of Indonesia's BOPC growth rate which, once again, highlights primarily the key role of the manufacturing sector, as well as productive diversification and complexity, FDI, and current account openness.

Appendix 2.1

Potential Growth Rate Estimation: State-Space Model with Time-Varying Parameters and Kalman Filter Estimation

The approach used in Chapter 2 links Okun's law and Phillips curve relationships to estimate Indonesia's potential growth rate (y_{Pt}) relying on an aggregate supply model. Specifically, the potential growth rate is defined as that particular rate of growth consistent with macroeconomic stability, both in terms of unemployment and (particularly) inflation. Since in the long run the unemployment rate (U_t) will be constant when it is equal to the non-accelerating inflation rate of unemployment (U_t^N), the potential growth rate can be defined as that growth rate consistent with $U_t = U_t^N$ and, thus, $\Delta U_t = 0$. This can be formalized in the following Okun's law relation:

$$U_t = U_t^N - \beta_t (y_t - y_{Pt}) \tag{A2.1}$$

where the Okun coefficient (β_t) and the non-accelerating inflation rate of unemployment (U_t^N) are assumed to be time varying. The relationship between inflation and unemployment is given by the following Phillips curve:

$$\pi_t = \pi_t^e - \gamma_t (U_t - U_t^N) \tag{A2.2}$$

where π_t and π_t^e are, respectively, the actual and expected inflation rates, while γ_t is a time-varying parameter. Plugging (A2.1) into (A2.2) yields:

$$\pi_t = \pi_t^e + \phi_t (y_t - y_{Pt}) \tag{A2.3}$$

where $\phi_t = \beta_t \gamma_t$. The specification in (A2.3) formalizes an aggregate supply model with time-varying parameters.

To estimate the model in (A2.3), a measure of the expected inflation rate π_t^e is needed. Since there is very limited availability of time series data for expected inflation, π_t^e is modeled as a function of the actual inflation rate (π_t) assuming three possible specifications. The first is in (A2.4), where expected inflation in time t is a time-varying function of actual inflation in t:

$$\pi_t^e = \alpha_t \pi_t + \varepsilon_t \tag{A2.4}$$

where α_t is a time-varying parameter reflecting the public's degree of accuracy in forecasting inflation and ε_t is an independent normally distributed error, with zero mean and constant variance. The estimated model in this case is thus:

$$y_t = y_{Pt} + \frac{(1-\alpha_t)}{\phi_t} \pi_t + \varepsilon_t \tag{A2.5}$$

The second specification assumes an extreme form of adaptive expectations, i.e., expected inflation in t is equal to actual inflation in $t-1$ plus a random error term:

$$\pi_t^e = \pi_{t-1} + \varepsilon_t \tag{A2.6}$$

and the relative model is

$$y_t = y_{Pt} + \frac{1}{\phi_t}\Delta\pi_t + \varepsilon_t \tag{A2.7}$$

The third specification assumes that inflation expectations are partly forward-looking and partly backward-looking, so that the model is specified as follows:

$$\pi_t = \pi_t^e + \phi_t\left(y_t - y_{Pt}\right) \tag{A2.3}$$

$$\pi_t^e = \theta_t^1\pi_t + \theta_t^2\pi_{t-1} + \varepsilon_t \tag{A2.8}$$

$$y_t = y_{Pt} + \left(\frac{1-\theta_t^1}{\phi_t}\right)\pi_t - \left(\frac{\theta_t^2}{\phi_t}\right)\pi_{t-1} + \varepsilon_t \tag{A2.9}$$

All the models specified above can be formalized in state-space form with time-varying parameters and estimated relying on the Kalman filter recursive algorithm, which is commonly used to estimate time-varying coefficients. A state-space model consists of two sets of equations, called measurement and state. The Kalman filtering approach provides optimal estimates for state variables based on the information from these two sources. To obtain time series for the state variables the analysis applies the Kalman smoothing procedure, which uses all the information in the sample to provide smoothed state estimates.[29] This procedure differs from the Kalman filter in the construction of the state series, as the latter technique uses only the information available up to the beginning of the estimation period. Smoothed series tend to produce more gradual changes than filtered ones and provide more precise estimates of the actual time variation in the data.[30]

Specifically, in the case of the model in equation (A2.5), the measurement equation is

$$y_t = \mu_t + \vartheta_t\pi_t + \varepsilon_t \tag{A2.5}$$

with $\mu_t = y_{Pt}$ and $\vartheta_t = \frac{(1-\alpha_t)}{\phi_t}$. Following a standard practice in the literature, to capture possible level breaks or trend patterns, the transition equations are assumed to follow a unit root:[31]

$$\mu_t = \mu_{t-1} + \upsilon_t \tag{A2.10}$$

$$\vartheta_t = \vartheta_{t-1} + \upsilon_t \tag{A2.11}$$

The most appropriate specification between the models specified in equations (A2.5), (A2.7), and (A2.9) is chosen using standard model selection criteria. In Chapter 2, the most appropriate specification selected for the estimation of Indonesia's potential growth is the model in (A2.5).

[29] Suppose that one observes the sequence of data up to time period t. The process of using all this information to form expectations at any time period up to t is known as *smoothing*.

[30] See discussion in Sims (2001).

[31] For example, see Harvey (1989).

Appendix 2.2

Determinants of Long-Run Labor Productivity Growth: Additional Results

Table A2.1 Determinants of Long-Run Implied Labor Productivity Growth—Models with ECI+

Change in manufacturing employment share	0.547**	0.522**	0.525**	0.476**
Primary gross enrollment ratio	0.288**	0.283*	0.280*	0.216
FDI as a share of GDP	0.897**	0.734**	0.736**	0.763**
Manufacturing exports as a share of total merchandise exports	0.139**	0.110**	0.104**	0.076^
ECI+	8.057*	8.879*	8.023*	6.167^
Current account openness	–	–	–	–
Exchange rate stability	–	–	–	–
Monetary independence	1.894	–	–	–
Sum of exports and imports of goods and services as a share of GDP	–	−0.018	–	–
Gross physical capital formation growth rate	–	–	0.010	–
Broad money as a share of GDP	–	–	–	0.047
Constant	−38.865**	−35.394*	−35.417*	−28.156
R^2	0.87	0.85	0.85	0.85
Observations	18	18	18	18

ECI = economic complexity index, FDI = foreign direct investment, GDP = gross domestic product.
Note: **, *, and ^ indicate significance at the 1%, 5%, and 10% levels, respectively.
Source: Authors' calculations.

Table A2.2 Determinants of Long-Run Implied Labor Productivity Growth—Models with High-Tech Exports Share

Change in manufacturing employment share	0.517**	0.551**	0.608**	0.552**	0.463**
Primary gross enrollment ratio	0.178**	0.190**	0.289**	0.193**	0.150*
FDI as a share of GDP	0.707**	0.733**	0.850**	0.668**	0.660**
Manufacturing exports as a share of total merchandise exports	0.095**	0.082*	0.114**	0.106**	0.084**
High-technology exports as a share of manufacturing exports	0.026	0.049^	0.058*	0.052^	0.024
Current account openness	–	0.756	–	–	–
Exchange rate stability	–	–	–	–	–
Monetary independence	–	–	1.034	–	–
Sum of exports and imports of goods and services as a share of GDP	–	–	–	−0.040*	–
Gross physical capital formation growth rate	–	–	–	–	0.052^
Broad money as a share of GDP	–	–	–	–	–
Constant	−20.211**	−21.758*	−34.190**	−20.428**	−16.945*
R^2	0.77	0.81	0.81	0.80	0.82
Observations	23	22	22	23	23

FDI = foreign direct investment, GDP = gross domestic product.
Note: **, *, and ^ indicate significance at the 1%, 5%, and 10% levels, respectively.
Source: Authors' calculations.

Appendix 2.3

Export-Led Growth and Industrialization: Relaxing the Balance-of-Payments Constraint

Asia's industrialization since the 1960s has gone hand in hand with its increasing openness, in what has been referred to as the region's export-led growth (ELG) model. As also argued above, a fast growth of exports and industrial output set up a virtuous circle of growth in Asia that relaxed the initial balance-of-payments (BOP) constraint that most developing countries encounter, i.e., that countries have to export to pay for necessary imports of capital goods, otherwise they will end up running current account deficits.

Work in this area has shown that the maximum growth rate a country can achieve without running into BOP problems is related to the growth rate of world income and to the income elasticities of demand for exports and imports.[32] These last two variables have proven to be fundamental to understanding why the successful Asian countries progressed so fast: their economic transformation translated into exporting products with an increasing income elasticity of demand.

Under this view, disparities between countries in the income elasticities of demand for their exports and imports largely reflect differences in nonprice competitiveness, broadly defined. The message for a country whose export growth rate is relatively slow, and has a rather high import elasticity, is that the goods it produces are relatively unattractive. What is meant by the nonprice "characteristics" of the goods produced? Many manufacturing industries engage quite often in nonprice rather than price competition.[33] Nonprice competitiveness encompasses all those factors other than price that affect consumers' choices such as quality, reliability, speed of delivery, and extent and efficacy of the distribution network. The importance of nonprice competitiveness is that as per capita income grows, the demand for more sophisticated goods also increasingly grows. For example, it is dubious that former Eastern Bloc automobiles such as Skodas and Ladas would have ever made inroads into the markets of advanced countries despite their exceptionally low prices. In the long run, in a world characterized by rapid product and process innovation, and where the rapid growth of demand is for increasingly sophisticated products, companies should not rely exclusively on price competition to maintain market share. This is exactly what Japanese companies such as Toyota and Sony, Korean companies such as Samsung, LG, and Hyundai, and Chinese companies such as Lenovo and Huawei have done.

If there are increasing returns to scale and induced productivity growth, export growth can set up a virtuous circle of growth that leads into center-periphery models of development which, on certain conditions, predict divergence between regions and countries in the world.[34] This helps understand why

[32] Thirlwall (1979) and McCombie and Thirlwall (1994).

[33] McCombie and Thirlwall (1994).

[34] To see this, consider what determines the growth of exports. Economists often argue that it depends on the difference between the growth of domestic prices and the growth of foreign prices (in a common currency), and also depends on the growth of foreign income. The effect of these two variables on the growth of export demand depends on the elasticity of each one: on the price elasticity of demand for exports (negative), a proxy for price competitiveness; and on the income elasticity of demand for exports (positive), a proxy for nonprice competitiveness, for example, characteristics and quality of the goods produced. This last parameter turns out to be key in the ELG explanation of Asia's growth. While the growth of foreign income, as well as the growth of foreign prices, may be taken as exogenous, the growth of domestic prices is not. Typically, firms use a markup mechanism, where prices are set as labor costs per unit of output (unit labor cost) plus a percentage markup. This means that the growth of domestic prices equals the growth rate of the wage rate minus the growth rate of labor productivity (i.e., the growth rate of unit labor costs) plus the growth rate of the markup. The latter is partly dependent on the growth of output itself through static and dynamic returns to scale. The growth rate that countries tend to move toward (the equilibrium growth rate) in this model is positively related to the autonomous component of productivity growth, the rate of growth of foreign prices, and the growth of world income; and negatively related to domestic wage growth and the increase in the markup.

countries that get into a virtuous circle of ELG do so well. In this model, the faster the growth of output the faster the growth of productivity, and the faster the productivity growth the slower the growth of unit labor costs, hence the faster the growth of exports and output. Once a country obtains a growth advantage, it will tend to sustain it. Suppose, for example, that an economy acquires an advantage in the production of goods with a high income elasticity of demand and achieves a growth rate above that of other economies. These goods could be made by technology-based activities such as advanced machinery, chemicals, or automobiles, or consumer products such as an expensive ball pen or perfume (all manufactures). This means that productivity growth will be higher and the competitive advantage of the economy in these goods will be reinforced, making it difficult for other countries to produce the same commodities, except through protection or exceptional industrial enterprise. In center-periphery models of growth and development, it is differences between the income-elasticity characteristics of exports and imports which lie at the core of the problem for poor countries and at the heart of the success of rich countries: primary products tend to have an income elasticity of demand less than unity (Engel's Law), while most industrial products, largely produced by advanced economies, have an income elasticity greater than unity.

An important implication of this story is that growth rates between countries differ not because the countries are in the process of divergence, but because their equilibrium growth rates differ, and this is mainly associated with differences in the income elasticity of demand for their exports. Center-periphery models highlight the importance of the elasticities and contain mechanisms that will tend to perpetuate initial differences in income elasticities associated with "inferior" industrial structures on the one hand, and "superior" industrial structures on the other.[35]

The relevance of nonprice competitiveness in the Asian context appears to be supported by sound statistical analysis.[36] Indeed, recent work shows that the spectacular productivity and export growth rates experienced by the Asian economies considered in the analysis (People's Republic of China [PRC], India; Japan; Republic of Korea; Singapore; and Taipei,China) during 1953–2010, were driven by innovation, in particular diversification (new product variety), which is an outcome of research and development (R&D) in the intermediate goods producing sector.[37] The coefficient of the (trade-weighted) income variable (proxy for nonprice competitiveness) is statistically significant and high at about two (interpreted as an elasticity). On the other hand, price competitiveness (measured by the price elasticities) was not a quantitatively important determinant of exports. Likewise, innovation competitiveness has been less influential for export growth for the PRC and India. These two countries' export booms were based more on imitation and process innovation than on fundamental innovation and product innovation.

The above findings imply that, to grow fast, developing countries must, first of all, raise their constraints on demand, in particular, their BOP constraint. The question is how to do it. One possible option is to liberalize the economy and depreciate the currency. While trade liberalization may improve export performance, it may also lead to a faster growth of imports, which would worsen the BOP. Liberalization of the capital account is also fraught with problems without internal macroeconomic stability. Too high domestic interest rates will lead to capital inflows and overvalued currencies, which will damage the tradable sector. As far as devaluation is concerned, this does not raise a country's growth rate unless it is continuous. The exchange rate, however, is not an efficient instrument for structural transformation because it simply makes countries more competitive temporarily in the goods that cause the balance-of-

[35] Myrdal (1957) or Kaldor (1970).

[36] Ang, Madsen, and Robertson (2015).

[37] The variables used to proxy technological competitiveness are R&D stock, patent stock, trademark stock, and product design stock.

payments problems in the first place. Countries can try and make their goods more price competitive by other means, but many of the goods developing countries produce (as a group), such as primary agriculture, raw materials, and unsophisticated manufactures, are price inelastic. Likewise, imposing import controls to reduce the income elasticity of demand for imports is not the way to go as this can breed inefficiency.

Countries can also encourage long-term capital inflows (FDI) to finance import growth in excess of export growth but need to make extra efforts to ensure that technologies are transferred and that the goods produced put the country in a learning escalator. Most other types of inflow, apart from pure aid, involve debt-service repayments, and debt problems can arise if the inflows are not translated into improved export performance which can earn the foreign exchange to pay interest and amortization. Moreover, as the Asian financial crisis of 1997–1998 clearly showed, financing ever-growing balance-of-payments deficits relative to GDP by increasing short-term capital flows is extremely dangerous. The current account of the balance of payments, and how it is financed, does matter for the real economy. Finally, even if the borrowing is invested in the tradable sector, foreign exchange is not guaranteed because the growth of exports is outside the control of the country. The export growth of developing countries depends largely on the health of the world economy.

The way to raise a country's BOP constraint on demand is by working on the nonprice characteristics of goods, such as their quality, technical sophistication, marketing, etc. The recent work on complexity, an idea that encompasses diversification at the country level and sophistication at the product level, shows that the structure of exports of many Asian countries shifted significantly during the last decades, from simple products like footwear and textiles to electronics, machinery, and chemicals.[38]

Country evidence shows that this shift is not easy and that virtually no country in the world has industrialized and moved up the development ladder without protection of one form or another. This brings the debate to the contentious issue of industrial policy in Asia. This report believes that there is an economic case for protection to alter the structure of production, induce growth-enhancing structural change, and to improve the balance of payments, but it needs to be implemented skillfully to avoid the protection of high-cost inefficient industries and the pursuit of rent-seeking.

[38] Original work by Hidalgo and Hausmann (2009). See also Felipe et al. (2012).

Appendix 2.4

Balance-of-Payments-Constrained Growth Rate Estimation: State-Space Model with Time-Varying Parameters and Kalman Filter Estimation

The concept of the balance-of-payments-constrained (BOPC) growth rate has given rise to a large theoretical and empirical literature.[39] The original BOPC growth rate model is based on the idea that, in the long run, countries cannot run current account deficits, so that their current account needs to be in balance. The term BOPC growth rate encapsulates the idea that a country's performance in external markets may ultimately constrain the growth of the economy to a rate below that which internal conditions would warrant.

To implement empirically the notion of the BOPC growth rate, assume the following specifications for export and import demand functions:

$$X_t = \left(\frac{P_{dt}}{P_{ft}} \right)^{\eta} Z^{\varepsilon} \tag{A2.12}$$

$$M_t = \left(\frac{P_{dt}}{P_{ft}} \right)^{\theta} Y^{\kappa} \tag{A2.13}$$

where t indicates time, X, M, Y, and Z are, respectively, the flows of exports, imports, domestic income, and world income (in real terms), respectively; while P_d and P_f are domestic and foreign prices (measured in a common currency), $\eta < 0$ and $\theta > 0$ are price elasticities, while $\varepsilon > 0$ and $\kappa > 0$ are the income elasticities of exports and imports, respectively. In a growing economy, the long-run constraint imposed by BOP equilibrium requires that exports and imports grow at the same rate, i.e., $x_t = m_t$. Log-linearizing equations (A2.12) and (A2.13) and differentiating with respect to time, the equilibrium condition $x_t = m_t$ can be written as:

$$\eta \left(p_{dt} - p_{ft} \right) + \varepsilon z_t = \theta \left(p_{dt} - p_{ft} \right) + \kappa y_t \tag{A2.14}$$

where lowercase letters denote the growth rates of the relevant variables. If purchasing power parity holds, so that relative prices measured in a common currency do not change over the long run (i.e., $p_{dt} = p_{ft}$), equation (A2.14) can be rearranged to give:

$$y_B = \frac{\hat{\varepsilon}}{\hat{\kappa}} z \tag{A2.15}$$

The simple rule in equation (A2.15) represents an upper limit to long-run growth, which becomes binding and, thus, constrains actual growth when a country's y_B is lower than its potential growth rate. Given that $\varepsilon z_t = x_t$, equation (A2.15) can also be expressed as:

[39] Original work by Thirlwall (1979). Some recent work include Guarini and Porcile (2016), Lanzafame (2014), and Mayer (2017).

$$y_B = \frac{x_t}{\hat{\kappa}} \tag{A2.16}$$

so that y_B is given by the ratio of the growth rate of exports to the income elasticity of imports.

Empirical studies in the literature typically consider the BOPC growth rate as constant, but this assumption is unrealistic, in particular since the income elasticities of exports and imports are likely to change over time. Time-varying estimates of the BOPC growth rate can be obtained by relying on Kalman filtering techniques and models with time-varying parameters, which can accommodate and account for changes in an economy's structural features and trade elasticities. To avoid problems with the possible nonstationarity of the variables involved, the estimates reported in Chapter 2 are based on the growth rate versions of the export and import demand functions. The latter are specified in state-space models with time-varying parameters and estimated relying on the Kalman filter recursive algorithm as described in Appendix 2.1. Hence, in the case of the export demand function, the model consists of the following system of equations, with the exports growth relation in (A2.17) the measurement equation, and (A2.18)–(A2.19) the two state equations:

$$x_t^T = \theta_t rp_t + \varepsilon_t z_t^T + u_t \tag{A2.17}$$

$$\theta_t = \theta_{t-1} + \upsilon_t \tag{A2.18}$$

$$\varepsilon_t = \varepsilon_{t-1} + \nu_t \tag{A2.19}$$

where lowercase letters denote growth rates, $rp_t = \left(p_{dt} - p_{ft}\right)$ and the terms υ_t and ν_t are independent normally distributed errors, with zero mean and constant variance. The parameters θ_t and ε_t are, respectively, the time-varying price and income elasticities of exports. Since the BOPC growth rate is held to be a long-term constraint on growth, the estimated $\hat{\varepsilon}_t$ and, thus, the relationship between the growth rates of exports and output need purging from short-run fluctuations. Thus, to estimate equation (A2.17), the analysis relies on x_t^T and z_t^T, which denote the trend growth rates of exports and world output, respectively.[40]

The same approach is applied to the growth rate version of the import demand function to obtain a time-varying estimate of the income elasticity of imports $\left(\hat{\kappa}_t\right)$. The estimate of Indonesia's time-varying BOPC growth rate $\left(y_{Bt}\right)$ is then constructed as follows:

$$y_{Bt} = \frac{\hat{\varepsilon}_t}{\hat{\kappa}_t} z_t^T \tag{A2.20}$$

where all variables are as previously defined.

[40] Obtained through the Hodrick–Prescott filter.

Appendix 2.5

Balance-of-Payments-Constrained Growth Rate: Decomposition into the Effects of the Oil and Non-Oil Sectors

The decomposition of Indonesia's balance-of-payments-constrained (BOPC) growth rate $\left(y_{Bt}\right)$ into the contributions of the oil and non-oil sectors, presented in Box 2.3, relies on the simpler specification in equation (A2.16'):

$$y_{Bt} = \frac{x_t^T}{\hat{\kappa}_t} \tag{A2.16'}$$

where the time-varying y_{Bt} is given by the ratio of the trend growth rate of exports $\left(x_t^T\right)$ to the (estimated) income elasticity of imports $\left(\hat{\kappa}_t\right)$. The trend growth rate of exports can be expressed as a weighted average of trend oil $\left(x_t^{TO}\right)$ and non-oil $\left(x_t^{TNO}\right)$ exports growth, where the weights $\left(w_t^O \text{ and } w_t^{NO}\right)$ are given by the shares of oil and non-oil exports in total exports. That is:

$$x_t^T = w_t^O x_t^{TO} + w_t^{NO} x_t^{TNO} \tag{A2.21}$$

Substituting equation (A2.21) into (A2.16'), the BOPC growth rate is decomposed into the contributions of the oil and non-oil sectors as follows:

$$y_{Bt} = \frac{w_t^O x_t^{TO}}{\hat{\kappa}_t} + \frac{w_t^{NO} x_t^{TNO}}{\hat{\kappa}_t} = y_{Bt}^O + y_{Bt}^{NO} \tag{A2.22}$$

The empirical implementation of the decomposition in (A2.22) is somewhat complicated by data availability issues. In particular, the United Nations Conference on Trade and Development (UNCTAD) trade volume series relied upon to estimate Indonesia's BOPC growth rate are not available at the sectoral level, so that the oil versus non-oil decomposition presented in Box 2.3 is based on the best alternative data source available—i.e., data on real oil exports and real total exports from CEIC, a data company. The UNCTAD and International Monetary Fund (IMF) series are based on different deflators. Therefore, to make the data consistent with the BOPC growth rate estimate based on UNCTAD data, the decomposition is constructed by calculating that particular (hypothetical) income elasticity of imports that would produce the same BOPC growth rate estimate using the IMF export growth series. As such, the decomposition in Box 2.3 imposes on the BOPC growth rate estimate (based on UNCTAD data) the oil versus non-oil export growth dynamics implicit in the CEIC data series.

3 Manufacturing as the Engine of Growth

3.1 Introduction

This chapter provides a rationale for why the manufacturing sector matters for Indonesia's growth and development prospects. Section 3.2 provides a discussion of the manufacturing sector's role by addressing two crucial questions: why gross domestic product (GDP) grows faster the faster manufacturing grows relative to the rest of the economy, and what determines the growth rate of manufacturing in the first place. Section 3.3 summarizes the arguments in favor of considering the manufacturing sector as the economy's *engine of growth*. Section 3.4 provides a review of the empirical literature on the subject and a summary of the recent debate on deindustrialization.

3.2 Understanding the Role of Manufacturing in Development: Two Important Questions

Two important questions must be addressed to properly understand the role of manufacturing in development. First, what accounts for the fact that the faster manufacturing output grows relative to GDP, the faster GDP grows? And second, what determines the growth of the manufacturing sector in the first place? Or, what constrains manufacturing output growth?

On the first question, it is well known that there is a strong causal positive relationship between the growth of manufacturing output and the growth of GDP;[41] as well as between the growth of productivity outside of the manufacturing sector and the growth of the manufacturing sector. Diminishing returns in agriculture and in many petty services that supply labor to the industrial sector may explain this latter relationship, since if the marginal product of labor is below the average product (productivity) in these sectors, their productivity will rise as employment is depleted. As surplus labor becomes exhausted in the nonmanufacturing sectors, however, with productivity levels tending to equalize across sectors, the degree of overall productivity growth induced by manufacturing output growth is likely to diminish. This is why countries' growth rates tend to be fastest in the takeoff stage of development, with overall GDP growth tending to diminish as the scope for absorbing labor from activities with diminishing returns dries up.

Since differences in growth rates are largely accounted for by differences in labor productivity growth rather than by differences in the growth rate of the labor force, there must be some relation between the growth of the manufacturing sector and productivity growth in the economy as a whole. There are two reasons that may explain this. The first is that whenever industrial production and output expand, labor resources are drawn from sectors that have open or disguised unemployment so that labor transfers into manufacturing do not cause a reduction in the output of these sectors, and productivity growth increases outside of manufacturing. A second reason is the existence of both static and dynamic increasing returns

[41] British economist Nicholas Kaldor (1966, 1967) found that there is a strong causal positive relationship between the growth of manufacturing output and the growth of GDP. To the extent that industrial output is a sizable share of GDP, it may be argued that this is a spurious correlation, since the same variable appears on both sides of the equation. This can be solved by (i) regressing the growth of output on the difference between industrial and nonindustrial output growth, or (ii) regressing nonindustrial output growth on industrial output growth.

within industry. Static returns result from the size and scale of production units and are a characteristic of manufacturing. These occur when, for example, output increases by a factor of more than two as the factors of production are doubled. Dynamic economies of scale are brought about by induced technical progress and learning-by-doing, itself the result of the expansion of production.[42]

On the second question, manufacturing output is not constrained by resources on the supply side, but rather by a nascent industrial sector that needs a market to sell to.[43] In the early stages of development, manufacturing growth draws on demand coming from agriculture. In this stage, agriculture is the largest autonomous sector, hence the importance of rising agricultural productivity to provide the purchasing power and growing market for industrial goods. Through time, however, the importance of agriculture as an autonomous market for industrial goods diminishes, with exports taking the main role in the later stages of development. In this sense, the capacity of exports to finance imports represents a constraint. A fast growth of exports and industrial output will tend to set up a virtuous circle of growth: fast export growth leads to fast output growth; fast output growth is determined by fast export growth; fast export growth depends on competitiveness and the growth of world income; competitiveness depends on the relationship between wage growth and productivity growth; and fast productivity growth depends on fast output growth. In East Asia's successes (including the People's Republic of China [PRC]), agriculture likely did not provide the huge early market for manufactured goods that this theory suggests, but instead the world market provided the major source of demand, because the share of agriculture in production fell very quickly.[44]

Agriculture and export growth are the two fundamental sources of autonomous demand to offset the leakages of income from the industrial sector associated with food imports from agriculture on the one hand, and imports from abroad on the other. Fast growth of exports and output may then set up a virtuous circle of growth, with rapid export growth leading to rapid output growth, and rapid output growth leading to fast export growth through the favorable impact of output growth on competitiveness.

A significant part of the explanation behind Asia's fast growth experience is that these economies understood that, in order to get rich, they had to move into manufactures, which offers the possibility to transform the economy by diversifying and upgrading it. Many developing countries have not been able to break into such a virtuous circle, and this is the reason why polarization between countries exists. Indeed, the present north–south divide in the world economy has its origins in the fact that the north contains the first set of countries that industrialized, and only a handful of countries since have managed to challenge their industrial supremacy and therefore achieve similar living standards. This point has been stressed in recent work discussing the PRC.[45] If a nation wants to develop it has to promote growth, which requires promoting manufacturing and, in turn, expanding tradables.

3.3 Manufacturing as the Engine of Growth

Aggregate growth is related to the rate of expansion of the sector with the most favorable growth characteristics. There is a body of historical work and empirical evidence that suggests that there is something special about industry, and in particular manufacturing, which makes it different from agriculture

[42] Kaldor (1966, 1967) took this idea from Allyn Young (1928) and his work on increasing returns at the macroeconomic level, which results from the interaction between activities in the process of general industrial expansion. This is in contrast to agriculture, where productivity was seen as arising through labor-saving technical change and the movement of workers off the land.

[43] Kaldor (1967).

[44] Felipe, Bayudan-Dacuycuy, and Lanzafame (2016).

[45] Rodrik (2010).

and from most services, and allows it to generate high growth rates. This key characteristic is that activities in this sector have a great capacity for productivity growth, externalities, and increasing returns to scale.[46] For this reason, the literature has referred to manufacturing as the *engine of growth*. Indeed, this idea is so well settled in the literature that the terms "industrialized" and "high income" were used interchangeably throughout much of the 20th century.

A central explanation of East Asia's fast growth starting in the second half of the 20th century is that these economies understood early on that the transition to manufacturing was key to generate high growth rates and to develop more generally. The shift from agriculture into manufactures has always been central to a country's development.

Indeed, the transition into manufacturing became a key piece of Asia's development in a context of export-led growth, whereby Asian companies saw the whole world as their market. They realized that they had to export, and export manufactures in particular, to pay for their import requirements. In other words, manufacturing and exports go hand in hand in explaining Asia's development.

The belief in the relevance of manufacturing for development is clear in a number of countries' policies and programs. India's 2011 National Manufacturing Policy aims at raising the share of manufacturing in GDP to 25% and creating 100 million manufacturing jobs, priorities reinforced by the current government's "Make in India" campaign. The Philippines, seeking to reverse almost half a century of gradual deindustrialization, is developing a comprehensive manufacturing road map. Indonesia has passed a series of laws since 2015 to rejuvenate its manufacturing sector. Even the PRC, the "factory of the world," is pushing high-technology industries and the use of technology in manufacturing through its "Made in China 2025" program. Developed countries like the United States, Australia, and the members of the European Union are also interested in industrializing, or rather, reindustrializing after decades of deindustrializing. These plans, particularly in late industrializing societies, often involve big changes to policies and institutions, including changes in land rights, labor laws, educational practices, trade and investment rules, and financial and fiscal arrangements.[47]

There is a large literature that explains and documents, both theoretically and empirically, why manufacturing matters, and why, as a result, the sector is labeled the *engine of growth*. A reading of the literature indicates that there are at least four theoretical reasons for nations seeking economic growth to specifically target manufacturing. First, shifting labor from traditional, low-productivity sectors of the economy toward higher-productivity manufacturing lifts labor productivity—an effect that grows with the rate of manufacturing job creation.[48] As productivity is higher in manufacturing than in agriculture, the transfer of resources from the former to the latter generates a "structural bonus." Likewise, the transfer of resources from manufacturing to services creates, in general, a "structural burden": as the share of the service sector increases, aggregate per capita growth will tend to slow down.[49]

Second, manufacturing has a potential for productivity catch-up that is unmatched by most services. Recent work has shown that manufacturing exhibits unconditional convergence in labor productivity—in other words, national manufacturing industries that start farther away from the labor-productivity frontier experience significantly faster productivity growth even without conditioning on variables such as domestic policies, human capital, geography, or institutional quality.[50]

[46] Today, it is known that some service activities do have similar properties, that is, they are subject to increasing returns to scale and generate sustained productivity growth, the same as manufacturing (see Maroto-Sánchez and Cuadrado-Roura 2009).

[47] Helper, Krueger, and Wial (2012); Felipe (2015).

[48] Lewis (1955); Kaldor (1966); Chenery, Robinson, and Syrquin (1986).

[49] This is known as "Baumol's disease" (Baumol 1967).

[50] Rodrik (2013).

Third, to the extent that manufactured goods have high income elasticities of demand (i.e., higher than those of agricultural products), and are produced under increasing returns to scale, industrialization sets in motion a virtuous cycle.[51] As costs in some manufacturing industries drop, the demand for all manufactured goods increases, in turn causing more investment in manufacturing activity and higher incomes, which spur further demand increases and cost reductions. Moreover, as per capita income rises, the share of agricultural expenditure in total expenditure declines and the share of expenditures on manufacturing goods increases (Engel's law). The relatively high income elasticity of demand of manufactures reflects the nonprice characteristics of a good. Countries specializing in agricultural and primary products will not profit from expanding world markets for manufacturing products.

There is a fourth reason to care about manufacturing related to the balance of payments: as income per capita increases, so does per capita demand for manufactured products. If a developing country does not have a strong manufacturing sector, it will have to import manufactured goods and may end up running a trade deficit in these goods. To cover this deficit, the country will either have to borrow or secure an equally large surplus of nonmanufactured goods (e.g., services, minerals, food, etc.). Either route is very difficult for the typical developing country.[52]

The first two mechanisms are activated by manufacturing employment rather than output. And, while the third ("big push") mechanism relies on output rather than employment growth, it should diminish in importance as globalization makes countries less reliant on local demand to propel industrialization. It follows that in a world of export-led industrialization, manufacturing employment is likely to be a stronger predictor of prosperity than manufacturing output. Box 3.1 provides a summary of additional arguments about why manufacturing matters.

3.4 The Empirical Literature on the Engine of Growth Hypothesis

The existing literature indicates that manufacturing was a driver of growth in developed countries over the period 1950–1973, and in recent years in developing countries. In the latter case, the contribution of the service sector has become more relevant, while the share of services in GDP is now well above 70% in the most advanced economies. Table A3.1 in Appendix 3.1 summarizes some of the recent work on the engine of growth hypothesis, which the data tend to validate.

Figure 3.1 shows a scatter plot of the annual growth rate of output vis-à-vis the absolute change in the share of manufacturing in total output for the 1970s to 2010s. The figure documents the positive correlation between both variables. Also reported in this figure are results from a simple regression relating GDP growth to the change in the manufacturing share. The regression also includes a dummy variable that tests whether Asian countries are different, and the analysis finds evidence that they are. For the non-Asian sample, the slope of 0.047 indicates that a country that registered an increase of 1 percentage point in manufacturing share above the average of all countries (–3.09 percentage points) will register a GDP growth rate of 0.047 percentage points above the average. For the Asian countries, the slope is 0.089 (0.047+0.042). Among the countries in the first quadrant with the highest increases in manufacturing share and output growth rate are Bangladesh, Bhutan, Cambodia, the Republic of Korea, Malaysia, and Thailand.

Likewise, regressions of GDP growth on industrial growth tend to yield a relatively high fit, with a slope of less than unity, indicating that the greater the excess of industrial growth over GDP growth the faster

[51] Rosenstein-Rodan (1943); Murphy, Shleifer, and Vishny (1989).
[52] Thirlwall (1979).

Box 3.1 Why Manufacturing Is the Engine of Growth

Empirically, there is a close relationship between the level of per capita income today and the share of manufacturing in gross domestic product (GDP) in the past, as well as between industrial growth and overall GDP growth. It is hard to find similar cross-section relationships between the growth of GDP and the growth of the agriculture sector, although this does not mean that the sector is irrelevant and that it should be neglected.[a] The relationship between GDP growth and the growth of services is stronger, but there is reason to believe that the direction of causation may be reversed, with the growth of GDP driving service growth, since the demand for many services is derived from the demand for manufacturing output itself. Recent research seems to indicate that some modern services have production characteristics, i.e., static and dynamic scale economies that can induce rapid growth.[b]

Other reasons why manufacturing matters include:

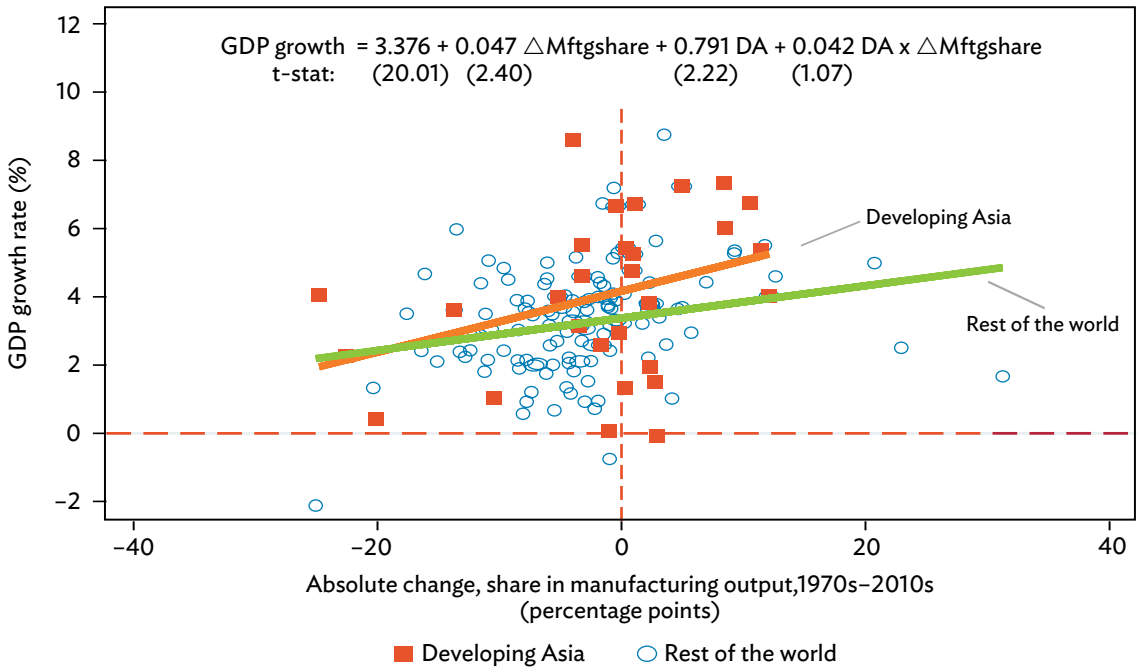
(i) Manufacturing offers significant opportunities for capital accumulation, with the latter being more easily realized in spatially concentrated manufacturing than in spatially dispersed agriculture and in many service activities. Capital accumulation is the result of investment, which itself is a direct source of economic growth.
(ii) The manufacturing sector offers special opportunities for economies of scale.
(iii) A significant portion of technological progress occurs in manufacturing. Overall, manufacturing is the main source of technology-driven productivity growth in modern economies. It is known that the capital goods subsector has been the "learning center of capitalism" in technological terms. It has also been the source of organizational innovation.
(iv) Linkage and spillover effects are stronger in manufacturing than in other sectors of the economy. Linkage effects refer to intersectoral purchases and sales, while spillover effects refer to knowledge flows between sectors. Linkages and spillovers are strong within manufacturing, and between manufacturing and both services and agriculture. For example, manufacturing has been the main source of demand for high-productivity activities in other industries (i.e., the main customers of high-productivity service activities are manufacturing firms).
(v) As the producer of physical and nonperishable products, manufacturing has higher tradability than agriculture and services. Indeed, one important aspect of manufacturing when compared with services and agriculture is the tradability of its output. Despite improvements in transportation—such as containerization, refrigeration, port efficiency, and other aspects of the "timeliness" of trade—and in information and communication technology that have increased the possibilities for international trade in agricultural products and services, manufactured goods remain more freely traded than products from either of these two sectors. A development strategy based upon manufacturing therefore allows a country to become increasingly engaged in international trade, particularly in exporting.

[a] Indeed, a classic failure of postwar policy has been to favor manufacturing at the expense of agriculture in many parts of the developing world. This has tended to retard agricultural development, and indirectly harm industrial development and consequently, overall growth through intersectoral linkages.
[b] Maroto-Sánchez and Cuadrado-Roura (2009).

Source: Authors.

GDP growth will be. For example, a regression with data for 131 economies for the period 2000–2005 (R-squared=0.50) yields a slope of 0.39, which indicates that a country with an industrial growth rate 1 percentage point above the average of all countries (about 4.5%) will have a GDP growth rate of 0.39 percentage points above the average. As mentioned above, such results should be treated with caution since they reflect a spurious correlation, with industrial output being a sizable share of GDP (i.e., given

Figure 3.1 Output Growth versus Change in Manufacturing Output Share



DA = developing Asia dummy, GDP = gross domestic product.
Source: Authors' estimates.

that the same variable appears on both sides of the equation we would expect there to be a correlation between the two).

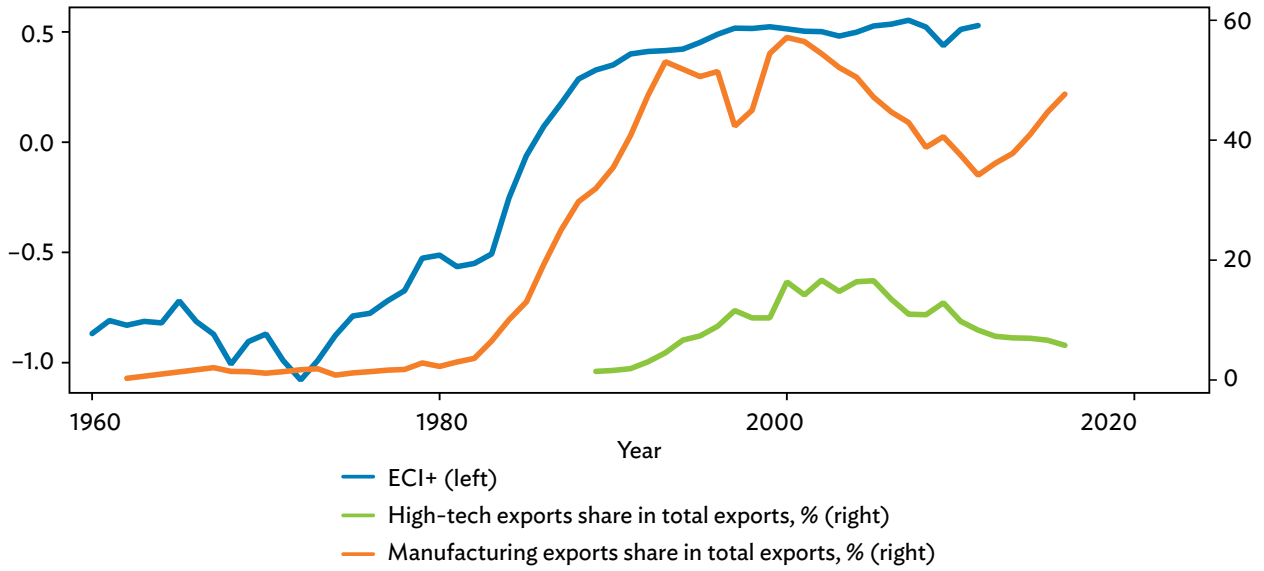
This potential problem is solved by regressing nonmanufacturing output growth on manufacturing output growth. Individual country regressions for a sample of Asian countries are shown in Tables A3.2.1, A3.2.2, and A3.2.3 in Appendix 3.2. Table A3.2.1 for 1961–2016 shows statistically significant coefficients (β in the tables) for all large Asian economies. The estimated relationship between the two variables results in coefficients less than 1, as expected, except in the cases of Afghanistan and Maldives, where the coefficient is 2.[53] Regression coefficients are statistically insignificant, even negative, for small economies such as Cambodia, the Lao People's Democratic Republic, Mongolia, or the Pacific island countries. The regression equation is also estimated until 1996, before the Asian financial crisis (AFC) (Table A3.2.2), and for the period afterwards since 2000 (Table A3.2.3).[54] The robust relationship between manufacturing and nonmanufacturing output growth broke down in Indonesia after the AFC.

In the case of Indonesia and for the complete period (Table A3.2.1), results indicate that a 1 percentage point growth in manufacturing output is associated with a 0.35 percentage point higher growth in nonmanufacturing output. This confirms that manufacturing has been a significant engine of growth. However, when the complete sample period is split, the statistically significant coefficient remains for the subperiod until 1996 (Table A3.2.2), but becomes statistically insignificant for the period after the AFC (Table A3.2.3). This suggests that the growth-boosting effect of manufacturing in Indonesia decreased significantly after the AFC.

Figure 3.2 gives an indication of what may have changed after the AFC. It can be seen that export complexity (ECI+), high-tech exports share in total exports, and the manufacturing exports share in total

[53] The notable exception to these general conclusions is Viet Nam.
[54] The somewhat inexplicable results for Viet Nam remain.

Figure 3.2 Three Measures of Economic Complexity, Indonesia



ECI = economic complexity index.
Source: Authors' calculations based on data from The Observatory of Economic Complexity. https://atlas.media.mit.edu/en/ and the World Bank, World Development Indicators. http://databank.worldbank.org/data/home.aspx (accessed August 2018).

exports, follow a broadly similar path over time.[55] In particular, all three series display increasing trends in the 1990s, but come to a halt at the beginning of the 2000s. Since 2000, ECI+ has remained fairly stable at a value close to about 0.5, while the share of high-tech exports has decreased substantially from about 16% to 5.8% in 2016, and the share of manufacturing goods in total merchandise exports has fallen nearly 10 percentage points, from 57.1% to about 47.7% in 2016.

This review of the empirical work on the engine of growth hypothesis ends by noting that some services do become more important at higher levels of per capita income. There is a new literature that argues that manufacturing is nevertheless important as a result of the intersectoral linkages between this sector and services. Service activities depend heavily on manufactured inputs. Manufacturing is also an important source of demand for modern intermediate service inputs such as financial services, transport and logistics, and business services.[56] What is likely to be true is that the relations of dependence between manufacturing and services are not symmetric: services depend more on manufacturing than vice versa. Also, the emergence of modern service activities depends on the structure of manufacturing. Some knowledge-intensive manufacturing sectors such as office and computing machinery, electrical apparatus, or industrial chemicals are the main users of producer services.[57]

In Indonesia, the manufacturing sector is closely linked to the rest of the economy.[58] The sector's value added represents about 37% of gross output, with value added divided into 11% wages and 29% surplus.

[55] The ECI+ indicator has recently been proposed by Albeaik et al. (2017), as an improvement on the well-known ECI (economic complexity index) originally developed by Hidalgo and Hausmann (2009). Data were downloaded from The Observatory of Economic Complexity website at https://atlas.media.mit.edu/en/. ECI+ was used in the regressions in Chapter 2 in the analysis of the determinants of potential growth and the balance-of-payments-constrained growth rates. This index is different from the one shown in Figure 1.4, as the latter was calculated with a database containing more products and with a slightly different method. Still, the overall story is similar.

[56] Park (2009).

[57] Guerrieri and Meliciani (2005).

[58] World Bank (2012a, 2012b, 2012c, 2012d, 2012e, 2012f, 2012g).

About 47% of the sector's intermediate inputs (63% of gross output) originate from other manufacturing activities, 17% from agriculture, 14% from mining, and the remaining 23% originate from the service sector. Moreover, the manufacturing sector creates high-productivity jobs.

3.5 The Recent Deindustrialization Debate

The recent literature on the relevance of industrialization for development has noted and documented that many developing countries have begun deindustrializing (i.e., a decline in the share of manufacturing in GDP and/or in the share of manufacturing employment in total employment) at relatively low levels of income per capita. A fundamental question is whether increased global competition and labor-displacing technological change have made it more difficult for countries to industrialize in employment.[59] Comparing manufacturing employment and output shares, the literature shows that what matters to eventually become a high-income economy is to attain a high manufacturing employment share in total employment. Manufacturing output shares are weak predictors of prosperity, however, and are under less pressure than employment. The literature also finds that all of today's rich non-oil economies enjoyed at least 18% manufacturing employment shares in the past, often before becoming rich. Figure 3.3 shows that industrialization in employment is a better predictor of future prosperity than industrialization in output.[60]

On premature deindustrialization, a phenomenon documented in recent years, recent work also confirms the inverted-U relationship between both manufacturing output and employment share and income per capita: countries industrialize as income per capita increases but up to a point, after which the manufacturing share starts declining. Specifically, the literature shows that manufacturing peaks at lower employment shares today (typically below 18%) than in past decades (often over 30%). Figure 3.4 shows that recent industrializers have peaked at lower employment shares but not at lower output shares. Finally, Figure 3.5 shows that deindustrialization in employment begins at lower income levels than it once did, with results not clear-cut for output. The figures corroborate the result that becoming rich through industrialization has become much more difficult. This is in large part the result of rapid growth in the manufacturing capabilities of some very populous countries, especially the PRC.

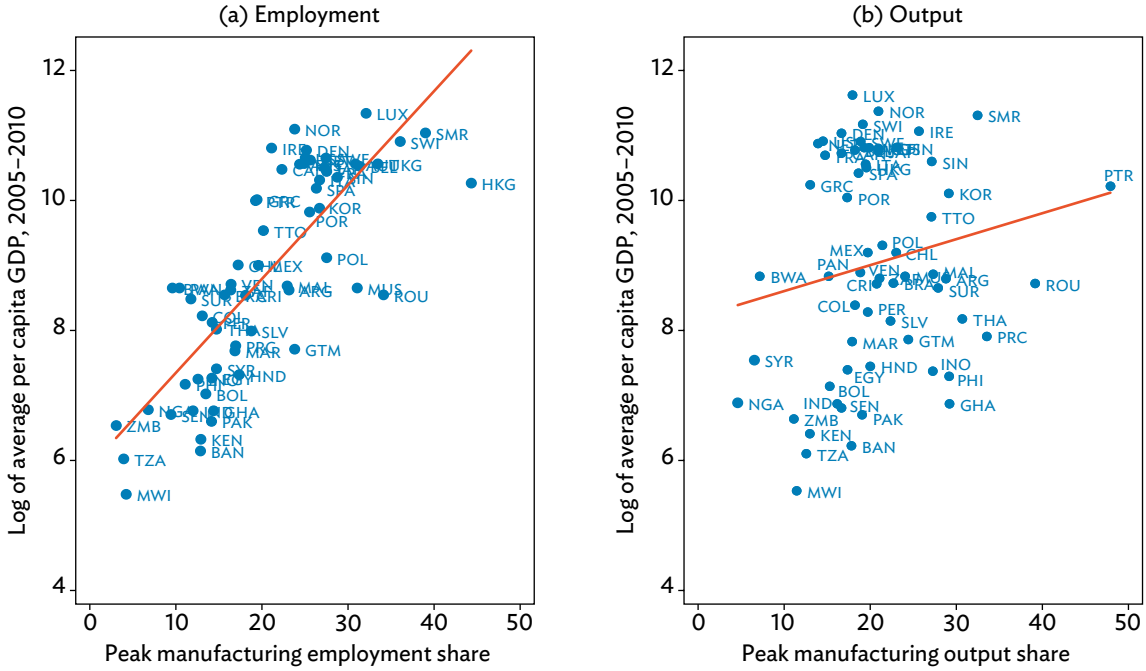
The literature has also analyzed the frequently asked question of whether premature deindustrialization in employment is a result of technological change or of globalization.[61] This presents something of a false dichotomy. The unconditional convergence explanation involves *both* technological changes at the national level and globalization. This explanation contends that the internationalization of supply chains has induced more rapid increases in national manufacturing labor productivity in developing economies than in advanced economies, and that the resulting increase in competition promotes further technological change, especially in advanced economies.

[59] Felipe, Mehta, and Rhee (2018).

[60] The economies included in the study are the following: ARG = Argentina; AUS = Australia; AUT = Austria; BAN = Bangladesh; BEL = Belgium; BOL = Bolivia; BRA = Brazil; BWA = Botswana; CAN = Canada; CHL = Chile; COL = Colombia; CRI = Costa Rica; DEN = Denmark; EGY = Egypt Arab Republic; FIN = Finland; FRA = France; GHA = Ghana; GRC = Greece; GTM = Guatemala; HKG = Hong Kong, China; HND = Honduras; IND = India; INO = Indonesia; IRE = Ireland; ITA = Italy; JPN= Japan; KEN = Kenya; KOR = Republic of Korea; LUX = Luxembourg; MAL = Malaysia; MAR = Morocco; MEX = Mexico; MUS = Mauritius; MWI = Malawi; NET = Netherlands; NGA = Nigeria; NOR = Norway; PAK = Pakistan; PAN = Panama; PER = Peru; PHI = Philippines; POL = Poland; POR = Portugal; PRC = People's Republic of China; PRI = Puerto Rico; ROU = Romania; SEN = Senegal; SIN = Singapore; SLU = El Salvador; SMR = San Marino; SPA = Spain; SUR = Suriname; SWE = Sweden; SWI = Switzerland; SYR = Syrian Arab Republic; THA = Thailand; TTO = Trinidad and Tobago; TZA = Tanzania; UKG = United Kingdom; USA = United States; VEN = Venezuela; ZAF = South Africa; ZMB = Zambia.

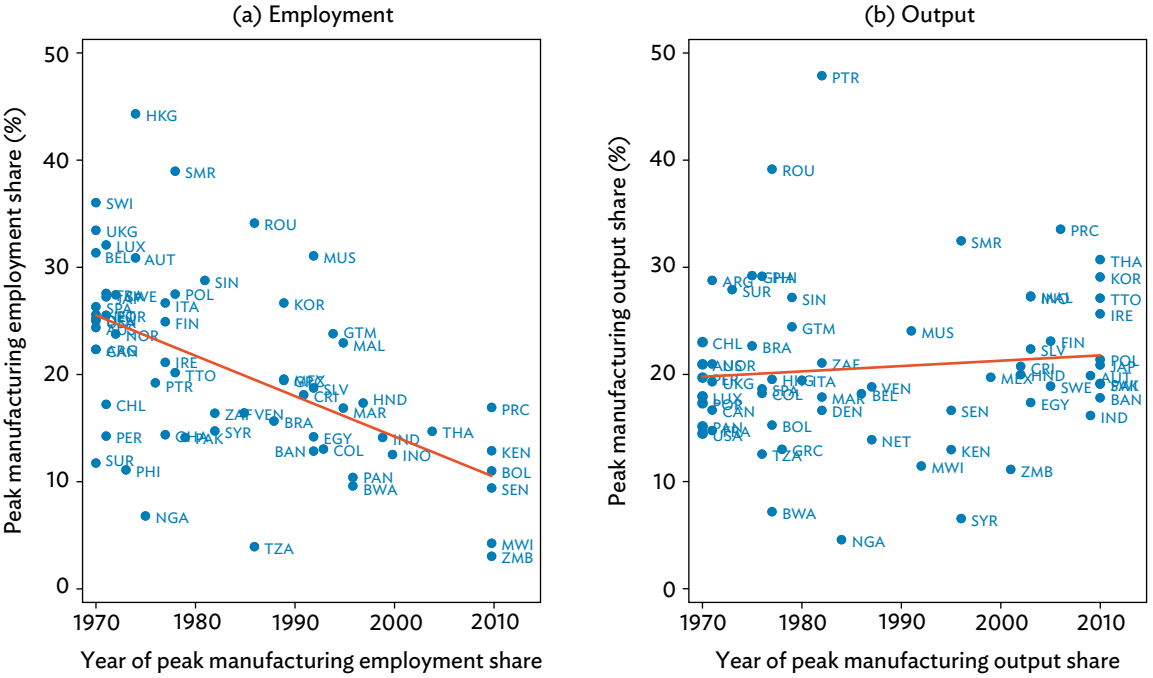
[61] Felipe and Mehta (2016).

Figure 3.3 Industrialization in Employment and Output



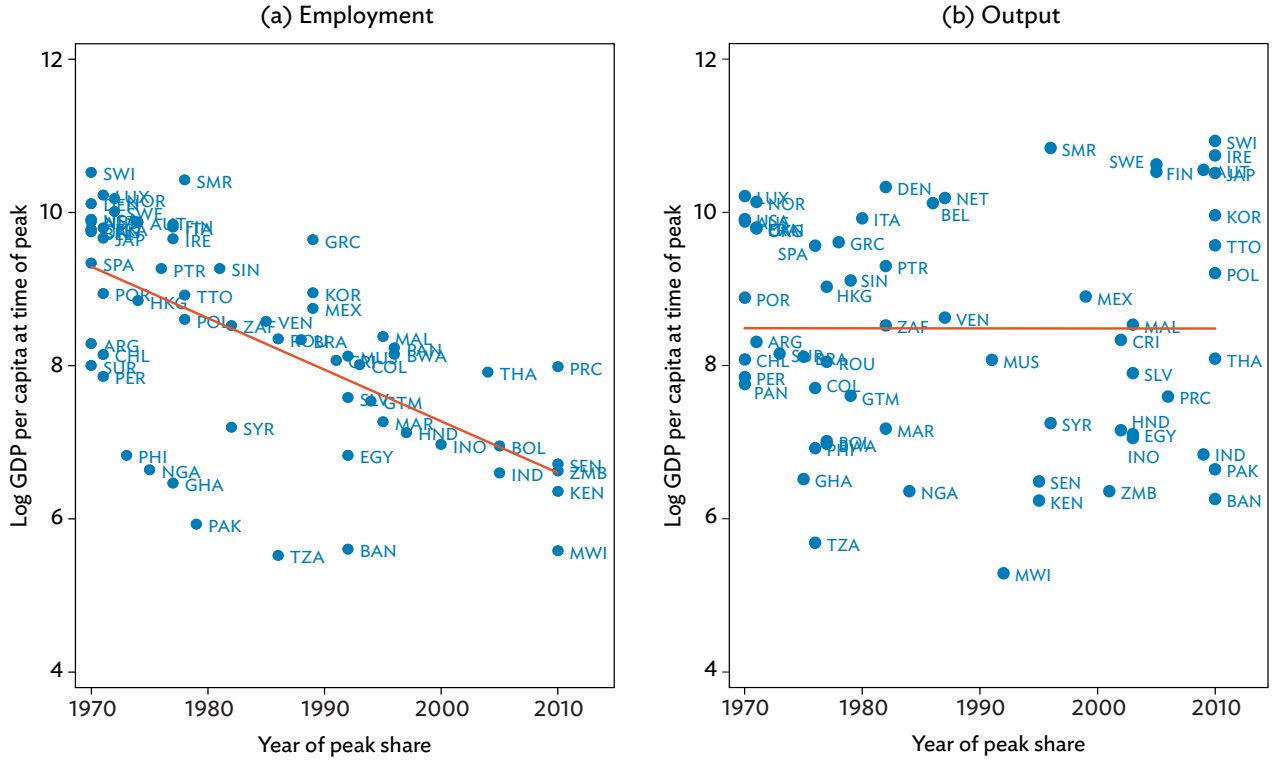
GDP = gross domestic product.
Notes: X-axis shows the level at which the 7-year moving average of the manufacturing employment and output shares peaked between 1970 and 2010. The dates of these peaks vary across countries. Only the 63 economies with adequate employment data are included. See footnote 60 for the complete list of economies.
Source: Felipe, Mehta, and Rhee (2018).

Figure 3.4 Manufacturing Shares and Year Peak Was Attained



Notes: X-axis shows the year that the 7-year moving average of the manufacturing sector's employment and output shares peaked between 1970 and 2010. Y-axis shows the manufacturing share that year. Only the 63 economies with adequate employment data are included. See footnote 60 for the complete list of economies.
Source: Felipe, Mehta, and Rhee (2018).

Figure 3.5 Year Peak Was Attained and Income per Capita

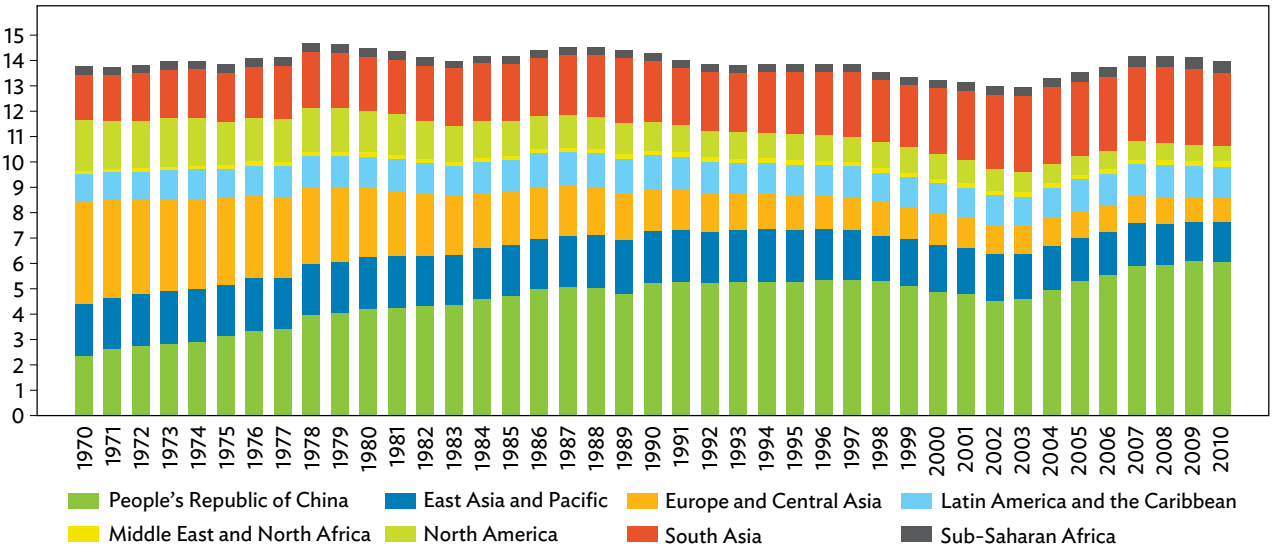


Notes: X-axis shows the year that the 7-year moving average of the manufacturing sector's employment and output shares peaked between 1970 and 2010. Y-axis shows the per capita income that year. Only the 63 economies with adequate employment data are included. See footnote 60 for the complete list of economies.
Source: Felipe, Mehta, and Rhee (2018).

Of course, one might argue that technological change occurs at the national level for exogenous reasons—other than globalization—but such an explanation is insufficient. What has to be explained is why manufacturing labor productivity grew faster (relative to aggregate productivity) in lower-income economies. Three pieces of evidence show that the spread of manufacturing capabilities to populous, lower-income countries seem to be an integral part of the story.[62] First, manufacturing labor productivity has grown more rapidly in poorer countries (not just relative to aggregate labor productivity). Second, even if these productivity trends might be considered suspect due to the usual problems of tracking output across time and countries, the employment data seem to tell the same story: manufacturing jobs have shifted from countries with initially more productive manufacturing sectors to countries with initially less productive manufacturing sectors (Figures 3.6 and 3.7). This is hard to reconcile with similar rates of productivity growth worldwide, especially as wages have at the same time risen faster in the destination countries. Third, if the only trend of relevance was rapid labor productivity growth in manufacturing everywhere, manufacturing's share of global employment should have fallen relative to its share of global output, but this has not happened. Rather, while productivity in manufacturing grew faster than aggregate labor productivity within nations, the ongoing relocation of manufacturing jobs from more to less productive but more populous countries—especially the PRC—canceled this out. This permitted the global

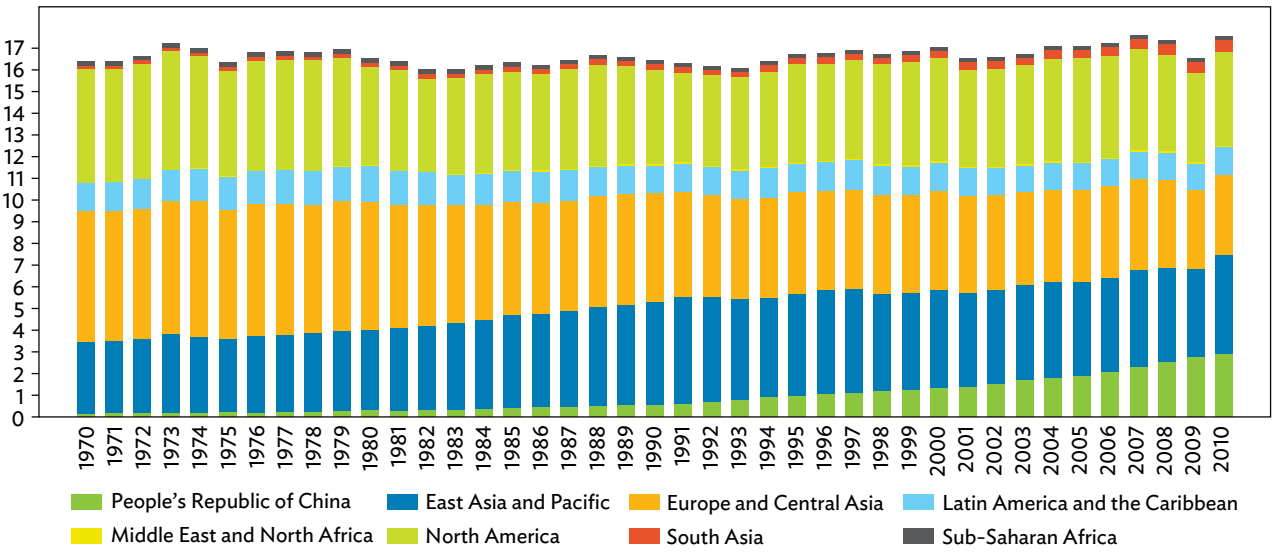
[62] Felipe and Mehta (2016).

Figure 3.6 Share of Manufacturing in Global Output with Regional Contributions (%)
(64 countries that have all necessary employment data)



Source: Felipe and Mehta (2016).

Figure 3.7 Share of Manufacturing in Global Employment with Regional Contributions (%)
(63 countries that have all necessary employment data)



GGDC = Groningen Growth and Development Centre.
Note: GGDC employment data, excluding former West Germany and Taipei,China, augmented with 23 non-GGDC countries from our main dataset. San Marino is excluded.
Source: Felipe and Mehta (2016).

economy to retain constant shares of both employment and output in manufacturing. Thus, labor-saving technological change on its own is insufficient as an explanation for national deindustrialization trends.

What are the implications of deindustrialization, in particular for the developing economies? In the advanced countries, the effects of deindustrialization are clear as they have been felt for decades: the very high labor productivity growth rates of manufacturing vis-à-vis the rest of the economy meant that the share of manufacturing employment started declining steadily as workers moved to service industries such as education, health, entertainment, and public administration. The main consequence was a significant increase in inequality. Those workers with skills that the new service economy rewards handsomely (e.g., bankers, consultants, engineers, lawyers, and logistics experts) earned very high wages, while less skilled workers ended up in jobs that did not pay well to start with, and that showed few opportunities for higher wages due to minimal productivity growth potential in these activities.

What is happening in the developing world? What is clear so far is that given the historical experience of the advanced economies, manufacturing is *the escalator* to eventually reach high income. Activities in this sector are subject to increasing returns to scale, and manufacturing can potentially absorb millions of workers. Moreover, through exports, the sector offers the possibility to satisfy a very large demand. This is how the successful Asian economies progressed during the 1960s to 1980s.

However, the evidence discussed above indicates that it will be very difficult for today's developing countries (with a few exceptions) to enjoy the benefits of industrialization: globalization and technological progress have combined to make industrialization a very difficult endeavor. Peak levels of manufacturing employment shares are much lower today than in previous decades, deindustrialization starts at lower income levels, and the labor-absorbing potential of manufacturing is much lower due to highly labor-saving technologies in manufacturing. This means that today's developing countries are becoming service economies without having reached the industrialization levels that the advanced western economies achieved. With the exception of a small group of already high-income Asian economies, this seems to be the curse of most other developing nations across the globe. The PRC, the great absorber of the transfer of manufacturing employment from Europe and the US, has had much to do with closing the manufacturing opportunity to many other developing nations.

Finally, what is the future of workers in most developing nations? Recent work documents that, contrary to what many seem to think, employment has not globalized in recent decades.[63] Quite the opposite, the share of employment in tradable activities has fallen significantly, in both advanced and developing countries. Instead, nontradable services, such as hotels and restaurants, personal services, and retail trade are generating employment. However, productivity in these sectors is generally low. Hence, it is very difficult for workers in these sectors to experience significant pay increases. It is not clear how the productivity of waiters or sales clerks will increase in the future to justify higher salaries if the share of those employed in tradable activities that pay those high salaries (engineers either in manufacturing or services) shrinks.

[63] Chen, Kam, and Mehta (2018).

Appendix 3.1

Table A3.1 Empirical Work on the Engine of Growth Hypothesis

Authors	What They Did	What They Found
Hansen and Zhang (1996)	(i) Regressed GDP growth on manufacturing growth, using data on 28 Chinese regions for 1965–1991 (ii) Regressed productivity in manufacturing on manufacturing growth (i.e., Verdoorn's Law)	Results reveal a strong correlation and a very high fit, 0.67. A region with manufacturing output growth 1 percentage point above the average for all regions will grow by 0.56% above the average of all regions. A 1% difference in the growth rate of manufacturing output induces a 0.71 percentage point increase in the growth rate of labor productivity within manufacturing. This is a very high coefficient that reflects large economies of scale reaped during the early stages of development.
Fagerberg and Verspagen (1999)	Regressed real GDP growth on growth rates of manufacturing	Corroborated engine of growth hypothesis for Asia and Latin America No significant effect on manufacturing in the advanced economies
Fagerberg and Verspagen (2002)	Examined the impact of shares of manufacturing and services in three periods: 1966–1972, 1973–1983, and 1984–1995, using a sample of 76 countries	Manufacturing has much more positive effects before 1973 than after. After 1973, ICT started to become more important as a source of productivity growth, especially since the 1990s. Many of these technologies are within the domain of services.
Felipe et al. (2009)	Used data on 17 Asian developing countries for 1980–2004 Regressed nonmanufacturing output on manufacturing output; and decomposed the growth rate of labor productivity	Both industry and services appear to have acted as engines of growth in Asia. Manufacturing is subject to strong increasing returns to scale. High increasing returns also exist in services, which appears to be a very dynamic sector. Services appear to have contributed significantly to growth, drawing employment from the less productive agriculture sector.
Rodrik (2009)	Regressed 5-year period growth rates of GDP on shares of overall industry in GDP in the initial year	Significant positive relationship between initial industry share and GDP growth, an effect ascribed to the structural bonus argument: i.e., the transition into modern activities acts as an engine of growth
Timmer and de Vries (2009)	Using growth accounting, calculated the proportion of aggregate growth accounted for by different sectors in periods of growth accelerations, in periods of normal growth, and in periods of growth deceleration	Increasing importance of services in Asia and Latin America In periods of normal growth, they find that manufacturing contributed the most. In periods of growth acceleration, the effect of services dominates, though manufacturing contributes positively.

(continued on next page)

Table A3.1 continued

Authors	What They Did	What They Found
(i) Kathuria and Raj (2009) (ii) Thomas (2009) (iii) Chakravarty and Mitra (2009)	Studied India's manufacturing sector	Found somewhat contradictory results: (i) Tested the engine of growth hypothesis at the regional level for recent years. They conclude that more industrialized regions grow more rapidly. (ii) Services have been the prime driver of growth in India since 1990. (iii) Manufacturing is clearly a determinant of overall growth. Construction and services turn out to be important for manufacturing growth.
Szirmai (2012)	Tested the engine of growth hypothesis for a group of advanced, Asian, and Latin American countries Focused on capital intensity, growth of output, and growth of labor productivity	Hypothesis is, in general, supported, but in some periods, capital intensity in services and industry turns out to be higher than in manufacturing. In the advanced economies, productivity growth in agriculture is more rapid than in manufacturing.
Szirmai and Verspagen (2015)	Regressed 5-year period of GDP per capita growth on shares of manufacturing and services, and other controls (e.g., GDP per capita relative to that of the US, education), for 88 countries, for 1950–2005 and subperiods (1950–1970; 1970–1990; and 1990–2005)	Whole period: moderate positive impact of manufacturing on growth. No effect from services. By subperiods: manufacturing has an effect only during 1970–1990. Services also have a positive impact during this period. Significant interaction effect of manufacturing with education and income gaps: there is a positive effect of manufacturing on growth in developing countries with an educated workforce. Since 1990, manufacturing has become a somewhat more difficult route to growth.

GDP = gross domestic product, ICT = information and communication technology, US = United States.
Source: Authors' review of the literature.

Appendix 3.2

Table A3.2.1 Regression of Nonmanufacturing Growth on Manufacturing Growth, 1961–2016

$\widehat{Y^{NM}} = \alpha + \beta \widehat{Y^{M}}$

	Manufacturing Value-Added Growth (β)	t-stat	Constant (α)	t-stat	Observations	R-squared	Start Year	End Year
Afghanistan	2.012***	(3.252)	2.244	(0.986)	14	0.468	2003	2016
Armenia	0.541***	(4.348)	2.282	(1.303)	26	0.441	1991	2016
Azerbaijan	0.380**	(2.226)	7.452***	(3.021)	24	0.184	1993	2016
Bangladesh	0.126***	(3.863)	3.029***	(6.523)	56	0.216	1961	2016
Bhutan	0.073**	(2.347)	6.487***	(7.622)	36	0.139	1981	2016
Brunei Darussalam	0.183*	(1.727)	1.144**	(2.475)	27	0.107	1990	2016
Cambodia	−0.061	(−0.969)	7.619***	(7.503)	23	0.043	1994	2016
PRC	0.229***	(5.447)	4.442***	(5.754)	51	0.377	1960	2010
Fiji	0.175***	(3.734)	2.469***	(4.276)	51	0.221	1966	2016
Hong Kong, China	0.433***	(3.573)	4.792***	(7.655)	16	0.477	2001	2016
India	0.370***	(3.675)	2.956***	(4.032)	56	0.200	1961	2016
Indonesia	**0.348*** **	**(5.569)**	**2.366*** **	**(4.009)**	**56**	**0.365**	**1961**	**2016**
Kazakhstan	0.588***	(5.051)	3.742***	(4.379)	16	0.646	2001	2016
Kiribati	−0.004	(−0.174)	1.000	(1.249)	31	0.001	1983	2013
Korea, Republic of	0.388***	(8.895)	2.556***	(4.317)	56	0.594	1961	2016
Kyrgyz Republic	0.194***	(3.541)	1.720	(1.489)	26	0.343	1991	2016
Lao PDR	−0.141**	(−2.294)	8.470***	(14.109)	16	0.273	2001	2016
Malaysia	0.342***	(7.765)	3.016***	(6.253)	46	0.578	1971	2016
Maldives	2.165***	(7.962)	3.447	(0.626)	15	0.830	2002	2016
FSM	0.016	(0.425)	0.235	(0.330)	20	0.010	1996	2015
Mongolia	0.014	(0.182)	6.451***	(5.814)	21	0.002	1996	2016
Myanmar	0.149*	(1.782)	6.083***	(3.575)	16	0.185	2001	2016
Nepal	0.078	(1.608)	3.707***	(8.350)	43	0.059	1974	2016
Pakistan	0.302***	(4.294)	3.051***	(5.636)	56	0.255	1961	2016
Palau	0.038	(0.717)	1.603	(1.180)	16	0.035	2001	2016
Papua New Guinea	0.254**	(2.136)	2.997***	(3.133)	32	0.132	1981	2014
Philippines	0.521***	(8.488)	2.112***	(5.860)	56	0.572	1961	2016
Samoa	0.062	(0.985)	4.041***	(6.317)	22	0.046	1995	2016
Singapore	0.309***	(6.184)	4.689***	(8.083)	56	0.415	1961	2016
Solomon Islands	0.020	(0.243)	2.590	(1.405)	16	0.004	1991	2006
Sri Lanka	0.099	(1.349)	4.288***	(8.937)	55	0.033	1962	2016
Tajikistan	0.604***	(4.574)	1.786	(1.088)	28	0.446	1986	2013
Thailand	0.415***	(7.651)	2.292***	(4.254)	56	0.520	1961	2016
Timor-Leste	−0.054	(−0.212)	5.424**	(2.586)	15	0.003	2001	2015
Tonga	−0.162**	(−2.461)	2.260***	(4.889)	35	0.155	1982	2016
Vanuatu	−0.004	(−0.111)	2.835***	(3.125)	16	0.001	1999	2014
Viet Nam	−0.144***	(−3.420)	7.488***	(15.615)	31	0.287	1986	2016

FSM = Federated States of Micronesia, Lao PDR = Lao People's Democratic Republic, PRC = People's Republic of China.
Notes: t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimates.

Table A3.2.2 Regression of Nonmanufacturing Growth on Manufacturing Growth, 1961–1996

$\widehat{Y^{NM}} = \alpha + \beta\widehat{Y^{M}}$

	Manufacturing Value-Added Growth (β)	t-stat	Constant (α)	t-stat	Observations	R-squared
Bangladesh	0.120***	(3.054)	2.372***	(3.637)	36	0.215
Bhutan	0.070	(1.534)	5.966***	(3.344)	16	0.144
PRC	0.229***	(5.827)	3.733***	(4.575)	36	0.500
Fiji	0.188***	(3.314)	2.971***	(3.563)	31	0.275
India	0.319**	(2.460)	2.495***	(2.775)	36	0.151
Indonesia	**0.230*** **	**(3.624)**	**3.222*** **	**(4.582)**	**36**	**0.279**
Kiribati	−0.001	(−0.020)	0.122	(0.081)	14	0.000
Korea, Republic of	0.254***	(4.223)	5.220***	(5.539)	36	0.344
Malaysia	0.334***	(4.054)	3.097***	(2.984)	26	0.406
Nepal	0.069	(0.951)	3.536***	(4.098)	23	0.041
Pakistan	0.356***	(3.448)	3.137***	(3.764)	36	0.259
Philippines	0.570***	(7.596)	1.639***	(3.641)	36	0.629
Papua New Guinea	0.241	(1.540)	3.434**	(2.290)	16	0.145
Singapore	0.274***	(3.693)	5.693***	(6.259)	36	0.286
Sri Lanka	0.058	(0.804)	3.993***	(7.674)	35	0.019
Tajikistan	0.643**	4.087	−3.541	(1.389)	11	0.650
Thailand	0.233***	(2.990)	4.594***	(5.113)	36	0.208
Tonga	−0.201**	(−2.555)	2.772***	(3.649)	15	0.334
Viet Nam	−0.091	(−0.885)	7.417***	(6.610)	11	0.0801

PRC = People's Republic of China.
Notes: t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimates.

Table A3.2.3 Regression of Nonmanufacturing Growth on Manufacturing Growth, 2000–2016

$\widehat{Y^{NM}} = \alpha + \beta \widehat{Y^{M}}$

	Manufacturing Value-Added Growth (β)	t-stat	Constant (α)	t-stat	Observations	R-squared
Afghanistan	2.012***	(3.252)	2.244	(0.986)	14	0.468
Armenia	0.269	(0.969)	5.333**	(2.140)	17	0.059
Azerbaijan	0.035	(0.174)	10.518***	(3.856)	17	0.002
Bangladesh	0.222***	(3.414)	3.554***	(6.406)	17	0.437
Bhutan	0.316***	(3.510)	5.183***	(5.591)	17	0.451
Brunei Darussalam	0.240*	(1.788)	0.979*	(1.773)	17	0.176
Cambodia	−0.044	(−0.624)	7.552***	(7.036)	17	0.025
PRC	0.201	(1.045)	7.869***	(3.597)	11	0.108
Fiji	0.049	(0.641)	1.921***	(3.536)	17	0.027
Hong Kong, China	0.433***	(3.573)	4.792***	(7.655)	16	0.477
India	0.426**	(2.753)	3.571**	(2.752)	17	0.336
Indonesia	**−0.039**	**(−0.175)**	**5.642*** **	**(5.239)**	**17**	**0.002**
Kazakhstan	0.588***	(5.051)	3.742***	(4.379)	16	0.646
Kiribati	−0.044	(−0.477)	1.717*	(1.832)	14	0.019
Korea, Republic of	0.250***	(3.967)	2.090***	(4.482)	17	0.512
Kyrgyz Republic	0.079**	(2.307)	4.564***	(7.887)	17	0.262
Lao PDR	−0.141**	(−2.294)	8.470***	(14.109)	16	0.273
Malaysia	0.257***	(4.005)	3.830***	(7.921)	17	0.517
Maldives	2.165***	(7.962)	3.447	(0.626)	15	0.830
FSM	0.022	(0.614)	0.628	(0.867)	16	0.026
Mongolia	−0.023	(−0.241)	7.231***	(4.977)	17	0.004
Myanmar	0.149*	(1.782)	6.083***	(3.575)	16	0.185
Nepal	0.290***	(3.694)	3.723***	(11.853)	17	0.476
Pakistan	0.139	(1.646)	3.290***	(5.349)	17	0.153
Palau	0.038	(0.717)	1.603	(1.180)	16	0.035
Papua New Guinea	0.380*	(1.867)	3.461**	(2.733)	13	0.241
Philippines	0.247**	(2.572)	4.068***	(7.045)	17	0.306
Samoa	0.081	(1.310)	3.587***	(5.363)	17	0.103
Singapore	0.269***	(5.462)	4.002***	(7.636)	17	0.665
Solomon Islands	0.741**	(2.882)	5.234	(1.924)	7	0.624
Sri Lanka	0.515**	(2.791)	3.732***	(4.118)	17	0.342
Tajikistan	−0.235**	(−2.605)	10.380***	(11.756)	14	0.361
Thailand	0.311***	(4.578)	2.887***	(7.283)	17	0.583
Timor-Leste	−0.054	(−0.212)	5.424**	(2.586)	15	0.003
Tonga	−0.003	(−0.020)	1.690**	(2.619)	17	0.000
Vanuatu	−0.004	(−0.106)	3.009***	(3.160)	15	0.001
Viet Nam	−0.184***	(−6.828)	7.684***	(24.180)	17	0.757

FSM = Federated States of Micronesia, Lao PDR = Lao People's Democratic Republic, PRC = People's Republic of China.
Note: t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimates.

4 A Historical Note on the Difficult Transformation of an Oil-Rich Economy

4.1 Introduction

This chapter provides an overview of Indonesia's economic performance since the 1960s, emphasizing the efforts made to industrialize and to diversify its economy. The analysis reinforces the point noted earlier, that Indonesia experienced significant progress between the mid-1960s and mid-1990s, but that the pace of progress diminished after the Asian financial crisis (AFC) of 1997–1998. The result, documented in Chapter 1, is that Indonesia has not reached the levels of industrialization, diversification, and sophistication attained by some of its East and Southeast Asian neighbors.

The chapter is structured as follows. Section 4.2 is an admittedly compressed tour of Indonesia's economy between the mid-1960s and the mid-1990s. Section 4.3 discusses Indonesia's industrialization efforts and why they stalled. Section 4.4 provides a brief summary of the effects of the AFC on Indonesia's manufacturing.

4.2 Indonesia's Economy since the Mid-1960s: A Quick Tour

Indonesia was a very poor economy in the early 1960s, and when former President Suharto assumed power in 1966, its economy was in shambles after 2 decades of economic stagnation (with gross domestic product [GDP] growth at 1.8% during 1957–1966, and GDP per capita growth at −0.6% during the same period), successive wars, revolution, brief economic recovery, political turbulence, and economic decline.[64] Prominent scholars thought that Indonesia's prospects to achieve economic growth were meager, and some considered it a *basket case or a chronic dropout*.[65] Inflation reached about 600% per year (in 1965 and 1966), foreign exchange was insufficient to purchase rice or to service foreign debt, and the manufacturing sector represented less than 10% of GDP. These outcomes were the result of the political chaos in which the country was submerged, and also of the large foreign borrowing, much of which was used to buy arms and to finance the construction of former President Sukarno's mega projects (e.g., large sports stadium or monuments). Until the mid-1960s, the modern industrial sector that existed in Indonesia was dominated by a few large state-owned enterprises, subsequently taken over by the state as part of the 1957–1958 series of nationalizations.

With the arrival of Suharto, Indonesia started growing much faster, reaching 10.9% in 1968.[66] The 3 decades between the mid-1960s and the mid-1990s can be broadly divided into four subperiods with features and industrialization patterns summarized in Table 4.1.

Likewise, the country began to experience rapid industrialization following major political changes and economic reforms in 1966–1967. This industrialization proceeded initially in an environment of import substitution before a policy of export promotion was adopted from the mid-1980s onward. Until the AFC,

[64] Boediono (2016).
[65] Myrdal (1968), Hill (1995).
[66] Boediono (2016).

Table 4.1 Indonesia's Growth and Industrialization Patterns between the Mid-1960s and Mid-1990s

Period	Major Feature	GDP Growth (% per year)	Industrialization Pattern
1966–1970	Rehabilitation and recovery	6.6	Broad-base catch-up and development of consumer goods industries
1971–1981	Rapid growth and oil boom	7.7	Strong growth of heavy industries from the late 1970s
1982–1986	Adjustment to lower oil prices	4.0	Beginning of labor and resource-based industrial exports
1987–1993	Liberalization, recovery, export orientation	6.7	Broadening of industrial exports

GDP = gross domestic product.
Source: Hill (1995, Table 1).

manufacturing grew rapidly, at a rate of over 10% per year, for much of the period after the late 1960s. As a result of this rapid growth, the share of the manufacturing sector in GDP tripled from an initial share of around 9% in 1965 to around 27% in 1997. Between the time Suharto took over and the AFC, Indonesia's performance was among the best within the developing countries, although its record does not match that of the other successful East and Southeast Asian countries (Box 4.1). Among the latter, it remains the only one that is still a lower-middle-income economy today.

To solve the pressing problems that affected Indonesia's economy, Suharto passed a relatively liberal program of economic reforms by relying on markets and the private sector to generate growth: he consolidated the country's external debt, achieved fiscal and monetary stabilization, implemented 5-year

Box 4.1 Indonesia and India's Performances between the Mid-1960s and the Mid-1990s

An economy's performance is often measured relative to those of other economies, especially when comparing countries at similar stages of development. India, for example, is a significantly larger country than Indonesia in terms of population. Indonesia has the third-largest population in Asia and fourth in the world, and, like India, became independent after World War II from a European power. Both started at very low levels of human capital, industrialization, and income per capita. And both countries are very heterogeneous in terms of languages, ethnicities, and religions. These characteristics, together with their large size, make them difficult to govern. In both cases, the 2 decades between the end of World War II and the mid-1960s were a mix of nation building, political unrest, and significant trial and error searching for an economic strategy, with economic growth averaging 3%–3.5% per year from independence to the mid-1960s. Former Prime Minister Nehru and Sukarno, their post independence leaders, were very nationalistic and socialist in ideology. However, the performance of both economies between the mid-1960s (when former Prime Minister Indira Gandhi took power in India and Suharto in Indonesia) and the mid-1990s (up until the end of former Prime Minister Rao's government in India and the AFC that devastated Indonesia) was significantly different. Indonesia clearly outperformed India in terms of growth rate and living standards, especially until the 1980s: the country achieved an average growth rate of about 7% per year between the mid-1960s and the mid-1990s; while India grew by only 3%–3.5% until the early 1980s, and then picked up to 6% in the 1990s. While the two nations had different systems of government (federal in India and unitary in Indonesia), political regimes, (parliamentary democracy in India and autocratic rule in Indonesia) and natural resources (large oil and natural gas resources in Indonesia), with all three likely favoring Indonesia, the main difference lay in the different economic strategies chosen by both countries.

Source: Authors.

plans (*repelita*), stressed higher food production, and developed physical infrastructure. Suharto also liberalized and opened the economy by, for example, welcoming foreign investment, creating a planning agency (BAPPENAS), and introducing policy incentives (e.g., tax holidays) to attract foreign investment. Nevertheless, between 1966 and 1983, Indonesia followed to a large extent an import substitution regime (Table 4.2). The result was that inflation fell to about 10% by 1969. During the 1970s, Indonesia's average annual growth rate exceeded 7%. Growth declined to about 4% during the first half of the 1980s, in 1982–1986, as a result of declining oil prices.

The Suharto regime gave a higher priority than other emerging countries in Asia (especially the Philippines) to the agriculture sector. An example was the desire to be sustainable in rice production. However, this did not mean that the sector underwent a land reform program comparable to those of Japan, the Republic of Korea (ROK); or Taipei,China. Indeed, even though President Sukarno nationalized plantations in 1957 and announced a program of land reform in 1960, the reality is that Indonesia never experienced any deep reform, as the land-owning elite rendered his policies ineffective by blocking land redistribution. The governments in the more advanced Asian group radically reformed and restructured agriculture after World War II. This opened the window for a fast and deep process of structural transformation, i.e., diversification and upgrading of the economy. Indonesia, however, did not redistribute and reorganize agriculture to the same extent. Consequently, about 30% of its workers are still employed in this sector today. The country's agricultural extension and rural credit programs amounted to a small fraction of the redistribution programs undertaken by Japan, the ROK, and Taipei,China. For this reason, Indonesia's agriculture sector continued to perform poorly after the country became independent, despite promises of radical agricultural development policies. Despite the government implementing extension programs to raise crop yields, these did not increase significantly because of the absence of true land reform.

Table 4.2 Indonesia's Industrial Policies

Period	Characteristics
Mid-1960s to mid-1970s	The first phase of import substitution (1966–1973) involved policies encouraging selective foreign direct investment, with the policy becoming increasingly selective, such that by the early 1970s preferential treatment was given to foreign investors in priority industries only, with more than 40 industries ineligible to receive foreign investment.
Mid-1970s to late 1970s	The oil price rise of 1973 had important implications for Indonesia in the second phase of import substitution (1974–1979). The government engaged in intensive protection of domestic industries, expanding the scope of foreign investment regulations and nationalizing foreign-affiliated firms.
Late 1970s to early 1980s	A further import substitution phase (1979–1983) saw the government attempt to nationalize 52 basic industries, including petrochemicals, basic chemicals, steel, shipbuilding, aerospace and automobiles, but the plan was discontinued in 1981.
Mid-1980s and beyond	Devaluations of the rupiah in 1979, 1983, and 1986 led to the adoption of an export promotion policy, driven in part by structural adjustments recommended by the International Monetary Fund and the World Bank. Deregulation was undertaken in all sectors of the Indonesian economy. The government introduced *Repelita* IV (Fourth Five-Year Plan, 1984–1989), a state-led industrialization plan financed by oil revenues. The plan was discontinued in 1986. Export processing zones were established in 1986 and 1992, with the government further allowing the establishment of foreign-owned companies in some limited areas, albeit without financial inducements. Wholly owned foreign enterprises were allowed from 1994 onward.

Sources: Authors based on Hill (1995) and Kuchiki (2007).

Like Japan, Indonesia relied on a labor-intensive, small-farm, multicrop cultivation regime centered on rice. But by 1960, 60% of Indonesia's population was still landless, and those fortunate to have land owned no more than half a hectare. The land reform set a minimum retention allowance of five hectares, and large-scale absentee landlords were asked to claim residency on their land or sell it to a resident in order to avoid expropriation. However, the implementation of the program was poor and only a tiny percentage of land changed hands. The result was that crop yields did not increase. Rice yields in soil-rich Java were just one-third of those in Japan in 1963, even though the Indonesian government provided funds for infrastructure, carried out extension campaigns to raise crop yields, and provided fertilizer and improved seeds. In the absence of land reform, these measures had little impact on yields. Farmers did not have incentives to produce more when most of the gain would accrue to the landlords. Further land reform efforts are summarized in Box 4.2.

The event that truly spring-boarded the Indonesian economy was the Organization of the Petroleum Exporting Countries price hike of 1974, when oil prices quadrupled. The country's foreign exchange reserves increased significantly and this gave the government the resources to expand the public sector and to face the debt accumulated under Sukarno. As a result, Indonesia could develop new infrastructure and had collateral for new loans. This bonanza also meant that the country turned toward a slightly more statist, nationalistic, and inward-looking strategy than in previous years: the government clamped down on inward investment; public sector enterprises invested heavily (e.g., in a floating fertilizer plant, an aluminum processing facility in Sumatra, and an integrated steel complex in Krakatau); and the government reverted to licensing many imports and increasing protection for domestic industries. Also, billions of oil revenue were wasted on loss-making projects in the public industrial sector. During this period "there was

Box 4.2 Land Reform in Indonesia

After Suharto became president in 1967, there was a more focused push to help farmers increase yields through further agricultural extension support. This worked because the support was complemented by the introduction of minimum price guarantees for rice. The increased yields lasted only until the mid-1970s, when it was discovered that funds were being misappropriated by the government market cooperatives. Overall, however, Indonesia failed to change its landholding pattern. It could not escape the colonial approach that led to the cultivation of cheap food for consumers rather than crops at higher prices that could incentivize small famers. Policy makers displayed a significant urban bias, reminiscent of the old colonial bias combined with the bias of the new indigenous elite. Indonesia had to import significant quantities of rice and wheat, draining scarce foreign exchange. The country did not become self-sufficient in rice until the late 1980s.

Nationalized plantations were taken over by state-owned enterprises and run inefficiently. Sugar plantations, for example, saw yields fall to pre-World War II levels. Urban bias was responsible for this poor performance as the objective was to keep domestic sugar prices low and to tax the plantations heavily.

Indonesia turned to farmer resettlement in the late 1970s. Tens of thousands of families were sent out of Java into less populous islands, in particular Sumatra. Between 1979 and 1984, 1.5 million settlers were paid by the government to move. This program managed to temporarily alleviate population and poverty pressures in some of the country's poorest areas but did not address the fundamental problem of land reform. The millions of landless and subsistence farmers that still remain in Java today survive simply because of the equatorial climate that favors growing certain foodstuff.

Source: Studwell (2013).

a discordance between macro and microeconomic policies, reflecting divided authority in the realm of economic and particular industrial policy at that time."[67]

Despite this, Indonesia grew by over 7% per year during the 1970s, doubling the size of the economy. Likewise, the government spent large amounts on primary education, health clinics, a very successful family planning program, and rural infrastructure. The percentage of people living below the poverty line fell dramatically, from about 57% in 1970 to less than 40% in 1980. Rice output doubled between 1974 and 1987 and Indonesia became self-sufficient. The economic and political life of Indonesia was a delicate balance between the army, which controlled the political system, the technocrats, who controlled the bureaucracy, and *the well-assimilated Indonesian-Chinese businessmen, who managed the private sector. The Pancasila philosophy was still ruling the country, but now without the interference of communism and global politics*.[68] The result was that the Suharto regime delivered: as a leader, Suharto clearly saw his legitimacy linked to pragmatism and to development success. His popular approval was the consequence of rapidly rising living standards, which resulted from his approach to policy making.[69]

With this bonanza, Indonesia's Minister of Research and Technology B. Jusuf Habibie dedicated significant amounts of state resources to high-tech projects, especially in the aircraft industry, in an attempt to upgrade industry. These had dubious results (see Box 4.3).

4.3 Indonesia's Incipient Industrialization

Despite the rapid growth in manufacturing from the late 1960s onward and despite a shift toward a more diversified industrial structure from the 1970s onward—away from the earlier dominance of simple consumer goods and resource processing—a dynamic manufacturing sector was slow to develop in Indonesia. It wasn't until the 1980s that Indonesia became a significant industrial exporter. At the start of the 1980s, exports of manufactured goods represented less than 5% of total merchandise exports, which stands in stark contrast to the early specialization in manufacturing of other Asian countries. The delay in moving toward exporting resource and labor-intensive goods was likely due to the presence of significant natural resources, most notably oil, but also rubber and others. At the peak of the boom, oil accounted for around three-quarters of export earnings and more than 60% of government revenues.

In 1982, economic expansion came to a halt when oil prices dropped, and the balance of payments deteriorated significantly. Like many other developing countries, Indonesia became balance-of-payments constrained. Moreover, the Plaza Accord of 1985 led to a significant increase in foreign debt as a result of the appreciation of the Japanese yen with respect to the United States dollar (most Indonesian debt was in yen). Debt had increased since the mid-1970s, but the currency swings of 1985 and the decline in oil revenue in 1986 aggravated the situation. Although Indonesia avoided debt default, external debt piled up quickly, from $21 billion in 1980 to $37 billion in 1987, and to $85 billion in 1992. Debt service accounted for more than one-third of export earnings in this latter year. The vision enunciated in *Repelita* IV (Fourth Five-Year Plan for 1984–1989) of industrialization financed by oil had to be discontinued.

The government responded to this situation with a new stabilization program. It was not until 1985–1986 that "both macro and microeconomic policy began to pull in the same direction…manufactured

[67] Hill (1995, p. 778).

[68] Pancasila, introduced by Sukarno after independence, includes five principles: belief in one God, humanitarianism, national unity, democracy, and social justice; and the idea of "Unity in Diversity." These principles were supplemented in 1956 with the idea of "Guided Democracy."

[69] Suharto replaced Sukarno's "Guided Democracy" by a more authoritarian "New Order," ushering in an era of political stability that created the foundations for economic growth that the country enjoyed until the mid-1990s.

Box 4.3 Indonesia—A Case of Unsuccessful Transition in the Aerospace Industry

Indonesia started developing the aerospace industry during the late 1950s and early 1960s. These were primitive attempts with the result that production was small. During the 1960s, a series of agencies were set up to develop the aerospace industry. The key promoter of industrial-scale aircraft manufacturing in Indonesia was B. J. Habibie, an engineer trained in Germany, who returned to the country in 1974. In 1976, the state-owned aircraft manufacturing company Industri Pesawat Terbang Nurtanio (IPTN) was founded, and it started to produce helicopters and airplanes under western license, with 8,760 employees. Habibie became state minister for research and technology in 1978 and set up an ambitious development strategy based on four steps—phase 1: acquire technology through licenses, phase 2: integrate the acquired technology into the design and production of new products, phase 3: develop new technologies, and phase 4: develop large-scale basic research. Despite not having a technological base, the Indonesian government formulated ambitious high-tech mega projects in telecommunications, shipbuilding, a national car, nuclear energy, and aircraft manufacturing.

Initially, Habibie succeeded in reaching phase 1 of his plan through deals with Germany, and a series of assembly projects took off during the 1970s and early 1980s. A key step in the development of the Indonesian aerospace industry took place in 1975, when the government signed a deal with Spain's Construcciones Aeronáuticas SA (CASA). Under the deal, Indonesia was allowed to produce under license a new and technologically simple 19-seater turboprop. CASA sent technicians to Indonesia to train the locals. Cooperation between CASA and IPTN continued and a new agreement was reached. In 1979, the two companies formed a joint venture (Airtech) to manufacture a bigger twin-prop commuter. From the point of view of Indonesia, the joint venture meant moving on to phase 2 of Habibie's strategy, as the project allowed the country to acquire and upgrade machinery and tools. Under the deal, IPTN would design and produce the outer wing sections, the rear fuselage, the tail, and the interior, while CASA would produce the more technologically demanding aspects of the plane. Parts would then be exchanged for final assembly both in Spain and Indonesia. However, this division of labor became problematic for certification purposes. In 1986, the American Federal Aviation Administration issued certification valid only for the prototypes assembled in Spain by CASA. Planes assembled by IPTN received certification by the British Aviation Authority in 1995, but despite this, customers preferred the planes assembled in Spain, hence Indonesia's market was very small. Nevertheless, the joint venture was a success in that it allowed Indonesia to set foot into the aerospace industry. Indeed, an aerospace innovation and production system (i.e., actors, institutional setup, capital and technological inputs, new machinery, and skilled labor) started emerging in Indonesia. The significant innovative efforts of the first 2 decades of coordinated industrial development led to a significant upgrading of Indonesia's production systems and processes, and these allowed IPTN to gain a small share in its airplane segment.

The mild success of this project proved fatal for the future development of Indonesia's aircraft industry. Habibie erroneously believed that IPTN was ready to develop an aircraft independently and he announced a new project in 1989. IPTN signed a technological agreement with Lucas Aerospace Flight Control Systems to develop an advanced flight control system by using the fly-by-wire system. IPTN obtained substantial public funds to develop the project. However, by 1998 only two planes had been completed and a third one came to a halt that year due to the financial crisis. The plane never received an airworthiness certificate.

This unsuccessful project exposed the failures in the Indonesian aerospace innovation system, in particular:

(i) The idea of developing an airplane independently was contrary to that of other producers, who opted for production joint ventures and alliances.
(ii) The project involved the development of a propeller when airlines were increasingly choosing for regional jets.
(iii) The innovation system that Habibie put in place did not take into account financial and marketing considerations; rather, it was a technology-push strategy, a public experiment to prove that technological capabilities can be acquired through learning-by-doing. A tough global competition did not favor this

(continued on next page)

Box 4.3 Indonesia—A Case of Unsuccessful Transition in the Aerospace Industry *(continued)*

type of experiment, where the emphasis on determining technological capabilities was excessive, and correcting mechanisms as well as institutional checks and balances were missing from the system.

(iv) The system suffered from underdeveloped managerial capabilities.

In 1995, Indonesia announced the development of another aircraft model. However, the project did not take off as the financing company behind it failed to raise the required capital and no potential foreign partners showed interest in the project.

The financial crisis of 1997–1998 signified an abrupt interruption to the development of Indonesia's aerospace industry. The reality is that, despite all the efforts, the country's innovation system was not mature enough to ensure competitive sales in the commuter market. The financial crisis was a *coup de grâce* that had devastating effects on the industry. The aeronautics education system collapsed, other projects were halted, and production and sales dipped. Apart from the financial problems, Indonesia should have properly identified its capabilities in the aerospace industry. Clearly, these were not the manufacturing of a complete aircraft, but rather the production of parts and components as part of a global value chain. This model would have allowed a more successful transition to other stages in the production and development of aircrafts.

Source: Authors based on Vertesy and Szirmai (2010).

exports and the private (domestic) sector became the major engines of economic growth."[70] "The major thrust of the reforms was not 'pro-export' and they did not generally involve government promotion in the sense of subsidy. Rather, the reforms were designed to achieve more straightforward and predictable policy environment, in which firms were less encumbered by complex, costly and often unenforceable business regulations."[71] Some of the reforms of the mid-1980s worked (macroeconomic reforms) while others did not have a significant impact (industrial policy).[72]

On the macroeconomic front, the basis of the program was to curtail many public sector projects and to return to a more liberal economic strategy. Over the next few years, the country saw further deregulation, including the liberalization of the financial system (although not accompanied by adequate supervision and prudential rules, for which Indonesia would pay a heavy price in 1997–1998), and the encouragement of inward investment. The rupiah was devalued in 1983 by 28% and again by 31% in 1986. Specific reforms included:[73] (i) the Swiss Surveillance Company SGS took over Indonesia's customs in 1985; (ii) introduction in 1986 of a corruption-free customs rebate-drawback facility for exporting firms; (iii) elimination of many nontariff barriers (import prohibitions, quotas, exclusive import licenses); (iv) financial reforms in 1988, which exposed the state banking sector to competition from domestic private banks; (v) opening of its stock market; and (vi) other reforms affecting foreign investment, inter-island shipping, and tourism.

As a result, the economy became more broadly based, i.e., more diversified toward manufactures of all types (and of higher value added), in particular textiles, plywood, iron and steel, footwear, sporting goods, toys, glass, electronics, and furniture. Manufactured exports represented a meager 2% of total exports in 1980. This share increased to 35% in 1990 and to 53% in 1993. During this period, manufactures of clothing,

[70] Hill (1995, p. 779).
[71] Hill (1995, p. 779).
[72] Hill (1995).
[73] Hill (1995, p. 779).

woven fabrics, footwear, and electronics increased significantly. Plywood was a major item in Indonesia's exports. This product's phenomenal growth resulted from the prohibition of log exports (unprocessed timber) introduced in the early 1980s. The ban was introduced to exploit Indonesia's market power in the industry and to increase domestic value added. Clothing and textiles were also very large, in part propelled by the Multi-Fiber Arrangement, an international trade agreement in effect from 1974 until 2004. The assigned quotas under the arrangement allowed Indonesia to compete with the newly industrializing economies (NIEs). The increase in these exports reflected Indonesia's comparative advantage in labor-intensive and resource-based activities. Indonesia showed amazing rates of manufacturing growth, of about 30% per year in real terms between 1980 and 1993. It was during these years that Indonesia, like its neighbors, followed the export-led growth model. Such developments led authors to argue that from the mid-1980s, Indonesia finally began to follow the standard path of labor-intensive outward orientation of other East Asian countries, with labor-intensive exports becoming a significant engine of growth.[74] During this period, Indonesia also benefited from restructuring in the NIEs and Japan, which shifted their labor-intensive industries to countries like Indonesia. It is true that there was significant waste and corruption in the country during the oil boom decade. However, the country recycled a significant amount of oil revenues into productive investment.

By the end of the 1980s the economy was growing fast again (6%–7%) and this lasted until 1996. In 1993, the World Bank included Indonesia as part of the group of "high-performing Asian economies."[75] Indeed, during the 1980s, Indonesia (as well as Malaysia and Thailand), seemed to be following the footsteps of the ROK; Singapore; Taipei,China; and Hong Kong, China. Indonesia was part of the third group of Asian latecomers. Like NIEs, Indonesia also achieved very high growth rates, and many argued that this outcome had been the result of pursuing similar policies and the adoption of a model similar to that of its more advanced neighbors. Its achievements became so well documented that it became part of the *The East Asian Miracle* report and many economists became convinced that it was following the Japanese-Korean development model.[76] As in the case of the NIEs, the World Bank attributed its success to "getting prices right," macroeconomic stability, export orientation, and the use of functional interventions or horizontal policies in the form of public goods such as infrastructure, education, and public health. Industrial policies were deemed incoherent and unsuccessful.

This report contends that *part* of the World Bank's reasoning was evidently correct, that stability and export orientation, combined with a basic set of skills, were certainly important for Indonesia's success. However, another 25 years of analysis and data provide us with a better view of Indonesia's record. Indonesia indeed progressed from the mid-1960s until 1996. Yet, its achievements cannot be compared with those of Hong Kong, China; Japan; the ROK; Singapore; and Taipei,China. While Indonesia also diversified its economy significantly, this diversification was much weaker in terms of technological and industrial upgrading. Its progression into a middle-income country was, as a result, much slower.

In the years before the AFC, some analysts started to question the country's status as a miracle economy, arguing that not everything was rosy in the Indonesian economy: the volume of bad loans mushroomed, cronyism between government, banks, and businesses had led to growing inefficiency, and corruption had become rampant (affecting the Suharto family). The next episode in Indonesia's development was the AFC of 1997–1998, which devastated the country. Not without reason, some authors concluded that "the World Bank may not have done the country a service by including it in the 'miracle club'."[77]

[74] Hill (1995).
[75] World Bank (1993).
[76] World Bank (1993).
[77] Hill (1995, p. 787).

Notwithstanding the country's progress, Indonesia could not create a thriving manufacturing sector like those of the NIEs, or even like those of Malaysia and Thailand. Why? While Indonesia's manufacturing sector diversified significantly, it was stuck in labor-intensive products and did not upgrade significantly. The reason is that the policies adopted by the Suharto regime during the 1960s and 1970s differed from both the export-orientation strategies of the successful East Asian countries as well as from the state-orchestrated industrialization of the PRC in the 1980s and beyond. Consequently, developments in Indonesia's manufacturing sector proceeded differently. Three factors explain this different outcome. First, as noted earlier, the shift toward manufacturing occurred later than in the other high-performing East Asian economies, an outcome that can be attributed, at least partly, to Indonesia's natural resource abundance, and especially to the effect of the oil boom on the structure of production and exports.

A second reason is that Indonesia's industrial policy contributed much less to the country's development because it was poorly designed and implemented.[78] Indeed, an analysis of protection policy, state enterprises, capital market interventions (credit policy), and areas where the government should have intervened but did not finds a clear conclusion: "there has been no consistent and cohesive industrial policy in Indonesia since 1966."[79]

On protection policy, it is claimed that this was not part of a coherent strategy of industrialization. Instead, protection policy was generally *ad hoc* in nature: manufacturing, on average, did not receive positive protection; export-oriented manufactures received low or negative protection; and consumer durables, such as automobiles and electronic industries, received above-average protection. In addition, and until 1986, the government used many nontariff barriers. There does not seem to be any correlation between the level of assistance to an industry and subsequent production and export growth, efficiency and productivity.[80] Analysis of three specific sectors that received assistance leads to the same conclusions:[81] (i) fragmentation in the automobile industry with ridiculously low production levels that did not reach minimum average cost; (ii) no evidence of exploiting scale economies or learning in the steel industry; and (iii) in the plywood industry, the government did not achieve its objectives in terms of increasing value added and meeting environmental standards, even though plywood represented a significant share of the country's exports during the 1980s.

The analysis of state enterprises (e.g., the aerospace industry) leads to the conclusion that the financial performance (e.g., return on assets) of state-owned enterprises was poor. Moreover, state-owned enterprises did not generate significant positive externalities.

On credit policy, like in the more successful Asian economies, Indonesian state-owned banks subsidized projects at low interest rates to lend to preferred customers and sectors. They did this mostly between 1973 and 1983 (much less extensive afterwards), and major liberalizing reforms took place between 1983 and 1988. During this 5-year period, deposit and lending rates were deregulated, subsidized credit programs were abolished, and state banks' privileged position ended.

Although it is not possible to formally test the proposition that the government picked winners and subsidized their activities such that these became successful, the available pieces of information indicate that the primary basis for this lending was political patronage and that there was little performance-based lending. Two pieces of information provide evidence:[82] first, there was never any systematic industry-based

[78] Hill (1995).
[79] Hill (1995, p. 787).
[80] Hill (1995).
[81] Hill (1995).
[82] Hill (1995).

guidelines for the allocation of subsidized credit; and second, subsidized small credit programs (*pribumi* small business) had no effect.[83]

Finally, the government neglected the one area where it should have intervened more to promote a competitive manufacturing sector, namely, education.[84] While the country registered significant increases in school enrollment, matriculation in vocational, technical, and higher education was deficient. Likewise, the country has had industry institutes (e.g., textiles) for a long time. However, they played a minimal role in the country's industrialization.

Overall, Indonesia's industrial policy interventions were significantly less effective than those of Japan; the ROK; Singapore; and Taipei,China. These four were much more forceful in applying the reciprocity principle of providing subsidies in exchange for performance standards, often in the form of export targets. This system of reciprocity disciplined both firms and the government itself. Interventions in the successful Asian economies were more effective because their bureaucracies were of higher quality. Indonesia's suboptimal performance became utterly clear after the 1997 AFC, when it was obvious that its capacity to recover from the crisis was not the same as that of the ROK. In particular, the financial systems of the successful Asian economies were kept under close supervision, and capital controls were in effect until an advanced stage of development. The finance sector supported state policy development objectives (e.g., the development of manufacturing and the acquisition of skills) by keeping interest on bank deposits below market rates, which helped pay for the subsidies to agriculture and industry. By contrast, Indonesia (which also had high levels of savings in its banking systems) directed its investments to subsidize companies that were not focused on manufacturing, or that were focused on manufacturing but for the protected domestic market. Moreover, it probably liberalized its financial system too early.

Virtually all interventions and industrial policy instruments implemented by the successful East Asian economies have also been implemented by other countries but with much less success. The difference lies in the "constant attentiveness to the problems and opportunities of particular industries, within the framework of a long-term perspective of the economy's overall evolution, and a 'hard' state which is strong not only to have significant effects on the economy, but also to control the effects, which is more demanding."[85] More specifically, the difference lies in the implementation and application of the policy instruments:[86]

(i) Mere protection was not sufficient to generate rapid growth. That is why protection was coupled with competition.

(ii) Interventions were selective and selection was based on future competitiveness. This is unlike what happened in India, for example, where the assumption was that trade controls plus unselective support for all domestic-market-oriented industrial investment was sufficient to promote industrialization.

(iii) Interventions were coherent and, as a consequence, had a cumulative impact. This was because East Asian economies had put in place the organizational requirements needed for the interventions to succeed, in particular, a credit-based financial system and a centralized decision-making structure that linked key players (e.g., planning agency, Ministry of Finance).

(iv) The willingness and ability of the state to discipline capital. Incentives were not giveaways but were granted in exchange for meeting specific performance targets, often with respect to exports, but also other measures (e.g., output, product quality, and investment).

[83] Hill (1995).
[84] Hill (1995).
[85] Tan (1999, p. 202).
[86] Tan (1999, pp. 202–203).

There is a third factor that explains why Indonesia's manufacturing sector did not perform as well as those of the more advanced East Asian economies. It is true that the period of high growth in Indonesia, the 1970s, and especially the 1980s and early 1990s, is largely associated with the development of the manufacturing sector. This development was a significant source of growth and Indonesia indeed experienced notable diversification and upgrading. This is where industrial policies probably played a significantly positive role. The fact that Indonesia went into manufacturing on a large scale could give the impression that it followed the model of the advanced Asian economies. This is what a statistical regression would pick up, i.e., a significant correlation between the growth of manufactures and the growth of GDP. However, while the first group of countries created domestic companies with manufacturing and technological capabilities, Indonesia failed to generate large indigenous manufacturing companies. Whatever manufacturing Indonesia generated was associated with (mostly) Japanese foreign direct investment. Indeed, Indonesia became overwhelmingly dependent on Japan and Japanese commercial R&D, especially after 1985, when Japan became the first foreign investor in Southeast Asia. Moreover, much of the manufacturing activity was concentrated on the electronics cluster, which was really a significant step in transforming the Indonesian economy, from an agrarian and natural-resource based one. However, much of the development was assembly and processing operations within quite advanced manufacturing global value chains, something that was masked by aggregate statistics and statistical work.[87] While the ROK and Taipei,China manufactured and exported automobiles, ships, engine components, computers, and machine tools in the late 1980s, Indonesia's export basket complexity was significantly lower, as it still is today. Indonesia made efforts to diversify out of oil and natural gas into manufactures, and government policies have stressed incentives to produce manufactured goods for export. Once again, Indonesia still ranks very low in the export complexity ranking.[88] Moreover, the share of employment in manufacturing is much lower than in the advanced countries.[89]

Additionally, Indonesia did not (and still does not) have the PRC's muscle to force foreign companies to transfer technology. Under these circumstances, Indonesia's economy remains technologically dependent on multinationals and large segments of manufacturing operations continue to be based largely on assembly. While in 1978 Japanese manufacturers operating in the ROK estimated that Korean companies would catch up with Japan within 5 years, or were already at a comparable level in many manufacturing sectors, Japanese manufacturers operating in Indonesia estimated that it would take over 10 years for domestic companies to catch up with Japan in many manufacturing branches.[90] This report stresses that Indonesia did better than most other developing economies across the world in terms of growth and economic transformation between the mid-1960s and the mid-1990s. The point is that its record does not match that of the northeast Asian economies.

Summing up, Indonesia obviously progressed significantly with respect to where it was in 1965, and certainly it did better than most other developing nations around the world, even better than most other Asian economies. There is no doubt that Indonesia's spectacular growth between the mid-1960s and mid-1990s was due largely to its choice of good economic policies, a liberal economic approach, investment in

[87] This can be appreciated by comparing what the economies of the ROK and Indonesia exported with revealed comparative advantage in 1970 and in 1995. This can be done by accessing the product spaces of these countries in the Atlas of Economic Complexity website of the Harvard Center for International Development. http://atlas.cid.harvard.edu/.

[88] As Felipe et al. (2012) document, Indonesia ranks 76th out of 124 economies in the complexity ranking. This is well below the ROK and Singapore, which are among the top 25 economies.

[89] Felipe, Mehta, and Rhee (2018).

[90] Hayashi (1990, Table 2, pp. 30–31).

infrastructure and human capital (although there are questions about the quality of the latter), and a relatively good management of oil revenues, which were injected into the economy rather than being siphoned off.

On closer scrutiny, however, Indonesia could have done better and, as a result, it still has a long way to go, with its performance certainly not matching that of the successful Asian economies because the model it followed was very different. The country's long-run performance was hampered by the lack of agricultural reform, a relatively large manufacturing sector (over 25% of GDP in 1996) that was small in terms of employment and could not upgrade, and a financial sector that was deregulated too early and that did not channel investment into the same types of projects as in the more successful Asian economies.

4.4 The Effects of the Asian Financial Crisis of 1997–1998 on Indonesia's Manufacturing Sector

Over the period 1990–1996, Indonesia's non-oil and gas sector grew at an average rate of 12% per year and contributed one-third to overall GDP growth. This contributed decisively to the transformation of Indonesia's economy. Today, manufacturing employs about 14 million Indonesians (about 14%-15%% of total employment) and contributes about 25% to GDP.

However, Indonesia experienced a deep economic contraction as a result of the 1997–1998 AFC. Most manufacturing sectors were severely affected (transport and equipment were the exception), particularly export-driven subsectors such as textiles, clothing, and footwear, and wood products. These sectors' activities fell into a "growth recession" and their contribution to GDP growth declined considerably.[91] Lower domestic demand and a deteriorating business environment in the years following the AFC were major drivers of this decline. At the same time, rising commodity prices induced a shift in Indonesia's exports, away from manufactures and toward resource-based manufacturing and commodities. The result was that the transformation of the economy took a different direction after the AFC, with natural resource-based sectors (e.g., food, beverages and tobacco, fertilizer, chemicals and rubber) increasing, and a labor-intensive sector (e.g., textiles, leather and footwear, and wood and wood products) decreasing in importance. The shares in total value added of sectors such as transport equipment and machinery and apparatus increased. Likewise, the shares of exports of natural resource-based commodities increased.

Analysis of the postcrisis decade concludes the following:[92]

(i) The manufacturing sector became less employment elastic. This was, at least partly, the result of intensified labor market regulations, which increased the cost of labor and deterred employers from hiring additional workers. This had a negative effect, especially on the labor-intensive sectors (textiles, clothing, and footwear), the main drivers of Indonesia's first round of successful export-oriented industrialization.

(ii) Industrial exports did not increase markedly despite the significant depreciation of the rupiah. This was due to the loss of macroeconomic control of the economy, which nullified the initial benefits of nominal depreciation.

(iii) The graduation of small firms into larger units slowed down.

(iv) Most output growth after the AFC came from existing firms rather than from new entrants. Although Indonesia's finance sector was fully operational, it is less supportive of new entrants, start-up projects, and risk-taking.

[91] World Bank (2012a, 2012b, 2012c, 2012d, 2012e, 2012f, 2012g).

[92] Aswicahyono, Hill, and Narjoko (2010).

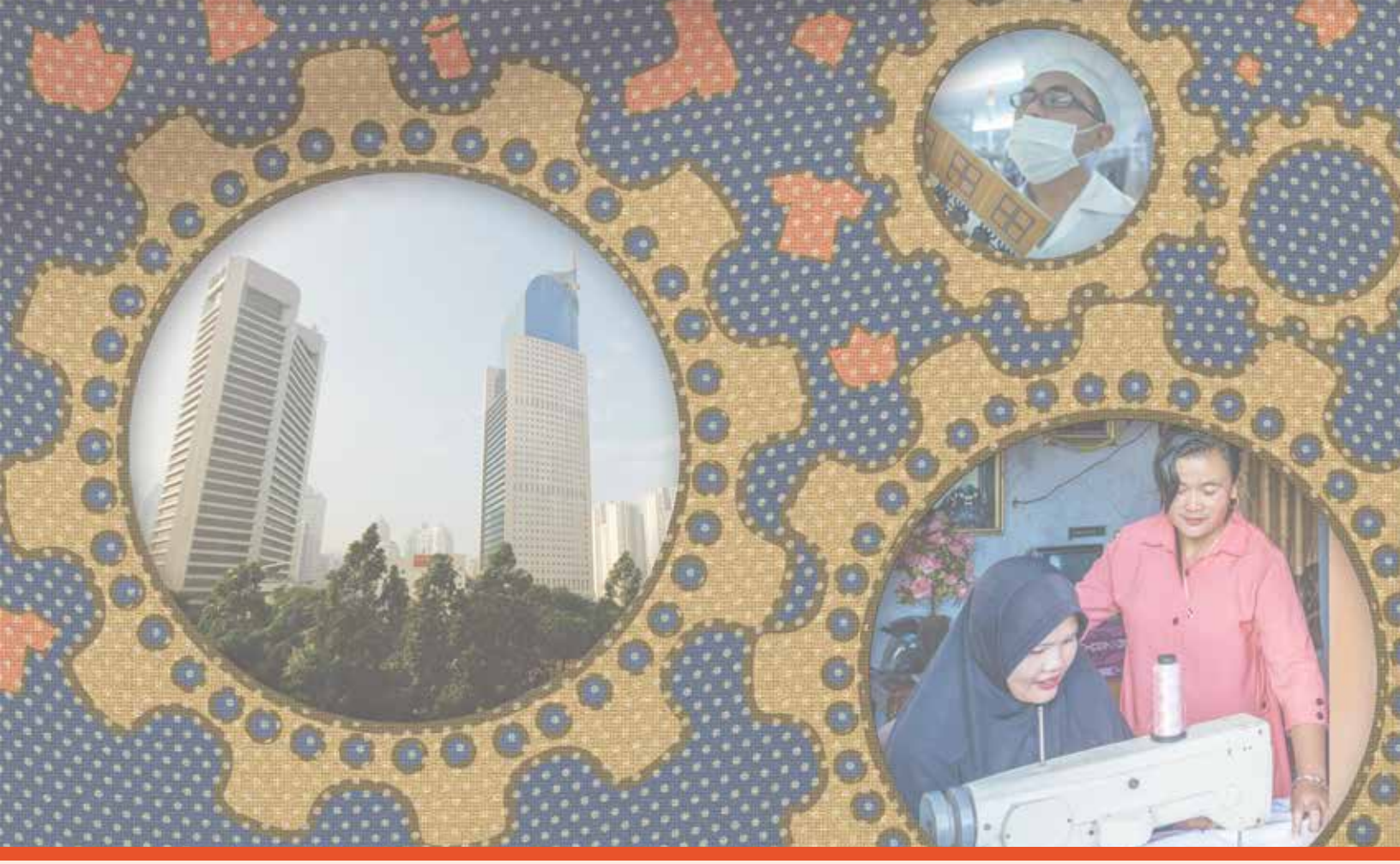
(v) There was increased institutional uncertainty, for example, slow and more complex export/import procedures as the customs service became less amenable to policy control. Increased uncertainty resulted in Indonesia's underperformance in resource-based activities (e.g., mining and forest-based products such as plywood, paper, and pulp). These sectors require a predictable, well-managed, and sustainable supply of raw material inputs. With hundreds of subnational governments seeking control over natural resource rents within their jurisdiction, this predictability was missing.

In a series of reports, the World Bank also highlight the underperformance of the manufacturing sector since the AFC, including the fact that sectors like furniture and garments have experienced a decline in the quality of products exported. Indonesia's growth is still significantly powered by the commodity sector.[93] Exports of primary commodities and natural resources recovered after the AFC (largely due to the global economic recovery) and have attracted significant amounts of investment. The service sector has also done well. The concern is that unless manufacturing plays a significantly larger role, Indonesia may become overdependent on the primary sector. This will undermine the country's capacity to move up in the development ladder. To address this problem, it is important to understand why manufacturing lost its former dynamism. Ultimately, Indonesia needs to diversify the sector and progressively move up in the manufacturing value chain. Indonesian companies need to hook up into the more capital and knowledge-intensive activities of GVCs. These will be the key to increasing wages and improving living standards.

Along similar lines to the ones espoused by this report, the World Bank also stresses the fact that the manufacturing sector is a source of innovation, entrepreneurship, quality employment, and also a catalyst for development in the service sector—a competitive manufacturing sector requires good infrastructure, good logistics, an educated workforce, and a sound legal system.[94]

The global financial crisis of 2008–2009 was a bump on the sector's recovery, which again showed positive growth toward the end of 2009 and thereafter. This was driven by developments in automotive machines and parts, chemicals, and basic metals in particular.

[93] World Bank (2012a, 2012b, 2012c, 2012d, 2012e, 2012f, 2012g).
[94] World Bank (2012a, 2012b, 2012c, 2012d, 2012e, 2012f, 2012g).



PART II

Indonesia's Manufacturing Sector

5 Indonesia's Manufacturing: A Sectoral Overview

5.1 Introduction

This chapter and the next provide an overview of the structure of Indonesia's manufacturing sector at both the aggregate and micro (firm) levels. The current chapter focuses on providing an aggregate overview of the structure of the Indonesian economy, by considering economy wide and sectoral developments in employment, value added, exports, and labor productivity both across time and in a comparative perspective. This allows for a comparison of manufacturing with other aggregated sectors (e.g., primary and service sectors), as well as a comparison of performance across different subsectors within manufacturing. The following chapter uses microlevel firm data to further explore the structure of manufacturing, concentrating in particular on the structure of subsectors in terms of firms' contributions to employment and value added. Combined, the two chapters describe the current structure of the Indonesian economy, and the manufacturing sector in particular, and identify recent developments in this structure. The chapters thus provide the baseline from which progress toward reviving the Indonesian manufacturing sector can be evaluated.

This chapter provides a comparison of the structure of Indonesia's economy with those of other Asian countries focusing particularly on the manufacturing sector. The analysis is based on the World Input–Output Database (WIOD), which is the outcome of the efforts of a team led by Groningen University to develop a set of global input–output tables and associated socio-economic accounts that allow for the analyses and comparison of various dimensions of economic performance across the major world economies.[95] The WIOD reports information on global input–output tables that are used in the later analysis on global value chains in this report (Chapters 9 and 10), along with information on indicators of employment, value added, gross output, and gross exports. The dataset reports information on 56 sectors (of which 18 are manufacturing sectors) for 43 economies (plus the rest of the world) over the period 2000–2014, including data on six Asian economies (India; Indonesia; Japan; the People's Republic of China [PRC]; the Republic of Korea [ROK]; and Taipei,China). Table 5.1 lists for convenience the sectors included in the database.

This chapter focuses on a number of these indicators and considers both aggregate developments as well as developments across individual primary and manufacturing sectors. The main message of the chapter is that Indonesia remains a highly specialized economy, with a strong specialization in primary subsectors and low-tech manufacturing. The current specialization pattern of Indonesia is in sectors that may have limited capabilities for diversification or upgrading.

The rest of the chapter is structured as follows: section 5.2 discusses developments in employment; section 5.3 considers value added; section 5.4 looks at the performance of labor productivity; section 5.5 considers developments in exports; and section 5.6 concludes.[96]

[95] Timmer et al. (2015).

[96] Appendix 5.1, Table A5.1 reports summary statistics on the average growth rate across the period 2000–2014 for a number of these and other variables.

Table 5.1 List of Industries and Industry Codes

	NACE Code	Sector Name	Short Name
Primary	A01	Crop and animal production, hunting and related service activities	Agriculture
	A02	Forestry and logging	Forestry
	A03	Fishing and aquaculture	Fishing
	B	Mining and quarrying	Mining
Manufacturing	C10–C12	Manufacture of food products, beverages and tobacco products	Food manufacture
	C10	Manufacture of food products	Food
	C11	Manufacture of beverages	Beverages
	C12	Manufacture of tobacco products	Tobacco
	C13–C15	Manufacture of textiles, wearing apparel and leather products	Textile manufacture
	C13	Manufacture of textiles	Textiles
	C14	Manufacture of wearing apparel	Apparel
	C15	Manufacture of leather and related products	Leather
	C16	Manufacture of wood and of products of wood and cork, except furniture; Manufacture of articles of straw and plaiting materials	Wood
	C17	Manufacture of paper and paper products	Paper
	C18	Printing and reproduction of recorded media	Printing
	C19	Manufacture of coke and refined petroleum products	Petroleum
	C20	Manufacture of chemicals and chemical products	Chemicals
	C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	Pharmaceuticals
	C22	Manufacture of rubber and plastic products	Rubber
	C23	Manufacture of other nonmetallic mineral products	Non-metallic minerals
	C24	Manufacture of basic metals	Basic metals
	C25	Manufacture of fabricated metal products, except machinery and equipment	Fabricated metal
	C26	Manufacture of computer, electronic and optical products	Computing
	C27	Manufacture of electrical equipment	Electrical equipment
	C28	Manufacture of machinery and equipment nec	Machinery and equipment
	C29	Manufacture of motor vehicles, trailers and semitrailers	Motor vehicles
	C30	Manufacture of other transport equipment	Other transport
	C31–C32	Manufacture of furniture; other manufacturing	Furniture and other
	C31	Manufacture of furniture	Furniture
	C32	Other manufacturing	Other manufacturing
	C33	Repair and installation of machinery and equipment	Repairs

(continued on next page)

Table 5.1 continued

	NACE Code	Sector Name	Short Name
Utilities and Services	D35	Electricity, gas, steam and air conditioning supply	Utilities
	E36	Water collection, treatment and supply	Water treatment
	E37–E39	Sewerage; waste collection, treatment and disposal activities; materials recovery; remediation activities and other waste management services	Sewerage
	F	Construction	Construction
	G45	Wholesale and retail trade and repair of motor vehicles and motorcycles	Motor vehicle trade
	G46	Wholesale trade, except of motor vehicles and motorcycles	Wholesale trade
	G47	Retail trade, except of motor vehicles and motorcycles	Retail trade
	H49	Land transport and transport via pipelines	Land transport
	H50	Water transport	Water transport
	H51	Air transport	Air transport
	H52	Warehousing and support activities for transportation	Warehousing
	H53	Postal and courier activities	Postal services
	I	Accommodation and food service activities	Accommodation
	J58	Publishing activities	Publishing
	J59–J60	Motion picture, video and television programme production, sound recording and music publishing activities; programming and broadcasting activities	Motion pictures
	J61	Telecommunications	Telecommunications
	J62–J63	Computer programming, consultancy and related activities; information service activities	Computer programming
	K64	Financial service activities, except insurance and pension funding	Financial services
	K65	Insurance, reinsurance and pension funding, except compulsory social security	Insurance
	K66	Activities auxiliary to financial services and insurance activities	Auxiliary financial services
	L68	Real estate activities	Real estate
	M69–M70	Legal and accounting activities; activities of head offices; management consultancy activities	Legal and accounting activities
	M71	Architectural and engineering activities; technical testing and analysis	Architecture
	M72	Scientific research and development	Research and development
	M73	Advertising and market research	Advertising
	M74–M75	Other professional, scientific and technical activities; veterinary activities	Other professional activities
	N	Administrative and support service activities	Administrative services
	O84	Public administration and defence; compulsory social security	Public administration
	P85	Education	Education
	Q	Human health and social work activities	Health services
	R–S	Other service activities	Other services
	T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	Household activities
	U	Activities of extraterritorial organizations and bodies	Extraterritorial organizations

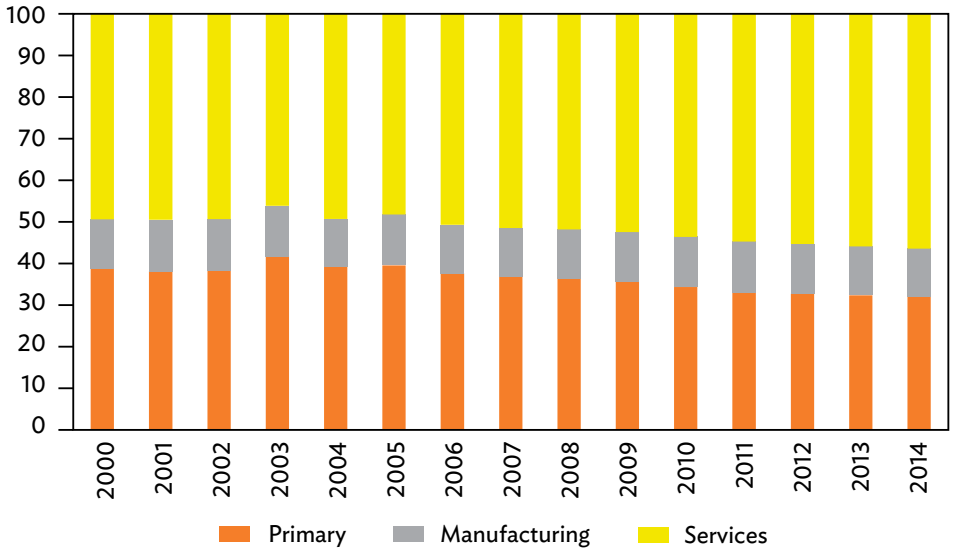
nec = not elsewhere classified.
Source: Nomenclature des Activités Économiques dans la Communauté Européenne (NACE). http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NACE_REV2&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=HIERARCHIC.

5.2 Employment: Persons Engaged[97]

Manufacturing contributes relatively little to employment generation, with the aggregated service sector contributing more than half of employment.

Figure 5.1 plots the sectoral shares of the primary, manufacturing, and service sectors in the total number of persons engaged over the period 2000–2014.[98] Manufacturing is found to make up a relatively small share, 11.8% in 2000 and changed very little over time, such that by 2014 it was 11.6%.[99] The employment share in primary sectors was considerably higher, rising to 40% in 2003 from a share of 38.8% in 2000, before steadily declining and reaching a share of 32% in 2014.

Figure 5.1 Aggregate Employment and Sectoral Shares, 2000–2014 *(%)*



Source: World Input–Output Database, Socio-economic accounts. http://www.wiod.org/database/seas16 (accessed August 2018).

[97] Note that the WIOD reports three separate employment series, namely: (i) number of employees, (ii) persons engaged, and (iii) total hours worked. To allow for a comparison with other Asian economies, the descriptive analysis in this chapter refers to persons engaged, rather than number of employees. The distinction between these two indicators is that persons engaged also includes the self-employed. Consequently, the employment shares discussed differ from those calculated using the number of employees, with large differences between the two found in the case of primary sectors and certain service sectors, where reported levels of self-employment are high.

[98] This classification is based on the Nomenclature des Activités Économiques dans la Communauté Européenne (NACE) system. The primary sector refers to subsectors A and B (i.e., agriculture, forestry, fishing, and mining and quarrying); the manufacturing sector refers to subsectors C1–C33; and the service sector to subsectors D–U. These subsectors are listed in Table 5.1.

[99] As noted above, to be consistent with the other data used in this chapter, the data on employment are taken from WIOD rather than national sources. These data are, in turn, obtained from input–output tables, the Groningen Growth and Development Center 10-Sector Database, the International Labour Organization, and the National Labor Force Survey. In some instances, notably for more recent years, data are estimated and are based on extrapolation. The numbers reported therefore differ somewhat from those reported in national statistics and those reported elsewhere in this report. Despite this strong caveat, we continue to use these data as they provide a ready comparison with data for other countries in the region.

The primary sector remains an important—though declining—source of employment, with agriculture remaining the largest single employer.

Concentrating on the set of primary and manufacturing sectors, Table 5.2 reports the composition of employment in 2000 and 2014. In 2000, a small number of sectors accounted for the majority of employment, with agriculture accounting for almost 60% of employment, and with the two other primary sectors (forestry and fishing) accounting for a further 15% of employment. The final primary sector, mining, is not a major source of employment, being relatively capital intensive. Manufacturing sectors that accounted for a significant portion of employment include: food manufacture with almost 6%, textile manufacture with almost 4%, and wood with slightly over 3%. These three sectors accounted for 57% of total *manufacturing* employment in 2000.

Between 2000 and 2014 the share of the three primary sectors (agriculture, forestry, and fishing) in total employment in primary and manufacturing sectors dropped from around 73% to 70%. However, this relatively small overall change hides some interesting dynamics, with the share of agriculture and the share of forestry declining—by 4.5 and 3 percentage points, respectively—and the share of fishing increasing by around 5 percentage points. The manufacturing sectors that saw the largest increases in their employment shares were textile manufacture, which increased its share by 1.5 percentage points; and nonmetallic minerals and basic metals, which both increased their shares by around 1 percentage point. Food manufacture saw a relatively large drop (2.2 percentage points) in its contribution to employment.

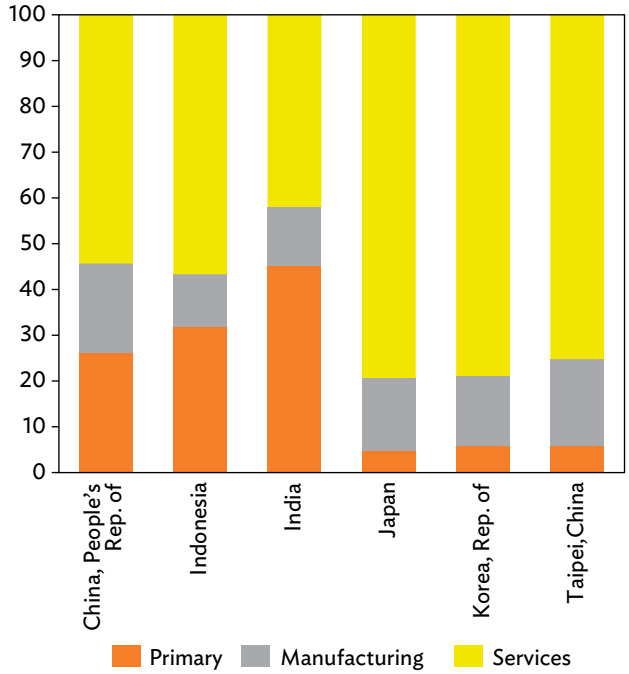
Table 5.2 Sectoral Composition of Primary and Manufacturing Employment *(%)*

Sector	2000	2014
Agriculture	58.61	54.08
Forestry	6.63	3.70
Fishing	7.38	12.19
Mining	1.44	1.87
Food manufacture	5.70	3.49
Textile manufacture	3.67	5.21
Wood	3.25	3.41
Paper	0.76	1.03
Printing	0.03	0.04
Petroleum	0.19	0.36
Chemicals	0.28	0.46
Pharmaceuticals	0.10	0.17
Rubber	1.84	2.66
Nonmetallic minerals	1.26	2.22
Basic metals	1.12	2.02
Fabricated metal	1.09	1.99
Computing	0.18	0.19
Electrical equipment	0.14	0.15
Machinery and equipment	0.35	0.18
Motor vehicles	0.50	0.74
Other transport	0.03	0.04
Furniture and other	1.52	1.12

Source: World Input–Output Database, Socio-economic accounts. http://www.wiod.org/database/seas16 (accessed August 2018).

To provide a comparative perspective Figure 5.2 reports the shares of employment in primary, manufacturing, and service sectors in Indonesia alongside the shares for a sample of other Asian economies included in the WIOD (i.e., India; Japan; the PRC; the ROK; and Taipei,China). The figure reveals that Indonesia has the smallest reported manufacturing share of employment of the six economies, with the PRC and Taipei,China having the largest shares. While the share of primary sectors is very low in Japan; the ROK; and Taipei,China (around 4%–6%), it is considerably larger in the other three economies. Indonesia has a primary share above 32%, which is higher than in the PRC (26%) but lower than in India (45%).

Figure 5.2 Composition of Employment across Asian Economies, 2014 *(%)*



Source: World Input–Output Database, Socio-economic accounts. http://www.wiod.org/database/seas16 (accessed August 2018).

5.3 Value Added

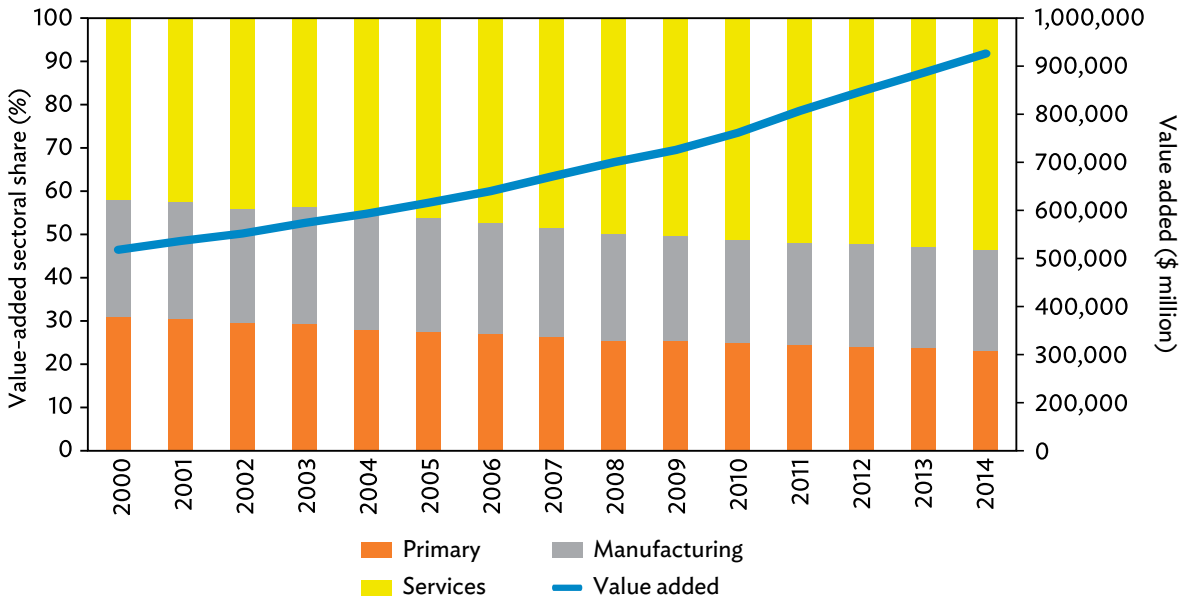
Service sectors account for the majority of value added, with the shares of manufacturing and primary sectors declining.

Figure 5.3 reports information on value added (in constant prices) in Indonesia over the period 2000–2014. The figure reveals a steadily rising level of value added over time (i.e., an annual average growth rate of 4.98% over the period 2000–2014). The figure further reveals a rising share of the service sector in value added. In particular, the share of service in value added increased by around 11.5 percentage points between 2000 and 2010, while the shares of primary and manufacturing sectors declined by 7.7 and 3.8 percentage points, respectively.

Value added in manufacturing tends to be dominated by a small number of low-tech manufacturing subsectors.

Table 5.3 reports the sectoral composition of value added for the primary and manufacturing sectors in 2000 and 2014. In 2000, nearly half (48.8%) of value added was accounted for by just two sectors: agriculture and mining. Other sectors accounting for a relatively

Figure 5.3 Aggregate Value-Added Shares, 2000–2014



Note: The data in current values have been deflated using the volume indices reported in the Socio-economic accounts of WIOD.
Source: World Input–Output Database, Socio-economic accounts. http://www.wiod.org/database/seas16 (accessed August 2018).

large share of value added include the low-tech sectors food manufacture and petroleum.[100] No other sector accounted for more than 5% of value added in the primary and manufacturing sectors. Of these other sectors, the two other primary sectors (forestry and fishing) and both textile manufacture and wood reported relatively large shares.

Both mining and petroleum saw relatively large declines in their shares of value added between 2000 and 2014, by about 5.5 percentage points for mining and 4.8 percentage points for petroleum. At the same time, the shares of fishing (2.4 percentage points), food manufacture (2.5 percentage points), and motor vehicles (2.2 percentage points) increased significantly. The value-added contribution of food manufacture increased despite the decline in its share of employment (Table 5.2).

Table 5.3 Sectoral Composition of Primary and Manufacturing Value Added (%)

Sector	2000	2014
Agriculture	22.03	23.02
Forestry	2.49	1.58
Fishing	2.77	5.19
Mining	26.76	21.32
Food manufacture	11.95	14.49
Textile manufacture	3.16	3.69
Wood	2.36	1.68
Paper	2.20	1.78
Printing	0.09	0.08
Petroleum	12.01	7.25
Chemicals	1.40	2.88
Pharmaceuticals	0.53	1.09
Rubber	1.08	1.77
Nonmetallic minerals	1.19	1.69
Basic metals	2.04	1.81
Fabricated metal	2.00	1.78
Computing	1.05	1.46
Electrical equipment	0.81	1.12
Machinery and equipment	0.86	0.73
Motor vehicles	2.09	4.31
Other transport	0.13	0.26
Furniture and other	1.00	1.03

Source: World Input–Output Database, Socio-economic accounts. http://www.wiod.org/database/seas16 (accessed August 2018).

While larger than the employment share, the share of value added accounted for by manufacturing is lower than in other Asian economies.

Figure 5.4 provides a comparison of Indonesia's performance with other Asian economies, reporting the shares of value added (for 2014) in primary, manufacturing, and service sectors in Indonesia alongside the shares for a sample of other Asian economies included in the WIOD. The results are—to an extent—similar to those for employment. Japan; the ROK; and Taipei,China report relatively small shares of primary sectors in value added, with much larger shares observed for the other three economies (though somewhat lower than the shares reported for employment). In the case of value added, Indonesia has the highest share in primary sectors—reflecting the importance of the mining sector in Indonesia. The share of Indonesia's manufacturing sector in value added is somewhat higher than that for employment but is still low when compared with economies such as the PRC; the ROK; and Taipei,China.

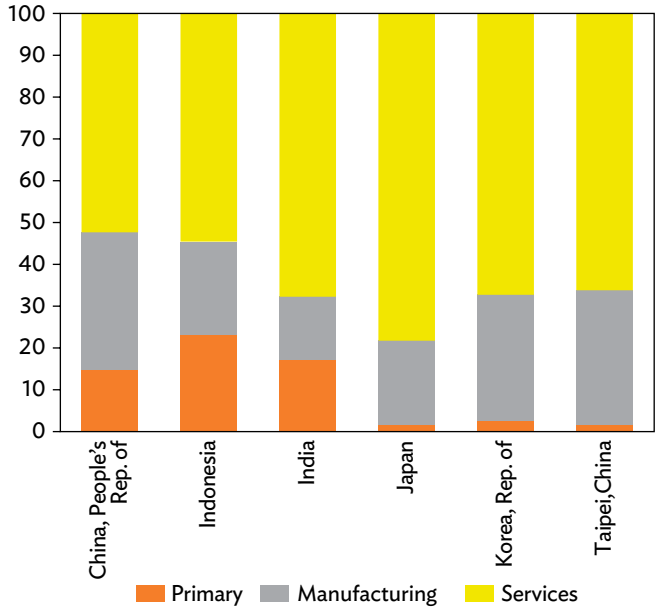
5.4 Labor Productivity

In comparison with other Asian economies, Indonesia's level of labor productivity is low.

An indicator of labor productivity (i.e., the ratio of value added to employment) can be constructed using information on value added (in constant prices) and employment (i.e., persons engaged) from WIOD. Figure 5.5 reports information on the level of labor productivity in primary, manufacturing, and service

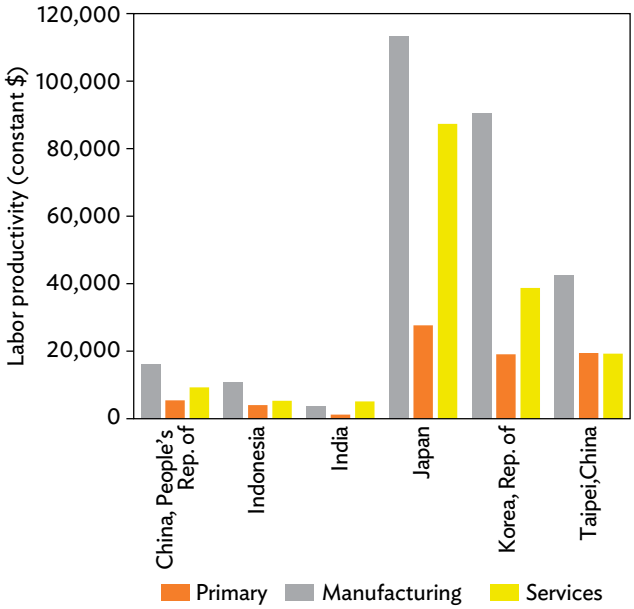
[100] See Table 6.1, United Nations Industrial Development Organization's (UNIDO) technology classification for the precise list of industries characterized as low-, medium-, and high-technology industries.

Figure 5.4 Composition of Value Added across Asian Economies, 2014 (%)



Source: World Input–Output Database, Socio-economic accounts. http://www.wiod.org/database/seas16 (accessed August 2018).

Figure 5.5 Levels of Labor Productivity in Selected Asian Economies, 2014



Source: World Input–Output Database, Socio-economic accounts. http://www.wiod.org/database/seas16 (accessed August 2018).

sectors for Indonesia and for five comparator Asian economies.[101] The first thing to note from this figure is that, across the different economies, labor productivity in manufacturing is generally higher than that of the other two broad sectors—emphasizing the importance of developing a manufacturing sector[102]—with the service sector tending to have higher labor productivity than the primary sector.[103] In comparison with other economies, Indonesia performs relatively poorly in terms of labor productivity. This is true when comparing with successful Asian economies such as Japan; the ROK; and Taipei,China, as well as with the PRC. Moreover, this pattern is true irrespective of whether the analysis considers manufacturing, services, or the primary sectors.

Growth rates of labor productivity in manufacturing and primary sectors have been relatively weak, while the growth of labor productivity in services has been relatively rapid in recent years.

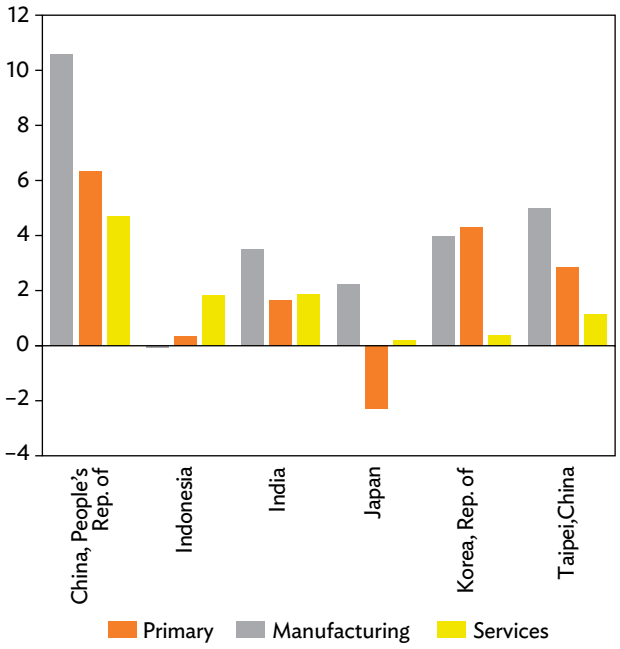
In addition to low levels of labor productivity across the different sectors in Indonesia, growth rates of labor productivity over time have also been relatively low (Figure 5.6). Indonesia's manufacturing sector experienced negative growth rates in labor productivity, while its primary sectors saw relatively low productivity growth rates. In comparator economies, growth rates of labor productivity in manufacturing were all positive, ranging from 2.2% in Japan to 10.6% in the PRC. Interestingly, the growth rate of productivity in services is higher in Indonesia than in all other economies except the PRC and India.

[101] Complementary analysis of the productivity performance of Indonesian manufacturing using firm-level data can be found in World Bank (2012f).

[102] See World Bank (2012b).

[103] The one exception is India, where labor productivity in services is somewhat higher than in manufacturing, which, in turn, is higher than in primary sectors.

Figure 5.6 Annual Average Growth Rate of Labor Productivity in Selected Asian Economies, 2000–2014



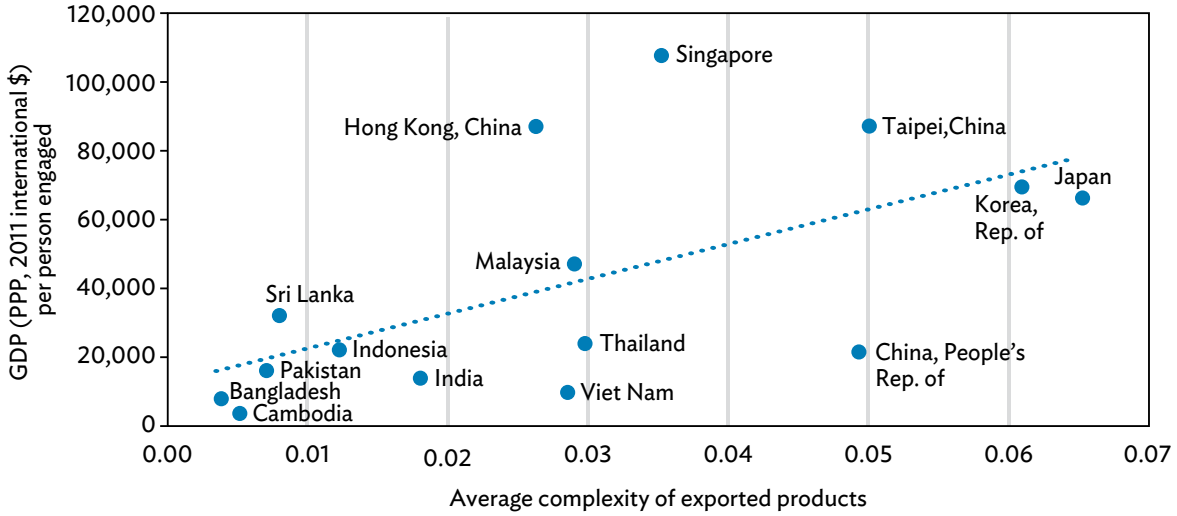
Source: World Input–Output Database, Socio-economic accounts. http://www.wiod.org/database/seas16 (accessed August 2018).

Indonesia has a relatively low level of export complexity, though somewhat higher than predicted for its income level.

Figure 5.7 reports the relationship between average product complexity (see Chapter 1, Box 1.2 for an explanation on complexity indices) at the country level and aggregate labor productivity for a number of Asian countries in 2014.[104] Product complexity in Figure 5.7 is the average value for the country, calculated as the weighted sum of each product's complexity with export value shares used as weights. The two indicators are positively correlated, suggesting that increases in income per capita (and development more generally) require the accumulation of production capabilities and related diversification, with more developed countries tending to have higher values for average complexity.

The ROK, Japan, and Taipei,China are the leading economies in terms of average complexity. The PRC's value for the average complexity indicator is also fairly high, ranking fourth in the set

Figure 5.7 Relationship between Product Complexity and Labor Productivity, 2014



GDP = gross domestic product, PPP = purchasing power parity.
Source: Authors calculations using CEPII's BACI Database. http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=1 and the Penn World Tables (accessed August 2018).

[104] Data on labor productivity for this broader set of countries were calculated using information from the Penn World Tables (Feenstra, Inklaar, and Timmer 2015). The numbers reported therefore differ from those calculated from the WIOD.

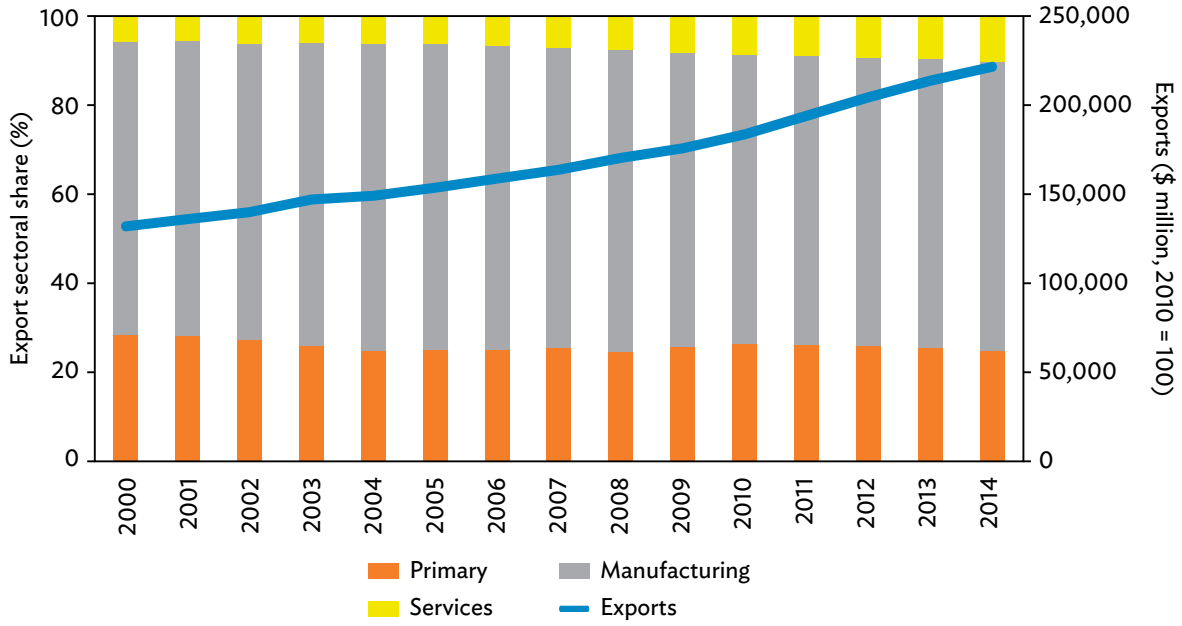
of countries included in the figure. This shows the relatively advanced nature of the PRC's production system in 2014. Indonesia ranks at the lower end of the average complexity indicator. Only Sri Lanka, Pakistan, Cambodia, and Bangladesh have lower scores. Despite this, Indonesia's complexity is somewhat higher than what would be predicted for a country of its income level (i.e., Indonesia is slightly to the right of the line depicting the best fit between economic complexity and GDP per person). The figure also suggests that country size plays an important role in the relationship between complexity and labor productivity. A large economy like the PRC has low productivity compared to its level of product complexity, while smaller ones like Singapore and Hong Kong, China have high productivity compared to their level of product complexity. Nevertheless, the positive relationship observed in Figure 5.7 is clear and strong.

5.5 Gross Exports

Manufacturing plays a relatively large role in driving exports.

This subsection considers developments in the value of exports. The data are collected from WIOD and include exports of both intermediate and final goods in current values. Given the lack of an export-specific deflator, gross output volume indices are used to express exports in constant prices. Figure 5.8 reports developments in the value of gross exports over time. Similar to results for value added, the volume of exports increases steadily over time (i.e., an average annual growth rate of around 3%).[105] Manufacturing accounts for a large share of gross exports (65.9% in 2000), while both the primary and service sectors account for smaller shares (28.3% and 5.8%, respectively in 2000). The service sector's small share of gross

Figure 5.8 Aggregate Gross Export Shares, 2000–2014



Note: The data in current values have been deflated using the gross output volume index from the World Input–Output Database.
Source: World Input–Output Database. http://www.wiod.org/home (accessed August 2018).

[105] Note that when considering exports in current values the data for Indonesia look somewhat similar to world trends, with a rising trend in the early to mid-2000s, followed by a drop at the time of the global financial crisis, a recovery shortly afterwards, and a further steady decline starting around 2011.

exports—particularly when compared with the observed shares for employment, value added, and gross output—is not unexpected, and indicates that Indonesia is heavily specialized in nontradable services. The split in exports between manufacturing, services, and primary sectors is fairly constant across time, with the share of the manufacturing sector dropping only slightly from 65.9% in 2000 to 65% in 2014. There is a somewhat larger—though still small—decline in the share of primary sectors, from 28.3% in 2000 to 24.8% in 2014, implying a somewhat larger share of services in exports over time, from 5.8% to 10.2%.

The subsectors that account for much of the contribution of manufacturing to exports tend to be low tech.

In 2000 (Table 5.4), four sectors accounted for around 64% of primary and manufactured gross exports. These sectors were mining (27.7%), food manufacture (11.5%), textile manufacture (9.4%), and petroleum (14.5%). Looking at developments over time, there is an observed decline in the importance of mining in gross exports between 2000 and 2014 (from 27.7% to 25.1%), with a relatively large drop also observed for petroleum (from 14.5% to 9.1%). Other sectors become more important over time. The share in gross exports of food manufacture increased significantly (from 11.5% to 14.3%), while three other sectors saw an increase of between 2 and 3 percentage points in their contribution to exports: chemicals, rubber, and computing.

Indonesia's export specialization is in intermediate goods, suggesting that it has been unable to develop downstream processing activities.

Figure 5.9 reports the share of intermediate goods exports in total exports by the manufacturing and primary sectors for the year 2000, along with the change in this share between 2000 and 2014.[106] Several patterns are evident. Exports of many sectors are heavily concentrated on intermediate exports, with intermediate exports accounting for more than 80% of gross exports in 10 of the 22 sectors and more than 50% of gross exports in all but four sectors. This is the case most notably for mining, wood, paper, petroleum, chemicals, rubber, and basic metals. This specialization in intermediate exports explains why Indonesia has been unable to develop downstream processing activities in these sectors, which in turn may have had negative implications for the value-added contributions of these sectors.

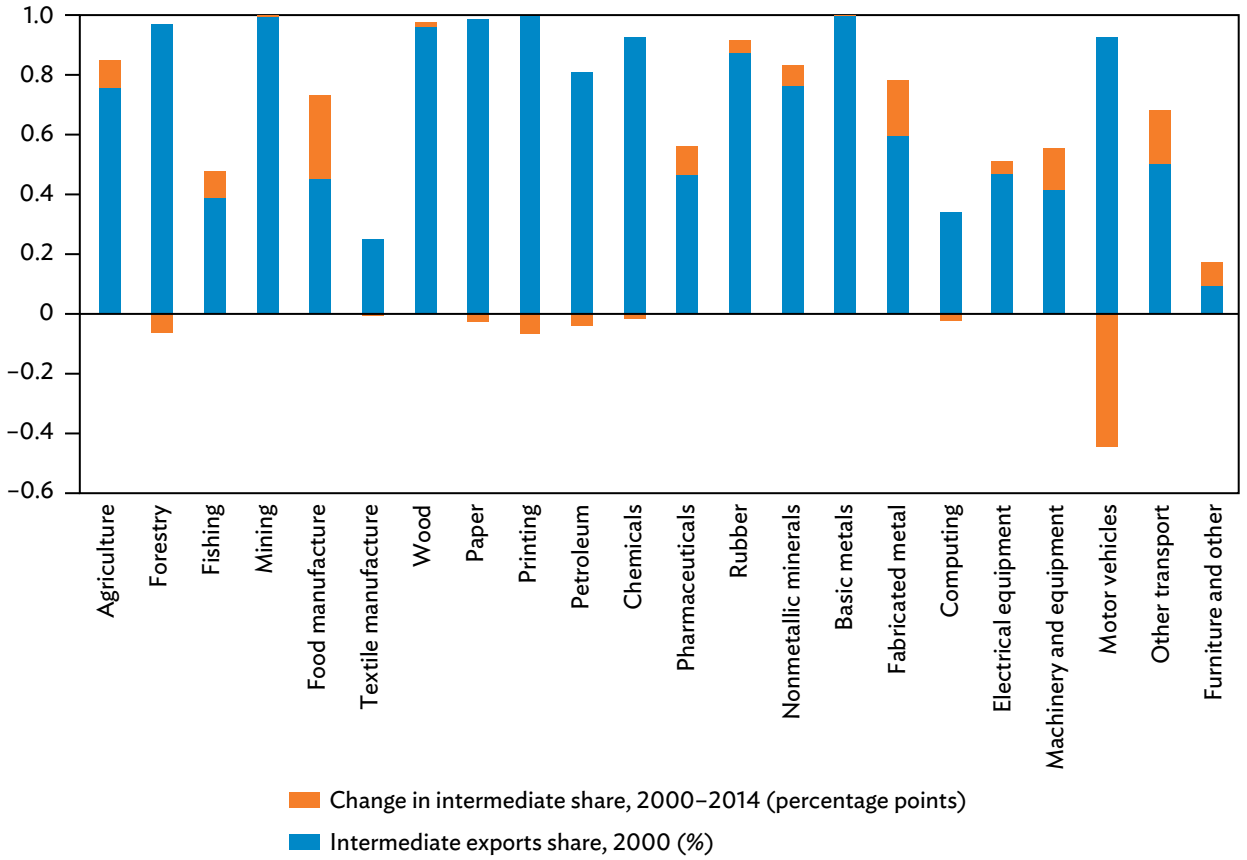
Table 5.4 Sectoral Composition of Primary and Manufacturing Gross Exports *(%)*

Sector	2000	2014
Agriculture	1.86	1.80
Forestry	0.09	0.05
Fishing	0.43	0.70
Mining	27.69	25.08
Food manufacture	11.46	14.25
Textile manufacture	9.39	9.10
Wood	3.01	1.80
Paper	3.98	2.93
Printing	0.00	0.00
Petroleum	14.55	9.12
Chemicals	2.69	5.26
Pharmaceuticals	0.44	0.85
Rubber	2.95	5.56
Nonmetallic minerals	0.38	0.64
Basic metals	8.52	6.29
Fabricated metal	1.09	0.90
Computing	3.90	6.23
Electrical equipment	2.18	3.24
Machinery and equipment	1.14	1.16
Motor vehicles	1.04	1.90
Other transport	0.64	1.02
Furniture and other	2.57	2.11

Source: World Input–Output Database, Socio-economic accounts. http://www.wiod.org/database/seas16 (accessed August 2018).

[106] Note that these shares are based on data in current prices.

Figure 5.9 Share of Intermediate Goods in Exports by Sector



Note: Based on exports in current prices.
Source: World Input–Output Database. http://www.wiod.org/home (accessed August 2018).

The major sectors in which intermediate exports are relatively less important, and thus final goods exports are more dominant, are fishing, textile manufacture, computing, and furniture and other manufacturing. However, with the exception of computing, these sectors tend to be low-tech sectors, where the benefits of processing activities may be limited (see Table 6.1, United Nations Industrial Development Organization's [UNIDO] technology classification).

Figure 5.9 further indicates that there have been relatively few changes in the composition of exports over time. The major exception is food manufacture, where the share of intermediate goods exports increased from 45% in 2000 to 73% in 2014. Fabricated metals and machinery and equipment also saw an increase in the share of intermediate exports, despite a drop in overall export values. The case of motor vehicles is also interesting, with the share of intermediate exports falling during the period, implying an increase in the share of final goods exported, along with an increase in export values.

5.6 Conclusions

The findings in this chapter indicate that Indonesia was—and to a large extent remains—a highly specialized economy, irrespective of whether employment, value added, or exports are considered. Moreover, the sectoral specialization of Indonesia has tended to be in primary subsectors—most notably agriculture and mining, and in low-tech manufacturing—for example, food manufacture and petroleum. As a result, Indonesia's specialization pattern tends to be in sectors that may limit its ability to diversify its

economy. Over time, there has been a movement away from some of these sectors, though in most cases they remain the dominant sectors. A small number of sectors have become more prominent—according to different variables—for example, chemicals, motor vehicles and fishing. This initial analysis suggests that there has been some limited upgrading in recent years and that further development and exploitation of these sectors may be an appropriate development strategy.

The patterns observed have important implications for Indonesia's overall performance and for its future development, particularly when considered in a comparative perspective with other—more successful—Asian economies. Economies that have historically been successful in developing have done so by shifting resources—captured by both value added and employment—into manufacturing. In the case of Indonesia, however, the share of employment—and to a lesser extent value added—in manufacturing is relatively low when compared with more successful Asian economies. Moreover, the levels and growth rates of labor productivity in Indonesia have been relatively low. This is true for manufacturing, but also for primary sectors. Indeed, the recent growth rate of labor productivity in manufacturing has been negative. Consistent with the results on the composition of the manufacturing sector and the complexity of Indonesia's production, the analysis suggests that the specialization pattern of Indonesia has been in products and sectors that suffer from low productivity and where opportunities for labor productivity growth are limited. To further develop, Indonesia will need to identify and exploit opportunities to diversify its economy and to upgrade—i.e., move to higher value added and more productive patterns of production—its economic activities.

Appendix 5.1

Table A5.1 Descriptive Statistics

Sector		Gross Output	Value Added	Employ-ment	Persons Engaged	Hours Worked	Exports	Exports to Gross Output	Labor Produc-tivity
Total		5.15%	4.98%	5.34%	4.11%	3.69%	–0.26%	–3.06%	–0.17%
Primary	A+B	3.10%	2.85%	6.25%	2.75%	7.37%	3.14%	0.38%	–2.83%
Manufacturing	C	3.95%	3.73%	3.69%	4.02%	–0.01%	–0.97%	–2.07%	0.42%
Services	D–U	6.77%	6.85%	5.70%	5.14%	4.19%	0.29%	–4.90%	1.38%
Crop and animal production, hunting and related service activities	A01	3.18%	3.60%	5.90%	2.40%	7.05%	2.34%	–0.05%	–1.70%
Forestry and logging	A02	–0.40%	0.12%	2.26%	–1.07%	3.29%	0.57%	3.63%	–1.70%
Fishing and aquaculture	A03	7.22%	8.03%	10.34%	6.76%	11.55%	0.70%	–4.12%	–1.70%
Mining and quarrying	B	2.74%	1.64%	8.10%	5.65%	8.56%	3.39%	–0.29%	-4.66%
Manufacture of food products, beverages and tobacco products	C10–C12	5.12%	4.75%	–0.74%	–0.32%	–4.16%	6.27%	3.57%	6.13%
Manufacture of textiles, wearing apparel and leather products	C13–C15	3.38%	4.58%	5.20%	5.54%	1.49%	–3.73%	–0.71%	–0.40%
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	C16	–0.13%	0.94%	3.15%	3.48%	–0.53%	–6.85%	–6.15%	–1.81%
Manufacture of paper and paper products	C17	1.69%	2.20%	5.06%	5.40%	1.27%	–3.13%	–1.05%	–2.46%
Printing and reproduction of recorded media	C18	6.26%	2.20%	5.06%	5.40%	1.27%	39.92%	45.07%	–2.46%
Manufacture of coke and refined petroleum products	C19	0.34%	–0.19%	7.33%	7.60%	3.52%	–2.82%	–5.47%	–6.54%
Manufacture of chemicals and chemical products	C20	9.74%	9.82%	6.93%	7.26%	3.45%	2.19%	0.01%	2.64%
Manufacture of basic pharmaceutical products and pharmaceutical preparations	C21	9.71%	9.82%	6.93%	7.26%	3.45%	6.52%	4.90%	2.64%
Manufacture of rubber and plastic products	C22	10.08%	8.73%	6.86%	7.19%	2.75%	3.48%	2.07%	2.06%
Manufacture of other nonmetallic mineral products	C23	7.49%	6.12%	7.02%	7.30%	3.16%	-7.36%	–10.62%	–0.56%

(continued on next page)

Table A5.1 continued

Sector		Gross Output	Value Added	Employ-ment	Persons Engaged	Hours Worked	Exports	Exports to Gross Output	Labor Produc-tivity
Manufacture of basic metals	C24	1.55%	2.62%	7.21%	7.52%	3.39%	6.20%	7.72%	–3.90%
Manufacture of fabricated metal products, except machinery and equipment	C25	2.26%	2.66%	7.27%	7.59%	3.46%	–1.54%	–0.53%	–3.90%
Manufacture of computer, electronic and optical products	C26	7.52%	6.43%	5.08%	5.23%	0.76%	–4.70%	–4.79%	3.82%
Manufacture of electrical equipment	C27	7.02%	6.43%	5.08%	5.23%	0.76%	0.53%	0.39%	3.82%
Manufacture of machinery and equipment nec	C28	4.70%	3.06%	–1.16%	–0.84%	–4.32%	–7.73%	–7.88%	7.77%
Manufacture of motor vehicles, trailers and semitrailers	C29	8.42%	9.07%	5.70%	6.11%	2.14%	11.70%	7.65%	3.81%
Manufacture of other transport equipment	C30	7.32%	9.07%	5.70%	6.11%	2.14%	2.52%	0.10%	3.80%
Manufacture of furniture; other manufacturing	C31–C32	2.6 %	4.16%	1.74%	1.85%	–1.80%	–0.64%	1.13%	4.72%

nec = not elsewhere classified.
Source: World Input–Output Database. http://www.wiod.org/home (accessed August 2018).

6 Indonesia's Manufacturing: A Firm-Level Perspective

6.1 Introduction

This chapter uses microeconomic data to provide a firm-level view of Indonesia's manufacturing sector. It sheds light on the structure of manufacturing by analyzing firm-size distribution and its impact on productivity and performance. The analysis uses two main sources of data: (i) the *Survey of Medium and Large Manufacturing Firms*, an annual survey of manufacturing establishments with at least 20 workers; and (ii) the *Survey of Micro and Small Manufacturing Establishments*, which includes information on micro (1–4 employees) and small (5–19 employees) establishments only (see Box 6.1 for details).

The chapter is organized as follows: section 6.2 gives an overview of the firm-size distribution across manufacturing sectors; section 6.3 considers firm productivity, ownership structure, and wages, and examines the geographical distribution of manufacturing within Indonesia; and section 6.4 concludes.

Box 6.1 Data on Firms—Two Main Surveys

The descriptive trends presented in this chapter are based on two surveys of manufacturing firms in Indonesia:

The *Survey of Medium and Large Manufacturing Firms* is an annual survey of manufacturing establishments with at least 20 workers, conducted by Indonesia's Badan Pusat Statistik (BPS) since 1975. The coverage of this survey is complete, with all medium and large manufacturing firms recorded in the economic census data included in the survey.

The survey is conducted at the plant (establishment) level, rather than at the level of the firm (company), the distinction between the two being that a firm may own a number of different plants in different locations. Estimates of the incidence of multiplant firms indicate that around 5%–7% (or 500–1,000 plants) of the more than 15,000 plants are part of a larger firm.[a] Earlier estimates of the incidence of multiplant firms also put the figure at around 5%. Given the relatively low incidence of multiplant firms, treating a plant as a firm in the analysis seems reasonable.[b] The survey collects data on more than 100 firm-specific variables including location, ownership, employment, inputs, and output.[c]

The second database used in this report is the *Survey of Micro and Small Manufacturing Establishments*, also conducted by the BPS, since 2011. This survey covers firms with 1–19 employees: firms with 1–4 employees classified as micro firms, and firms with 5–19 employees classified as small firms. The 2014 survey used a stratified sampling methodology to draw the sample of firms, with the probability of selection a function of firm size.[d] The sample frame, which defines the universe of firms eligible for inclusion in the survey, was based on the sample frame used in the 2006 Economic Census.

[a] Narjoko and Hill (2007).
[b] Blalock and Gertler (2005).
[c] See Aswicahyono (2009) for a detailed description of the survey.
[d] In 2014, the BPS used a sample of 60,000 micro and small firms, drawn from the 2006 Economic Census.

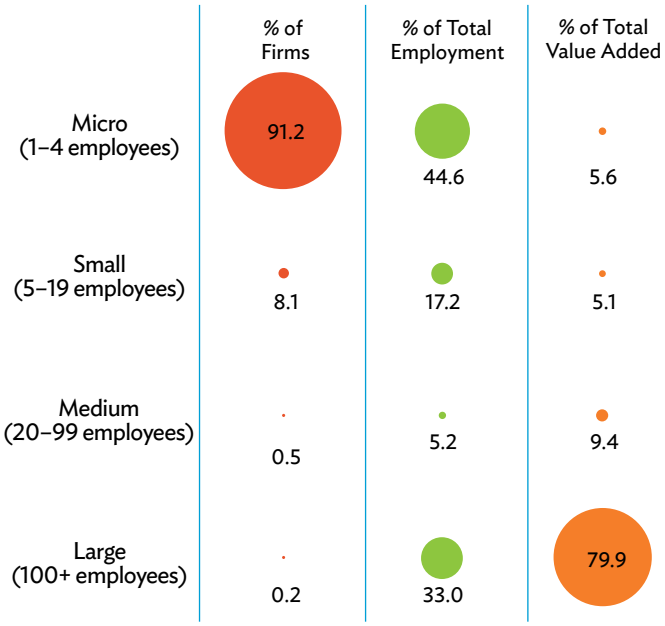
Source: Authors.

6.2 Firm-Size Distribution of the Manufacturing Sector

Micro and small firms dominate Indonesia's manufacturing sector.

Small and micro firms represent 99.3% of all manufacturing firms in Indonesia (Figure 6.1), meaning that medium- and large-sized firms account for less than 1% of all manufacturing firms. A somewhat different picture emerges when the contributions of these different types of firms to employment and value added are considered. In the case of employment, the data are consistent with the view that micro and small firms dominate. These firms account for 61.8% of total manufacturing employment, with large firms accounting for 33% and medium-sized firms just 5.2% of total manufacturing employment. In the case of value added, large firms, and to a lesser extent medium-sized firms, are found to dominate. Large firms account for around 80% of manufacturing value added, while medium-sized firms account for 9.4%. Micro and small firms therefore account for just over 10% of value added.

Figure 6.1 Manufacturing in Indonesia—Firm Distribution by Size, Employment, and Value Added, 2014



Note: In 2014, there were 3.53 million manufacturing firms in Indonesia, 13.54 million workers employed in the sector, and the manufacturing sector's value added was Rp1,892 billion.
Source: Authors' illustration based on the *Survey of Micro and Small Manufacturing Establishments* (2014) and the *Survey of Medium and Large Manufacturing Firms* (2014).

The food sector is the largest manufacturing sector by number of firms (24.5% of the total), employment (16.4% of the total), and value added (18.4% of the total).

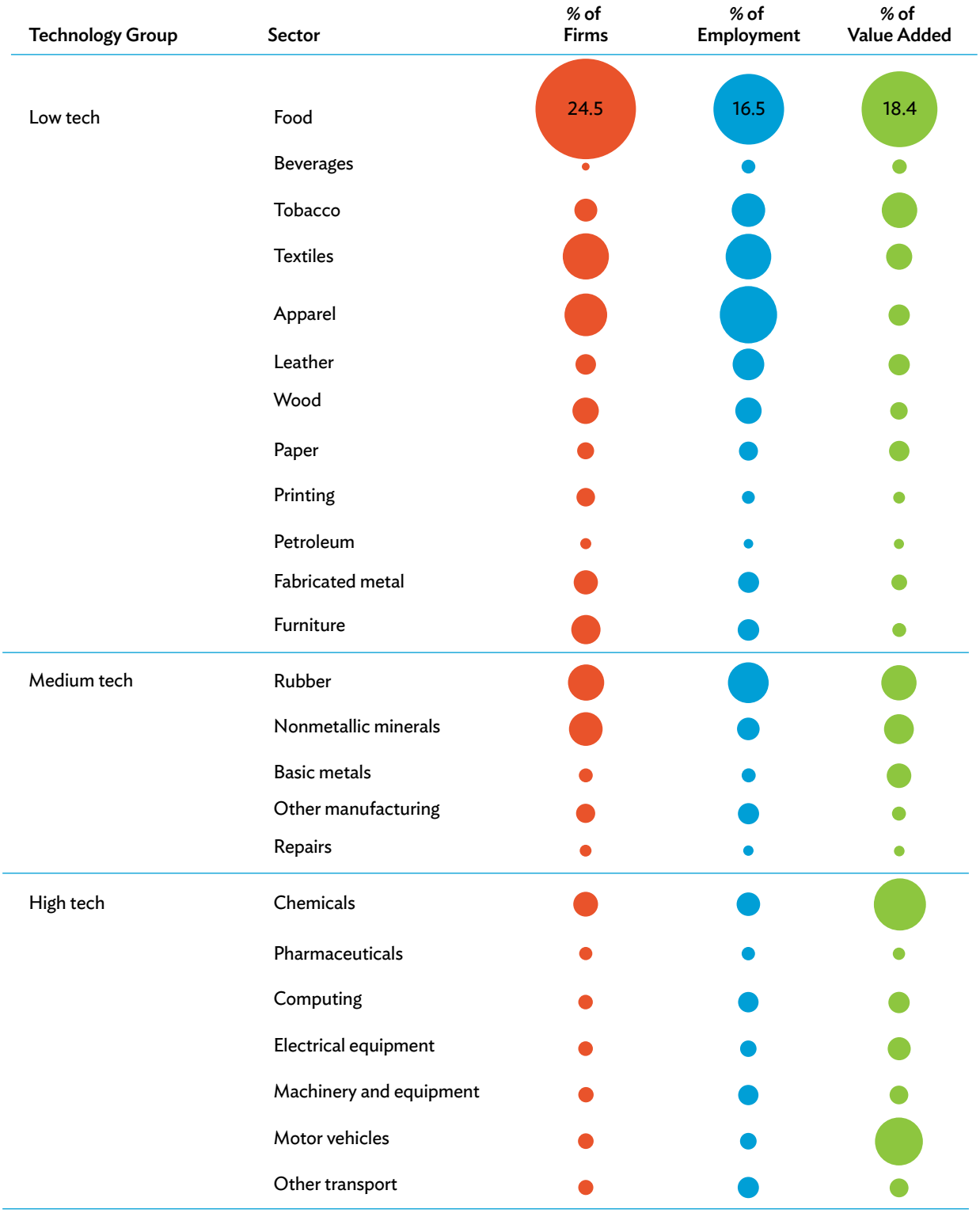
A small number of sectors including food manufacture, textiles, and wearing apparel dominate the manufacturing sector in Indonesia (Figure 6.2).[107] Together, these sectors account for around 44% of all manufacturing firms and around 39% of manufacturing sector employment. While food production also accounts for the largest share of value added, textiles and wearing apparel contribute relatively little in terms of value added. Other sectors such as chemicals and motor vehicles account for relatively large shares in value added. At the other extreme, there are many manufacturing subsectors that contribute very little across all three dimensions.

High-tech sectors produce a significant proportion of the manufacturing sector's total value added.

Figure 6.2 shows that high-technology sectors, as classified by the United Nations Industrial Development Organization (UNIDO), produce a significant proportion of the manufacturing sector's total value added,

[107] Where possible, the analysis uses the same sectoral classification throughout the report. In some cases, however, data are not reported using the same classification or the same level of aggregation.

Figure 6.2 Manufacturing by Industry—Firm Distribution by Sector, Employment, and Value Added



ISIC = International Standard Industrial Classification, UNIDO = United Nations Industrial Development Organization.
Notes: Sectoral classification is at the two-digit ISIC level. Technology grouping is based on UNIDO's classification.
Source: Authors' illustration based on the *Survey of Micro and Small Manufacturing Establishments* (2014) and the *Survey of Medium and Large Manufacturing Firms* (2014).

despite having a relatively small number of firms and employment share.[108] Chemicals, for example, account for 11.6% of the manufacturing sector's value added, second only to food manufacture (18.4%). Similarly, motor vehicles account for 10.4% of manufacturing value added, with electrical equipment, a sector that has been growing in recent years, accounting for 3.7% of manufacturing value added. These sectors are also important for the future of Indonesian manufacturing, as evidenced by the government's Industry 4.0 policy (section 7.4), which aims to utilize new technology for growth and job creation, focusing on five key sectors: food and beverages (C10 and C11 in Table 5.1), textiles and apparel (C13 and C14 in Table 5.2), automotive (C29 and C30 in Table 5.1), electronics (C26 in Table 5.1), and chemicals (C20 in Table 5.1).

Large firms generate a significant share of value added across most manufacturing subsectors.

Across different subsectors and technological intensities within the manufacturing sector, large firms (with 100 or more employees) contribute the bulk of value added (Table 6.1). Large firms account

Table 6.1 Value Added by Firm Size, Sector, and UNIDO's Technology Classification

Technology Group	ISIC Code, Rev. 4	Sector	Value Added				
			Total (Rp billion)	Share by Firm Size (%)			
				Micro	Small	Medium	Large
Low tech	10	Food	375.92	9	5	7	79
	11	Beverages	22.27	6	1	18	76
	12	Tobacco	143.70	1	5	3	90
	13	Textiles	91.86	4	4	12	80
	14	Apparel	83.53	15	21	6	58
	15	Leather	40.82	5	12	4	79
	16	Wood	44.82	34	16	6	43
	17	Paper	59.36	0	1	4	95
	18	Printing	16.52	11	17	16	56
	19	Petroleum	2.57	0	0	38	62
	25	Fabricated metal	52.57	13	9	14	65
	31	Furniture	45.63	24	28	10	38
Medium tech	22	Rubber	138.77	0	1	10	89
	23	Nonmetallic minerals	97.90	12	8	5	75
	24	Basic metals	67.41	0	0	12	87
	32	Other manufacturing	20.55	13	12	11	65
	33	Repairs	3.83	17	0	22	61
High tech	20	Chemicals	212.56	0	0	20	80
	21	Pharmaceuticals	15.68	1	0	8	90
	26	Computing	39.00	0	0	7	93
	27	Electrical equipment	71.04	0	0	5	94
	28	Machinery and equipment	35.79	0	6	20	74
	29	Motor vehicles	149.47	0	0	8	92
	30	Other transport	60.09	1	2	9	88

ISIC = International Standard Industrial Classification, Rp = rupiah, UNIDO = United Nations Industrial Development Organization.
Notes: Sectoral classification is at the two-digit ISIC level. Value added and firm size are for 2014.
Sources: *Survey of Micro and Small Manufacturing Establishments* (2014) and *Survey of Medium and Large Manufacturing Firms* (2014); and UNIDO (2017).

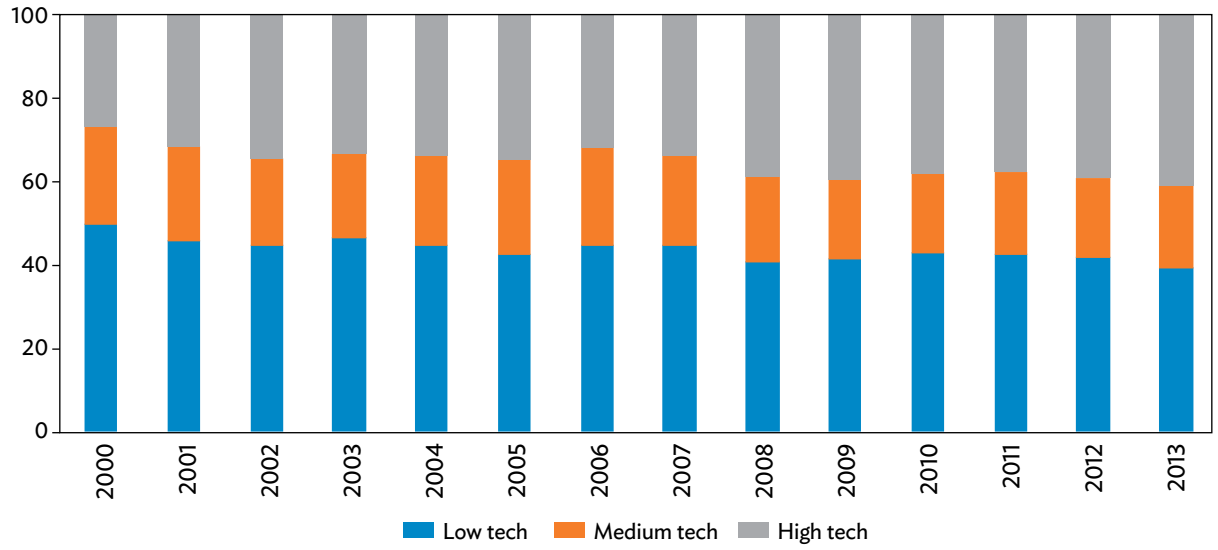
[108] Data on capital and labor intensity of the manufacturing sector in Indonesia are not available. Thus, the analysis uses the technological intensity (low, medium, and high tech) of manufacturing sectors, based on UNIDO's classification.

for 90% or more of value added in tobacco, paper, pharmaceuticals, computing, motor vehicles, and electrical equipment. Indeed, in the majority of sectors, more than two-thirds of value added comes from large firms, the major exceptions being light manufacturing subsectors such as apparel, wood, and furniture. In the case of high-tech sectors, between 74% and 94% of value added comes from large firms. This result is consistent with the view that technology requirements in these sectors translate to higher fixed capital investment, which further implies that firms must be large in order to achieve economies of scale and be profitable.

High-tech sectors' value added has increased in recent years, but not their employment.

The share of manufacturing value added that comes from high-tech sectors (as identified in Table 6.1) has increased fourfold in less than 10 years and currently stands at over 40% (Figure 6.3). The government is making significant efforts at incentivizing manufacturing firms—with a series of incentives aimed at high-tech industries (Chapter 7)—and a new focus on the automotive, electronics, and chemicals sectors as part of Industry 4.0 policy (section 7.4). Despite these positive developments, it is important to note that the distribution of firms and employment is still skewed toward low-tech manufacturing (Figure 6.4, panels [a] and [b]). In fact, the share of Indonesian manufacturing firms engaged in high-tech manufacturing has hovered at around 30% in the last decade.

Figure 6.3 Value Added by Technology Intensity *(%)*

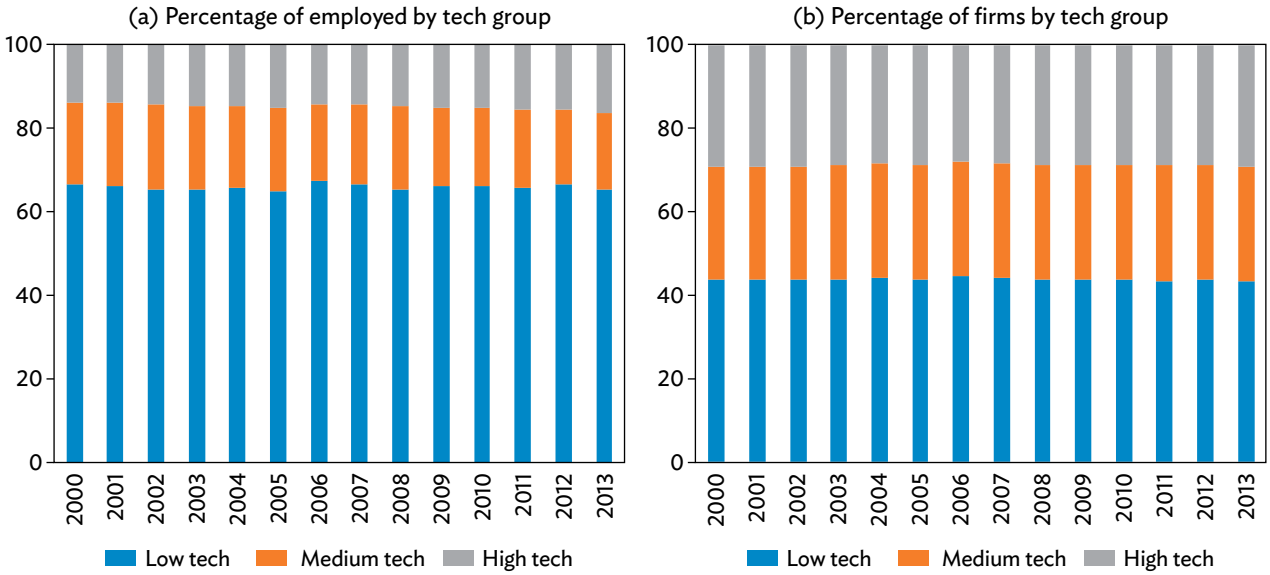


Note: See Table 6.1 for the classification of manufacturing industries into low-, medium-, and high-tech sectors (based on UNIDO).
Source: *Survey of Medium and Large Manufacturing Firms*, 2000–2013.

Reliance on imported inputs is more prevalent in medium- and high-tech industries.

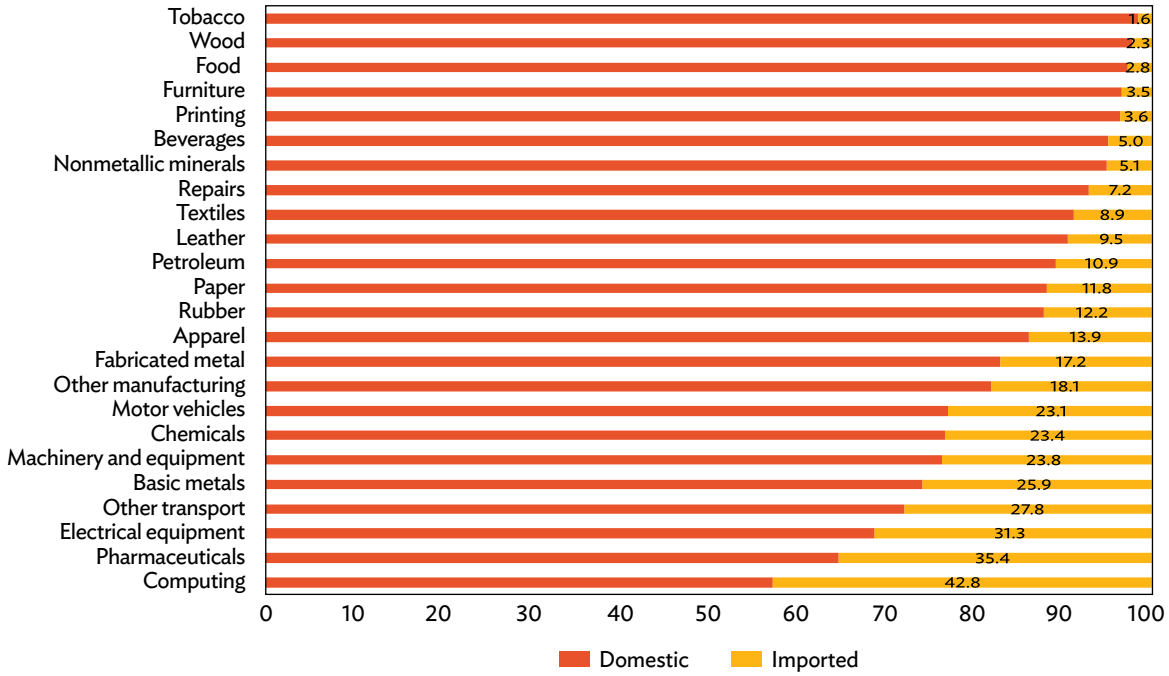
The *Survey of Medium and Large Manufacturing Firms* shows that industries that rely on foreign inputs—while more productive and contributing the most to the sector's value added—are also more vulnerable to macroeconomic shocks stemming from exchange rate volatility. Around 42.8% of the inputs in the computer sector are imported—the largest share of foreign inputs among all manufacturing sectors in Indonesia (Figure 6.5). About a third of all inputs are also imported in the electrical equipment and other

Figure 6.4 Distribution of Firms and Employment in Manufacturing by Technology Intensity (%)



Note: See Table 6.1 for the classification of manufacturing industries into low-, medium-, and high-tech sectors (based on UNIDO).
Source: *Survey of Medium and Large Manufacturing Firms*, 2000–2013.

Figure 6.5 Source of Material Inputs into Manufacturing by Product, 2014 (%)



Note: The orange bars report the share of imported materials (% of total inputs used in production) by industry.
Sources: *Survey of Micro and Small Manufacturing Establishments* (2014) and *Survey of Medium and Large Manufacturing Firms* (2014).

transport equipment sectors. Imported inputs also account for a significant share of total inputs in the low-tech sectors, such as textiles (8.9%) and apparel (13.9%). One of the key features of the Industry 4.0 strategy is to reduce imports of raw materials into manufacturing (section 6.3), particularly in the automotive, electronics, and chemicals sectors, as well as in the textiles and apparel sectors.

6.3 Productivity, Wages, and Agglomeration in Manufacturing

Large firms, joint ventures, and firms in Java are the most productive.

Large firms are the drivers of productivity improvements in Indonesia's manufacturing sector (Figure 6.6, panel [a]). Large manufacturers have, on average, both the highest levels and growth rates of labor productivity, with an average annual increase in productivity of around 7% per year. Medium-sized firms (20–99 employees) were less productive than large firms in 2000. Moreover, the gap in labor productivity between large- and medium-sized firms more than doubled between 2000 and 2013. While it is important and relevant to note that the results in Figure 6.6 are based on a survey of medium and large firms only, it is likely that productivity levels and growth rates of micro and small firms would be lower than those reported in the same figure, given that these firms tend to be engaged in low-tech manufacturing.

Comparing foreign-owned firms, joint ventures, and domestic firms, the data show that joint venture companies have both the highest levels of productivity and the fastest growth rates, with an average growth rate of 8% per year (Figure 6.6, panel [b]). Foreign-owned firms are more productive than domestic firms, consistent with results found elsewhere for many other countries, while the growth rate of productivity of these two groups are similar. When considering productivity by geographical region, firms in Java on average have significantly higher productivity levels than firms in other locations, with productivity in Java increasing rapidly at an average rate of 12% per year. (Figure 6.6, panel [c]).

Large firms and firms in high-tech sectors pay higher wages.

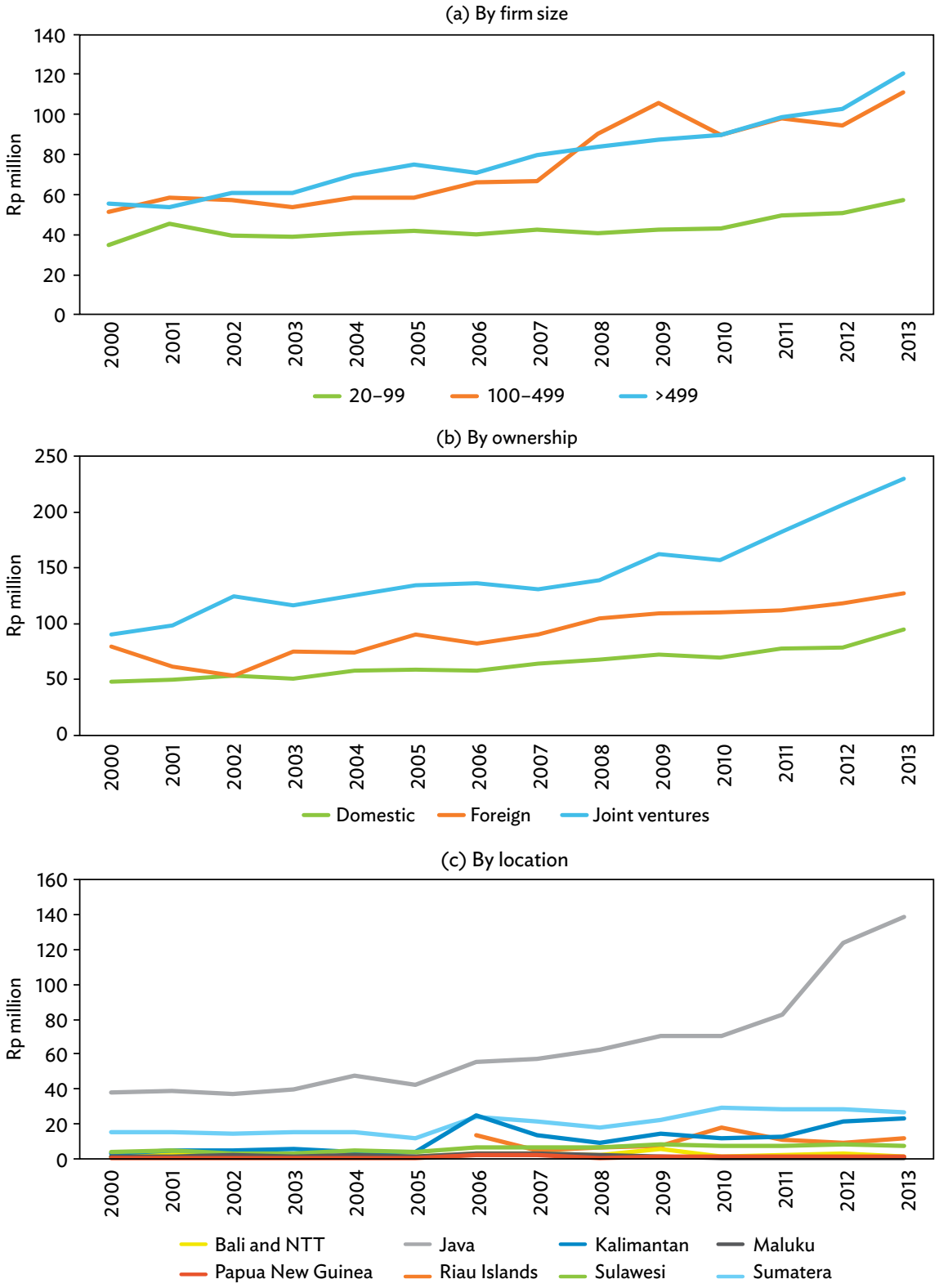
Evidence shows that, with the exceptions of firms in basic metals and in manufacture of coke and petroleum products, high-tech manufacturing firms generally pay higher wages in Indonesia (Figure 6.7). Average monthly wages in the automotive industry are almost five times those in the tobacco sector. These differences are likely due in part to differences in skill requirements of the sector, with average levels of education and training significantly higher in the motor vehicles sector than in low-tech sectors such as textiles and apparel. When distinguishing firms by size, large firms generally pay higher wages than small and micro firms (Table 6.2), with large firms paying on average five times more than micro firms in the same sector. This pay differential likely reflects in part the fact that micro firms tend to be informal.

Despite government efforts to decentralize, Indonesia's manufacturing is concentrated in Java.

Manufacturing firms are concentrated in Java, with 70% of the manufacturing sector's value added created there, particularly in greater Jakarta (including Jakarta, West Java, and Banten) and East Java (Figure 6.8). This agglomeration pattern is persistent, as reported in earlier studies.[109] The availability of supporting industries and amenities such as better infrastructure (including road, ports availability, and energy supply reliability), a large local market, and better access to international markets are important pull factors for Java. These figures hide important changes within Java, however, with many manufacturers recently moving out of the greater Jakarta area, in particular toward lower cost regions within Java, such as peripheral areas in West and Central Java.

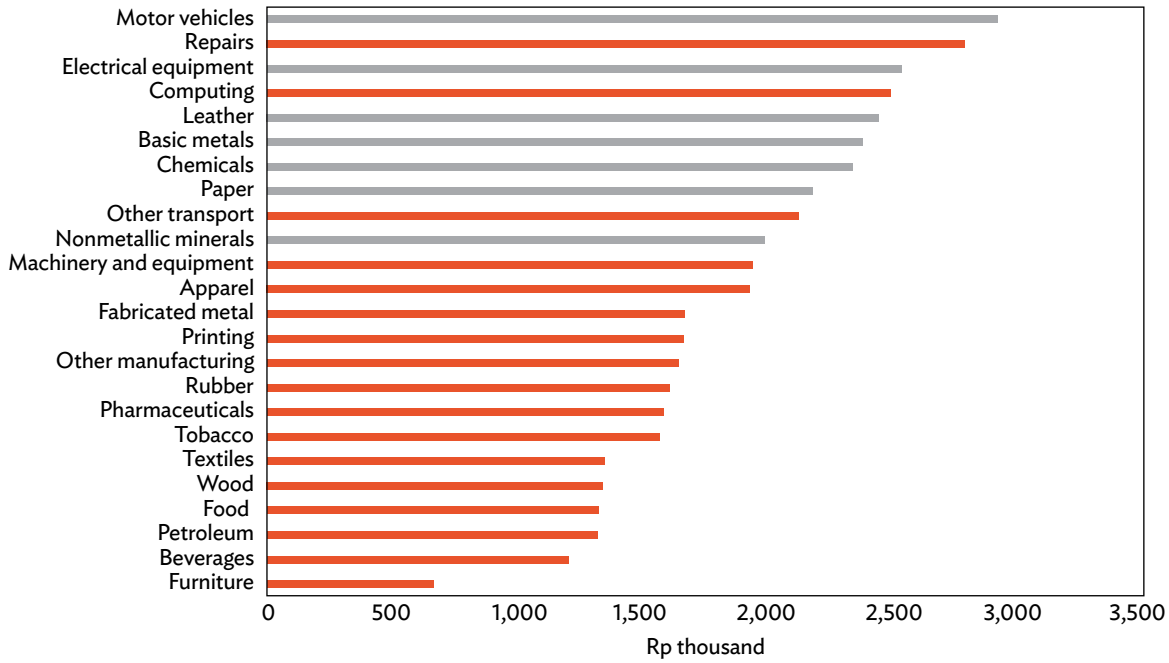
[109] World Bank (2012g).

Figure 6.6 Annual Productivity (value added per worker)



NTT = Nusa Tenggara Timur.
Notes: In panel (a), firm size refers to number of employees: medium (20–99), large (100–499), and very large (500 and above). In panel (b), joint ventures are firms with foreign shares below 90%.
Source: *Survey of Medium and Large Manufacturing Firms*, 2000–2013.

Figure 6.7 Average Monthly Wages by Sector, 2014



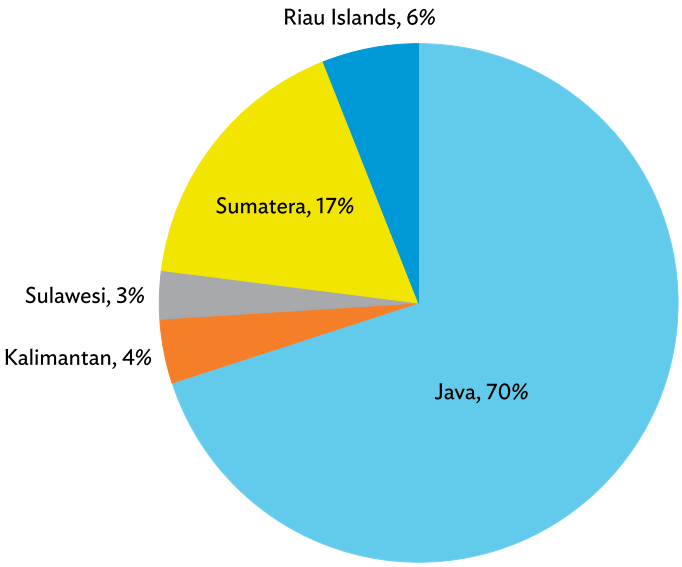
Notes: Bars in light gray are high-tech manufacturing industries.
Sources: *Survey of Micro and Small Manufacturing Establishments* (2014) and *Survey of Medium and Large Manufacturing Firms* (2014).

Table 6.2 Monthly Wages by Sector and Size, 2014 (Rp thousand)

Industry Type (ISIC Rev 4)	Firm Size				
	1–4	5–19	20–99	100 or More	Average
Food	523	744	1,440	2,623	1,333
Beverages	626	700	2,314	2,739	1,595
Tobacco	271	356	839	1,261	682
Textiles	572	867	1,477	1,947	1,216
Apparel	831	1,245	1,560	1,791	1,357
Leather	1,015	1,414	1,935	2,125	1,622
Wood	840	1,294	1,499	1,809	1,361
Paper	517	914	2,378	2,914	1,681
Printing	821	1,202	2,431	3,309	1,941
Petroleum			2,427	2,581	2,504
Chemicals	506	732	3,724	4,556	2,379
Pharmaceuticals	367	255	2,612	3,085	1,580
Rubber	934	1,363	2,455	3,059	1,953
Nonmetallic minerals	727	1,002	1,657	3,246	1,658
Basic metals	844	1,896	4,006	4,447	2,798
Fabricated metal	1,034	1,229	2,836	3,452	2,138
Computing	1,146	372	2,789	3,639	1,986
Electrical equipment	583	1,459	3,631	4,115	2,447
Machinery and equipment	736	1,308	3,439	3,868	2,338
Motor vehicles	1,947	1,244	3,752	4,734	2,919
Other transport	1,159	1,317	2,872	3,358	2,176
Furniture	1,260	2,173	1,552	1,715	1,675
Other manufacturing	750	808	1,657	2,119	1,334
Repairs	1,097	1,792	3,594	3,657	2,535

ISIC = International Standard Industrial Classification, Rp = rupiah.
Sources: *Survey of Micro and Small Manufacturing Establishments* (2014) and *Survey of Medium and Large Manufacturing Firms* (2014).

Figure 6.8 Geographical Distribution of Manufacturing in Indonesia
(% of total value added)



Sources: *Survey of Micro and Small Manufacturing Establishments* (2014) and *Survey of Medium and Large Manufacturing Firms* (2014).

6.4 Conclusions

This chapter has provided an overview of Indonesia's manufacturing sector at the firm level. A key finding is that the bulk of manufacturing firms in Indonesia are micro and small firms (99.3%), with only a small percentage accounted for by medium and large firms (less than 1%). This is very important for understanding what constrains the manufacturing sector and for thinking about the future of the sector. The reality is that it is very difficult for micro and small firms to grow to a size that makes an impact in terms of productivity, product upgrading, or research and development. The cross-country evidence shows that the vast majority of micro and small firms, particularly those that are informal, appear to begin and end their lives as unproductive and small firms. Studies have shown that the most effective growth strategy should focus on the entry of formal and large firms, which tend to be the most productive and contribute most to the manufacturing sector's value added.[110] Results in this chapter highlight the manufacturing subsectors in which these types of firms are relatively prevalent and the performance of these firms relative to others.

In Indonesia, the food manufacturing sector is the largest in terms of number of firms, employment share, and value added. However, high-tech manufacturing sectors such as chemical and chemical products, motor vehicles, and electrical equipment, although relatively small in terms of number of firms and employment share, also generate a substantial share of total manufacturing value added. The analysis indicates that most of the value added in manufacturing comes from large firms. Furthermore, value added by high-tech industries has increased in recent years, providing hope for a manufacturing revival. Finally, medium- and high-tech firms rely more heavily on imported inputs, which makes these firms more productive and adds to the sector's value added. Using imported inputs, however, can also lead to greater vulnerability to macroeconomic shocks due to exchange rate volatility.

[110] La Porta and Shleifer (2008).

Large firms and joint ventures are the most productive. Large firms grew at an average rate of 7% per year in 2000–2013, while joint venture companies grew at an average rate of 8% per year in the same period. Furthermore, large-sized firms and high-tech firms pay higher wages, which reflects in part the skill, training, and educational requirements in these types of firms.

Lastly, the largest concentration of manufacturing activity is to be found in Java, with around 70% of manufacturing sector value added created there. The geographic concentration of firms in Java may be linked to the availability of infrastructure such as roads, ports, reliable energy, a large local market, and Java's better access to international markets.

The current structure of Indonesia's manufacturing sector—dominated by micro and small firms, with a few large firms and high-tech sectors generating a significant share of value added—has been shaped by the deep economic crisis of 1997–1998 and the policy changes that came in its aftermath. Firm dynamism—entry and exit of firms—diminished following the crisis, with growth coming from existing firms rather than new entrants.[111] As the evidence presented in this chapter shows, to spur the revival of the manufacturing sector and to create jobs to absorb Indonesia's growing labor supply will require the government to facilitate the entry of large and high-tech firms. While policies to support micro and small firms are important for equity reasons (to help lower-skilled entrepreneurs operating in the informal sector), the growth of the manufacturing sector in Indonesia hinges on formal firms that are large, more productive, and produce high-tech and more sophisticated products.

[111] Aswicahyono, Hill, and Narjoko (2010).

7 Indonesia's Reform Packages, Incentives to the Manufacturing Sector, and Industry 4.0

7.1 Introduction

Having analyzed in previous chapters the history and structure of Indonesia's manufacturing sector, this chapter examines the recent reform packages, the current system of incentives to the manufacturing sector, and the strategy to achieve Industry 4.0. All three programs have important implications for the development of the manufacturing sector, and reflect the government's efforts to support the sector and the belief in its relevance as a driver of growth.

Since 2015, the Jokowi administration has implemented 16 reform packages to revive economic growth in Indonesia. These packages aim broadly to remove obstacles to doing business, boost exports, and achieve higher economic growth. The initiatives focus on all sectors and industries, including the manufacturing sector. In addition to these reform packages, the government over the years has offered a variety of policy incentives targeted at manufacturing, mostly to encourage greater investment in the sector. Many of these measures—fiscal and nonfiscal—cover a broad range of industries. Finally, Industry 4.0 is the Indonesian government's key strategy to rejuvenate the manufacturing sector. The government hopes this program will give the sector a new chance to be the country's engine of growth in the coming decades.

The rest of the chapter is organized as follows. Section 7.2 provides an overview of the reform packages, focusing on those that are most relevant for Indonesia's manufacturing sector. Section 7.3 takes stock of the incentives that have been in place for decades, well before the current reform packages were implemented. This section also examines how useful the current incentives are in spurring new investment in manufacturing. Section 7.4 looks at "Making Indonesia 4.0"—the government's strategy to leverage new technologies for better and inclusive growth, and its relevance to manufacturing industries in Indonesia, focusing particularly on five priority sectors: food, garments, automotive, electronics, and chemicals. Finally, section 7.5 offers conclusions.

7.2 Reform Packages under the Jokowi Administration

Since 2015, 16 economic packages have been implemented. The earlier ones were broad and general while the recent ones are more targeted.

The Government of Indonesia has implemented a series of economic packages since September 2015. So far, 16 packages have been introduced, aimed at improving competitiveness, boosting exports, simplifying regulation and business processes, and improving infrastructure to facilitate trade and commerce (see Table 7.1). The initial reform packages included broad measures, relatively general in scope, without a sectoral or industry focus. For instance, reform package no. 1 was aimed at boosting industrial competitiveness through deregulation, cutting red tape, and enhancing law enforcement and business certainty. In contrast, more recent reform packages such as package nos. 14 and 15 are sector specific, and deal with developing the e-commerce industry and improving logistics, respectively.

Table 7.1 Economic Reform Packages of the Jokowi Administration

Package	Announcement	Key Measures
1	9 September 2015	• Boost industrial competitiveness through deregulation • Curtail red tape • Enhance law enforcement and business certainty
2	30 September 2015	• Interest rate tax cuts for exporters • Speed up investment licensing for investment in industrial estates • Relax import taxes on capital goods in industrial estates and aviation
3	7 October 2015	• Cut energy tariffs for labor-intensive industries • Reduce People's Business Credit (KUR) rate from 22% to 7% to further stimulate MSMEs
4	15 October 2015	• Fixed formula to determine increases in labor wages • Soft micro loans for export-oriented, labor-intensive firms with less than 30 employees
5	22 October 2015	• Tax incentive for asset revaluation • Scrap double taxation on real estate investment trusts • Deregulate Islamic banking
6	5 November 2015	• Tax incentives for investment in special economic zones
7	4 December 2015	• Waive income tax for workers in the nation's labor-intensive industries • Free leasehold certificates for street vendors operating in 34 state-owned designated areas • Expedite the process of obtaining land certification
8	21 December 2015	• Scrap import duty for 21 categories of airplane spare parts • Incentives for the development of oil refineries by the private sector • One-map policy to harmonize the utilization of land
9	27 January 2016	• Single-billing system for port services conducted by SOEs • Integrate Indonesia National Single Window system with "inaportnet" system • Mandatory use of Indonesian rupiah for payments related to transportation activities • Remove price difference between private commercial and state postal services
10	11 February 2016	• Remove foreign ownership cap on 35 businesses • Support small and medium enterprises as well as cooperatives
11	29 March 2016	• Lower tax rate on property acquired by local real estate investment trusts • Harmonize customs checks at ports (to curtail dwell time) • Government-subsidized loans for export-oriented small and medium enterprises • Roadmap for the pharmaceutical industry
12	28 April 2016	• Enhance ease of doing business in Indonesia by cutting procedures, permits, and costs
13	24 August 2016	• Deregulate residential property projects for low-income families
14	10 November 2016	Create a roadmap for the nation's e-commerce industry: • Ease and widen access to funding • Offer tax incentives • Harmonize regulations and gradually develop a national payment gateway • Promote e-commerce awareness campaigns and improve e-commerce education • Accelerate the development of high-speed broadband network • Improve the e-commerce logistics system
15	15 June 2017	Improve Indonesia's logistics: • Enhance the role of transportation insurance • Reduce costs for logistic service providers • Strengthen the Indonesia National Single Window authority • Reduce the number of prohibited and restricted goods
16	31 August 2017	Single submission system: • Integrate business licensing services • Utilize information technology • Enhance cooperation/coordination among government agencies at the central and local levels

(continued on next page)

Table 7.1 continued

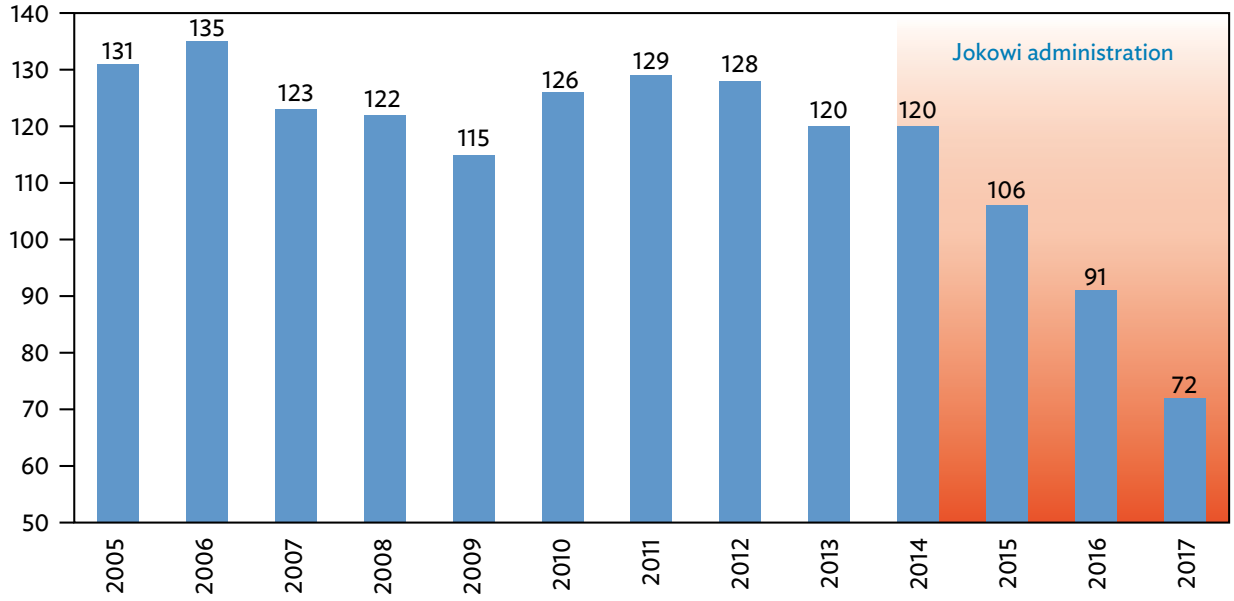
Package	Announcement	Key Measures
16 Updated	2 November 2018	• Extension of the tax holiday facility • Addition of two sectors eligible for tax holiday (natural resource-based manufacture and digital economy sector) • Addition of 70 ISIC into the list of pioneer industries* • Ease the tax holiday application and granting through OSS Relaxation of Negative Investment List: Government reduces the list of negative investment to 25 sectors** • Provide financial income tax cuts for exporters who deposit their earnings in designated accounts

ISIC = International Standard Industrial Classification; MSMEs = micro, small, and medium enterprises; OSS = Online Single Submission; SOE = state-owned enterprise.
Notes: *The number of ISIC codes given the status of pioneer industries was 99. After the latest reform, the number increased to 169. As of now, there is no list of what these 70 ISIC codes are. **The initial number of sectors was 54 (2 November 2018) but the government revised the number to 25 (16 November 2018), because some of them are still not yet approved.
Sources: Coordinating Ministry for Economic Affairs and IMF (2018a, Appendix IV).

Progress in several areas can be linked to these reform packages, notably on reducing regulation and trade barriers, facilitating business registration and land acquisition, and general clarity on minimum wage setting policies. Not surprisingly, given this series of reforms, Indonesia has also moved up in the World Bank's ease of doing business ranking—the shaded area on the right of Figure 7.1 indicates considerable improvements in rankings in the last 5 years under the Jokowi administration.

The reform packages can be broadly classified into three broad areas: (i) reducing regulatory and licensing burden; (ii) improving infrastructure (electricity, transport, trade, and other logistics); and (iii) financing schemes for micro, small, and medium-sized enterprises (MSMEs). The rest of the section will discuss the Jokowi administration's 16 reform packages under these three broad objectives.

Figure 7.1 Indonesia's Ranking in the World Bank's Ease of Doing Business Index



Notes: Lower values indicate a higher ranking. Yearly rankings may not be comparable due to changes in the survey's methodology, except for the period 2015–2018 when the rankings used the same methodology.
Source: World Bank (2018).

7.2.1 Reducing Regulatory and Licensing Burden

As of 2016, 324 regulations have been revoked while 75 have been revised.

The Jokowi administration's first reform package—aimed at reducing regulatory and licensing burden and at improving Indonesia's competitiveness—reflects the priorities of the new administration when it took office. Indeed, President Jokowi ordered a 50% reduction in regulations by 2019, which directly impacted about 20 ministries and implementing agencies. According to the Ministry of National Development Planning (BAPPENAS), as many as 324 regulations have been revoked while 75 have been revised as of 2016, achieved mainly through the implementation of reform package nos. 1 to 13 in the last few years. The simplification of regulations focused on a few key principles: make it easier to register and obtain a license to operate a business; improve public services to help businesses; provide legal certainty; accelerate dispute resolution processes; and introduce new regulations to reflect the changing realities of operating a business in Indonesia.

Indonesia provides a one-stop licensing service through the Pusat Pelayanan Terpadu Satu Pintu.

One of the notable reforms of the last few years has been the implementation of an integrated One Stop Service-Center (Pusat Pelayanan Terpadu Satu Pintu or PTSP Pusat) at the Indonesia Investment Coordinating Board (BKPM). The PTSP Pusat, inaugurated at BKPM on 26 January 2015, endeavors to make business registration and licensing more efficient and accessible to businesses. The service center covers all licensing and nonlicensing services of the government and regional governments, and accommodates integration between institutions and regions, thereby making the licensing process easier and eliminating the problem of fragmented standards for each region.

Firms investing rupiah (Rp) 100 billion can obtain a business permit/license within 3 hours.

As part of the introduction of PTSP Pusat, investors with a minimum investment of Rp100 billion (about $7.14 million at Rp14,000 = $1) or a workforce of more than 1,000 people can obtain their initial permits within 3 hours and start their business activities shortly afterward. Currently, the 3-hour service is given to companies that have already obtained a license and want to expand capacity. BKPM also serves companies that supply raw materials to core companies that get the 3-hour service. These "chain of companies/suppliers" are not required to invest at least Rp100 billion, but they need a proof of supply chain link from the core company. The 3-hour service is also provided to the infrastructure sector—toll roads, ports, and other infrastructure projects—but without the minimum investment value requirement. According to BKPM, between January and June 2016, the 3-hour investment service facilitated the investment efforts of 59 companies, valued at about Rp137.5 trillion. In a span of 6 months, these firms employed about 44,400 workers in total.

Online Single Submission (OSS) business licensing system further improves the electronic system of registration and licensing.

The government recently launched an OSS system for business licensing as part of its efforts to solve obstacles to doing business by using digital technology, under reform package no. 16. This web-based system facilitates business licensing through an integrated electronic system that synchronizes various licensing permits in the country. It is also expected to further simplify the process of obtaining business permits as several key permits (location, environmental, and building permits) can be obtained an hour after submitting all required data in the OSS.[112]

[112] Indonesia-Investments. 2018a. "Indonesia Launched the Online Single Submission Licensing System." https://www.indonesia-investments.com/news/todays-headlines/indonesia-launched-the-online-single-submission-licensing-system/item8887?

The government has expedited land acquisition and certification.

The Indonesian government recently accelerated the process of land certification through reform package no. 7, which is key for businesses looking to expand their operations. Through the leadership of the Ministry of Agrarian and Spatial Planning, the government has embarked on innovations such as adding working days and time to facilitate the process of land registration and certification, opening more outlets to provide registration and certification services, and introducing electronic registration systems.

As part of the objective to increase land access of businesses, a recent reform measure (Presidential Regulation No. 34, 2016) provides full compensation, including tax waivers, to displaced land owners as a result of an infrastructure development project that is of public interest. This new measure compliments a previous regulation (Presidential Regulation No. 148, 2015), which sped up the receipt of compensation to within 7 working days (there was no limit before 2015).

7.2.2 Improving Infrastructure—Electricity, Transport, Trade, and Other Logistics

The development of special economic zones (SEZs) is a key part of the government's efforts to reduce the cost of logistics and to facilitate trade.

Indonesia's ranking in the World Bank's Logistics Performance Index (LPI) has improved in the last few years, but other major economies in the region—India, Malaysia, the People's Republic of China (PRC), Thailand, and Viet Nam—all rank higher than Indonesia (Figure 7.2). Indeed, the cost of logistics in Indonesia remains much higher compared to its Southeast Asian neighbors. The waiting time for goods at the port is also longer; creating difficulties in meeting the demand from international buyers. Studies conducted by the government find that logistics-related difficulties create unnecessary trade barriers and reduce Indonesia's competitiveness.

Several of the reform initiatives of the government were aimed at reducing logistics costs and developing industrial areas to create a strong and resilient national industry. For instance, the Bonded Logistics Center (Pusat Logistik Berikat or PLB), created in 2016 under reform package no. 2, encouraged trade activities, strengthened competitiveness of export-oriented industries, and ensured timely arrival of intermediate inputs and the canalization of high-risk goods that could disrupt domestic industries.[113] Furthermore, the PLB, created as an extension of the existing bonded stockpile, became a center for the distribution of imported raw materials and a consolidation center for export goods. Industries that store imported raw materials and export goods from this facility were also exempted from paying import duties for machines and input materials, value-added tax (VAT), and luxury goods tax.

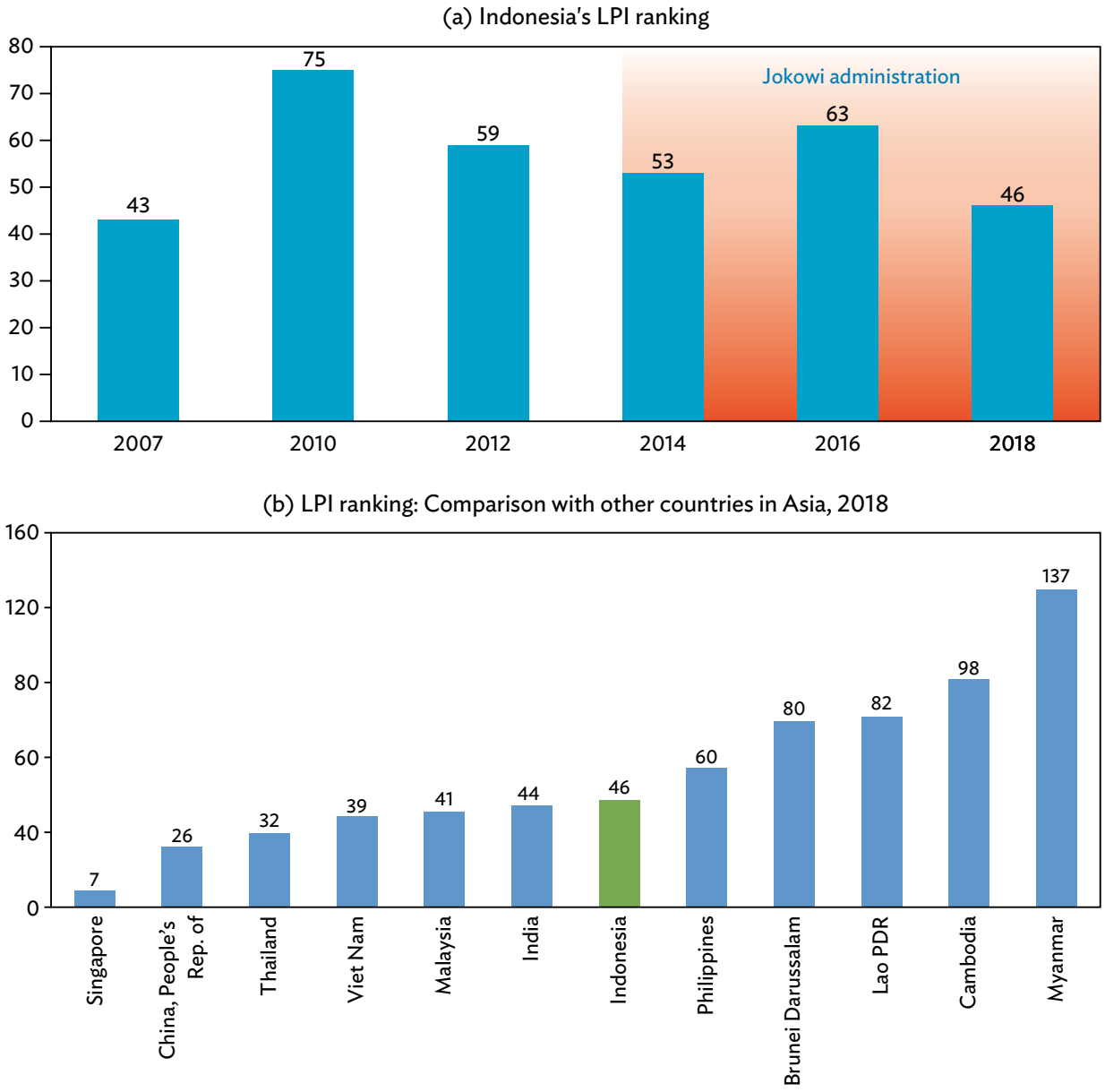
The PLB has facilitated trade while generating much needed revenue.

The introduction of the PLB has not only facilitated trade but has also generated much needed revenue for the government. In April 2017, the value of goods stored in the PLB warehouse was recorded at Rp1.16 trillion from 20 international suppliers, 34 international distributors, and 97 local distribution companies. The PLB also contributed to state revenues with an import duty amounting to Rp10.28 billion, Article 22 import tax amounting to Rp27.13 billion, and import VAT of Rp120.09 billion. The average lead time to import of 1.8 days was also much faster than normal for imports in general.[114]

[113] "Canalization" means that all goods entering or leaving a country must do so only through a customs-controlled channel or agencies designated by the government.

[114] Lead time to import is the median time (the value for 50% of shipments) from port of discharge to arrival at the consignee. Data are from Logistic Performance Index Surveys. https://lpi.worldbank.org/.

Figure 7.2 Logistics Performance Index



Lao PDR = Lao People's Democratic Republic, LPI = Logistics Performance Index.
Source: World Bank. Logistic Performance Index Surveys. https://lpi.worldbank.org/ (accessed August 2018).

Meanwhile, the PLB also had a positive impact on the warehouse industry in Indonesia. According to data released by the Central Bureau of Statistics (Badan Pusat Statistik), the transportation and warehousing sector grew by 0.27% from a year ago, second to the community service sector which grew by 0.42% during the same period. Furthermore, the PLB also decreased dwell time (idle time when goods stay in the port) by transferring several activities in the preclearance and custom clearance stages from the port to PLB. This was particularly beneficial for small and medium-sized enterprises, which lack the capacity or a trained workforce to deal with issues related to logistics.

On the back of this success, reform package no. 15, introduced in June 2017, further improved logistics by enhancing the role of transportation insurance, reducing the cost of doing business for logistics service providers, strengthening the Indonesia National Single Window authority, and reducing the number of prohibited and restricted goods. Furthermore, to facilitate international trade, the package included specific measures aimed at reducing the operational costs of transport services, eliminating licensing requirements for freight transport, mitigating investment costs of seaports, standardizing documents related to domestic goods flow, developing regional distribution centers, and providing vessel procurement facilities and cost recovery mechanisms for container collateral.

Furthermore, in March 2018, the government launched PLB Generation 2 to continue building on the progress that Indonesia has made in improving logistics for trade and commerce. As of the third quarter of 2018, there are 64 PLBs in Indonesia.

Improving access to electricity is a key part of efforts to scale up infrastructure.

The installed electricity capacity in Indonesia reached 53 gigawatts in 2015, with sold energy reaching 220 terawatt-hours. The current electrification ratio is 95.4% and is expected to increase to 99% by 2019.[115] The Jokowi government also aims to improve access to electricity. As part of reform package no. 3, the government has put in place a program to reduce fuel and gas prices, staggered by industry and sector. This is to enhance production in industries that rely on heavy machinery and steady supply of electricity. Electricity consumed between 23:00 and 08:00 is supplied at a discount of up to 30%. The government also provides deferment and discounts for firms that face cash flow difficulties to pay for electricity consumption.

7.2.3 Financing Schemes for Micro, Small, and Medium-Sized Enterprises

Increasing micro and small firms' access to credit encourages enterprise growth.

Over 99% of manufacturing firms in Indonesia are MSMEs, which account for close to two-thirds of the total employment in manufacturing. However, these firms are not linked to global value chains and face numerous obstacles to growth. The Government of Indonesia has recognized the role of MSMEs in reducing poverty and inequality. Hence, part of the reform measures includes targeted initiatives to help these firms, such as the following:

(i) People's Business Credit (Kredit Usaha Rakyat or KUR) is a facility that provides credit for MSMEs and aims to improve access to finance and the competitiveness of MSMEs. According to the Coordinating Ministry for Economic Affairs, recipients of KUR can avail up to Rp25 million per individual at an interest rate of 7% (through reform package no. 3, the KUR rate was reduced to 7% in 2017 from 22% in 2014). The lower interest rate is expected to stimulate the MSMEs sector.

(ii) The KUR facility is provided for a maximum period of 3 years for financing working capital and up to 5 years for investment financing.

(iii) Export-Oriented People's Business Credit (Kredit Usaha Rakyat Berorientasi Ekspor or KURBE) provides enterprises directly involved in export activities with lower interest rates on loans. As part of reform package no. 11, this measure aims to diversify Indonesia's exports and encourage investment in higher-value processed goods, automotive, and electronics.

(iv) Import Tax Waiver for Materials for Export Oriented Goods (Kemudahan Impor Tujuan Ekspor or KITE) is an incentive program for small and medium-sized enterprises (SMEs) that works to

[115] According to the Ministry of Energy and Mineral Resources.

reduce costs related to the import of materials used in manufacturing export-oriented products. Introduced in 2017, this program aims to reduce production costs of SMEs to make them more competitive in the international market. The KITE facilities include import duty and import VAT exemptions on imported raw materials to be processed, assembled, or installed into export goods.

7.2.4 Summary of Reform Measures under the Jokowi Administration

Since 2015, the government has implemented 16 economic packages. They aim to reduce regulatory and licensing burden; improve infrastructure (electricity, transport, trade, and other logistics); and provide access to finance for micro, small, and medium-sized enterprises (MSMEs). The reforms include the following:

(i) Efforts to reduce regulatory and licensing burden include:
   a. revoking 324 regulations and revising 75 regulations as of 2016;
   b. introducing an integrated one-stop service center to simplify licensing procedures and eliminate the problem of fragmented standards for each region in 2015 (as part of the PTSP Pusat or the One Stop Service-Center, firms investing Rp100 billion can obtain their business permit within 3 hours);
   c. adding working days and time to facilitate the process of land registration and certification, opening more outlets to provide registration and certification services, and introducing electronic registration systems; and
   d. implementing an OSS system of business licensing.

(ii) The government also implemented the following reforms related to infrastructure:
   a. establishment of SEZs throughout Indonesia to reduce the logistics cost and facilitate trade; and
   b. improvement in access to electricity in the country, especially for industries that rely on heavy machinery and steady supply of electricity. Reform package no. 3 includes a program to reduce fuel and gas prices, staggered by industry and sector. The government also provides deferment and discounts for firms that face cash flow difficulties to pay for electricity consumption.

(iii) Reform measures for MSMEs include targeted initiatives such as the following:
   a. People's Business Credit (KUR) provides credit to MSMEs. Through reform package no. 3, the KUR rate was reduced to 7% in 2017 from 22% in 2014. The lower interest rate is expected to stimulate the MSMEs sector.
   b. Export-Oriented People's Business Credit (KURBE) provides enterprises directly involved in export activities with lower interest rates on loans.
   c. Import Ease of Export Destination (KITE) is an incentive program that reduces costs related to the import of materials used in manufacturing export-oriented products. The KITE facilities include import duties and import VAT exemptions on imported raw materials.

7.3 A Review of the Existing Fiscal Incentives to Promote Manufacturing

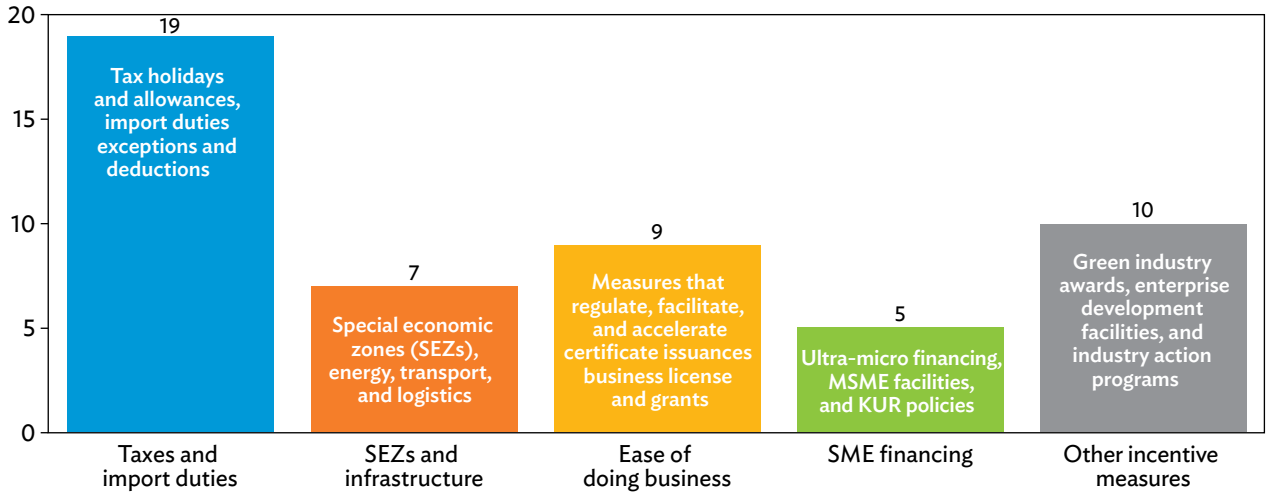
There are 50 different types of incentives to promote manufacturing in Indonesia.

The Government of Indonesia has been offering incentives to the manufacturing sector for decades (Table 4.2). In the aftermath of the Asian financial crisis, these incentives—or a revised and improved version of the incentives—were used to revive the manufacturing sector. Incentives for the manufacturing sector, 50 in total, can be grouped into the following five categories: (i) taxes and import duties; (ii) SEZs

and infrastructure; (iii) ease of doing business; (iv) SME financing; and (v) other incentive measures (Figure 7.3).[116]

Some of these incentives have fiscal implications while others do not. For instance, measures such as reducing regulatory and licensing burden, speeding up customs and clearance, and assisting with land acquisition tend to be noncontroversial as they do not usually entail additional costs to the government.[117] Some incentives may not require actual fiscal spending but may represent forgone revenues to the government, and these types of measures currently account for the largest number of policy incentives. There are about 19 incentives that offer reduced taxes and import duties aimed at addressing Indonesia's relatively high tax burden. The rest of this section provides an overview of the tax incentives and other fiscal incentives, which account for the bulk of incentives. In contrast, the reform packages under the Jokowi administration have focused on nonfiscal measures. This section doesn't discuss the government's efforts to improve the environment for doing business in Indonesia, but includes a brief discussion of SEZs that provide fiscal incentives for those firms operating within SEZs and financing schemes for SMEs.

Figure 7.3 Existing Policy Incentives to Promote Manufacturing (total = 50)



KUR = People's Business Credit; MSME = micro, small, and medium enterprise; SME = small and medium enterprise.
Notes: This may not be an exhaustive list of all incentives. There is a degree of subjectivity in classifying different incentives into different categories.
Source: Authors' compilation from government sources.

7.3.1 Taxes and Import Duties

Many developing countries offer fiscal incentives to attract foreign direct investment (FDI). These fiscal incentives often target direct investment flows—rather than financial or portfolio flows—due to their spillover effects and greater benefits to the economy. Fiscal incentives are also commonly used to alleviate some of the disadvantages of a particular investment location, such as poor infrastructure, excessive regulatory burden, or high tax rates. While the best solution is to upgrade infrastructure, remove extremely stringent regulations, or reform the tax code, such fundamental reforms may not be easy or politically feasible to undertake, thus the popularity of fiscal incentives.

[116] See Appendix 7.1, Table A7.1 for details regarding each policy incentive included in this chapter.
[117] Exceptions to this include investments in digital technology for online submission of registration and licensing.

Taxes and import duties represent over one-third of policy incentives.

The Government of Indonesia offers 19 tax incentives (out of 50) for its manufacturing sector (Figure 7.3). Tax incentives available to Indonesian manufacturing firms include tax allowances, tax holidays, import duty exemptions, and subsidized credit through the KUR (the major tax incentives will be discussed below).

Indonesia's corporate tax rate is relatively high at 25%. The Philippines, with a corporate tax rate of 30%, has implemented reforms to reduce it.[118] The Government of Indonesia has also put in place a series of tax-related incentives to attract FDI and promote domestic investment into the manufacturing sector.

The tax allowance has very few recipients, which are mostly large, high-tech firms in the chemical and automotive industries.

The tax allowance regulations have been revised several times. The latest version—Government Regulation No. 9 of 2016—provides the establishment with a net income tax reduction of 30% of the total investment in the form of tangible fixed assets, including land used for the main business activities charged at 5% per year over 6 years. There is also compensation for fiscal losses for 5 to 10 years. The tax allowance is available to investors in 71 industries, especially targeted at industries with high investment value or are export oriented and with high absorption of manpower or with high local content.

Even though the tax allowance reductions are smaller than the tax holidays (to be discussed later), the tax allowance facility is more attractive to investors because of its simple process and less cumbersome requirements. For instance, both tax incentives require approval from the BKPM and the Ministry of Finance, but unlike the tax holiday, the tax allowance does not require an "in advance notification letter." Likewise, the tax allowance also does not require a minimum investment value, unlike the tax holiday which requires an investment value of at least Rp500 billion.

However, despite the less stringent requirements, uptake for the tax allowance scheme is still low and declining (Figure 7.4, panel [a]). Between 2015 and 2017, only 50 investors took advantage of the tax allowance incentive. These numbers are not impressive given that there are over 25,000 medium and large firms operational in Indonesia based on the most recent estimate. Furthermore, the number of recipients declined to just 9 firms in 2017, from 25 in 2016 and 52 in 2007.

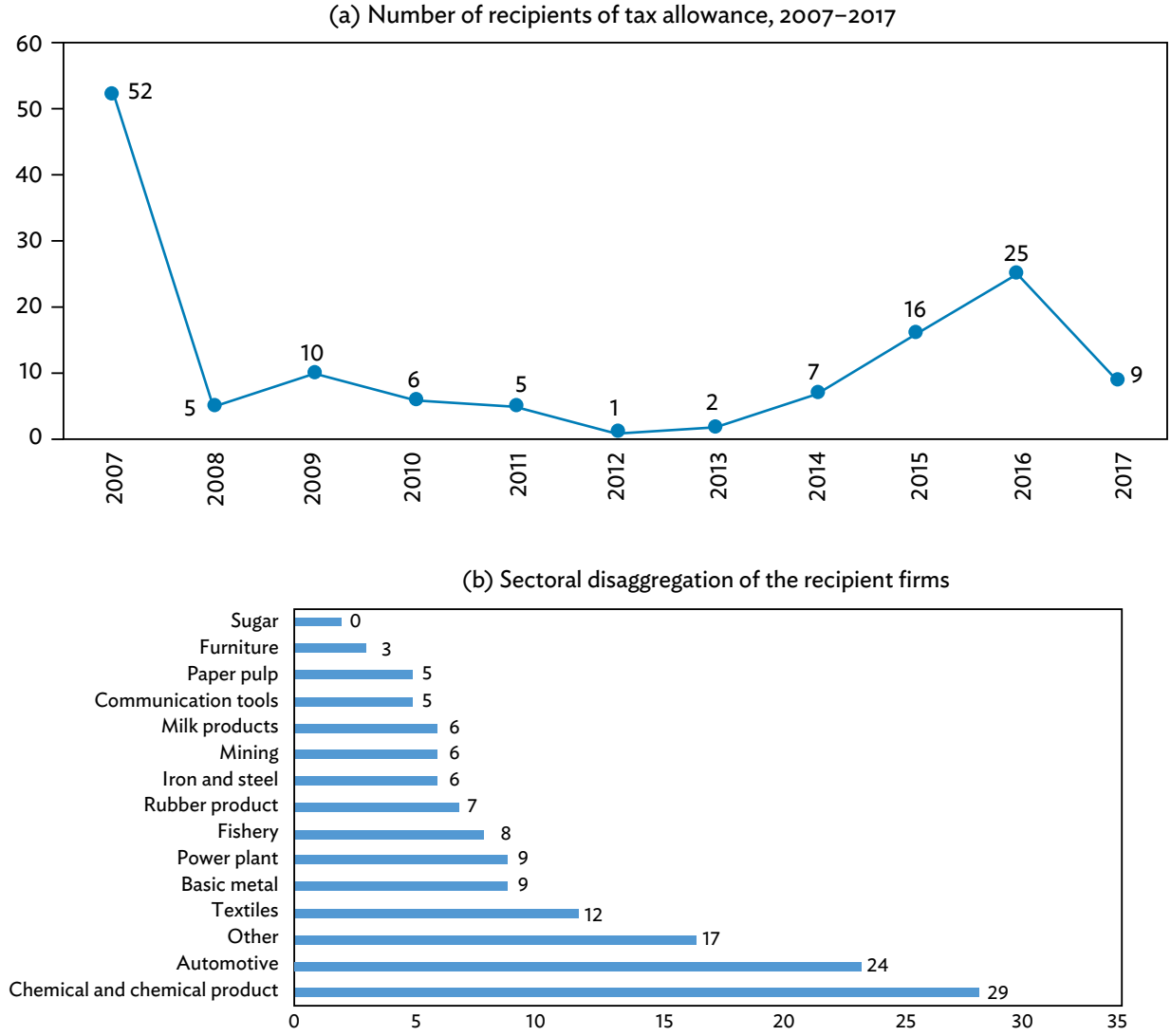
In terms of sectoral disaggregation of receiving firms, the largest number of recipients are in high-tech sectors such as chemical and automotive industries (Figure 7.4, panel [b]). Among the low-tech industries, textile and garment firms have made more use of tax allowances.

Tax holidays are generous but have almost no takers—nine firms in 2018, zero firms in 2016 and 2017, only one in 2015.

Tax holidays have been offered by the government since 1967 (Law No. 1 of 1967). They were abolished for some time but were then reinstated in 2007 through Law No. 25. Tax holidays reduce net corporate taxes based on the amount of investment and within a certain period. This tax incentive targets pioneer industries, those that provide additional value and high positive externalities, industries that introduce new

[118] Under the Tax Reform for Acceleration and Inclusion currently under discussion, the Philippines aims to reduce its corporate income tax rate. One aim of the reform is to level the playing field to ensure that similar entities pay comparable taxes. Under the current system, firms that get tax incentives pay a much lower effective tax. The government has estimated that ₱300 billion (about $6 billion) of government revenues were forgone in 2015 because of these incentives. The new reforms will rationalize existing fiscal incentives which lower the tax rate from 30%. This will help create a broader tax base and lower the overall tax rate, which will make the Philippines' tax system more competitive with other countries in the region.

Figure 7.4 Fiscal Incentives—Tax Allowance



Source: Indonesia Investment Coordinating Board (BKPM).

technologies, and industries that have strategic value for the national economy. Over time, the government has made several revisions to the regulations related to tax holidays. The latest version—Minister of Finance Regulation (*Peraturan Menteri Keuangan* or PMK) No.150/2018, November 2018—provides up to a 100% corporate income tax reduction to 16 pioneer industries depending on the investment plan value of at least Rp100 billion and within a certain period (see Table 7.2 for the list of eligible industries).[119] This PMK is a revision and extension of PMK 35/2018 (April 2018). Pioneer industries are those that possess broad linkages, provide added value and high externalities, introduce new technologies and entail strategic value for the national economy. The facility applies to new projects as well as expansions of existing facilities, and it is available for both domestic and foreign investors.

[119] PMK 150/2018 also is set to increase the number of sectors fully open to foreign capital to 54, with another 33 sectors partially open to foreign investors. The third incentive included in PMK 150 is the provision of final income tax cuts to exporters (in the mining, plantation, forestry, and fishery sectors) who deposit their earnings in designated bank accounts in order to provide liquidity to the domestic financial system.

Table 7.2 Tax Holidays Based on Value of Investment and Pioneer Industries (PMK 150/2018)

Value of Planned Investment	Period of Tax Holiday	Allowance (%)	List of Eligible Industries ("pioneer industries")
Rp100 billion–Rp500 billion	5 years	50	1. Upstream base metals 2. Oil and gas refineries 3. Petrochemicals based on coal, natural gas or oil 4. Inorganic basic chemicals 5. Organic-based basic chemicals 6. Pharmaceutical raw materials 7. Electronic components 8. Healthcare equipment components 9. Machinery components 10. Motor vehicles and components 11. Power generation components 12. Shipbuilding components 13. Air plane components 14. Railroad components 15. Pulp derived from agricultural, plantation or forestry products 16. Digital economy infrastructure
Rp500 billion–Rp1 trillion	5 years	100	
Rp1 trillion–Rp5 trillion	7 years	100	
Rp5 trillion–Rp15 trillion	10 years	100	
Rp15 trillion–Rp30 trillion	15 years	100	
≥ Rp30 trillion	20 years	100	

Rp = rupiah.
Source: Ministry of Finance (PMK No. 150/2018, November 2018).

The latest reform package extended the number of industries that can apply for tax holiday. It now includes two additional sectors: pulp derived from agriculture, plantation and forestry products; and digital economy infrastructure. The duration of the tax holiday depends on the value of the investment—a higher investment value corresponds to a longer tax holiday period. The minimum investment value, at Rp100 billion, is now lower than the minimum investment of Rp500 billion in the previous regulation (PMK No. 35/2018).

Tax holidays target very large investments into the country, but there are likely to be very few such investments in a year. In 2016 and 2017, no firms availed of the tax holiday facility, and only one firm used the facility in 2015.[120] The limited interest in tax holidays is the lack of policy certainty (government regulations are constantly changing) and to a lack of clarity on the requirements. Thus, in an attempt to increase uptake for tax holidays, the government revised the rules in 2018 to make it clearer and also to reduce the minimum investment amount.

7.3.2 Small and Medium-Sized Enterprise Financing Schemes

Import duty exemptions for SMEs have more takers than tax allowances and holidays.

In November 2016, the Government of Indonesia issued a Ministry of Finance Regulation (PMK No. 177/2016) concerning import facility for export purposes, specifically targeted to help small- and medium-sized firms (also known as KITE IKM). Import Tax Waiver for Materials for Export Oriented Goods (KITE) provides small and medium industries exemptions on import duties, value-added tax, and sales tax on imported luxury goods and machinery. While these exemptions imply a loss in state revenues, it is expected that the loss will be offset by an increase in exports which can generate additional growth and revenue for the government. To avail of the

[120] The Ministry of Finance informed the Asian Development Bank (ADB) team in November 2018 that nine companies had applied for and been granted the tax holiday exemption in 2018. The total investment value amounts to Rp161.3 trillion.

KITE facility, small and medium industries must meet the criteria shown in Table 7.3. The period of granting the KITE facility can be 12 months or more if the SMEs have a production period of more than 12 months.

Table 7.3 Eligibility Criteria for Ease of Import Facility for Export Purposes (KITE)

Size	Net Assets	Annual Sales
Small industries	Rp50 million–Rp500 million	Rp300 million–Rp2,500 million
Medium industries	Rp500 million–Rp10,000 million	Rp2,500 million–Rp50,000 million

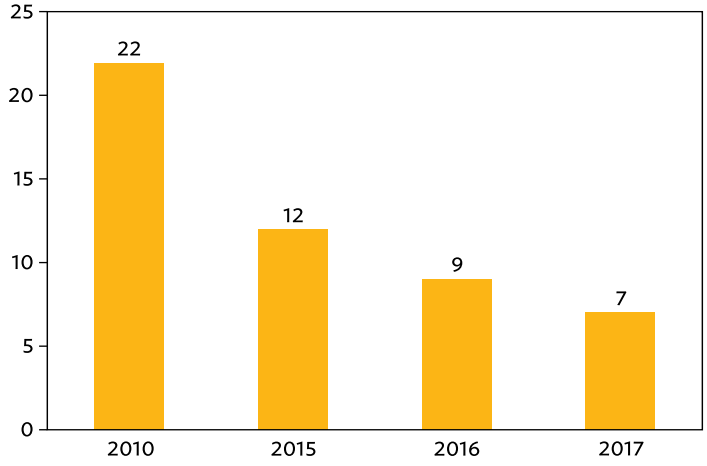
Source: Ministry of Finance (PMK No. 177/2016).

The number of KITE facility users tend to fluctuate every year which can be due to changes in regulations regarding the provision of this facility. In 2011, the enactment of the Minister of Finance Regulation (PMK) No. 253 and PMK No. 254 caused a significant reduction in the number of companies that received the KITE facility from the previous year. Prior to 2011, there were 966 KITE facility recipients (based on the company main number or NIPER). This decreased to 398 companies in the period 2011–2016. There was an increase in the following year, but only to 451 companies. While KITE may help reduce some of the burden faced by SMEs, several other obstacles remain, such as difficulties in obtaining import licenses and securing adequate financing for expansion.

People's Business Credit (KUR) provides financing for micro and small firms.

In addition to KITE, the government also provides financing facilities for MSMEs through the People's Business Credit (KUR). This facility aims to improve and expand access to finance of firms in agriculture, fisheries, processing, construction, and production services. KUR interest rates have declined significantly over time—from 22% in 2010 to 7% at present (Figure 7.5). The lower interest rates available for MSMEs is expected to stimulate investment and expand operations. In addition, the KUR facility is available in 41 financial institutions (banks, regional development banks, and savings and loan cooperatives) spread across the regions to ensure access to the facility.

Figure 7.5 People's Business Credit Interest Rate, 2010–2017 *(%)*



Source: Ministry of Economic Affairs.

The trade sector has consistently received the bulk of the funding from KUR—about two-thirds of all KUR funding—followed by the agriculture and forestry sectors, which receive about a quarter of the total amount. In the manufacturing sector, the use of the KUR is very small, at around 4% to 5% per year. This may be due to the fact that majority of manufacturing firms are small and medium sized rather than micro sized. In addition, manufacturing enterprises are more interested in other facilities such as KITE and export-oriented KUR (KURBE).[121]

[121] This credit facility is provided to MSMEs to improve the competitiveness of their exports. Export financing in the form of finance, insurance and guarantees, are provided to each exporter with a maximum of Rp50 billion. This facility is given to manufacturing sectors such as furniture, textile and footwear, and processed fish products.

7.3.3 Special Economic Zones and Infrastructure

The government has created SEZs outside the greater Jakarta and Java region to promote economic development and reduce regional disparities.

The government established Law No. 39 on SEZs in 2009. A more detailed regulatory framework (Regulation No. 2) concerning the implementation of SEZs was issued in 2011. In line with this, several SEZs were established in various regions in Indonesia, especially in areas with high economic potential. SEZs are envisioned to be a catalyst for the development of economic activities in other regions outside Java. Currently, there are four SEZs in Indonesia: Sei Mangkei, Tanjung Lesung, Palu, and Mandalika. Another eight SEZs are under construction.[122]

The government has provided generous fiscal incentives for firms operating within the SEZs.

The government offers a number of fiscal incentive schemes to attract investors to operate within the SEZs. The fiscal incentives provided in the SEZs are the most comprehensive incentive scheme available for investors. There are incentives for corporate income tax, investment allowances, and tax holidays for pioneer industries located in export processing zones. There is also tax relief on dividend taxes and the possibility to speed up the amortization calculation to reduce the tax burden in the initial period of establishment. In addition, there are also import duty exemptions for industries in export processing zones. Import duty exemptions in other zones, especially for the import of capital goods such as machinery and raw materials during construction and development are also available. There are also exemptions and suspensions of VAT and luxury sales tax for various imported goods and raw materials for domestic production, especially for industries in the export zone. There are also VAT and luxury sales tax refunds for individuals holding foreign passports who conduct transactions in the SEZs. Despite the fiscal benefits of operating within SEZs, industrial parks, and other such facilities, knowledge of the eligibility criteria and potential benefits to operate inside them is limited. This is especially the case with small- and medium-sized firms that plan to expand.[123]

7.3.4 Summary of Incentives to Promote Manufacturing

(i) Most of the incentives to promote manufacturing are fiscal in nature.
(ii) Taxes and import duties represent over one-third of policy incentives to promote manufacturing. However, there are very few recipients of tax allowances and fewer (or no) recipients of tax holidays.
(iii) Import duty exemption for SMEs has considerably more takers than tax allowances and holidays.
(iv) Existing financing schemes for micro, small, and medium-sized enterprises, notably People's Business Credit (KUR), have been further revised under the reform packages, with KUR interest rates significantly reduced from 22% in 2010 to 7% at present.

[122] To be declared ready to operate, an SEZ must meet three readiness criteria (in less than 3 years): (i) land and regional infrastructure, (ii) institutional and human resources, and (iii) administrative services.

[123] The ADB team held conversations with various industry leaders in Jakarta in September 2018 to get a sense of the constraints to doing business at the firm and industry levels, and the effectiveness of the government's policy incentives to support the manufacturing sector. As an example, a medium-sized firm in the food sector explained that it had acquired land to increase the size of its operations, but realized later that it had to operate within an SEZ or an industrial park as regulated by the government, given the firm's size and the location of its operations. The firm's plans for expansion were delayed by 2 years due to its inability to readily comply with the various requirements to operate within an SEZ, mostly due to a lack of clarity (different standards at the regional and national level) and poor communication of regulations.

(v) The government has also made efforts to create SEZs outside greater Jakarta and the Java region to promote economic development and reduce regional disparities. The government provides generous fiscal incentives for firms operating within the SEZs.

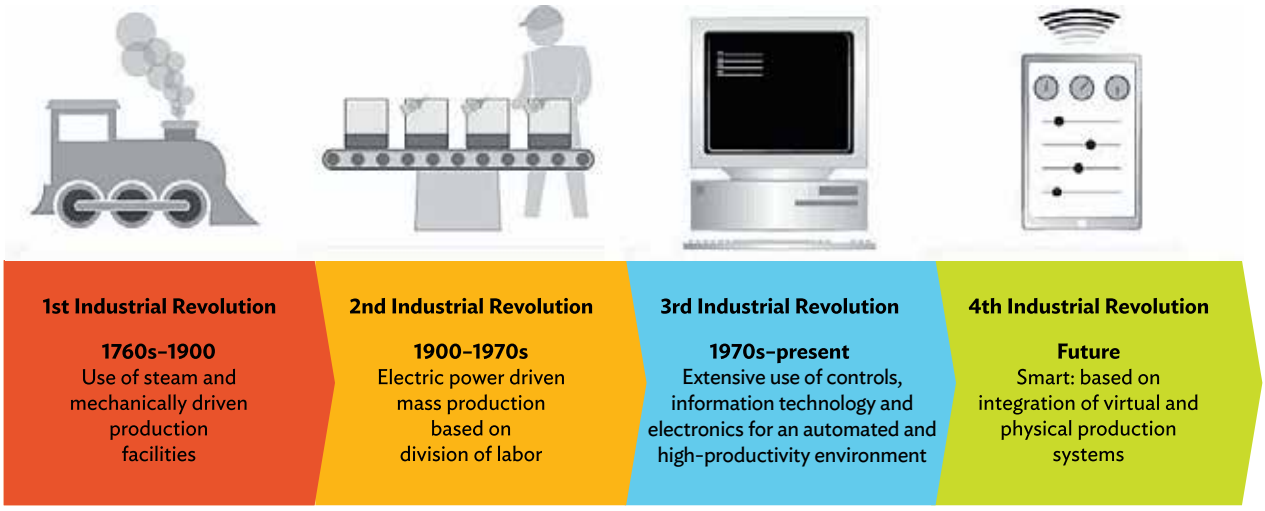
7.4 Manufacturing in the Age of Industry 4.0

The revival of Indonesia's manufacturing sector is a key strategy of "Making Indonesia 4.0."

This section discusses the government's most recent effort at revitalizing the manufacturing sector. As Indonesia plans to become the world's 10th largest economy by 2023, the government has acknowledged that this sector must play a key role. Industry 4.0 is a massive program under the notion that the coming decades will be characterized by the ubiquitous connectivity of people, machines, and real-time data. If Industry 3.0 was built around the use of electronics and information technology to further automate production, Industry 4.0 will be the age of cyber-physical systems.

In the age of Industry 4.0, a term that refers to the Fourth Industrial Revolution (4IR) in manufacturing and industry (Figure 7.6), the Indonesian government recognizes the promise of new technology to achieve higher growth through export promotion and "reindustrialization." According to the Ministry of Industry, Indonesia's aim to be among the 10 largest economies in the world by 2030 hinges on its ability to harness the power of the manufacturing sector to achieve an export-led growth. Moreover, the revival of the manufacturing sector is expected to create more jobs and absorb the country's growing labor supply. Three factors are key to achieving the country's "Making Indonesia 4.0" aspirations—(i) a return to a net exporter position, in line with 2000 levels; (ii) rapid improvement in the country's productivity-to-cost ratio (yielding double productivity-to-cost figures); and (iii) an increase in research and development expenditure (to 2% of gross domestic product [GDP]) in order to shore up the country's innovation capacity.[124]

Figure 7.6 The Four Industrial Revolutions



Source: Asian Development Bank (2018).

[124] Ministry of Industry, Government of Indonesia. 2018. Making Indonesia 4.0. http://www.kemenperin.go.id/download/19347.

The five priority manufacturing industries include: food and beverages, textiles and garments, automotive, electronics, and chemicals.

In an assessment of sectors that are well placed in terms of industry size or value contribution, net export potential, and feasibility of adoption of disruptive technologies, five sectors emerged as strategic to Indonesia's future growth: (i) food and beverages, (ii) textiles and garments, (iii) automotive, (iv) electronics, and (v) chemicals. In order to ramp up performance in these industries, improvement in upstream capabilities and a transition to more high tech, high value added, and specialized production is needed (Table 7.4). Moreover, enhancement of local ecosystems and optimization of industrial zones can boost the automotive and chemical sectors. More broadly, the country needs to address challenges common to all industries, including underdeveloped upper to midstream industries, underleveraged geographic potential, inadequate digital infrastructure, overcomplicated regulations and policy roadblocks, an absence of innovation centers, and lack of trained workers in spite of having the fourth largest working population globally.[125]

Table 7.4 Path to Achieving Industry 4.0 in Five Key Sectors

Food and beverages	• Improve upstream agrisector productivities by adopting new technologies • Empower SME segment by funding and technology support • Improve supply chain efficiencies • Enhance modern packaged food productions by product innovations • Scale up the industry by leveraging domestic demand • Accelerate export and be the regional food and beverage powerhouse
Textiles and garments	• Improve upstream capabilities locally • Enhance productivity by adopting technologies • Build functional clothing design and production capabilities • Establish textile industrial clusters and promote vertical integration • Scale up and leverage economies of scale to be competitive in the global market
Automotive	• Enhance raw material and key component productions • Improve productivity by adopting technology and building infrastructures • Align with global OEMs to boost support for specific vehicle types (MPVs, SUVs) • Cultivate EV production capabilities starting with e-motorcycle • Build EV industry ecosystem
Electronics	• Attract top global manufacturers • Build advanced manufacturing capabilities beyond assembly • Nurture skilled labor force • Enhance innovation capabilities locally • Cultivate domestic champions
Chemicals	• Enhance domestic petrochemical capacity and reduce reliance on imports • Optimize industrial zones to leverage domestic natural gas and oil resources • Improve productivity by adopting 4IR technologies • Accelerate R&D activities to establish next generation biofuel and bioplastic capabilities • Build an export position by leveraging economies of scale

4IR = fourth industrial revolution, EV = electric-powered vehicle, MPV = multipurpose vehicle, OEM = original equipment manufacturer, R&D = research and development, SME = small and medium enterprise, SUV = sport-utility vehicle.
Source: Ministry of Industry, Government of Indonesia. 2018. Making Indonesia 4.0. http://www.kemenperin.go.id/download/19347.

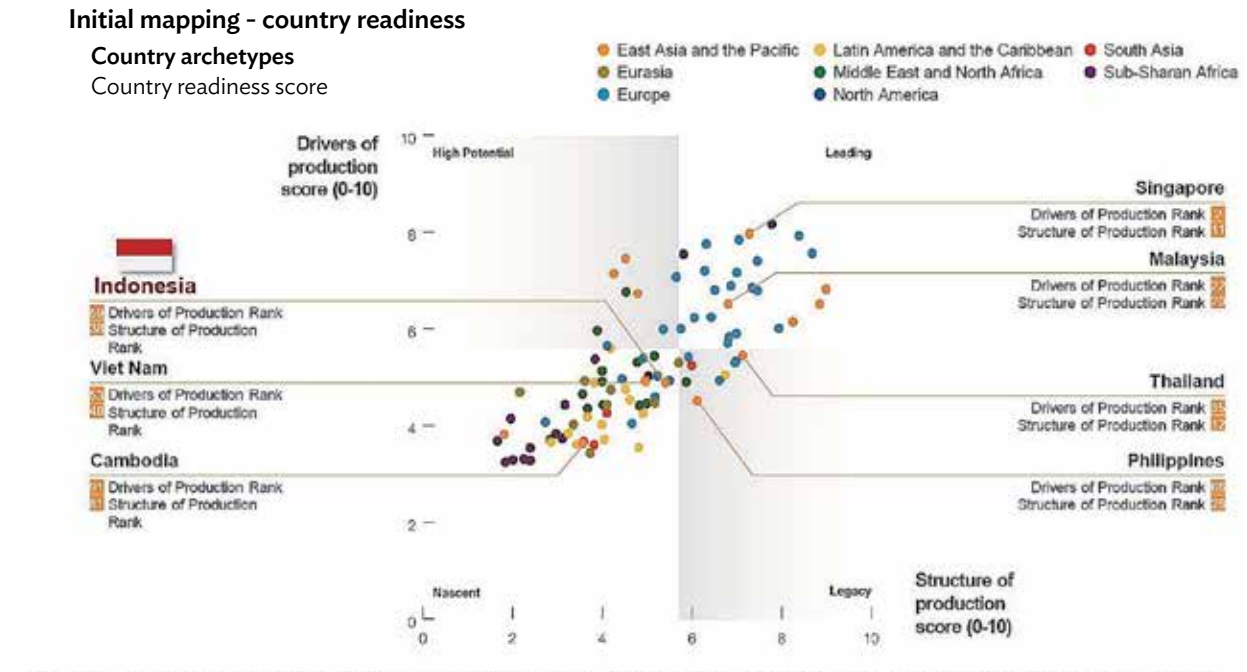
[125] A discussion with industry leaders in September 2018 provided important insights about the challenges to doing business and achieving the stated goals of Industry 4.0: (i) difficulties to expand due to regulations governing licensing and location, (ii) inability to upgrade products due to capacity limitations, (iii) limited resources available for research and development (R&D), and (iv) lack of skilled workforce to upgrade into a more sophisticated range of products (issue raised by medium-sized firms).

7.4.1 Promises and Challenges of Industry 4.0

Industry 4.0 provides a timely opportunity for Indonesia's manufacturing sector to boost productivity and enhance competitiveness in the export market. Indonesia's wages are lower than in the PRC, but productivity levels are also lower. Moreover, Indonesia's productivity improvement is slower than the labor cost increase, which weakens its competiveness in the global market. Indeed, as Indonesia prepares to build a robust manufacturing sector to achieve an export-led growth, utilizing emerging technologies to boost productivity will be key to achieving its aspiration of becoming a global top 10 economy in 2030. However, great opportunities often come with significant challenges.

Results of the country readiness assessment for the Fourth Industrial Revolution (4IR) conducted by the World Economic Forum and A.T. Kearney (2018) reveal Indonesia's production landscape as "nascent"—limited production base exhibiting a low level of readiness for the future of production (Figure 7.7). Moreover, Indonesia lags behind its neighbors in the Association of Southeast Asian Nations (ASEAN), such as Malaysia and Thailand, in terms of country readiness for the 4IR. Further, Indonesia spends less on information and communication technology (ICT)—the backbone of the 4IR—than its global peers. Indonesia's research and development spending is also low at about 0.1%–0.3% of GDP. Finally, despite an abundant working population, Indonesia has a very limited pool of trained talents.

Figure 7.7 Indonesia's 4IR Country Readiness



4IR = fourth industrial revolution.
Note: Drivers of production show potential to adopt the 4IR—consists of demand factor, technology and innovation, institutional framework, global trade and investment, human capital, sustainable resources; while structure of production shows the existing factors on the ability for the 4IR—consists of scale and complexity of production.
Sources: World Economic Forum and A. T. Kearney (2018).

The Government of Indonesia has recognized these key challenges and has laid out 10 national priorities to help the manufacturing sector reap the benefits of Industry 4.0. (Table 7.5). These include empowering SMEs through digital technology; building a nationwide digital infrastructure; attracting

Table 7.5 National Priorities to Achieve Industry 4.0

National Priorities		Key Strategies
1.	Reform material flow (enhance domestic production of inputs)	• Enhance domestic upstream material production; e.g., 50% of petrochemicals are imported
2.	Redesign industrial zones	• Build a single nationwide industry-zoning roadmap; resolve zoning inconsistency challenges
3.	Embrace sustainability	• Grab opportunities under global sustainability trend; e.g., EV, biofuel, renewables
4.	Empower SMEs	• Empower 3.7 million SMEs through the use of technologies; e.g., build SME e-commerce and technology bank
5.	Build nationwide digital infrastructure	• Advance network and digital platforms; e.g., 4G to 5G, fiber speed 1 gigabyte, data center and cloud
6.	Attract foreign investments	• Engage top global manufacturers with attractive offers and accelerate technology transfer
7.	Upgrade human capital	• Redesign education curriculum under 4IR era • Create professional talent mobility program
8.	Establish innovation ecosystem	• Enhance R&D centers by government, private sector, and universities
9.	Incentivize technology investment	• Introduce tax exemption/subsidies for technology adoption and support funding
10.	Reoptimize regulations and policies	• Build more coherent policies/regulations through cross-ministry collaborations

4IR = fourth industrial revolution, EV = electric-powered vehicle, R&D = research and development, SME = small and medium enterprise.
Source: Ministry of Industry, Government of Indonesia. 2018. Making Indonesia 4.0. http://www.kemenperin.go.id/download/19347.

foreign investors; upgrading human capital through science, technology, engineering, and mathematics and vocational training; and providing incentives for firms to invest in digital technology. Moreover, the government plans to enhance domestic production of inputs, revamp industrial zones under a single nationwide industry-zoning roadmap, embrace green growth opportunities, and build more coherent policies/regulations through cross-ministry collaborations. Perhaps what is less clear is how this ambitious program will be deployed and implemented; and how agencies will coordinate work to make sure that the program is implemented and targets achieved.[126]

Indonesia is equipped with multiple resources that can be harnessed in order to boost its competitiveness—in particular, a large working population, strong domestic demand, stable economic growth, and abundant natural resources. What it needs now is to leverage these drivers of competitiveness and capitalize on the new technologies afforded by Industry 4.0. Doing so can confer tremendous economic benefits to the country. The government has estimated that "Making Indonesia 4.0" can increase annual real GDP growth by 1%–2% between 2018 and 2030 (so that real GDP growth would increase from the current 5.5% to 6%–7% year on year between 2018 and 2030), increase significantly the manufacturing contribution to GDP by 2030, and create 10 million additional jobs by 2030.[127]

[126] According to the Indonesian Chamber of Commerce and Industry, regulations keep changing in Indonesia, and this lack of policy certainty needs to be addressed. Harmonizing regulations is key to boosting production in the five priority sectors of Industry 4.0.

[127] From a presentation given by the Ministry of Industry (12 September 2018). Estimates are from the World Bank, Badan Pusat Statistik, the Ministry of Industry, and A.T. Kearney.

7.5 Conclusions: An Assessment of Reforms, Incentives, and Industry 4.0

The 16 economic reform packages of the Jokowi administration represent an important step in the right direction.

The 16 economic packages of the Jokowi administration provide the necessary reforms to ease investment into Indonesia and do away with burdensome and redundant regulations. Indeed, progress in several areas, notably on reducing regulation and trade barriers, facilitating business registration and land acquisition, and general clarity on minimum wage-setting policies can be linked to the reforms implemented by the government. Indonesia's ranking in the World Bank's Ease of Doing Business and the LPI has improved in the last few years, which again can be attributed to the several reform packages implemented by the government.

Reforms also need to focus on sector-specific constraints to doing business.

Manufacturing firms in Indonesia face various constraints to doing business, ranging from poor infrastructure to complex regulatory environments. The reform packages addressed various constraints to doing business through broad measures, which are general in scope, without sector or industry focus. Moving forward, to further improve the business climate in Indonesia, reforms should take into account that constraints to doing business can vary across sectors and across firm characteristics and firm size. Thus, reforms should also feature sector-specific measures to effectively target constraints that hamper business activities of manufacturing firms.

There are 50 incentives for manufacturing. Some of them could be thought of more strategically and with better coordination among ministries.

The analysis of incentives for manufacturing identified 50 incentives with available details from government sources.[128] Incentives to support manufacturing are spread across different government departments and published in different pieces of government regulations. There is no single place to easily look up the list of fiscal incentives available to firms. This may have limited the effectiveness of many of the fiscal incentives since firms qualified for these incentives may not know that incentives were available to them. One way to improve transparency is to create an easily accessible system (through a portal or a document) that consolidates all the incentives available to firms.

Currently, fiscal incentives are implemented in a piecemeal fashion without a general coherent strategy. There is a need to come up with a strategic plan for fiscal incentives which identifies activities with significant positive externalities. The plan should ensure that tax incentives are directed to these activities to minimize distortion and tax leakages. The plan should also link fiscal incentives provided to firms to the government's industrial policy. Toward this end, the government may need to come up with a proper diagnosis of which industries to target and what is needed to attract investments into the country. Certainly, when countries like Indonesia use tax holiday programs to attract investments, there is always the doubt whether simple reforms could achieve the same result by lowering country risk.

Finally, and related to the previous point, some investments taking advantage of the tax holiday, may have occurred without the incentive. In the interest of transparency, it is important to calculate the

[128] Other incentives that lack details were not included in the assessment.

amount of revenue lost from the tax incentives. Without a proper accounting of the revenue loss, tax incentives can be perceived as costless, which they are not. A proper accounting of the revenue loss will enable a better measurement of the costs and benefits of the tax incentives and help reduce losses from ineffective tax incentives. Moreover, recipients of the tax benefits should be monitored to ensure that the conditions of the tax incentives are met.

Chapter 14 will return to the discussion of whether to provide incentives, how to provide them, and to whom. The answer to these questions will come from the identification of market failures as a justification to provide incentives, and use the principles of modern industrial policy.

Minimum eligibility requirements for fiscal incentives could be lowered further, while the list of "pioneer industries" needs revising according to Indonesia's comparative advantage.

One way to look at the effectiveness of fiscal incentives is to examine whether they have achieved their purpose of attracting new investment in manufacturing. Based on this criterion, the tax holiday and tax allowance do not seem to have been successful in attracting a large amount of investment. Uptake for these tax incentives has been very low. Recent reforms have made it easier to apply for tax incentives, such as Ministry of Finance decree number 150/2018, which lowered the minimum investment requirement (to Rp100 billion), with the range of tax incentives varying according to the value of total investment. While this should help in attracting new investors (in fact the number increased in 2018), it is also important to ask whether the target industries of tax incentives make sense for Indonesia. Tax allowances and holidays are provided to pioneer industries, including high-tech industries such as semiconductor, robotics, and aircraft manufacturing. While it is good to be aspirational and strive to move beyond labor-intensive industries, there is also value in moving up gradually in the value chain and developing the necessary supporting skills and infrastructure. Tax incentives only matter at the margin and cannot overcome the limitations of other constraints. Chapter 10 will provide a discussion of the pioneer sectors in Table 7.2 in the context of complexity (Table 10.6).

Only 10% of fiscal incentives are aimed explicitly at SMEs, while over 99% of manufacturing firms in Indonesia are micro, small, and medium-sized enterprises.

The analysis also finds that out of the 50 fiscal incentives, only five are directly targeting micro, small, or medium-sized firms. Most incentives available to firms do not specifically target SMEs and require a large minimum investment which excludes almost all of the SMEs. Although the minimum investment requirement has been recently lowered, it is still a very high threshold for most SMEs.

The main incentives aimed specifically at SMEs are financing schemes such as KUR and import duty and VAT exemptions (KITE). However, these are targeted to SMEs in all sectors and not directly to manufacturing sector SMEs. Thus, only a small percentage of manufacturing firms benefit from the KUR scheme. Future strategic plans require a rebalancing of incentives toward SMEs to help them grow, produce more sophisticated products, and achieve higher diversification. The manufacturing sector of Indonesia is currently dominated by SMEs, but they receive very few incentives. Thus, providing incentives to include the many SMEs in manufacturing can encourage enterprise growth and may also be more cost effective. Most often, tax revenues are lost because the incentives are given to firms that would have invested anyway even without the incentives. Large firms tend to have the financial capacity to invest even without the incentives, which is not the case for many SMEs.

In general, incentives are based on specific sectors and industries but not on performance.

Tax holiday and tax allowance facilities are only available for firms that invest in particular industries. Targeting tax incentives to specific industries requires identifying which sectors are deserving of special treatment. In a fast-changing economic landscape, it may be difficult for the government to identify industries which have high growth potential in the future. This could even result in the government supporting the wrong industries. Thus, providing incentives based on performance, i.e., amount invested, number of jobs created, total amount of wages paid, amount of exports, or research and development expenditure, rather than targeted to specific industries can also be explored. This will ensure that firms achieve their target performance before any incentives are paid out, and those that do not achieve their performance targets will not receive the incentive. Moreover, incentives based on performance ensures that the government does not overlook certain industries with high growth potential in the future.

Industry 4.0 is an ambitious program to make Indonesia's manufacturing sector the country's engine of growth.

The recently launched "Making Indonesia 4.0" strategy aims to harness the opportunities presented by Industry 4.0, by leveraging emerging technologies to bring about a revival of Indonesia's manufacturing sector and allowing the country to recover its strong export performance—ultimately laying the foundation for robust economic growth in the future. Five manufacturing industries were identified to serve as the backbone of the 4IR, namely, food and beverage, textiles, automotive, electronics, and chemicals. As shown in the chapter, these are also some of the key sectors in Indonesia's manufacturing, accounting for the most number of firms, manufacturing employment, and value added in the sector. The program is very ambitious and Indonesia faces important challenges to attain its objectives, mainly because the country's readiness to jump into these sectors is deemed low, and because it is not clear how the program will be implemented.

Appendix 7.1

Table A7.1 List of Policy Incentives to the Manufacturing Sector in Indonesia

	Incentive Measure	Brief Description	Objectives	Data on Utilization	Implementing Institution
	Taxes and Import Duties **Facilities in the form of tax holidays and allowances, import duties exceptions and deductions**				
1	Tax holiday	17 pioneer industries may obtain a deduction of the company's income tax on income received or accrued from the principal business activity undertaken	To further increase direct investment activities in the pioneer industry to boost economic growth	2012 = 2 2013 = 1 2014 = 1 2015 = 1 2016 = 0 2017 = 0	Ministry of Finance
2	Tax allowance	More than 70 business sectors and fields may be granted with tax allowances to residents conducting investment	To further increase direct investment activities in the pioneer industry to boost economic growth	71 sectors	Ministry of Finance
3	Import Duty Borne by Government (BMDTP)	Import duty facility thru BMDTP is given to 28 certain industries in 2018	To raise public interest and to improve industry-sector-specific competitiveness	Jan 2018 = 217 2017 = 129 2016 = 116 2015 = 96 2014 = 78	Ministry of Finance
4	Import duty relief for diamond and bicycle industry	Granting no import duties to jewelry products and bicycle component products	To protect and encourage the development of jewelry industry using diamond raw materials in domestic and bicycle component industries	valid from March 2018	Ministry of Finance
5	User Specific Duty Fee Scheme (USDFS)	Grants 0% import tariff on imported goods from Japan under USDFS scheme	To increase economic cooperation between Indonesia and Japan through the liberalization of trade in goods, services and investment, facilities and economic cooperation	106 assignments	Ministry of Finance
6	Exemption of value-added tax for import machines and spare parts for train, airplane, and ship	Deduction of Income Tax Article 21 from employers in textile and footwear industry by 2.5%	To encourage the development of national transportation, and to ensure availability of equipment of the Defense Force of the Republic of Indonesia (TNI)		Ministry of Finance
7	Income tax deductions of employee income	Deduction of Income Tax Article 21 from employers in textile and footwear industry by 2.5%	To simplify company administration in collecting employee taxes		Ministry of Finance
8	Incentives for export earnings (DHE)	Income tax cuts for exporters who deposit their earnings in designated bank accounts in order to provide liquidity to the domestic financial system	To maintain the stability of the rupiah against the United States dollar		Ministry of Finance
9	Import Ease for Export (KITE)	KITE is an incentive program for SMEs that works to reduce costs related to the import of materials used in manufacturing export-oriented products	To strengthen the economic foundation by realizing the export potential of SMEs	369 companies	Ministry of Finance

(continued on next page)

Table A7.1 continued

	Incentive Measure	Brief Description	Objectives	Data on Utilization	Implementing Institution
10	Import duty exemption in the framework of investment	Exempts import duty on machinery, goods and materials to encourage domestic industrial development	To increase investment in the country, and to encourage the national economy in the midst of global competition	Exemption of import duties for machinery: Foreign enterprises: 712 companies Local enterprises: 536 companies Exemption of import duties for goods and materials: Foreign enterprises: 96 companies Domestic enterprises: 76 companies	Ministry of Finance
11	Inland Free Trade Agreement	No import duty on goods and materials for domestic production if 40% of raw materials are sourced locally (TKDN)	To accelerate and expand the investment and development of national industries utilizing the production of domestic resources		Ministry of Finance
12	Tax incentive for coal mining business	Exemption of import duty and value-added tax on the import of goods under coal mining concessions	To improve the services of taxation and customs in the field of mineral and coal mining		Ministry of Finance
13	Delay of loans of import duties, export duties and/or administrative sanctions with fines	Payment deferral of outstanding import and export duty and administrative sanctions (penalty)	To optimize the acceptance of import and export duties, and to facilitate payment of duties in the form of a fine		Ministry of Finance
14	Granting tax deduction on land and building tax (PBB)	Reduction of land and building tax for firms whose assets have been affected by natural or other catastrophic disasters	To provide financial facilities to companies that are in bad condition		Ministry of Finance
15	Exemption of excise/export duties for selected goods	Exemption of excise/export duties for locally produced and cut tobacco; and fermented and distilled spirits, processed using simple technology	To provide protection to farmers and micro scale producers		Ministry of Finance
16	Delay of excise payments for factory enterprises or importer of delivery goods	Delay of excise payment can be given to the factory or importer	To develop the tobacco industry		Ministry of Finance
17	Exemption of value-added tax (PPn) and sales tax (PPnBM) on the import of taxable luxury goods released from import duty	Import duty exemptions for luxury goods obtained for assembly and installation on other items that make use of KITE facilities	To encourage export and SME development		Ministry of Finance
18	Income tax facility	Income tax facilities provided to investments in areas of high priority on a national scale	To secure increasing state revenues, and to realize a system of taxation that is neutral, simple, stable, more equitable		Ministry of Finance

(continued on next page)

Table A7.1 continued

	Incentive Measure	Brief Description	Objectives	Data on Utilization	Implementing Institution
19	VAT exemption for import and delivery of strategic goods, which have strategic value for the economy such as machinery and factory equipment	Certain taxable goods of a strategic nature which are imported are exempted from value-added tax	To encourage development of sectors that produce goods of strategic importance to the country		Ministry of Finance
20	VAT facility that is not levied on strategic goods	A VAT-free facility on business activities in the field of anode slime processing into gold bullion	To reduce exporting anode slime so gold bar's production in domestic market can be increased		Ministry of Finance
21	Value-added tax for micro and small enterprises (PPh)	VAT is given at 0.5% to firms with a gross income of no more than 4.8 billion in 1 year	To encourage the community to participate in formal economic activities		Ministry of Finance
	Ease of Doing Business **Measures that regulate, facilitate, and accelerate certificate issuances and business license grants**				
1	Incentive for private business enterprise	Private enterprise in oil refinery production and retail are offered commercial business license, storage and distribution facilities	To achieve energy security, to increase the volume of production capacity of the national oil fuel; and to reduce the dependence of imported oil	five private companies currently part of the program	Central government
2	One-door Integrated Service (PTSP)	Convenience service for handling business permits at the local government level	To improve services, provide convenience, and certainty of business licensing services		Local government
3	Acceleration of licensing customs and to ease doing business	Expedite the process to obtain permits and related customs and excise procedures to operate bonded areas (Tempat Penimbunan Berikat)	To simplify customs procedures to stimulate domestic and foreign investment		Central government
4	Certificate of Authorized Economic Operator (AEO)	Special treatment and provision of targeted facilities in customs process, such as the acceleration of export process in terms of document review facility and physical examination. This convenience can shorten the transit time; thus, it reduces logistics costs, and provides facility in payment procedures and other customs facilities.	To shorten the transit time; thus, reducing logistics costs, and providing facility in payment procedures and other customs facilities	2017: 46 firms	Central government
5	Determination of asset value in merger, consolidation, division, and takeover of business	Use of book value at time of merger—taxes are levied when sold to a third party based on it rather than market value.	To align policies in the field of taxation with policies in the field of economics, investment and monetary policies		Central government
6	Online Single Submission (OSS)	OSS is a web-based system that facilitates business licensing through an integrated electronic system that synchronizes various licensing permits in the country.	To implement electronic business licensing services in an integrated system, thereby facilitating investment by making it easier for firm entry and expansion		Central Government
7	Issuance of land certificate	Provide land certification on land that has not been certified	To facilitate investors in land acquisition		Ministry of Agrarian and Spatial Planning

(continued on next page)

Table A7.1 continued

	Incentive Measure	Brief Description	Objectives	Data on Utilization	Implementing Institution
8	Ease of Direct Investment Construction (KLIK)	Granting construction permits while awaiting the issuance of other permits such as environmental permits	To accelerate business licensing	47 industrial estates	Central government
9	Accelerated import of goods - Green Line Services	Streamlined process for import of goods (e.g., without going through physical examination at the port of entry) after the issuance of Letter of Approval of Expenditure of Goods (SPPB)	To accelerate construction and development of new plants and other firm facilities		Ministry of Finance
	Infrastructure (Energy, Transport and Logistics, KEKs and SEZs) **Energy and electricity payment incentives, training centers and facilities, special economic zones, industrial estates (KI), boned zones, free trade and free port areas**				
1	Incentive to use natural gas for industries	Determination of the natural gas price in certain production industries	To encourage use of natural gas and set prices to facilitate production and improve competitiveness	eight companies	Central government
2	Bali Creative Industry Center (BCIC)	BCIC aims to empower education and training for creative industry in Bali	To accommodate the creativity of the country's human resources in promoting creative economic growth	BCIC 2015 BCIC 2016	Local government
3	Delay of electricity bill payment for industries	Electrical incentives in the form of delayed payment of bills and discount on electricity usage for labor-intensive firms	To facilitate firms in paying electricity and to boost labor-intensive firms	254 firms until January 2016	State Electricity Company (PLN)
4	Risk management to accelerate the goods flow	Risk control to smooth the flow of goods at ports through Indonesia Single Risk Management (ISRM)	To accelerate the services of import/export activities that can provide business certainty and efficiency through increased effectiveness of supervision		Ministry of Finance
5	Business development and competitiveness of national logistics service providers (INSW)	Web that provides export and import databases	To provide export and import databases for firms		Ministry of Finance
6	Special Economic Zones (SEZs) or *Kawasan Ekonomi Khusus* (KEKs)	The government offers a number of fiscal incentive schemes to attract investors to operate within the SEZs; these incentives are the most comprehensive incentive scheme available for investors.	SEZs or KEKs were established in various regions in Indonesia, especially in areas with high economic potential. They are envisioned to be a catalyst for the development of economic activities in the other regions outside Java.	12 KEKs currently in place	Central and local government
7	Industrial Estates or *Kawasan Industri* (KIs)	KIs provide fiscal incentives in the form of reduced corporate income tax, VAT exemption on machinery and equipment, and offers import duty exemption on manufacturing inputs.	To further increase direct investment activities in the pioneer industry to boost economic growth	83 KIs currently in place with 9,179 manufacturing companies	Central and local government
8	Bonded zone	Enterprises in this zone are given some facility such as suspension of import duty, excise exemption	To encourage increased exports and enhance the competitiveness of exported products	1,403 companies	Central government

(continued on next page)

Table A7.1 continued

	Incentive Measure	Brief Description	Objectives	Data on Utilization	Implementing Institution
9	Logistic Bonded Zone or *Pusat Logistik Berikat* (PLB)	PLBs serve as centers of distribution of imported raw materials and consolidation centers of export goods	To further encourage trade activities and national industry, strengthen the competitiveness of enterprises, and increase investment	50 companies	Central government
10	Free trade and free port areas	Regions free from imposition of import duty, import tax, and excise tax	To encourage international trade that brings in foreign exchange, and to open wide employment opportunities both foreign and domestic	Currently there are four areas that are designated as free areas and free ports: Sabang, Batam, Bintan, and Karimun	Central and local government
	MSME Financing Ultra and micro financing, MSME facilities, and KUR policies				
1	Facilities for Micro, Small and Medium Enterprises (UMKM)	Micro, small, and medium enterprise (MSME) facilities provide business development, partnership, licensing, and coordination and control assistance	To provide opportunities for MSMEs to grow by addressing market failures inherent to running a micro or small business, for e.g., inability to invest in product development, weakness in exploring partnerships, resource constraints in obtaining licenses, etc.	2016: 59,267,759 MSMEs	Ministry of Cooperatives and MSME's
2	Ultra Micro Financing	Provides increased access to finance for micro firms (four employees or less)	To provide swift and affordable financing facilities for micro enterprises to allow them to grow and become more competitive	800,000 citizens	Ministry of Cooperatives and MSME's
3	Financing Policy for Micro and Small Medium Enterprises (KUR)	KUR is credit-financing viable business entities that lacks additional collateral	To improve and expand financing access to productive businesses, and improve the competitiveness of MSMEs	314,414 micro enterprises 11,789 retails 1,345 Indonesian workers (TKI)	Ministry of Cooperatives and MSME's
4	KUR for Export-Oriented Company (KURBE)	This credit facility is provided to MSMEs to improve the competitiveness of export products. Export financing in the form of financing, insurance, guarantee provided to each exporter with a maximum financing facility of Rp50 billion. This facility is given to some manufacturing sectors such as furniture, textile and footwear, and processed fish product.	To improve MSME's ability to export	As of June Rp64,631,607 million 2,454,968 debtors 42 banks	Ministry of Cooperatives and MSME's
5	Center of integrated Business Services of Cooperation and MSMEs (PLUT-KUMKM)	A program that provides comprehensive and integrated services for the development of MSMEs	To improve MSME competitiveness aimed at making them sustainable; to enhance access to digital technology	14 PLUTs 22,190 training for new entrepreneurs	Ministry of Cooperatives and MSME's
	Others Green industry awards, enterprise development facilities and industry action programs				
1	Restructuring machinery or equipment program	Grants discounts on purchases of machinery and equipment for small and medium enterprises (SMEs)	To develop the SMEs as a national priority and to provide opportunities for new entrepreneurs	2009–2014: more than 420 SMEs 2016: 163 SMEs	Central government

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Table A7.1 continued

	Incentive Measure	Brief Description	Objectives	Data on Utilization	Implementing Institution
2	SNI Award	SNI stands for Indonesia National Standard or typically called standard quality for a certain product that is obtained by way of a product certification system to determine the conformity of a product with specified requirements through initial testing of samples of the product, assessment and surveillance of the involved quality system, and surveillance by testing of product samples taken from the factory or the open market, or a combination of both. The affixing of SNI marking on the product is an indication that it meets the standard requirements (SNI) in place to allow it to be sold anywhere in the Republic of Indonesia.	To improve the quality of manufacturing products in Indonesia	38 companies	Central government
3	Bonded warehouse	Warehouse to stock imported goods exempt from import and excise duties	To facilitate trade by allowing enterprises eligible to receive import duty exemptions to store their goods and go through an expedited process of clearance; these warehouses have also proven to be an important source of revenue.	231 companies	Central government
4	Incentives for Low Cost Green Car (LCGC)	A production development program providing value-added tax incentives on luxury goods (PPnBM), particularly energy-efficient four-wheeled vehicles	To support the achievement of economies of scale in the production activities of four-wheeled vehicles		Central government
5	Forest Law Enforcement, Governance and Trade (FLEGT)	Action Plan sets out a program of actions that forms the European Union's response to the problem of illegal logging and the trade in associated wood products	To improve the effectiveness of exports of forest industry products	14,548 license until market 2017	Central government
6	Facilities to obtain raw materials for the sugar industry	New sugar industry companies must gradually increase the use of domestic sugarcane raw materials in its production process	To improve the industry's ability to meet the national sugar demand through investment in sugar industry		Central government
7	Facility to pay excise in the form of regular payment based on previous period value of paid excise	Company can pay the excise on a regular basis. The amount of monthly excise will be 1.5 of the average monthly excise value in the last 12 months instead of using the actual value of the goods produced or imported.	To facilitate firms to pay excise duty		Central government
8	VAT facility on feed materials for animal and fish	This facility import duty and VAT exemption on feed materials imported by enterprises manufacturing animal and fish food	To improve the quality of animal feed produced by firms		Central government
9	Award for Green Industries	This is aimed at recognizing greening efforts of manufacturing firms, while improving the overall quality of the products.	To promote green industry and to strengthen institutional capacity through industry promotion	nine times Green Industry Award	Central government
10	Priority Investment Services - 3 Hour Investment Permit Service (123J)	Issuance of five business licensing within a maximum of 3 hours	To accelerate business licensing		Central government

BMDTP = Bea Masuk Ditanggung Pemerintah, KLIK = Kemudahan Investasi Langsung Konstruksi, PBB = Pajak Bumi dan Bangunan, PLN = Perusahaan Listrik Negara, SPPB = Surat Pemberitahuan Pengeluaran Barang, TKDN = Tingkat Komponen Dalam Negeri, TKI = Tenaga Kerja Indonesia, TNI = Tentara Nasional Indonesia, UMKM = Usaha Mikro Kecil Menengah.
Source: Authors' compilation based on national sources.

8 Constraints to Firm Growth: Evidence from Indonesian Manufacturing Firms

8.1 Introduction

This chapter analyzes the critical constraints that Indonesia's manufacturing firms claim to encounter, and examines how these constraints affect firm growth, measured in terms of employment and sales. The analysis uses data from the World Bank Enterprise Survey (WBES) and from the World Bank's Ease of Doing Business Index and Indonesia's Investment Climate Monitoring Survey 2014.

The chapter is structured as follows. Section 8.2 discusses the problems that manufacturing firms report as obstructions to their business activities and compares Indonesia's rankings in doing business indicators with those of other Southeast Asian countries. Section 8.3 assesses the extent to which the reported obstacles to doing business negatively affect employment and sales growth. Variations in the effect of constraints by firm characteristics such as size, age, ownership, trade orientation, and technological intensity will be explored in this section. Section 8.4 concludes.

8.2 Descriptive Evidence: Survey Data on Indonesian Firms

The economic literature points to a myriad of constraints to firm growth in developing countries.

The literature indicates that manufacturing firms in the developing world face a myriad of constraints to their growth, ranging from poor infrastructure to complex regulatory environments (Table 8.1). Studies find that constraints vary across countries and sectors, and across firm characteristics and firm size, with certain constraints affecting smaller firms more heavily.[129] A number of these studies use subjective, firm-level data such as the WBES and the investment climate assessments, which are based on the perceptions of firm managers or owners on what they think are binding constraints on their firms' operations.

Moreover, studies show that investment climate indicators are highly significant determinants of firm performance, with more favorable investment climates translating into higher productivity, wage rates, profit rates, growth rates of output, employment, and capital stock at the firm level.[130] The role of regulation in hampering firm entry and expansion has been well documented.[131] Lower costs of entry and better credit information are linked to a larger small and medium-sized enterprise (SME) sector, while higher exit costs are related to a larger informal economy.[132]

Meanwhile, a lack of adequate access to finance is the most common constraint cited in the literature.[133] The literature highlights the skewed nature of firm-size distribution in developing economies in favor of

[129] Dinh, Mavridis, and Nguyen (2010); Fischer and Karlan (2015).

[130] Dollar, Hallward-Driemeier, and Mengistae (2005).

[131] Djankov et al. (2002); Klapper, Laeven, and Rajan (2004).

[132] Ayyagari, Beck, and Demirgüç-Kunt (2007).

[133] Demirgüç-Kunt and Maksimovic (1998); Rajan and Zingales (1998); Cabral and Mata (2003); Desai, Gompers, and Lerner (2003); Galindo and Micco (2007); Angelini and Generale (2008); and Beck, Demirgüç-Kunt, and Maksimovic (2005).

Table 8.1 Constraints to Firm Growth—A Short Summary of the Empirical Evidence

Authors (year)	Methodology	Main Findings	Country Coverage
Beck, Demirgüç-Kunt, and Maksimovic (2005)	• Regression analysis using firm-level survey data and controlling for country and random effects; examine effect of financial, legal, and corruption problems on firms' growth	• Smallest firms are most constrained by obstacles to growth. • Financial and institutional development weakens constraining effects of financial, legal, and corruption obstacles.	54 countries
Ayyagari, Demirgüç-Kunt, and Maksimovic (2006)	• Analysis using regression and directed acyclic graph methodologies to examine the importance of different features of the business environment in promoting and restraining firm growth • Used World Bank Enterprise Survey data (1999 and 2000)	• Constraints relating to finance, crime, and policy instability have a direct impact on firm expansion—with finance-related constraints emerging as the most robust of the three constraints.	80 developed and developing economies
Dollar, Hallward-Driemeier, and Mengistae (2005)	• Employed firm-level surveys by the World Bank to examine relationship between investment climate and firm growth • Compared firms producing similar goods with similar technologies in different locations—concentrated on garments sector	• Investment climate indicators are highly significant determinants of firm performance. More favorable investment climates translate to higher productivity, wages, profit, and higher growth rates of output, employment, and capital stock.	Bangladesh, the PRC, India, Pakistan
Pagés, Aterido, and Hallward-Driemeier (2007); Aterido, Hallward-Driemeier, and Pagés (2009)	• Used firm-level data on more than 56,000 enterprises to examine the impact of business climate on employment growth by firms, focusing on differences across firm size	• Business climate conditions vary significantly across firms of different sizes, with important nonlinearities in their impact on employment growth. • Micro and small firms pay more in bribes and are more adversely affected by interruptions in infrastructure services than large firms. Micro and small firms are disproportionately affected by a weak business climate.	85 developing and 5 high-income economies
Arellano, Bai, and Zhang (2009)	• Regression analysis controlling for country-specific, two-digit industry- specific effects and seven age-group-specific effects to analyze impact of cross-country variation in financial market development on firm growth rates, using comprehensive firm-level datasets from 2004–2005 (data from Amadeus)	• In less financially developed economies, the fast emergence of small firms arises because firms have lower debt-to-asset ratios than large firms.	22 European economies
Dinh, Mavridis, and Nguyen (2010)	• Used World Bank Enterprise Survey data (2006–2010) to examine the relationship between business environment and firm growth (employment growth) • Investigated the effect of financial access variables on firm growth, controlling for the effects of firm characteristics	• Access to finance among most binding constraints • Firm size and firm age are significantly correlated with firm growth • Low level of financial development negatively skews firm-size distribution • Firms grow faster if they export, are part of an entity with multiple establishments, or are foreign or privately owned.	98 countries

PRC = People's Republic of China.
Note: This summary is not meant to be an exhaustive list of all studies on this topic.
Source: Authors' compilation.

SMEs. This skewness arises from the lack of access to external financing of small firms, thereby limiting their prospects for future expansion.[134] Studies also suggest that the impact of credit constraints on firm performance varies across regions, countries, and sectors, and by firm characteristics within countries (firm size, age, sector, and ownership type).[135] For instance, credit constraints disproportionately affect micro, small, and medium-sized enterprises—in particular, in the developing economy context—as these firms lack the necessary collateral to access bank financing.[136] Studies also show that business constraints impact more heavily firms that are private, smaller, younger, domestic-owned, and those that cater to domestic markets.[137]

Manufacturing firms cite practices of competitors in the informal sector, political instability, and tax rates as top obstacles to doing business in 2015.

The WBES (2015) shows that practices of the informal sector, political instability, and tax rates are the top reported obstacles to doing business for 57% of Indonesian manufacturing firms, more than twice as many as in 2009 (Table 8.2).[138] These constraints reflect the most relevant business environment obstacle that firm managers and owners perceive as affecting their daily operations in 2015.[139] One observation that stands out is that fewer firms report access to finance, electricity, and access to land as top obstacles in 2015. On the other hand, the percentage of firms citing practices of the informal sector, political instability, tax rates, and customs and trade regulations as top obstacles to doing business, increased in 2015.[140] These changes reveal that perceptions on the most relevant business obstacles have shifted from concerns on basic business elements, such as electricity and access to finance, to concerns on the quality of governance and regulations (political instability, tax rates, and customs and trade regulations).

Survey data also show that constraints to doing business vary by firm characteristic.

The WBES (2015) shows that the top reported constraints to doing business—practices of the informal sector, political instability, tax rates, access to finance, and customs and trade regulations—are similar across all types of firms (Table 8.2). However, variations exist. Comparing firms of different sizes, the survey finds that a higher percentage of small- and medium-sized firms cite practices of the informal sector and access to finance as their top constraint. More medium- and large-sized firms report tax rates and customs and trade regulations as constraints to business than small firms.[141] Finally, only large firms identify labor regulations as one of the top five constraints.

[134] Cabral and Mata (2003); Desai, Gompers, and Lerner (2003); Angelini and Generale (2008); Beck, Demirgüç-Kunt, and Maksimovic (2005).

[135] Dinh et al. (2010); Beck, Demirgüç-Kunt, and Maksimovic (2005); Pagés, Aterido, and Hallward-Driemeier (2007); Aterido, Hallward-Driemeier, and Pagés (2009); Fort et al. (2013); Bartelsman, Haltiwanger, and Scarpetta (2013).

[136] Love and Mylenko (2003).

[137] Batra, Kaufmann, and Stone (2003).

[138] Other macroeconomic factors tend to top the list. They are rated as important constraints across most enterprise surveys globally. For the purposes of this report, the analysis focuses on the factors where policy interventions are relatively easily identifiable.

[139] To be precise, the perceived constraint or obstacle is captured by the survey through the following question: "On a scale of 0–4 ('not a problem' to 'a very severe problem'), how much of an obstacle is electricity to the operations of this establishment?" Identical questions are posed for the other obstacles.

[140] Note that changes in what firms report as their top constraint to doing business does not imply an improvement or deterioration of the business environment element, but merely reveals that the most relevant business obstacle to the firm has changed (Yang 2011).

[141] This finding is corroborated by an account of a large firm engaged in food manufacturing during the ADB team's meeting with industry leaders in August 2018. According to this firm, import duties and vague food regulations limit its ability to penetrate international markets such as South Asia.

Table 8.2 Percentage of Manufacturing Firms Identifying a Business Environment Element as the Biggest Obstacle to Doing Business

	Practices of Competitors in the Informal Sector	Political Instability	Tax Rates	Access to Finance	Customs and Trade Regulations	Labor Regulations	Crime, Theft, and Disorder	Transport	Inadequately Educated Workforce	Corruption	Electricity	Business Licensing and Permits	Access to Land	Courts	Tax Administration
All manufacturing firms															
2015	30.86	16.01	10.41	7.23	6.46	5.30	3.95	3.76	3.38	3.18	2.99	2.99	1.74	1.06	0.68
2009	12.11	7.32	2.72	39.15	3.47	4.32	2.72	3.57	3.38	3.00	9.20	3.76	3.47	0.38	1.41
By size															
Small	43.07	11.75	5.72	10.54	2.71	0.90	4.82	5.42	4.82	1.81	3.61	2.41	1.81	0.30	0.30
Medium	31.61	14.71	13.90	7.63	7.36	3.00	3.00	4.36	2.18	3.00	3.54	1.91	1.91	1.63	0.27
Large	18.05	21.60	11.24	3.55	9.17	12.13	4.14	1.48	3.25	4.73	1.78	4.73	1.48	1.18	1.48
By age (years in operation)															
Young (1–5)	8.57	5.71	0	0	5.71	2.86	20.00	28.57	5.71	5.71	11.43	0	0	0	5.71
Mature (6–15)	33.05	12.43	11.30	9.04	5.93	3.39	5.37	3.95	4.24	3.11	3.11	1.98	1.13	1.98	11.30
Older (16+)	30.96	18.58	10.22	6.66	6.81	6.50	2.32	2.32	2.48	3.10	2.48	3.72	2.17	0.62	1.08
By technology group															
Low tech	34.90	14.83	8.55	7.50	7.16	4.54	3.49	3.49	3.32	2.62	3.32	2.44	1.92	0.87	1.05
Medium tech	25.43	17.34	13.58	6.07	6.07	5.49	4.34	5.49	3.18	3.76	2.89	2.89	1.73	1.45	0.29
High tech	27.12	17.80	10.17	9.32	4.24	8.47	5.08	0	4.24	4.24	1.69	5.93	0.85	0.85	10.17
By ownership															
Foreign	8.33	26.67	10.00	5.83	5.83	23.33	3.33	2.50	1.67	3.33	1.67	3.33	2.50	0.83	0.83
Domestic	33.80	14.60	10.47	7.42	6.54	2.94	4.03	3.93	3.60	3.16	3.16	2.94	1.64	1.09	0.65
By exporting status															
Nonexporter	33.86	13.86	10.91	7.61	6.02	2.95	4.20	4.20	3.41	3.3	3.07	2.73	1.93	1.25	0.68
Exporter	14.01	28.03	7.64	5.10	8.92	18.47	2.55	1.27	3.18	2.55	2.55	4.46	0.64	0	0.64

Note: Highlighted cells refer to the top five business constraints reported by manufacturing firms.
Source: World Bank. Enterprise Surveys. Indonesia – Enterprise Survey 2015. http://microdata.worldbank.org/index.php/catalog/2665 (accessed August 2018).

In terms of firm age, mature firms (operating more than 6 years but less than 16 years) and old firms (more than 16 years) report similar constraints while young firms (less than 5 years) report a different set of top constraints. A higher percentage of young firms report transport-related constraints, crime, and electricity as top obstacles to doing business.

Based on UNIDO's technology classification (Table 6.1), the top five constraints reported by firms across technology groups are generally similar. One notable difference is that a higher percentage of high-tech firms say that political instability, access to finance, and labor regulations are top constraints to doing business.

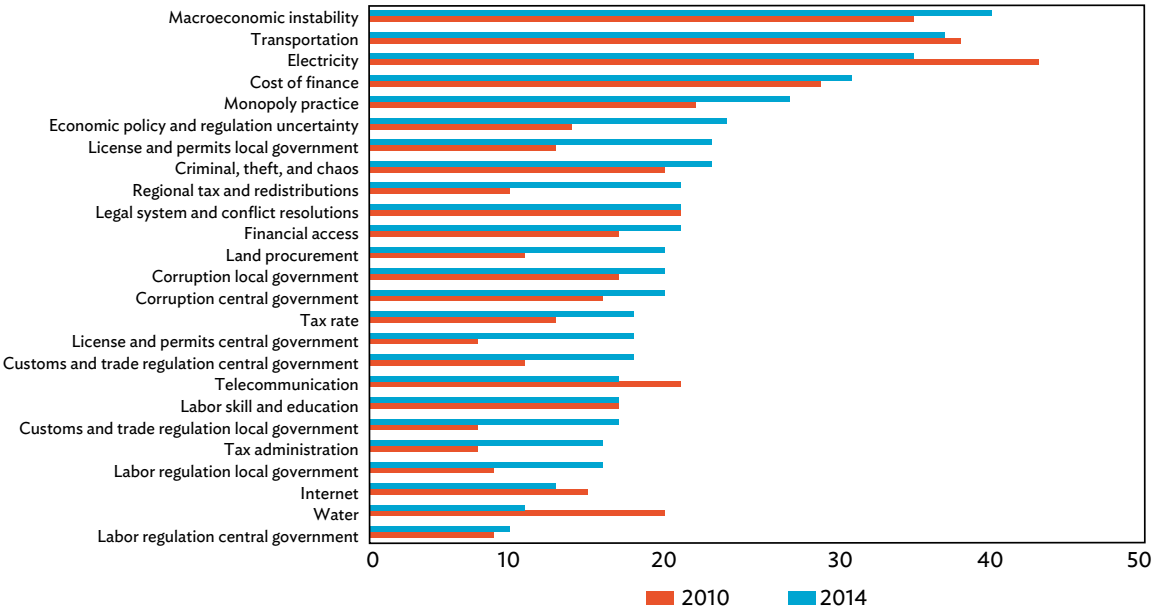
In terms of ownership, domestic-owned firms cite practices of the informal sector as the most important constraint. For foreign-owned firms, political instability and labor regulations are key constraints to business.

Finally, in terms of exporting status, while both exporters and nonexporters had similar concerns, a higher percentage of exporters identify political instability, customs and trade regulations, and labor regulations as top constraints to doing business.

Indonesia's Investment Climate Monitoring Survey 2014 finds that macroeconomic instability—measured by exchange rate volatility and inflation—is a major business constraint (Figure 8.1). Concerns over transportation rank second, with 37% of firms citing it as a major constraint, followed by electricity (35%), licenses and permits from local government (31%), and economic policy and regulatory uncertainty (27%). The survey also shows a deterioration of firm perception on the business climate. In fact, out of 25 indicators, only five indicators showed a decline from 2010 to 2014 in the proportion of respondents rating an issue as severe or very severe obstacle to business: water, electricity, telecommunication, internet, and transportation. For all other indicators, a higher proportion of firms perceived these indicators as obstacles to doing business.

Figure 8.1 Obstacles to Doing Business in Indonesia

(Percentage of firms reporting the following issues as severe or very severe obstacles to doing business)

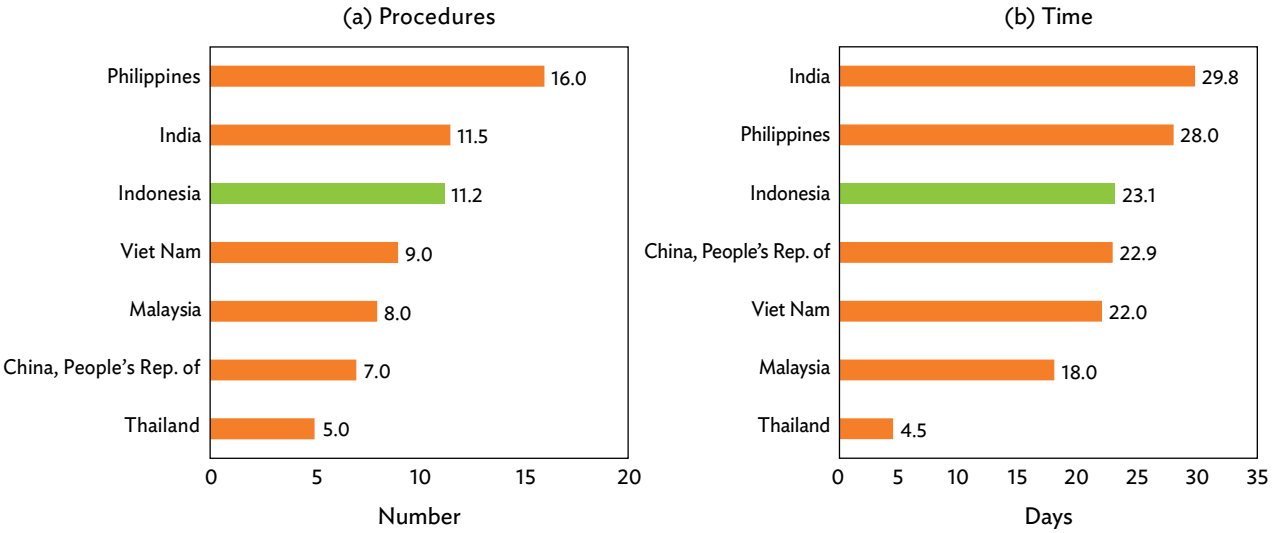


Note: The Investment Climate Monitoring Survey covers 343 manufacturing firms in Indonesia: 40 in Medan, 138 in Greater Jakarta, 48 in Bandung, 27 in Semarang, 75 in Surabaya, and 15 in Makassar.
Source: Investment Climate Monitoring Survey 2014.

Indonesia has made significant progress in its business climate ranking, but challenges remain.

As reported in Figure 7.1, Indonesia climbed 19 places to no. 72 in 2017 (out of 190 countries) from no. 91 in 2016 in the World Bank's Ease of Doing Business Index. The country's performance on all 10 indicators improved in 2017, most notably in getting credit, protecting minority investors, registering property, and getting electricity. However, Indonesia remains behind its Association of Southeast Asian Nations (ASEAN) neighbors in terms of ease of doing business. Malaysia, Thailand, and Viet Nam ranked higher at 24th, 26th, and 68th, respectively. For example, it takes 11 procedures to legally start and operate a company in Indonesia, taking an average of 23 days to complete. In comparison, it takes only five procedures to start a business in Thailand, which can be completed in 4.5 days (Figure 8.2).

Figure 8.2 Starting a Business



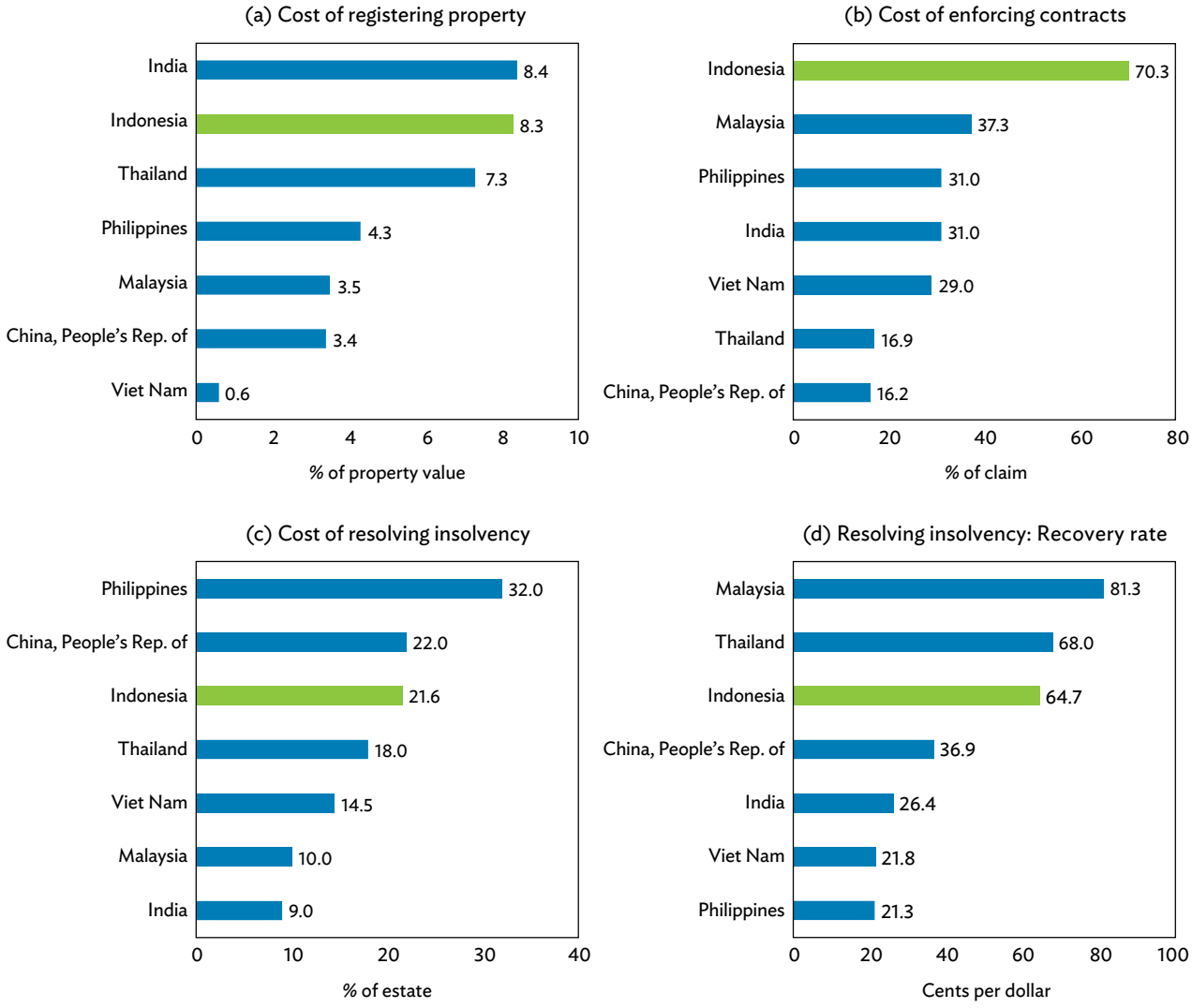
Source: World Bank. Doing Business Database. https://datacatalog.worldbank.org/dataset/doing-business (accessed July 2018).

Meanwhile, the cost of registering a property in Indonesia, at 8.3% of the property value, is one of the highest in our sample of developing Asian countries (Figure 8.3). In contrast, registering a property only costs around 0.6% of the property value in Viet Nam and about 3.5% in the PRC and Malaysia. Moreover, the cost of enforcing contracts is substantially higher in Indonesia, at around 70% of the claim, than in other countries in developing Asia: around 30% in Viet Nam, India, Philippines, and Malaysia and about 16% in Thailand and the PRC. It costs up to 21.6% of the debtor's estate to recover debt in Indonesia, a considerable amount compared to the cost incurred in India and Malaysia at 9% and 10%, respectively. Furthermore, the insolvency recovery rate is only 64.7 cents per dollar in Indonesia compared with up to 81.3 cents in Malaysia.

Infrastructure bottlenecks persist—electricity is costly to get and supply remains unreliable.

The number of days required to get electricity in Indonesia (34 days) is comparable to other countries in developing Asia. However, the cost of getting connected to the electrical grid is considerably higher in Indonesia, estimated at 276% of the country's income per capita, compared to only 25% of income

Figure 8.3 Cost of Registering Property, Enforcing Contracts, and Resolving Insolvency

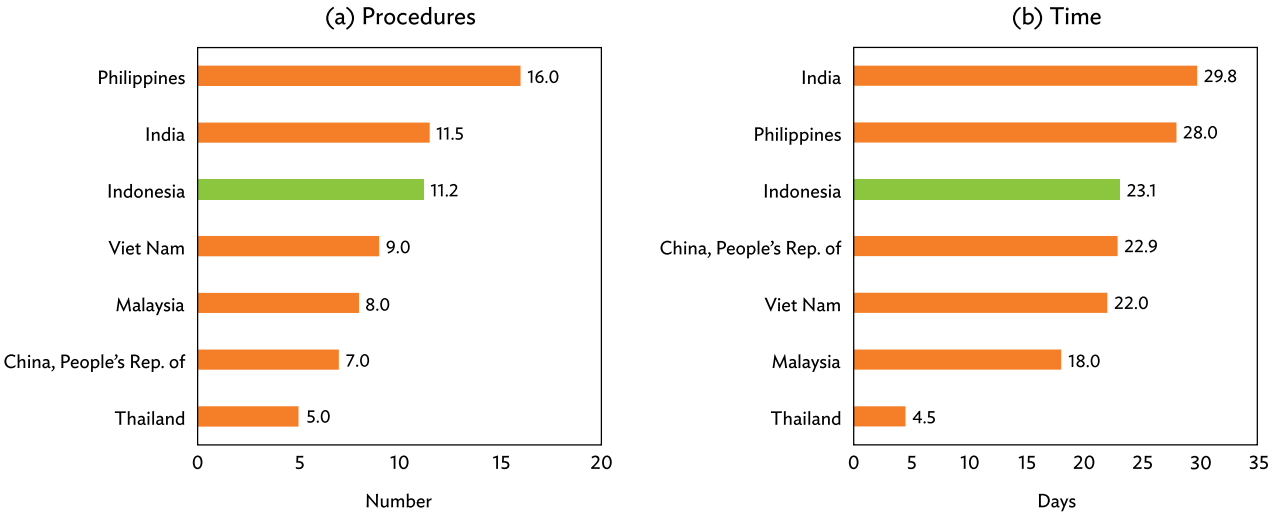


Source: World Bank. Doing Business Database. https://datacatalog.worldbank.org/dataset/doing-business (accessed July 2018).

per capita in the Philippines, but still much lower than Viet Nam's cost (Figure 8.4).[142] Furthermore, Indonesia scores the lowest among our sample of developing Asian countries in reliability of supply and transparency of electricity tariffs. Results of the WBES 2015 show that the number of power outages in a month increased to 1.6 in 2015 (versus 0.9 in 2009) and the proportion of firms that own or share a generator jumped to 21% in 2015 from 6% in 2009.

[142] The cost of getting electricity is measured as a percentage of the economy's income per capita, exclusive of value-added tax. This cost includes all fees and costs associated with completing the procedures to connect a warehouse to electricity, including those related to obtaining clearances from government agencies, applying for the connection, receiving inspections of both the site and the internal wiring, purchasing material, getting the actual connection working, and paying a security deposit (World Bank Doing Business Getting Electricity Methodology. http://www.doingbusiness.org/en/methodology/getting-electricity).

Figure 8.4 Getting Electricity

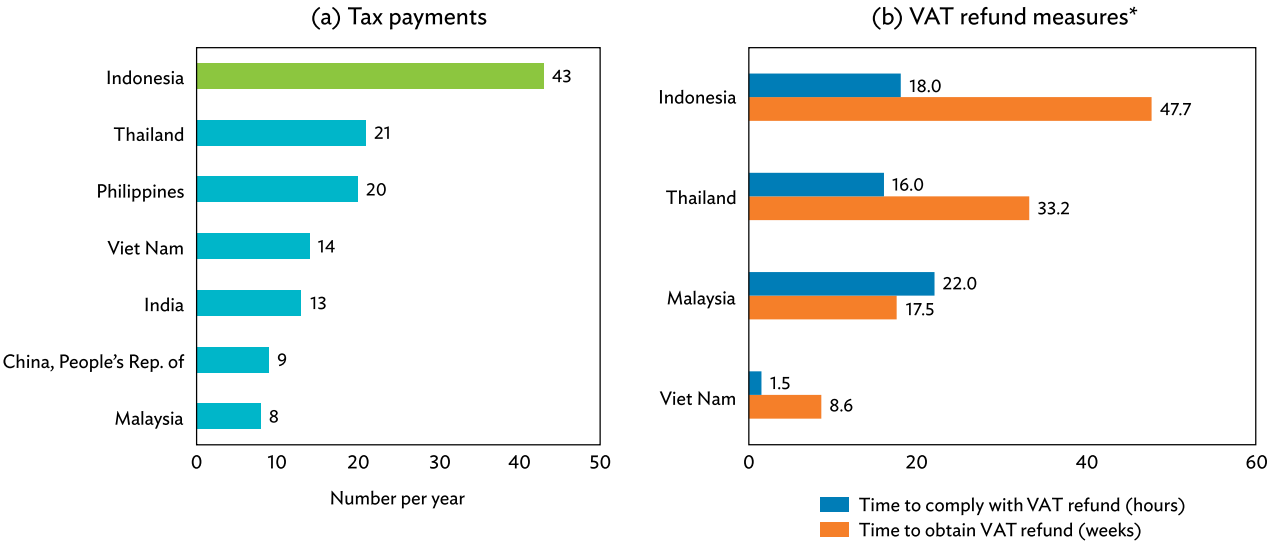


Source: World Bank. Doing Business—Getting Electricity Methodology. http://www.doingbusiness.org/en/methodology/getting-electricity (accessed July 2018).

Indonesian firms make more tax payments in a year than its peers in other countries, while trading across borders remains cumbersome.

Firms in Indonesia need to make 43 tax payments each year (which take around 207.5 hours to comply with on average). In comparison, firms in Malaysia and the PRC make only 8 and 9 payments, respectively, each year. Moreover, an Indonesian firm needs to spend around 18 hours to comply with value-added tax (VAT) refunds and wait 47.7 weeks to receive them, longer than in other countries in developing Asia (Figure 8.5).

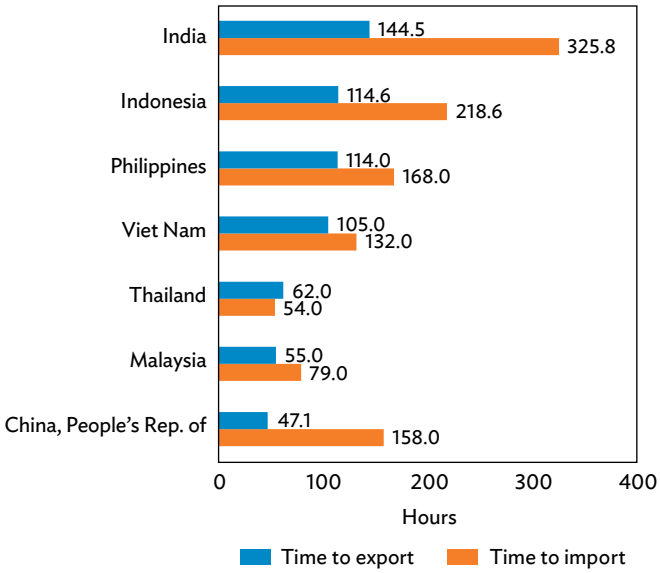
Figure 8.5 Paying Taxes



VAT = value-added tax.
Note: * There is no VAT refund available in India, the People's Republic of China, and the Philippines.
Source: World Bank. Doing Business Database. https://datacatalog.worldbank.org/dataset/doing-business (accessed July 2018).

Meanwhile, trading across borders requires complying with border and documentary requirements, which on average take around 114.6 hours for exports and 218.6 hours for imports in Indonesia (Figure 8.6). The average number of hours required to export/import in Indonesia is one of the highest in our sample of developing Asian countries. For instance, the average time to import is 60 hours longer (well over 2 days) than for the PRC.

Figure 8.6 Trading across Borders



Source: World Bank. Doing Business Database. https://datacatalog.worldbank.org/dataset/doing-business (accessed July 2018).

Employment regulations are protective: Indonesia restricts fixed-term contracting and pays the highest severance for redundancy dismissal.

In contrast to other countries in Asia with more flexible hiring rules, Indonesia prohibits fixed-term contracts for permanent tasks and imposes a limit on the duration of such contracts—2 years for single fixed-term contracts and 3 years for renewals (Table 8.3). Thailand also prohibits fixed-term contracts, but does not impose a limit on duration. Indonesia's monthly minimum wage—$248.87 in Jakarta and $244.45 in Surabaya—is higher than in Thailand, India, and Viet Nam, but lower compared to Malaysia, the Philippines, and the PRC (Figure 8.7).

In terms of dismissal procedures, Indonesia is the only country that requires third-party notification and approval for the dismissal of nine workers (Table 8.3). Notice period for redundancy dismissal is zero in Indonesia, compared to 6.7 weeks in Malaysia and 4.3 weeks in other Asian countries. Indonesia stands out with regards to severance pay for redundancy dismissal. On average, firms pay the equivalent of 57.8 weeks (around 14.5 months) of wages as severance payment, compared to 11.4 weeks of wages in India and 17.2 weeks of wages in Malaysia (Figure 8.7).

Finally, Table 8.4 reports Indonesia's Eximbank diagnostics analysis of problems and challenges in five manufacturing sectors.

8.3 Constraints to Growth of Indonesia's Manufacturing Firms: An Empirical Assessment

While the previous section summarized what manufacturing firms say are problems to doing business, this section will test whether the critical constraints that firms perceive as obstacles to their daily operations do in fact impact firm growth. We use two measures of firm growth: (i) employment growth measured by the number of permanent employees; and (ii) sales growth measured by the firm's total annual sales.[143]

The analysis uses firm-level data on 390 manufacturing firms surveyed in 2009 and 2015 from the WBES. Since the analysis involves identifying the most important constraints to firm growth, we take into

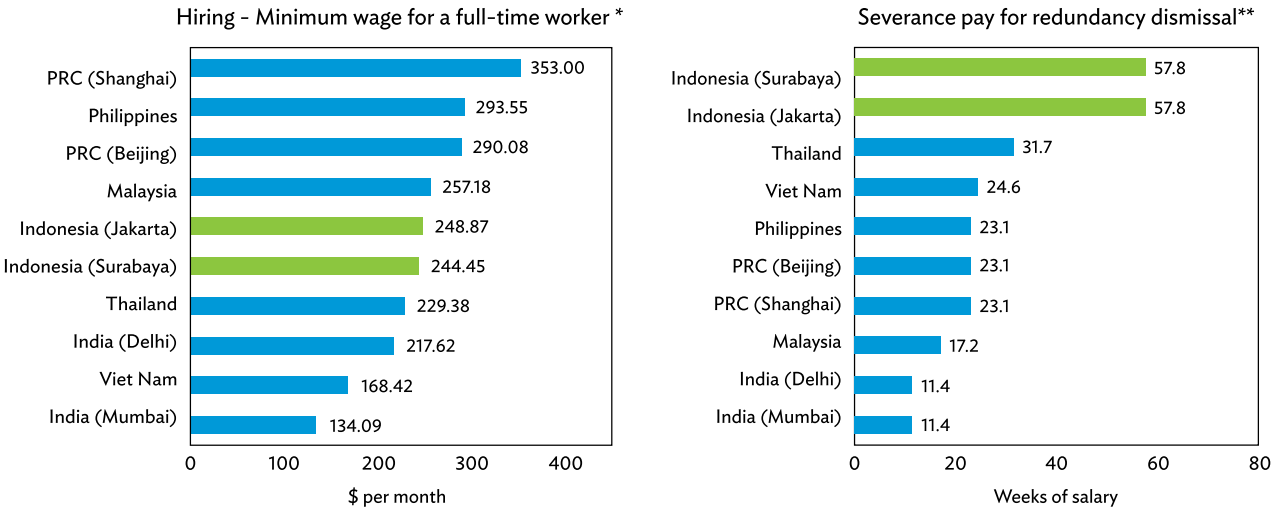
[143] We do not present regression results using sales from exports as a measure of firm growth because only 32 firms report sales coming from exports.

Table 8.3 Select Hiring and Redundancy Rules in Asia by Country

Country	Hiring Rules			Redundancy Rules					
	Fixed-Term Contracts Prohibited for Permanent Tasks?	Maximum Length of Fixed-Term Contract (months)		Dismissal Due to Redundancy Allowed by Law?	Third-Party Notification Requirement		Third-Party Approval Requirement		Notice Period for Redundancy Dismissal (weeks of salary)**
		Single Contract	Renewals		1 worker	9 workers	1 worker	9 workers	
PRC (Shanghai)	No	No limit	No limit	Yes	Yes	No	Yes	No	4.3
PRC (Beijing)	No	No limit	No limit	Yes	Yes	No	Yes	No	4.3
India (Mumbai)	No	No limit	No limit	Yes	Yes	No	Yes	No	4.3
India (Delhi)	No	No limit	No limit	Yes	Yes	No	Yes	No	4.3
Indonesia (Jakarta)	Yes	24	36	Yes	Yes	Yes	Yes	Yes	0.0
Indonesia (Surabaya)	Yes	24	36	Yes	Yes	Yes	Yes	Yes	0.0
Malaysia	No	No limit	No limit	Yes	No	No	Yes	No	6.7
Philippines	No	No limit	No limit	Yes	Yes	No	Yes	No	4.3
Thailand	Yes	No limit	No limit	Yes	No	No	No	No	4.3
Viet Nam	No	36	72	Yes	No	No	Yes	Yes	0.0

PRC = People's Republic of China.
** Average for workers with 1, 5, and 10 years of tenure.
Source: World Bank. Doing Business Database. https://datacatalog.worldbank.org/dataset/doing-business (accessed September 2018).

Figure 8.7 Labor Market Regulations



PRC = People's Republic of China.
Notes: *Refers to the worker in the Doing Business case study: a cashier, age 19, with 1 year of work experience. **Average for workers with 1, 5, and 10 years of tenure.
Source: World Bank. Doing Business Database. https://datacatalog.worldbank.org/dataset/doing-business (accessed July 2018).

Table 8.4 Sectoral Problems and Challenges in Indonesia's Manufacturing Sectors

Textile products	• Machinery is inefficient and old, especially in the weaving and knitting industry. • High share of imported raw materials • The policy to exempt imported textile products for export purposes from value-added tax, through the Import Facility for Export Purpose (KITE) program, has backfired on the domestic upstream textile industry. This is due to the fact that the downstream textile industry prefers to import cheaper raw materials from abroad rather than source them locally. The upstream textile industry has thus urged the government to apply the Local Facility for Export Purposes (KLTE) instead. • High energy prices: electric and gas energy tariffs are relatively high compared to other countries • Import duties carried out by the European Union and the United States for Indonesian textiles and textile products are around 11%–17%. These countries are Indonesia's largest export markets. • Lack of trade diplomacy: other countries are very fast in negotiating trade deals • Increased competition, especially from Viet Nam • Flood of cheap imported products, especially from the PRC (following the implementation of the ASEAN–China Free Trade Agreement in January 2010) • Limited number of dry ports when goods exceed the stacking time limit of 3 days • Inadequate roads • Introduction of a regulation that prohibits Indonesian-based textile factories from selling their products to companies that have not registered as taxable employers (PKP) has added further difficulties, as nearly 70% of the industry players in the textile sector are not PKP.
Electronic products and machinery equipment	• Lack of technological development, even though technology is rapidly changing • Need an R&D center • Need fiscal incentives such as tax allowances or tax holidays to attract investors • Import tariff for electronic components is 0% so producers prefer imports rather than building factories in Indonesia
Tires	• Uncertainty regarding tire import regulations
Basic chemicals	• Raw materials need to be imported • Energy availability • Cumbersome tariff and nontariff barriers
Fish processing industry	• Low quality of fisheries • Inadequate logistics system as a result of the distance between location of the fish processing industry and that of potential fisheries

ASEAN = Association of Southeast Asian Nations, PKP = Pengusaha Kena Pajak, PRC = People's Republic of China, R&D = research and development.
Sources: Conversation with Eximbank officials on 12 September 2018; for the textile sector, Global Business Guide Indonesia. http://www.gbgindonesia.com/en/manufacturing/article/2017/indonesia_s_upstream_textile_sector_on_the_rise_after_a_slump_11803.php.

account changes in firms' perceptions between 2009 and 2015. Therefore, if a constraint reported in 2009 is also reported in 2015, then it is referred to as a critical constraint, and hypothesize that it limits firm growth. Box 8.1 presents the empirical strategy behind the regression results presented here, and Table A8.1 in Appendix 8.1 provides a list of the variables used in the regression, including variable definitions and summary statistics. Regression tables are shown in Tables A8.2–A8.12, also in the appendix.

Critical constraints to doing business have no discernible effect on employment growth; but some constraints appear to be significant when disaggregating the analysis by firm characteristics.

Results show that, on average, critical constraints have no significant effect on the employment growth of manufacturing firms (Table 8.5, column 1). Likewise, none of the reported obstacles included in the

Box 8.1 Constraints to Growth of Indonesia's Manufacturing Firms—Empirical Strategy

The analysis uses firm-level data from the World Bank Enterprise Surveys (WBES) to identify constraints to firm growth in Indonesia's manufacturing sector. Our sample consists of 390 manufacturing firms in Indonesia surveyed in 2009 and 2015. Using ordinary least squares (OLS), the analysis estimates the following model:

$$\Delta Y_{it,t-6} = \alpha + \sum_{i=1}^{17} \beta_1 Critical Constraint_{it} + \sum_{i=1}^{6} \gamma_i FC_{it} + \sum_{i=1}^{9} \delta_i Region_{it} + \varepsilon$$

where ΔY denotes a firm's growth in terms of employment and sales between 2009 and 2015. Although the WBES asks about the number of full-time employees and total sales in the last fiscal year and 3 fiscal years preceding it, the analysis uses only the current values reported in WBES 2009 and 2015. This approach minimizes potential recall bias in the dependent variable that may arise from the respondent's poor or incomplete memory of the level of employment or sales 3 fiscal years ago.

$Critical Constraint_{it}$ refers to a business environment constraint perceived by firm i as a "moderate to very severe" problem in the two time periods 2009 and 2015. Formally, we define it as follows:

$$Constraint_{it,t-6} = \begin{cases} 1, & if\ firm\ i's\ response\ is\ moderate\ or\ very\ severe\ problem \\ 0, & if\ firm\ i's\ response\ is\ no\ or\ minor\ problem \end{cases}$$

$$Critical Constraint_{it} = \begin{cases} 1, & if\ Constraint_{i2009} = Constraint_{i2015} \\ 0, & otherwise \end{cases}$$

The WBES asks the firm's manager or owner to evaluate how problematic a set of general business environment elements are in the firm's operations on a scale of 0 to 4 (ranging from "not a problem" to "a very severe problem"). Since firm $i's$ perceptions on the business environment may be affected by the firm's characteristics, we use sector-region-size averages for the firm's response on the severity of a particular business environment constraint.

FC_{it} is a vector of firm attributes that have been shown in the literature to influence firm growth, such as firm size, age, trade orientation, ownership, manufacturing branch, and technological intensity. $Region_{it}$ corresponds to the region where firm i is located.

Source: Authors.

analysis appears to be critical constraints to employment growth for large firms, old firms, low-tech firms, domestic firms, and firms in the garment sector. Looking at the table by rows, it appears that complaints such as political instability, customs and trade regulations, and the practices of the informal sector have no significant effect on employment growth on any type of firm.

However, disaggregating the analysis by firm characteristics, we find variations in the impact of constraints on employment growth (Table 8.5):

(i) By size, tax rates negatively affect employment growth of small- and medium-sized firms (columns 2 and 3). Constraints related to electricity, land, labor regulations, and crime limit employment growth of medium-sized firms (column 3).

Table 8.5 Constraints to Employment Growth

		All Firms	Size			Age		Technology Group			Ownership		Exporter		Sector						
	Critical Constraints	(1)	Small (2)	Medium (3)	Large (4)	Mature (5)	Older (6)	Low Tech (7)	Medium Tech (8)	High Tech (9)	Foreign (10)	Domestic (11)	Yes (12)	No (13)	Food (14)	Textiles (15)	Garments (16)	Chemicals (17)	Rubber (18)	Nonmetallic (19)	Other Manufacturing (20)
Financing difficulty and tax burden	Finance										■										
	Tax rates		■	■						■			■			■		■			
	Tax administration									■								■			
Infrastructure bottlenecks	Electricity			■															■		
	Telecommunications								■							■			■		
	Transport																	■			
Institutional factors	Crime, theft, and disorder			■																	■
	Political instability																				
	Corruption														■					■	
	Courts					■															
Limited access to land and labor	Land			■		■					■			■	■					■	
	Inadequately educated workforce								■											■	
Regulatory and licensing burden	Customs and trade regulations																				
	Licensing and permits					■															
	Labor regulations			■		■				■											
	Practices of competitors in the informal sector																				

■ Constraint not statistically significant
■ Constraint statistically significant

Note: Regression results for young firms are not presented due to insufficient number of observations.
Source: Authors.

(ii) By age, employment growth of firms operating for 6 to 15 years (mature firms) is negatively affected by constraints related to land, licensing and permits, labor regulations, and courts (column 5).[144]
(iii) By technological intensity, constraints related to telecommunications and worker skills limit employment growth of medium-tech firms (column 8). Tax burden (tax rates and tax administration) as well as labor regulations limit growth of high-tech firms (column 9).
(iv) Employment growth of foreign-owned firms is particularly constrained by limited access to finance and land (column 10).
(v) Employment growth of exporters is constrained by tax rates, while access to land issues constrains nonexporters (columns 12 and 13).
(vi) We also find sectoral differences on the effect of critical constraints on employment growth (columns 14–20). For firms in the food sector, access to land and corruption are significant constraints to growth. For firms in textiles, constraints related to telecommunications and tax rates limit employment growth. Tax rates and tax administration as well as transport bottlenecks limit employment growth of firms in the chemicals sector. For firms in rubber and plastics, infrastructure bottlenecks negatively impact growth (electricity and telecommunications). Limited access to land, inadequately educated workforce, and corruption negatively impact employment growth of firms in the nonmetallic mineral products sector. Finally, employment growth of firms in other manufacturing is negatively affected by crime, theft, and disorder.

Electricity, institutional factors, limited access to land, and regulatory and licensing burden negatively impact sales growth of manufacturing firms.

Using sales growth as a measure of firm growth, the results show that more critical constraints significantly affect sales growth than employment growth. Infrastructure bottlenecks (electricity), institutional factors (crime, political instability, and corruption), labor regulations, and licensing burden are significant constraints to sales growth (Table 8.6, column 1). However, similar to employment growth, none of the reported obstacles seems to constrain firms in the garment sector. The tax administration system is also not a constraint on any type of firm.

Disaggregating the analysis by firm characteristics, some patterns emerge (Table 8.6):

(i) By firm size, sales growth of small firms is constrained by tax rates, licensing, labor regulations, and courts (column 2). Constraints related to electricity, land, licensing, and labor regulations limit the sales growth of medium-sized firms (column 3). Large firms are constrained by infrastructure bottlenecks (electricity and transport); institutional factors (crime, corruption, and courts); limited access to land and labor; labor regulations; and licensing burden (column 4).
(ii) By age, constraints related to crime and labor regulations negatively affect the sales growth of mature firms or firms in operation for 6 to 15 years (column 5). Institutional factors (crime and corruption), limited access to land, and regulatory and licensing burden significantly constrain the sales growth of old firms or firms in operation for more than 15 years (column 6).
(iii) By technological intensity, institutional factors (crime, corruption, and courts); limited access to land and labor; and regulatory and licensing burden (labor regulations, and licensing and permits) negatively affect sales growth of low-tech firms (column 7). Constraints related to electricity, licensing issues, and corruption are negatively associated with sales growth of medium-tech firms (column 8). Finally, financing difficulties limit sales growth of high-tech firms (column 9).

[144] Regression results for young firms are not shown due to the limited number of observations.

Table 8.6 Constraints to Sales Growth

		All Firms	Size					Technology Group			Ownership		Exporter		Sector						
	Critical Constraints	(1)	Small (2)	Medium (3)	Large (4)	Mature (5)	Older (6)	Low Tech (7)	Medium Tech (8)	High Tech (9)	Foreign (10)	Domestic (11)	Yes (12)	No (13)	Food (14)	Textiles (15)	Garments (16)	Chemicals (17)	Rubber (18)	Nonmetallic (19)	Other Manufacturing (20)
Financing difficulty and tax burden	Finance									■								■			
	Tax rates		■												■						■
	Tax administration														■						
Infrastructure bottlenecks	Electricity	■		■	■				■		■	■		■	■				■	■	
	Telecommunications															■			■	■	
	Transport				■																
Institutional factors	Crime, theft, and disorder	■			■	■	■	■				■	■	■							■
	Political instability	■									■			■					■	■	
	Corruption	■			■		■	■	■			■		■							
	Courts		■		■			■					■		■						
Limited access to land and labor	Land	■		■	■		■	■				■		■		■					
	Inadequately educated workforce				■			■								■					
Regulatory and licensing burden	Customs and trade regulations				■						■		■								
	Practices of competitors in the informal sector														■				■		
	Licensing and permits	■	■	■	■		■	■	■			■		■	■				■		
	Labor regulations	■	■		■	■	■	■				■		■	■				■	■	■

■ Constraint not statistically significant
■ Constraint statistically significant

Note: Regression results for young firms are not presented due to insufficient number of observations.
Source: Authors.

(iv) Infrastructure bottlenecks (in particular, electricity) negatively affect sales growth of both foreign- and domestic-owned firms (columns 10 and 11). Constraints related to customs and trade regulations and political instability negatively affect sales growth of foreign-owned firms (column 10). On the other hand, sales growth of domestic-owned firms is negatively affected by crime, corruption, access to land, and regulatory and licensing burden (column 11).

(v) Sales growth of exporters is negatively affected by crime, courts, and customs and trade regulations (column 13). Sales growth of nonexporters is constrained by obstacles related to electricity, institutional factors, access to land, licensing, and labor regulations (column 12).

(vi) The sales growth of firms in the food sector is negatively affected by tax rates, electricity, courts, and practices of competitors in the informal sector (column 14). Infrastructure bottlenecks (telecommunications) and limited access to land and labor constrain sales growth of firms in textiles manufacturing (column 15). Financing difficulties limit the sales growth of firms in the chemicals sector (column 17). For firms in rubber and plastics, electricity, political instability, and practices of competitors in the informal sector limit sales growth (column 18). For firms in nonmetallic mineral products, electricity and political instability negatively affect sales growth (column 19). Finally, sales growth of firms in other manufacturing is negatively constrained by tax rates, crime, and labor regulations (column 20).

The pattern of firm growth varies significantly across regions.

Results indicate that firms in Jawa Timur (East Java) experienced lower employment growth than firms located in Jawa Barat (West Java) (Appendix 8.1, Table A8.2). On the other hand, sales growth of manufacturing firms located in Jawa Timur (East Java), Jawa Tengah (Central Java), DKI Jakarta, Banten, Sumatera Utara (North Sumatra), and Lampung are significantly higher compared to Jawa Barat (Appendix 8.1, Table A8.6). These results hold across firm characteristics.

8.4 Conclusions

This chapter has shed light on the extent to which business environment constraints limit the growth of manufacturing firms in Indonesia. It has analyzed whether business obstacles reported by firms actually reduce employment and sales growth, or whether these are just firms' general complaints without a sound empirical basis.

In this chapter, critical constraints are defined as obstacles to doing business, reported by firms as impediments to their daily business operations in 2 survey years, 2009 and 2015. An analysis of whether the critical constraints are an impediment to employment growth of manufacturing firms shows that the constraints on average have no statistically significant effect. However, the critical constraints that firms perceive as hampering their daily operations indeed reduce sales growth. In particular, sales growth of manufacturing firms is negatively affected by infrastructure bottlenecks (electricity); institutional factors (crime, political instability, and corruption); limited access to land; and regulatory and licensing burden (labor regulations and licensing and permits).

Some patterns emerge when disaggregating the analysis by firm attributes. For instance, infrastructure bottlenecks such as electricity significantly limit employment and sales growth of medium-sized firms and firms engaged in rubber and plastics manufacturing. Electricity constraints also limit the sales growth of large firms, firms engaged in medium-tech manufacturing, as well as those in the food and nonmetallic mineral products sectors. Transport-related constraints negatively affect the employment growth of firms in the

chemicals sector and the sales growth of large firms. Employment growth of medium-tech firms, particularly firms in the rubber and plastics sector, is also constrained by telecommunications-related concerns.

Access to land is particularly important for firm growth of medium-sized firms and for nonexporters. Limited access to land also significantly constrains the employment growth of mature firms, foreign-owned firms, and firms in the food and nonmetallic mineral products sectors. It also limits the sales growth of large firms, old firms, domestic-owned firms, firms engaged in low-tech manufacturing, as well as firms in the textiles sector. Moreover, worker skills significantly constrain the sales growth of large firms, firms in low-tech manufacturing, and firms in the textiles sector.

Labor regulations matter for both employment and sales growth of mature firms. Labor regulations also figure significantly in the employment decisions of high-tech firms. Labor regulations negatively affect the sales growth of small and large firms, old firms, domestic-owned firms, nonexporters, and firms engaged in low-tech manufacturing. Furthermore, customs and trade regulations limit the sales growth of large firms, foreign-owned firms, and exporters. Licensing burden also constrains the sales growth of large firms, old firms, and low-tech firms.

Tax rates limit the growth of small firms using both employment and sales as a measure of firm growth. Tax rates also limit the sales growth of firms in the food sector, and the employment growth of medium firms, high-tech firms, exporters, as well as firms engaged in textiles and chemicals manufacturing. Tax administration significantly limits employment growth of high-tech firms, particularly firms in the chemicals sector.

The analysis in this chapter highlights the fact that critical constraints related to land, infrastructure bottlenecks, regulatory and licensing burden, and institutional factors matter for sales growth more than financing difficulties. For instance, financing difficulties matter only for the sales growth of high-tech firms, particularly the chemicals sector. This result may reflect the various tax incentives and financing options available to manufacturing firms in Indonesia (as discussed in Chapter 7). Moreover, results indicate the value of examining firm types separately to understand what constrains their growth, as this will be an important factor in deciding which policy interventions are important to promote manufacturing in Indonesia.

Appendix 8.1

Constraints to Firm Growth

Table A8.1 Summary Statistics

Variable	Description	N	Mean	SD	Min	Max
Employment growth	Employment growth (%) $\left[\ln Employees_{i,2015} - \ln Employees_{i,2009}\right]$	390	−0.04	0.87	−3.0	3.3
Sales growth	Sales growth (%) $\left[\ln Sales_{i,2015} - \ln Sales_{i,2009}\right]$	390	0.70	2.65	−7.0	13.8
Age	Years of firm's operations	390	22.12	11.24	3.0	87.0
Exporter	Equal to 1 if direct exports account for at least 10% of the firm's annual sales; zero otherwise	390	0.15	0.36	0	1
Domestic	Equal to 1 if a firm has less than 10% foreign ownership; zero otherwise	390	0.91	0.29	0	1
By age (number of years in operation)						
Young	Equal to 1 if firm has been operating for 1 to 5 years; zero otherwise	390	0.01	0.09	0	1
Mature	Equal to 1 if firm has been operating for 6 to 15 years; zero otherwise	390	0.34	0.47	0	1
Old	Equal to 1 if firm has been operating for more than 15 years; zero otherwise	390	0.65	0.48	0	1
By size						
Small	Equal to 1 if firm has <20 employees; zero otherwise	390	0.37	0.48	0	1
Medium	Equal to 1 if firm has 20 to 99 employees; zero otherwise	390	0.31	0.46	0	1
Large	Equal to 1 if firm has 100+ employees; zero otherwise	390	0.31	0.46	0	1
By sector						
Food	Equal to 1 if ISIC Rev. 3.1 code 15; zero otherwise	390	0.16	0.36	0	1
Textiles	Equal to 1 if ISIC Rev. 3.1 code 17; zero otherwise	390	0.14	0.34	0	1
Garments	Equal to 1 if ISIC Rev. 3.1 code 18; zero otherwise	390	0.17	0.37	0	1
Chemicals	Equal to 1 if ISIC Rev. 3.1 code 24; zero otherwise	390	0.11	0.31	0	1
Rubber	Equal to 1 if ISIC Rev. 3.1 code 25; zero otherwise	390	0.14	0.34	0	1
Nonmetallic minerals	Equal to 1 if ISIC Rev. 3.1 code 26; zero otherwise	390	0.13	0.33	0	1
Other manufacturing	Equal to 1 if ISIC Rev. 3.1 code 16, 19–23, 27–37; zero otherwise	390	0.17	0.37	0	1
By technological intensity						
Low tech	Equal to 1 if ISIC Rev. 3.1 code 15–22, 36–37; zero otherwise	390	0.57	0.5	0	1
Medium tech	Equal to 1 if ISIC Rev. 3.1 code 3, 25–28; zero otherwise	390	0.3	0.46	0	1
High tech	Equal to 1 if ISIC Rev. 3.1 code 24, 29–35; zero otherwise	390	0.13	0.34	0	1
Region						
Jawa Barat	Equal to 1 if firm is located in Jawa Barat; zero otherwise	390	0.18	0.39	0	1
Jawa Timur	Equal to 1 if firm is located in Jawa Timur; zero otherwise	390	0.19	0.4	0	1
Jawa Tengah	Equal to 1 if firm is located in Jawa Tengah; zero otherwise	390	0.18	0.38	0	1
DKI Jakarta	Equal to 1 if firm is located in DKI Jakarta; zero otherwise	390	0.08	0.27	0	1
Banten	Equal to 1 if firm is located in Banten; zero otherwise	390	0.14	0.35	0	1

(continued on next page)

Table A8.1 continued

Variable	Description	N	Mean	SD	Min	Max
Sulawesi Selatan	Equal to 1 if firm is located in Sulawesi Selatan; zero otherwise	390	0.06	0.23	0	1
Sumatera Utara	Equal to 1 if firm is located in Sumatera Utara; zero otherwise	390	0.04	0.2	0	1
Bali	Equal to 1 if firm is located in Bali; zero otherwise	390	0.05	0.23	0	1
Lampung	Equal to 1 if firm is located in Lampung; zero otherwise	390	0.07	0.25	0	1
Critical constraints						
Electricity	Equal to 1 if the business environment element is rated as moderate to very severe in 2009 and 2015; zero otherwise	390	0.12	0.33	0	1
Telecommunications		390	0.04	0.2	0	1
Transport		390	0.05	0.21	0	1
Customs and trade regulations		390	0.03	0.17	0	1
Practices of competitors in the informal sector		390	0.09	0.28	0	1
Land		390	0.03	0.18	0	1
Crime, theft, and disorder		390	0.05	0.21	0	1
Finance		390	0.11	0.31	0	1
Tax rates		390	0.02	0.14	0	1
Tax administration		390	0.02	0.12	0	1
Licensing and permits		390	0.02	0.15	0	1
Political instability		390	0.06	0.24	0	1
Corruption		390	0.04	0.2	0	1
Courts		390	0.02	0.13	0	1
Labor regulations		390	0.03	0.17	0	1
Inadequately educated Workforce		390	0.04	0.2	0	1

ISIC = International Standard Industrial Classification, N = number of observations, SD = standard deviation.
Notes: Regression results in Tables A8.2–A8.12 in Appendix 8.1 show only significant critical constraints. Complete regression results are available upon request.
Source: Authors' estimates.

Table A8.2 Ordinary Least Squares Employment Growth Regression Results, All Manufacturing Firms

	All Manufacturing Firms																
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**
Size (default: small)																	
Medium	0.211**	0.193**	0.184**	0.171	0.173*	0.202**	0.185**	0.170**	0.194**	0.189**	0.198**	0.235***	0.242**	0.251***	0.168*	0.158*	0.308***
	(0.0171)	(0.0285)	(0.0319)	(0.103)	(0.0709)	(0.0201)	(0.0402)	(0.0461)	(0.0283)	(0.0330)	(0.0267)	(0.00828)	(0.0179)	(0.00797)	(0.0733)	(0.0994)	(0.00355)
Large	0.235	0.201	0.215	0.208	0.208	0.222	0.212	0.196	0.217	0.207	0.216	0.231	0.211	0.216	0.196	0.182	0.290
	(0.169)	(0.228)	(0.177)	(0.232)	(0.202)	(0.166)	(0.193)	(0.216)	(0.172)	(0.195)	(0.184)	(0.158)	(0.193)	(0.192)	(0.204)	(0.263)	(0.153)
Age (default: young)																	
Mature (6–15)	0.361	0.352	0.315	0.348	0.276	0.385	0.382	0.374	0.346	0.340	0.349	0.376	0.397	0.404	0.351	0.336	0.349
	(0.520)	(0.537)	(0.595)	(0.544)	(0.640)	(0.494)	(0.510)	(0.517)	(0.539)	(0.548)	(0.537)	(0.516)	(0.511)	(0.508)	(0.534)	(0.552)	(0.581)
Older (16+)	0.420	0.405	0.373	0.415	0.336	0.442	0.430	0.424	0.400	0.396	0.405	0.399	0.459	0.452	0.419	0.411	0.394
	(0.466)	(0.489)	(0.537)	(0.477)	(0.573)	(0.445)	(0.468)	(0.475)	(0.490)	(0.497)	(0.484)	(0.506)	(0.460)	(0.475)	(0.468)	(0.478)	(0.545)
By trade orientation																	
Exporter	0.122	0.129	0.132	0.155	0.109	0.120	0.124	0.128	0.129	0.134	0.121	0.102	0.127	0.111	0.134	0.118	0.0991
	(0.508)	(0.477)	(0.464)	(0.393)	(0.526)	(0.503)	(0.490)	(0.472)	(0.474)	(0.436)	(0.498)	(0.575)	(0.500)	(0.554)	(0.440)	(0.482)	(0.583)
By ownership																	
Domestic	0.127	0.119	0.137	0.163	0.143	0.126	0.129	0.122	0.138	0.142	0.149	0.115	0.126	0.139	0.136	0.137	0.155
	(0.535)	(0.566)	(0.502)	(0.439)	(0.479)	(0.534)	(0.527)	(0.545)	(0.485)	(0.465)	(0.468)	(0.573)	(0.553)	(0.523)	(0.505)	(0.490)	(0.508)
Technology group (default: low tech)																	
Medium tech	-0.0912	-0.0911	-0.0855	-0.0441	-0.0320	-0.0887	-0.0956	-0.0807	-0.0794	-0.0755	-0.0769	-0.106	-0.0963	-0.0966	-0.0708	-0.0616	0.0111
	(0.348)	(0.354)	(0.361)	(0.665)	(0.733)	(0.369)	(0.319)	(0.411)	(0.418)	(0.431)	(0.434)	(0.259)	(0.342)	(0.343)	(0.476)	(0.536)	(0.924)
High tech	-0.0759	-0.0748	-0.0651	-0.0341	-0.0614	-0.0623	-0.0763	-0.0763	-0.0760	-0.0667	-0.0865	-0.0516	-0.0824	-0.111	-0.0622	-0.0507	0.0619
	(0.596)	(0.597)	(0.655)	(0.827)	(0.697)	(0.669)	(0.594)	(0.601)	(0.604)	(0.648)	(0.575)	(0.730)	(0.592)	(0.485)	(0.675)	(0.736)	(0.712)
Region (default: Jawa Barat)																	
Jawa Timur	-0.482***	-0.474***	-0.468***	-0.472**	-0.473***	-0.469***	-0.460***	-0.440**	-0.478***	-0.470**	-0.476**	-0.449**	-0.316	-0.341*	-0.477***	-0.489***	-0.334
	(0.00595)	(0.00680)	(0.00825)	(0.0189)	(0.00907)	(0.00720)	(0.00898)	(0.0132)	(0.00759)	(0.0113)	(0.0107)	(0.0200)	(0.105)	(0.0926)	(0.00476)	(0.00618)	(0.204)
Jawa Tengah	-0.192	-0.228	-0.221	-0.262*	-0.262**	-0.186	-0.207	-0.224	-0.212	-0.226*	-0.213	-0.207	-0.206	-0.226	-0.218	-0.247*	-0.287*
	(0.169)	(0.125)	(0.112)	(0.0882)	(0.0482)	(0.186)	(0.142)	(0.114)	(0.136)	(0.0994)	(0.136)	(0.135)	(0.156)	(0.160)	(0.130)	(0.0747)	(0.0771)
DKI Jakarta	-0.246	-0.241	-0.236	-0.253	-0.204	-0.223	-0.230	-0.235	-0.225	-0.214	-0.215	-0.233	-0.227	-0.278	-0.229	-0.217	-0.250
	(0.250)	(0.257)	(0.259)	(0.296)	(0.322)	(0.282)	(0.264)	(0.259)	(0.285)	(0.317)	(0.305)	(0.279)	(0.300)	(0.247)	(0.280)	(0.293)	(0.333)
Banten	-0.126	-0.114	-0.110	-0.190	-0.0855	-0.116	-0.116	-0.115	-0.111	-0.0924	-0.102	-0.130	-0.120	-0.143	-0.104	-0.0963	-0.234
	(0.386)	(0.425)	(0.446)	(0.238)	(0.554)	(0.418)	(0.419)	(0.424)	(0.451)	(0.521)	(0.493)	(0.380)	(0.427)	(0.391)	(0.466)	(0.503)	(0.178)
Sulawesi Selatan	0.00978	-0.0251	-0.0597	-0.105	-0.0153	0.0109	0.00146	0.0203	0.00163	-0.0207	-0.00696	-0.00773	0.000202	-0.0270	-0.00118	-0.0680	-0.0532
	(0.950)	(0.885)	(0.721)	(0.550)	(0.923)	(0.943)	(0.993)	(0.906)	(0.992)	(0.884)	(0.965)	(0.961)	(0.999)	(0.876)	(0.994)	(0.685)	(0.789)
Sumatera Utara	-0.0359	-0.0629	-0.160	-0.0403	-0.170	0.0248	-0.0257	-0.0560	-0.0664	-0.0329	-0.0416	-0.0524	-0.0374	-0.0609	-0.0505	-0.0516	0.0537
	(0.850)	(0.754)	(0.425)	(0.845)	(0.352)	(0.913)	(0.903)	(0.768)	(0.730)	(0.861)	(0.830)	(0.776)	(0.849)	(0.764)	(0.790)	(0.783)	(0.854)
Bali	-0.192	-0.184	-0.177	-0.180	-0.138	-0.182	-0.186	-0.177	-0.177	-0.159	-0.172	-0.189	-0.188	-0.198	-0.174	-0.165	-0.136
	(0.194)	(0.206)	(0.229)	(0.283)	(0.351)	(0.210)	(0.207)	(0.253)	(0.241)	(0.276)	(0.255)	(0.203)	(0.194)	(0.242)	(0.241)	(0.265)	(0.428)
Lampung	-0.153	-0.175	-0.171	-0.183	-0.169	-0.163	-0.160	-0.172	-0.165	-0.143	-0.152	-0.162	-0.155	-0.171	-0.165	-0.215	-0.202
	(0.456)	(0.403)	(0.402)	(0.405)	(0.403)	(0.418)	(0.426)	(0.390)	(0.414)	(0.481)	(0.460)	(0.423)	(0.455)	(0.435)	(0.409)	(0.284)	(0.417)
Critical constraints																	
Electricity	-0.0813																-0.291
	(0.620)																(0.179)
Telecommunications		0.0929															0.225
		(0.725)															(0.453)

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Table A8.2 continued

	All Manufacturing Firms																
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**
Transport			0.273														0.0909
			(0.209)														(0.744)
Customs and trade regulations				0.563*													0.319
				(0.0781)													(0.332)
Practices of competitors in the informal sector					0.384**												0.518**
					(0.0344)												(0.0135)
Land						-0.297											-0.529*
						(0.250)											(0.0772)
Crime, theft, and disorder							-0.0726										-0.320
							(0.747)										(0.226)
Finance								0.0681									0.172
								(0.693)									(0.363)
Tax rates									0.168								-0.309*
									(0.616)								(0.0825)
Tax administration										0.845**							0.820**
										(0.0246)							(0.0478)
Licensing and permits											0.159						-0.0129
											(0.546)						(0.961)
Political instability												-0.0424					-0.257
												(0.826)					(0.330)
Corruption													-0.0476				-0.312
													(0.829)				(0.230)
Courts														-0.0252			0.0523
														(0.911)			(0.909)
Labor regulations															0.121		0.248
															(0.790)		(0.673)
Inadequately educated workforce																0.430**	0.425
																(0.0436)	(0.101)
Constant	-0.471	-0.444	-0.436	-0.501	-0.441	-0.497	-0.477	-0.466	-0.470	-0.485	-0.491	-0.455	-0.518	-0.509	-0.475	-0.465	-0.581
	(0.444)	(0.480)	(0.492)	(0.426)	(0.479)	(0.421)	(0.452)	(0.457)	(0.444)	(0.432)	(0.428)	(0.470)	(0.415)	(0.445)	(0.441)	(0.452)	(0.396)
Observations	388	387	389	359	380	386	388	386	387	382	379	363	353	336	386	387	297
R-squared	0.059	0.059	0.062	0.067	0.070	0.061	0.055	0.053	0.060	0.075	0.057	0.050	0.043	0.043	0.059	0.071	0.116

Notes: Robust p-values in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimates.

Table A8.3 Ordinary Least Squares Employment Growth Regression Results by Firm Size and Age

	Size						Firm Age			
	Small-Sized Firms	Medium-Sized Firms					Mature			
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Size (default: small)										
Medium							0.123	0.124	0.146	0.0668
							(0.363)	(0.410)	(0.323)	(0.631)
Large							0.0893	0.0908	0.169	0.103
							(0.744)	(0.741)	(0.549)	(0.702)
Age (default: young)										
Mature (6–15)	0.440									
	(0.463)									
Older (16+)	0.283	0.116	0.0986	0.0875	0.113	0.132				
	(0.641)	(0.456)	(0.544)	(0.591)	(0.482)	(0.402)				
Trade orientation										
Exporter	−0.588**	−0.0252	−0.0490	−0.0371	−0.0605	−0.0318	−0.104	−0.107	−0.123	−0.137
	(0.0257)	(0.842)	(0.705)	(0.782)	(0.650)	(0.806)	(0.667)	(0.658)	(0.615)	(0.569)
Ownership										
Domestic	−0.241	−0.0342	0.0275	0.0179	−0.0931	0.0198	0.417	0.443	0.366	0.218
	(0.378)	(0.908)	(0.923)	(0.949)	(0.665)	(0.945)	(0.462)	(0.433)	(0.501)	(0.733)
Technology group default: low tech)										
Medium tech	−0.0363	−0.162	−0.102	−0.105	−0.0981	−0.0763	−0.185	−0.184	−0.233	−0.147
	(0.814)	(0.164)	(0.440)	(0.417)	(0.447)	(0.601)	(0.122)	(0.139)	(0.128)	(0.225)
High tech	0.264*	−0.115	0.0443	−0.0262	−0.0122	−0.0288	−0.287	−0.278	−0.372	−0.245
	(0.0785)	(0.637)	(0.834)	(0.913)	(0.958)	(0.901)	(0.161)	(0.207)	(0.107)	(0.223)
Region (default: Jawa Barat)										
Jawa Timur	−0.244	−0.783***	−0.594**	−0.619**	−0.658**	−0.659**	−0.687***	−0.724***	−0.555*	−0.776***
	(0.359)	(0.00368)	(0.0300)	(0.0248)	(0.0229)	(0.0134)	(0.00439)	(0.00473)	(0.0527)	(0.00125)
Jawa Tengah	−0.0996	−0.198	−0.118	−0.146	−0.224	−0.0988	−0.693***	−0.703***	−0.773***	−0.745***
	(0.714)	(0.414)	(0.601)	(0.529)	(0.350)	(0.666)	(0.00707)	(0.00642)	(0.00748)	(0.00294)
DKI Jakarta	0.223	−0.0968	0.119	0.0317	−0.0144	0.0243	−0.681	−0.626	−1.015*	−0.579
	(0.270)	(0.720)	(0.613)	(0.909)	(0.960)	(0.930)	(0.190)	(0.158)	(0.0821)	(0.107)
Banten	0.707**	−0.225	−0.0420	−0.0562	−0.0924	−0.0451	−0.127	−0.137	−0.197	−0.184
	(0.0287)	(0.336)	(0.863)	(0.817)	(0.714)	(0.860)	(0.677)	(0.657)	(0.553)	(0.558)
Sulawesi Selatan	0.186	0.431	0.432	0.460	0.290	0.433	−0.315	−0.329	−0.365	−0.323*
	(0.327)	(0.222)	(0.251)	(0.240)	(0.468)	(0.260)	(0.135)	(0.131)	(0.138)	(0.0986)
Sumatera Utara	0.337	−0.00902	0.104	0.0495	−0.0420	−0.116	0.0121	−0.0620	−0.0812	−0.143
	(0.168)	(0.973)	(0.748)	(0.879)	(0.899)	(0.712)	(0.969)	(0.837)	(0.800)	(0.631)

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Table A8.3 continued

	Size						Firm Age			
	Small-Sized Firms	Medium-Sized Firms					Mature			
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
Bali	0.173	−0.192	0.0386	0.0111	−0.0346	0.0248	−0.521***	−0.531***	−0.567***	−0.563***
	(0.448)	(0.444)	(0.885)	(0.968)	(0.905)	(0.932)	(0.00444)	(0.00471)	(0.00693)	(0.00379)
Lampung	0.316	0.0461	0.135	0.109	0.0438	0.107	0.206	0.194	0.165	0.138
	(0.133)	(0.885)	(0.652)	(0.719)	(0.893)	(0.723)	(0.415)	(0.448)	(0.536)	(0.593)
Critical constraints										
Electricity		−0.513***								
		(0.00631)								
Land			−0.810***				−0.499**			
			(0.00170)				(0.0162)			
Crime, theft, and disorder				−0.608**						
				(0.0272)						
Tax rates	−0.225*				−0.431*					
	(0.0746)				(0.0602)					
Tax administration										
Licensing and permits								−0.224*		
								(0.0715)		
Courts									−0.385*	
									(0.0863)	
Labor regulations						−0.763***				−0.838**
						(0.00583)				(0.0223)
Constant	−0.356	0.377	0.102	0.143	0.274	0.0944	−0.116	−0.133	0.00173	0.140
	(0.543)	(0.382)	(0.782)	(0.697)	(0.471)	(0.795)	(0.835)	(0.812)	(0.998)	(0.829)
Observations	144	121	120	121	121	120	130	127	111	130
R-squared	0.175	0.247	0.224	0.215	0.202	0.255	0.180	0.178	0.182	0.214

Notes: Robust p-values in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimates.

Table A8.4 Ordinary Least Squares Employment Growth Regression Results by Technological Classification of Manufacturing Sector, Ownership, and Exporting Status

	Technology Group					Ownership		Exporting Status	
	Medium Tech		High Tech			Foreign-Owned Firms		Exporter	Nonexporter
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Size (default: small)									
Medium	0.265	0.297	0.141	0.134	0.104	1.454**	1.454**	−0.00115	0.206**
	(0.156)	(0.122)	(0.748)	(0.758)	(0.806)	(0.0460)	(0.0460)	(0.998)	(0.0280)
Large	0.418	0.377	−0.0562	−0.00374	0.0716	1.376*	1.376*	0.258	0.180
	(0.236)	(0.259)	(0.889)	(0.993)	(0.862)	(0.0925)	(0.0925)	(0.512)	(0.348)
Age (default: young)									
Mature (6–15)	−0.793**	−0.843**							0.430
	(0.0233)	(0.0121)							(0.437)
Older (16+)	−0.787**	−0.828**	0.228	0.217	0.142	0.854	0.854	0.435	0.426
	(0.0217)	(0.0106)	(0.516)	(0.530)	(0.685)	(0.460)	(0.460)	(0.334)	(0.453)
Trade orientation									
Exporter	0.171	0.201	0.744**	0.780**	0.682**	0.145	0.145		
	(0.465)	(0.383)	(0.0289)	(0.0266)	(0.0473)	(0.804)	(0.804)		
Ownership									
Domestic	0.0840	0.0162	0.0396	0.160	0.216			0.357*	−0.0152
	(0.826)	(0.967)	(0.914)	(0.628)	(0.492)			(0.0736)	(0.963)
Technology group (default: low tech)									
Medium tech						0.715	0.715	0.201	−0.117
						(0.231)	(0.231)	(0.335)	(0.284)
High tech						0.0999	0.0999	0.510	−0.139
						(0.880)	(0.880)	(0.149)	(0.359)
Region (default: Jawa Barat)									
Jawa Timur	−0.402	−0.423	−0.916**	−0.904*	−0.916**	−0.901	−0.901	0.0776	−0.458**
	(0.153)	(0.161)	(0.0481)	(0.0543)	(0.0494)	(0.484)	(0.484)	(0.838)	(0.0154)
Jawa Tengah	−0.0418	−0.0993	−0.773	−0.785	−0.620	1.973***	5.049***	−0.606	−0.111
	(0.889)	(0.732)	(0.141)	(0.154)	(0.244)	(0.00345)	(0.000117)	(0.359)	(0.490)
DKI Jakarta	0.216	0.169	−1.491***	−1.439***	−1.229***	−0.0328	−0.0328	−0.864**	−0.0323
	(0.720)	(0.781)	(0.00898)	(0.00935)	(0.00440)	(0.956)	(0.956)	(0.0212)	(0.896)
Banten	−0.0981	−0.119	−0.659	−0.652	−0.623	−0.342	−0.342	−0.302	−0.0431
	(0.737)	(0.695)	(0.134)	(0.146)	(0.122)	(0.599)	(0.599)	(0.287)	(0.796)

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Table A8.4 continued

	Technology Group					Ownership		Exporting Status	
	Medium Tech		High Tech			Foreign-Owned Firms		Exporter	Nonexporter
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Sulawesi Selatan	0.202	0.150	0.187	0.226	0.299			−0.588	0.128
	(0.753)	(0.818)	(0.496)	(0.427)	(0.347)			(0.383)	(0.424)
Sumatera Utara	0.401	0.379	−1.122**	−1.115**	−1.117*			0.267	0.0689
	(0.181)	(0.227)	(0.0298)	(0.0381)	(0.0560)			(0.385)	(0.762)
Bali	−0.318	−0.340				0.108	0.108	−0.288	−0.138
	(0.119)	(0.136)				(0.884)	(0.884)	(0.490)	(0.398)
Lampung	0.361	0.395*	−0.180	−0.307	−0.287	−0.611	−0.611	−0.223	−0.103
	(0.101)	(0.0902)	(0.678)	(0.475)	(0.499)	(0.329)	(0.329)	(0.469)	(0.626)
Critical constraints									
Telecommunications	−0.668**								
	(0.0481)								
Land						−3.076***			−0.443*
						(0.00833)			(0.0981)
Finance							−3.076***		
							(0.00833)		
Tax rates			−0.585***					−0.963*	
			(0.00834)					(0.0520)	
Tax administration				−0.632**					
				(0.0205)					
Labor regulations					−0.893*				
					(0.0773)				
Inadequately educated workforce		−0.564***							
		(0.00348)							
Constant	0.428	0.553	0.266	0.120	0.0813	−2.226	−2.226	−0.370	−0.390
	(0.382)	(0.260)	(0.621)	(0.820)	(0.884)	(0.212)	(0.212)	(0.464)	(0.547)
Observations	115	116	52	52	52	37	37	58	328
R-squared	0.121	0.120	0.333	0.325	0.342	0.291	0.291	0.222	0.064

Notes: Robust p-values in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimates.

Table A8.5 Ordinary Least Squares Employment Growth Regression Results by Manufacturing Sector

	Food		Textiles		Chemicals			Rubber		Nonmetallic Mineral Products			Other Manufacturing
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Size (default: small)													
Medium	0.655***	0.675***	0.485	0.503	0.143	0.215	0.183	0.0621	0.00195	0.251	0.367	0.332	0.273
	(0.000534)	(0.00497)	(0.232)	(0.237)	(0.780)	(0.702)	(0.734)	(0.940)	(0.998)	(0.300)	(0.243)	(0.123)	(0.396)
Large	1.478***	1.545***	0.382	0.437	0.0948	0.0443	0.0967	0.0272	−0.0704	−0.0302	0.138	−0.0575	−0.117
	(0.000896)	(0.000462)	(0.446)	(0.439)	(0.867)	(0.934)	(0.871)	(0.976)	(0.934)	(0.958)	(0.819)	(0.917)	(0.756)
Age (default: young)													
Mature (6–15)	0.858***	0.554***	1.676***	1.650***						−1.000**	−0.984**	−1.054**	
	(0.00248)	(0.00813)	(0.00110)	(0.00161)						(0.0255)	(0.0255)	(0.0299)	
Older (16+)	0.401	0.293*	2.182***	2.109**	0.455	0.493	0.490	0.164	0.147	−1.259***	−1.184***	−1.276***	−0.150
	(0.117)	(0.0891)	(0.00464)	(0.0112)	(0.160)	(0.141)	(0.155)	(0.629)	(0.672)	(0.00120)	(0.00655)	(0.00155)	(0.546)
Trade orientation													
Exporter	0.0474	−0.104	0.330	0.453	0.785*	0.766	0.801*	0.937	1.052	0.339	0.444**	0.299	−0.450
	(0.894)	(0.787)	(0.550)	(0.358)	(0.0972)	(0.104)	(0.0996)	(0.154)	(0.125)	(0.175)	(0.0340)	(0.257)	(0.385)
Ownership													
Domestic	0.777	0.604	−0.479	−0.380	0.326	0.219	0.376*	1.056	1.005	−0.609	−0.456	−0.595	−1.200***
	(0.248)	(0.378)	(0.149)	(0.207)	(0.123)	(0.363)	(0.0905)	(0.227)	(0.241)	(0.321)	(0.519)	(0.342)	(0.00157)
Region (default: Jawa Barat)													
Jawa Timur	−0.255	−0.0226	0.0881	−0.0201	−0.663*	−0.725**	−0.710*	−0.236	−0.122	−0.441	−0.362	−0.537	−0.860
	(0.670)	(0.965)	(0.806)	(0.964)	(0.0707)	(0.0423)	(0.0510)	(0.553)	(0.729)	(0.254)	(0.368)	(0.226)	(0.143)
Jawa Tengah	0.691*	0.321	−0.336	−0.410	−0.825	−0.865	−0.895	0.485*	0.541**	−0.633*	−0.593**	−0.736*	−0.635
	(0.0756)	(0.406)	(0.151)	(0.123)	(0.220)	(0.148)	(0.171)	(0.0596)	(0.0239)	(0.0526)	(0.0396)	(0.0530)	(0.294)
DKI Jakarta	0.473	0.132	0.239*	0.179	−1.059**	−1.175**	−1.087**	0.295	0.402		−2.863***	−2.857***	−0.268
	(0.340)	(0.828)	(0.0642)	(0.142)	(0.0231)	(0.0238)	(0.0186)	(0.526)	(0.370)		(0.00120)	(0.00366)	(0.703)
Banten	0.153	−0.0727	−0.00614	−0.124	−0.432**	−0.483**	−0.473**	−0.286	−0.143	−0.184	−0.297	−0.231	−0.295
	(0.642)	(0.859)	(0.988)	(0.773)	(0.0380)	(0.0199)	(0.0280)	(0.362)	(0.525)	(0.717)	(0.487)	(0.660)	(0.623)
Sulawesi Selatan	0.263	0.0381	0.110	0.0369	0.314	0.202	0.237			−0.887**	−0.901*	−0.917**	−0.0931
	(0.680)	(0.952)	(0.659)	(0.861)	(0.290)	(0.342)	(0.306)			(0.0351)	(0.0749)	(0.0302)	(0.879)
Sumatera Utara	1.059***	0.630**	-0.0145	-0.0501		−0.919***	−0.868***	0.161	0.243	0.356*	0.310	0.288	−1.275*
	(0.00587)	(0.0321)	(0.948)	(0.820)		(0.00758)	(0.00731)	(0.615)	(0.461)	(0.0728)	(0.138)	(0.134)	(0.0826)
Bali	0.379	0.0306	-0.106	-0.141						−0.610***	−0.644***	−0.698***	−0.576
	(0.538)	(0.960)	(0.523)	(0.395)						(0.00105)	(0.00997)	(0.00111)	(0.338)
Lampung	0.0256	−0.327	0.407**	−0.321	−0.341	0.250	−0.397	0.652	0.720	0.130*	0.115	0.0566	−1.016
	(0.942)	(0.394)	(0.0463)	(0.346)	(0.340)	(0.665)	(0.273)	(0.250)	(0.201)	(0.0813)	(0.400)	(0.567)	(0.158)

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Table A8.5 continued

	Food		Textiles		Chemicals			Rubber		Nonmetallic Mineral Products			Other Manufacturing
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**
Critical constraints													
Electricity								−0.414**					
								(0.0371)					
Telecommunications			−2.031***						−0.786***				
			(1.75e-06)						(0.00613)				
Transport					−0.771**								
					(0.0138)								
Land	−0.520**									−2.813***			
	(0.0103)									(0.00326)			
Crime, theft, and disorder													−1.531**
													(0.0332)
Tax rates				−1.223***		−0.667**							
				(0.00263)		(0.0258)							
Tax administration							−0.644**						
							(0.0275)						
Corruption		−1.146*									−0.859*		
		(0.0743)									(0.0650)		
Inadequately educated workforce												−0.773***	
												(0.00123)	
Constant	−2.059***	−1.457*	−1.688**	−1.679**	−0.376	−0.230	−0.405	−1.397**	−1.403**	1.713**	1.519*	1.801**	1.893**
	(0.00490)	(0.0631)	(0.0327)	(0.0326)	(0.508)	(0.674)	(0.505)	(0.0186)	(0.0258)	(0.0457)	(0.0836)	(0.0406)	(0.0122)
Observations	61	53	53	53	43	43	43	53	52	50	47	50	65
R-squared	0.377	0.402	0.356	0.323	0.316	0.335	0.327	0.298	0.305	0.438	0.487	0.453	0.262

Notes: Robust p-values in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimates.

Table A8.6 Ordinary Least Squares Sales Growth Regression Results, All Manufacturing Firms

Variables	All Manufacturing Firms						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Size (default: small)							
Medium	−0.781***	−0.988***	−1.053***	−0.878***	−0.923***	−0.960***	−0.992***
	(0.00640)	(0.000908)	(0.000507)	(0.00526)	(0.00209)	(0.00456)	(0.00171)
Large	−0.805*	−1.129**	−1.117**	−0.994**	−1.119**	−1.068**	−1.039**
	(0.0834)	(0.0121)	(0.0152)	(0.0342)	(0.0158)	(0.0376)	(0.0195)
Age (default: young)							
Mature (6–15)	0.124	0.211	0.247	0.0632	0.0117	0.0809	0.113
	(0.894)	(0.838)	(0.813)	(0.947)	(0.990)	(0.934)	(0.907)
Older (16+)	0.208	0.237	0.246	0.0309	0.0743	0.170	0.0790
	(0.840)	(0.832)	(0.829)	(0.976)	(0.943)	(0.873)	(0.939)
Trade orientation							
Exporter	0.852	0.881*	0.899*	0.828*	0.882*	0.901*	0.847*
	(0.100)	(0.0647)	(0.0579)	(0.0835)	(0.0640)	(0.0733)	(0.0693)
Ownership							
Domestic	−1.319**	−1.475**	−1.392**	−1.414**	−1.424**	−1.407**	−1.429**
	(0.0389)	(0.0219)	(0.0315)	(0.0333)	(0.0276)	(0.0352)	(0.0233)
Technology group (default: low tech)							
Medium tech	−0.366	−0.333	−0.342	−0.342	−0.268	−0.268	−0.309
	(0.305)	(0.361)	(0.363)	(0.352)	(0.476)	(0.502)	(0.399)
High tech	−0.487*	−0.391	−0.370	−0.404	−0.233	−0.439	−0.354
	(0.0937)	(0.212)	(0.222)	(0.187)	(0.488)	(0.208)	(0.217)
Region (default: Jawa Barat)							
Jawa Timur	0.830*	0.878**	0.996**	0.872**	0.784*	1.091**	0.852**
	(0.0554)	(0.0442)	(0.0222)	(0.0471)	(0.0587)	(0.0139)	(0.0311)
Jawa Tengah	1.368***	1.250**	1.093*	1.170**	1.078**	1.053**	1.123**
	(0.00930)	(0.0289)	(0.0533)	(0.0362)	(0.0476)	(0.0487)	(0.0414)
DKI Jakarta	0.889*	1.063**	0.981**	0.912*	0.848*	0.894*	0.933**
	(0.0719)	(0.0232)	(0.0427)	(0.0721)	(0.0867)	(0.0704)	(0.0440)
Banten	1.894***	2.063***	2.051***	2.012***	1.998***	2.091***	1.974***
	(0.00457)	(0.00135)	(0.00172)	(0.00183)	(0.00188)	(0.00109)	(0.00223)
Sulawesi Selatan	0.0890	-0.0494	-0.0367	0.0645	0.0235	0.101	-0.103
	(0.898)	(0.944)	(0.960)	(0.928)	(0.975)	(0.892)	(0.882)

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Table A8.6 continued

Variables	All Manufacturing Firms						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sumatera Utara	2.245***	2.474***	2.475***	2.083***	1.985***	2.020***	2.004***
	(2.01e-06)	(1.52e-05)	(4.79e-06)	(3.99e-05)	(0.000102)	(9.45e-05)	(6.50e-05)
Bali	0.707	0.864	0.855	0.831	0.773	0.790	0.790
	(0.233)	(0.136)	(0.139)	(0.152)	(0.156)	(0.132)	(0.164)
Lampung	1.720***	1.676***	1.717***	1.686***	1.571***	1.614***	1.596***
	(0.000767)	(0.00226)	(0.00133)	(0.00223)	(0.00307)	(0.00169)	(0.00218)
Critical constraints							
Electricity	−1.374**						
	(0.0284)						
Land		−1.899***					
		(0.00193)					
Crime, theft, and disorder			−1.203**				
			(0.0232)				
Licensing and permits				−2.153***			
				(0.000243)			
Political instability					−1.036*		
					(0.0959)		
Corruption						−1.856**	
						(0.0180)	
Labor regulations							−2.286***
							(1.72e-05)
Constant	1.371	1.463	1.396	1.564	1.641	1.519	1.617
	(0.332)	(0.327)	(0.358)	(0.273)	(0.230)	(0.241)	(0.235)
Observations	345	344	345	337	327	315	343
R-squared	0.159	0.160	0.149	0.153	0.146	0.161	0.160

Notes: Robust p-values in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimates.

Table A8.7 Ordinary Least Squares Sales Growth Regression Results by Firm Size

Variables	Small-Sized Firms				Medium-Sized Firms			Large-Sized Firms									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Technology group (default: low tech)																	
Medium tech	0.0176	0.174	-0.0122	0.0520	-0.379	-0.174	-0.265	-0.842	-1.190	-1.328	-1.047	-1.059	-1.221	-1.237	-0.991	-1.066	-1.182
	(0.966)	(0.652)	(0.977)	(0.896)	(0.485)	(0.730)	(0.574)	(0.341)	(0.219)	(0.174)	(0.275)	(0.271)	(0.215)	(0.197)	(0.302)	(0.270)	(0.227)
High tech	-0.872*	-0.977**	-1.176**	-0.941**	-0.972	-0.527	-0.769	-0.353	-0.364	-0.278	-0.259	-0.108	-0.233	-0.476	-0.139	-0.208	-0.275
	(0.0651)	(0.0466)	(0.0123)	(0.0414)	(0.375)	(0.595)	(0.456)	(0.501)	(0.489)	(0.613)	(0.591)	(0.837)	(0.667)	(0.376)	(0.808)	(0.683)	(0.582)
Age (default: young)																	
Mature (6-15)	0.176	0.115	0.309	0.207													
	(0.824)	(0.872)	(0.689)	(0.782)													
Older (16+)	0.223	-0.00274	0.0961	0.125	0.0719	0.0261	-0.0348	0.718	0.390	0.349	0.417	0.377	0.432	0.610	0.242	0.223	0.489
	(0.783)	(0.997)	(0.893)	(0.861)	(0.897)	(0.961)	(0.951)	(0.544)	(0.733)	(0.764)	(0.717)	(0.743)	(0.706)	(0.603)	(0.838)	(0.849)	(0.667)
By trade orientation																	
Exporter	0.300	0.179	0.210	0.167	0.520	0.518	0.507	1.687**	1.654**	1.847***	1.687***	1.760***	1.600**	1.588***	1.985***	1.659**	1.907***
	(0.622)	(0.771)	(0.722)	(0.778)	(0.687)	(0.666)	(0.678)	(0.0124)	(0.0116)	(0.00547)	(0.00772)	(0.00698)	(0.0162)	(0.00591)	(0.00486)	(0.0126)	(0.00499)
By ownership																	
Domestic	2.609***	2.558***	2.396***	2.464***	-0.873	-1.019	-1.018	-1.428	-1.458	-1.429	-1.468	-1.231	-1.471	-1.402	-1.515	-1.406	-1.317
	(0.00103)	(0.00250)	(0.00293)	(0.00314)	(0.450)	(0.354)	(0.365)	(0.147)	(0.152)	(0.157)	(0.147)	(0.226)	(0.157)	(0.141)	(0.153)	(0.160)	(0.184)
Region (default: Jawa Barat)																	
Jawa Timur	0.619	0.414	0.704	0.524	-0.786	-0.303	-0.498	2.700**	2.992**	3.195**	2.687**	2.885**	2.970**	3.098***	2.548**	2.833**	2.988**
	(0.288)	(0.546)	(0.251)	(0.295)	(0.340)	(0.651)	(0.397)	(0.0236)	(0.0108)	(0.0108)	(0.0198)	(0.0138)	(0.0112)	(0.00753)	(0.0460)	(0.0155)	(0.0109)
Jawa Tengah	1.981**	2.050**	1.960**	1.827**	-1.298	-0.980	-1.139	4.169***	1.794	2.121	2.121*	1.508	2.012	1.449	1.648	1.583	1.941
	(0.0219)	(0.0226)	(0.0327)	(0.0313)	(0.257)	(0.381)	(0.268)	(0.000221)	(0.150)	(0.114)	(0.0907)	(0.228)	(0.114)	(0.220)	(0.225)	(0.209)	(0.116)
DKI Jakarta	1.661***	1.730***	1.260**	1.496***	-0.964	-0.425	-0.747	1.358	1.237	1.335	1.478	1.440	1.200	1.253	1.172	1.279	1.219
	(0.00282)	(0.00208)	(0.0106)	(0.00342)	(0.256)	(0.543)	(0.220)	(0.118)	(0.224)	(0.214)	(0.107)	(0.148)	(0.262)	(0.229)	(0.291)	(0.194)	(0.229)
Banten	2.410***	2.478***	2.344***	2.336***	-0.873	-0.378	-0.570	3.676***	3.935***	4.026***	3.930***	3.876***	3.946***	3.639***	3.863***	3.772***	3.929***
	(0.00173)	(0.00123)	(0.00343)	(0.00238)	(0.473)	(0.739)	(0.597)	(0.00109)	(0.000507)	(0.000550)	(0.000479)	(0.000766)	(0.000575)	(0.00133)	(0.00226)	(0.00110)	(0.000642)
Sulawesi Selatan	0.0105	0.0745	-0.0490	-0.148	-0.265	-0.282	-0.0971										
	(0.981)	(0.859)	(0.923)	(0.774)	(0.724)	(0.686)	(0.913)										
Sumatera Utara	2.349***	2.104***	2.032***	1.934***	0.899	0.968	0.798										
	(0.000501)	(0.000441)	(0.00113)	(0.000518)	(0.178)	(0.207)	(0.234)										
Bali	1.705***	1.755***	1.648***	1.536***	0.0135	0.602	0.359	-1.477	-1.242	-1.120	-1.179	-1.283	-1.229	-1.664	-1.042	-1.290	-1.327
	(0.00194)	(0.00215)	(0.00214)	(0.00172)	(0.989)	(0.448)	(0.580)	(0.274)	(0.357)	(0.418)	(0.385)	(0.341)	(0.363)	(0.214)	(0.452)	(0.365)	(0.330)
Lampung	1.812***	1.859***	1.810***	1.652***	0.995	1.519*	1.299*	4.153***	0.619	0.818	0.696	2.769**	0.611	0.171	0.952	0.574	2.995**
	(3.42e-05)	(4.41e-05)	(1.59e-05)	(8.75e-06)	(0.315)	(0.0901)	(0.0879)	(0.000207)	(0.527)	(0.451)	(0.480)	(0.0108)	(0.534)	(0.870)	(0.382)	(0.553)	(0.0444)
Critical constraints																	
Electricity					-1.330**			-3.756***									
					(0.0433)			(0.00127)									
Telecommunications																	
Transport									-5.394***								
									(1.79e-07)								

(continued on next page)

Table A8.7 continued

Variables	Small-Sized Firms				Medium-Sized Firms			Large-Sized Firms									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Customs and trade regulations										-2.825**							
										(0.0119)							
Practices of competitors in the informal sector																	
Land						-1.491*					-2.856**						
						(0.0734)					(0.0197)						
Crime, theft, and disorder												-2.148***					
												(0.00853)					
Finance																	
Tax rates	-2.432***																
	(2.56e-05)																
Tax administration																	
Licensing and permits		-2.549***					-2.170*						-3.252**				
		(3.04e-07)					(0.0956)						(0.0220)				
Political instability																	
Corruption														-3.054***			
														(0.00426)			
Courts			-4.722***												-3.000***		
			(0)												(0.00222)		
Labor regulations				-4.736***												-1.839***	
				(0)												(0.00778)	
Inadequately educated workforce																	-2.360*
																	(0.0822)
Constant	-2.854**	-2.728**	-2.547***	-2.499***	1.947	1.489	1.784	-0.647	-0.510	-0.697	-0.604	-0.727	-0.531	-0.338	-0.638	-0.349	-0.767
	(0.0124)	(0.0101)	(0.00649)	(0.00904)	(0.278)	(0.356)	(0.276)	(0.708)	(0.769)	(0.690)	(0.721)	(0.675)	(0.761)	(0.829)	(0.720)	(0.844)	(0.652)
Observations	138	133	122	138	106	106	105	100	100	97	99	100	99	97	93	100	100
R-squared	0.237	0.252	0.271	0.266	0.110	0.093	0.109	0.354	0.310	0.306	0.316	0.298	0.309	0.333	0.300	0.300	0.306

Notes: Robust p-values in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimates.

Table A8.8 Ordinary Least Squares Sales Growth Regression Results by Firm Age

Variables	Mature		Older				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Size (default: small)							
Medium	−0.581	−0.480	−1.370***	−1.374***	−1.226***	−1.227***	−1.320***
	(0.294)	(0.394)	(0.000284)	(0.000235)	(0.00112)	(0.00342)	(0.000629)
Large	−0.467	−0.308	−1.425***	−1.422***	−1.274**	−1.336**	−1.391***
	(0.556)	(0.700)	(0.00973)	(0.00961)	(0.0217)	(0.0255)	(0.00898)
Trade orientation							
Exporter	0.353	0.258	1.197*	1.253**	1.124*	1.263*	1.186*
	(0.584)	(0.703)	(0.0555)	(0.0427)	(0.0703)	(0.0547)	(0.0550)
Ownership							
Domestic	−5.667	−6.665**	−0.641	−0.566	−0.578	−0.492	−0.579
	(0.102)	(0.0287)	(0.337)	(0.404)	(0.404)	(0.485)	(0.391)
Technology group (default: low tech)							
Medium tech	−1.064	−0.873	−0.210	−0.211	−0.262	−0.0582	−0.226
	(0.144)	(0.199)	(0.634)	(0.636)	(0.548)	(0.896)	(0.612)
High tech	−1.730***	−1.628***	0.376	0.370	0.372	0.517	0.360
	(0.00631)	(0.00469)	(0.382)	(0.466)	(0.492)	(0.397)	(0.479)
Region (default: Jawa Barat)							
Jawa Timur	1.674***	1.245**	0.777	0.894	0.814	1.166	0.869
	(0.00829)	(0.0446)	(0.230)	(0.175)	(0.220)	(0.136)	(0.185)
Jawa Tengah	2.435	2.228	0.835	0.618	0.740	0.555	0.663
	(0.272)	(0.299)	(0.135)	(0.267)	(0.180)	(0.301)	(0.239)
DKI Jakarta	1.316	1.388	1.070*	0.882	0.840	0.818	0.864
	(0.246)	(0.188)	(0.0571)	(0.156)	(0.190)	(0.217)	(0.163)
Banten	1.958**	1.609**	2.417***	2.396***	2.347***	2.428***	2.424***
	(0.0226)	(0.0484)	(0.00174)	(0.00214)	(0.00272)	(0.00161)	(0.00181)
Sulawesi Selatan	0.131	0.0525	−0.0591	−0.0820	−0.0741	0.0719	−0.0904
	(0.832)	(0.922)	(0.953)	(0.935)	(0.941)	(0.945)	(0.927)
Sumatera Utara	4.556***	3.758***	1.656***	1.392**	1.022*	0.921*	1.007*
	(1.72e-07)	(3.14e-05)	(0.00858)	(0.0218)	(0.0793)	(0.0960)	(0.0999)
Bali	2.179***	1.879***	0.370	0.332	0.304	0.257	0.320
	(7.56e-05)	(9.37e-05)	(0.644)	(0.676)	(0.705)	(0.716)	(0.698)
Lampung	3.289***	3.006***	0.873	0.956*	0.876	0.761	0.844
	(8.06e-08)	(2.56e-09)	(0.125)	(0.0834)	(0.133)	(0.147)	(0.134)
Critical constraints							
Land			−2.111***				
			(0.000749)				
Crime, theft, and disorder	−1.047**			−1.306**			
	(0.0281)			(0.0479)			
Licensing and permits					−2.850***		
					(0.00200)		
Corruption						−2.269***	
						(0.00323)	
Labor regulations		−3.759***					−1.703***
		(0.00497)					(0.00826)
Constant	5.505	6.688**	1.183	1.137	1.115	1.052	1.151
	(0.140)	(0.0370)	(0.207)	(0.227)	(0.251)	(0.241)	(0.224)
Observations	120	119	221	222	217	204	221
R-squared	0.329	0.369	0.172	0.151	0.167	0.178	0.154

Notes: Robust p-values in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' estimates.

Table A8.9 Ordinary Least Squares Sales Growth Regression Results by Technological Classification of Manufacturing Sector

Variables	Low Tech							Medium Tech			High Tech
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Size (default: small)											
Medium	−1.106**	−1.169**	−0.888*	−1.003*	−1.266**	−1.043**	−1.123**	−0.727	−1.006*	−0.929	−0.634
	(0.0158)	(0.0101)	(0.0566)	(0.0556)	(0.0150)	(0.0275)	(0.0166)	(0.289)	(0.0607)	(0.108)	(0.410)
Large	−0.936	−1.010	−0.783	−0.704	−1.277*	−0.913	−0.822	−0.611	−1.358	−1.197	−0.539
	(0.129)	(0.115)	(0.211)	(0.347)	(0.0986)	(0.123)	(0.199)	(0.624)	(0.233)	(0.266)	(0.392)
Age (default: young)											
Mature (6–15)	1.533***	1.555***	1.155***	1.339***	1.457***	1.159***	1.195***	−2.062	−2.483	−2.878*	
	(0.00624)	(0.000590)	(0.00762)	(0.00494)	(0.00399)	(0.00590)	(0.00329)	(0.186)	(0.147)	(0.0877)	
Older (16+)	1.131**	1.120***	0.684*	0.803**	0.679*	0.764**	0.779**	−1.650*	−2.211*	−2.170*	1.753
	(0.0293)	(0.00531)	(0.0590)	(0.0302)	(0.0846)	(0.0126)	(0.0149)	(0.0966)	(0.0726)	(0.0833)	(0.117)
Exporter	0.941	1.050	0.875	0.765	1.333	0.886	1.047	−0.483	−0.288	−0.0967	2.906**
	(0.283)	(0.254)	(0.329)	(0.388)	(0.211)	(0.302)	(0.283)	(0.652)	(0.776)	(0.922)	(0.0137)
Domestic	−1.569	−1.530	−1.580	−1.691**	−1.596	−1.572	−1.432	−0.891	−0.785	−0.486	−1.486
	(0.116)	(0.129)	(0.120)	(0.0308)	(0.105)	(0.120)	(0.177)	(0.532)	(0.610)	(0.762)	(0.183)
Region (default: Jawa Barat)											
Jawa Timur	1.281**	1.376**	1.120*	1.192*	1.126	1.049*	1.218*	0.0937	0.336	0.931	2.085*
	(0.0336)	(0.0227)	(0.0867)	(0.0837)	(0.148)	(0.0601)	(0.0539)	(0.888)	(0.670)	(0.303)	(0.0859)
Jawa Tengah	1.619**	1.457*	1.543**	1.374**	1.502**	1.447**	1.563**	1.069	0.563	0.497	0.0743
	(0.0370)	(0.0531)	(0.0396)	(0.0462)	(0.0459)	(0.0468)	(0.0425)	(0.227)	(0.624)	(0.670)	(0.962)
DKI Jakarta	1.868***	1.798***	1.761***	1.569***	1.829***	1.671***	1.824***	−0.132	−0.128	−0.268	−0.675
	(0.00158)	(0.00175)	(0.00357)	(0.000304)	(0.00240)	(0.00115)	(0.00267)	(0.865)	(0.904)	(0.806)	(0.425)
Banten	2.403***	2.365***	2.316***	2.282***	2.125**	2.283***	2.362***	1.322	1.848	1.792	1.408
	(0.000829)	(0.00180)	(0.00141)	(0.00513)	(0.0223)	(0.00206)	(0.00182)	(0.342)	(0.171)	(0.171)	(0.377)
Sulawesi Selatan	0.664	0.687	0.811*	0.762*	0.715	0.546	0.910**	−1.453	−1.470	−1.399	0.0414
	(0.157)	(0.172)	(0.0981)	(0.0900)	(0.233)	(0.237)	(0.0462)	(0.361)	(0.385)	(0.387)	(0.971)
Sumatera Utara	2.360**	2.160***	1.733**	1.617**	1.769***	1.592**	1.753**	2.454***	2.450**	2.627***	
	(0.0124)	(0.00962)	(0.0121)	(0.0112)	(0.00441)	(0.0110)	(0.0133)	(0.00651)	(0.0145)	(0.00497)	
Bali	1.235	1.209	1.159	1.046*	1.340*	1.085	1.208	0.362	0.417	0.575	
	(0.104)	(0.107)	(0.131)	(0.0928)	(0.0751)	(0.136)	(0.115)	(0.477)	(0.511)	(0.370)	
Lampung	2.354***	2.478***	2.343***	2.184***	2.363***	2.214***	2.545***	0.750	0.805	0.812	1.604*
	(0.00188)	(0.000300)	(0.00264)	(0.000890)	(0.00118)	(0.00127)	(0.000160)	(0.200)	(0.232)	(0.236)	(0.0523)
Critical constraints											
Electricity								−2.990**			
								(0.0225)			
Land	−2.011**										
	(0.0123)										
Crime, theft, and disorder		−1.448**									
		(0.0137)									
Finance											−1.421**
											(0.0491)
Licensing and permits			−2.400***						−2.826**		
			(0.000961)						(0.0105)		
Corruption				−2.915***						−1.844**	
				(0.000779)						(0.0154)	
Courts					−2.115*						
					(0.0811)						
Labor regulations						−2.400***					
						(0.000948)					
Inadequately educated workforce							−1.704**				
							(0.0350)				
Constant	0.143	0.157	0.549	0.682	0.544	0.646	0.341	3.263**	3.664*	3.431*	−0.305
	(0.932)	(0.920)	(0.724)	(0.554)	(0.705)	(0.656)	(0.831)	(0.0379)	(0.0642)	(0.0925)	(0.834)
Observations	196	196	192	176	165	195	195	103	102	97	46
R-squared	0.182	0.179	0.186	0.211	0.193	0.189	0.182	0.216	0.163	0.165	0.479

Notes: Robust p-values in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimates.

Table A8.10 Ordinary Least Squares Sales Growth Regression Results by Ownership

Variables	Foreign Owned			Domestic Owned					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Size (default: small)									
Medium	3.927	1.822	3.927	−0.832**	−1.000***	−1.064***	−0.891***	−0.966***	−1.007***
	(0.192)	(0.438)	(0.192)	(0.0114)	(0.00213)	(0.00123)	(0.00891)	(0.00678)	(0.00357)
Large	2.392	0.883	2.392	−0.909*	−1.199**	−1.151**	−1.033*	−1.128**	−1.069**
	(0.322)	(0.611)	(0.322)	(0.0941)	(0.0214)	(0.0303)	(0.0563)	(0.0479)	(0.0390)
Exporter	2.259*	2.305	2.259*	0.784	0.842	0.815	0.725	0.846	0.716
	(0.0875)	(0.115)	(0.0875)	(0.223)	(0.162)	(0.171)	(0.230)	(0.173)	(0.228)
Technology group (default: low tech)									
Medium tech	−0.122	−1.772	−0.122	−0.227	−0.190	−0.194	−0.189	−0.0848	−0.178
	(0.954)	(0.286)	(0.954)	(0.554)	(0.628)	(0.633)	(0.636)	(0.849)	(0.656)
High tech	0.825	0.774	0.825	−0.633**	−0.570*	−0.537*	−0.575*	−0.680*	−0.495
	(0.572)	(0.612)	(0.572)	(0.0474)	(0.0976)	(0.0953)	(0.0845)	(0.0746)	(0.119)
Age (default: young)									
Mature (6–15)				0.0453	0.113	0.187	−0.00104	0.0263	0.0378
				(0.961)	(0.909)	(0.854)	(0.999)	(0.978)	(0.968)
Older (16+)	−2.399	−2.746	−2.399	0.265	0.277	0.323	0.114	0.281	0.171
	(0.483)	(0.365)	(0.483)	(0.788)	(0.791)	(0.765)	(0.907)	(0.778)	(0.861)
Region (default: Jawa Barat)									
Jawa Timur	2.118	3.122**	2.118	0.652	0.670	0.797**	0.638	0.953**	0.671*
	(0.208)	(0.0462)	(0.208)	(0.113)	(0.104)	(0.0459)	(0.123)	(0.0282)	(0.0786)
Jawa Tengah				1.062*	0.963*	0.853	0.908	0.812	0.895
				(0.0509)	(0.0982)	(0.132)	(0.103)	(0.134)	(0.109)
DKI Jakarta	2.410	2.204	2.410	0.585	0.717*	0.720*	0.598	0.518	0.722*
	(0.131)	(0.195)	(0.131)	(0.191)	(0.0858)	(0.0664)	(0.148)	(0.216)	(0.0561)
Banten	5.708***	6.149***	5.708***	1.379**	1.515***	1.504**	1.444**	1.550***	1.455**
	(0.00945)	(0.00240)	(0.00945)	(0.0207)	(0.00824)	(0.0102)	(0.0106)	(0.00975)	(0.0132)
Sulawesi Selatan				0.107	−0.0149	0.0338	0.120	0.192	-0.0104
				(0.816)	(0.974)	(0.945)	(0.803)	(0.690)	(0.982)
Sumatera Utara				1.950***	2.117***	2.212***	1.790***	1.743***	1.766***
				(6.15e-05)	(0.000248)	(0.000113)	(0.000665)	(0.00122)	(0.000802)
Bali	−0.567	−0.113	−0.567	0.569	0.699	0.696	0.647	0.630	0.647
	(0.694)	(0.945)	(0.694)	(0.305)	(0.195)	(0.199)	(0.227)	(0.222)	(0.227)
Lampung				1.454***	1.416***	1.465***	1.403***	1.359***	1.356***
				(0.00155)	(0.00374)	(0.00201)	(0.00371)	(0.00389)	(0.00292)
Critical constraints									
Electricity	−3.985*			−1.129**					
	(0.0693)			(0.0462)					
Customs and trade regulations		−2.864**							
		(0.0357)							
Land					−1.519***				
					(0.00720)				
Crime, theft, and disorder						−1.206**			
						(0.0244)			
Licensing and permits							−2.252***		
							(0.000193)		
Political instability			−3.985*						
			(0.0693)						
Corruption								−1.862***	
								(0.00774)	
Labor regulations									−2.330***
									(0.000297)
Constant	−2.041	−0.0888	−2.041	0.265	0.224	0.188	0.361	0.270	0.359
	(0.690)	(0.985)	(0.690)	(0.811)	(0.850)	(0.876)	(0.744)	(0.806)	(0.737)
Observations	33	32	33	312	311	312	305	283	310
R-squared	0.570	0.551	0.570	0.126	0.129	0.122	0.129	0.138	0.135

Notes: Robust p-values in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimates.

Table A8.11 Ordinary Least Squares Sales Growth Regression Results, by Exporting Status

	Exporter			Nonexporter						
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
Size (default: small)										
Medium	−1.370	−1.482	−1.400	−0.638**	−0.886***	−0.973***	−0.781**	−0.863***	−0.868**	−0.914***
	(0.593)	(0.572)	(0.599)	(0.0370)	(0.00312)	(0.00164)	(0.0140)	(0.00521)	(0.0141)	(0.00475)
Large	−0.241	−0.385	−0.462	−0.814	−1.259**	−1.249**	−1.077*	−1.231**	−1.158*	−1.125**
	(0.922)	(0.880)	(0.858)	(0.163)	(0.0224)	(0.0258)	(0.0578)	(0.0285)	(0.0567)	(0.0378)
Age (default: young)										
Mature (6–15)				0.131	0.227	0.227	0.0495	0.00950	0.0809	0.0894
				(0.876)	(0.814)	(0.809)	(0.954)	(0.991)	(0.927)	(0.919)
Older (16+)	0.749	0.723	0.716	0.202	0.226	0.202	−0.00508	0.0343	0.130	0.0582
	(0.710)	(0.724)	(0.732)	(0.824)	(0.824)	(0.841)	(0.996)	(0.969)	(0.889)	(0.949)
Technology group (default: low tech)										
Medium tech	−1.108	−1.194	−1.218	−0.0992	−0.0592	−0.0466	−0.0542	0.0554	0.0198	−0.0423
	(0.244)	(0.232)	(0.236)	(0.805)	(0.882)	(0.910)	(0.893)	(0.893)	(0.965)	(0.915)
High tech	0.240	0.281	0.333	−0.769**	−0.678*	−0.579*	−0.645**	−0.429	−0.779**	−0.549*
	(0.820)	(0.792)	(0.778)	(0.0278)	(0.0506)	(0.0683)	(0.0431)	(0.241)	(0.0305)	(0.0566)
Ownership										
Domestic	−1.693*	−1.345	−1.490	−1.231	−1.529	−1.334	−1.310	−1.360	−1.450	−1.220
	(0.0673)	(0.217)	(0.193)	(0.222)	(0.129)	(0.182)	(0.197)	(0.183)	(0.130)	(0.227)
Region (default: Jawa Barat)										
Jawa Timur	4.196***	4.003***	4.805***	0.496	0.540	0.690	0.499	0.459	0.735	0.545
	(0.00355)	(0.00745)	(0.00666)	(0.314)	(0.267)	(0.146)	(0.307)	(0.325)	(0.111)	(0.217)
Jawa Tengah	1.405	1.045	1.040	1.269*	1.098	0.954	1.013	0.980	0.847	0.988
	(0.391)	(0.587)	(0.608)	(0.0623)	(0.132)	(0.183)	(0.150)	(0.157)	(0.214)	(0.155)
DKI Jakarta	1.759*	1.694*	1.578	0.534	0.720	0.629	0.502	0.512	0.375	0.613
	(0.0771)	(0.0931)	(0.192)	(0.338)	(0.178)	(0.256)	(0.375)	(0.358)	(0.469)	(0.244)
Banten	4.820***	4.314***	4.272***	1.135*	1.336**	1.366**	1.255**	1.281**	1.310**	1.270**
	(0.000343)	(0.00456)	(0.00669)	(0.0893)	(0.0366)	(0.0343)	(0.0477)	(0.0460)	(0.0324)	(0.0458)
Sulawesi Selatan	−1.144	−1.483	−1.545	0.561	0.359	0.373	0.477	0.495	0.580	0.318
	(0.702)	(0.628)	(0.621)	(0.152)	(0.404)	(0.410)	(0.274)	(0.247)	(0.168)	(0.452)
Sumatera Utara	4.885**	4.588**	4.504**	1.977***	2.197***	2.113***	1.713***	1.671***	1.638***	1.678***
	(0.0134)	(0.0281)	(0.0334)	(3.17e-05)	(0.000834)	(0.000704)	(0.00200)	(0.00259)	(0.00320)	(0.00191)

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Table A8.11 continued

	Exporter			Nonexporter						
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
Bali	−0.125	−0.405	−0.469	0.930	1.085	1.105*	1.025	1.049	0.981*	1.023
	(0.932)	(0.809)	(0.788)	(0.169)	(0.103)	(0.0979)	(0.123)	(0.101)	(0.0961)	(0.123)
Lampung				1.503***	1.435**	1.481***	1.420**	1.356**	1.342***	1.365***
				(0.00351)	(0.0102)	(0.00710)	(0.0108)	(0.0116)	(0.00846)	(0.00878)
Critical constraints										
Electricity				−1.641***						
				(0.00602)						
Customs and trade regulations	−2.531**									
	(0.0110)									
Land					−2.111***					
					(0.00120)					
Crime, theft, and disorder		−2.933*				−1.049**				
		(0.0718)				(0.0181)				
Licensing and permits							−2.376***			
							(5.92e-05)			
Political instability								−1.029*		
								(0.0777)		
Corruption									−2.217***	
									(0.00473)	
Courts			−2.881*							
			(0.0862)							
Labor regulations										−2.341***
										(0.000116)
Constant	0.841	1.013	1.191	1.427	1.682	1.507	1.663	1.716	1.780	1.575
	(0.739)	(0.693)	(0.654)	(0.401)	(0.346)	(0.395)	(0.329)	(0.300)	(0.232)	(0.342)
Observations	55	55	53	290	289	290	283	272	261	288
R-squared	0.415	0.419	0.417	0.142	0.146	0.121	0.135	0.119	0.146	0.139

Notes: Robust p-values in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimates.

Table A8.12 Ordinary Least Squares Sales Growth Regression Results by Sector

	Food				Textiles			Chemicals	Rubber			Nonmetallic Minerals		Other Manufacturing		
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**
Size (default: small)																
Medium	0.230	−0.829	−1.161	−1.370	−1.901	−1.979	−1.599	−0.846	1.054	0.503	1.092	−1.543	−1.392	−0.879	−1.049	−0.541
	(0.806)	(0.456)	(0.490)	(0.453)	(0.160)	(0.182)	(0.304)	(0.124)	(0.139)	(0.208)	(0.181)	(0.271)	(0.375)	(0.163)	(0.127)	(0.372)
Large	−1.584	−3.041*	−2.766	−3.944**	−0.00354	0.763	0.722	0.442	0.854*	0.413	0.427**	−2.045	−1.955	−0.249	−0.393	0.0783
	(0.245)	(0.0676)	(0.133)	(0.0442)	(0.996)	(0.426)	(0.364)	(0.573)	(0.0860)	(0.422)	(0.0258)	(0.330)	(0.362)	(0.872)	(0.811)	(0.956)
Age (default: young)																
Mature (6–15)	1.872***	2.888***	3.054***	2.176**	0.755	0.516	0.437					−0.145	−0.126			
	(0.000370)	(0.00478)	(0.00998)	(0.0155)	(0.405)	(0.570)	(0.538)					(0.951)	(0.959)			
Older (16+)	1.892***	2.938***	3.253***	1.740**	0.418	0.174	−0.182	0.794	0.716	0.920	0.732	−0.933	−0.980	0.0459	0.509	0.114
	(0.000353)	(0.00326)	(0.00860)	(0.0235)	(0.752)	(0.905)	(0.907)	(0.410)	(0.384)	(0.185)	(0.382)	(0.521)	(0.494)	(0.965)	(0.607)	(0.914)
Trade orientation																
Exporter	5.485***	4.301***	3.919***	4.178**	1.411**	0.955	1.701**	1.823***	−0.763	−0.342	−0.497	1.603	1.582	2.188	2.496	2.011
	(0.000153)	(0.000849)	(0.00240)	(0.0119)	(0.0183)	(0.118)	(0.0483)	(0.00208)	(0.696)	(0.855)	(0.762)	(0.443)	(0.464)	(0.492)	(0.406)	(0.520)
Ownership																
Domestic	1.734	0.902	0.961	0.400	−6.176***	−6.029***	−5.229***	−1.444	−0.0467	−0.219	−0.288	−2.118	−2.155	−1.760	−1.941	−1.542
	(0.195)	(0.491)	(0.468)	(0.826)	(0.000104)	(0.000144)	(0.000471)	(0.285)	(0.923)	(0.553)	(0.690)	(0.377)	(0.372)	(0.572)	(0.553)	(0.611)
Region (default: Jawa Barat)																
Jawa Timur	1.925	2.066	2.426*	1.362	1.619*	1.538	1.088	1.157	0.413	0.712	0.459	−0.937	−1.051	0.370	0.142	0.432
	(0.154)	(0.138)	(0.0806)	(0.139)	(0.0668)	(0.152)	(0.191)	(0.428)	(0.512)	(0.361)	(0.296)	(0.344)	(0.385)	(0.809)	(0.940)	(0.780)
Jawa Tengah	3.140**	3.445**	1.740	1.007	2.191	3.116	2.368	−0.315	−0.725***	−1.214*	−1.462***	1.240	1.269	0.697	0.824	1.460
	(0.0376)	(0.0157)	(0.332)	(0.593)	(0.366)	(0.110)	(0.203)	(0.881)	(0.00330)	(0.0870)	(0.00797)	(0.458)	(0.450)	(0.736)	(0.732)	(0.495)
DKI Jakarta	1.518*	1.705*	2.410**	1.678	1.481**	1.642**	1.409**	−0.902	−0.781***	−0.291	−0.884*	1.865	1.845	1.366	0.640	1.480
	(0.0577)	(0.0727)	(0.0477)	(0.278)	(0.0121)	(0.0112)	(0.0298)	(0.433)	(0.00160)	(0.200)	(0.0572)	(0.375)	(0.396)	(0.293)	(0.737)	(0.283)
Banten	1.312	2.002	2.699**	1.791	1.046	1.062	0.516	−0.0360	−0.434	0.159	−0.335	0.0325	−0.00395	2.936	2.601	2.995
	(0.300)	(0.159)	(0.0423)	(0.309)	(0.251)	(0.226)	(0.688)	(0.981)	(0.577)	(0.873)	(0.461)	(0.986)	(0.998)	(0.120)	(0.221)	(0.114)
Sulawesi Selatan	2.185***	0.993	1.607**	0.453	0.656	0.842	3.257	0.198				−5.049	−5.017	0.300	−0.517	0.318
	(0.000582)	(0.214)	(0.0218)	(0.571)	(0.493)	(0.296)	(0.191)	(0.902)				(0.106)	(0.115)	(0.833)	(0.751)	(0.840)
Sumatera Utara	3.542***	3.716***	4.404**	1.950	1.690*	10.02***	1.759*		3.466**	3.830**	3.466***	0.587	0.580	2.664*	2.698	2.918**
	(0.000336)	(0.00346)	(0.0104)	(0.120)	(0.0709)	(0.000472)	(0.0864)		(0.0144)	(0.0119)	(0.00675)	(0.710)	(0.719)	(0.0622)	(0.109)	(0.0403)
Bali	1.451	1.473	1.943	1.401	1.613	1.777	1.682					−0.711	−0.730	1.348	1.161	1.430
	(0.537)	(0.532)	(0.466)	(0.537)	(0.213)	(0.161)	(0.138)					(0.554)	(0.552)	(0.323)	(0.462)	(0.323)
Lampung	3.914***	2.813***	3.238***	2.485**	3.527***	3.012**	2.825**		1.997**	2.517***	2.004**	−0.104	−0.0502	0.831	0.560	0.949
	(9.52e-05)	(0.00308)	(0.00282)	(0.0130)	(0.00859)	(0.0464)	(0.0296)		(0.0397)	(0.00252)	(0.0408)	(0.902)	(0.950)	(0.503)	(0.730)	(0.443)
Critical constraints																
Electricity	−3.459**								−1.516**			−6.896**				
	(0.0410)								(0.0157)			(0.0161)				
Telecommunications					−2.031**											
					(0.0409)											
Practices of competitors in the informal sector		−3.108**								−1.226*						
		(0.0427)								(0.0607)						
Land						−8.162***										
						(0.000500)										
Crime, theft, and disorder														−2.986*		
														(0.0771)		
Finance								−1.766***								
								(0.00175)								

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Table A8.12 continued

	Food				Textiles			Chemicals	Rubber			Nonmetallic Minerals		Other Manufacturing		
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**
Tax rates			−3.904***												−3.455*	
			(0.00291)												(0.0513)	
Political instability											−1.478*		−6.926**			
											(0.0994)		(0.0166)			
Courts				−5.336***												
				(0.000331)												
Labor regulations																−3.193**
																(0.0233)
Inadequately educated workforce							−4.231***									
							(0.00608)									
Constant	−4.730**	−4.072*	−4.820*	−1.805	4.801***	4.735***	4.386***	0.562	−1.287	−1.362	−1.063	4.320	4.328	2.092	2.238	1.619
	(0.0224)	(0.0767)	(0.0686)	(0.496)	(0.00428)	(0.00876)	(0.00766)	(0.638)	(0.396)	(0.288)	(0.500)	(0.190)	(0.195)	(0.579)	(0.594)	(0.661)
Observations	53	53	53	44	46	46	46	39	45	43	45	48	45	53	52	53
R-squared	0.462	0.481	0.405	0.539	0.371	0.558	0.503	0.458	0.273	0.283	0.261	0.360	0.352	0.314	0.308	0.350

Notes: Robust p-values in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimates.

9 Developments in Indonesia's Participation in Global Value Chains

9.1 Introduction

This chapter and the next provide an overview of Indonesia's participation in global value chains (GVCs). The aim of these two chapters is to identify those value chains in which Indonesia performs well and to identify the positioning of Indonesia within these value chains. The results from these chapters are then used to identify which value chains Indonesia can successfully move into and upgrade in. Chapter 9 identifies Indonesia's performance in GVCs by concentrating on three dimensions: (i) positioning (e.g., whether Indonesia is a supplier of raw materials, intermediate goods, or final goods); (ii) the sectoral chains in which Indonesia has a comparative advantage; and (iii) Indonesia's contribution to regional value chains. The main message of the chapter is that Indonesia's involvement in GVCs relies to a large extent on sectors that supply primary products and raw materials. Indonesia supplies other economies with the primary products and raw materials necessary for their value chains. Moreover, Indonesia is heavily involved in a relatively narrow number of value chains, with its participation lacking the diversification observed in other countries. Chapter 10 extends this analysis by combining the information on GVC participation with product-level information to identify the complexity of Indonesia's GVC participation (see Chapter 1, Box 1.2 for a precise definition of complexity). The analysis is then used to identify which sectors in Indonesia contribute products that are relatively high in the complexity ranking and thus where opportunities for upgrading are perhaps strongest.

For developing economies, the emergence of GVCs offers a new—and potentially easier—path to industrialization.[145] GVCs break up the production process so that different steps can be carried out in different economies. Production is sliced into different production segments that are relocated across national borders to places where they can be performed most efficiently. While this is not new, the extent of these activities has increased drastically in the last 20–25 years, driven by lower trade costs—both natural and policy related—and developments in information and communication technologies (ICT). Participation in GVCs is considered an important component of the development strategy of many developing economies, with export-oriented manufacturing a critical part of the catching-up process of many emerging economies. GVCs have the significant advantage that economies do not need to build the entire course of the production capacity of a sector but can instead concentrate on a specific production process or task based on their comparative advantage. This can allow them to integrate into the global economy more rapidly than was possible in the previous industrialization period.[146]

While the potential benefits from GVC participation are large, these benefits are not automatic and some economies have not benefited from GVC participation to the same extent as others. The success or otherwise of economies in GVCs is likely to depend on many factors. An important factor affecting the successful integration of economies in GVCs relates to their positioning, and whether an economy operates

[145] Baldwin (2016).
[146] Kowalski et al. (2015).

in low or high value-added activities in the value chain. A typical value chain would involve activities such as research and development (R&D) and design at the beginning of the chain and postproduction services such as marketing toward the end of the chain. In between are the extraction of primary inputs, the production of various intermediate goods, and final assembly. Within GVCs, developed economies tend to specialize in high value-added activities at the beginning of the value chain, such as R&D and design, and at the end of the value chain, such as after-sales services and marketing. Conversely, developing economies are often specialized in low value-added activities in the middle of the value chain, such as final assembly. This pattern of specialization can have important implications for the distribution of gains from GVC participation.

Case study evidence suggests that an economy's positioning within a value chain has important implications for the share of value added that an economy can capture from GVC participation. A prime example of this is the iPhone. The People's Republic of China (PRC), which assembles the final product, captures a tiny fraction (< 2%) of the value added of the iPhone, while Apple in California captures the vast majority of the value added.[147] This pattern is depicted in the "smiling curve," a U-shaped curve suggested by Acer founder Stan Shih in the early 1990s. The curve reflects the idea that the two ends of the value chain, i.e., the beginning and end, provide greater value added than the middle of the value chain. Economies that contribute at the middle of the value chain are therefore likely to benefit less than economies that contribute at either end of the chain. While middle-of-the-chain production activities may indeed be an entry point for economies into GVCs, successful development will rely upon being able to move up the value chain in either direction, diversifying the set of production activities that an economy undertakes. The extent to which this upgrading can occur is likely to depend on local capabilities and learning, as well as the extent of technology transfer from developed economies. While the share of value added that an economy captures will impact upon the success of a development strategy based on GVC participation, a further factor is likely to be the scale of production. Economies may be able to create significant value added and employment through GVC participation if they can produce at scale, even if that economy's share of value added within a value chain is relatively small. It can be argued that this was the case for the PRC in the electronics sector, for example. During the 2000s, the data suggest that the PRC captured an increasingly smaller share of the value added of electronics production that it was engaged in, but that the overall value of Chinese production increased dramatically, offsetting the smaller value-added share.[148]

The discussion above has concentrated on the positioning and extent of production within a value chain. It should also be remembered, however, that there are numerous value chains in which economies can participate. Upgrading, therefore, doesn't necessarily involve a movement within a value chain to higher value-added activities—a movement up the smiling curve—but may also involve a movement toward different value chains that are of higher complexity, that allow for greater spillovers and technology diffusion, and that involve more opportunities for upgrading.

A value chain comprises the full range of activities that are required to bring a product from its conception to the final consumer, including design, sourcing of raw materials and intermediate inputs, marketing, distribution, and support to the final consumer. A GVC is then set up when all these activities are coordinated across countries. In the analysis that follows, GVCs are identified using (global) input–output tables from the World Input–Output Database (WIOD).[149] In this context a GVC is defined as the final demand served by a specific sector in an economy (e.g., sales of automobiles by the Japanese transportation

[147] Kraemer, Linden, and Dedrick (2011).
[148] Kowalski et al. (2015).
[149] Timmer et al. (2015).

equipment sector), which is then decomposed by the sectors and countries that contribute value added to the final output. The input–output approach has an important advantage over "case studies" of GVCs that are aimed at a single product (such as mobile phones or coffee) in that it provides a comprehensive view of the global economy instead of just one product or company. The comprehensiveness of the input–output approach entails costs, however. Since this kind of analysis is done at an aggregation level of around 55 sectors (of which only a subset of sectors are manufacturing sectors), the approach will mix together many different value chains into just one unit. For example, the Japanese automobiles value chain will likely consist of one value chain for trucks, but also one for passenger cars of various sizes and types, and for electric cars or gasoline cars. Such heterogeneity also exists on the input side, i.e., in terms of which intermediate inputs are used in various value chains that will be aggregated into the sectors of input–output tables. As such, the input–output approach has limitations in terms of the level of detail that can be analyzed. With these drawbacks in mind, this chapter uses input–output analysis to identify Indonesia's role and positioning within GVCs.

The rest of the chapter is structured as follows. Section 9.2 reports information on the participation of Indonesia in GVCs at the aggregate—economywide—level. Section 9.3 considers Indonesia's engagement in GVCs at the sectoral level. Section 9.4 examines by sector the level of GVC engagement in a comparative perspective. Section 9.5 identifies the sectors in which Indonesia has a comparative advantage. Section 9.6 considers the regional dimension of Indonesia's involvement in GVCs. Section 9.7 concludes.

9.2 Indonesia's Participation in Global Value Chains: An Aggregate View

This section reports on developments in GVC participation at the aggregate (i.e., economywide) level. It begins by comparing developments in Indonesia's performance in GVCs with those of a set of comparator Asian economies, considering Indonesia's upstream and downstream involvement in GVCs (Box 9.1).

In a comparative perspective, and despite a recent upturn, Indonesia's performance in downstream GVC participation has tended to deteriorate over time.

Figure 9.1 reports developments in the indicator of downstream GVC participation for Indonesia and five other Asian economies included in the WIOD (i.e., India; Japan; the PRC; the Republic of Korea (ROK); and Taipei,China). The numbers reported are based on the set of primary and manufacturing sectors (International Standard Industrial Classification [ISIC] sectors A–C).[150] While other economies experienced a generally rising trend in downstream participation—at least until the start of the global financial crisis—Indonesia's downstream participation was on a declining trend. Following the crisis, the trend in Indonesia (along with Japan) has been positive, while that in other economies has tended to be negative. While Indonesia had one of the highest rates of downstream GVC participation in 2000, this rate was the second lowest of all economies in 2014 (with the PRC having the lowest rate following a relatively rapid decline after 2007).

[150] The full list is reported in Table 5.1.

Box 9.1 Identifying Indonesia's Positioning within Global Value Chains

While there are a range of possible positions at which firms can engage in global value chains (GVCs), one may think of two general ways in which economies can be engaged in GVCs. On the one hand, economies may be involved in supplying intermediates and raw materials to other economies that then assemble these into a final product. This form of participation is defined as upstream participation in GVCs. On the other hand, economies may be engaged largely in the final assembly itself, receiving intermediate inputs and raw materials from upstream suppliers from different economies. This form of participation is called downstream participation in GVCs. Given these considerations, this chapter begins by discussing two alternative, but complementary, indicators of GVC participation that have been used in existing studies:[a]

(i) A measure of upstream involvement in GVCs, defined as the value added that Indonesia contributes to the final demand of other economies' value chains through intermediate supplies. Upstream participation involves an economy contributing value added to other economies' value chains. To capture this dimension, the report considers the ratio of the value added that Indonesia contributes to other countries' value chains to the total value added by Indonesia, implying that the indicator is bound between zero and one, with higher numbers indicating a higher share of Indonesian value added that is used in other countries' GVCs.[b]

(ii) A measure of downstream participation, defined as the value added that Indonesia receives from other economies to produce its own final goods. Downstream participation captures the value added that Indonesia receives from abroad and that is used in the production of final goods in Indonesia. This value is taken as a ratio, in this case to total final demand, implying that the ratio is again bound between zero and one.

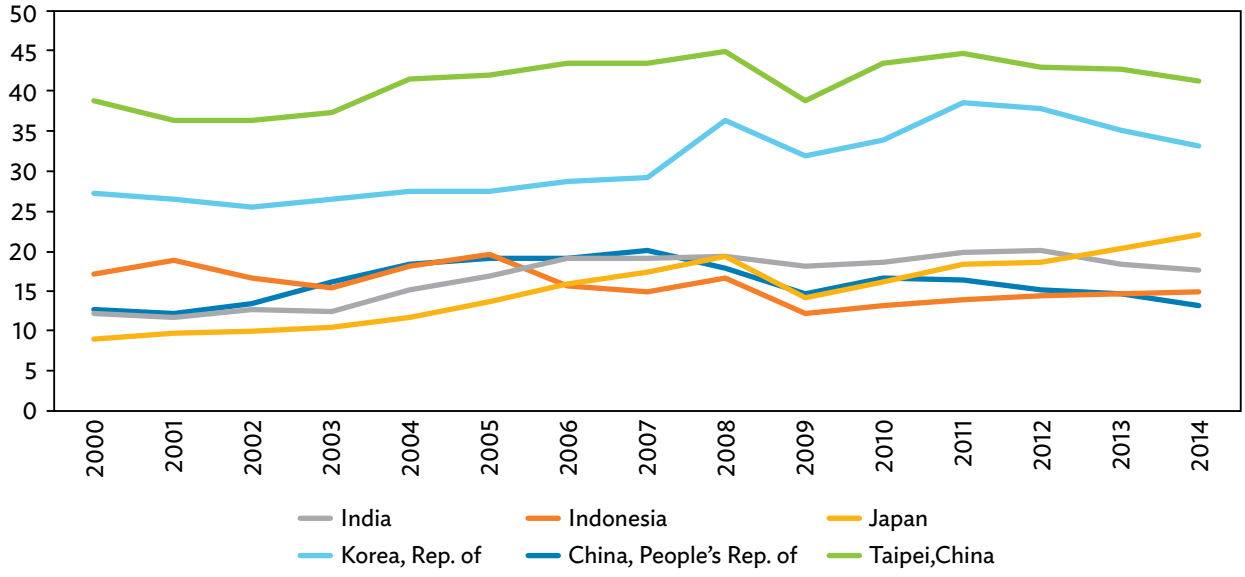
These indicators can be constructed at both the aggregate economy level and at the sectoral level.

[a] For more details on the construction of these indicators, see Appendix 9.1. See UNCTAD (2013) for an example of the use of these indicators.

[b] Note further that the numbers reported here are based on all sectors of the economy (i.e., all 56 primary, manufacturing, and service sectors).

Source: Authors.

Figure 9.1 Downstream Global Value Chain Participation of Asian Economies, Manufacturing and Primary Sectors (%)

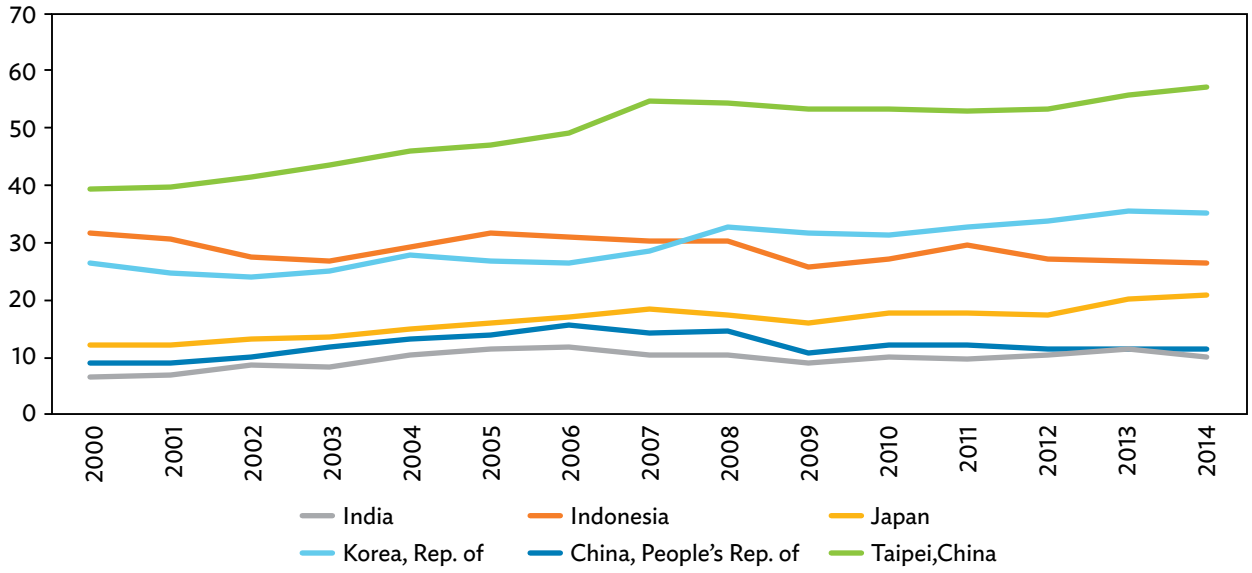


Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

Despite the recent declining trend in upstream participation, Indonesia's upstream GVC participation rate is higher than its downstream participation rate.

In the case of upstream participation (Figure 9.2), Indonesia had the second highest rate of upstream participation in 2000, with the rate also significantly higher than that observed for downstream GVC participation. Over time, however, the rate of upstream participation declined. This pattern differed significantly from other Asian economies, where there was a general tendency for the rate of upstream participation to increase over time, at least until the financial crisis. Despite this, in 2014, Indonesia had the highest rate of upstream GVC participation among the follower economies (i.e., the four economies behind the ROK and Taipei,China).

Figure 9.2 Upstream Global Value Chain Participation of Asian Economies, Manufacturing and Primary Sectors (%)



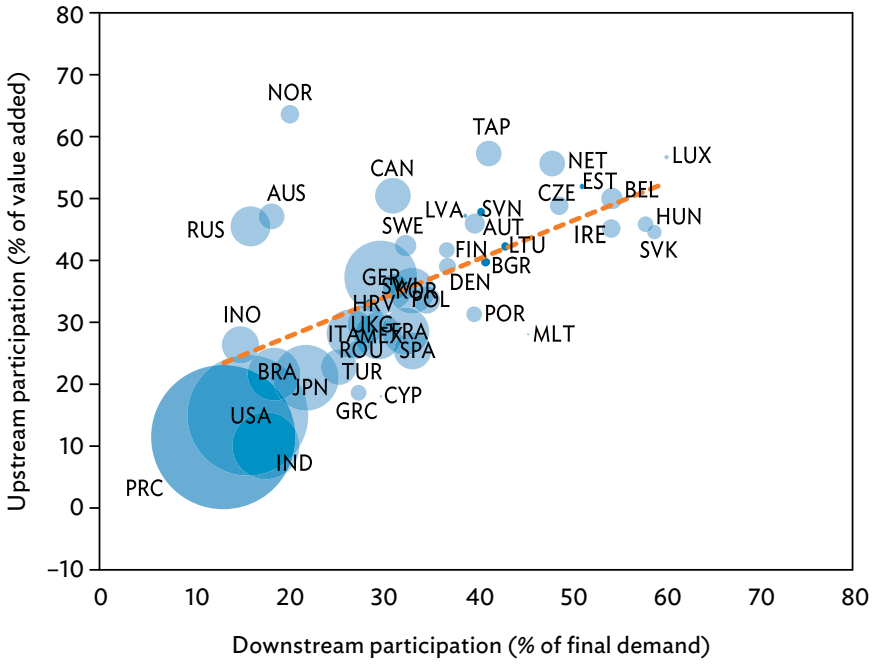
Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

At the country level, Indonesia is more heavily involved in supplying intermediates and/or raw materials to other economies' value chains than it is in receiving such inputs from other economies for final production activities in Indonesia.

Moving beyond the Asian sample to see the performance of all WIOD economies and how Indonesia compares, Figure 9.3 reports the indicators of downstream and upstream GVC participation (on the x- and y-axis, respectively), along with the total value of final demand (in United States dollars and represented by the size of the circles) for 2014.[151] Two things stand out. First, Indonesia has relatively low rates of downstream participation, with rates well below those found in economies such as Mexico and

[151] The economies included in the study are the following: AUS = Australia; AUT = Austria; BEL = Belgium; BGR = Bulgaria; BRA = Brazil; CAN = Canada; CYP = Cyprus; CZE = Czech Republic; DEN = Denmark; EST = Estonia; FIN = Finland; FRA = France; GER = Germany; GRC = Greece; HRV = Croatia; HUN = Hungary; IND = India; INO = Indonesia; IRE = Ireland; ITA = Italy; JPN= Japan; KOR = Republic of Korea; LTU = Lithuania; LUX = Luxembourg; LVA = Latvia; MEX = Mexico; MLT = Malta; NET = Netherlands; NOR = Norway; POL = Poland; POR = Portugal; PRC = People's Republic of China; ROU = Romania; RUS = Russian Federation; SPA = Spain; SVK = Slovakia; SVN = Slovenia; SWE = Sweden; SWI = Switzerland; TAP = Taipei,China; TUR = Turkey; UKG = United Kingdom; USA = United States.

Figure 9.3 Upstream and Downstream Global Value Chain Participation, Manufacturing and Primary Sectors, 2014 *(%)*



Notes: The size of the circles represents the total value of final demand. See footnote 151 for the complete list of economies.
Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

Turkey, as well as the set of European transition economies. Secondly, Indonesia has a rate of upstream GVC participation that is somewhat high relative to the observed rates of downstream GVC participation, with rates comparable to those in Turkey, for example. These initial descriptive results thus suggest that Indonesia's engagement in GVCs has been to a large extent driven by supplying other countries with intermediate goods and primary products for their final output production.

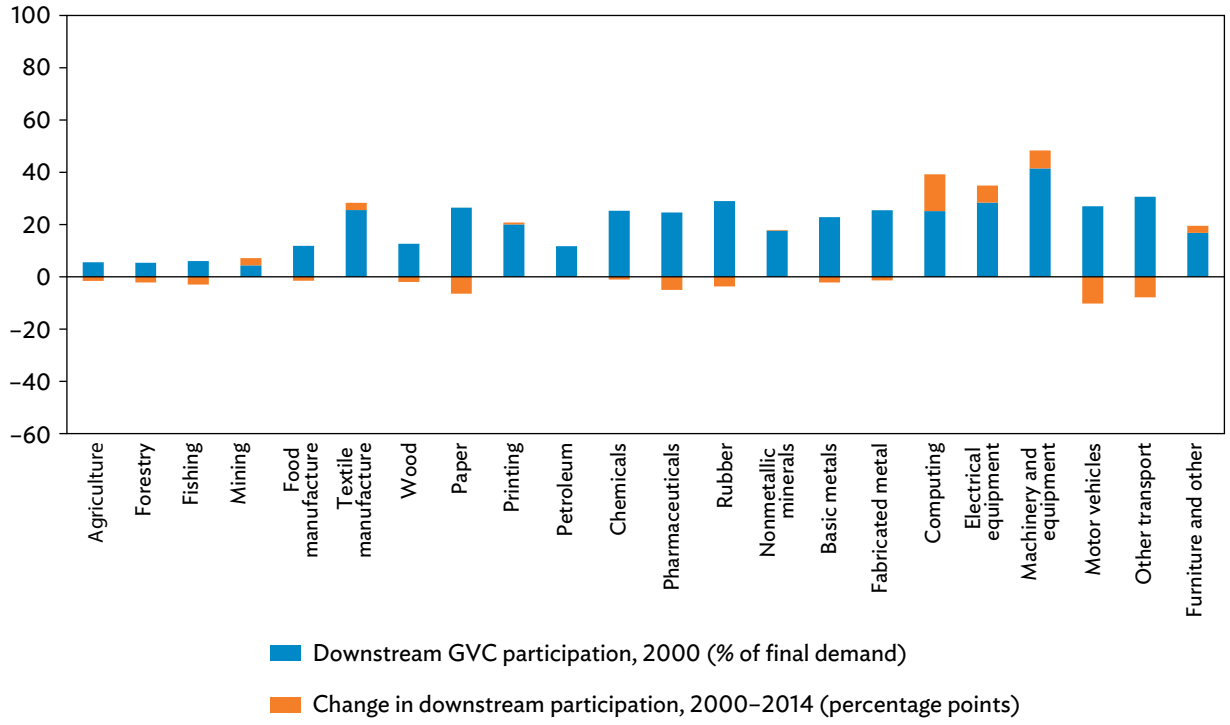
9.3 Sectoral Rates of Global Value Chain Participation

The previous section showed that in primary and manufacturing sectors Indonesia tends to perform relatively well in terms of upstream GVC participation and relatively poorly in terms of downstream GVC participation. In this section, the analysis will identify the subsectors in which Indonesia performs relatively well along these two dimensions.

Downstream GVC participation tends to be relatively low in most sectors, most notably in primary and low-tech manufacturing sectors.

Figure 9.4 reports the rates of downstream and upstream GVC participation by sector for 2000 and the observed change between 2000 and 2014. The figures reveal that downstream GVC participation rates tend to be relatively low in most sectors, with reported rates often below 20%. This is particularly true for agriculture, forestry, fishing, and mining, as well as other low-tech manufacturing sectors such as food manufacture, wood, and petroleum. The low downstream participation rates suggest that activity in these sectors tends not to involve the processing of various raw materials and commodities or the final assembly

Figure 9.4 Sectoral Downstream Global Value Chain Participation of Manufacturing and Primary Sectors in Indonesia



GVC = global value chain.
Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

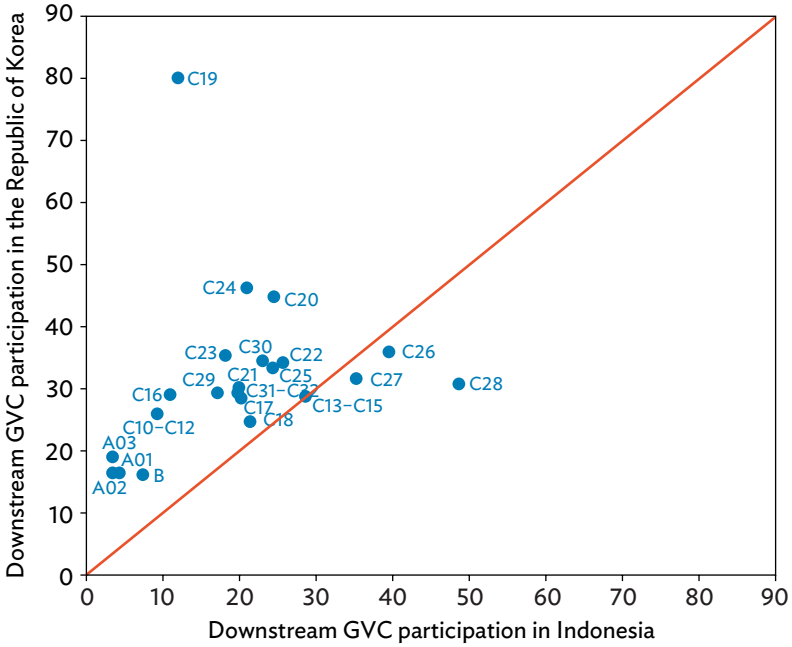
of products. Rates of downstream participation are somewhat higher (and increasing over time) in more technology-intensive sectors such as computing, electrical equipment, and machinery and equipment, though as will be seen later the scale of contributions to these sectors tends to be relatively small.

To provide a comparison with other countries, Figure 9.5 reports a scatterplot of sectoral GVC participation rates for both Indonesia and the ROK for 2014. Points above the 45-degree line indicate that the ROK has higher rates of downstream GVC participation than Indonesia, while points below the line indicate the reverse. The figure reveals that Indonesia has higher rates of downstream GVC participation than the ROK in relatively few sectors. In particular, higher rates of downstream GVC participation are found in computing, electrical equipment, and machinery and equipment, sectors that tend to be relatively high-tech sectors.

Rates of upstream GVC participation tend to be significantly higher than those of downstream participation, especially in primary sectors, supporting the view that Indonesia's main role within GVCs is to provide raw materials to other economies' value chains for processing.

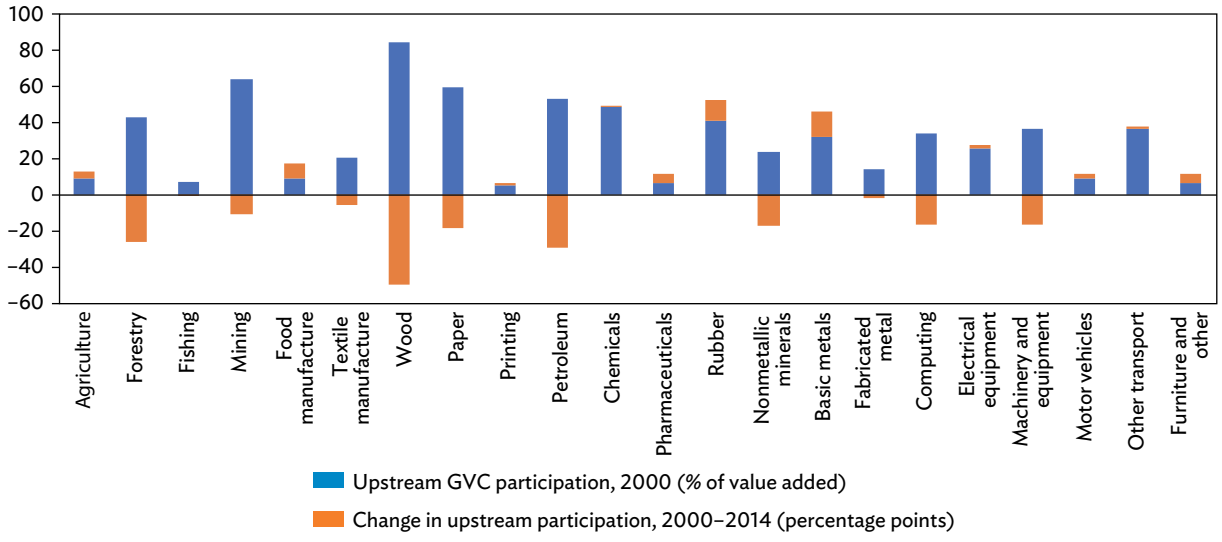
The rate of upstream GVC participation (Figure 9.6) is in many cases much higher than the values observed for downstream participation, with rates above 40% observed in many sectors. Relatively high rates of upstream GVC participation are observed in the primary sectors, forestry, and mining, confirming the view that Indonesia's involvement in these primary sectors largely involves supplying basic raw materials.

Figure 9.5 Sectoral Downstream Global Value Chain Participation of Manufacturing and Primary Sectors in Indonesia and the Republic of Korea, 2014 (% of final demand)



Note: See Table 5.1 for the full list of sectors and sector codes.
Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

Figure 9.6 Sectoral Upstream Global Value Chain Participation of Manufacturing and Primary Sectors in Indonesia

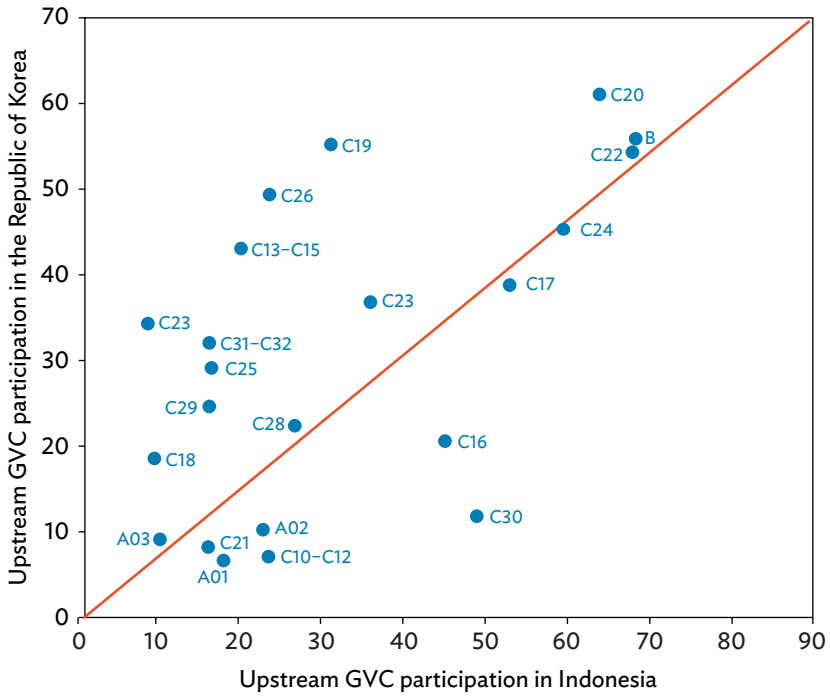


GVC = global value chain.
Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

Relatively large values are also observed in a number of manufacturing sectors, most notably wood, paper, petroleum, chemicals, and rubber. Interestingly, developments over time in a number of these sectors have been negative, with declines observed in the two primary sectors, both of which had above 40% participation rates in 2000, as well as in the relatively low-tech manufacturing sectors (i.e., wood, paper, and petroleum).

Figure 9.7 reports a comparison of Indonesia's upstream GVC participation with that of the ROK in 2014. In the case of upstream participation, we find many sectors in which Indonesia's rate of GVC involvement is in excess of that for the ROK. These sectors tend to be primary sectors (agriculture and forestry) as well as mostly low-tech manufacturing sectors (e.g., food manufacture, wood, and paper).

Figure 9.7 Sectoral Upstream Global Value Chain Participation of Manufacturing and Primary Sectors in Indonesia and the Republic of Korea, 2014 (% of value added)

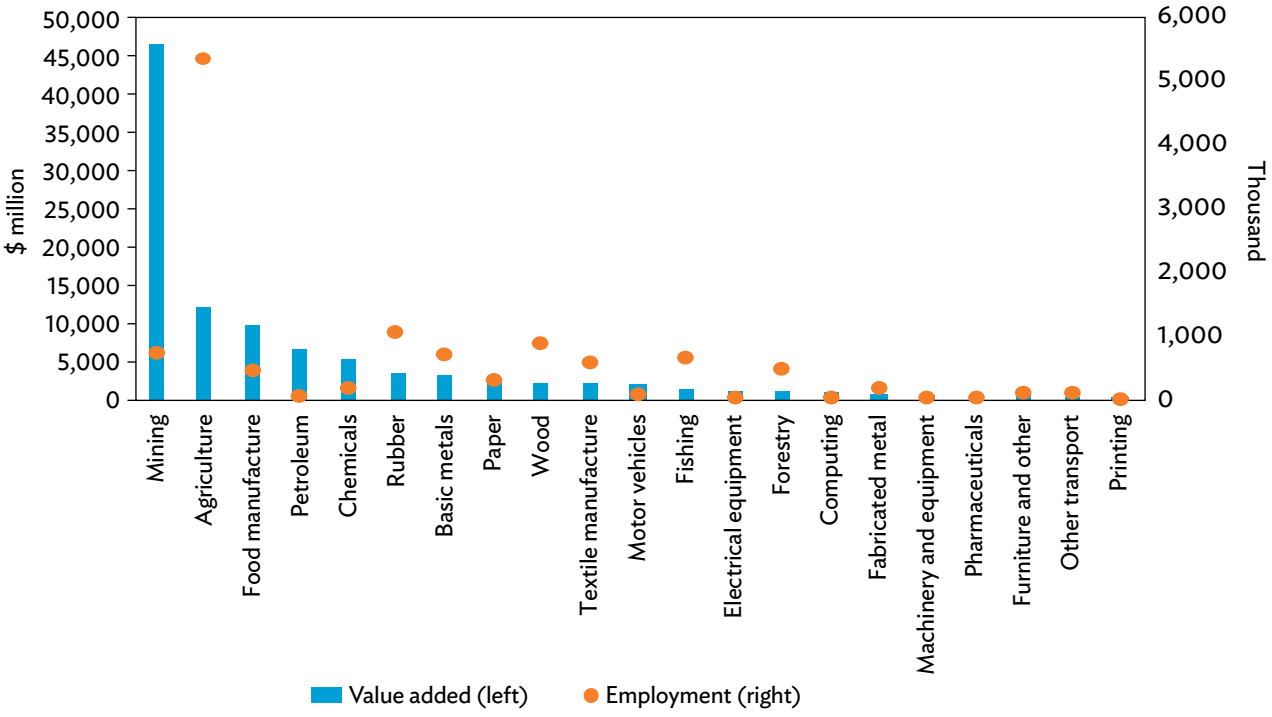


Note: See Table 5.1 for the full list of sectors and sector codes.
Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

9.4 Level of Global Value Chain Participation

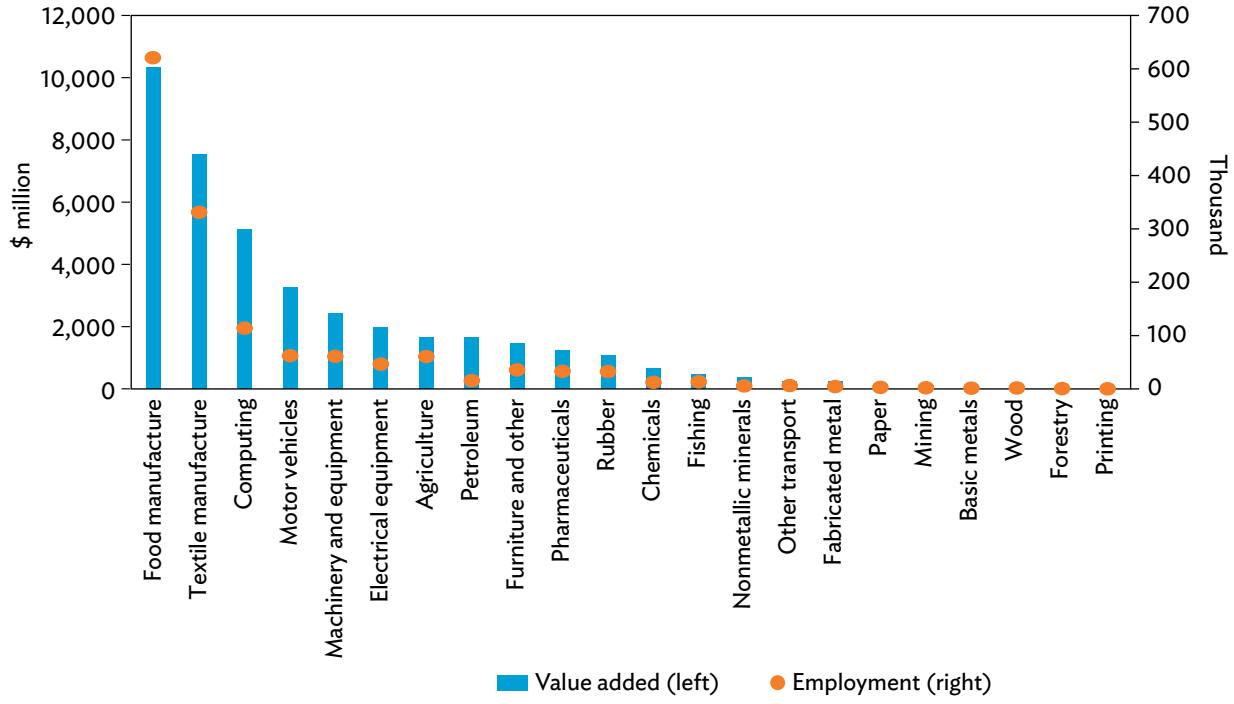
The analysis above concentrates on various ratios capturing the extent of GVC participation. While informative, these ratios reveal little about the actual scale or value of Indonesia's engagement in different value chains, and as such provide little information on the relative importance of different sectors. To shed some light on this, Figure 9.8 reports the value added and employment that Indonesia contributes to other economies' value chains through upstream GVC participation, and Figure 9.9 reports the value added and employment generated elsewhere and used in final production activities within Indonesia. These values are reported for the set of primary and manufacturing sectors for the year 2014.

Figure 9.8 Value Added and Employment Contributions of Indonesia to Other Economies' Value Chains, 2014



Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

Figure 9.9 Value Added and Employment Contributions of Other Economies to Indonesia's Value Chains, 2014



Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

Mining dominates the value-added contribution of Indonesia's upstream participation in GVCs, while agriculture dominates in terms of employment generation.

Figure 9.8 reveals that one sector, mining, is by far the largest contributor to other economies' value chains when considering value added. Its employment contribution is low, in contrast, reflecting the capital-intensive nature of the sector. Other sectors that make a significant contribution include, agriculture—which is by far the largest generator of employment through GVC participation—food manufacture, and petroleum.

Indonesia has been able to contribute significantly to a few high-tech GVCs, suggesting an important role for the import of high-tech intermediates in allowing entry into these high-tech GVCs.

A few sectors dominate when considering the value added that Indonesia receives from other economies for its own value chain activities (Figure 9.9), with relatively large contributions in food manufacture, textiles, computing, machinery and equipment, and motor vehicles. That some high-tech sectors are important in terms of downstream GVC participation indicate a role for Indonesia as an assembler in high-tech sectors, with Indonesia's participation in these sectors driven by imports of high-tech intermediate inputs from abroad. In this case, the correlation between employment and value-added contributions is much higher than in the case of upstream participation.

9.5 Indonesia's Comparative Advantages in Global Value Chains

The figures in the previous section indicate that Indonesia is engaged in a relatively small number of sectoral GVCs, irrespective of whether we consider value added or employment. This is true for Indonesia's upstream contributions to other economies' value chains and the contributions of other economies to Indonesia's value chains, though there are differences in the relevant sectors depending upon which dimension of GVC participation is considered. Given Indonesia's sectoral performance, it would also be informative to consider how it compares to other economies in the WIOD—i.e., observing a high value of participation for Indonesia in a sector need not imply a good performance if all other economies also perform well in this sector. To address this issue, the analysis makes use of the concept of revealed comparative advantage (RCA), which is described in Box 1.1.[152] This indicator will compare the contribution of a particular sector in Indonesia (say, in terms of the value-added share) to the contribution of that particular sector in the world as a whole—or the set of WIOD economies. A value greater than 1 implies that Indonesia has a (revealed) comparative advantage in that sector.

The areas in which Indonesia has comparative advantage tend to be concentrated in upstream GVC activities and in a small number of usually primary or low-tech manufacturing sectors.

Table 9.1 reports the values of the RCA indicator for both upstream and downstream GVC participation in 2000 and 2014. The table reveals that Indonesia has RCA>1 in many sectors when considering its upstream participation, i.e., for a relatively large number of sectors the value-added shares for Indonesia are larger than for the world as a whole, indicating that Indonesia is a relatively important supplier of intermediates to other economies' value chains in these sectors. These values are particularly high for fishing, forestry, and printing.

[152] In terms of upstream GVC participation, a revealed comparative advantage (i.e., RCA>1) would imply that an Indonesian sector contributes more to foreign value chains than that sector contributes at the world level. In the case of downstream GVC participation, an RCA index above 1 would indicate that a sector in Indonesia is served by foreign intermediates more intensively than that sector is served by foreign intermediates at the world level.

Table 9.1 Global Value Chains: Upstream and Downstream Revealed Comparative Advantage, 2014

Industry Code	Upstream GVC Participation			Downstream GVC Participation		
	2000	2014	Change 2010–2014	2000	2014	Change 2010–2014
Agriculture	1.052	0.747	−0.305	1.017	0.765	−0.252
Forestry	2.030	3.826	1.797	1.132	0.159	−0.973
Fishing	15.644	10.664	−4.979	2.275	2.040	−0.235
Mining	0.085	0.073	−0.012	0.408	0.210	−0.198
Food manufacture	2.345	1.631	−0.714	1.466	1.344	−0.122
Textile manufacture	1.247	1.872	0.625	2.297	2.351	0.053
Wood	0.533	2.654	2.120	0.520	0.336	−0.184
Paper	0.670	1.739	1.068	1.676	0.439	−1.238
Printing	4.120	7.245	3.125	0.206	0.011	−0.195
Petroleum	1.112	1.287	0.175	0.428	0.348	−0.081
Chemicals	0.294	0.331	0.037	1.047	0.356	−0.691
Pharmaceuticals	2.883	2.291	−0.592	2.089	1.008	−1.081
Rubber	0.820	0.749	−0.071	2.716	1.542	−1.174
Nonmetallic minerals	1.561	2.347	0.786	0.781	1.214	0.433
Basic metals	0.502	0.450	−0.052	0.902	0.107	−0.795
Fabricated metal	0.869	1.029	0.160	1.290	0.192	−1.098
Computing	0.306	0.489	0.182	0.551	1.098	0.547
Electrical equipment	0.972	1.112	0.139	1.145	0.845	−0.300
Machinery and equipment	0.667	0.792	0.125	0.682	0.514	−0.168
Motor vehicles	1.171	1.205	0.034	0.539	0.398	−0.142
Other transport	1.511	1.789	0.277	0.180	0.098	−0.082
Furniture	3.113	2.676	−0.437	0.862	0.872	0.010

GVC = global value chain, RCA = revealed comparative advantage.
Note: Colored in red (upstream) and green (downstream) are the sectors whose RCA increased from less than 1 to over 1 between 2000 and 2014, and sectors whose RCA increased during this period.
Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

Interestingly, Indonesia has no RCA in some sectors that have a high value-added contribution to other economies' value chains (Figure 9.8), including food manufacture, mining, and chemicals.

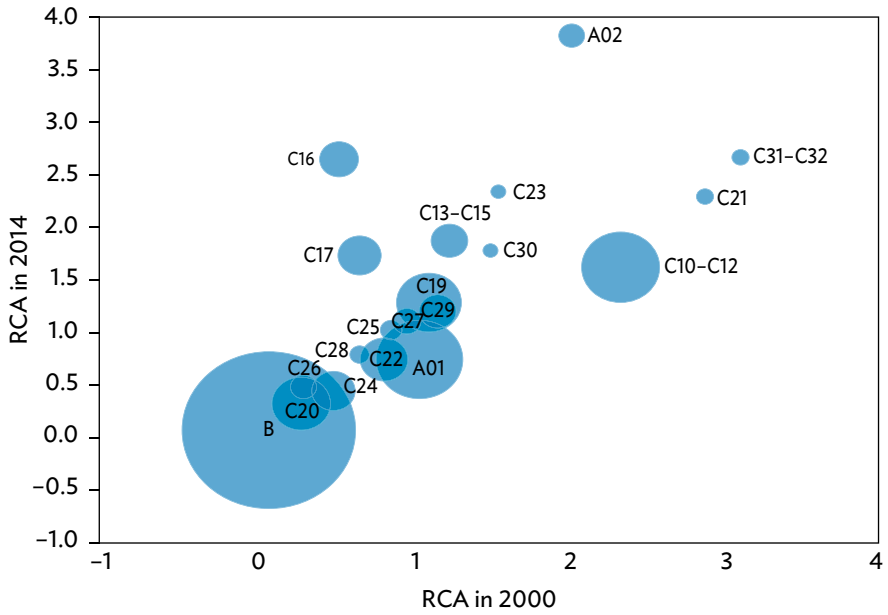
In the case of downstream GVC participation, there are relatively few sectors in which Indonesia has a revealed comparative advantage, i.e., sectors in which other economies contribute more intensively to Indonesia's value chains than they do to the world as a whole. The sectors in which downstream RCA is largest are fishing and textile manufacture. This result tempers the conclusion of the previous section which suggested that Indonesia has increased its downstream participation in some high-tech GVCs. While it remains true that Indonesia has been able to enter these GVCs and produce at scale, it still hasn't developed a comparative advantage in many of these sectors, with computing being the major exception (the sector shows a small comparative advantage).

Colored in red (upstream) and green (downstream) are value chains where Indonesia could focus its efforts on. These are sectors whose RCA increased from less than 1 to over 1 between 2000 and 2014, and sectors whose RCA increased during this period.

Over time, Indonesia has not been able to develop significant comparative advantage in downstream GVC activities and has instead lost comparative advantage in a number of downstream value chains. The major exception has been the development of comparative advantage in downstream activities within the computing sector.

The final two figures in this subsection report RCA values for upstream and downstream GVC activities (Figures 9.10 and 9.11, respectively) in 2000 and 2014. In Figure 9.10, the size of the circles reflects the value added that Indonesia contributes to other economies' value chains, while the circles in Figure 9.11 reflect the value added that other economies contribute to Indonesia's value chains. Figure 9.10 excludes the fishing sector, which has very large values of RCA in both periods (i.e., 15.64 in 2000 and 10.66 in 2014), indicating a strong (though declining) RCA. Figure 9.10 reveals few major changes over time. Sectors in which Indonesia either had or didn't have an RCA in 2000 tend to be the same sectors in 2014 (i.e., sectors tend to be situated in the lower-left and upper-right segments of the figure). There are a small number of exceptions, with Indonesia developing an RCA in wood, paper, fabricated metal, and electrical equipment, while losing RCA in agriculture.

Figure 9.10 Developments in Indonesia's Upstream Revealed Comparative Advantage, 2000 and 2014

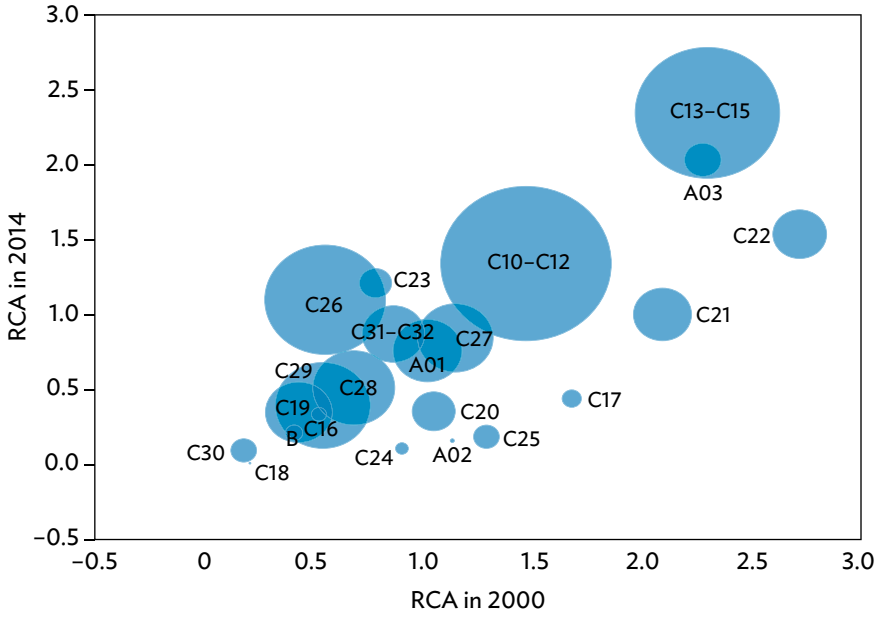


RCA = revealed comparative advantage.
Notes: For ease of presentation, the fishing and aquaculture sector (A03) is excluded from this figure. This sector reports large values of the RCA index in both 2000 (15.64) and 2014 (10.66). The size of the circles reflects the value added that Indonesia contributes to other economies' value chains. See Table 5.1 for the full list of sectors and sector codes.
Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

In the case of downstream participation (Figure 9.11), Indonesia lost RCA in a number of sectors between 2000 and 2014, including agriculture, forestry, paper, chemicals, fabricated metal, and electrical equipment. However, Indonesia developed an RCA in two sectors, nonmetallic minerals and computing. The results indicate that although Indonesia lost competitiveness in terms of its downstream GVC activity in a number of sectors—often primary and low-tech sectors—it gained competitiveness in a small number of other sectors, most notably computing.

Table 9.1 and Figures 9.10 and 9.11 provide insights into the sectoral value chains in which Indonesia maybe be able to move toward. One way of identifying such sectors is to consider in Table 9.1 those sectors

Figure 9.11 Developments in Indonesia's Downstream Revealed Comparative Advantage, 2000 and 2014



RCA = revealed comparative advantage.
Noted: The size of the circles reflects the value added that other economies add to Indonesia's value chains. See Table 5.1 for the full list of sectors and sector codes.
Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

in which Indonesia has recently developed revealed comparative advantage; plus those sectors where the index of revealed comparative advantage increased between 2000 and 2014 and approached 1. Adopting this approach, it can be argued that fabricated metal, electrical equipment, and machinery and equipment are value chains in which Indonesia could potentially develop its upstream involvement (shown in red); while nonmetallic minerals, computing, and furniture are sectoral value chains in which Indonesia could develop its downstream participation (shown in green). In the case of upstream participation, it is also possible to identify the value chains (i.e., the final demand) that are served by the three identified sectors. Considering data for the full WIOD, Table 9.2 reports information on the share of value added of the three

Table 9.2 Value Chains Served by Selected Sectors, 2014 (%)

Sector	Fabricated Metal	Electrical Equipment	Machinery and Equipment
Food manufacture	2.15	1.13	1.22
Textile manufacture	11.71	1.31	1.28
Wood	16.11	13.10	6.95
Paper	1.86	19.82	1.22
Printing	5.19	4.42	30.23
Petroleum	0.41	0.25	0.45
Chemicals	0.31	0.18	0.23
Pharmaceuticals	0.15	0.10	0.11
Rubber	0.17	0.08	0.09
Nonmetallic minerals	0.08	0.04	0.06
Basic metals	0.15	0.09	0.12
Fabricated metal	10.27	0.28	0.33
Computing	1.23	2.39	0.79
Electrical equipment	1.19	19.40	0.80
Machinery and equipment	3.90	2.67	29.49
Motor vehicles	4.51	2.71	3.01
Other transport	1.64	1.39	1.10
Furniture	0.75	0.35	0.31

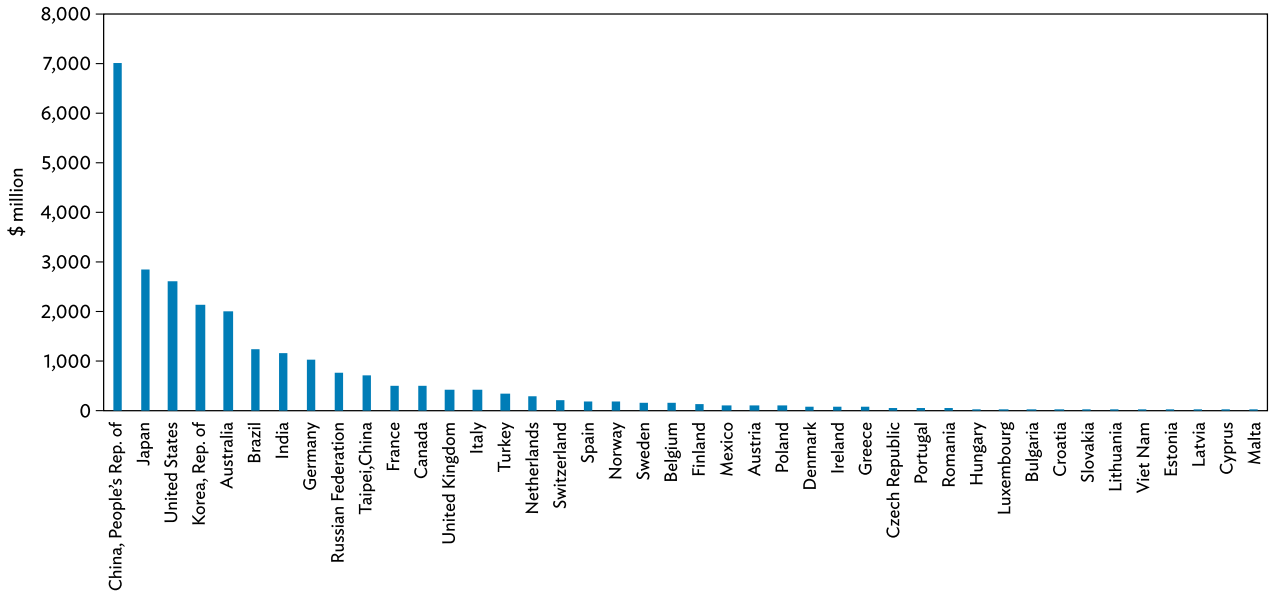
Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

identified upstream sectors that contribute to different manufacturing value chains. The results indicate that these three upstream sectors (fabricated metal, electrical equipment, and machinery and equipment) tend to serve other manufacturing value chains, rather than services or primary value chains, with the share of value added serving manufacturing sectors as a whole being above 60%, and in the case of machinery and equipment above 75%. Relatively large values are reported for the sectors own value chain, meaning that each sector provides a significant amount of value added to its own value chains. In the case of fabricated metal, the sector also provides significant value added to the wood and textile manufacture sectors. Wood and paper are important value chains served by electrical equipment, while printing is an important value chain for machinery and equipment. This analysis helps to identify the potential linkages that are likely to be important when developing upstream GVC participation in sectors, such as these three identified sectors.

9.6 Contributions to Regional Global Value Chains

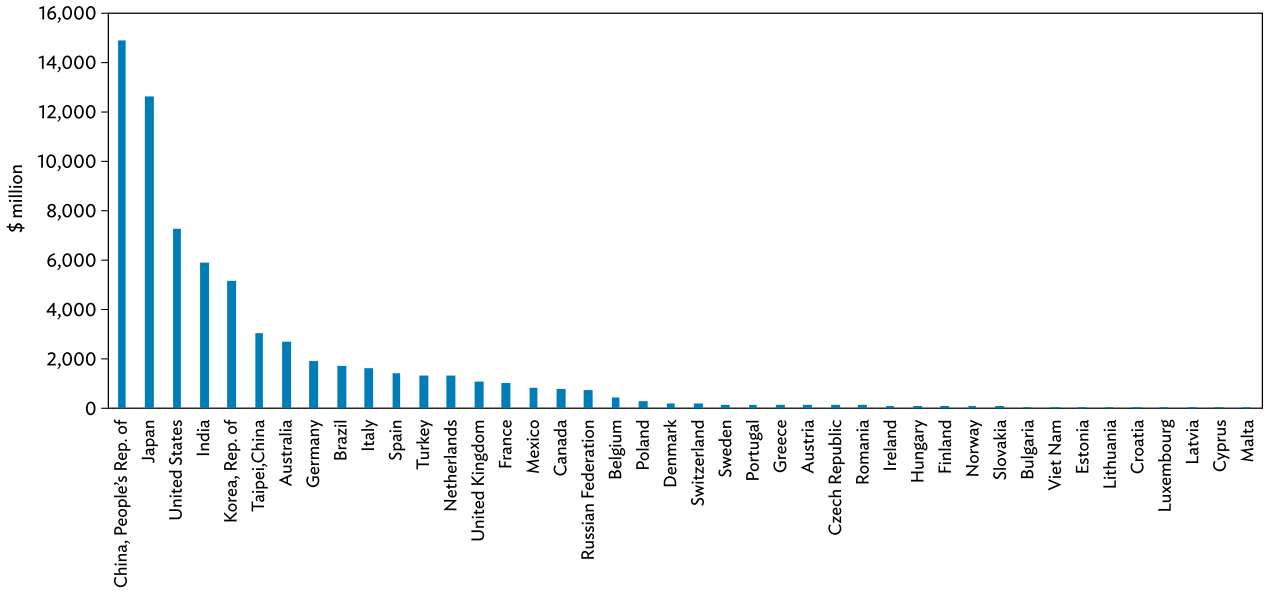
In addition to considering the sectors in which Indonesia engages intensively in GVCs, it is also instructive to consider the regional dimension of Indonesia's GVC participation. As above, this involves two dimensions: (i) the economies to which Indonesia contributes through its GVC activity (upstream participation), and (ii) the economies that contribute to Indonesia's final demand through intermediate deliveries (downstream participation). Figures 9.12 and 9.13 report for 2014 the value added that other economies contribute to Indonesia's final demand (Indonesia's downstream participation) and the value added that Indonesia contributes to other economies' final demand (Indonesia's upstream participation), respectively. Note that in these figures the "rest of the world" is ignored, with the figures concentrating on the other 42 economies included in the WIOD, and thus allowing for a clearer view of the regional dimension to Indonesia's GVC involvement. It should be borne in mind however that in general, the rest of the world—including other Asian economies not included in WIOD—make up a substantial component of the value added that is supplied both to and by Indonesia.

Figure 9.12 Value-Added Contribution to Indonesia's Final Demand by Economy of Origin, 2014



Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

Figure 9.13 Value-Added Contribution of Indonesia to Other Economies' Final Demand by Economy of Origin, 2014



Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

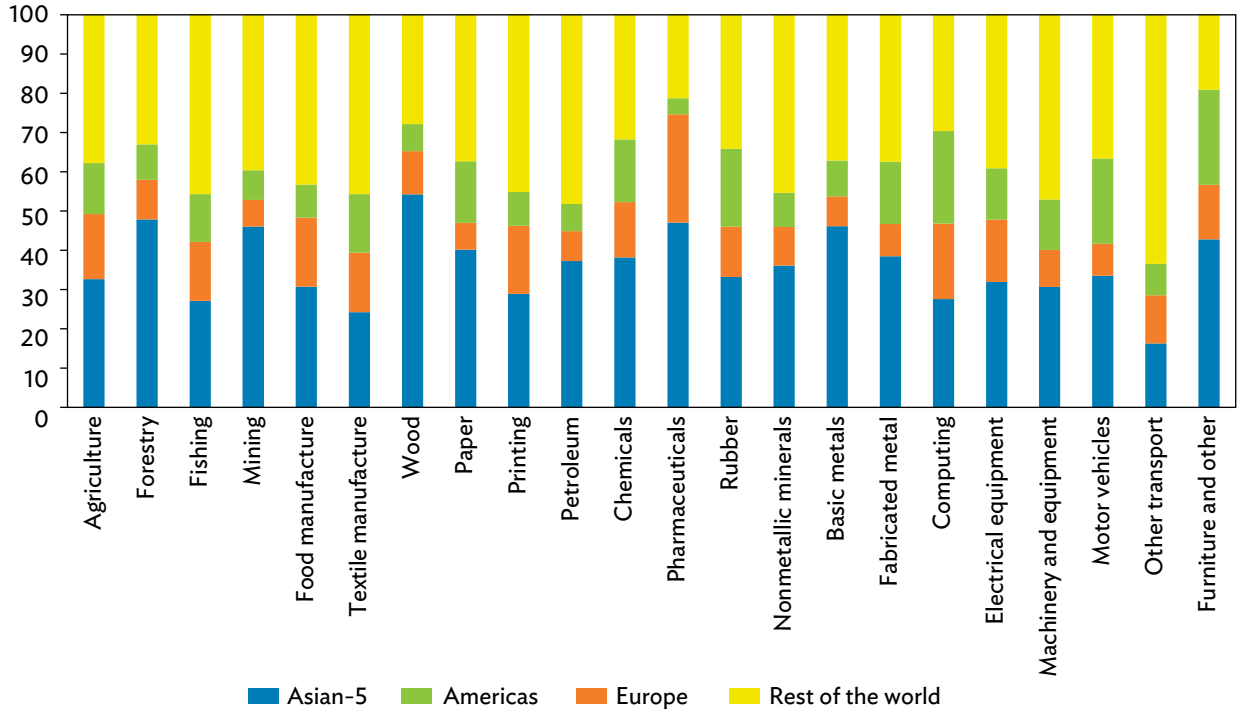
There is a strong regional component in Indonesia's involvement in GVCs, supporting the view that Indonesia is integrated into "Factory Asia." The PRC, in particular, is an important source of intermediate inputs into Indonesia's GVCs and an important destination for Indonesia's intermediate exports.

The results reported in Figure 9.12 are largely in line with expectations and support the following conclusions: (i) larger countries in terms of gross domestic product (e.g., the PRC, Japan, the US, Brazil, etc.) contribute more to Indonesia's final demand through intermediate supplies than smaller countries; and (ii) there is a strong regional component in Indonesia's participation in GVCs. This latter point is reflected in the relatively high values of value added contributed to Indonesia's final demand by economies such as the PRC; Japan; the ROK; India; and Taipei,China; as well as countries such as Australia and to a lesser extent the Russian Federation. An interesting result from Figure 9.12 is the dominant role played by the PRC in supplying intermediates to Indonesia for its final demand—the PRC's contribution is more than double than that of any other economy.

The results when considering Indonesia's upstream participation (Figure 9.13) are similar to those for downstream participation. In particular, the importance of the larger economies and proximity in driving value-chain contributions remain, with the dominance of the other five Asian economies being even more apparent. While the value added sent to the PRC is considerably larger than that received from the PRC, it is noticeable that the PRC is less of an outlier when considered from the upstream perspective. In particular, Indonesia contributes to Japan's final demand to an extent that is not dissimilar to its contribution to the PRC's final demand.

Finally, the analysis considers the regional dimension of sectoral value chains. Figure 9.14 reports by sector the extent to which Indonesia is involved in upstream GVC participation with other economies (i.e., supplying value added to other economies' final output). For ease of presentation the economies have been aggregated into four (regional) groups: (i) Asian-5 (India; Japan; the PRC; the ROK; and

Figure 9.14 Value-Added Contribution of Indonesia to Other Economies' Final Demand by Sector, 2014 (%)



Note: Asian-5 includes India; Japan; the People's Republic of China; the Republic of Korea; and Taipei,China.
Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

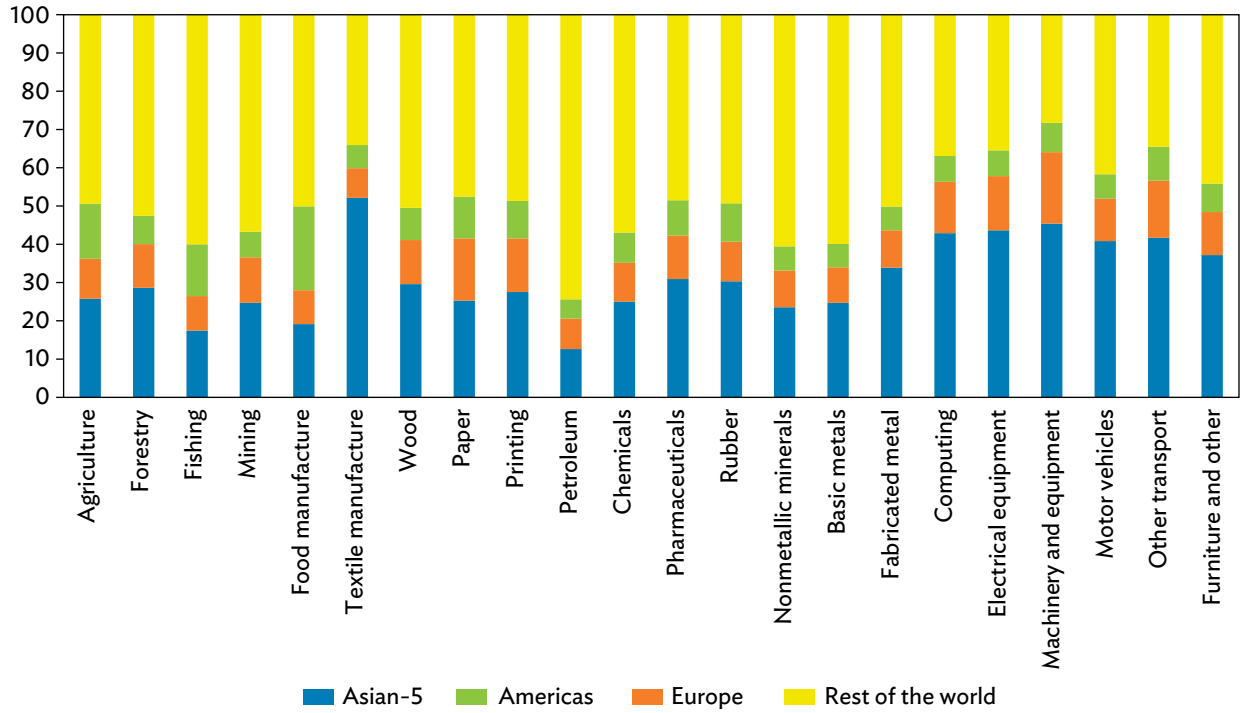
Taipei,China); (ii) Europe; (iii) Americas; and (iv) the rest of the world, which now also includes the rest of the world as reported in the WIOD. As expected, the figure reveals that Indonesia contributes relatively little to final demand in Europe and the Americas in most sectors, with somewhat larger contributions found in agriculture, textiles, pharmaceuticals, computing, and furniture. The contribution to the other Asian-5 economies tends to be relatively large, particularly in wood, forestry, mining, and pharmaceuticals. Indonesia's contribution to the rest of the world is also relatively large in many sectors, most notably in other transport.

Among the economies that contribute to Indonesia's final demand at the sectoral level (Figure 9.15), the rest of the world makes a relatively large contribution across many sectors. Indeed, the shares of the rest of the world often exceed or approach 50% in a majority of sectors, though the share drops somewhat for many of the high-tech sectors (e.g., computing, electrical equipment, machinery and equipment, motor vehicles, and furniture). In these latter sectors, which may be considered the more high-tech sectors, the Asian-5 tend to play a larger role. The Asian-5 also play a significant role in textiles, but otherwise the shares of this group tend to be below 30% and often lower than those reported in Figure 9.14. The role of Europe and the Americas in supplying intermediates for Indonesia's final demand is generally quite small, tending to be around 20% or less. Overall, and with few exceptions, the sectoral results confirm the strong regional dimension to Indonesia's GVC involvement.

9.7 Conclusions

The picture that emerges from this analysis is that Indonesia performs relatively well in terms of upstream GVC participation and relatively poorly in terms of downstream GVC participation. This implies that

Figure 9.15 Value-Added Contribution to Indonesia's Final Demand by Sector, 2014 *(%)*



Note: Asian-5 includes India; Japan; the People's Republic of China; the Republic of Korea; and Taipei,China.
Source: World Input–Output Database. http://www.wiod.org/home (accessed March 2018).

the GVC involvement of Indonesia is to a relatively large extent reliant upon sectors that supply primary products and raw materials, with Indonesia engaged in supplying other economies with the primary products and raw materials necessary for their value chains. A further finding and implication is that Indonesia is heavily involved in a relatively narrow number of value chains, with its participation lacking the levels of diversification observed in other countries. Since the global financial crisis, there have been some signs of improvement in the extent of Indonesia's involvement in GVCs—both in terms of upstream and downstream participation. In terms of upstream participation Indonesia has been able to generate new comparative advantages in some sectors, namely in paper and printing. While the number of sectors in which Indonesia had a comparative advantage in 2000 was limited and the sectors generally low in complexity, it has also been able to develop a comparative advantage in additional sectors, including nonmetallic minerals and computing. At the same time, Indonesia also lost competitiveness in other sectors, some of which are considered to be relatively complex, for example, electrical equipment.

Overall, therefore, the story for Indonesia is somewhat mixed. It has participated strongly in GVCs but often its contribution was limited to a small number of sectors and as a supplier of intermediates to other economies' value chains. Recent developments suggest an increase in GVC involvement. While this remains to a large extent in upstream contributions to other economies' value chains, there has been some movement toward increased downstream involvement in some relatively complex sectors, most notably computing and machinery and equipment. Further exploitation of these comparative advantages can be a way to increase the diversification of Indonesia's involvement in GVCs and to upgrade its value chains, both in terms of the positioning within value chains and the complexity of the value chains that Indonesia participates in. This transition will require a number of factors to come together. For instance, investments to enhance skills will be needed. It will also require rethinking the current incentive policy.

Appendix 9.1

Measuring Global Value Chain Participation

Table A9.1 reports a stylized representation of a multiregion input–output (MRIO) table with G economies and N sectors. In this table Z^{ih} is $N \times N$ matrix of intermediate input flows produced in economy i and used in economy h; Y^{ih} is an $N \times 1$ vector of final products produced in economy i and consumed in economy h; X^i is an $N \times 1$ vector of gross output in economy i; and Va^i is an $N \times 1$ vector of direct value added in economy i. The rows in the MRIO indicate the use of gross output of a particular economy, with the gross output in economy 1 being used by the economy itself either as intermediates or final goods or by other economies, also as either intermediates or final goods. Note therefore that gross exports can be defined as the sum of intermediate and final goods delivered to third economies. The columns of the table provide information on the technology of production by indicating the amounts of intermediates needed for the production of gross output. The difference between the gross output produced in each economy and the sum of domestic and foreign intermediate inputs is the value added generated in each economy.

Table A9.1 Stylized Representation of Multiregion Input–Output Table

Inputs \ Outputs		Intermediate Use				Final Demand				Total Output
		1	2	…	G	1	2	…	G	
Intermediate Inputs	1	Z^{11}	Z^{12}	…	Z^{1g}	Y^{11}	Y^{12}	…	Y^{1g}	X^1
	2	Z^{12}	Z^{22}	…	Z^{2g}	Y^{21}	Y^{22}	…	Y^{2g}	X^2
	⋮	⋮	⋮	⋱	⋮	⋮	⋮	⋱	⋮	⋮
	G	Z^{g1}	Z^{g2}	…	Z^{gg}	Y^{g1}	Y^{g2}	…	Y^{gg}	X^g
Value Added		Va^1	Va^2	…	Va^g					
Total Input		$(X^1)'$	$(X^2)'$	…	$(X^g)'$					

Source: Wang et al. (2017).

Using this table, one can translate the MRIO table for multiple economies and industries into a standard input–output matrix form:

$$X = Z + Y$$

$$X = AX + Y$$

$$(I - A)X = Y \tag{A9.1}$$

$$X = (I - A)^{-1} Y = BY \tag{A9.2}$$

with X, Z, and Y being gross output, intermediate demand, and final demand, respectively, and A being the technological coefficient matrix (i.e., the ratio of intermediate use to gross output). The term $(I - A)^{-1}$ is the well-known Leontief inverse and is denoted by B in what follows. The equation (A9.2) is

the classical Leontief (1936) equation.[153] Thus, for the G economy world:

$$\begin{pmatrix} X^{11} & \cdots & X^{1g} \\ \vdots & \ddots & \vdots \\ X^{n1} & \cdots & X^{gg} \end{pmatrix} = \begin{pmatrix} B^{11} & \cdots & B^{1g} \\ \vdots & \ddots & \vdots \\ B^{n1} & \cdots & B^{gg} \end{pmatrix} \begin{pmatrix} Y^{11} & \cdots & Y^{1g} \\ \vdots & \ddots & \vdots \\ Y^{g1} & \cdots & Y^{gg} \end{pmatrix} \quad \text{(A9.3)}$$

Based upon this framework it is possible to decompose the value added associated with final demand. To do this, begin with a row vector, v, with each element representing the share of value added per unit of output in the economy (i.e., $v^1 = V^1 / X^1$), combining this vector with the Leontief inverse and a vector describing final demand in the economy:[154]

$$\begin{pmatrix} T^{11} & \cdots & T^{1g} \\ \vdots & \ddots & \vdots \\ T^{g1} & \cdots & T^{gg} \end{pmatrix} = \begin{pmatrix} v^{11} & 0 & 0 \\ 0 & \ddots & 0 \\ 0 & 0 & v^{g} \end{pmatrix} \begin{pmatrix} B^{11} & \cdots & B^{1g} \\ \vdots & \ddots & \vdots \\ B^{g1} & \cdots & B^{gg} \end{pmatrix} \begin{pmatrix} Y^{1} & 0 & 0 \\ 0 & \ddots & 0 \\ 0 & 0 & Y^{g} \end{pmatrix} \quad \text{(A9.4)}$$

The matrix T is the key matrix and allows us to decompose value added associated with final demand. The matrix describes how value added contained in the final demand for each economy's goods is generated across economies. The first column of the matrix describes the sources of value added contained in the final demand for economy 1's goods. The first term, T^{11}, denotes the domestic value-added content of final demand for economy 1's goods, while all other terms in the column denote the foreign value-added content of final demand for economy 1's goods (i.e., each term represents the value added for another economy in the final demand for economy 1's goods, with the sum representing total foreign value added generated through final demand for economy 1's goods). The column sum of domestic and foreign value added will equal the total final demand for economy 1's goods. Obviously, the remaining columns do the same, but for the other economies in the MRIO table. Taking the ratio of foreign value added to total final demand for an economy is often used as an indicator of GVC participation, and in particular, a measure of downstream participation in GVCs (i.e., it is an indicator of the importance of foreign value added in the final demand for an economy's goods, thus capturing backward industrial linkages).

In addition to using foreign value added in the production of final goods, economies also provide value added to other economies for the production of their final goods. This can be captured by looking at the rows of the matrix. Consider the first row of the T matrix. The term T^{11} denotes the value added that is supplied from domestic sources for the production of economy 1's final goods. The term T^{12}, however, indicates the value added of economy 1 that is supplied to economy 2 for the production of economy 2's final goods, with the remaining terms capturing similar flows for other economies. Excluding the diagonal terms and adding up across the rows therefore provides information on the economy's value added that is supplied to third economies for the production of their final goods. In this case, the row sum of the matrix adds up to the total value added of the economy of interest. As such, the analysis takes the ratio of the value added of an economy that is supplied to third economies for the production of their final goods to total value added, which can be interpreted as an indicator of upstream participation in GVCs (i.e., it is an indicator of the importance of an economy's value added in the production of other economies' final goods, thus capturing forward industrial linkages).

[153] Leontief (1936).

[154] In some cases, the final demand vector is replaced by the export vector to capture the value added in trade.

Various extensions of this approach exist. One of them replaces the value added to gross output matrix with other relevant matrices. One such approach is to split the sources of value added by replacing, in turn, the value-added matrix with similar matrices for capital and labor compensation (and often further splitting up labor compensation by skill level).[155] A further approach has been to construct the levels of employment generated by final demand—and different sources of final demand—by replacing the value-added matrix with another one including the ratio of employment to gross output.[156]

[155] Timmer et al. (2014).
[156] Los, Timmer, and de Vries (2015).

10 Complexity, Global Value Chain Participation, and Upgrading in Indonesia

10.1 Introduction

This chapter builds on Chapter 9 by considering the complexity of Indonesia's production and export baskets. As defined in Chapter 1, the complexity of exports is a measure of how advanced an economy's production capabilities are, capabilities that are needed to successfully produce and export a product. Using advanced production capabilities (i.e., producing and exporting highly complex products) can raise productivity, because high complexity captures high value.

Consistent with the results reported in Chapter 9, the results in this chapter indicate that the Indonesian manufacturing sector is strongly resource based, which makes the economy a supplier of products of low complexity to global value chains (GVCs). Upgrading Indonesian firms' production capabilities can lead to supplying the global economy with products of higher complexity, which in turn can induce rising levels of labor productivity. Given this argument, what are the implications of this strong resource-based specialization for the possibilities of upgrading? On the one hand, the strong resource-based profile of Indonesian manufacturing upgrades the output of its primary sectors (i.e., agriculture, forestry, fisheries, and mining) that serve the resource-based manufacturing sectors. On the other hand, this specialization also implies that there are strong limits to increasing product complexity, since product complexity in resource-based sectors is much lower than in nonresource-based manufacturing sectors.

The remainder of this chapter is structured as follows. Section 10.2 highlights the resource-based nature of Indonesian manufacturing, reporting indicators of downstream domestic linkages and export specialization patterns. Section 10.3 shows how the resource-based and primary sectors hold back Indonesian complexity. Section 10.4 links these results to indicators of upstream and downstream participation in GVCs by Indonesian firms. This shows that Indonesia provides products of low complexity to GVCs (upstream linkages), but takes in highly complex inputs from foreign producers (downstream linkages). Section 10.5 identifies the complex products that Indonesia exports with revealed comparative advantage, while section 10.6 identifies exports that may potentially upgrade Indonesia's production capabilities. Finally, section 10.7 summarizes the findings. The list of sectors, including sector codes, is provided in Table 5.1.

10.2 The Resource-Based Nature of Indonesia's Manufacturing

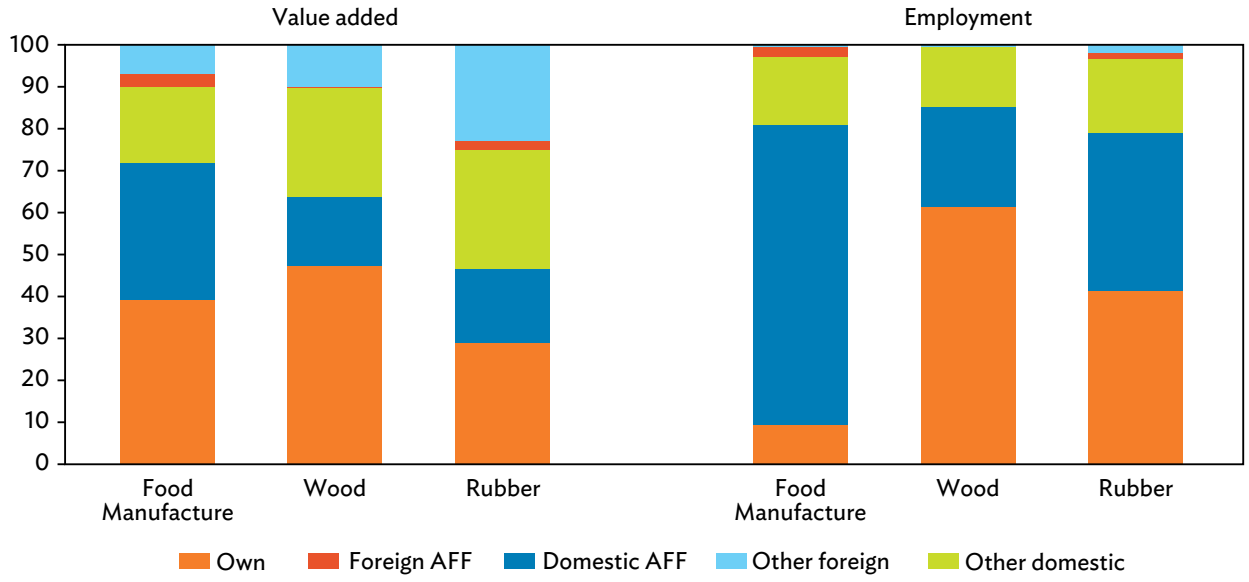
Indonesian manufacturing is strongly resource based, with strong production linkages to domestic-resource sectors (agriculture, forestry, fishing, and mining).

The results in Chapter 9 indicate the importance of the four primary sectors (agriculture, forestry, fishing, and mining) for Indonesia. This is particularly the case for Indonesia's involvement in upstream GVCs. This section shows that the importance of these sectors also has implications for the structure of manufacturing production in Indonesia, with many manufacturing sectors being intensive in the use of inputs from the primary sectors.

The role of the primary sectors in different manufacturing sectors can be identified by using input–output indicators of value chain participation. These highlight the role of certain manufacturing sectors through their domestic downstream links to the primary sectors.[157] Using these indicators it is possible to identify those manufacturing sectors that have strong downstream links with primary sectors, in the sense that the latter contribute a large part of the value added that is needed to serve demand for products from the (resource-based) manufacturing sectors. The primary sectors do this by supplying the raw materials and commodities that the manufacturing sector transforms into products.

Using the input-output methodology, six manufacturing sectors are found to have relatively strong downstream links to the four primary sectors, and are thus defined as resource-based manufacturing sectors. Three of these sectors, food manufacture, wood, and rubber, are found to have relatively strong downstream links to the agriculture , fishing, and forestry primary sectors; while three other manufacturing sectors, petroleum, nonmetallic minerals, and basic metals, have relatively strong downstream links to the mining sector. Figure 10.1 shows the downstream linkages of the manufacturing sectors with relatively strong links to agriculture, forestry, and fishing. Figure 10.2 shows the links between the other three manufacturing sectors and mining. Each bar in these two figures represents either total value added (in the left three columns) or employment (in the right three columns) needed to serve demand in the manufacturing sector of interest, with the different segments of the bars representing the contributions of five distinct sources of value added or employment, namely: (i) the own contribution of the sector (Own); (ii) the domestic primary sector (either Domestic AFF for agriculture, forestry, and fishing, or Domestic M for mining); (iii) other domestic sectors, including manufacturing and other nonmanufacturing (i.e., services) sectors (Other domestic); (iv) the foreign primary sector (either Foreign AFF for agriculture, forestry, and fishing, or Foreign M for mining); and (v) other foreign sectors (Other foreign). A strongly resource-based sector will have a relatively large contribution from the Domestic AFF (Figure 10.1) or Domestic M (Figure 10.2)

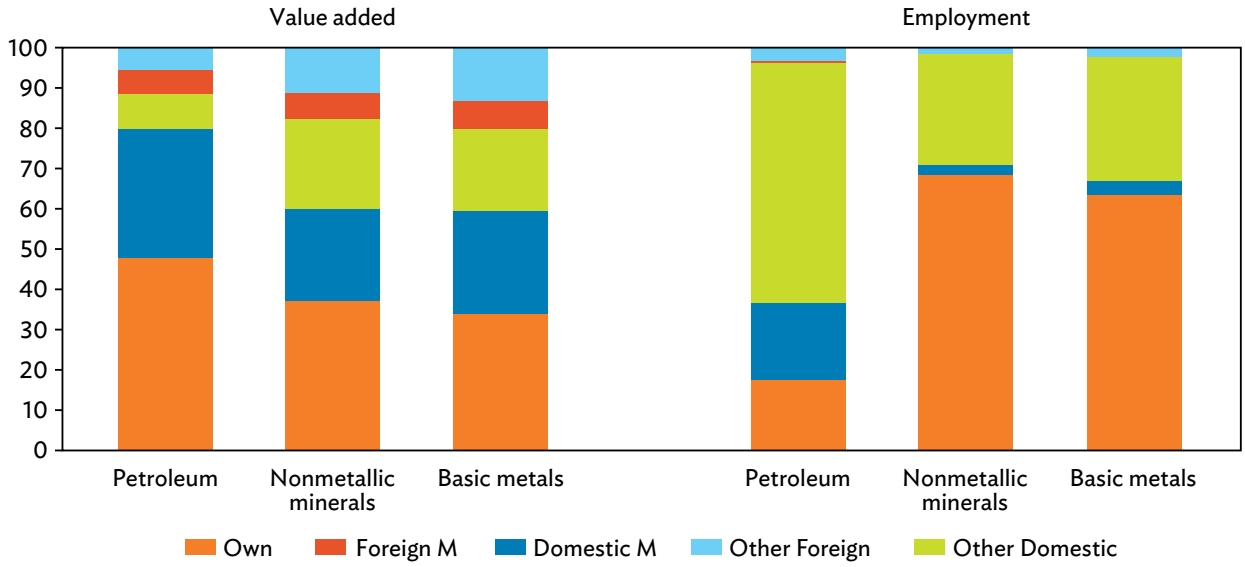
Figure 10.1 Downstream Breakdown of Value Added and Employment in Agriculture and Fisheries-Based Sectors *(%)*



AFF = agriculture, forestry, and fishing.
Source: Authors' estimates based on World Input–Output Database. http://www.wiod.org/home (accessed January 2018).

[157] The concepts of upstream and downstream linkages were explained in Box 9.1.

Figure 10.2 Downstream Breakdown of Value Added and Employment in Mining-Based Sectors (%)



M = mining.
Source: Authors' estimates based on World Input–Output Database. http://www.wiod.org/home (accessed January 2018).

sectors, with the figures reporting significant contributions of these sectors in terms of either value added or employment. In the case of downstream links to the mining sector (Figure 10.2) however, we do observe that in terms of employment (i.e., the right three columns) the reported links to the domestic mining sector are small. This reflects the fact that the mining sector is not very labor intensive, with the relatively large contribution from the petroleum sector reflecting the fact that this sector is also not labor intensive.

An additional necessary characteristic for a manufacturing sector to be classified as resource based is that resource-based products must play an important role in the export specialization of the sector. To capture this dimension, the analysis uses detailed data on exports to provide an intuitive understanding of which resources matter in which manufacturing sectors (for example, the analysis identifies processed products from the fishery sector as an important part of the specialization profile of the Indonesian food products sector). In particular, the analysis uses the same database that was used to measure export product complexity, i.e., a database with 149 economies and more than 5,000 products that can be classified into primary and manufacturing sectors. Table 10.1 reports information on the export specialization of each of the six manufacturing sectors classified as resource based in Figures 10.1 and 10.2. The last column of this table reports the share of Domestic AFF or Domestic M in total value added (VA) or employment (EMP) needed to serve demand for the manufacturing sectors, as reported in Figure 10.1 or 10.2.

Indonesia's export specialization pattern in food manufacture lies in two distinct groups: fish and (other) seafood, and tropical vegetable products such as palm oil, cacao, and coffee. Both product groups have clear linkages to the agriculture and fishing sectors. In wood, Indonesia's export specialization pattern lies in roughly processed tropical woods, and in simple wooden products like doors. Processed tropical woods, in particular, have a clear link to the domestic primary sector. In rubber, Indonesia is specialized in natural rubber products like tires and gloves. It ranks in the top 5% of most specialized economies (i.e., with the highest values of revealed comparative advantage [RCA]) in these three sectors that have links to agriculture, fishing, and forestry.

Petroleum is clearly resource based through its link to crude oil, which is also evident from Indonesia's export specialization pattern in this sector. Indonesian producers are strongly specialized in petroleum

Table 10.1 Resource-Based Manufacturing Subsectors and Export Specialization of Indonesia, 2000–2014

Sector	Indonesian Export Specialization	Downstream Linkages to Resource Sectors (2014)
Food manufacture	Fish and seafood; tropical vegetable products	33% (VA), 72% (EMP)
Wood	Tropical wood roughly processed	17% (VA), 24% (EMP)
Petroleum	Petroleum oils	32% (VA), 19% (EMP)
Rubber	Rubber products (tires, gloves)	18% (VA), 38% (EMP)
Nonmetallic minerals	Stone, ceramics	23% (VA), 3% (EMP)
Basic metals	Aluminium, zinc, tin	25% (VA), 3% (EMP)

EMP = employment, VA = value added.
Source: Authors' estimates based on CEPII's BACI Database. http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=1 (accessed January 2018).

oils (Indonesia is in the top 1% of most specialized economies in the sector). In nonmetallic minerals all internationally traded products are essentially resource based. Indonesia is specialized in stone and ceramics in this sector. In basic metals, Indonesia's specialization pattern lies in metals such as aluminium (linked to bauxite resources), zinc, and tin.

In 2014, the six resource-based sectors shown in Table 10.1 accounted for 59% of manufacturing value added (in 2010 prices) and 56% of manufacturing employment. Such figures lead to the conclusion that the resource-based part of manufacturing plays a large role in Indonesian manufacturing, which makes manufacturing closely linked to the domestic resource sector.

To summarize, the manufacturing sector in Indonesia is strongly resource based, meaning that a subset of manufacturing sectors that intensively use natural resources dominates manufacturing value added and employment. In this way, Indonesia is able to upgrade the complexity of raw materials produced in the primary sector, by adding value to these resources through further processing.

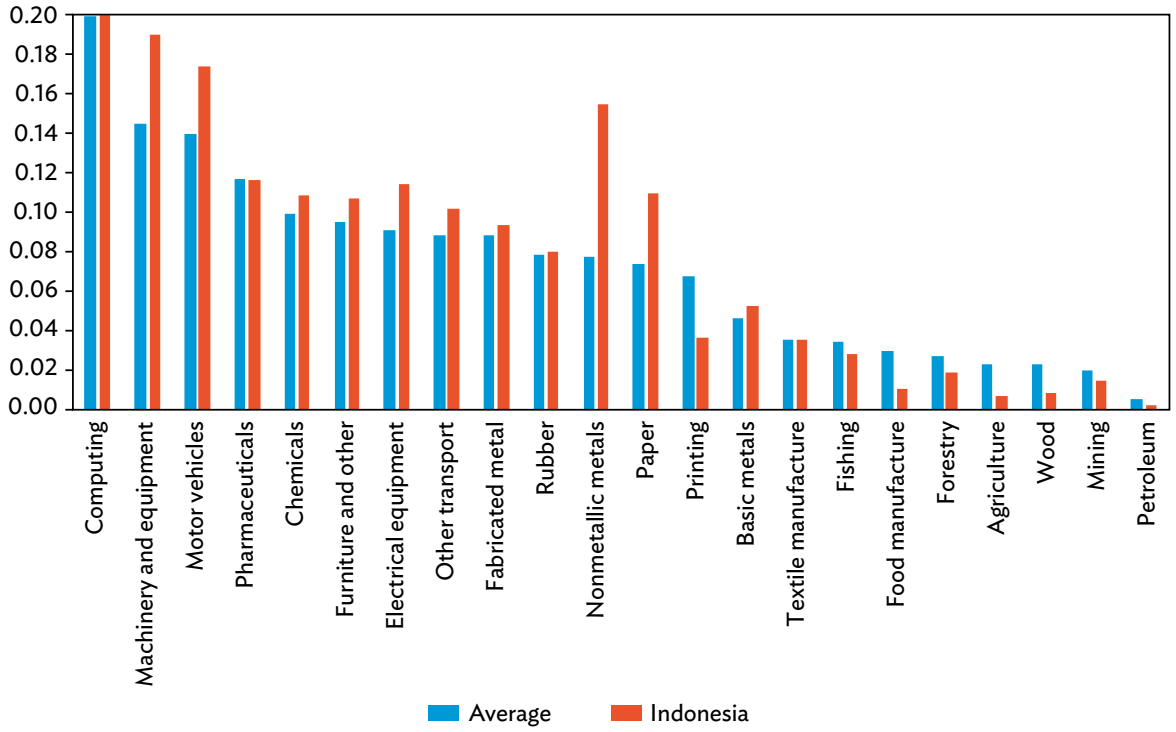
10.3 Product Complexity of Indonesian Exports

The resource-based nature of manufacturing lowers the complexity of Indonesian exports, as compared to the exports of other major Asian economies.

Figure 10.3 shows the average complexity of the products exported by each sector of the Indonesian economy alongside the global average level of complexity across all 149 economies in the dataset. At the global level, the computing sector exports the most complex products, followed by electrical equipment, motor vehicles, and pharmaceuticals. Sectors with low complexity include agriculture, forestry, wood, mining, and petroleum. The resource-based manufacturing sectors (Table 10.1) and the primary resource sectors themselves have a relatively low level of complexity. Exceptions are rubber and nonmetallic minerals.

Compared to global average complexity, Indonesia has a somewhat mixed performance. In some sectors, most notably in two of the three most complex sectors (machinery and equipment and motor vehicles), the complexity levels of Indonesia's exports are high relative to the global average of 149 economies. However, the complexity levels of other sectors are relatively low, one example being food manufacture, which reports low complexity in both absolute and relative terms. Indonesia tends to specialize in sectors with relatively low complexity, which depresses the aggregate level of complexity of Indonesia's exports. Despite the observation

Figure 10.3 Product Complexity of Indonesia's Exports by Sector, 2014



Source: Authors.

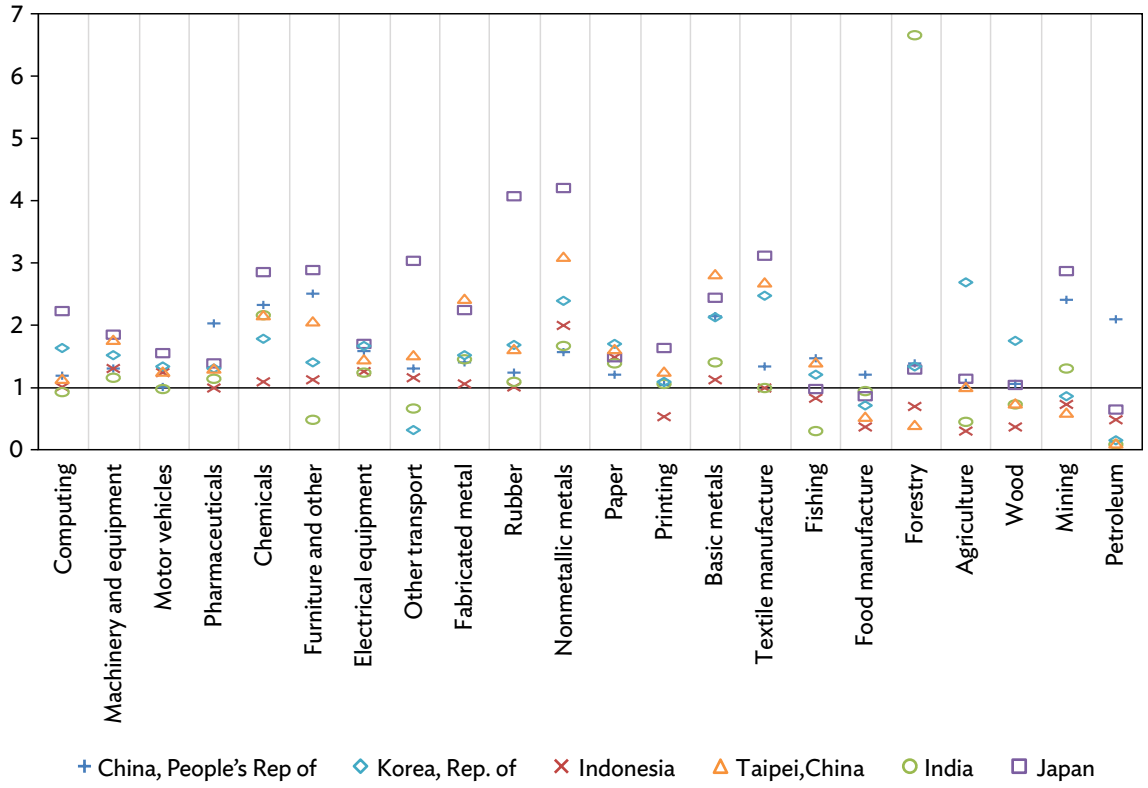
that the level of complexity of most products in food manufacture is low, upgrading is possible, as can be seen with the example of palm oil in Indonesia (discussed at the end of this section).

Figure 10.4 reports the relative level of complexity of Indonesia and of the five comparator economies used in Chapter 9 (i.e., India; the People's Republic of China [PRC]; the Republic of Korea [ROK]; Japan; and Taipei,China). The relative complexity of a sector is defined as the complexity of the economy relative to the global average complexity of the sector, which is reported in Figure 10.3. Confirming the results reported in Figure 10.3, Indonesia performs above global average complexity in 12 out of 22 sectors. Relative to other Asian economies, however, most sectors of the Indonesian economy are not complex. In only two sectors (paper and petroleum) does Indonesia rank in the top three of the six Asian economies considered. In all other sectors, Indonesia ranks below third place, and it ranks last among the six Asian economies in nine sectors.

At the aggregate level, Indonesian export complexity is mostly determined by the specialization pattern, i.e., the fact that Indonesia is mostly specialized in sectors with low complexity depresses the aggregate complexity of its exports. Figure 10.5 provides this aggregate perspective. On the horizontal axis is the level of complexity, while the vertical axis shows the share of total exports of an economy for which complexity is lower than the threshold. Taking Indonesia as an example, a value of 0.1 on the horizontal axis corresponds to a value of 0.81 on the vertical axis, which indicates that 81% of Indonesia's exports have a complexity level of 0.1 or lower. The maximum value of the complexity index is 3.8, but products with such high values contribute only a very modest share of exports in Figure 10.5, which is why the horizontal axis is truncated at 0.6. This cutoff captures 99.9% of Indonesian exports and 94.4% of Japanese exports (the lowest share of all economies).

In a comparative perspective, the curve for Indonesia in Figure 10.5 is the highest of all economies in the figure. This means that a large fraction of Indonesia's total exports is accounted for by product classes

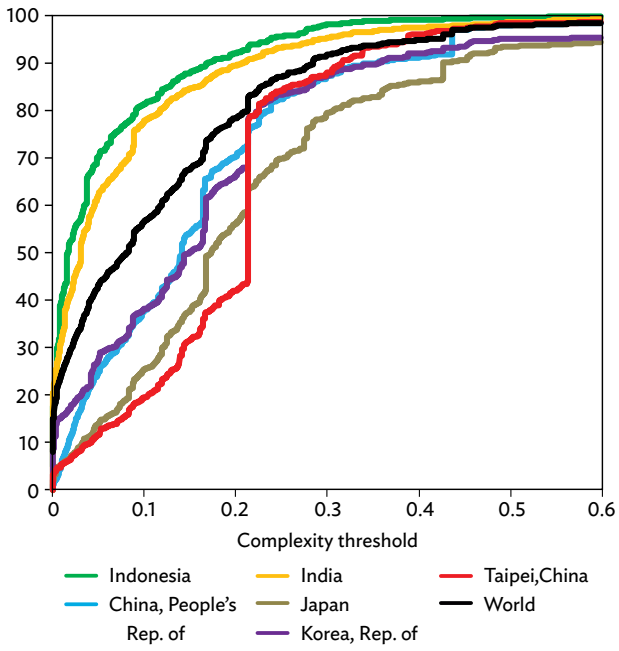
Figure 10.4 Relative Complexity of Exports for Selected Asian Economies, 2014



Note: The global average of relative complexity is equal to 1.
Source: Authors.

with low complexity, compared with the global average (i.e., the black line) and with other Asian economies in the figure. Such results indicate that Indonesia specializes in products of relatively low complexity. Japan and Taipei,China, on the other hand, stand out as the economies with high-complexity products; their curves lie below the global average. These economies have a relatively large share of their exports accounted for by relatively highly complex products. The ROK and the PRC also have curves that are well below the global average (i.e., they have comparatively highly complex exports). The pattern for India is similar to that of Indonesia, i.e., its curve is above the global average, indicating that its exports are of low complexity.

Figure 10.5 Complexity of Indonesian Export Value in Comparative Perspective, 2014 (%)



Source: Authors.

This pattern can be further seen in Table 10.2, which reports the share in total exports of the top 100, 500, and 1,000 most complex products (out of a total of 5,111 products, ordered by complexity), for Indonesia, the world, and other comparator economies. The table reveals that Indonesia's export share of the top 100 most complex products is zero, as compared with a share of exports of 0.38% for the world as a whole, and a share of 1.8% for Japan.[158] The share of Indonesia's exports in the top 500 most complex products is less than 1% (0.58%), compared with nearly 4% for the world as a whole, and around 10% for Japan. This pattern also holds when we consider the top 1000 most complex products, with Indonesia's export share in these products just above 4%, and the share for the world as a whole three times higher, and four times higher for the PRC and the ROK.

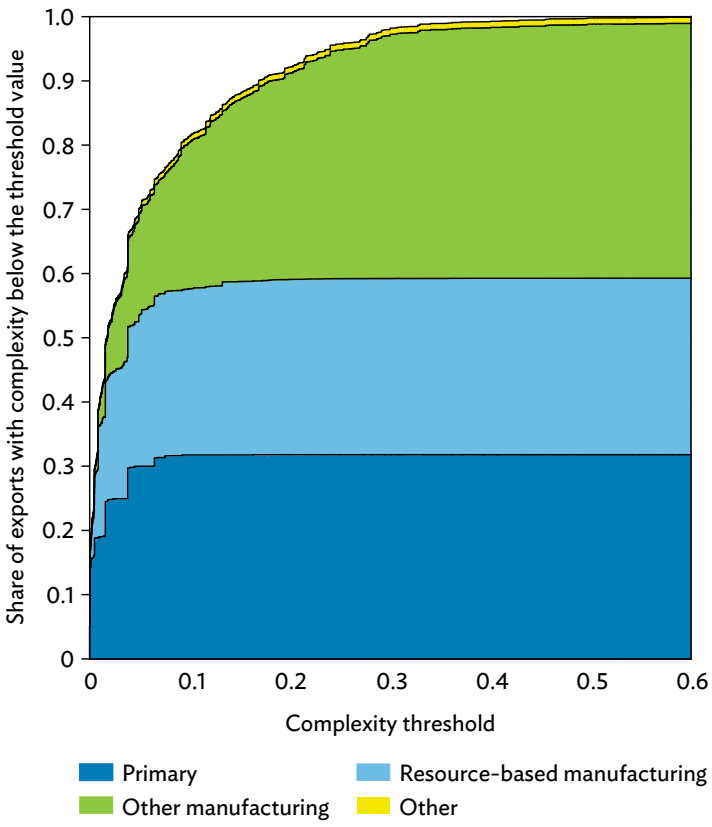
Table 10.2 Shares of Exports of the Most Complex Products, 2014 (% of total value)

	PRC	Indonesia	Japan	Republic of Korea	Taipei,China	India	World
Top 100	0.12	0.00	1.80	0.48	0.46	0.04	0.38
Top 500	8.09	0.58	9.68	6.72	3.19	2.05	3.87
Top 1000	16.01	4.01	28.55	16.02	14.53	6.24	11.77

PRC = People's Republic of China.
Source: Authors' estimates based on CEPII's BACI Database. http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=1 (accessed January 2018).

Figure 10.6 shows how the export complexity of Indonesia is influenced by the resource-based nature of its manufacturing sector. The figure breaks down the results for Indonesia reported in Figure 10.5 into the contribution of four broad sector groups: primary sectors (A and B sectors in Table 5.1), resource-based manufacturing (i.e., the six sectors defined in Table 10.1), other manufacturing (i.e., the remaining nonresource-based manufacturing sectors), and other nonmanufacturing and nonprimary sectors (D–U sectors in Table 5.1). At the aggregate level, the results in Figure 10.6 match those in Figure 10.5, except that each share on the vertical axis is now broken down into the four groups. The share of exports with complexity lower than 0.1 is 81% as before, with Figure 10.6 indicating that of the 81%, about 32 percentage points are due to the primary sectors, 26 percentage points due to resource-based manufacturing, 23 percentage points due to nonresource-based manufacturing, and a meagre 1 percentage point due to other sectors.

Figure 10.6 Complexity of Indonesian Export Value Broken Down by Four Sectoral Groups, 2014



Source: Authors.

[158] Appendix Table A10.1 in Appendix 10.1 provides the list of the 100 most complex products out of the 5,111 products in the database.

The striking feature of Figure 10.6 is that the contributions of the primary and resource-based manufacturing sectors do not grow at all beyond the 0.1 complexity threshold, while the share of the other manufacturing sectors continues to increase. The share of other manufacturing in total exports is 39%, of which 23 percentage points are found at the 0.1 complexity threshold, and 16 percentage points are added beyond this threshold. Clearly, the other manufacturing sectors contribute the most to the movement toward more complex export classes (i.e., a move toward higher complexity values). In other words, the primary and resource-based manufacturing sectors are depressing the complexity value of (aggregate) Indonesian exports.

For reference, we provide in Panel (a) of Table 10.3 the list of Indonesia's top 10 complex exports, the ranking (out of 5,111 products) and the share in the country's total exports. As the table shows, Indonesia's most complex exports are ranked between 200–600 and they represent a tiny fraction of the country's total exports: the largest share is barely 0.05% and, together, they represent 0.2% of total exports. Panel (b) of Table 10.3 shows Indonesia's top 10 exports by value. These products accounted for 38% of Indonesian exports by value in 2014. Panel (c) lists the top 10 exports by RCA (RCA>1 in 2012–2014). The products accounted for 11.74% of Indonesia's exports in 2014. As these two panels show, the complexity levels of Indonesia's top exports (natural resources and primary products) are very low.

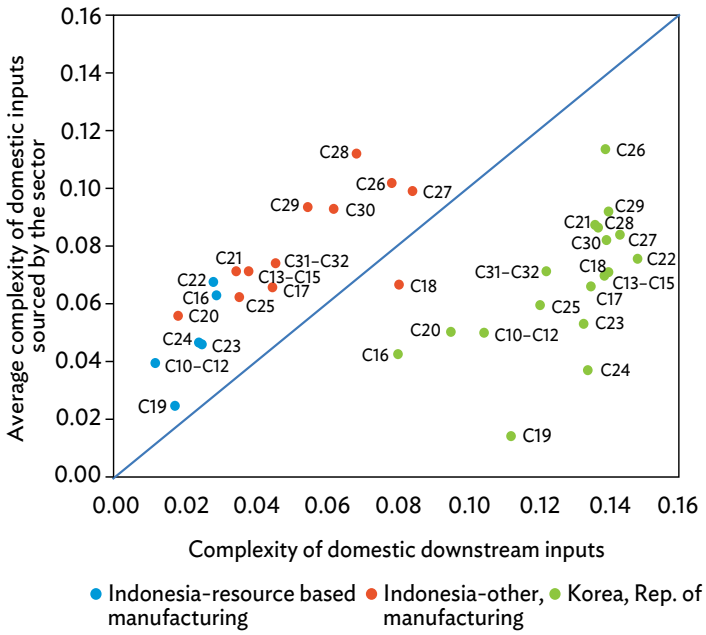
Despite this general result, the case of palm oil production in Indonesia is an example of successful upgrading within resource-based value chains, with production increasing dramatically and moving from a reliance on the production and export of the raw material toward the successful development of downstream milling and processing capabilities (Box 10.1).

10.4 Product Complexity and Global Value Chains

Because of the strong resource-based nature of its manufacturing sector, Indonesia adds low complexity to GVCs and takes in high complexity from abroad into its own value chains.

Indonesia's resource and nonresource-based manufacturing sectors differ in terms of the complexity level of their production and in terms of their domestic and foreign sourcing patterns. These differences between resource-based and other manufacturing sectors have strong implications for how Indonesia is positioned within GVCs. Figure 10.7 considers the downstream side, that is, the contributions of other sectors to the value chains of Indonesian sectors. Dots in this figure correspond to manufacturing sectors, where a distinction is made for Indonesia between resource-based sectors—as defined above—and other

Figure 10.7 Downstream Linkages and Product Complexity, Indonesia and the Republic of Korea, 2014



Note: See Table 5.1 for the full list of sectors and sector codes.
Source: Authors.

Table 10.3 Indonesia's 10 Most Complex Exports, 10 Top Exports by Value, and 10 Top Exports by RCA

Industry	Product Description	Complexity Ranking	Share in Indonesia's Total Exports (%)
(a) Top 10 Indonesian exports by complexity			
Nonmetallic minerals	Other ceramic wares for laboratory, chemical or other technical uses	204	0.05
Paper	Uncoated paper and paperboard, for writing and printing, in rolls or sheets	210	0.00
Furniture	Parts and accessories for pianos	319	0.01
Machinery and equipment	Automatic beverage-vending machines incorporating heating or refrigerating devices	323	0.04
Nonmetallic minerals	Ceramic wares for laboratory, chemical or other technical uses, of porcelain or china	413	0.02
Furniture	Grand pianos	478	0.02
Chemicals	Alcohol peroxides, ether peroxides, ketone peroxides and their halogenated, sulfonated, nitrated or nitrosated derivatives	496	0.00
Paper	Paper and paperboard, coated, bleached, weighing 150 grams per square meter	529	0.01
Chemicals	Acrylic acid and its salts	547	0.03
Furniture	Golf balls	581	0.02
(b) Top 10 Indonesian exports by value 2014			
Food manufacture	Other palm oil and its fractions, whether or not refined, but not chemically modified	4,841	6.29
Mining	Liquefied natural gas	5,098	5.95
Mining	Other coal, whether or not pulverized, but not agglomerated	4,598	5.36
Mining	Petroleum oils and oils obtained from bituminous minerals, crude.	5,111	4.96
Mining	Bituminous coal, whether or not pulverized, but not agglomerated	3,827	4.79
Food manufacture	Crude palm oil and its fractions	4,961	2.57
Mining	Petroleum gases and other gaseous hydrocarbons, natural gas	4,956	2.46
Food production	Technically specified natural rubber	5,079	2.44
Petroleum	Petroleum oils and oils obtained from bituminous minerals, other than crude; preparations not elsewhere specified or included, containing by weight 70% or more of petroleum oils or of oils obtained from bituminous minerals	5,102	1.98
Mining	Lignite, whether or not pulverized, but not agglomerated	3,210	1.28
(c) Top 10 Indonesian exports by RCA (2012–2014)			
Mining	Lignite, whether or not pulverized, but not agglomerated	3,210	1.28
Food production	Mace	4,785	0.02
Food production	Edible products of animal origin, not elsewhere specified or included	2,749	0.11
Food manufacture	Oil cake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of vegetable fats or oils, other than those of heading No. 23.04 or 23.05, of palm nuts or kernels	5,028	0.34
Food manufacture	Other palm kernel or babassu oil and fractions thereof	3,841	0.61
Food production	Nutmeg	3,760	0.05
Food manufacture	Crude palm oil and its fractions not chemically refined	4,961	2.57
Basic metals	Powder gold	5,011	0.25
Food manufacture	Other palm oil and its fractions, whether or not refined, but not chemically modified	4,841	6.29
Food manufacture	Crude palm kernel or babassu oil and fractions thereof	4,909	0.23

RCA = relative comparative advantage.
Source: Authors' estimates based on CEPII's BACI Database. http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=1 (accessed January 2018).

sectors. The vertical axis displays the average complexity of foreign inputs sourced by the sector (i.e., downstream participation in GVCs as defined in Chapter 9), while the horizontal axis displays the average complexity of domestic inputs sourced by the sector (i.e., from other sectors in Indonesia). The figure thus provides a comparison of the complexity of foreign and domestic inputs used in different sectors. Only

Box 10.1 Palm Oil Production in Indonesia—Upgrading with Global Value Chains

Global demand for palm oil has increased rapidly in recent years, driven by increases in the demand for food (i.e., cooking oil and as an ingredient in various processed foods) in response to rising populations, as well as the increased demand for palm oil as a biofuel. As a result, palm oil has become one of the most profitable commercial high-tree crops.

Palm oil production in Indonesia began during the time when Indonesia was a Dutch colony and has developed significantly since the 1960s, such that by 2006 Indonesia was the largest producer (and exporter) of palm oil (see table below). The case of palm oil production in Indonesia is an example of successful upgrading within value chains. From being an exporter of crude palm oil back in the 1960s, Indonesia has become the leading exporter of processed palm oil products. The example of palm oil development in Indonesia further highlights the important contribution that smallholder enterprises can play in a value chain as well as the role of the government in creating the right incentives for production and export.

Indonesian Palm Oil Production and Exports

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Production (million metric tons)	19.2	19.4	21.8	23.5	26.5	30.0	31.5	32.5	32.0
Exports (million metric tons)	15.1	17.1	17.1	17.6	18.2	22.4	21.7	26.4	27.0
Exports ($ billion)	15.6	10.0	16.4	20.2	21.6	20.6	21.1	18.6	18.6

Source: Indonesia-Investment. https://www.indonesia-investments.com/business/commodities/palm-oil/item166?.

A defining feature of the development of the palm oil sector in Indonesia has been the role of smallholders in participating in the palm oil sector, and benefiting—directly and indirectly—from involvement in global value chains. Smallholder palm oil farmers in Indonesia are estimated to own around 42% of the approximately 11,400 hectares under cultivation (in 2015). Smallholder palm oil farming was promoted under the New Order regime in the 1970s through Perkebunan Inti Rakyat/Nucleus Estate Smallholder (PIR/NES) schemes. These state-led schemes helped link smallholders to state-owned plantation companies through outgrower arrangements, with plantation companies helping develop plantations for smallholders as well as providing inputs, technical assistance, and finance. With the state reducing its role in the sector during the 1980s, the private sector filled the gap and developed further the original PIR/NES schemes. The approach that came to dominate—the Kredit Koperasi Primer Anggota (KKPA) scheme—aimed to increase rural entrepreneurship and led to the development of village unit cooperatives.

In addition to government policy promoting smallholder plantations in the palm oil sector, the policy has also played a role in encouraging upgrading within the value chain. Despite demand for palm oil increasing dramatically in the 1990s, the exports of Indonesia were dominated by unprocessed products, with around 60% of Indonesia's palm oil exports comprising unprocessed products. To promote upgrading and the development, production, and export of refined palm oil, the government reduced export taxes on refined palm oil products, with the export tax for crude palm oil ranging between 0% and 22.5%.

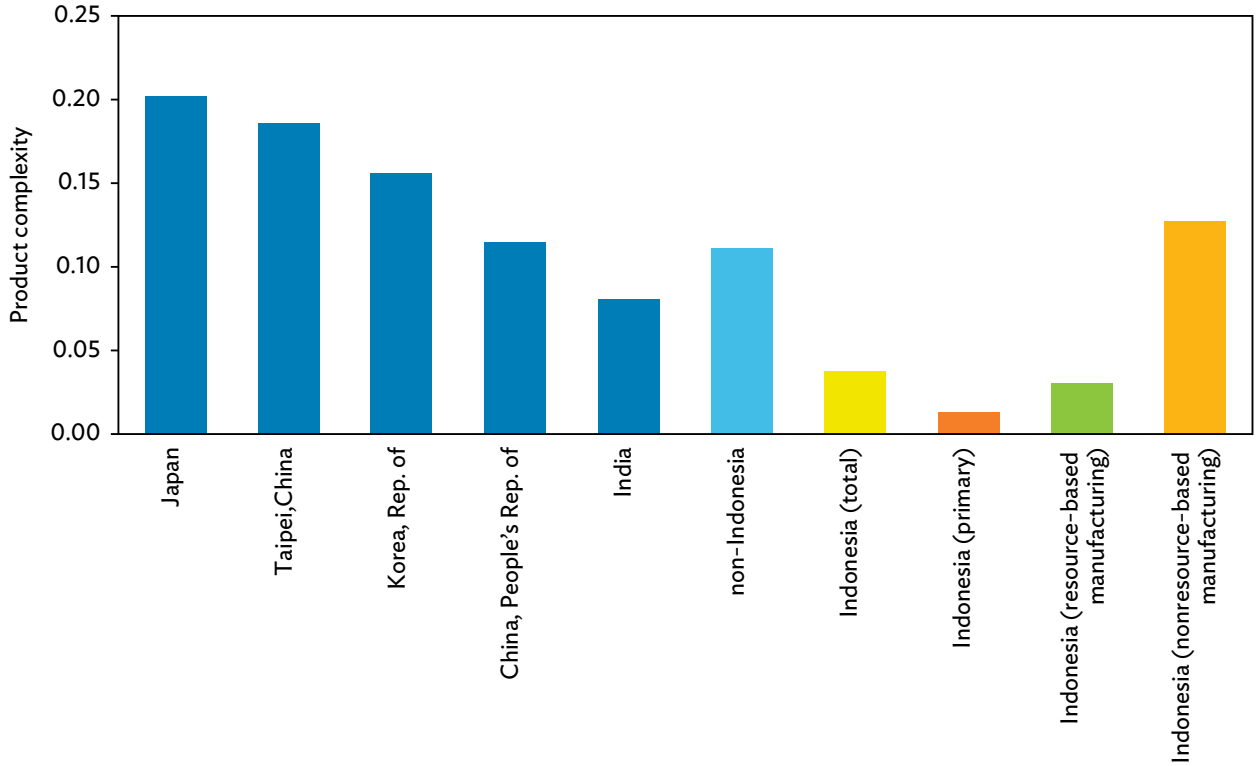
Source: Authors.

intermediate and primary product classes are used when constructing the sectoral complexity measures using the product-level export data, since these are the products that are being sourced from other sectors for production within value chains. Results for the ROK are included in the figure for purposes of comparison.

The diagonal line separates observations with relatively high domestic complexity (to the right) from those with relatively high foreign complexity (to the left). Comparing Indonesia and the ROK reveals a very clear distinction between the two economies: the ROK sources its high-complexity inputs from domestic sources and low-complexity inputs from abroad, while for Indonesia, the situation is reversed (except for printing). Put slightly differently, manufacturing in the ROK tends to outsource less complex products, while Indonesian manufacturing tends to outsource relatively highly complex products. Focusing on Indonesia alone, it can also be observed that the resource-based sectors tend to source less complex products from abroad than the other manufacturing sectors: resource-based manufacturing tends to score lower on the vertical axis. The results indicate that Indonesia's resource-based manufacturing has low capabilities to take in highly complex inputs, leading to a lower capacity for product differentiation.

Figure 10.8 shifts the perspective to consider upstream linkages, by reporting information on the complexity level of Indonesian exports (and other economies' exports for comparison) provided to foreign value chains, i.e., the intermediate supplies of Indonesia to other economies' value chains. The figure shows the average value of intermediate and primary inputs provided by Indonesia and other selected Asian economies to foreign value chains, as well as the global average for economies other than Indonesia. For Indonesia, the figure further splits the total contribution into primary sectors, resource-based manufacturing sectors, and nonresource-based manufacturing sectors.

Figure 10.8 Upstream Linkages and Product Complexity, Indonesia and Selected Asian Economies, 2014



Source: Authors.

The most striking result in Figure 10.8 is that Indonesia is clearly a provider of low-complexity inputs to GVCs. Complexity of economies other than Indonesia is almost three times as high as the complexity provided by Indonesia. The five Asian comparator economies provide higher complexity than Indonesia, with Japan ranking highest (more than five times Indonesia's complexity level) and India ranking lowest (but still twice Indonesia's level). Breaking down Indonesia's complexity into the three sectoral groups, it can be seen that the primary sectors provide the lowest level of complexity, followed by resource-based manufacturing, with other manufacturing reporting the highest complexity contribution. Complexity in nonresource-based manufacturing is slightly higher than the level reported for non-Indonesian economies, but complexity in the other two sector groups is well below the average of the rest of the world. The results suggest that resource-based manufacturing adds complexity to the raw resources provided by Indonesia's primary sectors, but it is still far below the level of complexity provided by nonresource-based manufacturing.

10.5 Pockets of High-Complexity Exports

Despite the strong dependence of Indonesian exports on low-complexity products, Indonesia exports with revealed comparative advantage some products with relatively high complexity.

While the results presented above indicate that Indonesia has a strong reliance on the production and export of low-complexity products, particularly those associated with resource-based manufacturing, the evidence from the trade data also indicate that there are products in which Indonesia has a sustained comparative advantage and which are relatively highly complex. In what follows these products are defined as those which are above average complexity and which Indonesia exports with comparative advantage over a sustained period of time. The positioning of these products provides a useful indication of where a targeted policy of upgrading in Indonesian manufacturing could start.

The analysis focuses on the period 2012–2014, which is the most recent period for which data are available, and only considers products in which Indonesia has a comparative advantage in all three of these years. There are 712 such products, out of a total of 5,111 in the database. Of the 712 products with sustained Indonesian comparative advantage, 59 have a complexity level above the average of all products. These 59 products are reported in Table 10.4.

In line with the results in the previous section, an overwhelming majority (90%) of the 59 high-complexity products are found in the nonresource-based sectors. As far as the resource-based sectors are concerned, three (out of six) products in Table 10.4 are in the nonmetallic minerals sector, which includes ceramics and glassware products.

Outside of the group of resource-based sectors, chemicals has the greatest number of relatively complex products (15). These products tend to be specific chemical compounds, mostly alcohols and acrylic acids, as well as artificial fibers (viscose rayon), which are related to product classes in textiles.

The sector with the next largest number of complex products in Table 10.4 is computing. This sector includes a fairly wide range of products, from electronic components (resistors, capacitors) to contact lenses, hearing aids, and sound and video equipment. Furniture also has a relatively large number of complex products, with most of these products relating to musical instruments, especially pianos and keyboards. We will return to this table in Chapter 14, in the context of the discussion of the role of the government supporting them.

Table 10.4 Products with Above-Average Complexity in Which Indonesia has a Sustained Comparative Advantage

HS Code	Description	Complexity Ranking
Resource-based sectors		
Rubber (C22)		
401029	Other transmission belts or belting	1,328
590610	Adhesive tape of a width not exceeding 20 centimeters	849
Nonmetallic minerals (C23)		
690911	Ceramic wares for laboratory, chemical or other technical uses, of porcelain or china	414
690919	Other ceramic wares for laboratory, chemical or other technical uses	205
701332	Glassware of a kind used for table (other than drinking glasses) or kitchen purposes	1,144
Basic metals (C24)		
710610	Silver (including silver plated with gold or platinum), powder	1,186
Nonresource-based sectors		
Textiles (C13)		
540341	Artificial filament yarn, multiple (folded) or cabled, of viscose rayon	1,089
551611	Woven fabrics of artificial staple fibers, containing 85% or more by weight of artificial staple fibers	1,413
Paper (C17)		
480230	Uncoated paper and paperboard, for writing and printing, in rolls or sheets	211
480920	Self-copy paper, in rolls or sheets	679
481029	Other paper and paperboard, coated, used for writing and printing	1,363
481032	Paper and paperboard, coated, bleached, weighing 150 grams per square meter	530
481620	Self-copy paper, whether or not put up in boxes	756
Chemicals (C20)		
290517	Dodecan-1-ol (lauryl alcohol), hexadecan-1-ol (cetyl alcohol) and octadecan-1-ol (stearyl alcohol)	1,168
290544	D-glucitol (sorbitol)	1,099
290950	Ether-phenols, ether-alcohol-phenols and their halogenated, sulphonated, nitrated or nitrosated derivatives	1,390
290960	Alcohol peroxides, ether peroxides, ketone peroxides and their halogenated, sulphonated, nitrated or nitrosated derivatives	497
291590	Other saturated acyclic monocarboxylic acids and their anhydrides, halides, peroxides and peroxyacids	887
291611	Acrylic acid and its salts	548
291612	Esters of acrylic acid	949
291619	Other unsaturated acyclic monocarboxylic acids, their anhydrides, halides, peroxides, peroxyacids and their derivatives	686
292700	Diazo-, azo- or azoxy-compounds	882
320420	Synthetic organic products of a kind used as fluorescent brightening agents	844
340490	Other artificial waxes and prepared waxes	1,321
382370	Industrial fatty alcohols	1,315
382460	Other sorbitol	1,320
540310	High tenacity yarn of viscose rayon	997
550410	Artificial staple fibers of viscose rayon	953
Pharmaceuticals (C24)		
292241	Lysine and its esters, salts thereof	1,222

(continued on next page)

Table 10.4 continued

HS Code	Description	Complexity Ranking
294000	Sugars, chemically pure, other than sucrose, lactose, maltose, glucose and fructose; sugar ethers and sugar esters, and their salts	1,474
Fabricated metal (C25)		
840420	Condensers for steam or other vapor power units	1,240
Computing (C26)		
847160	Input or output units for automatic data processing machines	1,146
851821	Single loudspeakers, mounted in their enclosures	1,070
851939	Other turntables (record decks)	1,333
852190	Other video recording or reproducing apparatus	894
853222	Aluminium electrolytic fixed capacitors	985
853223	Ceramic dielectric, single layer fixed capacitors	1,452
853390	Parts for electrical resistors (including rheostats and potentiometers), other than heating resistors	1,132
900130	Contact lenses	762
900669	Other photographic flashlight apparatus and flashbulbs	1,383
900699	Parts and accessories for photographic (other than cinematographic) cameras; photographic flashlight apparatus and flashbulbs other than discharge lamps	1,125
902140	Hearing aids, excluding parts and accessories	1,298
910700	Time switches with clock or watch movement or with synchronous motor	1,376
Electrical equipment (C27)		
630110	Electric blankets	1,302
842381	Weighing machinery (excluding balances of a sensitivity of 5 centigrams or better) having a maximum weighing capacity not exceeding 30 kilograms	1,137
847621	Automatic beverage-vending machines incorporating heating or refrigerating devices	324
851640	Electric smoothing irons	990
870911	Electrical works trucks, self-propelled, not fitted with lifting or handling equipment	1,278
Machinery and equipment (C28)		
850730	Nickel-cadmium electric accumulators, including separators thereof	655
Other transport (C30)		
871419	Other parts of motorcycles (including mopeds)	1,233
Furniture and other (C31–C32)		
920110	Upright pianos	638
920120	Grand pianos	479
920710	Keyboard instruments, other than accordions	747
920991	Parts and accessories for pianos	320
920994	Parts and accessories for electrically amplified musical instruments	1,303
920999	Other parts and accessories of musical instruments; metronomes, tuning forks and pitch pipes of all kinds	1,079
950390	Other toys; reduced-size (scale) models and similar recreational models, working or not; puzzles of all kinds	1,307
950632	Golf balls	582
950710	Fishing rods	1,024

Notes: Nomenclature des Activités Économiques dans la Communauté Européenne (NACE) codes are enclosed in parentheses. http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NACE_REV2&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=HIERARCHIC. HS is the Harmonized Commodity Description and Coding System.
Source: Authors.

10.6 Indonesia's Potential Exports

There are relatively complex products which Indonesia could naturally diversify into given its current comparative advantages.

The chemical and electronic sectors, among others, have been identified as policy targets in the Indonesian government's plans for Industry 4.0 (see section 7.4). To implement these plans, the Indonesian economy needs to diversify further within these sectors. One way of assessing the potential for such diversification is to identify the highly complex export product classes that share production capabilities with the product classes that Indonesia is already specialized in (i.e., those with significant revealed comparative advantage, as shown in Table 10.4). The analysis in this section concludes by identifying products that are logical targets for Indonesian diversification into high-complexity products.

The full database of 149 economies and 5,111 products contains 1,474 products with complexity above the average of all products. Because particular combinations of products share similar underlying production capabilities, the specialization patterns of economies in these products will be correlated. In other words, if products X and Y share production capabilities, then economies that (do not) specialize in X, will also naturally tend to (not) specialize in Y. Such correlations can be quantified through the notion of conditional probability (Box 10.2). The argument that underlies the analysis is that an economy that specializes in X but not in Y can then consider product Y as a logical target for diversification, because Y is a "related variety" product to X. Box 10.2 describes the procedure that yields a list of products that are logical targets for Indonesian manufacturers, based on the concept of related variety and the set of complex products where Indonesia already has a comparative advantage, as identified in Table 10.4.

The procedure discussed in Box 10.2 yields 69 products, reported in Table 10.5. These are logical candidates for the Indonesian manufacturing sector to diversify into from its current specialization pattern,

Box 10.2 Conditional Probabilities and Potential Exports of Indonesia

The conditional probability of specializing in product X given a specialization in product Y is the probability that an economy was specialized in product X in the years 2012–2014 (i.e., it exported product X with revealed comparative advantage in 2012–2014), given that it was also specialized in product Y. This conditional probability is calculated as the number of economies that are specialized in both X and Y divided by the number of economies that specialized in Y. In other words, it is the share of economies specializing in product Y that are also specialized in product X. If the conditional probability of specializing in X given Y is (much) larger than the unconditional probability of specializing in X (that is, the share of all 149 economies that are specialized in X), then the two products are likely to share production capabilities.

This idea can be applied to determine the products that Indonesia could potentially export given its current export specialization pattern. This is done by calculating the conditional probabilities of the 1,474 products with above-average complexity, conditional on each of the 59 products in Table 10.4 (i.e., highly complex products that Indonesia exports with revealed comparative advantage). In other words, a search is conducted among the list of 1,474 high-complexity products to identify through the concept of conditional probability those that are related to the 59 highly complex products that Indonesia currently exports with revealed comparative advantage.

To arrive at a list of related products, it is first necessary to impose a threshold on the conditional probability to identify whether two products are related (i.e., that they share strong production capabilities) or not. The analysis

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Box 10.2 Conditional Probabilities and Potential Exports of Indonesia *(continued)*

applies two conditions or thresholds. The first one is that the conditional probability that Indonesia specializes (i.e., exports with revealed comparative advantage) in product X given that it specializes in product Y must be at least 0.3 higher than the unconditional probability of specializing in X (this is the share of all economies that specialize in X). In addition to this threshold, a second condition is imposed. This is that, at least 24 of the 59 products in Table 10.4 must reach the 0.3 threshold. In the case of food manufacture and textiles (sectors added because they are in Industry 4.0), the 0.3 threshold set above needs to be reached by at least 10 of the 59 products in Table 10.3. This weaker condition is applied to these two sectors because none of their products meet the stronger condition (of 24 out of 59 products). This indicates that the production capabilities of these sectors are less well suited to be redeployed for the production of above-average complexity products. While this procedure is somewhat arbitrary, it is useful in identifying a small set of relatively complex products that are related to Indonesia's current specialization pattern, and which Indonesia could potentially move into. Applying less stringent conditions/thresholds would increase the list of such products.

Source: Authors.

i.e., they are Indonesia's related varieties. Considering the set of related products for the individual sectors, some general comments can be made. There are four food manufacture products.[159] In textiles, there are many (intermediate) products made of artificial fibers. In chemicals, there are many specialized chemical compounds, but also polymers. In computing, there are electronic parts and automated machines. In addition to providing information on specific products that Indonesia can move into relatively easily given its current capabilities, Table 10.5 can also be used as a tool to discuss general recommendations, both in terms of the areas or segments within each sector to develop (e.g., artificial fibers in textiles), and in terms of the types of policies and support that will enable Indonesia to develop the production capabilities needed to move into these segments. We will return to this table in Chapter 14, in the context of the discussion of the role of the government supporting them.

Finally, it is worth recalling the discussion of tax holidays in Table 7.2. It is possible to classify the sectors/products granted the status of pioneer according to their complexity. This should also be of great help to the Indonesian authorities when deciding whether or not to include a product in this list (in general associated to high-technology products). Table 10.6 shows the complexity ranking of the sectors considered in this report (as in Table 5.1), and then matches in the last column the eligible sectors/products for tax holiday shown in Table 7.2. The average complexity of a sector is the unweighted mean of all products in the sector and it is standardized with a mean of zero. This means that sectors with negative complexity values are below the overall mean of the 5,111 products, while sectors with positive values are those with complexity above the overall mean.

This matching is certainly no exempt of caveats due to the significant level of aggregation. In principle, it would be possible to make a more detailed concordance between eligible products for tax holiday and complexity, but this would require more knowledge of the specific products. This means that Table 10.6 should be used carefully. It is shown for reference to indicate that it is possible to provide a strong rationale to the sectors/products selected to be included in the list of eligible sectors/products for tax holiday.

[159] The procedure actually indicates that there are five other feasible food products: (i) meat of swine, fresh or chilled hams, shoulders, and cuts thereof, with bone (HS code 20312); (ii) meat of swine bellies (streaky) and cuts thereof (HS code 21012); (iii) edible offal of swine, frozen: other (HS code 20649); (iv) meat of swine, fresh or chilled: other (HS code 20319); and (v) edible offal of swine, fresh or chilled (HS code 20630).

Table 10.5 Products with Above-Average Complexity into Which Indonesia Can Naturally Diversify from Its Current Specialization Pattern

HS Code	Description	Complexity Ranking
Food manufacture (C10–C12)		
350510	Dextrins and other modified starches	951
20726	Meat and edible offal, of turkeys: cuts and offal, fresh or chilled	725
110900	Wheat gluten, whether or not dried	1,271
350219	Egg albumin: other	1,274
Textiles (C13–C15)		
560313	Nonwovens, whether or not impregnated, coated, covered or laminated, of man-made filaments	1,370
560130	Wadding of textile materials and articles thereof: textile flock and dust and mill neps	373
590320	Textile fabrics impregnated, coated, covered or laminated with polyurethane	958
580125	Woven pile fabrics and chenille fabrics, of cotton: warp pile fabrics, cut	834
590110	Textile fabrics coated with gum or amylaceous substances, of a kind used for the outer covers of books or the like	1,265
551632	Woven fabrics of artificial staple fibers, containing less than 85% by weight of artificial staple fibers, mixed mainly or solely with wool or fine animal hair	1,160
520635	Cotton yarn (other than sewing thread), containing less than 85% by weight of cotton, multiple (folded) or cabled yarn, of uncombed fibers	830
550610	Synthetic staple fibers, carded, combed or otherwise processed for spinning, of nylon or other polyamides	1,293
560420	Rubber thread and cord, textile covered, high tenacity yarn of polyesters, of nylon or other polyamides or of viscose rayon, impregnated or coated	897
701952	Glass fibers (including glass wool) and articles thereof (e.g., yarn, woven fabrics): other woven fabrics	899
540341	Artificial filament yarn (other than sewing thread), of viscose rayon	1,089
570320	Carpets and other textile floor coverings, tufted, whether or not made up, of nylon or other polyamides	1,417
640330	Footwear made on a base or platform of wood, not having an inner sole or a protective metal toe cap	580
580123	Woven pile fabrics and chenille fabrics, of cotton: other weft pile fabrics	1,343
Chemicals (C20)		
281210	Chlorides and chlorid	253
290711	Phenol (hydroxybenzene) and its salts	954
291100	Acetals and hemiacetals, whether or not with other oxygen function, and their halogenated, sulphonated, nitrated or nitrosated derivatives.	1,259
291419	Other acyclic ketones without other oxygen function	979
320419	Other synthetic organic coloring matter and preparations based thereon	612
321511	Black printing ink, writing or drawing ink and other inks	547
381210	Prepared rubber accelerators	742
390390	Other polymers of styrene, in primary forms	1,412
390690	Other acrylic polymers in primary forms	720

(continued on next page)

Table 10.5 continued

HS Code	Description	Complexity Ranking
Rubber (C22)		
392069	Plates, sheets, film, foil and strip, of other polyesters	1,277
400520	Compounded rubber, unvulcanized, in primary forms or in plates, sheets or strip, solutions, dispersions	1,437
400920	Tubes, pipes and hoses, of vulcanized rubber other than hard rubber, reinforced or otherwise combined only with metal, without fittings	1,129
Nonmetallic minerals (C23)		
690310	Other refractory ceramic goods, other than those of siliceous fossil meals or of similar siliceous earths, containing by weight more than 50 % of graphite or other carbon	528
700239	Glass in tubes, unworked	950
Basic metals (C24)		
721935	Flat-rolled products of stainless steel, of a width of 600 millimeters or more, not further worked than cold rolled	1,426
722691	Flat-rolled products of other alloy steel, of a width of less than 600 millimeters, not further worked than hot rolled	1,049
730451	Tubes, pipes and hollow profiles, seamless, of other alloy steel, cold drawn or cold rolled	1,156
731815	Other screws and bolts, whether or not with their nuts or washers	800
Fabricated metal (C25)		
741991	Other articles of copper, cast, molded, stamped or forged, but not further worked	892
750810	Cloth, grill and netting, of nickel wire	564
821195	Knives with cutting blades, serrated or not (including pruning knives), handles of base metal	1,392
840211	Watertube boilers with a steam production exceeding 45 tons per hour	1,432
Computing (C26)		
847290	Other office machines (e.g., hectograph or stencil duplicating machines, addressing machines, automatic banknote dispensers, coin-sorting machines, coin-counting or wrapping machines, pencil-sharpening machines)	428
852032	Other digital audio magnetic tape recorders incorporating sound reproducing apparatus	1,377
852540	Still image video cameras and other video camera recorders	862
852691	Radio navigational aid apparatus	1,068
853290	Parts of electrical capacitors, fixed, variable or adjustable (preset)	962
900652	Other cameras, for roll film of a width less than 35 millimeters	1,434
900661	Discharge lamp (electronic) flashlight apparatus	801
901710	Drafting tables and machines, whether or not automatic	1,128
901790	Parts and accessories for drawing, marking out or mathematical calculating instruments	848
903289	Other automatic regulating or controlling instruments and apparatus	1,261
910610	Time registers; time recorders	1,203
Machinery (C27)		
851290	Parts for electrical lighting or signaling equipment, windscreen wipers, defrosters and demisters, of a kind used for cycles or motor vehicles	1,385
853932	Mercury or sodium vapor lamps; metal halide lamps	1,087
Electrical equipment (C28)		
840610	Turbines for marine propulsion	458
841391	Parts of pumps for liquids, whether or not fitted with a measuring device	860

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Table 10.5 continued

HS Code	Description	Complexity Ranking
841960	Machinery for liquefying air or other gases	854
841989	Other machinery, plant or laboratory equipment, whether or not electrically heated, for the treatment of materials by a process involving a change of temperature such as heating, cooking, roasting, distilling, rectifying, sterilizing	1,178
842489	Other mechanical appliances for projecting, dispersing or spraying liquids or powders; fire extinguishers, whether or not charged; spray guns and similar appliances; steam or sand blasting machines and similar	1,406
844321	Reel fed letterpress printing machinery, excluding flexographic printing	657
844359	Other printing machinery, including inkjet printing machines, machines for uses ancillary to printing	1,012
844530	Textile doubling or twisting machines	966
845951	Milling machines, knee type, numerically controlled	925
846799	Parts of tools for working in the hand, pneumatic, hydraulic or with self-contained nonelectric motor	1,158
847990	Parts of machines and mechanical appliances having individual functions, not specified or included elsewhere	1,310
848390	Parts of transmission shafts and cranks; bearing housings and plain shaft bearings; gears and gearings; ball or roller screws; gear boxes and other speed changers, including torque converters	1,204
848420	Mechanical seals	903
851430	Other industrial or laboratory electric (including induction or dielectric) furnaces and ovens	1,435
Other transport (C30)		
871494	Brakes, including coaster braking hubs and hub brakes, and parts thereof, for motorcycles, cycles, etc.	1,273
Furniture and other (C31–C32)		
961220	Ink pads	1,206

Notes: Nomenclature des Activités Économiques dans la Communauté Européenne (NACE) codes are enclosed in parentheses. http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NACE_REV2&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=HIERARCHIC. HS is the Harmonized Commodity Description and Coding System.
Source: Authors.

Table 10.6 Complexity of Indonesia's Pioneer Sectors/Products Selected for Tax Holiday (PMK 150/2018)

NACE Code	Sector Name	Short Name	Complexity Ranking	Sectors/Products in Table 7.2
Primary				
A01	Crop and animal production, hunting and related service activities	Agriculture	3,667	
A02	Forestry and logging	Forestry	3,324	
A03	Fishing and aquaculture	Fishing	3,474	
B	Mining and quarrying	Mining	3,354	
Manufacturing				
C10–C12	Manufacture of food products, beverages and tobacco products	Food manufacture	3,513	Pulp derived from agricultural, plantation or forestry products
C13–C15	Manufacture of textiles, wearing apparel and leather products	Textile manufacture	3,279	
C16	Manufacture of wood and of products of wood and cork, except furniture; Manufacture of articles of straw and plaiting materials	Wood	3,664	Pulp derived from agricultural, plantation or forestry products
C17	Manufacture of paper and paper products	Paper	2,339	
C18	Printing and reproduction of recorded media	Printing	3,364	
C19	Manufacture of coke and refined petroleum products	Petroleum	3,808	Oil and gas refineries
C20	Manufacture of chemicals and chemical products	Chemicals	1,773	• Petrochemicals • Inorganic basic chemicals • Organic-based basic chemicals
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	Pharmaceuticals	1,444	Pharmaceutical raw materials
C22	Manufacture of rubber and plastic products	Rubber	2,507	Organic-based basic chemicals
C23	Manufacture of other nonmetallic mineral products	Nonmetallic minerals	2,487	Upstream base metals
C24	Manufacture of basic metals	Basic metals	2,554	Upstream base metals
C25	Manufacture of fabricated metal products, except machinery and equipment	Fabricated metal	2,354	
C26	Manufacture of computer, electronic and optical products	Computing	1,416	• Electronic components • Healthcare equipment components • Digital economy
C27	Manufacture of electrical equipment	Electrical equipment	2,392	Power generation components
C28	Manufacture of machinery and equipment nec	Machinery and equipment	1,977	Machinery components
C29	Manufacture of motor vehicles, trailers and semi-trailers	Motor vehicles	2,385	Motor vehicle and components

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Table 10.6 continued

NACE Code	Sector Name	Short Name	Complexity Ranking	Sectors/Products in Table 7.2
C30	Manufacture of other transport equipment	Other transport	2,537	• Motor vehicle and components • Shipbuilding components • Air plane components • Railroad components
C31–C32	Manufacture of furniture; other manufacturing	Furniture and other	2,135	Healthcare equipment components

nec = not elsewhere classified.
Note: Nomenclature des Activités Économiques dans la Communauté Européenne (NACE). http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NACE_REV2&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=HIERARCHIC.
Source: Authors.

10.7 Conclusions

Indonesian manufacturing tends to produce outputs with relatively low product complexity. Moreover, the analysis of specialization and domestic production linkages in Indonesian manufacturing shows that there is a broad divide between two groups of manufacturing subsectors in Indonesia. There is a group of sectors that is strongly resource based and in which GVC participation mainly takes the form of strong upstream foreign linkages. These subsectors obtain a fairly large share of their value added and/or employment from delivering resource-based value to foreign value chains. Food manufacture, with strong domestic downstream linkages to agriculture, fishing, and forestry; and petroleum, with strong domestic downstream linkages to mining, are two examples of large sectors in this group.

The presence of a strong resource-based manufacturing sector creates opportunities for Indonesia to upgrade by increasing the complexity of the output of its primary sectors. A large part of the value added that Indonesian producers provide to foreign value chains (upstream foreign linkages) results from primary sectors. By further increasing domestic processing in resource-based manufacturing, this value can increase, with palm oil as a successful example of this process. Despite this, resource-based manufacturing is still a supplier of products with relatively low complexity, when compared to the nonresource-based manufacturing sector in Indonesia. Nonresource-based manufacturing is Indonesia's main supplier of relatively complex products to GVCs. Opportunities for upgrading, i.e., increasing product complexity, are therefore strongest in the nonresource-based part of Indonesian manufacturing.

The analysis also identified a number of product classes with high complexity in nonresource-based manufacturing sectors where Indonesia already has a comparative advantage. These are found in chemicals and computing sectors in particular. Upgrading may be achieved by sourcing more foreign inputs, i.e., strengthening downstream foreign linkages, which supply more complex inputs into Indonesian manufacturing than domestic downstream linkages do. In this sense, the nonresource-based manufacturing

sectors provide better opportunities for upgrading than resource-based manufacturing. On the whole, Indonesian GVC participation is characterized by weak foreign downstream GVC participation, even in the nonresource-based manufacturing sectors. Thus, Indonesia can benefit from foreign capabilities to upgrade its own value chains.

Appendix 10.1

Table A10.1 Top 100 Complex Products

Rank	HS Code	HS 4-Digit Description	HS 6-Digit Description	NACE Code	NACE Sector Short Name
1	854311	Electrical machines and apparatus, having individual functions, not specified or included elsewhere in this chapter	Particle accelerators: Ion implanters for doping semiconductor materials	C27	Electrical equipment
2	845691	Machine tools for working any material by removal of material, by laser or other light or photon beam, ultrasonic, electro-discharge, electro-chemical, electron beam, ionic-beam or plasma arc processes	Other: For dry-etching patterns on semiconductor materials	C28	Machinery and equipment
3	392073	Other plates, sheets, film, foil and strip, of plastics, noncellular and not reinforced, laminated, supported or similarly combined with other materials	Of cellulose or its chemical derivatives: Of cellulose acetate	C22	Rubber
4	310270	Mineral or chemical fertilizers, nitrogenous	Calcium cyanamide	C20	Chemicals
5	901042	Apparatus and equipment for photographic (including cinematographic) laboratories (including apparatus for the projection or drawing of circuit patterns on sensitized semiconductor materials), not specified or included elsewhere in this chapter; negatoscopes; projection screens	Apparatus for the projection or drawing of circuit patterns on sensitized semiconductor materials: Step and repeat aligners	C26	Computing
6	293970	Vegetable alkaloids, natural or reproduced by synthesis, and their salts, ethers, esters and other derivatives	Nicotine and its salts	C21	Pharmaceuticals
7	290714	Phenols; phenol-alcohols	Monophenols: Xylenols and their salts	C20	Chemicals
8	290730	Phenols; phenol-alcohols	Phenol-alcohols	C20	Chemicals
9	10593	Live poultry, that is to say, fowls of the species Gallus domesticus, ducks, geese, turkeys and guinea fowls	Other: Fowls of the species Gallus domesticus, weighing more than 2,000 grams	A01	Agriculture
10	430140	Raw furskins (including heads, tails, paws and other pieces or cuttings, suitable for furriers' use), other than raw hides and skins of heading No. 41.01, 41.02 or 41.03	Of beaver, whole, with or without head, tail or paws	A01	Agriculture
11	741600	Copper springs	Copper springs	C25	Fabricated metal

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Table A10.1 continued

Rank	HS Code	HS 4-Digit Description	HS 6-Digit Description	NACE Code	NACE Sector Short Name
12	370241	Photographic film in rolls, sensitized, unexposed, of any material other than paper, paperboard or textiles; instant print film in rolls, sensitized, unexposed	Other film, without perforations, of a width exceeding 105 millimeters: Of a width exceeding 610 millimeters and of a length exceeding 200 meters, for color photography (polychrome)	C20	Chemicals
13	811230	Beryllium, chromium, germanium, vanadium, gallium, hafnium, indium, niobium (columbium), rhenium and thallium, and articles of these metals, including waste and scrap	Germanium	C24	Basic metals
14	283020	Sulphides; polysulphides	Zinc sulphide	C20	Chemicals
15	291513	Saturated acyclic monocarboxylic acids and their anhydrides, halides, peroxides and peroxyacids; their halogenated, sulphonated, nitrated or nitrosated derivatives	Formic acid, its salts and esters: Esters of formic acid	C20	Chemicals
16	480710	Composite paper and paperboard (made by sticking flat layers of paper or paperboard together with an adhesive), not surface coated or impregnated, whether or not internally reinforced, in rolls or sheets	Paper and paperboard, laminated internally with bitumen, tar or asphalt	C17	Paper
17	530529	Coconut, abaca (Manila hemp or Musa textilis Nee), ramie and other vegetable textile fibers, not elsewhere specified or included, raw or processed but not spun; tow, noils and waste of these fibers (including yarn waste and garnetted stock)	Of abaca: Other	C13–C15	Textile manufacture
18	293791	Hormones, natural or reproduced by synthesis; derivatives thereof, used primarily as hormones; other steroids used primarily as hormones	Other hormones and their derivatives; other steroids used primarily as hormones: Insulin and its salts	C21	Pharmaceuticals
19	291817	Carboxylic acids with additional oxygen function and their anhydrides, halides, peroxides and peroxyacids; their halogenated, sulphonated, nitrated or nitrosated derivatives	Carboxylic acids with alcohol function but without other oxygen function, their anhydrides, halides, peroxides, peroxyacids and their derivatives: Phenylglycolic acid (mandelic acid), its salts and esters	C20	Chemicals

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Table A10.1 continued

Rank	HS Code	HS 4-Digit Description	HS 6-Digit Description	NACE Code	NACE Sector Short Name
20	850530	Electro-magnets; permanent magnets and articles intended to become permanent magnets after magnetization; electro-magnetic or permanent magnet chucks, clamps and similar holding devices; electro-magnetic couplings, clutches and brakes; electro-magnetic lifting heads	Electro-magnetic lifting heads	C27	Electrical equipment
21	392041	Other plates, sheets, film, foil and strip, of plastics, noncellular and not reinforced, laminated, supported or similarly combined with other materials	Of polymers of vinyl chloride: Rigid	C22	Rubber
22	902740	Instruments and apparatus for physical or chemical analysis (e.g., polarimeters, refractometers, spectrometers, gas or smoke analysis apparatus); instruments and apparatus for measuring or checking viscosity, porosity, expansion, surface tension or the like	Exposure meters	C26	Computing
23	120926	Seeds, fruit and spores, of a kind used for sowing	Seeds of forage plants, other than beet seed: Timothy grass seed	A01	Agriculture
24	851722	Electrical apparatus for line telephony or line telegraphy, including line telephone sets with cordless handsets and telecommunication apparatus for carrier-current line systems or for digital line systems; videophones	Facsimile machines and teleprinters: Teleprinters	C26	Computing
25	050900	Natural sponges of animal origin	Natural sponges of animal origin	A03	Fishing
26	282734	Chlorides, chloride oxides and chloride hydroxides; bromides and bromide oxides; iodides and iodide oxides	Other chlorides: Of cobalt	C20	Chemicals
27	292222	Oxygen-function amino-compounds	Amino-naphthols and other amino-phenols, their ethers and esters, other than those containing more than one kind of oxygen function; salts thereof: Anisidines, dianisidines, phenetidines, and their salts	C20	Chemicals
28	701200	Glass inners for vacuum flasks or for other vacuum vessels	Glass inners for vacuum flasks or for other vacuum vessels	C23	Nonmetallic minerals
29	283800	Fulminates, cyanates and thiocyanates	Fulminates, cyanates and thiocyanates	C20	Chemicals

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Table A10.1 continued

Rank	HS Code	HS 4-Digit Description	HS 6-Digit Description	NACE	
				Code	Sector Short Name
30	292122	Amine-function compounds	Acyclic polyamines and their derivatives; salts thereof: Hexamethylenediamine and its salts	C20	Chemicals
31	950320	Other toys; reduced-size (scale) models and similar recreational models, working or not; puzzles of all kinds	Reduced-size (scale) model assembly kits, whether or not working models, excluding those of subheading No. 9503.10	C31–C32	Furniture and other
32	330126	Essentials oils (terpeneless or not), including concretes and absolutes; resinoids; extracted oleoresins; concentrates of essential oils in fats, in fixed oils, in waxes or the like, obtained by enfleurage or maceration; terpenic by-products of the deterpenation of essential oils; aqueous distillates and aqueous solutions of essential oils	Essential oils other than those of citrus fruit: Of vetiver	C20	Chemicals
33	381720	Mixed alkylbenzenes and mixed alkylnaphthalenes, other than those of heading No. 27.07 or 29.02	Mixed alkylnaphthalenes	C20	Chemicals
34	283422	Nitrites; nitrates	Nitrates: Of bismuth	C20	Chemicals
35	610421	Women's or girls' suits, ensembles, jackets, blazers, dresses, skirts, divided skirts, trousers, bib and brace overalls, breeches and shorts (other than swimwear), knitted or crocheted	Ensembles: Of wool or fine animal hair	C13–C15	Textile manufacture
36	910620	Time of day recording apparatus and apparatus for measuring, recording or otherwise indicating intervals of time, with clock or watch movement or with synchronous motor (e.g., time registers, time recorders)	Parking meters	C26	Computing
37	284110	Salts of oxometallic or peroxometallic acids	Aluminates	C20	Chemicals
38	920420	Accordions and similar instruments; mouth organs	Mouth organs	C31–C32	Furniture and other
39	722520	Flat-rolled products of other alloy steel, of a width of 600 millimeters or more	Of high-speed steel	C24	Basic metals
40	610321	Men's or boys' suits, ensembles, jackets, blazers, trousers, bib and brace overalls, breeches and shorts (other than swimwear), knitted or crocheted	Suits: Of wool or fine animal hair	C13–C15	Textile manufacture
41	293963	Vegetable alkaloids, natural or reproduced by synthesis, and their salts, ethers, esters and other derivatives	Alkaloids of rye ergot and their derivatives; salts thereof: Lysergic acid and its salts	C21	Pharmaceuticals

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Table A10.1 continued

Rank	HS Code	HS 4-Digit Description	HS 6-Digit Description	NACE	
				Code	Sector Short Name
42	911011	Complete watch or clock movements, unassembled or partly assembled (movement sets); incomplete watch or clock movements, assembled; rough watch or clock movements	Of watches: Complete movements, unassembled or partly assembled (movement sets)	C26	Computing
43	722910	Wire of other alloy steel	Of high-speed steel	C24	Basic metals
44	900840	Image projectors, other than cinematographic; photographic (other than cinematographic) enlargers and reducers	Photographic (other than cinematographic) enlargers and reducers	C26	Computing
45	392072	Other plates, sheets, film, foil and strip, of plastics, noncellular and not reinforced, laminated, supported or similarly combined with other materials	Of cellulose or its chemical derivatives: Of vulcanized fiber	C22	Rubber
46	610312	Men's or boys' suits, ensembles, jackets, blazers, trousers, bib and brace overalls, breeches and shorts (other than swimwear), knitted or crocheted	Suits: Of synthetic fibers	C13–C15	Textile manufacture
47	731910	Sewing needles, knitting needles, bodkins, crochet hooks, embroidery stilettos and similar articles, for use in the hand, of iron or steel; safety pins and other pins of iron or steel, not elsewhere specified or included	Sewing, darning or embroidery needles	C25	Fabricated metal
48	850930	Electro-mechanical domestic appliances, with self-contained electric motor	Kitchen waste disposers	C28	Machinery and equipment
49	290270	Cyclic hydrocarbons	Cumene	C20	Chemicals
50	110421	Cereal grains otherwise worked (e.g., hulled, rolled, flaked, pearled, sliced or kibbled), except rice of heading No. 10.06; germ of cereals, whole, rolled, flaked or ground	Other worked grains (e.g., hulled, pearled, sliced or kibbled): Of barley	C10–C12	Food manufacture
51	251621	Granite, porphyry, basalt, sandstone and other monumental or building stone, whether or not roughly trimmed or merely cut, by sawing or otherwise, into blocks or slabs of a rectangular (including square) shape	Sandstone: Crude or roughly trimmed	B	Mining
52	910511	Other clocks	Alarm clocks: Electrically operated	C26	Computing
53	901041	Apparatus and equipment for photographic (including cinematographic) laboratories (including apparatus for the projection or drawing of circuit patterns on sensitized semiconductor materials), not specified or included elsewhere in this chapter; negatoscopes; projection screens	Apparatus for the projection or drawing of circuit patterns on sensitized semiconductor materials: Direct write-on-wafer apparatus	C26	Computing

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Table A10.1 continued

Rank	HS Code	HS 4-Digit Description	HS 6-Digit Description	NACE Code	NACE Sector Short Name
54	650300	Felt hats and other felt headgear, made from the hat bodies, hoods or plateaux of heading No. 65.01, whether or not lined or trimmed	Felt hats and other felt headgear, made from the hat bodies, hoods or plateaux of heading No. 65.01, whether or not lined or trimmed	C13–C15	Textile manufacture
55	521022	Woven fabrics of cotton, containing less than 85% by weight of cotton, mixed mainly or solely with man-made fibers, weighing not more than 200 grams per square meter	Bleached: 3-thread or 4-thread twill, including cross twill	C13–C15	Textile manufacture
56	282735	Chlorides, chloride oxides and chloride hydroxides; bromides and bromide oxides; iodides and iodide oxides	Other chlorides: Of nickel	C20	Chemicals
57	291523	Saturated acyclic monocarboxylic acids and their anhydrides, halides, peroxides and peroxyacids; their halogenated, sulphonated, nitrated or nitrosated derivatives	Acetic acid and its salts; acetic anhydride: Cobalt acetates	C20	Chemicals
58	430170	Raw furskins (including heads, tails, paws and other pieces or cuttings, suitable for furriers' use), other than raw hides and skins of heading No. 41.01, 41.02 or 41.03	Of seal, whole, with or without head, tail or paws	A01	Agriculture
59	847110	Automatic data processing machines and units thereof; magnetic or optical readers, machines for transcribing data onto data media in coded form and machines for processing such data, not elsewhere specified or included	Analogue or hybrid automatic data processing machines	C26	Computing
60	441222	Plywood, veneered panels and similar laminated wood	Other, with at least one outer ply of nonconiferous wood: With at least one ply of tropical wood specified in Subheading Note 1 to this chapter	C16	Wood
61	920910	Parts (e.g., mechanisms for musical boxes) and accessories (e.g., cards, discs and rolls for mechanical instruments) of musical instruments; metronomes, tuning forks and pitch pipes of all kinds	Metronomes, tuning forks and pitch pipes	C31–C32	Furniture and other
62	911210	Clock cases and cases of a similar type for other goods of this chapter, and parts thereof	Cases of metal	C26	Computing
63	950299	Dolls representing only human beings	Parts and accessories: Other	C31–C32	Furniture and other
64	850890	Electro-mechanical tools for working in the hand, with self-contained electric motor	Parts	C28	Machinery and equipment

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Table A10.1 continued

Rank	HS Code	HS 4-Digit Description	HS 6-Digit Description	NACE Code	NACE Sector Short Name
65	292620	Nitrile-function compounds	1-Cyanoguanidine (dicyandiamide)	C20	Chemicals
66	900120	Optical fibers and optical fiber bundles; optical fiber cables other than those of heading No. 85.44; sheets and plates of polarizing material; lenses (including contact lenses), prisms, mirrors and other optical elements, of any material, unmounted, other than such elements of glass not optically worked	Sheets and plates of polarizing material	C26	Computing
67	290614	Cyclic alcohols and their halogenated, sulphonated, nitrated or nitrosated derivatives	Cyclanic, cyclenic or cycloterpenic: Terpineols	C20	Chemicals
68	910221	Wristwatches, pocket watches and other watches, including stopwatches, other than those of heading No. 91.01	Other wristwatches, whether or not incorporating a stopwatch facility: With automatic winding	C26	Computing
69	930610	Bombs, grenades, torpedoes, mines, missiles and similar munitions of war and parts thereof; cartridges and other ammunition and projectiles and parts thereof, including shot and cartridge wads	Cartridges for riveting or similar tools or for captive-bolt humane killers and parts thereof	C28	Machinery and equipment
70	460110	Plaits and similar products of plaiting materials, whether or not assembled into strips; plaiting materials, plaits and similar products of plaiting materials, bound together in parallel strands or woven, in sheet form, whether or not being finished articles (e.g., mats, matting, screens)	Plaits and similar products of plaiting materials, whether or not assembled into strips	C16	Wood
71	920410	Accordions and similar instruments; mouth organs	Accordions and similar instruments	C31–C32	Furniture and other
72	253020	Mineral substances not elsewhere specified or included	Kieserite, epsomite (natural magnesium sulphates)	B	Mining
73	481410	Wallpaper and similar wall coverings; window transparencies of paper	Ingrain paper	C17	Paper
74	660310	Parts, trimmings and accessories of articles of heading No. 6601 or 6602	Handles and knobs	C31–C32	Furniture and other
75	843062	Other moving, grading, leveling, scraping, excavating, tamping, compacting, extracting or boring machinery, for earth, minerals or ores; pile drivers and pile extractors; snow ploughs and snow blowers	Other machinery, not self-propelled: Scrapers	C28	Machinery and equipment

(continued on next page)

Table A10.1 continued

Rank	HS Code	HS 4-Digit Description	HS 6-Digit Description	NACE Code	NACE Sector Short Name
76	844811	Auxiliary machinery for use with machines of heading No. 84.44, 84.45, 84.46 or 84.47 (e.g., dobbies, Jacquards, automatic stop motions, shuttle changing mechanisms); parts and accessories suitable for use solely or principally with the machines of this heading or of heading No. 84.44, 84.45, 84.46 or 84.47 (e.g., spindles and spindle flyers, card clothing, combs, extruding nipples, shuttles, healds and heald frames, hosiery needles)	Auxiliary machinery for machines of heading No. 84.44, 84.45, 84.46 or 84.47: Dobbies and Jacquards; card reducing, copying, punching or assembling machines for use therewith	C28	Machinery and equipment
77	293921	Vegetable alkaloids, natural or reproduced by synthesis, and their salts, ethers, esters and other derivatives	Alkaloids of cinchona and their derivatives; salts thereof: Quinine and its salts	C21	Pharmaceuticals
78	283610	Carbonates; peroxocarbonates (percarbonates); commercial ammonium carbonate containing ammonium carbamate	Commercial ammonium carbonate and other ammonium carbonates	C20	Chemicals
79	293292	Heterocyclic compounds with oxygen hetero-atom(s) only	Other: 1-(1,3-Benzodioxol-5-yl) propan-2-one	C20	Chemicals
80	901049	Apparatus and equipment for photographic (including cinematographic) laboratories (including apparatus for the projection or drawing of circuit patterns on sensitized semiconductor materials), not specified or included elsewhere in this chapter; negatoscopes; projection screens	Apparatus for the projection or drawing of circuit patterns on sensitized semiconductor materials: Other	C26	Computing
81	290316	Halogenated derivatives of hydrocarbons	Saturated chlorinated derivatives of acyclic hydrocarbons: 1,2-Dichloropropane (propylene dichloride) and dichlorobutanes	C20	Chemicals
82	291534	Saturated acyclic monocarboxylic acids and their anhydrides, halides, peroxides and peroxyacids; their halogenated, sulphonated, nitrated or nitrosated derivatives	Esters of acetic acid: Isobutyl acetate	C20	Chemicals
83	540320	Artificial filament yarn (other than sewing thread), not put up for retail sale, including artificial monofilament of less than 67 decitex	Textured yarn	C20	Chemicals
84	370520	Photographic plates and film, exposed and developed, other than cinematographic film	Microfilms	M74–M75	Other professional activities

(continued on next page)

Table A10.1 continued

Rank	HS Code	HS 4-Digit Description	HS 6-Digit Description	NACE Code	NACE Sector Short Name
85	560730	Twine, cordage, ropes and cables, whether or not plaited or braided and whether or not impregnated, coated, covered or sheathed with rubber or plastics	Of abaca (Manila hemp or Musa textilis Nee) or other hard (leaf) fibers	C13–C15	Textile manufacture
86	291431	Ketones and quinones, whether or not with other oxygen function, and their halogenated, sulphonated, nitrated or nitrosated derivatives	Aromatic ketones without other oxygen function: Phenylacetone (phenylpropan-2-one)	C20	Chemicals
87	370292	Photographic film in rolls, sensitized, unexposed, of any material other than paper, paperboard or textiles; instant print film in rolls, sensitized, unexposed	Other: Of a width not exceeding 16 millimeters and of a length exceeding 14 meters	C20	Chemicals
88	722591	Flat-rolled products of other alloy steel, of a width of 600 millimeters or more	Other: Electrolytically plated or coated with zinc	C24	Basic metals
89	521012	Woven fabrics of cotton, containing less than 85% by weight of cotton, mixed mainly or solely with man-made fibers, weighing not more than 200 grams per square meter	Unbleached: 3-thread or 4-thread twill, including cross twill	C13–C15	Textile manufacture
90	660191	Umbrellas and sun umbrellas (including walking-stick umbrellas, garden umbrellas and similar umbrellas)	Other: Having a telescopic shaft	C31–C32	Furniture and other
91	851931	Turntables (record decks), record players, cassette players and other sound reproducing apparatus, not incorporating a sound recording device	Turntables (record-decks): With automatic record changing mechanism	C26	Computing
92	290721	Phenols; phenol-alcohols	Polyphenols: Resorcinol and its salts	C20	Chemicals
93	291635	Unsaturated acyclic monocarboxylic acids, cyclic monocarboxylic acids, their anhydrides, halides, peroxides and peroxyacids; their halogenated, sulphonated, nitrated or nitrosated derivatives	Aromatic monocarboxylic acids, their anhydrides, halides, peroxides, peroxyacids and their derivatives: Esters of phenylacetic acid	C20	Chemicals
94	300431	Medicaments (excluding goods of heading No. 30.02, 30.05 or 30.06) consisting of mixed or unmixed products for therapeutic or prophylactic uses, put up in measured doses or in forms or packings for retail sale	Containing hormones or other products of heading No. 29.37 but not containing antibiotics: Containing insulin	C21	Pharmaceuticals
95	610799	Men's or boys' underpants, briefs, nightshirts, pyjamas, bathrobes, dressing gowns and similar articles, knitted or crocheted	Other: Of other textile materials	C13–C15	Textile manufacture
96	293942	Vegetable alkaloids, natural or reproduced by synthesis, and their salts, ethers, esters and other derivatives	Ephedrines and their salts: Pseudoephedrine (INN) and its salts	C21	Pharmaceuticals

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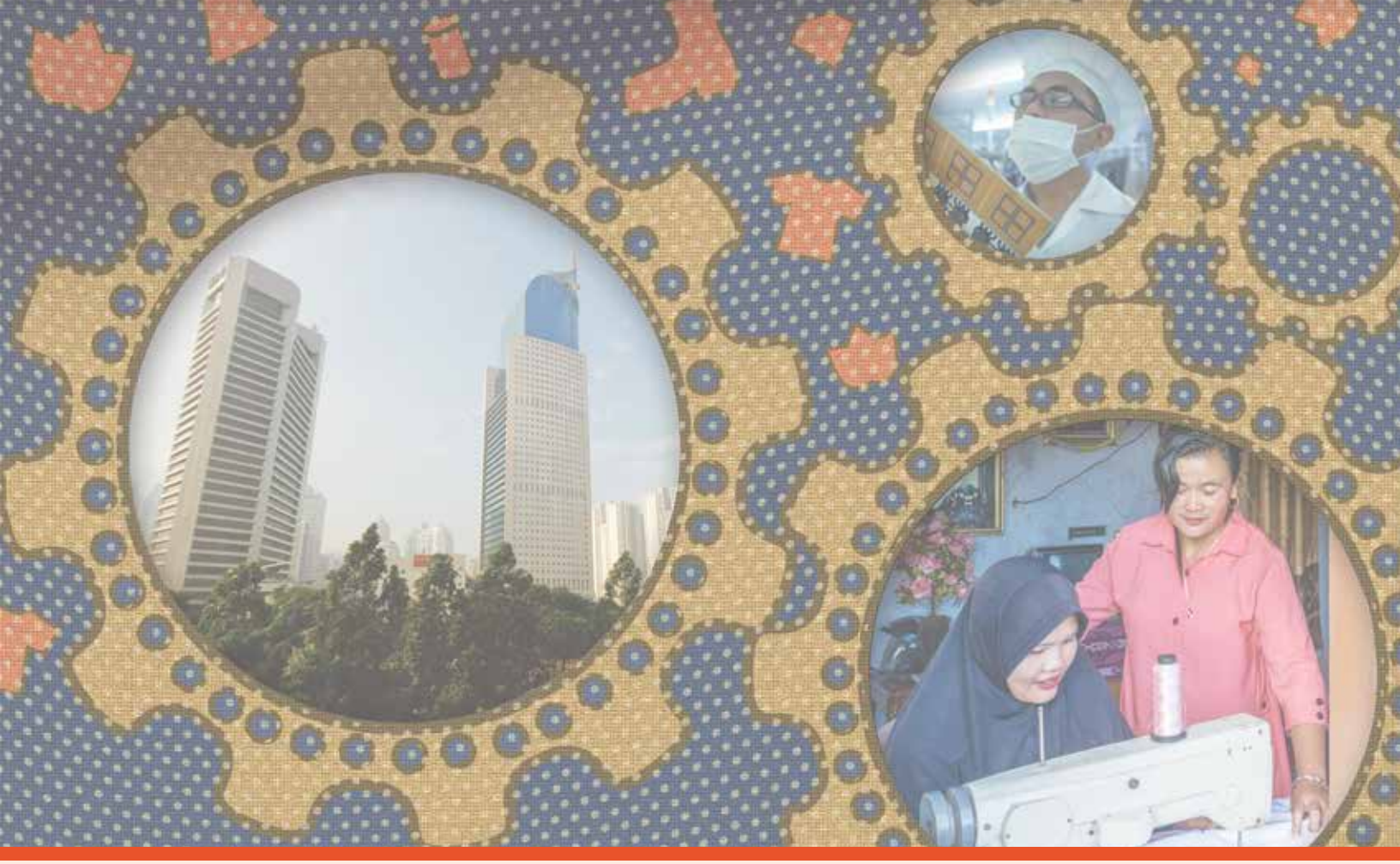
Table A10.1 continued

Rank	HS Code	HS 4-Digit Description	HS 6-Digit Description	NACE Code	NACE Sector Short Name
97	71110	Vegetables provisionally preserved (e.g., by sulphur dioxide gas, in brine, in sulphur water or in other preservative solutions), but unsuitable in that state for immediate consumption	Onions	C10–C12	Food manufacture
98	551432	Woven fabrics of synthetic staple fibers, containing less than 85% by weight of such fibers, mixed mainly or solely with cotton, of a weight exceeding 170 grams per square meter	Of yarns of different colors: 3-thread or 4-thread twill, including cross twill, of polyester staple fibers	C13–C15	Textile manufacture
99	700220	Glass in balls (other than microspheres of heading No. 70.18), rods or tubes, unworked	Rods	C23	Nonmetallic minerals
100	270760	Oils and other products of the distillation of high temperature coal tar; similar products in which the weight of the aromatic constituents exceeds that of the nonaromatic constituents	Phenols	C20	Chemicals

Notes: Nomenclature des Activités Économiques dans la Communauté Européenne (NACE): http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NACE_REV2&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=HIERARCHIC. HS is the Harmonized Commodity Description and Coding System.
Source: Authors' estimates based on CEPII's BACI Database. http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=1 (accessed January 2018).



PART III

Prospects for Fiscal and Monetary Policy Coordination to Support Growth and Industrialization in Indonesia

11 How Can Fiscal and Monetary Policy Coordination Support Growth and Industrialization in Indonesia?

11.1 Introduction

This chapter and the next are conceptually different from those in previous chapters, which focused on the manufacturing sector. The idea here is that a coherent strategy for Indonesia needs to consider jointly long-term development policies (including industrial policy) and short-term macroeconomic policy. This is because development strategies require a close coordination of the macroeconomic regime with the industrial policy, both oriented to reindustrialization and catching up.[160]

While it is obvious in modern discussions why fiscal policy can affect long-run growth via government spending (via capital expenditures in particular), the long-run growth effects of monetary policy are less obvious. This is because monetary policy is in the hands of central banks, which tend to be much more concerned with short-term macro-stabilization, inflation in particular.[161] This chapter shows that, in modern economies, central banks and the government's fiscal arm (Treasury, Ministry of Finance), have to coordinate their activities at the operational level. As a result, the distinction between long-run growth strategies (government spending) and short-term macro stabilization policies (central bank) becomes less clear.

The argument starts from the basic proposition that growth is always financed. This is a basic fact of economics, finance, and accounting. Unlike in Chapter 2, "growth" in this chapter and in the next does not refer to any economic theory (neoclassical or any other) of how growth is created or increased. It is a more fundamental point—"growth" in gross domestic product (GDP) is measured as an increase in spending and then in the income of the recipients of that spending. As a matter of basic accounting, all transactions change the financial positions of those involved. That growth is financed is not a problem per se, but *how* growth is financed and who finances growth are of interest. This chapter uses the sector financial balances (SFBs)—private, government, and external—from the flow-of-funds accounting to discuss these issues, and in particular to discuss *who bears the burden of financing faster growth?* To be precise, the sectors that bear the financial burden of the economy are those that persistently incur a negative financial balance, which enables positive financial balances in the other sector(s). In order to increase growth, spending has to increase relative to income, and thereby incur an additional decline in the SFB.

How growth is financed and who finances it have different effects on the degree of financial fragility of an economy. Financial fragility refers to a worsening financial position of a household, firm, bank, government, or sector of the economy in terms of the ability of its cash inflows to service payment obligations, particularly those related to debt. In terms of the SFBs, a negative sector balance is not necessarily equivalent to increased financial fragility, since the negative balance might be financed by equity (which does not carry a legal financial obligation for the issuer) or by drawing down cash or other

[160] This is acknowledged by Juhro (2015) for Indonesia.

[161] See Juhro (2015) for an acknowledgment that central banks need to also promote sustainable growth and development, for example, to coordinate with the government to accelerate economic reforms so as to help the manufacturing sector (Juhro 2015, p. 24).

liquid balances instead of an increase in debt and debt service obligations. The degree of financial fragility, in turn, affects the economy's risk of financial instability, whether because of greater sensitivity to "shocks" that affect the economy or from interactions of rising financial fragility itself with the state of the economy and/or macroeconomic policy.

Questions that should be of fundamental interest for macroeconomic policy makers, especially when faster growth is a goal of government planning, are: (i) *Who will bear the burden of financing faster growth?* (ii) *What are the implications of financial fragility for the macroeconomy?* (iii) *What can macroeconomic policy makers do to counter or reduce financial fragility at the macroeconomic scale?* The first of these is the topic of this chapter; the second question is discussed in Chapter 12; and Chapter 15 presents proposals that respond to the third question.

This chapter identifies the sector of the economy that is currently bearing the burden of growth in Indonesia by analyzing the SFBs from the flow-of-funds accounting. The analysis shows that this is the corporate or firm sector. This finding leads to the discussion of the corporate sector's financial fragility in Chapter 12.

From basic accounting, financial flows comprise a closed system. It is not possible, for instance, for every nation to have a current account surplus; if one nation has a current account surplus, then at least one other nation has a current account deficit. Equivalently, if one sector of an economy has a surplus, at least one other sector must be in deficit. The SFBs show upon which sector(s) the financial burden of Indonesia's current and past growth has fallen—as the analysis presents below, the nonfinancial firm sector has usually been in this role. Since financial flows are a closed system, Indonesia's firm sector is not bearing this financial burden independently from the actions of the other sectors. It is doing so within the context of Indonesia's current account deficit, surpluses in its household and financial corporation sectors, the government sector's modest deficits, and an economy whose real GDP is growing at around 5% per year. To the degree that the financial positions of the other sectors do not change, then by accounting definition Indonesia's firm sector will continue to bear the financial burden of growth, which will increase if Indonesia's economy grows still faster.

Managing the degree of financial fragility and minimizing the risk of financial instability are among the duties of macroeconomic policy makers. Indonesia's macroeconomic policy mix includes an independent central bank and a government constrained by a fiscal rule. At the same time, there are unavoidable, important areas of interdependence for fiscal and monetary policies related to monetary policy making itself, the implementation of monetary policy, and the government's fiscal position and debt service. If the financial burden of faster economic growth continues to fall on the domestic nonfinancial corporate sector, policy makers will need to determine if a macroeconomically significant level of financial fragility is present; if so, they will need to be able to act.

The rest of the chapter is organized as follows. Section 11.2 presents flow-of-funds accounting for the sector financial balances in Indonesia. Section 11.3 considers the components of Indonesia's domestic private sector balance within the context of the state of the macroeconomy, illustrating in particular that the country's nonfinancial firm sector has been bearing the financial burden of growth. Section 11.4 uses the SFBs to provide an accounting-consistent understanding of the respective interactions and effects of monetary and fiscal policies with the domestic private sector balance. Section 11.5 discusses the macroeconomic policy mix in Indonesia and its legal foundations, and the inherent interdependencies between the nation's fiscal and monetary policies. In doing so, it discusses the implications of monetary dominance, and specifically Indonesia's fiscal rule, for the domestic private sector's financial position and for macroeconomic stabilization policy. Section 11.6 concludes.

11.2 Indonesia's Sector Financial Balances

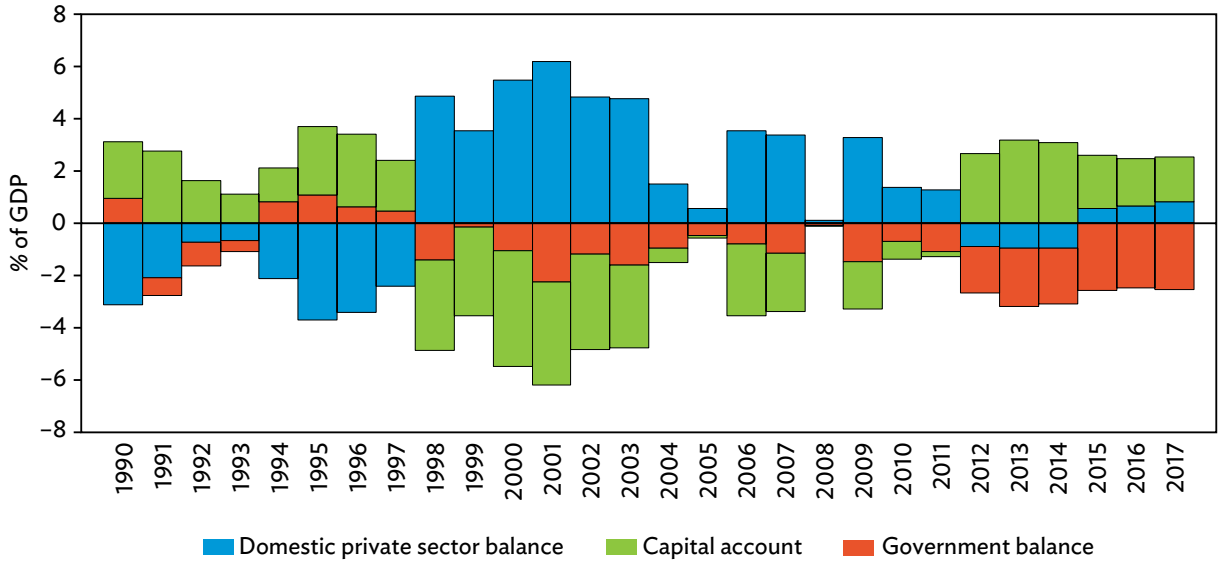
From flow-of-funds accounting, the SFBs show that the combination of Indonesia's fiscal rule and negative current account balances is leaving the domestic private sector balance near zero. It appears unlikely that this pattern will change in the near future given regional competition in international trade.

Indonesia's quarterly and annual flow-of-funds reports present the SFBs for nonfinancial businesses (hereafter called firms), the financial sector, the household sector, the government, and the capital account balance (the net financial position of the rest of the world with Indonesia, which is also the negative of Indonesia's current account balance). The following simple identities define the SFBs and their flow-of-funds-based relationships to each other:

Domestic private balance ≡ Household sector balance + Firm sector balance + Financial sector balance (1)
Government balance ≡ Tax revenues – Government spending (2)
Capital account balance ≡– Current account balance (3)
Domestic private balance + **Government sector balance** + **Capital account balance** ≡ 0 (4)

Figure 11.1 presents the SFBs using equation (4) for Indonesia during 1990–2017. The sum of the balances in (4) is zero (financial flows are a closed system), thus the three SFBs generate mirror images above and below zero in every year. Of interest for the discussions that follow below are the three distinct periods: 1990–1997, 1998–2011, and 2012–2017. The 1990–1997 period was characterized by a capital account surplus (current account deficit), domestic private deficits, and small government deficits during 1991–1993 turning to small government sector surpluses during 1994–1997. The 1998–2011 period was characterized by domestic private surpluses that averaged 3.2% of GDP and were often significantly

Figure 11.1 Indonesia's Sector Financial Balances



GDP = gross domestic product.
Source: Authors' calculations based on Indonesia's flow-of-funds accounts.

larger, capital account balances that averaged −2.2% of GDP (+2.2% average current account balance), and modest government sector deficits (usually less than 1% of GDP). The 2012–2017 period was characterized by a return to capital account surpluses that are on average about 2.4% of GDP (current account deficits that average −2.4% of GDP), government deficits around 2.3% of GDP, and small domestic private balances that were slightly negative during 2012–2014 and then slightly positive during 2015–2017.

A useful way to visualize the inherent interactions of the SFBs is in Figure 11.2 (a), which presents two axes and a bisecting line that combined to generate the sector financial balances map (SFBM).[162] The horizontal axis is the current account balance (CA) and the vertical axis is the government's balance (GB). The diagonal dotted line bisects the graph through the origin—on every point along this line the domestic private balance (DPB) is zero. For the SFBM it is useful to substitute the negative of the current account balance from (3) into (4) and then rearrange as follows:

Domestic private balance ≡ **Current account balance** − **Government sector balance** (5)

Using the abbreviations in the figure, (5) becomes

DPB ≡ **CA** − **GB** (6)

Figure 11.2 (b) then visually represents the logic of (5) and (6): the area to the northwest of the DPB = 0 line is where DPB < 0 since CA < GB, while the area to the southeast of DPB = 0 is where DPB > 0 since CA > GB.

Figures 11.3 (a) and 11.3 (b) present Indonesia's SFBs as a percent of GDP from Figure 11.1 within two different contexts. In both figures, the annual combinations of the SFBs data are represented by the small circles (coded green and red to denote that the DPB for the year was positive or negative, respectively); these are connected by blue lines that illustrate the transition in the SFBs from one year to the next. The larger circles present averages for the three subperiods from above: 1990–1997, 1998–2011, and 2012–2017 (coded green if the period-average DPB > 0 and red if the period-average DPB < 0).

Figure 11.3 (a) combines the SFBs data with "The Golden Triangle" shaded in the DPB > 0 portion of the northeast quadrant of the graph.[163] This triangle represents visually the possible combinations of the SFBs in which all three balances (CA, GB, DPB) are simultaneously positive. In the northeast quadrant, both CA and GB are positive, but for DPB to also be positive requires CA > GB.[164] In other words, for all three balances to be positive, CA must be as large as the sum of a positive GB and a positive DPB. From Figure 11.3 (a), for the entire 1990–2017 period, Indonesia's combination of SFBs did not in any year enter the Golden Triangle.

Figure 11.3 (b) combines the same SFBs data for Indonesia that appear in Figure 11.3 (a) with the country's fiscal rule requiring that government deficits not exceed 3% of GDP. The red horizontal line running through −3 of the vertical axis in the figure is therefore effectively a lower bound for Indonesia's GB, which has significant implications for the other two sector balances. From (5) and (6), a 3% of GDP deficit limit (GB ≥ −3) means DPB is negative if CA is not at least as large as the constrained GB. The two shaded areas between the fiscal rule line and the diagonal DPB = 0 line together represent the reduced

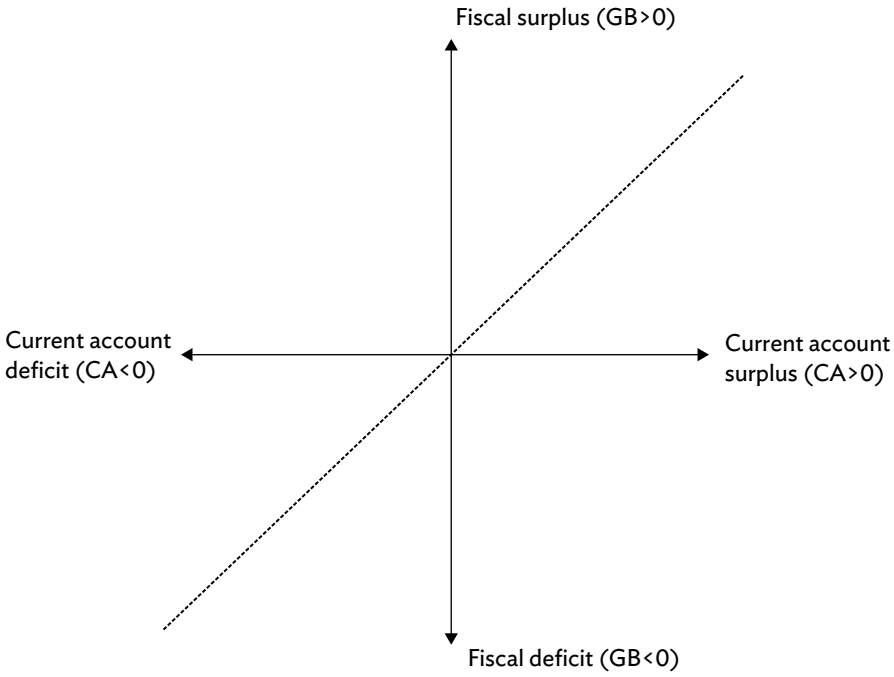
[162] The SFBM originally appeared in Parenteau (2010).

[163] The term and definition for "The Golden Triangle" in the SFBM originates in Eric Tymoigne (2018).

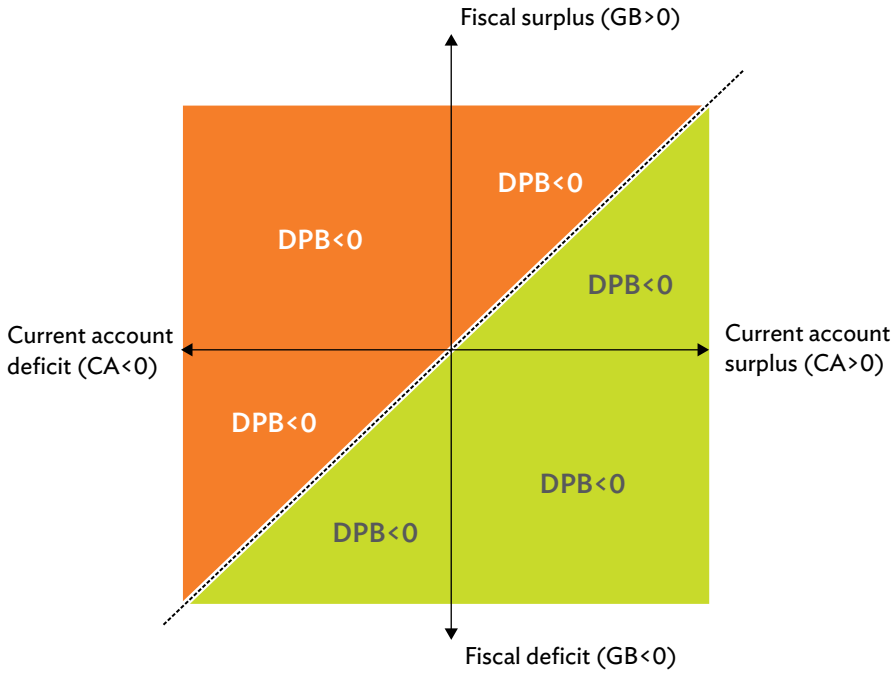
[164] Rearranging equation (6), DPB + GB ≡ CA.

Figure 11.2 Sector Financial Balances Map

(a) Sectoral financial balances map



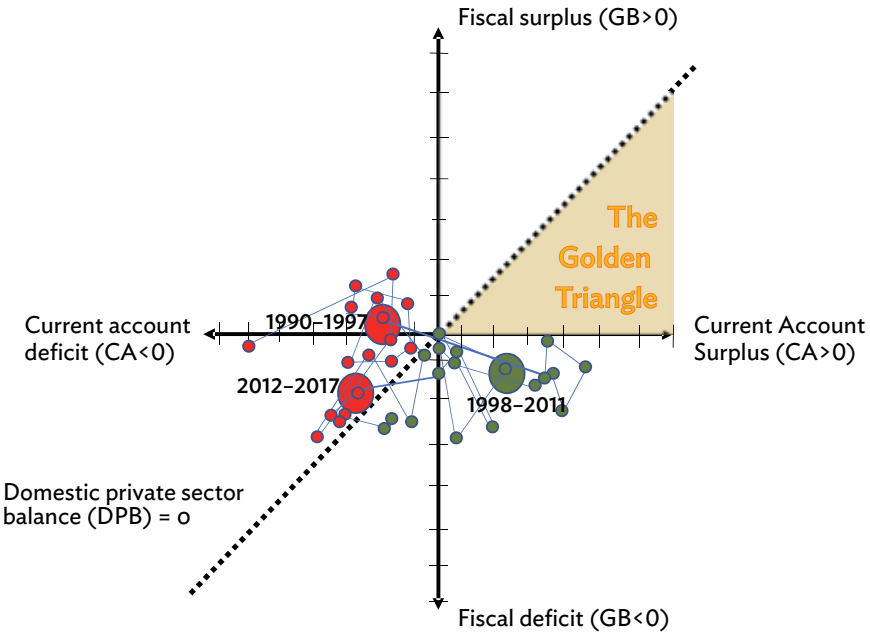
(b) Domestic private sector balance in sector financial balances map



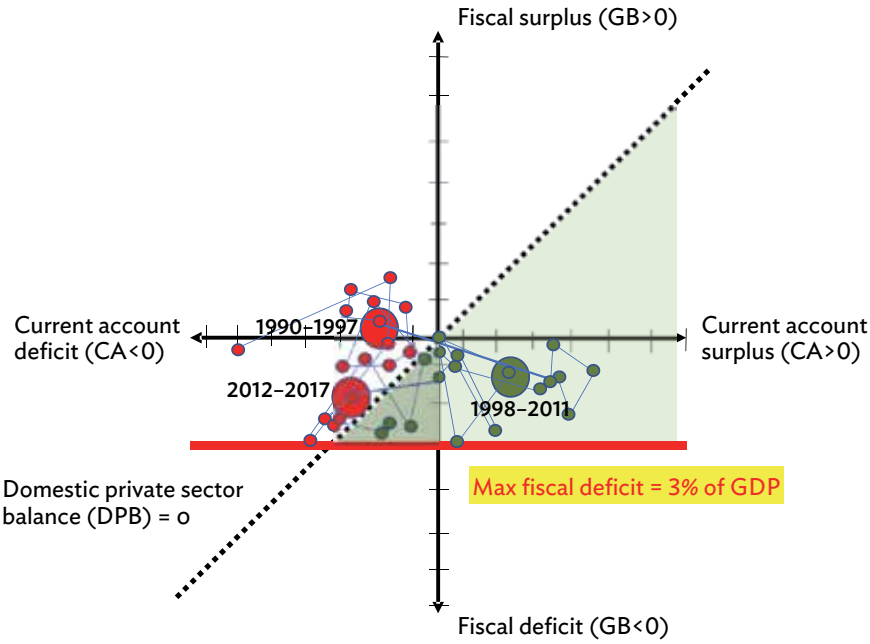
Source: Parenteau (2010).

Figure 11.3 Indonesia's Sector Financial Balances Map, Golden Triangle and Fiscal Rule, 1990–2017

(a) Indonesia's sector financial balances and the Golden Triangle



(b) Indonesia's sector financial balances and the fiscal rule

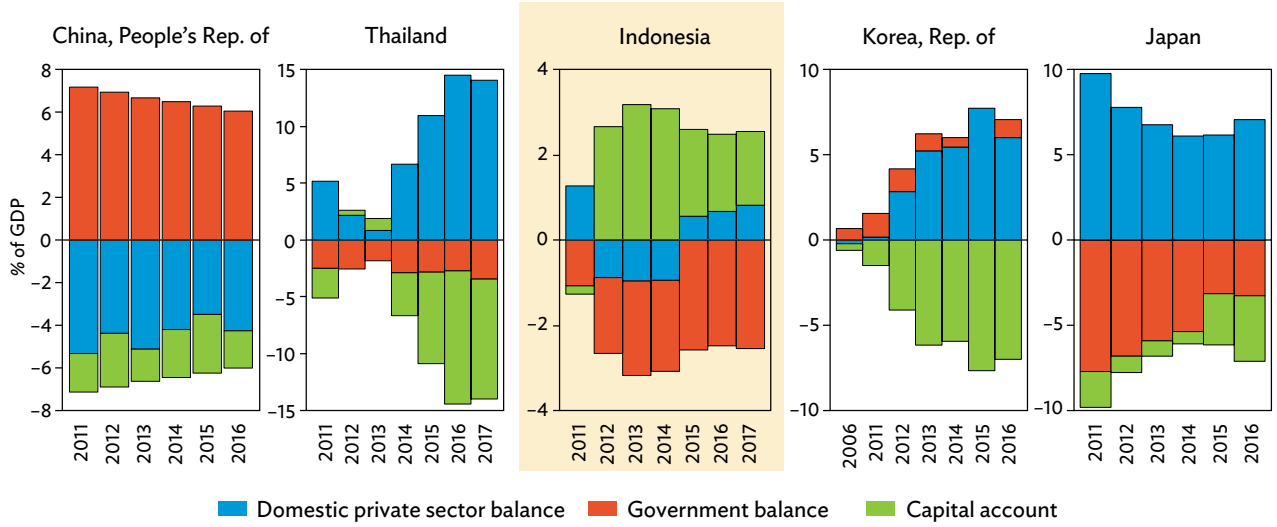


Source: Authors' calculations based on Tymoigne (2018) and Indonesia's flow-of-funds accounts.

possibilities for the DPB to be in surplus given the presence of the fiscal rule. The darker green-shaded triangle to the left of the vertical axis presents visually the limited possibilities for DPB to be in surplus if CA is negative given the fiscal rule.[165]

Figures 11.1, 11.3 (a), and 11.3 (b), indicate that, throughout 1990–2017, Indonesia's CA has been positive only during 1998–2011 and has been 1% of GDP or larger for only 6 of the 28 years. Figure 11.4 compares Indonesia's recent SFBs (2011–2017) to those of some of the larger economies in its region. All four—the People's Republic of China (PRC), Thailand, the Republic of Korea (ROK), and Japan—have run persistent CA surpluses throughout. While CA as a percent of GDP for the PRC and Japan are not large for the period, each has an economy many times larger than Indonesia's, and thus the monetary values of their CA surpluses are large relative to the size of the Indonesian economy and its exporting industries.

Figure 11.4 Comparison of Indonesia's Recent Financial Sector Balances with the People's Republic of China, Thailand, the Republic of Korea, and Japan



GDP = gross domestic product.
Source: Authors' calculations based on Haver Analytics and CEIC data (accessed April 2018).

Recalling the fact from basic accounting that not all nations can run CA surpluses, given the CA positions of Indonesia's competitors in Figure 11.4, it is difficult to justify anticipating Indonesia's CA to turn positive in the nearer term, much less achieve a CA surplus of significant magnitude relative to those in the figure.[166] In this case, the algebra of the SFBs means that the combination of at best small CA deficits and a GB constrained by the fiscal rule will result in a DPB that at its largest is only a small surplus. Further, if Indonesia's CA deficits or GB surpluses, or both, are even larger, then via the accounting identities in (5) and (6) the result is a DPB that is that much smaller (even negative).

[165] Parenteau named this the "Euro Triangle," representing the possible space available for members of the euro area in the so-called periphery to maintain a domestic private surplus given the Maastricht deficit limits and Germany's dominance of the region's trade.

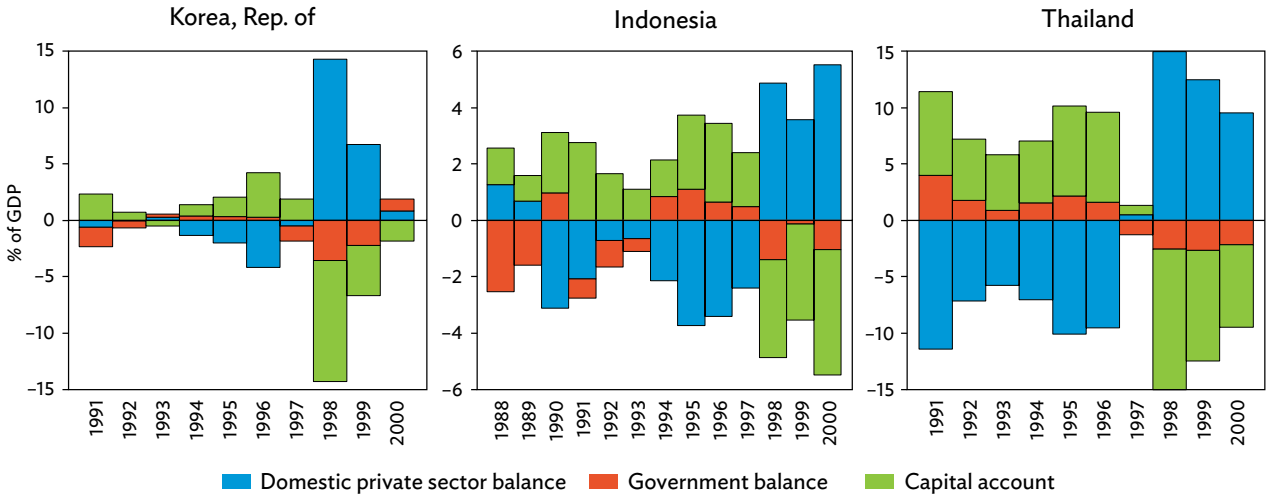
[166] This presumes the absence of a macroeconomic catastrophe for Indonesia and for the others in Figure 11.4.

11.3 Indonesia's Domestic Private Sector Balance and the State of the Macroeconomy

The domestic private sector balance has been a reliable indicator of financial fragility in several countries. Breaking down the relatively small balance for Indonesia across household, financial, and firm sectors shows that the latter is incurring significant negative balances.

Why is the DPB of interest? Figure 11.5 presents Indonesia's sector financial balances during the 1990s alongside those of the ROK and Thailand for the same period. There is a clear, consistent pattern for all three: private sector deficits during the years leading up to the Asian financial crisis (AFC), and an abrupt reversal when the AFC begins that continues through the end of the decade.

Figure 11.5 Comparison of Indonesia's Financial Sector Balances in the 1990s with the Republic of Korea and Thailand



GDP = gross domestic product.
Source: Authors' calculations based on Haver Analytics and CEIC data (accessed April 2018).

There are similar patterns in other countries. In the United States (US) during the late 1990s, DPB turned negative for the first sustained period in the post-World War II era as the stock market bubble peaked and the federal government began to run surpluses; but then turned positive with the collapse of the bubble and the subsequent recession in 2000–2001. However, the emergence of the housing debt bubble in the mid-2000s saw a return to a negative DPB through 2008, which again reversed abruptly with the beginning of the global financial crisis and then the Great Recession. In Japan, with its well-known historically high private sector rates of saving, the DPB fell to 1.5% of GDP in 1990, its lowest point since World War II, at the peak of the country's real estate and stock market bubbles, both of which subsequently collapsed. In the eurozone during the 2000s, Spain's DPB fell below –10% of GDP by 2007, and then abruptly reversed after the global financial crisis and the country's subsequent fall into what was essentially a depression. Particularly for the US, some economists pointed to the move to a negative DPB in both the late 1990s and mid-2000s as a warning sign of financial fragility.[167]

[167] For the 1990s, see, for instance, Godley and Wray (1999). For the 2000s, see, for example, Papadimitriou, Chilcote, and Zezza (2006); Godley and Zezza (2006); Parenteau (2006); and Tymoigne (2007).

Overall, a negative DPB has repeatedly provided a signal of financial fragility that subsequently turned into financial instability.[168]

From simple accounting, this signal arises because a negative DPB is a potential sign of accumulating debt or asset price growth beyond historical and sustainable metrics. An entity currently in deficit can avoid external finance by spending liquid account balances or selling assets. Neither of these are long-term strategies, however, since there are limits to cash on hand and to assets that can be liquidated quickly without capital loss. For the domestic private sector overall, external financing will net to zero in a flow-of-funds sense if the transactions are all within the sector—for instance, a bank lending to a firm is external financing for the firm but this transaction nets to zero for the domestic private sector balance since the deficit entity (the firm) and the surplus entity (the bank) are both in the domestic private sector. The domestic private sector balance instead declines when the external finance comes from nondomestic sources or from the government, or if the economy is growing and the increased incomes leave businesses and households with greater tax liabilities.

It is not clear whether a specific theoretical rationale exists for a low, negative, or any particular value of the DPB to signal fragility per se. But it is straightforward that in expansions, households and firms increase spending and are more likely to seek out sources of external finance. Developing countries will experience capital inflows. Governments receive more revenues as economic activity increases. These all reverse in recessions as the private sector repairs its financial position. In other words, a decline (i.e., less positive or more negative) in the domestic private balance is an economic expansion, and an increase (i.e., more positive or less negative) is a recession. Where financial fragility is building, external finance is plentiful and easier to secure beyond what may be traditional "norms." In the flow-of-funds accounts, this is a decline in the DPB beyond traditional norms, accompanied by some combination of an increase in GB (decrease in deficit or increase in surplus) and an increase in CA (increase deficit or decrease surplus).

There are two separate Indonesia official accounts that break down the DPB as in equation (1) above into the household, firm, and financial sectors, neither of which covers the entire 1990–2017 period. Figures 11.6 (a) and 11.6 (b) present the data from one of these sources for 1990–2013 as a percentage of GDP, labeled as (0300), which corresponds to its label in the flow-of-funds accounts.[169] Figure 11.6 (a) presents all three series, while Figure 11.6 (b) omits the financial sector for ease of viewing the other two sectors. The effects of the AFC on the financial sector balance in Figure 11.6 (a) are obvious, as the destruction of equity in that sector created a steep fall from about 1% of GDP in 1997 to more than –8% of GDP in 1999. Otherwise, however, the financial sector's balance is largely stable at about 1% of GDP. For the household sector, except for 3 years, its balance is essentially between 2% and 4% of GDP. The firm sector, by contrast, is persistently negative except for 1999 and 2003. Further, the patterns from Figure 11.1 are present in the firm sector balance. The decline in the DPB during 1990–1997 was driven by the fall in the firm sector's financial balance. The AFC brought a sharp reversal. During 2003–2013 the firm sector balance was negative, remaining in the 3% to 4% of GDP range during 2003–2010 and then falling in 2011–2013 by about 3 percentage points. The latter is also consistent with the lower DPB since 2011 in Figure 11.1.

[168] The PRC's persistently negative DPB in Figure 11.4 is consistent with the discussion here and with some analysts' views that the country is experiencing a private debt bubble.

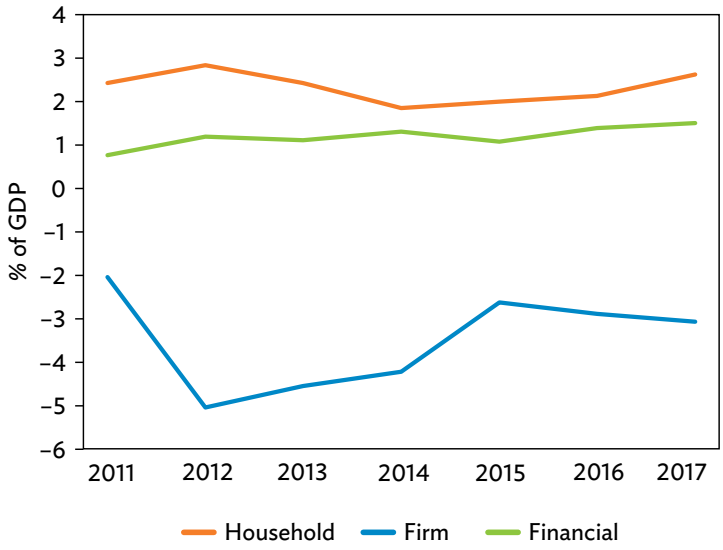
[169] The data for Figure 11.6 (a) does not sum to the DPB in Figure 11.1. The sum follows the same general pattern as in Figure 11.1 and, aside from 1997–2000 deviations, subsequently corrects such that the average annual deviation is –0.21% of GDP.

Figure 11.6 Decomposition of Indonesia's Domestic Private Sector Balance

GDP = gross domestic product.
Source: Authors' calculations based on Indonesia's flow-of-funds accounts..

Figure 11.7 presents data for the same three components of DPB for 2011–2017 as a percentage of GDP, this time labeled B9C.[170] The same pattern found in Figures 11.6a and 11.6b is present here—a positive, rather stable household sector balance (between 2% and 3% of GDP) and financial sector balance (between 1% and 1.5% of GDP), but a persistently negative firm sector balance. The result is that DPB is either modestly negative or modestly positive, depending largely upon the size of the firm sector balance. The move to modestly positive DPB for 2015–2017 in Figure 11.1 is reflected in the rise in firm sector balance by about 1.5 to 2 percentage points of GDP during the same period.

Figure 11.7 Indonesia's Household, Firm, and Financial Sector Balances, 2011–2017 (B9C)



GDP = gross domestic product.
Source: Authors' calculations based on Indonesia's flow-of-funds accounts.

The data and figures in this section make it clear that the financial burden of growth has fallen on the firm sector. Both the household and financial sector balances stay within modest ranges and are positive (aside from the late 1990s for the financial sector). On the other hand, the firm sector balance is persistently negative. Its decline in the early to mid-1990s, subsequent rise, and its movements during 2011–2017, all dominate the movements in DPB during those times. Furthermore, Indonesia's firm sector balance will probably remain negative absent a turn to current account surpluses, larger government deficits, or a reduction in the household sector balance, all of which are not as likely to occur. The question then is whether the firm sector can continue to bear this financial burden, and whether it can do so during a transition to a faster rate of growth in real GDP.

11.4 Flow-of-Funds-Based Interdependence of Monetary and Fiscal Policies

Fiscal and monetary policies affect spending via opposite effects on the private sector financial balance. If the latter is of significance to macroeconomic performance, then the appropriate macroeconomic policy mix in a given instance is a function of the state of private sector financial positions.

The rationale for examining the domestic private sector balance is its ability to provide a potentially reliable indicator of financial fragility and instability in that sector. The "lens" of the sector financial balances enables an accounting-consistent understanding of the respective interactions of monetary and fiscal policies with the domestic private sector balance.[171] While accounting consistency is neither a macroeconomic theory nor sufficient on its own for designing macroeconomic policy, it is an effective method of keeping track of

[170] The B9C data for the household, firm, and financial sector balances sum exactly to the domestic private sector balance in Figure 11.1.

[171] Monetary and fiscal policies self-evidently impact CA as well, but while the interaction of CA and macroeconomic policy is already standard in macroeconomic literature, the case for DPB and macroeconomic policy is not.

economic activity. Any policy framework should at minimum be robust to the details of how accounting conventions record or otherwise keep track of an economy's real-world transactions.

A decrease in the central bank's interest rate will stimulate the economy if it reduces the domestic private sector balance (i.e., it becomes less positive or more negative). That is, lower interest rates act by encouraging greater spending out of existing income, either via borrowing or reduced saving. At the sector balances level, this will reveal itself in a reduction in the domestic private sector balance, though the magnitude will depend on how much other interest rates change in response, how interest sensitive private spending is, how procyclical government tax revenues are, how countercyclical government spending is, and so on. The result is unchanged if one prefers to think of monetary policy affecting the economy through control of monetary aggregates rather than interest rates. More money is not the same thing as more income. Central bank open market operations to increase the monetary base do not add income, but rather add central bank reserves to the banking system in a trade for some other asset the central bank's counterparty is holding (usually a government security or a separate liability of the central bank). In other words, if central bank open market operations stimulate the economy by adding "more money," from basic accounting they do so by stimulating spending relative to income.[172]

A potential exception to this negative effect of monetary stimulus on DPB is its effect on the exchange rate. If monetary stimulus weakens the exchange rate, this can increase CA and offset some of the effects of lower interest rates on the domestic private sector balance. However, particularly from the perspective of a developing or emerging market economy, it is not a given that a weaker exchange rate will improve the trade balance if the demand for certain necessities is highly price inelastic and/or export demand is substantially less inelastic.

In the case of fiscal policy, the effect is the opposite of monetary policy. This result comes directly from the sector balances accounting in equations (4), (5), and (6)—a reduced GB directly raises DPB, ceteris paribus. If fiscal policy through a reduction in GB succeeds in stimulating the economy out of economic contraction, it does so by raising private sector spending out of increased private sector income.[173] Lower interest rates in a downturn can enable refinancing to reduce debt service payments, but for distressed private sector firms or households such refinance may not be available, particularly since credit terms normally tighten in a downturn. Fiscal policy, through greater income for the purposes of servicing debts, reducing debt, and so forth, can reduce the negative effects of a downturn and encourage a quicker return to expansion; it reduces the need for private sector firms and households to reduce outlays relative to income to accomplish these, and thereby directly reduces the severity of the contraction.

In summary, there are two important points in regard to macroeconomic policy and the SFBs, and DPB in particular. First, from basic flow-of-funds accounting, monetary and fiscal policies both interact with DPB, but their respective effects on DPB can be entirely different. Second, given the first point, if both the state of the private sector's financial positions and where the financial burden of growth is borne are relevant to macroeconomic stabilization, then there are differing combinations of fiscal and monetary policies that are more or less appropriate to achieving macroeconomic stability for different states of the private sector's financial positions. That is, the macroeconomic effects of the macroeconomic policy mix are themselves dependent upon the state of the domestic sector's financial positions. Specifically, a financially fragile private sector may respond asymmetrically to changes in interest rates in ways that are very different from the standard view of a uniformly negative relationship between interest rates and spending:

[172] The classic example is Milton Friedman's proposed excess money balances effect.

[173] As with monetary policy, there is a potential offset regarding CA, since in this case, greater fiscal stimulus can reduce CA.

(i) In a recession, lower interest rates may not encourage borrowing if the private sector's goal is to reduce debt; at best, lower interest rates may put a floor under the recession by enabling some borrowers to refinance at lower interest rates, reducing their debt service burdens.
(ii) In an expansion, higher interest rates could push a fragile domestic private sector to instability if debt service burdens grow for the financially fragile while tighter monetary policy slows the economy and reduces incomes available to service the debts.

Finally, even macroprudential regulatory measures to reduce fragility can be insufficient since these operate by reducing private credit creation and slowing the economy's expansion, which then begs the question of how such a leakage can be offset with fiscal policy bound to a fiscal rule.

11.5 Understanding Indonesia's Macroeconomic Policy Mix

Bank Indonesia (BI) is provided with legal independence to carry out monetary policy, manage the exchange rate, and macroprudential regulation. The Indonesian government is constrained legally by the fiscal rule. Nonetheless, there are unavoidable, significant instances of macroeconomic interdependence between the two that occur with high regularity in normal times and out of necessity in times of economic stress.

Given the inherent flow-of-funds-based accounting relationships of fiscal and monetary policies to DPB, it is necessary to understand how the macroeconomic policy mix functions in practice. In Indonesia, this mix may appear to resemble what many economists refer to as monetary dominance. However, the relationship between the country's fiscal and monetary policies and its policy makers is more complex and nuanced than that term suggests. This section first discusses the straightforward division of responsibilities set out in Indonesia's laws. Thereafter, it describes several areas in which fiscal and monetary policies interact and are even interdependent.

11.5.1 Division of Responsibilities between Bank Indonesia and the Government

The country's Central Banking Act grants BI explicit, legal independence from the government, and mandates BI to ensure a stable value of the rupiah.[174] In pursuing the latter, BI is given authority over monetary policy, macroprudential regulation, exchange rate policy, and management of the payments system. Article 9 of the Act is explicit about the nature of BI's legal independence in carrying out its responsibilities: "(1) Other parties shall not interfere with the implementation tasks of Bank Indonesia … and (2) Bank Indonesia shall refuse and/or ignore any form of interference conducted by any parties in the implementation of the tasks." BI defines rupiah stability through price and foreign exchange rate stability:

> There are two aspects to stability in the value of the rupiah, namely stability of the currency in relation to goods and services and stability in relation to the currencies of other nations. The first aspect is reflected in the inflation rate, while the second is reflected in the rupiah exchange rate against foreign currencies.[175]

[174] President of the Republic of Indonesia (1999), Act of the Republic of Indonesia Number 23 of 1999 Concerning Bank Indonesia; and President of the Republic of Indonesia (2004a), Act of the Republic of Indonesia Number 3 of 2004 Concerning Amendments to the Act of the Republic of Indonesia Number 23 of 1999 Concerning Bank Indonesia.
[175] Bank Indonesia. Inflation as the Single Objective of BI. https://www.bi.go.id/en/moneter/inflasi/bi-dan-inflasi/Contents/Single.aspx.

BI is clear in its own publications and communications that it is an inflation-targeting central bank; the foreign exchange value of the rupiah is of concern mostly to the degree that its movements are expected to affect the inflation rate. Box 11.1 discusses BI's approach to inflation targeting

Box 11.1 Inflation Targeting in Indonesia

BI refers to its own monetary policy approach as the Inflation Targeting Framework (ITF). BI's website describes "The Inflation Target" in the following way:[a]

> Under the Bank Indonesia Law [that is, the Central Bank Act of 1999, revised in 2004], the inflation target is established by the Government. In a Memorandum of Understanding between the Government and Bank Indonesia, the inflation target is established for [a] three-year period in a Decree of the Minister of Finance (KMK). In the KMK No.93/PMK.011/2014, the inflation targets established by the Government for 2016, 2017, and 2018 are 4%, 4%, and 3.5%, with ± 1% deviation.
>
> These inflation targets are envisaged as a benchmark for business and the public in conducting their future economic activities and in so doing bring inflation down to a low, stable level. The Government and Bank Indonesia are steadfastly committed to achieving the established inflation target through policy coordination that consistently tracks this target. One measure for inflation control to bring about low, stable inflation is the shaping and guiding of public inflation expectations towards the anchor of the established inflation target.
>
> The inflation target is published on the Bank Indonesia Website and sites owned by other government institutions, such as the Ministry of Finance, Coordinating Ministry for the Economy, and the National Development Planning Agency (BAPPENAS). Before Act No. 23 of 1999 concerning Bank Indonesia, the inflation target was adopted by Bank Indonesia. However, after this law came into force, the inflation target has been established by the Government in a move to strengthen the credibility of Bank Indonesia.

In a more general sense, inflation targeting refers to a monetary policy strategy that has been adopted explicitly or implicitly at numerous central banks. It is based on a paradigm that views the following as fundamental to the functioning of modern economies:

(i) There is a "potential" or "speed limit" beyond which the economy cannot sustain; attempts to push the economy beyond this potential or speed limit result in accelerating inflation only, not additional economic growth.

(ii) The economy's potential is a function of supply-side policy—namely those affecting longer-run growth in productivity and the labor force—not demand-side policies related to macroeconomic stabilization.

(iii) Modern economies have built-in stabilization mechanisms that over time result in a return to their potentials; the sources of temporary deviations from a potential path are external or internal shocks to the economy and misapplication of macroeconomic stabilization policies.

(iv) The private sector's expectations of inflation influence strongly the economy's inflation rate and the short-run path of the economy relative to its potential via effects on labor negotiations, firm price setting, and foreign exchange markets.

(v) The central bank has substantial abilities to manage the path of the economy in the near term and over the growth of the money supply in the longer term.

(continued on next page)

Box 11.1 Inflation Targeting in Indonesia *(continued)*

From this perspective, it follows that the central bank bears full responsibility for the economy's long-run rate of inflation. Therefore, the long-run rate of inflation reflects the central bank's ability to keep private sector inflation expectations low and keep the economy on its potential path but not beyond it. Low inflation expectations are the result of the central bank's ability to build credibility in the private sector that inflation will remain low. A loss of such credibility can require a deep recession before inflation expectations reset at a lower rate. As a result, the appropriate strategy for achieving the economy's potential path with low inflation is for the central bank to explicitly target the desired rate of inflation in a manner that is consistent and credible to private sector actors. For the central bank to have the ability to pursue such a strategy, it must have independence from the shorter-run interests of the national political system.

In practice and in theory, announcing the inflation target, credibly following what is known as the Taylor Rule approach (or a framework similar to it) to adjusting the central bank's interest rate target, and independence from the political system are the cornerstones of monetary policy consistent with the above. The "rule" is more properly understood in practice as a policy "guide" rather than a rigid "rule"; as a "guide," it advises a central bank to adjust its interest rate target at a greater than one-for-one ratio to deviations from the inflation target, and smaller changes to the interest rate target in response to deviations from the economy's potential path. Consistently pursuing such a strategy earns the private sector's trust as the latter sets its inflation expectations. Because monetary policy actions affect the economy with a lag, central bankers may gauge the private sector's inflation expectations and insert those into its version of the Taylor Rule rather than actual inflation. For the same reason, central bankers provide "forward guidance" to markets regarding their projections of the economy's path relative to its potential, inflation expectations, and the inflation target, all within the context of how they expect to employ the interest rate target in response.

BI employs a Taylor rule-like "guide" to managing its short-term interest rate, the 7-day reverse repurchase agreement rate. In BI's case, the announcement of the target and continued frequent guidance to the public regarding how it is viewing incoming data and events occurring in the domestic and global economy with respect to its inflation target, provide transparency and accountability to help anchor the public's inflation expectations. In addition to adjusting its interest rate target, BI's communications to the public may include whether there is currently a bias toward a tighter policy (higher interest rate target) or looser policy (lower interest rate target). Whether there is a change to its interest rate target or not, BI's communication of its bias sends its own signal regarding the likelihood and direction of future changes in the interest rate target that have their own ability to anchor inflation expectations of the public.

Finally, BI's ITF is flexible, which refers to coordination with the government and BI's use of additional tools to complement both its changes to the 7-day reverse repurchase agreement target rate and its ongoing communications. In addition to setting the inflation target, the government takes part in the ITF in several ways, as BI explains:[b]

> At the policy making level, Bank Indonesia and the Government address this need by holding regular Coordination Meetings to discuss the latest economic developments. Similarly, Bank Indonesia is also frequently invited to Cabinet Meetings chaired by the President of Indonesia to provide opinions on macroeconomic and monetary developments relevant to achievement of the inflation target. Coordination of fiscal and monetary policy also takes place in the joint formulation of the State Budget Macro Assumptions deliberated with the Indonesian Parliament. In other areas, the Government coordinates debt management operations with Bank Indonesia.
>
> At the technical level, the coordination between the Government and BI has been established with the formation of the ministerial level Inflation Targeting, Monitoring and Control Team

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Box 11.1 Inflation Targeting in Indonesia *(continued)*

(TPI) in 2005. The TPI members include Bank Indonesia and technical ministries, such as the Ministry of Finance, Coordinating Ministry for the Economy, National Development Planning Agency, Ministry of Trade, Ministry of Agriculture, Ministry of Transportation and Ministry of Manpower and Transmigration. In view of the importance of this coordination, TPI was expanded to the regional level in 2008. Looking forward, the Government and BI envisage even stronger coordination with the support of ministerial and regional level TPI forums to bring about low, stable inflation as a platform for sustainable economic growth.

The TPI works to understand the relationship of prices of, say, food, to local, national, and global economic conditions and to policies (such as subsidies, transfers, regulations, and administered prices) and works to coordinate policy actions. Further, BI's tools for macroprudential regulation (such as countercyclical capital buffers and loan-to-value maximums) enable BI to, for example, reduce the domestic negative economic effects of a monetary policy tightening aimed at offsetting inflationary pressures originating in the global economy. For minimizing negative effects on inflation and the economy in general of fluctuations in the rupiah in foreign exchange markets, BI has developed numerous tools such as hedging requirements for corporations and banks, local currency bilateral settlement agreements (currently with Thailand and Malaysia), and central bank swap arrangements (currently with central banks of Australia, Japan, and the Republic of Korea), to name just a few.

[a] Bank Indonesia. The Inflation Target. https://www.bi.go.id/en/moneter/inflasi/bi-dan-inflasi/Contents/Penetapan.aspx.
[b] Bank Indonesia. Monetary and Fiscal Policy Coordination. https://www.bi.go.id/en/moneter/koordinasi-kebijakan/Contents/Default.aspx.

Source: Authors.

Indonesian law, on the other hand, places significant limits on fiscal policy. The State Finances Law restricts the government to an annual budget deficit of 3% of GDP (this is the horizontal line in Figure 11.3 above)[176] and a total national debt of 60% of GDP.[177] Since the law's inception in 2003, the national debt has fallen from nearly 90% of GDP to its current value of around 30%. The Central Banking Act further limits fiscal policy by (i) requiring the government to "hold prior consultations" with BI before issuing securities to fund its debt; (ii) requiring the government to consult with BI on all economic and financial policy matters, including the government budget, and for BI to submit an opinion on the government's budget and other policy matters relevant to BI's monetary policy duties; and (iii) forbidding BI from directly financing the government.[178] The clear legal intent is for fiscal policy in Indonesia to avoid significant attempts to provide countercyclical stabilization of the macroeconomy, while the national government has no legal basis for interfering or otherwise effecting a more countercyclical approach by BI to monetary policy.

BI's legal mandate could suggest that monetary policy in Indonesia might not be countercyclical either since—regardless of the state of GDP growth or unemployment—BI would be expected to tighten monetary policy when it believes there is a threat to "rupiah stability." This is true on its face, perhaps, but in

[176] President of the Republic of Indonesia (2003), Law of the Republic of Indonesia Number 23 of 2003 on State Finances.

[177] Further, Article 83 of Law Number 33 of 2004 on Fiscal Balance between the Central Government and the Regional Governments limits the combined deficits of all levels of government to 3% of GDP. See President of the Republic of Indonesia (2004b), Law of the Republic of Indonesia Number 33 of 2004 on Fiscal Balance between the Central Government and the Regional Governments.

[178] Article 55 requires the government to consult with BI on debt issuance. Article 54 requires the government to consult with BI on its annual budget and any policy proposals related to BI's legal mandate. Article 56 forbids direct government finance. Further, Articles 67 and 68 specify punishments of imprisonment and fines for "interference" in BI's carrying out of its monetary policy duties.

practice BI's approach to fulfilling its mandate has been rather flexible in its response to events in real time. For instance, during mid-2014 to late 2015, the rupiah's value fell nearly 15% against the US dollar, but BI did not respond with interest rate increases to defend the rupiah's value given that prices of oil and some other key commodity imports were falling at the same time. Ultimately, inflation fell from 8.4% in 2014 to 3.4% in 2015. On the other hand, during May to August 2018, BI responded to the rise in the US Federal Reserve's interest rate target, the uncertain environment surrounding the Trump administration's trade policy, and the potential spillover effects from the Turkish lira's fall by aggressively raising its target rate from 4.25% to 5.5%, and draining official foreign reserves by more than $10 billion. Nonetheless, BI's overarching target is inflation, which remains slightly below the target rate of 3.5%. Consequently, even as its recent tightening actions are also consistent with defending the rupiah's exchange rate, BI has stopped short of defending against any fall in the rupiah, which has depreciated 6% against the US dollar during this time.

Also, BI's responsibilities for financial regulation and its accompanying development of a range of macroprudential regulation policy tools enable a more "flexible inflation targeting" framework. BI's macroprudential tools can reinforce or "soften" changes it might make to interest rates in terms of their macroeconomic impact.[179] This flexible inflation targeting framework is currently on display, as BI's 0.5% increase in its interest rate target on 29 June 2018 was accompanied by a relaxation of loan-to-value limits for auto and property loans. In other words, BI's interest rate increases intended to reduce depreciation pressures on the rupiah were an attempt to ward off inflationary pressures that might pass-through from exchange rate depreciation to the supply side of the economy, while, simultaneously, BI viewed the financial sector as robust enough to warrant reducing the negative aggregate demand effect of higher interest rates by loosening credit conditions via higher loan-to-value limits.[180]

11.5.2 The Interdependence of Bank Indonesia and the Government

While Indonesian law is explicit on BI's independence and the government's limits, several policy interrelationships are also explicit. As explained in Box 11.1, the government and BI coordinate in setting, monitoring, and managing the inflation target. The Central Banking Act authorizes the President to nominate individuals, and the House of Representatives to confirm them, for openings on BI's Board of Governors. It also requires BI to provide written annual and quarterly reports on its actions and the economy's performance relative to BI's policy mandate, and authorize the House of Representatives to assess BI's performance, form a supervisory body whose purpose is to "strengthen the accountability, independence, transparency, and credibility" of BI, and to approve BI's annual budget.

Operational interdependence is inherent in BI's role as the government's fiscal agent. The Central Banking Act establishes BI as the "cashier" for the government, whose main transaction account is a liability on BI's balance sheet. Consequently, the government's spending, debt service, or principal payment on government debt adds directly to the monetary base, while receipt of tax revenues or proceeds from government bond sales reduce the monetary base directly.[181] These direct effects on the supply of settlement balances require offsetting actions by BI to avoid deviations in the interbank funding markets from BI's interest rate target. Daily flows to and from the government's account at BI thereby require daily coordination between the government

[179] For instance, Agung et al. (2016) and Warjiyo (2017).

[180] Indonesia Investments. 2018b. "A Closer Look at Bank Indonesia's Latest LTV Ratio Relaxation." 30 June. https://www.indonesia-investments.com/news/todays-headlines/a-closer-look-at-bank-indonesia-s-latest-ltv-ratio-relaxation/item8867?.

[181] BI settlement balances are held by banks in deposit accounts at BI. Settlement balances together with physical currency outstanding make up the monetary base. Since both are also liabilities for BI, by the logic of double entry accounting, a fall in the government's account on the liability side of BI's balance sheet raises reserve balances, and vice versa.

and BI to enable the latter to achieve its interest rate target. For instance, while by law BI cannot directly lend to the government or purchase the government's debt except in secondary markets, to achieve its interest rate target BI must ensure adequate settlement balances are available to the banking system via its own short-term operations such that government auctions can be settled without disruption to money markets.[182]

Interdependence extends to the government's budget position, which is directly affected by BI's financial position. The Central Banking Act requires BI to credit any "surplus" capital to the government's account beyond what it retains for its own capital.[183] However, should BI's capital fall below Rp2 trillion, the government is required to recapitalize BI to this level.[184] In other words, when BI profits from interest earned relative to interest paid or experiences a capital gain on its portfolio of assets denominated in rupiah and foreign currency (the latter being the nation's foreign currency reserves), this addition to BI's surplus capital adds to the government's budget position. When BI's surplus capital is smaller because of reduced net interest margins, reduced capital gains, or even capital losses, this reduces the government's budget position relative to otherwise. BI's capital at the end of July 2018 was more than Rp350 trillion, which is obviously well above the level that triggers the government's financial backstop.[185] Nevertheless, as an emerging market country desiring both large capital inflows and a relatively stable exchange rate, the risk of sizable reductions in BI's capital and an accompanying, in-kind reduction in the government's budget position via reduced credits to its account from BI are not insignificant.[186]

The operational interactions of BI and the government can be seen most clearly via BI's balance sheet, shown in the table in Box 11.2.

Banks lend and borrow reserve balances from each other in the interbank market at the interbank overnight rate (O/N rate), which is closely tied to BI's target of the 7-day repurchase agreement interest rate (BI 7DRR), set at 6% since 15 November 2018. As BI puts it, "at the operational level, the BI 7DRR is reflected in movements in the Interbank Overnight (O/N) Rate."[187] In other words, achieving the BI 7DRR target rate is consistent with balancing the quantity of reserve balances banks hold with the quantity demanded where the O/N rate stabilizes at nearly the same rate as the BI 7DRR target rate. If the quantity of reserve balances is less than the quantity demanded at this rate, the O/N rate will rise above this rate, putting pressure on the BI 7DRR rate to rise as well (since the interbank market and repurchase agreement markets are alternative sources of funds for banks) until BI adds reserve balances through open market operations, and vice versa.

In order to achieve its target interest rate, therefore, BI must do two things: (i) project the quantity of reserve balances demanded near its target rate; and (ii) through its open market operations, offset changes to its balance sheet that would otherwise move the quantity of reserve balances in circulation away from the projected quantity demanded at the target rate. For (ii), from BI's balance sheet, recall that its assets are equal to its combined liabilities and equity; then recognize that its liabilities can be split into reserve balances and nonreserve balance liabilities. These logical accounting steps are shown in (7), (8), and (9):

[182] An exception for monetary policy implementation purposes and for the funding of a government-financed emergency facility exists in Article 55 of the Central Banking Act.

[183] How much of its surplus BI retains is specified in the first two paragraphs of Article 62 of the Central Banking Act.

[184] Paragraph 3 of Article 62 of the Central Banking Act.

[185] Bank Indonesia. Economic Data, Monetary Statistics—Analytical Balance Sheet of Monetary Authority (Base Money). https://www.bi.go.id/en/iru/economic-data/monetary/Contents/Default.aspx.

[186] Dalton and Dziobek (2005).

[187] Bank Indonesia. Monetary Operations by Bank Indonesia—Description. https://www.bi.go.id/en/moneter/operasi/penjelasan/Contents/Default.aspx.

Box 11.2 Bank Indonesia's Balance Sheet

On the asset side are BI's claims on the domestic private sector (mostly loans to banks and others), the government (government securities), and nonresidents (foreign exchange reserves held by BI). BI's liabilities are currency in circulation (paper money), bank reserve balances (bank's settlement balances in accounts at BI), BI's certificates (short-term liabilities related to BI's interest rate target; these are no longer in use in BI's operations), other liabilities to banks and nonbanks, liabilities to nonresidents (accounts of other central banks and nonresident institutions), the government's account (a deposit account through which the government spends and receives payments), liabilities related to BI's open market operations (such as BI's reverse repurchase agreements), and "other" liabilities. BI's equity from paid-in capital and its retained profits are the final entry on the liabilities/equity side of its balance sheet.

Bank Indonesia's Balance Sheet (Rp billion)

	31 December 2015	31 December 2016	31 December 2017	30 September 2018
Assets				
Claims on the domestic private sector	8,330	7,867	7,503	7,380
Claims on government	241,710	207,515	193,766	193,140
Claims on nonresidents	1,529,331	1,642,137	1,843,171	1,791,339
Total	1,779,371	1,857,520	2,044,440	1,991,859
Liabilities and Equity				
Currency in circulation	586,763	612,545	694,830	679,858
Bank reserve balances	308,756	288,824	306,361	315,917
Bank Indonesia certificates	50,031	87,853	84,127	0
Other liabilities to banks and nonbanks	84,547	80,853	80,382	93,168
Liabilities to nonresidents	106,886	116,436	115,317	115,915
Government's account	149,895	125,060	157,565	167,030
Liabilities from Bank Indonesia monetary policy operations	177,243	259,798	264,838	193,721
Net other items	1,918	33,352	35,308	29,567
Equity	313,332	252,816	305,710	396,683
Total	1,779,371	1,857,520	2,044,440	1,991,859

Rp = rupiah.
Source: Bank Indonesia. Indonesian Financial Statistics, Monetary Sector—Analytical Balance Sheet of Monetary Authority (Base Money). https://www.bi.go.id/en/statistik/seki/terkini/moneter/Contents/Default.aspx.

From basic double-entry accounting the asset side of BI's balance sheet must equal the liabilities/equity side of its balance sheet. Among BI's liabilities, bank reserve balances settle payments among banks, transactions with the government, and with domestic and international payments systems.

Source: Authors.

$$\text{Assets} = \text{Liabilities} + \text{Equity} \quad (7)$$

$$\text{Assets} = \textbf{Reserve balances} + \text{Nonreserve-balance liabilities} + \text{Equity} \quad (8)$$

$$\text{Assets} - \text{Nonreserve-balance liabilities} - \text{Equity} = \textbf{Reserve balances} \quad (9)$$

From BI's balance sheet, the largest entry by far is for claims on nonresidents, BI's foreign exchange reserves. An increase in this entry results in an increase in reserve balances; in order to achieve its target rate while foreign reserves are increasing, BI will have to drain reserve balances. This results in the net of BI's open market operations entered as a liability on BI's balance sheet.

Recalling that the government's account is one of BI's liabilities, the government spends, receives taxes and fees, and receives proceeds from government bond sales through this account. In other words, when individuals pay taxes, receive payments from the government, or purchase a government bond, these payments are ultimately settled by a transfer to (from) a bank's reserve account at BI from (to) the government's account. From equation (9), the change in the quantity of reserve balances circulating is the negative of the change to the government's account. Given BI's daily operational objective of achieving its target rate for BI 7DRR, these flows to and from the government's account must be offset either by counter operations by the government or by BI's own open market operations. Absent offsetting operations, a net outflow from the government's account on a given day (i.e., a government deficit) will cause the O/N rate to fall below the target rate or even zero (bringing BI 7DRR with it) unless BI offers interest on reserve balances or an interest-bearing alternative liability. The opposite occurs on a day with net inflows to the government's account—the O/N rate will rise (again, bringing BI 7DRR with it) absent offsetting open market operations or banks accessing BI's standing facilities to borrow additional reserve balances.

The interdependence of monetary and fiscal policies at the operational level is inherent and arises because the operations of both alter the quantity of reserve balances. From the table in Box 11.2, the size of foreign reserves (claims on nonresidents on the asset side) has driven the longer-run balance of BI's operations into a net reduction in reserve balances as an offset after accounting for the net rise in other nonreserve balance liabilities and BI's equity.[188]

As a thought experiment, consider what would happen if the Government of Indonesia ran deficits without issuing debt to the private sector and instead received overdrafts in its account at BI (once the government's account balance fell below zero). This scenario is, of course, not consistent with current law, but it is useful for understanding the operational interdependence of fiscal and monetary policies. Over time, foreign reserves would be overwhelmed as the driver of BI's balance sheet by the rise in BI's loans to the government; from double-entry accounting, this rise in BI's assets (the loans to the government) would raise reserve balances in kind on its liability/equity side of the balance sheet (Box 11.3).

BI's interest rate policy and management of the rupiah's foreign exchange value also affect the government's budget position. Around 40% of the outstanding government debt is issued in foreign currency (mostly US dollars). A weaker rupiah increases the rupiah-based costs of debt service, and thereby worsens the government's budget position. A similar effect occurs with government subsidies for administered energy prices, where a weaker rupiah again brings more spending on subsidies and worsens the government's budget position.[189] The combined effect of a global fall in crude oil prices in 2015 and the Jokowi administration's reduction of petrol subsidies in late 2014 and again in 2016 enabled government spending on fuel subsidies to be 80% lower than in 2014, while spending on electricity subsidies was half the 2014 amount.[190] Nonetheless, spending on subsidies can still rise significantly via a rise in oil prices or a fall in the rupiah (or both), which then affects the government's budget position relative to the limit set by

[188] Note that for BI, the endogenous changes in official reserves (a BI asset) drive the balance sheet higher. BI's open market operations are, on average, increases in BI's liabilities to reduce reserve balances (though they would vary from day to day). So, when foreign reserves are transferred in, Indonesia's private banks receiving the transactions have their BI accounts credited with reserve balances. To achieve BI's target rate, BI must drain them by offering its own liabilities. The opposite case is, for example, that of the US, where the driver is an endogenous increase in currency circulating (a Fed liability), so the Fed's open market operations are, on average, adding to reserve balances (purchasing US government securities) since banks "purchase" the currency from the Fed (for their vault cash) by having their reserve accounts at the Fed debited.

[189] Although the ultimate effect on government subsidies depends also on global crude oil prices. That is, the effect of a fall in the rupiah on energy subsidies can be partially or even completely offset by a fall in oil prices, and vice versa.

[190] Indonesia Investments. 2018c. "Inflation in Indonesia—Analysis Consumer Price Index." 10 August. https://www.indonesia-investments.com/finance/macroeconomic-indicators/inflation-in-indonesia/item254.

Box 11.3 Government Deficits without Issuing Debt—A Thought Experiment

Operationally, not issuing debt is nearly the same as when the government issues securities to the private sector to finance its deficits. In the absence of government issuing securities, BI would have to pay interest on reserve balances at its target rate or offer interest-bearing alternatives to drain sufficient reserve balances to meet banks' demand for them at BI's target rate. In other words, the government deficits would still be held by the private sector as interest-bearing liabilities; the difference is that these would be liabilities of BI and not the government. The debt service would thereby by paid by BI, and would be large enough to turn its annual profits into losses. BI's losses would reduce its equity and thus its remittances to the government in kind. Eventually, BI's equity would fall below Rp2 trillion, at which point the Central Bank Act would require the government to recapitalize BI. In essence, the government would continue to be responsible for servicing its debt, albeit indirectly via lost remittances and then payments to recapitalize BI. Furthermore, BI would be able to directly control interest on rupiah-denominated government debt for maturities as high as it desired since the private sector would hold government debt in the form of BI's own liabilities, which BI could offer on demand at various maturities and announced rates of interest, as it has done via its own time deposits and securities in the past.

This is merely a thought experiment since direct BI loans to the government are not consistent with current law. Its importance is an illustration of the inherent interrelationship of fiscal and monetary policies. While Indonesian law regarding fiscal and monetary policies separates them, these inherent interdependencies exist at the operational level and are recognized in the same laws as lawful national resources for policy makers to draw upon under exceptional circumstances.

Source: Authors.

the fiscal rule. On the other hand, reduced subsidies may instead (or also) bring greater pass-through from oil prices to the inflation rate relative to the effect on the government budget. Finally, the ongoing increase in infrastructure spending (itself funded by reduced subsidies), in the current context of concern for a negative current account balance and depreciation in the rupiah, has led the government to weigh the import content of state-owned enterprise projects in its prioritization process, which is yet another point of interaction between Indonesian fiscal and monetary policies.[191] Appendix 11.1 provides more discussion and details regarding the interactions of BI's interest rate and exchange rate actions with the government deficit and debt.

Although BI is normally forbidden legally from directly lending to the government or purchasing government securities in the primary market, there are several ways in which BI affects interest rates on government debt (which thereby affects debt service and through it the government's budget position). Indonesia's government debt is issued across the yield curve, which BI attempts to manipulate, via its own interest rate target on the shorter maturities and through forward guidance for the longer maturities, in order to transmit monetary policy to the economy. In addition, BI manages government bond auctions, conducts clearing and settlement of government bond sales in the primary and secondary markets, and is effectively a backstop to government bond markets through its reverse repurchase operations in government bonds for setting its policy target. Consistent with the government's pursuit of shifting government debt from external to domestic financing,[192] the more successful BI is at catalyzing greater

[191] Indonesia Investments. 2018d. "Bank Indonesia Urges Government to Be More Selective in Infrastructure Projects." 31 July. https://www.indonesia-investments.com/news/todays-headlines/bank-indonesia-urges-gov-t-to-be-more-selective-in-in-frastructure-projects/item8921.

[192] For instance, Hendar (2012).

liquidity in government bond markets in order to enhance its own monetary policy implementation and transmission, the more interest rates on government debt will reflect BI's policy stance. Finally, in the event of a financial crisis where systemic solvency issues arise, the Central Banking Act requires the government to fund an emergency lending facility,[193] while it also allows BI to purchase government debt in primary markets to fund this, effectively enabling BI to set the interest rate on funds raised for the facility.[194]

In summary, while Indonesia's macroeconomic policy mix legally mandates BI as the dominant policy maker the reality is more complex. Operationally, BI and the government coordinate daily in order for BI to achieve its targeted interest rate. BI's own actions in domestic and international financial markets that add to or subtract from its profits, or result in capital gains/losses, necessarily affect the government's budget position, while BI's role providing market liquidity in government bond markets, setting an interest rate target, and exchange rate policy all affect government spending on debt service. In a financial crisis, BI would rely directly on the government to fund important stabilizing operations when solvency issues arise, while BI is legally authorized to directly set the terms of the government's funding. In short, BI, through its own monetary policy actions, necessarily impacts on the government's budget position and especially its debt service, while the latter is the specific spending item that Indonesia's fiscal rule attempts to remove from BI's list of concerns.

11.6 Conclusions

The foregoing sections of this chapter make the following assertions:

(i) Indonesia's SFBs for the past several years show CA < 0 and GB ≥ −3% of GDP. Since DPB = CA − GB, DPB has been close to zero, sometimes a bit above and sometimes a bit below. There is little reason to put high probability on CA turning positive in the near future.

(ii) Historically, DPB < 0 has been a fairly reliable signal of building financial fragility for numerous countries.

(iii) The DPB can be decomposed into the household, firm, and financial sector components. This decomposition for Indonesia shows that the firm sector is bearing the financial burden of growth.

(iv) Fiscal and monetary policies have opposing effects on DPB and the private sector's financial positions. Therefore, the mix of fiscal and monetary policies that is appropriate is a function of the state of domestic private sector financial positions and DPB.

(v) While Indonesia's macroeconomic policy mix might appear to be one of monetary dominance, there is in place far more interdependence than this term suggests, especially with regard to the operational and budgetary interactions of fiscal and monetary policies.

Points (i)–(iv) above suggest that, absent a significant improvement in the current account, Indonesia's fiscal rule is leaving the firm sector to bear the financial burden of growth. This is particularly so if one assumes monetary dominance in Indonesia, since through the lens of the first four points monetary dominance is at a disadvantage if the financial burden of growth becomes too great for the firm sector. While there is a clear, strong preference in Indonesian law (and thus, political culture) for BI to be the dominant policy maker, and for the government's fiscal position to enhance rather than detract from BI's credibility as it pursues an inflation target, point (v) reflects the inviolable fact that monetary and fiscal

[193] Article 11 of the Central Banking Act.
[194] Article 55 of the Central Banking Act.

policies are always interrelated—via flow-of-funds accounting, operations, budgetary effects, and so on. Legislating differing policy roles and objectives does not change the nature of flow-of-funds accounting, central bank and fiscal operations, or government budgeting.

The potential for resolution lies in recognizing that there need not be an inconsistency between this values-based position that sets criteria for institutional arrangements in macroeconomic policy design and the real-world scenario that (i)–(iv) above present. This yields a two-step process: (i) determining whether or not the financial burden of growth on the firm sector is showing signs of rising financial fragility; and, if so, (ii) answering the question "how does a BI-led policy mix reduce this burden without sacrificing the goal of faster growth?" The first of these is the subject of the next chapter, while the second is the organizing principle of the policy recommendations for fiscal and monetary policies to support economic growth in the final chapter.

Appendix 11.1

The Debt Laws of Motion for Indonesia's Government

Economists frequently discuss the evolution of a government's debt ratio (government debt divided by gross domestic product [GDP]) through so-called "laws of motion." The latter is given by the formula:

$$d_{t+1} = d_t\left(1+\frac{i_{t+1}-g_{t+1}}{1+g_{t+1}}\right)+pdef_{t+1}+x_{t+1} \qquad \text{(A11.1)}$$

where

d_j = debt-to-GDP ratio in period j;

i_j = interest rate on government debt in period j;

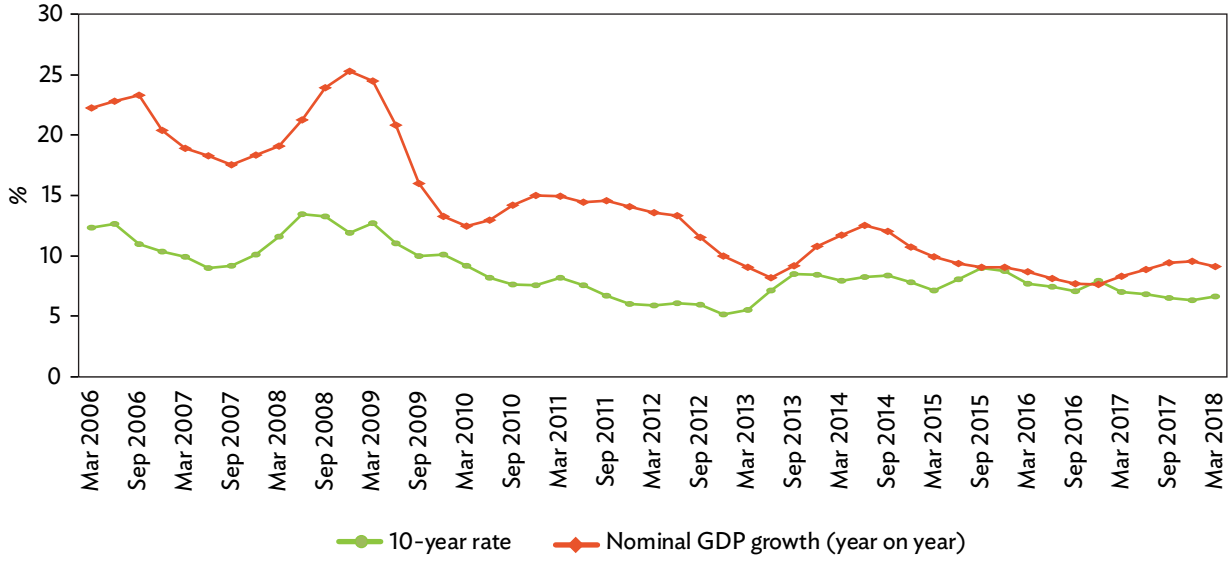
g_j = growth rate of GDP in period j;

$pdef_l$ = primary government deficit (i.e., the negative of the government's budget position excluding debt service) in period j; and

x_j = "other" factors affecting the budget position in period j; this often refers to seigniorage income (which in practice is mostly remittances from the central bank to the government), net purchases or sales of government assets, and so forth. (As with $pdef$, because x is added to d, x is the negative of the government's position regarding these "other" effects.)

The difference between i and g accounts for the difference between the growth in debt service's effect on the government's debt and the growth of GDP's effect on the debt ratio (since GDP is the ratio's denominator). Figure A11.1 shows that for Indonesia, $i < g$ since the mid-2000s, using the 10-year rate

Figure A11.1 Nominal Gross Domestic Product Growth (year on year) and 10-Year Interest Rate on Rupiah-Denominated Government Debt

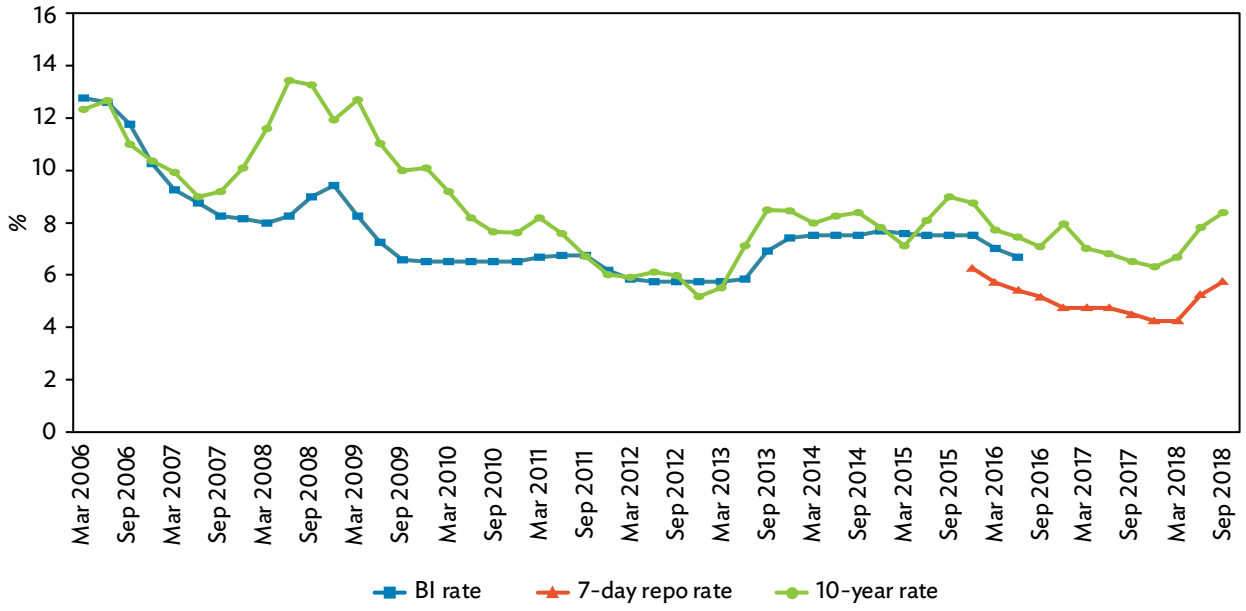


GDP = gross domestic product.
Sources: Bank Indonesia and Indonesia Central Bureau of Statistics.

of interest on rupiah-denominated government debt as a proxy for the average rate of interest on the government debt. Indonesian government debt outstanding has different maturities, rather than all and exclusively at 10-years (though currently the average is near 10-year maturities) and the interest on the nonrupiah-denominated portion is obviously not subject to rupiah-based interest rates. Nonetheless, as the rupiah-denominated portion of the debt is now 60% and growing relative to the foreign currency-denominated portion, the significance of the relationship in Figure A11.1 increases.

Figure A11.2 presents the 10-year interest rate on rupiah-denominated government debt together with BI target rate. The target rate changed from the BI rate to the 7-day repurchase agreement rate (repo rate) in August 2016; both are present in the figure with a bit of overlap in 2016 in preparation for the change. The figure illustrates that the 10-year rate's changes have moved largely in step with changes in BI's target rate. In other words, the current and expected BI target rate (the latter referring to the bond market's expectations) significantly affect the path of the 10-year rate.

Figure A11.2 Bank Indonesia Target Rates and 10-Year Interest Rate on Rupiah-Denominated Government Debt

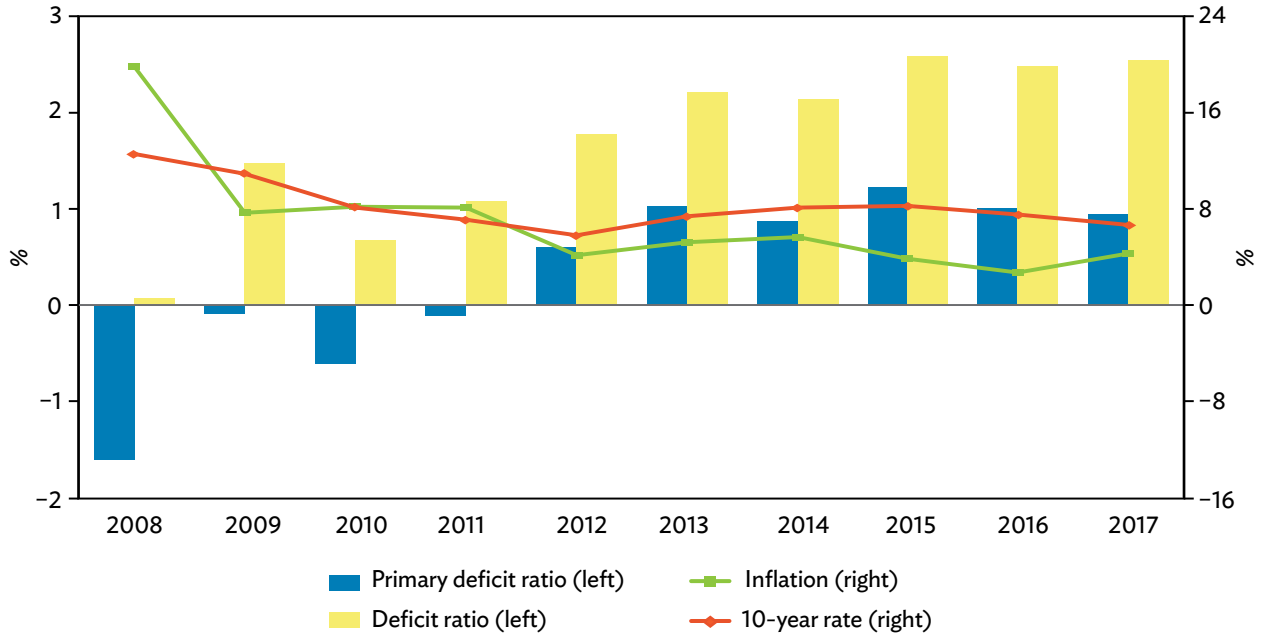


Source: Bank Indonesia (BI).

Figure A11.3 graphs four series—the primary deficit ratio, the deficit ratio, the inflation rate (nominal GDP less real GDP), and the 10-year interest rate from the two previous figures. The objective is to discern whether the path of the interest rate is a reflection of the government's budget position or of the inflation rate. The primary deficit ratio is negative for the first 4 years, then rises to around 1% of GDP for the final 5 years. The inflation rate follows a much different path, falling from near 20% to at or below 5% in the final 6 years. The 10-year rate largely follows the path of inflation. From the previous figure, the 10-year rate mostly follows BI's target rate. This suggests that inflation drives BI's interest rate target, which has substantial influence on the 10-year rate; the primary and total deficit ratios appear to have little if any effect on the latter.

Together, the preceding figures suggest that BI's policy rate might have substantial influence over the portion of equation (A11.1) referring to debt service relative to GDP growth, to the degree that rupiah-denominated interest rates are influenced by the path of BI's policy rate now and in the future.

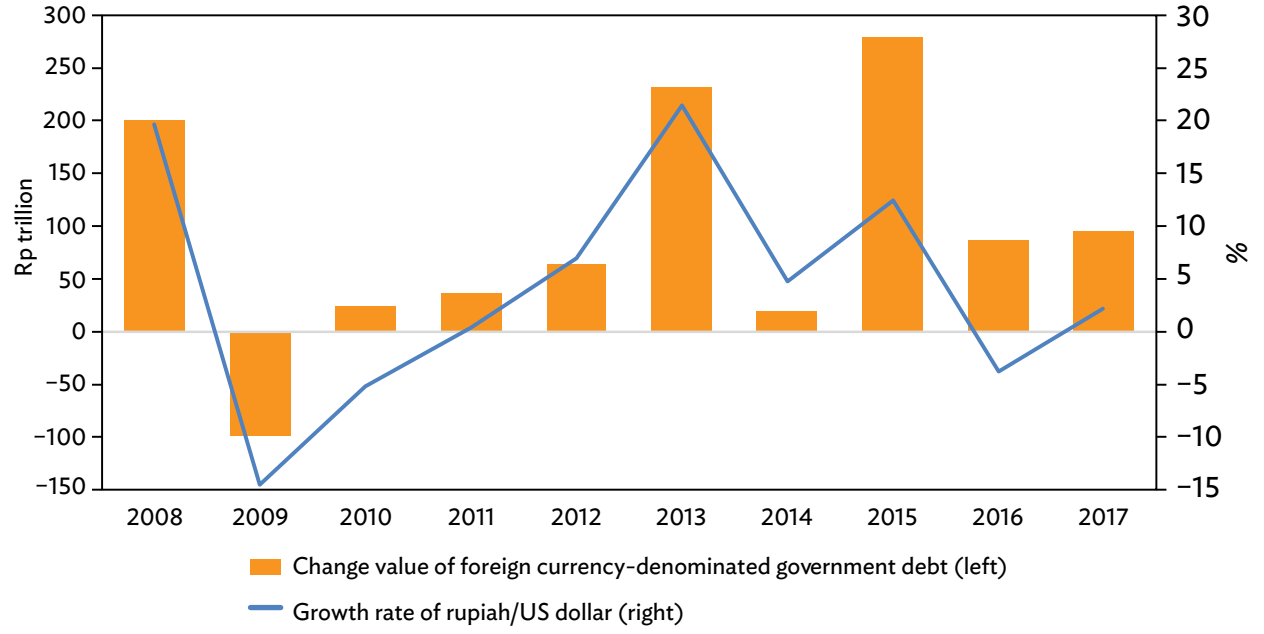
Figure A11.3 Indonesian Government Primary and Total Deficit Ratios, Inflation, and 10-Year Interest Rate on Rupiah-Denominated Debt



Sources: Bank Indonesia, Indonesia Central Bureau of Statistics, and Indonesia Ministry of Finance.

Since 40% of Indonesia's government debt is denominated in foreign currencies—overwhelmingly in US dollars—the exchange rate should affect the size of the debt when valued in rupiah. Figure A11.4 shows the change in the value of foreign currency-denominated debt (Rp trillion) with the growth rate of

Figure A11.4 Change in Value of Foreign Currency-Denominated Government Debt and Growth Rate of Rupiah per United States Dollar



Rp = rupiah, US = United States.
Sources: Author's calculations based on data from the Indonesia Ministry of Finance.

the rupiah–dollar exchange rate (a higher growth rate means the rupiah is depreciating, and vice versa). The relationship is close, as the peak increases correspond to the highest rates of rupiah depreciation, and vice versa. This suggests that equation (A11.1) is incomplete and should incorporate the exchange rate's effect on foreign currency-denominated debt.

To make this adjustment, the growth rate in foreign debt, g_{t+1}^{for}, as a result of exchange rate depreciation is

$$g_{t+1}^{for} = \left(-gIDR_{t+1}\right)\left(\frac{forD_t}{D_t}\right) \tag{A11.2}$$

where

$-gIDR_j$ = depreciation rate of the rupiah relative to the United States (US) dollar in period j;
$forD_t$ = foreign currency-denominated government debt in period j; and
D_t = total government debt in period j.

Inserting equation (A11.2) into (A11.1) yields equation (A11.3):

$$d_{t+1} = d_t\left[1+\frac{i_{t+1}-g_{t+1}}{1+g_{t+1}}+\frac{g_{t+1}^{forD}}{1+g_{t+1}}\right]+pdef_{t+1}+x_{t+1} \tag{A11.3}$$

which can be rewritten as

$$d_{t+1}-d_t = \frac{d_t\left(i_{t+1}-g_{t+1}\right)}{1+g_{t+1}}+\frac{d_t g_{t+1}^{forD}}{1+g_{t+1}}+pdef_{t+1}+x_{t+1} \tag{A11.4}$$

The left-hand side of equation (A11.4) is the change in the debt ratio. The right-hand side of (A11.4) isolates the effect on the change in the debt ratio resulting from (i) the difference between the interest paid on the national debt and GDP growth, (ii) growth in foreign currency-denominated debt resulting from exchange rate depreciation, (iii) the primary deficit, and (iv) "other" effects.

Using proxy variables for (i) and (ii), equation (A11.4) provides estimations of the relative effects of (i) through (iv) on the evolution of Indonesia's debt ratio. This is shown in Table A11.1. The proxies are the 1-year average of the 10-year rate of interest on rupiah-denominated government debt for ij; annual nominal GDP for gt; the annual growth rate of the rupiah per US dollar for -gIDRj; and the Indonesian government's nonrupiah-denominated outstanding liabilities in the form of both loans and securities for forDj. While these are obviously imperfect proxies, nonetheless they result in estimated changes to the debt ratio that are not far off the actual changes.

Columns C and D of Table A11.1 show the estimates of respective effects of interest rates versus nominal GDP growth and depreciation of the rupiah on changes in the debt ratio via the proxy variables. Columns E and F are the actual primary deficits (note that a negative sign indicates a primary surplus since this reduces the debt ratio) and "other" effects, both as a percentage of GDP. Column G presents the sum of columns C, D, E, and F, which is the estimate of the change in the debt ratio. Column H presents how much the estimate overpredicts or underpredicts the actual debt ratio change in column B. At the bottom of the table are two rows that present averages and standard deviations for each column. Note in column H that the average is –0.01; in other words, the method and proxies together generate estimates

Table A11.1 Sources of the Change in the Estimated Debt Ratio (percentage points)

Year	Actual Change Debt Ratio	Estimated Interest Rate versus Growth Effect	Estimated Rupiah Depreciation Effect	Primary Balance Effect	"Other" Effects	Estimated Change to Debt Ratio (C+D+E+F)	Estimated Less Actual Change to Debt Ratio (G – B)
A	B	C	D	E	F	G	H
2008	–1.97	–3.35	2.43	–1.60	0.81	–1.71	0.26
2009	–4.41	–0.64	–2.07	–0.09	–0.61	–3.41	1.00
2010	–2.22	–1.58	–0.57	–0.60	0.22	–2.54	–0.32
2011	–1.33	–1.49	0.04	–0.11	0.13	–1.43	–0.10
2012	–0.14	–0.89	0.66	0.61	–0.56	–0.17	–0.03
2013	1.93	–0.71	1.97	1.03	–0.48	1.82	–0.11
2014	–0.20	–0.59	0.50	0.88	–0.12	0.67	0.88
2015	2.78	–0.18	1.22	1.24	–0.18	2.09	–0.69
2016	0.88	–0.02	–0.43	1.01	–0.36	0.20	–0.68
2017	0.65	–0.74	0.24	0.95	–0.14	0.31	–0.33
Average	–0.40	–1.02	0.40	0.33	–0.13	–0.42	–0.01
Standard deviation	2.14	0.95	1.30	0.81	0.43	1.81	0.58

Source: Authors' calculations.

of changes to the debt ratio that across 10 years are on average nearly identical to the actual changes. Although in no year is the estimate identical to the actual change, in 6 of the 10 years the absolute value of the estimate is within one-third of a percentage point of the actual change; the absolute value of the largest error is only 1 percentage point.

The estimates suggest substantial interdependence between monetary and fiscal policy in Indonesia. From column B, the average change in the debt ratio for all 10 years is –0.4 percentage points. In columns C and D, the average interest rate and rupiah depreciation effects are –1.02 and 0.4 percentage points, respectively, while the average primary deficit effect in column E is 0.33 percentage points. In other words, the effects that may be far more under the influence of BI (interest rates and rupiah depreciation) are both greater than the effect that the government influences more (primary budget balance—though the rupiah's value can affect this as well, such as via energy subsidies or the import content of infrastructure projects). Further, the result is the same for the respective standard deviations in columns C, D, and E: variability in debt-ratio changes have been more the result of BI than of the government on average. In particular, consistent with Figure A11.3, the largest increases in the debt ratio during 2008–2017 occurred in 2013 and 2015, which appear to be in significant part the result of rupiah depreciation as much as or more than they were caused by the government's primary deficits.

Overall, given how much more influence BI has on interest rates on rupiah-denominated government debt and the rupiah's value in foreign exchange markets than the government, the evolution of the government debt ratio and the government's total deficit position in any given year (i.e., including debt service on rupiah and nonrupiah-denominated debt) is a product of the policies of both the government and BI. While, as noted, the proxies here are imperfect (for instance, debt service is obviously a known variable, not something that needs to be estimated via proxy), as debts incurred well in the past become less significant to the composition of the total government debt, the conclusions here become increasingly relevant.

12 Indonesia's Nonfinancial Corporate Sector, Financial Fragility, and Macroeconomic Policy Consistent with Faster Growth

12.1 Introduction

Indonesia's corporate or firm sector currently bears the financial burden of growth. This burden will increase in order for Indonesia's economy to grow faster, unless some of the burden is shifted to another sector. However, the combination of a current account deficit and fiscal rule could leave few, if any, other options. If that is the case, or even if it is only partly so, it is important to understand the financial condition of Indonesia's corporate sector. From the perspective of macroeconomic policy, the focus goes beyond the financial condition of the corporate sector to what the appropriate policy response might be. For instance, in the event of a Bank Indonesia (BI) policy stance aimed at reducing inflationary risks, if the corporate sector must refinance a large amount of its debt, an increase in interest rates could leave the sector's financial positions even worse than before. This calls for a more general consideration of what it means for macroeconomic policy to simultaneously pursue faster growth while promoting a more robust firm-sector financial position.

Section 12.2 discusses recent analyses of financial risks to Indonesia's corporate sector from foreign-currency-denominated liabilities. Section 12.3 then presents and applies an approach to evaluating financial risks to the corporate sector that can be integrated into the framework in Chapter 11 of the sector financial balances and macroeconomic policy. Section 12.4 provides concluding remarks on the implications for Indonesia's macroeconomic policy mix and faster economic growth.

12.2 Foreign-Currency-Denominated Liabilities for Indonesia's Corporate Sector

Analysts have warned of risks to foreign-currency-denominated debt for Indonesia's corporate sector even as overall debt has been at what are normally considered manageable levels. The pace of this borrowing appears to have continued through early 2018 even as BI has implemented regulatory oversight as well as hedging and liquidity minimums for foreign-currency-denominated corporate debt.

In a 2017 analysis, the International Monetary Fund (IMF) economists found that "the risk from the corporate sector remains manageable in Indonesia, and the [monetary] authorities have strengthened the monitoring framework."[195] They noted the sector's high profitability (measured as return on assets), low corporate debt-to-gross domestic product (GDP) ratio, and moderate near-term refinancing risks, both in absolute terms and in comparison to other emerging market corporate sectors. The authors also approvingly noted multiple times BI's monitoring of corporate financial positions particularly in regard to currency risks. They concluded:

[195] Chan-Lau et al. (2017, p. 19).

> Nonetheless, close monitoring and granular analysis on maturing FX [foreign-currency-denominated] debt are warranted. Even though the overall risk of the corporate sector is manageable, a group of corporates faced heightened debt risks, some of which are connected to large business groups. Close monitoring, therefore, is required for FX debt of corporates with rupiah income, as well as unhedged, non-affiliated, or maturing FX debt, together with bank linkages. Strengthening policy coordination should also continue, coupled with data analysis to assess the dimensions of the debt problems of specific corporates in vulnerable groups.[196]

The IMF authors noted some potentially problematic trends in foreign-currency-denominated borrowing:

> [R]isks started to emerge as foreign currency (FX) denominated corporate debt increased rapidly over the past years. FX corporate debt (including that owed to domestic banks) doubled from 2010, reaching around 20 percent of GDP in the second quarter of 2015 . . . The level remains relatively low but the fast pace of increases could be a risk factor. Around 90 percent of debt securities issued in 2014 were FX denominated, and FX debt now accounts for around 60 percent of the total corporate debt. Looking at the distribution, FX corporate debt is concentrated in the commodities and selected non-tradeable sectors . . . FX debt issuance moderated in 2015, after supply (i.e., higher risk aversion towards [emerging markets] generally) and demand (i.e., weak private investment amid the prolonged commodity down cycle) factors both weakened. However, external borrowing could accelerate, as infrastructure spending is expected to rise in the coming years, driven by the government's push for economic development.[197]

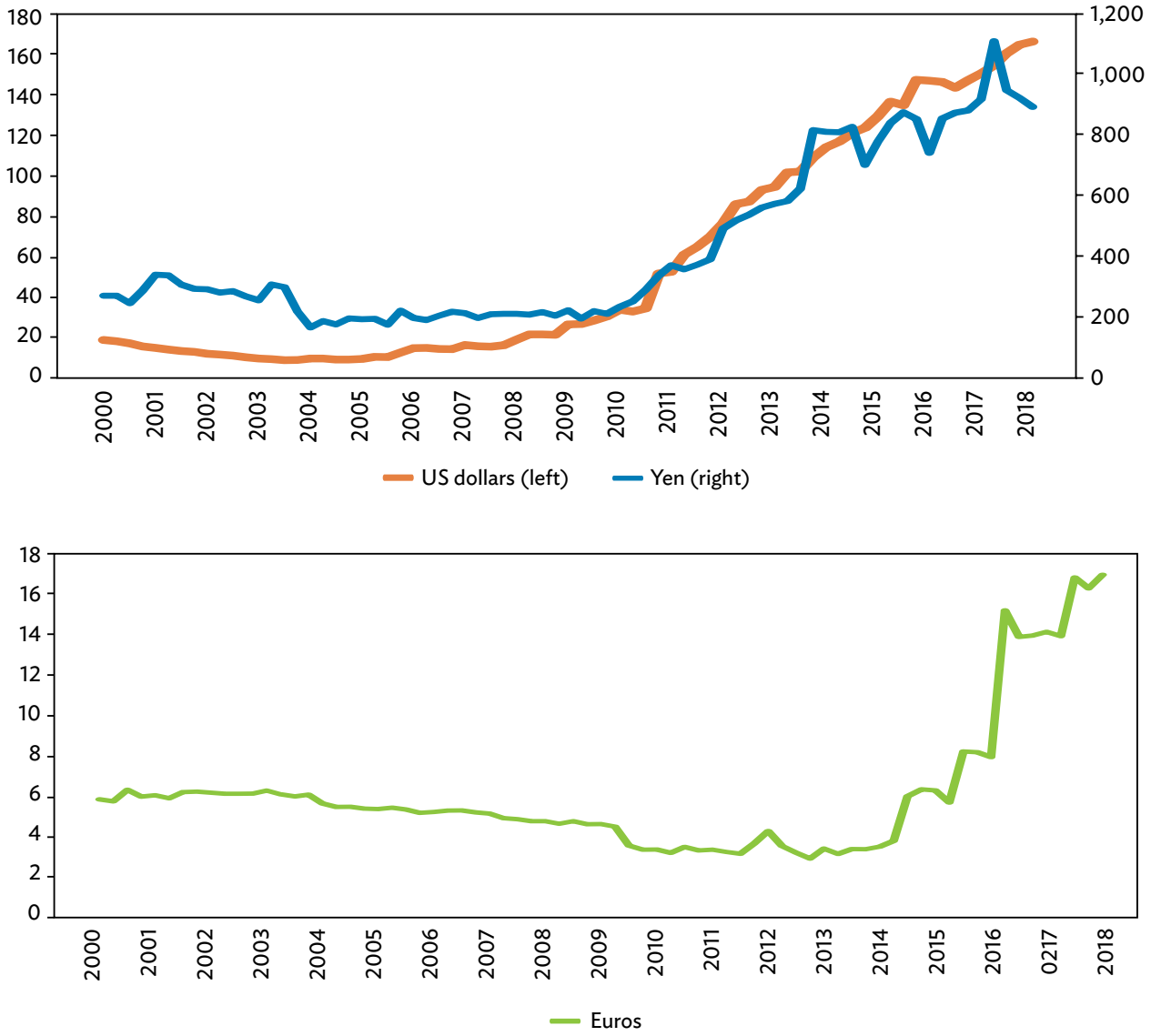
Figure 12.1 shows Indonesian corporate sector borrowing in United States (US) dollars, yen, and euros. The data suggest that growth in corporate borrowing in US dollars continued its pace following a pause in 2015, but the pace in yen borrowing slowed, apart from a one-time surge in early 2017. Borrowing in euros, like in US dollars, increased through the first quarter of 2018 following a pause in 2015, although the scale of borrowing in euros is far smaller than in US dollars or yen.

As the IMF authors noted, BI has implemented regulations to reduce the risks of corporate FX debt. These require that corporate borrowers do the following:[198]

(i) Hedge a minimum of 25% net foreign currency liabilities with maturities between 0 and 3 months and between 3 and 6 months.
(ii) Hold foreign currency, short-term assets equal to 70% of foreign-currency liabilities that mature within 3 months.
(iii) Possess a credit rating of BB– or greater from a BI-recognized rating agency, issued within the past 2 years that includes consideration of foreign currency debt(s).

[196] Chan-Lau et al. (2017, p. 19).
[197] Chan-Lau et al. (2017, p. 5)
[198] Bank Indonesia (2014a).

Figure 12.1 Indonesian Corporate Sector Borrowing in United States Dollars, Yen, and Euros



US = United States.
Note: Data refer to credit to nonbank borrowers.
Source: Bank for International Settlements (2018).

There are a number of technical details regarding definitions and exclusions, and related discussions regarding the regulation's potential effectiveness, as might be expected.[199] Many of these regulations revolve around how inclusively FX assets and liabilities are defined; for instance, nonmarketable FX claims such as inventories and receivables count toward their FX assets and, more importantly, short-term FX assets, substantially reducing the amount of FX exposure a company might otherwise have to hedge.

[199] Bank Indonesia (2014b).

Recently, Moody's on 13 September 2018 noted similarly that, "Indonesia's broadly sound economic fundamentals and strengthened policy framework are containing credit risks associated with the rupiah's recent decline, but additional currency weakness would have economywide credit-negative effects, especially given the government and corporate sector's reliance on external funding."[200] It noted that Lippo Karawaci, Alam Sutera Realty, MNC Investama, and Gajah Tunggal, were "most vulnerable to rupiah weakness as their debt is largely denominated in dollars, while their cash flow is in rupiah. Most other rated companies have risk mitigants that would limit the credit impact of continued rupiah depreciation."[201] On 4 November 2018, an article in FinanceAsia added that, "in the international bond markets, companies such as B minus rated property developer Lippo Karawaci and B rated Jababeka are trading at 19.2% and 11.97% for 2022 and 2023 paper respectively."[202]

The perception of rising macroeconomic risks from foreign-currency-denominated debts in the firm sector led BI to take preemptive steps to reduce these risks. If successful, the rupiah can be allowed to depreciate as it is doing now, when inflationary pressures are low, with less concern for the consequences from foreign currency liabilities in the firm sector. However, for the firm sector to bear the financial burden of faster growth in Indonesia, robust financial positions overall—that is, not only net positions in foreign currencies, but the ability to service and refinance obligations in general—are necessary, which is the subject of the next section.

12.3 Corporate Sector Financial Positions and Interest Rate Sensitivity in Indonesia

Data from a sample of Indonesian corporations suggest that financial performance has slowed since 2012 while the robustness of financial positions may have also declined. Sensitivity analysis illustrates how the combination of slower growth and tightened policy can significantly affect firms' financial positions, especially when they start from a less robust point.

This section presents an approach to evaluating financial positions of the Indonesian corporate sector consistent with the sector financial balances and macroeconomic policy mix. The approach is not complicated and uses common metrics. The significance here is the relationship of the analysis to macroeconomic policy and, more specifically, to the macroeconomic policy mix employed in pursuing a stable balance for bearing the financial burden of faster growth. It is summarized in Box 12.1.

Table 12.1 presents return on invested capital (ROIC) from equation (12.4) for a sample of several Indonesian publicly held companies sorted by highest to lowest returns in 2017. At the bottom of the table is the average and median for each column. From those, at least for this sample, ROIC declined from 2012 through 2015 for median values (2012 through 2014 for average values), and then rebounded somewhat by 2017. Only five companies in the sample achieved ROICs in 2017 above their values in 2012. Negative ROICs for Bayan in 2014, Krakatau Steel in 2015, and Garuda Indonesia in 2014 are in bold since a negative value means calculations for both equations (12.5) and (12.6) are mathematically not meaningful; they are financially meaningful, though, since cash flows from operations were clearly not enough to cover debt service or even interest.

[200] Moody's (2018).
[201] Moody's (2018).
[202] Home (2018).

Box 12.1 Metrics to Evaluate the Financial Positions of the Corporate Sector

Consider three standard, simple measures that together provide substantial information for evaluating a company's financial position.

$$\text{Operating net cash inflow} = \text{Earnings before interest and taxes} + \text{Depreciation} + \text{Amortization} + \text{Other noncash charges} \quad (12.1)$$

Operating net cash inflow here is simply the cash flow available to service debts and nondebt liabilities such as trade credit. It is equivalent to earnings before interest, tax, depreciation, and amortization (EBITDA) if "other noncash charges" are limited to amortization.

$$\text{Total debt service} = \text{Interest due on debts and leases} + \text{Short-term debt} + \text{Current portion of long-term debts and leases} + \text{Other debts currently due} \quad (12.2)$$

Total debt service includes all principal and interest payments coming due. A firm whose cash inflow is larger than this amount can, in theory, retire all maturing debts. If cash inflow is smaller than (12.2), the firm requires refinancing of at least some of its maturing debt.

$$\text{Interest due} = \text{Total interest due on debts and leases} \quad (12.3)$$

If a firm's operating net cash inflow is less than interest due, then it must not only refinance its maturing debt but also (at least) some of the interest due. The firm's debt will grow as a consequence of refinancing. If, on the other hand, cash flow lies in between total debt service and interest due, then the firm can cover its interest at the very least, and also some of its maturing debt; refinancing will not result in an increase in the firm's debt.

To compare performance across companies, industries, and time, the analysis here uses a cash-flow-based version of return on invested capital (ROIC):

$$\text{ROIC} = \text{Net operating cash inflow} / \text{Invested capital} \quad (12.4)$$

The numerator of equation (12.4) is simply (12.1). It is common not to add back noncash charges like depreciation in the numerator of ROIC in the context of valuation or project analysis. The purpose here is to investigate cash flows relative to commitments, for which equation (12.1) as the numerator of (12.4) is more appropriate. Invested capital is defined as total assets minus excess holdings of cash and short-term investments, and minus nondebt liabilities such as trade credit and accruals. Excess holdings of cash and marketable securities are defined here as balances beyond 10% of sales (that is, beyond a sufficient buffer for operations). Invested capital is thus the amount invested by creditors and shareholders, with a reduced "charge" for excess cash that is yet to be employed or returned to investors. ROIC is then the net cash flow generated by operations that is available to return to investors or to reinvest in the company as a percentage of the invested capital.

While it is common to use profit margin or return on assets to evaluate and compare company performance, both of these have shortcomings relative to ROIC. Profit margin—a company's profits as a percentage of sales—is particularly poor since different industries have different inherent abilities to generate margins. A good example is the retail industry. For example, evaluating company performance via profit margin would categorize companies like Wal-Mart and Amazon as perennial underperformers. Return on assets—profits as a percentage of assets—is an improvement since it is a fairer comparison of a company like Wal-Mart that generates profits through volume rather than margin to, say, a pharmaceutical company that does so based on margins. Still, for assessing capacity to service debts, the appropriate measure of profit is operating profits before interest and taxes, which neither profit margin nor return on assets provides. Return on assets also penalizes companies for holding cash—such as Apple, Microsoft, Berkshire Hathaway, and Google, all of which hold large cash balances—

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Box 12.1 Metrics to Evaluate the Financial Positions of the Corporate Sector *(continued)*

since it is part of the denominator, even though holding cash may be valuable for added flexibility in acquisitions, projects, or other opportunities, thus reducing (or eliminating) the need for external finance. Unlike return on assets, not charging company returns for large cash holdings is consistent with the goal here of evaluating the ability to meet debt service requirements.

Two ratios evaluate the ability to service debts. They combine equations (12.1), (12.2), and (12.3):

Debt-service-to-cash inflow = Total debt service / Net operating cash inflow (12.5)

Interest-to-cash inflow = Interest due / Net operating cash inflow (12.6)

Equation (12.5) is simply (12.2) divided by (12.1), whereas equation (12.6) is (12.3) divided by (12.1). These two ratios provide clear assessments of the ability to service debts and the need for refinance. If equation (12.5) is greater than 1, then the company must refinance at least part of its debt principal coming due. If equation (12.6) is greater than 1, then the company must refinance all of its debt principal coming due and at least some of its interest on debt and/or leases.

Note that neither equation (12.5) nor (12.6) incorporates cash or short-term liquid assets on hand. Obviously, a firm can use these assets to meet its debt obligations when cash inflows are insufficient. These balances themselves result from cash inflows or are built via more debt, equity issuance, or asset sales. However, when cash inflows are insufficient to meet obligations, selling assets will hurt credit ratings and will reduce financial flexibility going forward. Consequently, drawing down liquid assets to meet obligations is, in most cases, only a temporary solution and therefore inconsistent with the intent of the analysis here.

Source: Authors.

Table 12.1 Return on Invested Capital for a Sample of Indonesian Publicly Held Companies (%)

Company	2012	2013	2014	2015	2016	2017
Matahari	200.7	142.3	159.1	151.8	150.2	106.4
Bayan	5.6	2.4	–11.2	1.5	15.8	70.5
Sampoerna	79.0	78.8	78.7	43.2	48.3	47.6
Surya Citra Media	74.8	71.3	66.0	60.8	53.7	41.1
Telkom Indonesia	43.9	42.1	40.6	40.9	42.2	40.7
Bukit Asam	62.2	33.3	25.3	26.6	24.1	39.4
Indosat Ooredoo	22.5	21.7	19.5	25.2	30.4	30.5
Sarana Menara Nusantara	13.6	13.2	20.0	39.6	29.6	28.4
Kalbe	35.0	30.8	30.7	28.9	29.0	26.6
Adaro	17.9	13.9	13.9	11.7	17.5	24.9
Sawit Sumbermas Sarana	59.3	34.0	34.3	17.9	18.9	23.4
Gudang Garang	19.7	17.9	19.2	19.7	20.0	20.8
Indocement	61.0	56.7	46.9	36.8	27.7	19.8
Astra International	22.6	20.0	18.3	14.8	16.4	18.6
Pakuwon Jati	25.1	33.1	30.0	15.4	17.1	18.5

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Table 12.1 continued

Company	2012	2013	2014	2015	2016	2017
Astra Agro Lesari	37.1	24.0	26.7	10.8	15.0	18.4
Indofood	20.8	19.6	16.5	16.4	19.1	17.6
Metland	17.8	15.8	15.4	11.9	13.9	17.1
London Sumatra Indonesia	29.2	20.0	21.0	14.4	13.1	17.0
Tempo Scan Pacific	30.7	25.8	20.6	22.0	16.5	13.8
Jasa Marga	16.1	11.8	14.3	13.3	11.5	10.4
Smart Agribusiness and Food	25.4	14.9	13.5	7.1	9.3	10.1
Gajah Tunggal	20.4	9.9	11.2	6.8	14.4	9.1
Lippo Karawaci	19.1	16.3	21.5	11.1	12.3	8.4
Eagle High Plantations	15.0	13.0	4.6	6.7	6.8	8.1
Antam	10.5	6.1	3.5	0.3	4.3	6.7
Krakatau Steel	5.4	6.0	2.6	–0.5	6.1	6.5
Waskita Kariya	22.5	18.6	16.2	8.8	5.6	6.2
Garuda Indonesia	9.8	6.0	–12.7	9.0	5.5	2.0
Average	35.3	28.3	16.4	23.2	13.9	24.4
Median	22.5	19.6	19.5	14.8	16.5	18.5

Source: Authors' compilation from published annual reports of companies.

Table 12.2 presents debt-service-to-cash inflow from equation (12.5) for the same companies.[203] These are sorted by 2017 values, from highest to lowest. A value greater than 1 indicates that net operating cash inflows were less than short-term principle and interest obligations that year. The negative ROIC values for Garuda International, Bayan, and Krakatau Steel result in "n/a" (for "not applicable") in Table 12.2, although again their values in equation (12.5) are clearly greater than 1 in the financial sense. At the bottom of the table, the averages, which exclude the "n/a" entries, suggest a rising trend throughout 2012–2015; the 2014 average was driven higher by Krakatau Steel and Antam (both of which had small, but positive, net cash inflows that year). The mean calculations assume values for the "n/a" entries greater than 1 and show some increases and decreases with an overall increasing trend. At the bottom of the table is a count of companies whose debt-service-to-cash inflow is greater than 1 for each year (including entries with "n/a"); these again show a rising trend throughout, with an intermediate peak in 2015 at 13 companies (45% of the sample of 29) with still more than twice as many firms above 1 in 2017 compared to 2012.

Table 12.3 presents interest-to-cash inflow from equation (12.6) for the same companies. As with the previous table, the averages presented in the bottom rows do not include "n/a" entries while the median calculations assume these values are 1.01. A clear pattern is not necessarily present, though both median and average increased during 2012–2015, and although they declined afterward, the 2017 average is higher than that in 2012. In the absence of clear trends, standard deviation calculations (which assume "n/a" entries are equal to 1.01) provide some additional information, particularly for comparing 2012 and 2017, since there were no significant outliers or "n/a" entries in either year. These show that the variation in interest relative to net cash inflow in 2017 was slightly more than double than in 2012.

[203] For all companies, debt is measured as all short-term and long-term portions of loans, bonds, financial and capital leases, and net pension-related liabilities.

Table 12.2 Debt-Service-to-Cash Inflow Ratio for a Sample of Indonesian Publicly Held Companies

Company	2012	2013	2014	2015	2016	2017
Garuda Indonesia	0.92	2.99	n/a	2.26	5.19	18.47
Waskita Kariya	2.02	1.28	2.13	2.17	9.23	6.45
Krakatau Steel	7.69	7.27	19.52	n/a	5.00	4.64
Antam	1.25	2.49	4.66	51.5	3.96	2.82
Smart Agribusiness and Food	0.51	2.16	2.73	5.24	2.75	2.48
Eagle High Plantations	0.60	0.94	1.87	4.10	2.36	2.07
Gudang Garang	1.23	1.76	1.93	1.86	1.72	1.59
Astra International	0.80	1.08	1.08	1.32	1.60	1.24
Gajah Tunggal	0.17	0.46	0.55	1.35	0.59	1.17
Indofood	0.50	0.78	0.73	0.98	0.90	1.11
Lippo Karawaci	0.18	0.20	0.21	0.63	0.74	0.99
Metland	0.30	0.89	1.20	1.44	1.29	0.92
Jasa Marga	1.43	0.98	0.50	1.30	2.27	0.87
Indosat Ooredoo	0.58	0.87	1.66	0.96	0.85	0.59
Sawit Sumbermas Sarana	0.42	0.62	0.76	0.84	0.84	0.53
Tempo Scan Pacific	0.16	0.27	0.18	0.15	0.26	0.43
Sarana Menara Nusantara	0.42	0.99	0.40	0.22	0.51	0.31
Bayan	0.80	6.10	n/a	3.21	0.39	0.26
Pakuwon Jati	0.40	0.36	0.26	0.40	0.46	0.26
Bukit Asam	0.09	0.17	0.67	0.63	0.71	0.24
Adaro	0.38	0.37	0.46	0.28	0.22	0.22
Astra Agro Lesari	0.26	0.70	0.55	1.02	0.66	0.19
Telkom Indonesia	0.17	0.16	0.21	0.14	0.16	0.17
Matahari	0.53	0.27	0.30	0.13	0.10	0.10
Kalbe	0.10	0.22	0.11	0.11	0.06	0.07
Indocement	0.02	0.03	0.02	0.03	0.04	0.07
Surya Citra Media	0.05	0.05	0.08	0.09	0.11	0.04
London Sumatra Indonesia	0.13	0.17	0.08	0.10	0.11	0.04
Sampoerna	0.20	0.20	0.24	0.05	0.04	0.04
Average	0.77	1.20	1.60	2.95	1.49	1.67
Median	0.42	0.70	0.55	0.96	0.71	0.53
Number of companies > 1	5	8	11	13	10	11

Source: Authors' calculations.

Table 12.3 Interest-to-Cash Inflow Ratio for a Sample of Indonesian Publicly Held Companies

Company	2012	2013	2014	2015	2016	2017
Garuda Indonesia	0.12	0.41	n/a	0.28	0.53	1.38
Eagle High Plantations	0.34	0.46	0.35	0.74	0.82	0.66
Gajah Tunggal	0.17	0.46	0.39	0.70	0.33	0.51
Krakatau Steel	0.36	0.37	0.86	n/a	0.59	0.41
Waskita Kariya	0.26	0.13	0.19	0.18	0.42	0.38
Lippo Karawaci	0.18	0.19	0.17	0.29	0.34	0.36
Antam	0.17	0.27	0.56	7.30	0.53	0.30
Jasa Marga	0.30	0.34	0.31	0.33	0.30	0.22
Sawit Sumbermas Sarana	0.15	0.12	0.18	0.19	0.14	0.20
Smart Agribusiness and Food	0.08	0.12	0.13	0.27	0.22	0.20
Indosat Ooredoo	0.17	0.20	0.26	0.23	0.17	0.16
Sarana Menara Nusantara	0.34	0.32	0.31	0.11	0.15	0.16
Pakuwon Jati	0.16	0.12	0.09	0.13	0.14	0.12
Indofood	0.11	0.23	0.13	0.21	0.12	0.11
Metland	0.05	0.07	0.16	0.22	0.19	0.10
Bayan	0.45	6.10	n/a	2.94	0.39	0.06
Gudang Garang	0.07	0.10	0.14	0.12	0.10	0.06
Telkom Indonesia	0.03	0.03	0.04	0.05	0.06	0.05
Astra International	0.03	0.03	0.04	0.05	0.06	0.05
Adaro	0.11	0.14	0.23	0.09	0.05	0.04
Astra Agro Lesari	0.01	0.02	0.02	0.06	0.04	0.03
Tempo Scan Pacific	0.01	0.01	0.01	0.01	0.01	0.03
Bukit Asam	0.00	0.00	0.02	0.05	0.05	0.02
Surya Citra Media	0.05	0.02	0.03	0.02	0.01	0.01
Kalbe	0.01	0.01	0.02	0.01	0.01	0.01
Matahari	0.25	0.18	0.11	0.05	0.01	0.01
Indocement	0.00	0.01	0.00	0.00	0.00	0.00
Sampoerna	0.00	0.01	0.00	0.01	0.00	0.00
London Sumatra Indonesia	0.00	0.00	0.00	0.00	0.00	0.00
Average	0.14	0.36	0.21	0.52	0.20	0.19
Median	0.11	0.12	0.14	0.13	0.14	0.10
Standard deviation	0.13	1.09	0.28	1.39	0.21	0.28
Number of companies > 1	0	1	2	3	0	1

Source: Authors' calculations.

To this point, and to the degree that the sample of companies is representative, there is some evidence that financial positions worsened during 2012–2015 and may have been slightly worse than those at the end of 2017, or at least did not improve enough to return to their 2012 levels. From Figure A11.2 of Appendix 11.1, BI's interest rate target rose during 2013 from about 6% to about 7.5%; it remained at that level until falling in 2016 and 2017 to around 4%. Similarly, the rupiah-denominated 10-year Treasury rate increased in kind during 2013 from about 6% to 8%, even reaching 9% in late 2015. It then fell again to near 6% by the end of 2017. From the above tables, company performance worsened as interest rates increased, as did total debt service and interest alone relative to cash inflows. The number of companies with total debt-service-to-cash inflows or interest- to-cash flows greater than 1 peaked with BI's target rate peak in 2015. As interest rates then fell, ROIC increased and both debt-service-to-cash inflows and interest-to-cash inflows fell. Nevertheless, the average and median ROIC was still below 2012 values. Further, total debt service relative to cash inflows was still more than double the 2012 averages in 2017, the 2017 median was about 35% higher than its 2012 value, and the number of companies with a ratio greater than 1 was still double the 2012 value. While Indonesian companies obviously incur significant net liabilities in foreign currencies, their financial positions appear to be related to BI's policy stance.

As noted in the previous chapter, as of October 2018, BI's interest rate target has increased by 1.5 percentage points since May 2018. Without real-time financial data, it is obviously not possible to know exactly what the effect may be on firm-sector financial positions. Table 12.4 presents a basic framework for understanding how this might be done if such data were available. Assuming a 10% average rate of interest on company debts, each company's total debt service is capitalized at this rate while the number of years to maturity is adjusted until the total debt service corresponds to the company's actual debt (or very close to it). This is the first column of data in Table 12.4 under 10% for "estimated debt-service-to-cash inflow." Then, the interest rate on each company's debt is increased to 12% then 14%. These are the second and third columns of Table 12.4. The fourth, fifth, and sixth columns are the amortized interest payments in the first year at 10%, 12%, and 14%, respectively. The companies are ranked in the same order as in Table 12.2. The results show that higher interest rates, from 10% to 14%, increase the median in the third column by 17%, compared to the first column; and the median in the sixth column by 43%, compared to the fourth column. Also, the estimated debt-service-to-cash inflow is greater than 1 for two additional companies when the interest rate increases from 10% to 14%.

The analysis in Table 12.4 has clear shortcomings. Usually, not all debt carries a floating interest rate, in which case not all debt would be subject to rising interest rates. Also, some companies pay significantly less than 10% on much of their debt, especially debt that carries a floating interest rate. In this analysis, 10% is a basic benchmark, though starting with a lower rate can actually have larger effects in some instances than in Table 12.4, since 2 and 4 percentage point increases are relatively larger in that case compared to the starting point.

On the other hand, it is possible that results in Table 12.4 are understated, even significantly, since there are no adjustments for potential fall in ROIC via a fall in net operating cash inflow, for which there is at least some evidence of a correlation with a rise in interest rates. In Table 12.5, the two columns labeled "ROIC 2017" repeat the results in the 14% columns in Table 12.4. These are the estimated results for equations (12.5) and (12.6) when the interest rate rises without assuming a change in ROIC. The two columns in Table 12.5 labeled "ROIC 2017 x 0.9" calculate equations (12.5) and (12.6) assuming the interest rate is 14% and ROIC is 90% of the 2017 value. Likewise, the two columns in Table 12.5 labeled "ROIC 2017 x 0.8" calculate equations (12.5) and (12.6) assuming the interest rate is 14% and ROIC is 80% of the 2017 value.

Table 12.4 Estimated Sensitivity of Debt-Service-to-Cash Inflow and Interest-to-Cash Inflow to Changes in Interest Rates

	Estimated Debt-Service-to-Cash Inflow			Estimated Interest-to-Cash Inflow		
Company	**10%**	**12%**	**14%**	**10%**	**12%**	**14%**
Garuda Indonesia	18.33	18.79	19.25	1.28	1.54	1.80
Waskita Kariya	6.42	6.58	6.73	0.40	0.47	0.55
Krakatau Steel	4.70	4.83	4.95	0.37	0.44	0.52
Antam	2.84	2.92	3.01	0.36	0.43	0.50
Smart Agribusiness and Food	2.48	2.55	2.63	0.32	0.38	0.44
Eagle High Plantations	2.08	2.17	2.26	0.51	0.61	0.71
Gudang Garang	1.52	1.55	1.58	0.03	0.03	0.04
Astra International	1.25	1.28	1.32	0.16	0.19	0.22
Gajah Tunggal	1.18	1.26	1.34	0.49	0.59	0.69
Indofood	1.13	1.16	1.20	0.14	0.17	0.20
Lippo Karawaci	0.99	1.05	1.12	0.38	0.45	0.53
Metland	0.92	0.95	0.98	0.10	0.12	0.14
Jasa Marga	0.87	0.96	1.05	0.55	0.66	0.77
Indosat Ooredoo	0.59	0.62	0.64	0.14	0.17	0.20
Sawit Sumbermas Sarana	0.53	0.57	0.62	0.26	0.31	0.36
Tempo Scan Pacific	0.43	0.44	0.45	0.04	0.05	0.06
Sarana Menara Nusantara	0.31	0.34	0.38	0.19	0.23	0.26
Bayan	0.27	0.28	0.28	0.02	0.03	0.03
Pakuwon Jati	0.27	0.30	0.33	0.19	0.23	0.26
Bukit Asam	0.24	0.25	0.26	0.06	0.07	0.08
Adaro	0.22	0.24	0.25	0.10	0.12	0.13
Astra Agro Lesari	0.19	0.21	0.22	0.10	0.12	0.14
Telkom Indonesia	0.17	0.18	0.19	0.06	0.07	0.08
London Sumatra Indonesia	0.10	0.11	0.13	0.09	0.10	0.11
Matahari	0.10	0.10	0.10	0.02	0.02	0.03
Kalbe	0.07	0.07	0.07	0.01	0.02	0.02
Indocement	0.07	0.07	0.07	0.02	0.02	0.03
Surya Citra Media	0.04	0.04	0.04	0.01	0.01	0.01
Sampoerna	0.04	0.04	0.04	0.01	0.02	0.02
Average	1.67	1.72	1.78	0.22	0.26	0.31
Median	0.53	0.57	0.62	0.14	0.17	0.20
Number of companies > 1	10	11	12	1	1	1

Source: Authors' calculations.

Table 12.5 Estimated Sensitivity of Debt-Service-to-Cash Inflow and Interest-to-Cash Inflow to Decline in Return on Invested Capital and Higher Interest Rates

	Estimated Debt-Service-to-Cash Inflow Interest Rate = 14%			Estimated Interest-to-Cash Inflow Interest Rate = 14%		
Company	ROIC 2017	ROIC 2017 x 0.9	ROIC 2017 x 0.8	ROIC 2017	ROIC 2017 x 0.9	ROIC 2017 x 0.8
Garuda Indonesia	19.25	21.39	24.07	1.80	2.00	2.25
Waskita Kariya	6.73	7.48	8.42	0.55	0.62	0.69
Krakatau Steel	4.95	5.50	6.18	0.52	0.57	0.65
Antam	3.01	3.35	3.77	0.50	0.56	0.63
Smart Agribusiness and Food	2.63	2.92	3.29	0.44	0.49	0.55
Eagle High Plantations	2.26	2.52	2.83	0.71	0.79	0.89
Gudang Garang	1.58	1.76	1.98	0.04	0.04	0.05
Astra International	1.32	1.47	1.65	0.22	0.25	0.28
Gajah Tunggal	1.34	1.48	1.67	0.69	0.76	0.86
Indofood	1.20	1.33	1.50	0.20	0.22	0.25
Lippo Karawaci	1.12	1.24	1.40	0.53	0.59	0.66
Metland	0.98	1.08	1.22	0.14	0.16	0.18
Jasa Marga	1.05	1.17	1.32	0.77	0.85	0.96
Indosat Ooredoo	0.64	0.71	0.80	0.20	0.22	0.25
Sawit Sumbermas Sarana	0.62	0.68	0.77	0.36	0.40	0.45
Tempo Scan Pacific	0.45	0.50	0.56	0.06	0.07	0.08
Sarana Menara Nusantara	0.38	0.42	0.47	0.26	0.29	0.33
Bayan	0.28	0.31	0.35	0.03	0.03	0.04
Pakuwon Jati	0.33	0.37	0.41	0.26	0.29	0.33
Bukit Asam	0.26	0.29	0.32	0.08	0.09	0.10
Adaro	0.25	0.28	0.31	0.13	0.15	0.17
Astra Agro Lesari	0.22	0.25	0.28	0.14	0.15	0.17
London Sumatra Indonesia	0.13	0.14	0.16	0.12	0.14	0.15
Telkom Indonesia	0.19	0.21	0.24	0.08	0.09	0.11
Matahari	0.10	0.11	0.13	0.03	0.03	0.03
Kalbe	0.07	0.08	0.09	0.02	0.02	0.02
Indocement	0.07	0.08	0.09	0.03	0.03	0.04
Surya Citra Media	0.04	0.05	0.06	0.01	0.01	0.01
Sampoerna	0.04	0.05	0.05	0.02	0.02	0.02
Average	1.78	1.97	2.22	0.31	0.34	0.39
Median	0.62	0.68	0.77	0.20	0.22	0.25
Number of companies > 1	12	13	13	1	1	1

ROIC = return on invested capital.
Source: Authors' calculations.

The results are that both average and median levels of both "ROIC 2017 x 0.8" columns are around 25% greater than their respective "ROIC 2017" columns.[204] When compared to the starting values from Table 12.4 where the interest rate was 10% and ROIC was assumed to be the 2017 value (that is, the columns with "10%" headings), average debt-service-to-cash inflow (equation [12.5]) increases by 33% if interest rates rise to 14% and ROIC falls 20%; while the median rises 45%. For interest-to-cash inflow (equation [12.6]), the total increase is 75% for both average and median from the respective values in the "10%" columns in Table 12.4. Even the adjustments in Table 12.5 do not tell the entire story, since companies whose financial positions have worsened significantly may incur downgrades in their credit ratings that would further increase interest rate payments, at least on some debts. This would increase the estimates for equations (12.5) and (12.6) yet again in those cases.

12.4 Conclusions

The dynamics discussed in previous sections are important for the ability of Indonesia's firm sector to continue to bear the burden of economic growth. If growth increases and the firm sector continues its path of negative sector balances, will this lead to a worsening of the sector's financial position? The paths of the sample of companies in this chapter suggest the answer is "yes." During economic expansion, financial positions can worsen.

Unfortunately, a financially fragile firm sector is ill-suited to maneuver through macroeconomic shocks, such as a depreciating currency, rising interest rates, volatile commodity prices, and so forth. Tightening monetary policy to reduce inflationary pressures can increase debt service and interest obligations, and may require refinancing at higher rates, as in Table 12.5. Furthermore, if higher interest rates bring a slower economy, this will reduce cash inflows that service obligations already being refinanced at higher rates, as in Table 12.5. The result may be worse than a simple temporary economic slowdown if the firm sector starts from a less robust financial position. How many companies can withstand an increase in their total debt service payments relative to net cash inflows of 33% to 45%, or an increase in their interest payments relative to net cash inflows of 75%? The situation is worse still if there are additional negative effects from the firm sector's increasing obligations in foreign currencies.

Similarly, if an opportunity for monetary policy loosening arises, its impacts are a function of the financial positions of the firm sector. If the firm sector begins the expansion in a more financially fragile state, taking advantage of lower interest rates to grow production will leave the sector more fragile and more vulnerable when interest rates inevitably rise or when other shocks occur. Interestingly, macroeconomic policy consistent with managing both loosening and tightening stances in the face of less robust financial positions in the private sector is found in fiscal policy—since fiscal policy can tighten without raising the cost of refinance and can encourage economic expansion while simultaneously adding to the domestic private sector balance.

Given the likelihood of continued current account deficits (discussed in Chapter 11) combined with the government's fiscal rule, the financial burden of faster growth likely falls on the firm sector. The lesson from this chapter is that this situation requires financial positions that are robust throughout macroeconomic expansion and in the face of changes in BI's monetary policy stance. However, taking

[204] For example, consider Gajah Tunggal in Table 12.4. Its value for equation (12.5) is 1.34 when the interest rate is 14%; for equation (12.6) the value is 0.69 when the interest rate is 14%. In Table 12.5, for Gajah Tunggal the two "ROIC 2017" columns show these same values (1.34 and 0.69). Then, the "ROIC 2017 x 0.9" columns show that the value for equation (12.5) rises to 1.48 if ROIC is only 90% of its 2017 value, while equation (12.6) is 0.76. The "ROIC 2017 x 0.8" columns show that the value for equation (12.5) rises to 1.67 if ROIC is 80% of its 2017 value, while equation (12.6) is 0.86.

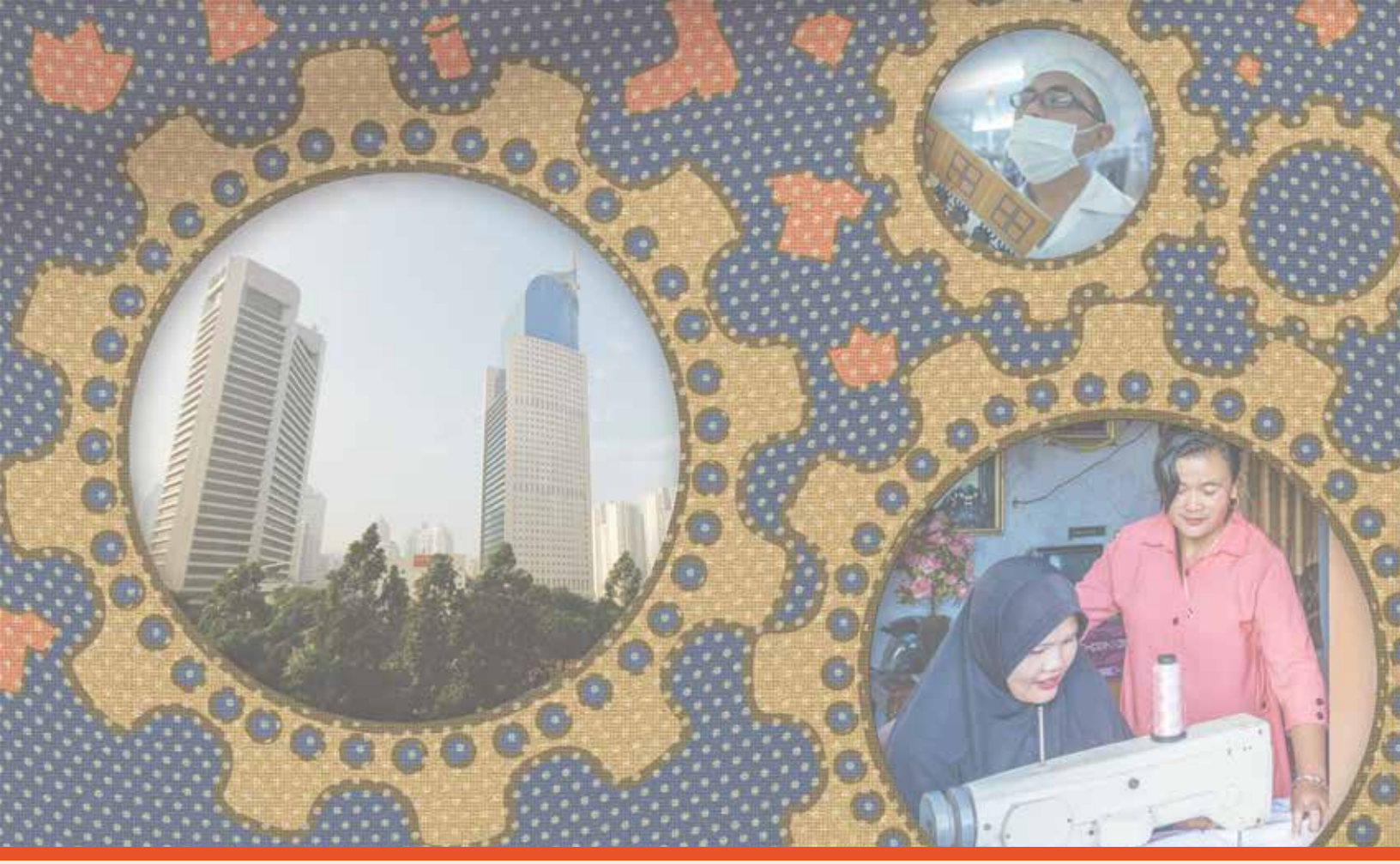
macroprudential regulatory steps to ensure that corporate financial positions are robust such that BI can raise interest rates to ward off inflation risks or, contrastingly, allow the rupiah to depreciate if inflation risks remain minimized, may reduce the ability of the corporate sector to remain the sector that bears the burden of faster growth. That is, the combination of reducing financial risks to the corporate sector while also maintaining it as the sector primarily bearing the burden of faster growth can be contradictory unless both objectives are properly pursued.

To confront the challenge of avoiding such contradictions in macroeconomic policy requires a combination of the following, which are addressed in Chapter 15:

(i) monetary policy that takes into account the sensitivity of the firm sector's financial positions to rising interest rates, depreciating currency, and so forth, when formulating its policy stance and deciding on policy tools to employ at a given time;

(ii) a macroprudential approach to firm-sector financial positions not unlike that already in place for net foreign currency liabilities, but which also makes available financing or refinancing for particularly sensitive or important portions of the firm sector (and possibly other parts of the private sector), to encourage faster growth at rates or on terms that are consistent with robust financial positions even if macroeconomic conditions deteriorate; and

(iii) recognition of the inherent interdependencies of monetary and fiscal policies and consideration of the contributions both can make to balancing faster growth, robust financial positions in the private sector, and monetary policy independence.



PART IV

Growth during 2020–2024 and Recommendations to Transform Indonesia's Economy

13 How Fast Can Indonesia Realistically Grow during 2020–2024? Potential and Balance-of-Payments-Constrained Growth Rate Scenarios

13.1 Introduction

This chapter constructs growth scenarios for 2020–2024 based on the analysis in Chapter 2. This allows an informed discussion on how fast Indonesia can grow in the medium term. The starting point is the crucial question at the center of this report: can Indonesia improve its long-run growth performance and achieve a gross domestic product (GDP) growth rate of 7%–8% or more? The indications are that, as things stand, achieving this growth rate is very unlikely to occur in the near term. For instance, using the framework adopted in this report to estimate potential growth, as well as the output and inflation forecasts provided by the International Monetary Fund (IMF 2018b), Indonesia's potential GDP growth rate for 2018–2023 is projected to average about 5.65%.[205] This chapter analyzes what could happen to Indonesia's potential and balance-of-payments-constrained (BOPC) growth rates if economic conditions and, in particular, economic policies change.

As stated in Chapter 2, a country's growth performance must be in line with both its potential and BOPC growth rates to be sustainable in the long run. Deviations of actual growth from the potential and/or BOPC growth rates will have different types of domestic and external effects (Table 13.1). In particular, when the actual growth rate is higher (lower) than the potential growth rate, inflationary (deflationary) pressures will destabilize the macroeconomic environment and set in motion an adjustment process that will cause the actual growth rate to fall (increase) toward the potential growth rate. Meanwhile, while there are several historical examples of countries experiencing a persistently positive and/or improving current account balance, there is stronger evidence to indicate that lasting current account deficits cannot be sustained in the long run. Thus, the BOPC growth rate imposes a ceiling on actual growth in the long run. All of this implies that the potential and BOPC growth rates, whichever is lower, will ultimately set the limit to long-run growth.

The evidence presented in Chapter 2 indicates that Indonesia's current growth performance is broadly in line with the country's potential growth rate. However, the report's most recent estimate of Indonesia's BOPC growth rate is about 2.8% (in 2014). This is substantially lower than both its potential and current actual growth rates. As a result, the country's current account has been deteriorating since the early 2000s and has been negative since 2012. Though not necessarily worrying in the short run, a growing external debt is not sustainable in the long run. Indeed, many associate the rupiah's significant depreciation in the summer of 2018 to Indonesia's disappointing current account dynamics. At the moment, therefore, it appears that the BOPC growth rate represents the most severe constraint to the country's long-run growth prospects. Consequently, issues related to the country's international competitiveness and current account sustainability in a high-growth environment should be high up on the economic policy agenda.

[205] The IMF output and inflation forecasts are retrieved from the IMF (2018b) *World Economic Outlook* database.

Table 13.1 Effects of Deviations of the Actual Growth Rate from the Potential and Balance-of-Payments-Constrained Growth Rates

Growth Conditions	Effects
Actual growth rate > Potential growth rate > BOPC growth rate	Inflationary pressures, worsening current account
Potential growth rate > Actual growth rate > BOPC growth rate	Rising unemployment, worsening current account
Potential growth rate > BOPC growth rate > Actual growth rate	Rising unemployment, improving current account
BOPC growth rate > Potential growth rate > Actual growth rate	Rising unemployment, improving current account
BOPC growth rate > Actual growth rate > Potential growth rate	Improving current account, inflationary pressures
Actual growth rate > BOPC growth rate > Potential growth rate	Worsening current account, inflationary pressures

BOPC = balance-of-payments-constrained.
Source: Authors.

For Indonesia's actual growth to be significantly and sustainably faster in the future than it is today, both the country's potential and BOPC growth rates need to be higher. Under what conditions can this be expected to happen during 2020–2024? The following sections explore this question by constructing possible scenarios for Indonesia's potential and BOPC growth rates.

The rest of the chapter is structured as follows. Section 13.2 constructs and discusses potential growth rate scenarios for Indonesia, while section 13.3 is devoted to the BOPC growth rate scenario. Section 13.4 concludes by summing up the main results of the analysis. The data used in this chapter come from several sources, including Badan Pusat Statistik, Groningen Growth and Development Centre (GGDC) 10-Sector Database (2018), International Monetary Fund (IMF 2018), The Observatory of Economic Complexity (2018), United Nations Conference on Trade and Development (UNCTAD 2018), and World Bank Population Estimates and Projections, and World Bank World Development Indicators.

13.2 Potential Gross Domestic Product Growth Scenarios for 2020–2024

The analysis carried out in this chapter is based upon three possible scenarios. Building on evidence presented in this report, the scenarios are constructed considering primarily the role that the manufacturing sector can play as an engine of growth in Indonesia. Specifically, the simulations for the 2020–2024 period focus on three scenarios:

(i) **Moderate scenario**. The structural composition of the economy in terms of sectoral employment shares remains the same, and thus the relative importance of the manufacturing sector also stays the same. In this scenario, the role played by manufacturing as an engine of growth does not change.
(ii) **Good scenario**. The economy experiences manufacturing-biased structural change, such that the relative weight of the manufacturing sector increases. In this scenario, manufacturing enhances to some extent its role as an engine of growth.
(iii) **Bad scenario**. The structural composition of the economy changes such that the manufacturing employment share decreases. In this scenario, the role that manufacturing plays as an engine of growth diminishes.

These alternative scenarios are selected among a wide range of possible structural change and potential growth paths for Indonesia in 2018–2024. They are not more likely than other scenarios not considered in this chapter. Such an exercise, therefore, is not and should not be considered akin to a forecast. Rather, the objective here is to provide a tool to outline the possible dynamics of potential growth in 2020–2024 under a certain set of conditions. As such, the analysis in this chapter can be considered at most as providing guidelines for a general policy framework for growth: a number of specific policy measures for such a framework will be proposed in Chapter 15.

The scenarios consider three effects to arrive at potential growth rate: (i) working-age population growth, as projected by the World Bank Population Estimates and Projections; (ii) the direct impact of structural change on potential growth rate; and (iii) the impact on labor productivity growth of the following channels, which derive from the empirical evidence presented in Chapter 2 (Table in Box 2.2):

(i) endogenous channel relating manufacturing-biased structural change to other determinants of labor productivity growth, which can be boosted (endogenously) by the expansion of the manufacturing sector even in the absence of additional policy changes;
(ii) exogenous channel through which policy intervention can promote the determinants of labor productivity growth; and
(iii) human capital accumulation, proxied by the primary gross enrollment ratio.

The technical details of the methodology adopted are illustrated in Box 13.1, while the main results are presented in Table 13.2.

According to the results reported in Table 13.2, Indonesia's average potential growth rate in 2020–2024 would be 5.68% in the moderate scenario, reaching 5.54% in 2024. The corresponding values in the bad scenario are an average of 5.52% in 2020–2024 and of 5.38% in 2024. Finally, in the good scenario potential growth increases to an average rate of 6.31% in 2020–2024, while it is projected to reach 6.15% in 2024. Since the impact of human capital accumulation, the exogenous channel, and working-age population growth rate are the same in all scenarios, the different outcomes can be explained by the assumed dynamics for the manufacturing employment share in the three scenarios.

In the good scenario the manufacturing employment share increases by about 6 percentage points, going from 14% in 2018 to about 20% in 2024. This significant manufacturing-biased structural change in the economy has positive effects on labor productivity growth, both directly (since employment increases in the high-productivity manufacturing sector) and indirectly (via the endogenous channel). Overall, together with the assumed effects from human capital accumulation and the policy measures implicit in the exogenous channel, this positive impact from structural change is more than sufficient to counterbalance the slowdown in working-age population growth, thus leading to an increase in potential growth in 2020–2024. Note, however, that even in this scenario, potential growth starts to decrease in 2020 and slows down gradually until 2024, when it is 6.15%.

In the bad scenario, the negative effects from the declining working-age population growth are reinforced by an unfavorable structural change path, with the manufacturing employment share falling from 14% to about 13%. Because of this, the endogenous channel subtracts from (rather than adds to) the potential growth rate, which declines continuously in 2020–2024.

Finally, in the moderate scenario, given the unchanged sectoral employment structure of the economy, and the constant contributions of structural change, the endogenous and exogenous channels, and human capital accumulation to labor productivity growth in all years in 2020–2024, the potential growth rate declines throughout the period as a result of the projected slowdown in working-age population growth.

Box 13.1 Potential Gross Domestic Product Growth Rate Scenarios—Assumptions and Methodology

The regression analysis in Chapter 2 indicates that three factors impact aggregate labor productivity growth: (i) structural change (changes in the employment shares); (ii) factors that affect within sectors' productivity growth; and (iii) demographics, proxied here by the growth rate of the working-age population (World Bank Population Estimates and Projections).

The direct impact of structural change on labor productivity growth is given by the weighted sum of sectoral productivity growth times the sectoral employment shares, which evolve differently in the three scenarios. This measure of the direct impact of structural change is based on the simplifying assumption that sectoral productivity growth rates are constant over time, so that aggregate labor productivity growth changes only because of the varying sectoral allocation of labor (i.e., the employment shares). Labor productivity growth in each sector in 2018–2024 is assumed to be equal to its average for 1960–2017, excluding the Asian financial crisis (AFC) years of 1997–1999.

Regarding the employment shares, the assumption is that net employment in the agriculture sector will decline over the entire 2020–2024 period, such that the agricultural employment share will fall. Specifically, it is assumed that the agricultural employment share will decrease at an annual average of 0.35 percentage points, the same average decline registered during the post-AFC period, 2001–2017. Since the working-age population growth rate is projected to be positive over 2020–2024, total employment in the economy can be expected to grow. The scenarios in this chapter assume that employment in the economy will grow at the same pace as working-age population, so that the ratio between the two will remain constant at 68%, the average value for 2013–2017.

From the assumption that workers are flowing out of agriculture in 2020–2024, it follows that all new employment (i.e., workers released from agriculture plus new entrants into the working-age population) will be distributed to other sectors of the economy. For consistency between the recent and less recent sectoral data used in the analysis, based on different sectoral classifications, the data are aggregated up to five sectors only, to assess the effects of structural change in the potential growth scenarios:

(i) agriculture;
(ii) manufacturing;
(iii) wholesale and retail trade, and hotels and restaurants;
(iv) social, community, government, and personal services; and
(v) the rest of the economy (mining, construction, public utilities, transport, and finance).

The key variable in constructing the scenarios is the share of new employment in the economy going to manufacturing. This determines the path of the manufacturing employment share in 2020–2024, as well as the other sectors' employment shares. The employment share in "the rest of the economy" is constructed as a residual, i.e., as 100 minus the employment shares in the other sectors. Note that this assumption does not affect the qualitative outcome of the analysis, since productivity growth differences between nonmanufacturing sectors (excluding agriculture) are not significant.[a]

Employment in the three scenarios considered is distributed as follows:

(i) **Moderate scenario**. New employment goes to manufacturing and other sectors of the economy such that the shares remain as in 2017.[b]
(ii) **Good scenario**. All new employment goes to manufacturing.
(iii) **Bad scenario**. No new employment goes to manufacturing.

The regression analysis in Chapter 2 indicates that factors other than structural change also have an additional and significant impact on aggregate labor productivity growth. The role played by these factors is taken into

(continued on next page)

Box 13.1 Potential Gross Domestic Product Growth Rate Scenarios—Assumptions and Methodology
(continued)

account in the construction of the scenarios, considering in particular that their importance for the dynamics of potential growth in Indonesia may be partly dependent on the development of the manufacturing sector (and thus endogenous) and partly conditional on policy. The impact of the policy variables is assessed as follows:

(i) Attention focuses on the variables included in the benchmark model (1) of the table in Box 2.2 only, that is: primary gross enrollment ratio (as a proxy for human capital), foreign direct investment (FDI) as a share of GDP, manufacturing exports as a share of merchandise exports, and the economic complexity index ECI+.

(ii) For the primary gross enrollment ratio, the analysis assumes an annual change of 0.2 in 2020–2024, equal to the 1961–2017 annual average. Then the impact on labor productivity growth is 0.2 times the coefficient of primary gross enrollment ratio in model (1) of the table in Box 2.2 (i.e., 0.278).

(iii) For the other three variables, it is important to note that their evolution over time may be partly endogenous with respect to the expansion of the manufacturing sector and partly exogenously determined by policy. Thus:
   (a) To account for the endogenous channel, the analysis first takes estimates of the correlations between the manufacturing employment share and each of the three variables: FDI share, manufacturing exports share, and ECI+.[c] The impact of these policy variables on productivity growth is then calculated as the product of the change in the manufacturing employment share, times the coefficient from regressing the relevant policy variable on the manufacturing employment share (the correlations), and times the estimated coefficient from the benchmark model in the table in Box 2.2.
   (b) To account for the exogenous channel, the analysis assumes that the FDI share grows by 0.01 percentage points each year; the manufacturing exports share grows by 0.5 percentage points each year; and the ECI+ grows by 0.1 standard deviations each year.

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[a] Since the sectoral data used to construct the scenarios are not retrieved from the same database used to estimate the potential growth rate and the implied labor productivity growth rate, the overall labor productivity growth rate obtained from sectoral data is scaled in order to be consistent with that implied by the potential growth rate estimate.

[b] In the moderate scenario, the share of manufacturing increases slightly (figures are rounded up to the second decimal) for the following reason: the assumption is that all new employment (i.e., the workers flowing out of agriculture plus the new ones entering the labor force because of working-age population growth) is distributed across the sectors of the economy (other than agriculture) in the same proportion as their employment shares in 2017. This means that since the share of manufacturing is about 14%, then 14% of the new employment goes to manufacturing in the moderate scenario. For the same reason, the rest of the economy receives more workers over 2018–2024, so the share of manufacturing increases only slightly in this scenario. The same reasoning applies to the good and bad scenarios.

[c] The coefficients from regressing the policy variables on the manufacturing employment share are: 0.13 for the FDI share, 1.45 for the share of manufacturing exports, and 0.07 for ECI+.

Source: Authors.

To sum up, the analysis signals that, even in the most optimistic scenario, Indonesia's potential growth rate is unlikely to increase well above 6% in 2020–2024. This is primarily because the shrinking demographic dividend will weigh heavily on potential growth: under reasonable assumptions, the projected decline in working-age population growth will outweigh the positive effects from labor productivity growth.

This outcome depends on a number of assumptions, which may be deemed more or less realistic. Among other things, all else constant, a much bigger boost via the policy-driven exogenous channel would lead to a significantly higher potential growth rate. For instance, if the exogenously assumed increases in the foreign direct investment share, the manufacturing exports share, and the ECI+ were three times as

Table 13.2 Potential Growth Rate Scenarios for Indonesia in 2020–2024 (%)

Moderate Scenario							
		Contributions to Labor Productivity Growth Rate (%)					
Year	Manufacturing Employment Share (%)	Structural Change	Human Capital	Endogenous Channel	Exogenous Channel	WAP Growth Rate (%)	Potential Growth Rate (%)
2018	14	3.97	0.06	0.09	0.54	1.38	6.03
2019	14	3.97	0.06	0.12	0.54	1.30	5.98
2020	14	3.97	0.06	0.11	0.54	1.18	5.86
2021	14	3.97	0.06	0.11	0.54	1.12	5.79
2022	14	3.97	0.06	0.10	0.54	0.99	5.65
2023	14	3.97	0.06	0.10	0.54	0.91	5.57
2024	14	3.97	0.06	0.10	0.54	0.88	5.54
2020–2024	14	3.97	0.06	0.10	0.54	1.02	5.68
Good Scenario							
		Contributions to Labor Productivity Growth Rate (%)					
Year	Manufacturing Employment Share (%)	Structural Change	Human Capital	Endogenous Channel	Exogenous Channel	WAP Growth Rate (%)	Potential Growth Rate (%)
2018	14	3.99	0.06	0.38	0.54	1.38	6.34
2019	15	4.02	0.06	0.76	0.54	1.30	6.67
2020	17	4.05	0.06	0.69	0.54	1.18	6.52
2021	18	4.08	0.06	0.65	0.54	1.12	6.44
2022	18	4.11	0.06	0.58	0.54	0.99	6.27
2023	19	4.13	0.06	0.54	0.54	0.91	6.18
2024	20	4.16	0.06	0.52	0.54	0.88	6.15
2020–2024	18	4.11	0.06	0.60	0.54	1.02	6.31
Bad Scenario							
		Contributions to Labor Productivity Growth Rate (%)					
Year	Manufacturing Employment Share (%)	Structural Change	Human Capital	Endogenous Channel	Exogenous Channel	WAP Growth Rate (%)	Potential Growth Rate (%)
2018	14	3.97	0.06	0.01	0.54	1.38	5.95
2019	13	3.96	0.06	−0.05	0.54	1.30	5.81
2020	13	3.95	0.06	−0.04	0.54	1.18	5.69
2021	13	3.94	0.06	−0.03	0.54	1.12	5.62
2022	13	3.93	0.06	−0.02	0.54	0.99	5.49
2023	13	3.92	0.06	−0.01	0.54	0.91	5.41
2024	13	3.92	0.06	−0.01	0.54	0.88	5.38
2020–2024	13	3.93	0.06	−0.02	0.54	1.02	5.52

WAP = working-age population.
Source: Authors' calculations.

high as those considered in the scenarios in Table 13.2, average potential growth in the good scenario would turn out to be 7.39% (rather than 6.31%) in 2020–2024. However, to some extent, this observation is of course trivial since this growth boost is precisely assumed to be exogenous. A more interesting question relates to the conditions underpinning structural change, the main driver of potential growth dynamics in the scenarios proposed in Table 13.2. Specifically, one could ask: what is the rate of manufacturing-biased structural change needed that would boost potential growth in Indonesia to a much higher rate of, say, 7%–8% in 2020–2024? Box 13.2 provides an answer to this question.

Box 13.2 Is a 7%–8% Potential Growth Rate Scenario Realistic for Indonesia?

This box investigates the conditions under which Indonesia's potential growth rate could reach 7%–8% in 2020–2024. The analysis focuses on the role played by structural change. The statistics and calculations reported in the table below are based on the same methodology illustrated in Box 13.1, but in this case, it is assumed that the pace of job creation in the manufacturing sector is more rapid, so that the share of manufacturing employment more than doubles between 2018 and 2024, reaching a value of 35% in 2024. As can be seen, this amplifies the productivity-boosting effects of structural change, particularly the endogenous channel. As a result, even assuming that all other determinants follow the same path as indicated in Table 13.2, average potential growth in 2020–2024 turns out to be 7.9%, with rates above 8% in 2019–2021.

An 8% Potential Growth Rate Scenario for Indonesia in 2020–2024

A Very High Potential Growth Scenario							
		Contributions to Labor Productivity Growth Rate (%)					
Year	Manufacturing Employment Share (%)	Structural Change	Human Capital	Endogenous Channel	Exogenous Channel	WAP Growth Rate (%)	Potential Growth Rate (%)
2018	15	4.03	0.06	1.11	0.54	1.38	7.12
2019	19	4.15	0.06	2.36	0.54	1.30	8.41
2020	23	4.27	0.06	2.14	0.54	1.18	8.18
2021	26	4.37	0.06	2.01	0.54	1.12	8.09
2022	29	4.46	0.06	1.79	0.54	0.99	7.83
2023	32	4.55	0.06	1.64	0.54	0.91	7.70
2024	35	4.63	0.06	1.59	0.54	0.88	7.69
2020–2024	**29**	**4.46**	**0.06**	**1.83**	**0.54**	**1.02**	**7.90**

WAP = working-age population.
Source: Authors' calculations.

Therefore, in the scenario proposed, a faster and more pronounced manufacturing-biased structural change process than that assumed for the scenarios in Table 13.2 would need to occur for potential growth in Indonesia to reach much higher rates. Both history and economic analysis suggest that such a development, implying a doubling of the manufacturing employment share in just a few years, is highly unlikely.

Source: Authors.

13.3 Balance-of-Payments-Constrained Growth Rate Scenarios

To construct BOPC growth scenarios for Indonesia in 2020–2024, this section builds on the assumptions and framework used for the potential growth rate scenarios. Since the BOPC growth rate is given by the trend world growth rate multiplied by the ratio of export to import income elasticities, the BOPC growth rate's future path will depend on the dynamics of these three elements. In what follows, the analysis will focus primarily on the key parameter in the BOPC growth rate approach—the income elasticity of exports—while adopting simplifying assumptions for trend world growth rate and the income elasticity of imports. In the BOPC framework, the income elasticity of exports is highlighted as the main proxy for international competitiveness and thus a critical element for growth policy strategies.

As with the analysis in section 13.2, the same three scenarios are considered, that is, a moderate scenario, a good scenario and a bad scenario. To isolate the effects of changes in relative competitiveness, the scenarios assume a constant growth rate of the world economy and focus on changes in the ratio of export to import income elasticities. Specifically, in the good scenario, the elasticities ratio increases (i.e., the export income elasticity rises faster than the import income elasticity) as a result of gains in relative competitiveness driven by the expansion of the manufacturing employment share. In the bad scenario, the ratio remains constant with a value of one. Finally, in the moderate scenario, the ratio increases at a modest pace.

The technical details of the methodology adopted are illustrated in Box 13.3, and the main results for the three BOPC growth rate scenarios are presented in Table 13.3.

Box 13.3 Balance-of-Payments-Constrained Growth Rate Scenarios—Assumptions and Methodology

The sectoral distribution of employment (and the implications for the manufacturing employment share) in the three scenarios follows that in Box 13.1 for potential growth. The impact of structural change and of the other determinants on the income elasticity of exports is assessed using the parameter estimates of model (3) in the table in Box 2.4. This specification is selected for consistency, being the most similar to the benchmark model used for the potential growth scenarios reported in the table in Box 2.2. Together with the change in the manufacturing employment share, the other variables included in the analysis are: foreign direct investment (FDI) as a share of gross domestic product, the change in manufacturing exports as a share of total merchandise exports, and the change in the economic complexity index, or ECI+. Without loss of generality, the current account openness index is excluded from the analysis, by assuming that it does not change in 2018–2024.

The path followed by the income elasticity of exports is then derived as follows:

(i) The starting point is the latest point estimate of the income elasticity of exports, 0.35. To this, add the contributions of structural change and of the endogenous and exogenous channels, as detailed below in (ii) and (iii).[a]

(ii) The impact of structural change is given by the product of the change in the manufacturing employment share (regressor in model [3] in the table in Box 2.4) times the coefficient estimate in the table in Box 2.4 (i.e., 0.251).[b]

(iii) The evolution of these variables over time may be partly endogenous with respect to the expansion of the manufacturing sector and partly exogenously determined by policy. Thus:
   a. To account for the endogenous channel, the analysis estimates the correlations between the manufacturing employment share and each of the three variables: FDI share, the manufacturing exports share, and ECI+.[c] The impact of these policy variables on the income elasticity of exports is

(continued on next page)

Box 13.3 Balance-of-Payments-Constrained Growth Rate Scenarios—Assumptions and Methodology
(continued)

then constructed as the product of the change in the manufacturing employment share, times the coefficient from regressing the relevant policy variable on the manufacturing employment share (the correlations), and times the estimated coefficient from the benchmark model in the table in Box 2.4.

b. To account for the exogenous channel, the analysis relies on the same assumptions used in the potential growth scenarios: the FDI share grows by 0.01 percentage points each year; the manufacturing exports share grows by 0.5 percentage points each year; and the ECI+ grows by 0.1 standard deviations each year.

(iv) Next, the path followed by the income elasticity of imports in the three scenarios is determined as follows:

a. In the moderate scenario, the balance-of-payments-constrained (BOPC) growth rate increases gradually, allowing for somewhat faster actual growth over 2020–2024, which causes the income elasticity of imports to also rise. Since the share of manufacturing employment remains constant in this scenario, the positive impact on competitiveness from the exogenous channel is not reinforced by the structural change and endogenous channel effects. Thus, the income elasticity of imports increases significantly, but not as fast as the income elasticity of exports. Specifically, the assumption is that the growth rate of the income elasticity of imports is 0.8 times the growth rate of the income elasticity of exports. This produces an elasticities ratio of 1.46 in 2024, broadly in line with the average value of 1.69 for 1982–2014, excluding the Asian financial crisis (AFC) years.

b. In the good scenario, Indonesia's BOPC growth rate increases significantly, allowing for much faster actual growth in 2020–2024, which again causes a higher income elasticity of imports. However, in this scenario, the share of manufacturing employment rises, so that the positive effects on competitiveness from the exogenous channel are compounded by the impact of structural change and the endogenous channel. Thus, the income elasticity of imports increases, but by less than in the moderate scenario. Specifically, the assumption is that the growth rate of the income elasticity of imports is 0.6 times the growth rate of the income elasticity of exports. This gives an elasticity ratio of 2.42 in 2024, broadly in line with the average value of 2.65, which is associated with Indonesia's high-growth years in the 1990s, before the AFC years.

c. In the bad scenario, the manufacturing employment share decreases so that the endogenous channel has a negative impact on competitiveness. This effect is counterbalanced by the positive effects from the exogenous channel. As a result, the income elasticity of imports grows at the same rate as the income elasticity of exports, so that their ratio remains constant at its last estimated 2014 value of 1.

(v) Finally, the growth rate of the world economy is assumed to stay constant at 2.7%, the average growth rate over the last decade.

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[a] This means that the value of the elasticity in 2018 is 0.35+0.00014+0.01+0.41=0.77. For 2019, the same procedure is applied but starting with the previous year's estimate of the elasticity, that is 0.77, and so on.

[b] Note that the impact of this effect is calculated differently from how it was calculated for the potential growth scenarios. For potential growth, the analysis in Chapter 2 allows a more complete treatment of the different effects on labor productivity growth, building on the shift and share analysis. On the other hand, the only way to assess the effect of structural change on the BOPC growth rate is via the regression results in the table in Box 2.4, which only includes the manufacturing employment share.

[c] The coefficients from regressing the policy variables on the manufacturing employment share are 0.13 for the FDI share and 0.07 for ECI+, as reported above, while it is 0.04 for the change in manufacturing exports.

Source: Authors.

Table 13.3 Balance-of-Payments-Constrained Growth Rate Scenarios for Indonesia in 2020–2024 (%)

Year	Manufacturing Employment Share (%)	Impact on the Income Elasticity of Exports (%)				Elasticities Ratio	BOPC Growth Rate (%)
		Structural Change	Endogenous Channel	Exogenous Channel	Income Elasticity of Exports*		
Moderate Scenario							
2018	14	0.00014	0.01	0.41	0.77	1.12	3.03
2019	14	0.00027	0.03	0.41	1.20	1.21	3.27
2020	14	0.00024	0.02	0.41	1.63	1.28	3.45
2021	14	0.00023	0.02	0.41	2.06	1.33	3.60
2022	14	0.00021	0.02	0.41	2.49	1.38	3.72
2023	14	0.00019	0.02	0.41	2.91	1.42	3.84
2024	14	0.00018	0.02	0.41	3.34	1.46	3.94
2020–2024	14	0.00021	0.02	0.41	2.49	1.37	3.71
Good Scenario							
2018	14	0.00141	0.14	0.41	0.90	1.32	3.57
2019	15	0.00303	0.31	0.41	1.61	1.61	4.34
2020	17	0.00274	0.28	0.41	2.30	1.83	4.93
2021	18	0.00257	0.26	0.41	2.97	2.01	5.42
2022	18	0.00228	0.23	0.41	3.61	2.16	5.83
2023	19	0.00209	0.21	0.41	4.23	2.29	6.19
2024	20	0.00202	0.20	0.41	4.84	2.42	6.52
2020–2024	18	0.00234	0.24	0.41	3.59	2.14	5.78
Bad Scenario							
2018	14	−0.00018	−0.02	0.41	0.74	1.00	2.70
2019	13	−0.00044	−0.04	0.41	1.10	1.00	2.70
2020	13	−0.00039	−0.04	0.41	1.46	1.00	2.70
2021	13	−0.00037	−0.04	0.41	1.83	1.00	2.70
2022	13	−0.00032	−0.03	0.41	2.20	1.00	2.70
2023	13	−0.00029	−0.03	0.41	2.58	1.00	2.70
2024	13	−0.00028	−0.03	0.41	2.96	1.00	2.70

BOPC = balance-of-payments-constrained.
Note: * Recall from Box 13.3 that the income elasticity of exports in any year is calculated as the value of the previous year's estimate (starting with 0.35 for 2018) plus the impact of structural change, the endogenous channel, and the exogenous channel.
Source: Authors' calculations.

According to the results reported in Table 13.3, Indonesia's average BOPC growth rate would grow to 6.52% in 2014 in the good scenario, while it would reach 3.94% under the moderate scenario and, given the assumptions, remain constant and equal to 2.7% in the bad scenario. The corresponding average values for the 2020–2024 period are 5.78% in the good scenario, 3.71% in the moderate scenario and, again, 2.7% in the bad scenario. As mentioned above, the mechanism driving these dynamics is the evolution of relative international competitiveness over time, proxied by the ratio of export to import elasticities of income. Both in the moderate and good scenarios, the BOPC growth rate increases over time because relative competitiveness rises: for a given world growth rate, the economy becomes increasingly able to sustain faster growth without creating current account problems. This gain in relative competitiveness is higher in the good scenario (the ratio of the elasticities increases from 1.32 to 2.14) than in the moderate scenario (the ratio of the elasticities increases from 1.12 to 1.37), so that the BOPC growth rate increases more in the first case. In the bad scenario, on the contrary, there is no competitive gain: the mechanism boosting the BOPC growth rate does not operate in this case, so that the BOPC growth rate remains constant.

13.4 Conclusions

As stated in the introduction, the starting point of the analysis in this chapter is the evidence suggesting that, given current conditions, Indonesia's economy is very unlikely to achieve growth rates of 7%–8% over the medium term. This chapter has analyzed what could happen to Indonesia's potential and BOPC growth rates if economic conditions, and particularly economic policies, change.

To investigate the possible path of growth during 2020–2024, this chapter has elaborated scenarios for Indonesia's potential and BOPC growth rates. The three alternative scenarios proposed are not (and are not intended as) forecasts, but rather should be considered as reasonable scenarios under the assumptions adopted. Indeed, the approach taken is to work in reverse from the following questions: what would be a possible set of conditions for Indonesia's potential and BOPC growth rates to rise above 6% (i.e., toward 7%–8%) in 2020–2024? Similarly, what possible conditions would lead the country's potential and BOPC growth rates to remain more or less in line with the current estimated values? What would a moderate scenario between the good and bad scenarios look like?

To summarize the main results from the potential growth rate and BOPC growth rate scenarios developed in this chapter, it is useful to focus on the comparison reported in Table 13.4, where only

Table 13.4 Potential and Balance-of-Payments-Constrained Growth Rate Scenarios for Indonesia in 2024 and 2020–2024 *(%)*

	Potential Growth Rate *(%)*		
Year	**Bad Scenario**	**Moderate Scenario**	**Good Scenario**
2024	5.38	5.54	6.15
2020–2024	5.52	5.68	6.31
	BOPC Growth Rate *(%)*		
Year	**Bad Scenario**	**Moderate Scenario**	**Good Scenario**
2024	2.70	3.94	6.52
2020–2024	2.70	3.71	5.78

BOPC = balance-of-payments constrained.
Source: Authors' calculations.

the results for 2024 and the average of 2020–2024 are considered. What can clearly be observed is that the projected BOPC growth rate for Indonesia is higher than the potential growth rate in 2024 only in the good scenario, while average BOPC growth rate for 2020–2024 is lower than the potential growth rate. This implies that even in the good scenario considered in this chapter, if the balance-of-payments constraint becomes binding, Indonesia's growth rate may be limited by a poor current account performance for most of 2020–2024. Moreover, with the country's potential growth rate above its BOPC growth rate in 2020–2024, actual growth will also be lower than the potential growth rate—leading to rising unemployment and underutilized productive resources (second line in Table 13.1).[206]

This is, of course, not to say that the country's BOP constraint will become binding during 2020–2024: Indonesia may well be able to grow faster than its BOPC growth rate and accumulate further current account deficits in the medium term, particularly if the current turmoil in financial markets subsides and confidence in the country's growth prospects and macroeconomic fundamentals is restored. But this analysis does raise a flag for policy makers. It suggests that, even in an optimistic scenario, faster growth is unlikely to rid the country from the current BOP concerns without appropriate and effective policy action. On the other hand, even if the BOP constraint does not become binding in 2020–2024, the potential growth scenarios indicate that Indonesia's growth performance is unlikely to improve significantly, nor achieve a growth rate higher than 6%, except under the particularly optimistic assumptions of the good scenario. Again, the analysis in this chapter emphasizes the need for an appropriate growth strategy.

[206] Since the actual growth rate is broadly in line with potential growth right now, any inflationary pressures in Indonesia will come from a different source (e.g., supply side). However, both growth rates are above the BOPC growth rate. This means that if the balance-of-payments constraint becomes binding (i.e., the current account deterioration worsens), the country will have to curtail growth until the actual growth rate is in line with the BOPC growth rate.

14 Modern Industrial Policy

14.1 Introduction

This chapter summarizes recent discussions and work on industrial policy under what the report calls modern industrial policy (MIP). MIP comprises interventions based on the premise that Indonesia faces important market failures that impede or constrain the development of a modern manufacturing sector. These market failures are mostly coordination and information problems. MIP is also based on the idea that the public and private sectors need to collaborate to relax constraints. Finally, the implementation of MIP requires a series of principles to avoid rent-seeking. Introducing elements of MIP into Indonesia's public interventions to revitalize the manufacturing sector is key to avoiding past mistakes (see discussion in Chapter 4).

14.2 Modern Industrial Policy

Broadly defined, the term "industrial policy" refers to the set of government interventions whose goal is to select specific sectors of the economy and to support them through a series of interventions, on the belief that these actions would trickle down positively throughout the economy.

During the first decades after World War II, industrial policy was understood as any type of selective intervention or government policy that attempted to alter the structure of production toward sectors that are expected to offer better prospects for economic growth (and to raise the productivity level) than without such intervention. Government intervention and the use of industrial policies became widespread after World War II by many developing member countries on the grounds that market failures were pervasive in most developing countries, and that the private sector alone could not lead the economic transformation out of agriculture into industry (Box 14.1). Development, particularly in the form of a "big push," was the business of the government.

These types of interventions have their adherents—those who believe in market failures—and their detractors—those who believe in the efficient working of markets. The latter argue that industrial policy

Box 14.1 Market Failures

(i) Failures of competition, existence of monopoly power

(i) Public goods: desirable goods to society that the private sector would not supply (or not efficiently) because they are not profitable

(iii) Externalities: diseconomies not reflected in producers' costs; and benefits not reflected in their revenues

(iv) Incomplete markets: situations where markets fail to produce what people desire even though they would be willing to pay more than the cost of producing them

(v) Information failures, mostly the tendency to underproduce information to which access cannot be limited

(vi) Situations where consumers may prefer not to consume some goods; or producers not to supply some products.

Source: Authors.

interventions have often degenerated into an exercise in "picking winners," a game played by government officials deciding which activities and sectors to promote and spend public money on. Since the 1970s, however, an increasing number of theoretical arguments have shown the negative effects of industrial and trade policies in developing countries. The idea that governments do more damage than good, and a frontal opposition to industrial policy, became the norm. The literature on the topic is very extensive and it has kept economists divided until today, between those who object to these government interventions (Box 14.2) on the grounds that governments should not select sectors and support them (something that should be done exclusively by the market); and those who argue that the debate is not about whether governments should intervene or not (as in reality all governments intervene) but about how government interventions should be carried out to avoid rent-seeking.

Box 14.2 Orthodox Arguments against Industrial Policy

(i) Industrial policy will lead to an inefficient allocation of resources as a result of interfering with the free market.

(ii) Even a "mild" industrial policy in the form of targeting is objectionable because of its distortionary effects.

(iii) Distortions create rents, which become the subject of rent-seeking behavior.

(iv) Self-seeking bureaucrats compromise the intent of industrial policy for their own ends (principal-agent problem).

(v) Public enterprise disciplinary mechanisms tend to be ineffective and discourage fiscal discipline, especially in the face of soft budget constraints.

(vi) Governments lack the required information.

Source: Authors' compilation based on Jomo (1999, pp. 239–40).

14.2.1 The Rationale for Government Intervention to Support Diversification and Upgrading

The development landscape of the 21st century will be significantly different from that of the second half of the 20th century, when a small group of economies (mostly in Asia) made significant progress, and some achieved high-income status. Reproducing what this small group of economies has achieved will be next to impossible in the coming decades because of the emergence of India and the People's Republic of China (PRC), the development of many new labor-saving technologies, the fact that developed countries will not be keen on running deficits that facilitate export-led growth in developing countries, and the restrictions that the World Trade Organization (WTO) places on developing countries to conduct industrial policies (widely used earlier). For these reasons, policy makers in developing countries need to understand that the key to achieving high-income status will be to induce rapid structural change by moving from traditional primary products to nontraditional industrial products, and to find niches in industrial products, consumer products with high income elasticities of demand, and modern services.

Evidence, however, indicates that development is a path-dependent process. This means that it is easier for a country to develop new comparative advantage in some product if it already has comparative advantage in similar products. This makes development a slow process that requires stepping stones. Consequently, leapfrogging, that is, the development of comparative advantage in sophisticated and complex products (e.g., advanced machinery and chemicals and pharmaceuticals) without having previously developed comparative advantage in similar products, is rejected by empirical evidence.[207] A

[207] Mehta and Felipe (2014).

frequent question in policy circles is whether it is possible to reduce or eliminate path dependence. This is because sophisticated products and services are usually associated with high wages.

Not surprisingly, Indonesia's policy makers are looking closely at the experiences of the region's economic success stories, especially the PRC, the Republic of Korea, and Singapore, for guidance and lessons. Even though it is clear that these experiences cannot be repeated because of the very different economic and political contexts, there is nevertheless huge interest in understanding how these countries organized themselves to make the jump to high-income status within a generation.

One answer to all these questions could be along the lines of "governments ought to stay out of the economy and let the market decide" and to recognize that government failures are large in developing countries (indeed they are!). This, however, is not a satisfactory answer. For better or worse, all governments get involved in the economy for one reason or another. Although the market is the best mechanism to allocate resources efficiently, it is also clear that quite often this does not happen for reasons that are now well established—market failures. Because of market failures, a government has to facilitate the transformation of the economy and contribute to its diversification and upgrading, as neither are natural processes. Diversification can happen quite easily within a narrow range of products, that is, across products that require similar technologies and capabilities (e.g., from simple textiles into slightly more sophisticated textiles, or from garments into shoes). However, diversification into distant product lines—the development of new generations of industries with a greater potential for innovation and productivity, such as from garments into automobiles—requires mastering specific capabilities across many areas, as well as having well-developed supporting institutions. History teaches that this process is policy induced. Clearly, it is virtually impossible to list a set of universally valid policies on how to diversify; indeed, the only generally valid recommendation is to avoid policy incoherence. In this context, this report discusses key market failures that developing countries face and how to solve them, which is the essence of MIP.

As discussed in Chapter 1, many economists today understand that economic development is essentially about three key issues or components, which jointly provide the rationale for modern industrial policy: (i) the accumulation of productive capabilities, (ii) structural transformation, and (iii) the joint role of public and private sectors. The idea of structural transformation encompasses the concepts of diversification and upgrading (sophistication) of an economy's productive structure, and acknowledges that not all activities have the same consequences for development.

Although industrial policy is still taboo in many circles, the reality is that virtually all national economic programs include elements of it through different forms of government intervention. The difference across countries is that some are still engaged in old-style industrial policy while others have evolved into the practice that we refer to as modern industrial policy. Old-style industrial policy is about picking specific sectors of the economy (associated to "vertical" industrial policy) for political reasons—thus preserving the status quo and preventing institutional change—and promoting these sectors through different strategies. The most criticized of these interventions has been the use of subsidies not linked to performance measures. Unfortunately, this type of industrial policy has often led to rent-seeking behavior that undermines the initial good intentions and, sooner or later, to losers that need to be bailed out, with the corresponding fiscal implications.[208] This is not what modern industrial policy is about.

[208] It is important to differentiate when rent-seeking activities are probably harmful and when they are not. To understand this, it is important to differentiate between rent-seeking activities and state-created rents. The danger of rent-seeking transaction costs (e.g., payments to keep subsidies) lies in the possibility of the state augmenting and encouraging the existence of inefficient producers who may end up having monopoly rights. This may have serious consequences for long-term efficiency. But the mere existence of state-created rents, which are only a transfer of wealth and may not involve wastage, does not mean that resources will be spent on rent-seeking. In fact, these rents could stimulate entrepreneurship.

14.2.2 World Trade Organization and Industrial Policy

The arguments against industrial policy since the 1970s, and especially since the 1980s, made the case for policy reform much easier. Three factors forced governments to reduce their use of industrial policies. One was the debt crisis of the 1980s. A second one was the proliferation of multilateral, regional, and bilateral trade agreements that limited the scope for government intervention. Multilateral agreements obliged countries to reduce tariff and nontariff barriers to trade. The third factor was the WTO rules, which restricted the use of selective subsidies. Developing countries had traditionally used a mix of import protection, export promotion, foreign investment restrictions, performance requirements, tax incentives, and other measures to promote industrialization. As a result of increased restrictions on industrial policies, governments have been forced to use different instruments since the late 1970s , such as multilateral and regional agreements and domestic regulatory reforms, initiated as a result of structural adjustment loans or domestic efforts to restructure their economies (e.g., export subsidies were restricted in 1979, General Agreement on Tariffs and Trade (GATT) Code on Subsidies and Countervailing Duties).

The GATT was replaced in 1995 by the WTO. Under the WTO, there has been a decline in the use of tariff and nontariff measures, with the consequence that the present WTO rules restrict the industrial policy instruments available to WTO members. The use of border measures has also declined. Specifically, WTO prohibits (i) the use of selective subsidies (severely limited); (ii) export subsidies (also in the form of export processing zones); (iii) subsidies for using domestic (rather than imported) inputs, although export subsidies in low-income countries are still allowed; (iv) local content requirements and quantitative restrictions on imports; and (v) voluntary export restraints.

Therefore, what can developing countries do today to induce structural change and plan transitions to higher growth rates and deeper degrees of structural transformation and diversification? While it is true that today's developing countries have fewer degrees of freedom than those in the past, a number of provisions in the WTO rules deal with various measures that member states can use to protect domestic suppliers and promote exports and technology transfer. Specifically, WTO rules still allow the use of trade policy interventions in the form of selective subsidies to promote domestic research and development, regional development, and environmentally friendly activities. Likewise, WTO enables members to use safeguard measures (limited to a maximum of 8 years) to protect themselves in two cases: when imports can destabilize their balance of payments (article XVIII), and when foreign competition threatens a specific industry due to an import surge (article XIX) or an unfair trade practice (article VI).[209] WTO rules also allow countries to promote their industries, including the manufacturing sector, in particular under the umbrella of advancing science and technology (e.g., by setting up technology parks). Subsidies in exchange for monitorable, results-oriented performance standards are acceptable, and countries can, for example, target national champions. Likely, the hurdles that developing countries face are (i) informal political pressures by developed countries to opening their markets; (ii) the subjection to "reciprocal control mechanisms" (these are conditions attached to state support [i.e., subsidies and incentives] which ensure that firms that

[209] The discipline on the use of subsidies, together with contingent protection and intellectual property rules, have been strengthened. According to Bora, Lloyd, and Pangestu (2000, p. 26) there is evidence that shows that a number of policies that distort trade are still allowed under existing rules. On the other hand, the added discipline imposed by the WTO rules has reduced the flexibility of national governments to pursue development objectives. Bora, Lloyd, and Pangestu (2000, p. 19): "Articles I and III of GATT 1994 lay down MFN and national treatment for imported goods. However, up to the bound rate (if a tariff item has been bound), tariffs can still be used to protect infant industries and develop domestic capacity. Tariffs are often complemented by other tools of industrial policy such as subsidies, which are used to both promote particular firms and industries and to penetrate foreign markets."

receive such support "reciprocate" through appropriate investment behavior and performance) of those countries that make use of WTO rules to promote their industries; and (iii) their lack of "vision."

14.2.3 What is Modern Industrial Policy?

This subsection will provide the key elements of MIP to adequately support the development of the manufacturing sector in Indonesia.[210] The objective is to develop a set of interventions to help the manufacturing sector diversify and upgrade, and small and micro firms to grow to become medium and large firms that are technologically more sophisticated. The recommendations presented in Chapter 15 are based on the empirical analyses presented in earlier chapters on the report. These proposals follow the diagnostics conducted of the current state of manufacturing in Indonesia. First, the current incentive system does not work adequately because it is not designed to serve the majority of the firms (micro and small). For example, provisions such as tax holidays are not used at all (notwithstanding recent changes to eligibility requirements). Consequently, it would make sense to redesign this policy incentive to target more labor-intensive firms and require smaller upfront investments. Second, the proposals will address the market failures that affect firms in the manufacturing sector (e.g., constraints to their growth), in particular information and coordination problems, and also lack of organizational capabilities (i.e., organization of the work flow and the floor shop).

Consistent with the view of development espoused in this report, MIP involves anticipating change and facilitating it by removing obstacles and correcting market failures. A key argument of this part of the report is that Indonesia's next phase of industrialization will be possible only if it revisits its policy interventions and introduces elements of MIP.

In practice, MIP comprises restructuring policies that facilitate the transfer of resources to the more dynamic activities of an economy, whether they are in agriculture, industry, or services. These policies are both "horizontal" and "vertical," aimed at addressing market failures and/or equity considerations. Horizontal policies refer to the provision of inputs that can be used by a broad range of firms across different sectors. Typical examples are transport infrastructure, well-educated engineers, or health and safety inspection systems. Vertical policies, as noted above, favor a particular sector (e.g., training electronic engineers). Very often, however, publicly provided inputs (e.g., a road) are sector or product specific, that is, they are vertical inputs. Examples of these inputs are a remote road that fosters ecotourism but does not help carry merchandise to a port, or a laboratory certifying the quality of meat, which is different from a laboratory certifying the quality of vegetables. Such examples show that there is a small difference between horizontal and vertical policies. Table 14.1 provides a typology of interventions, horizontal-vertical, and whether the intervention is considered a public input or a market intervention. Horizontal policies that are public inputs are, in most cases, uncontroversial; while vertical policies that are market interventions tend to be controversial. These interventions will have to be decided in combination with interventions at the product level in the complexity-easiness to jump to new products space, as shown in Figure 14.1.[211] The analysis in Chapter 10 indicated that Indonesia's export basket is relatively unsophisticated, with very few products in the upper right-hand corner (Do not intervene). This means that Indonesia needs to implement a combination of the strategies in the other three cells: *competitiveness policy* for products with a certain level of complexity; *parsimonious industrial policy* for products below average complexity where Indonesia could succeed (i.e., attain RCA>1); and *strategic bets* for selected products that Indonesia does not export but that may decide to target for a variety of reasons.

[210] For a recent analysis of modern industrial policies see Felipe (2015).

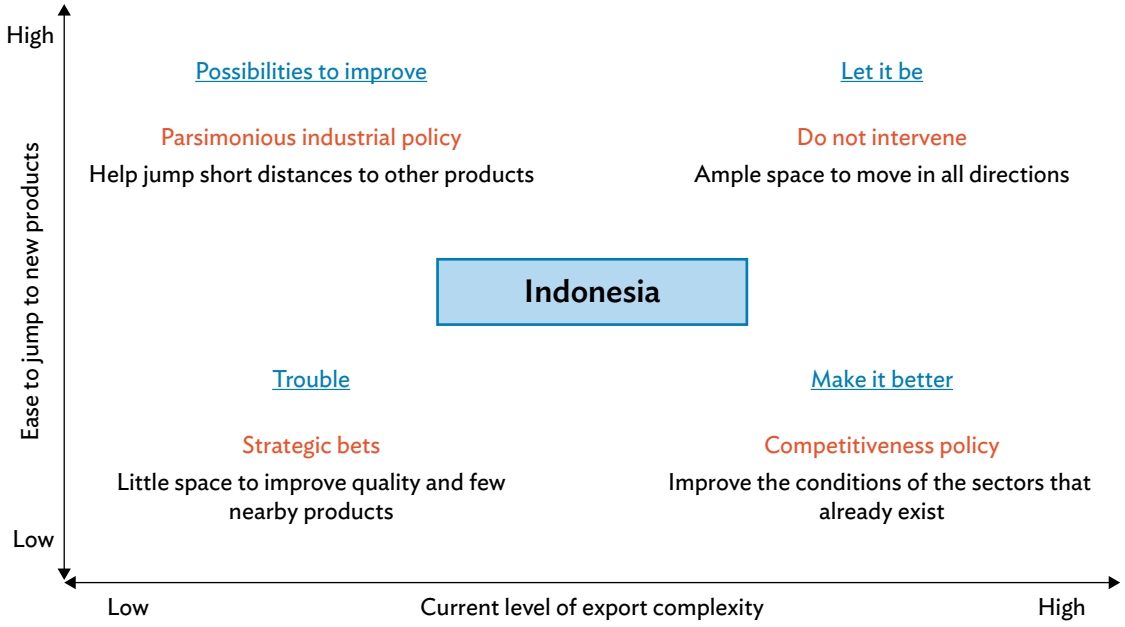
[211] The authors thank Ricardo Hausmann for providing this figure in previous conversations on this subject.

Table 14.1 Potential Areas of Intervention to Promote Manufacturing Firms in Indonesia

	Horizontal (broad based)	Vertical (sector specific)
Public inputs	• Simplification of business licensing procedures, e.g., one-stop shop for registration • Improvements in connectivity (infrastructure) • Simplified tax administration • Efficient market for electricity services **(Least controversial)**	• Improved ports and logistics centers for exporting industries • Improved access to ICT to help exporting firms reach international markets • Phytosanitary control for agricultural products
Market interventions	• R&D subsidies • Incentives to use new technologies	• Financial assistance to start-ups • Incentives for training and skill development among large and exporting firms • Facilitate import of inputs for high-tech industries • Tax exemptions for a particular sector **(Most controversial)**

ICT = information and communication technology, R&D = research and development.
Source: Authors' compilation based on Inter-American Development Bank (2014).

Figure 14.1 Indonesia's Policy Option



Source: Authors.

Consequently, MIP entails sector selection (e.g., training a particular type of engineer or building a particular road). However, the strategies used to select sectors need to have a clear rationale, and the tools to promote the sectors should be dependent on their stage of development and linked to performance measures. This means that assistance is given according to the principle of reciprocity and provided in exchange for concrete performance standards. MIP also has a clear objective: to address the typical market failures that many firms face in the discovery of new activities in which they may thrive and that may ultimately lead to an economy's transformation. To solve these problems, MIP uses both horizontal and vertical tools. Finally, to succeed, MIP has to be conducted in a highly competitive environment.

Firms from developing countries face a multiplicity of market failures. Two that are typical are information and coordination externalities. The first derives from the difference between the social and private values that entrepreneurs face when they try a new venture. For example, if the introduction of a product in a new market fails, the company will have to bear the full cost, but if it succeeds, it will share the discovery with other producers. Coordination externalities refer to the fact that new industries require capital that private entrepreneurs may not have. Moreover, new industries require coordinated investments in many related industries that individual entrepreneurs cannot organize by themselves. These investments generate demonstration effects and technological spillovers that raise the social return above the private return. This is the role of MIP. Solving these problems and providing adequate public services may not be easy (and not all cases will be successful), but they are a necessary condition to become a modern market economy and to engineer the structural transformation process that many developing countries need to accomplish.

Information and coordination failures make discovery a costly and difficult process. The discovery of new activities and the identification and removal of market failures requires strategic collaboration between private and public sectors. As a consequence, MIP is not just about picking promising sectors, but about jointly uncovering the obstacles to restructuring an economy and the types of interventions that can remove these obstacles. See Box 14.3 on how Indonesia's Eximbank helps remove such obstacles, and Box 14.4 on how the government supports the textile sector.

Another significant problem that many firms in developing countries face is a lack of organizational capabilities, and this could be more important than the market failures described above. Cross-country evidence shows that larger firms are better managed, while management practices improve with countries'

Box 14.3 The Role of the Eximbank Addressing Market Failures

Indonesia's Eximbank was created in 2009 (Law No.2/2009) as a fully government-owned institution. As of 2018, its assets amount to Rp115.6 trillion and the value of its equity to Rp21.4 trillion. Its main activities are to provide financing (Rp105.3 trillion), insurance (Rp11.8 trillion), guarantees (Rp11.4 trillion), and advisory services (13 new small- and medium-sized exporters).[a] A key role of the Eximbank is to connect exporters to the rest of the world by solving typical market failures. On the domestic side, these refer to facilitating export permits, customs issues, and logistics. On the external side, the Eximbank provides information on issues such as new markets and buyers, buyer and country risk (guarantee/insurance), or buyers' credit (finance). To have access to Eximbank's services, a firm must (i) be an exporter, (ii) have a good management track record, (iii) conduct business prudently, and (iv) be financially sound.

[a] Figures are as of July 2018.

Source: Eximbank. http://www.indonesiaeximbank.go.id/.

Box 14.4 Government Support to the Textile Sector

Table 8.4 summarized some of the problems and challenges of the textile sector. The Indonesian government has been focusing its attention on the sector to help the local textile industry, which is deemed strategic given that it employs nearly 3 million workers. To this purpose, the government developed the National Industry Development Master Plan (RPIN) for 2015–2035, in which the textile industry has been given national priority.

More generally, since 2015, the government has introduced a number of policies to facilitate the growth of the industry. These include establishing greater onshore warehousing of cotton, and promoting the Central Java province as a new textile hub with a dedicated industrial estate on its northern coast. This last measure is expected to increase the sector's competitiveness and attract more foreign investors, especially Chinese textile factories looking to relocate their production facilities overseas. The attractiveness of Central Java is due to the province's monthly minimum wage of $103, lower than those of Viet Nam ($132.1) and Pakistan ($105).

Other measures introduced by the government include offering new tax holidays, capping natural gas prices at a maximum of $6 per million British thermal unit, offering 30% discounted electricity rate to industrial consumers from 11 p.m. until 8 a.m., and incentivizing the purchase of new and secondhand machinery. Furthermore, the Indonesian government has also dramatically reduced the dwelling time in ports and improved vocational education to produce reliable factory operators.

To curb illegal textile imports, the Indonesian government has prohibited imported textile products to be shipped directly to Javanese ports. Only two ports, namely Dumai in North Sumatra and Bitung in North Sulawesi, are allowed to receive imported fabric, yarn, and garments to make their supervision easier.

Finally, the government launched a series of trade missions to help promote and market Indonesian textile products abroad.

Source: Global Business Guide Indonesia. http://www.gbgindonesia.com/en/manufacturing/article/2017/indonesia_s_upstreamtextile_sector_on_the_rise_after_a_slump_11803.php.

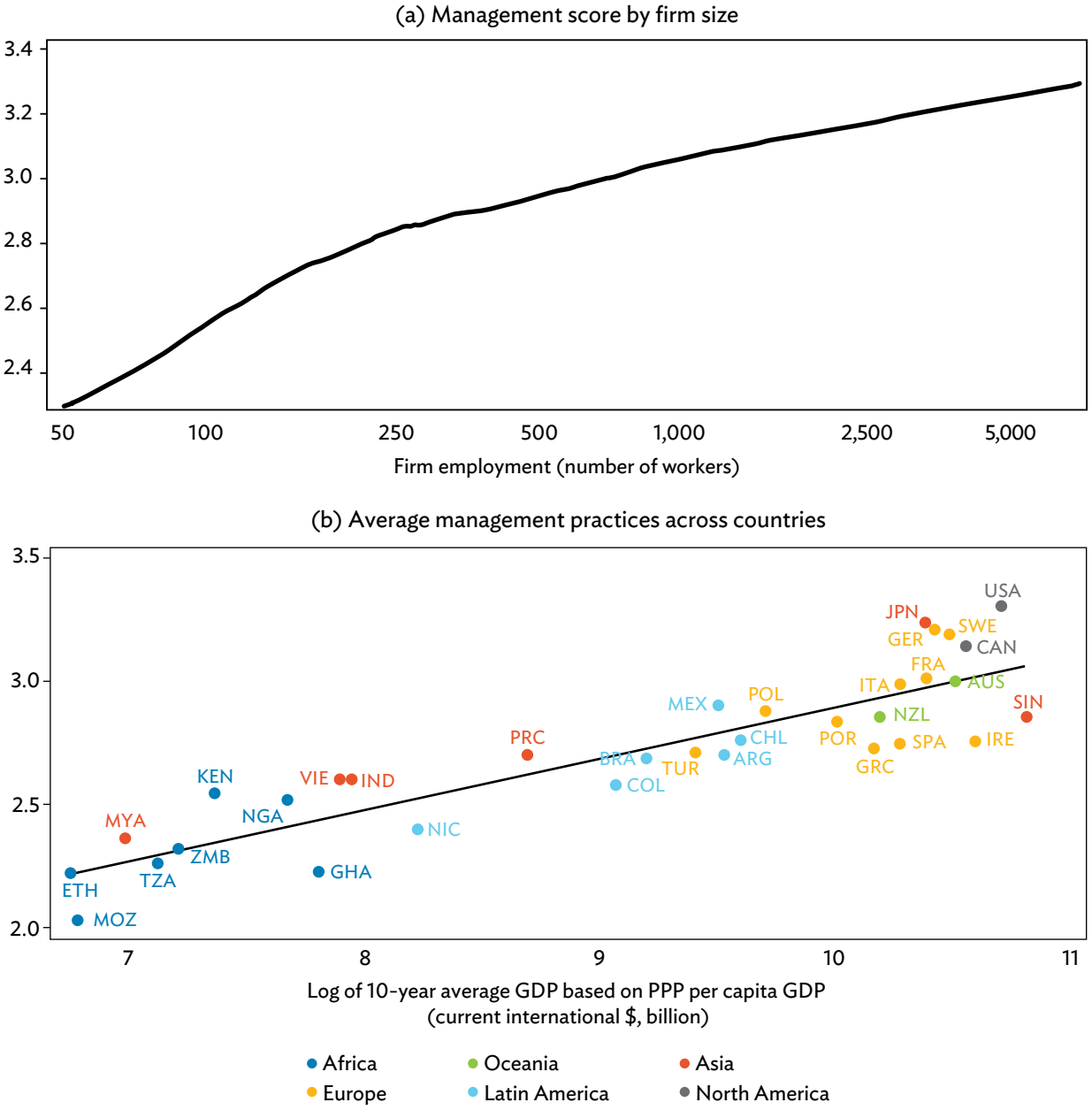
level of development. Panel (a) in Figure 14.2 plots the relationship between employment size and management scores, while panel (b) shows the relationship between GDP per capita and management practices.[212] To understand what these results summarize, imagine two firms making the same product or delivering the same service in a developed country and a developing country. Significant differences in the organization of the work flow and the floor shop are quickly apparent. Very often these differences are not related to different capital–labor ratios but to work practices. It has been argued that becoming a rich country is about being able to earn higher real wages, and that some economic activities are more lucrative than others.[213] Countries that specialize in such activities enjoy a higher level of real wages. But unlike the traditional neoclassical model in which higher real wages are the result of an increasing capital–labor ratio, the primary driver of growth is the gradual buildup of firms' organizational capabilities. This is also reminiscent of the O-ring theory, whereby production is a series of tasks that can be performed at different levels of skill, where skill refers to the probability of successfully completing a task.[214] For the final

[212] The economies included in the study are the following: ARG = Argentina, AUS = Australia, BRA = Brazil, CAN = Canada, CHL = Chile, COL = Colombia, ETH = Ethiopia, FRA = France, GER = Germany, GHA = Ghana, GRC = Greece, IND = India, IRE = Ireland, ITA = Italy, JPN= Japan, KEN = Kenya, MEX = Mexico, MOZ = Mozambique, MYA = Myanmar, NGA = Nigeria, NIC = Nicaragua, NZL = New Zealand, POL = Poland, POR = Portugal, PRC = People's Republic of China, SIN = Singapore, SPA = Spain, SWE = Sweden, TUR = Turkey, TZA = Tanzania, USA = United States, VIE = Viet Nam, ZMB = Zambia.

[213] Sutton (2000, 2005).

[214] Kremer (1993).

Figure 14.2 Management Scores, by Firm Size and Cross-Country Differences



GDP = gross domestic product, PPP = purchasing power parity, WMS = World Management Survey.
Notes: Panel (a) plots the relationship between employment size and management scores for the entire sample of 15,559 firm surveys using a Lowess smoother (bandwidth 0.25) to generate predicted management values against firm size (log-scaled). Panel (b) shows the management scores for the 15,454 interviews across the countries in the WMS survey. Management is scored on a 1–5 scale for 18 questions, with these country scores reflecting the average across all 18 questions across all firms in each country. GDP data for 2013 are from the IMF *World Economic Outlook*. Smaller and larger firms in Mozambique, Nigeria, and the People's Republic of China have been restratified to balance the sampling frame. See footnote 212 for the complete list of economies.
Source: Bloom, Lemos, and Scur (2016).

product or service to be successfully made or delivered, every single task must be completed correctly. For example, a car is a car if and only if all systems and components work. This implies that the value of each worker's effort depends on the quality of the efforts of all workers.

Lastly, there is another class of problems that countries face as they become richer and have solved some of the problems mentioned above. These are referred to as network failures. In a wide array of technological and industrial arenas, advances are achieved not entirely through competitive transactions, but also through mutual learning processes fostered by well-managed collaboration between specialists in complementary fields, as well as between designers, producers, and end-users. These failures can be addressed through policies aimed at helping dispersed network partners acquire a degree of certainty about the trustworthiness and competence of one another.

Seen in this light, industrial policy need not be controversial. Here, industrial policy is much less about the efficacy of government intervention—in particular, about the incorrect allocation of funds to the wrong sectors or the capture of subsidies by private interests—than about collaboration and the design of mechanisms to avoid these problems (e.g., through transparency and accountability, sunset clauses, and time-bound assistance). Consequently, both vertical and horizontal measures can be used simultaneously. Public–private collaboration is the essence of modern market economies and a key differentiating factor between economies that function well and those that do not.

In the context of the policy space that WTO allows developing countries, as discussed above, there has, since the 1990s, been a renewed interest in placing value in the role of government interventions back into development discussions, and to question the prevailing view that most economic distortions are the result of government actions. This view argues that there is a role for governments to address macroeconomic disequilibria (inflation and unemployment), poverty, inequality, and the many market failures that affect developing economies.

A series of recent papers have argued in favor of a new type of industrial policy.[215] One such study acknowledges the existence of generic market failures and argues "that the location and magnitude of these market failures is highly uncertain."[216] Under this view, information and coordination externalities are more important than technological externalities, for the former weaken the entrepreneurial drive to restructure and diversify low-income economies. Hence, industrial policy is not about addressing distortions in the traditional way (i.e., by enumerating technological and other externalities and then targeting policy interventions on these market failures), but about eliciting information from the private sector on significant externalities and about the constraints to structural transformation (hence, industrial policy also encompasses activities in agriculture and services) and the opportunities available. This requires "strategic collaboration" between the public and private sectors to determine the areas in which the country has a comparative advantage. The reason is that entrepreneurs may lack information about where the comparative advantage of a country lies, and governments may not even know what they themselves do not know. And certainly, most governments do not have adequate knowledge to pick winners. Uncertainty arising from lack of communication—that is, from one decision-maker having no way of finding out the concurrent decisions and plans made by others—may, if sufficiently great, inhibit investment decisions and arrest growth. In these circumstances, markets alone are likely to undersupply the incentives and demand for new activities necessary to transform the economy. These market failures are more prevalent in developing economies. "The trick for the government is not to pick winners, but to know when it has

[215] Rodrik (2007).
[216] Rodrik (2007, p. 100).

a loser."[217] This requires the development of appropriate institutional arrangements for industrial policy. Box 14.5 summarizes the basic elements of the institutions and principles for industrial policy.

The recommendations proposed in the next chapter to revitalize Indonesia's manufacturing sector belong to the four groups of interventions in Table 14.1. For example, Table 10.4 (products in which Indonesia has a sustained comparative advantage and with above-average complexity) and Table 10.5 (products with above-average complexity into which Indonesia can naturally diversify given its current specialization pattern) identified specific products that may call for vertical interventions. The intention of this selection or identification of products is not to "pick winners" in the old traditional sense of the term, that is, often for political reasons and to subsidize them. The purpose, instead, is to let both the government and the private sector (based on a sound methodology, not on ad hoc selection) know the complex products that Indonesia is already exporting successfully (Table 10.4), the complex products that Indonesia could potentially export successfully (Table 10.5), as well as the level of complexity of the sectors/products eligible for tax holiday (Table 10.6).[218] The key question to ask when deciding whether or not the private sector needs some type of assistance or incentive (recall the discussion in Chapter 7), is whether there is a market failure that constrains the private sector. If the answer is no (or if the firms in the sector are already doing well), then there is no economic rationale to provide it. If, however, the answer is yes, then the next decision to make concerns the type of assistance needed: some products will

Box 14.5 Institutions for Industrial Policy and Principles to Implement It

The basic elements of an institutional architecture for industrial policy are as follows:

(i) Place political leadership at the top,
(ii) Set up coordination and deliberation councils, and
(iii) Set up mechanisms of transparency and accountability.

The following are 10 design principles for the formulation of industrial policy:

(i) Incentives should be provided only to "new" activities.
(ii) There should be clear benchmarks for success and failure.
(iii) There must be a built-in sunset clause.
(iv) Public support must target activities, not sectors.
(v) Activities that are subsidized must have the clear potential of providing spillovers and demonstration effects.
(vi) The authority for carrying out industrial policies must be vested in agencies with demonstrated competence.
(vii) The implementing agencies must be monitored closely by a principal with a clear stake in the outcomes and who has political authority at the highest level.
(viii) The agencies carrying out promotion must maintain channels of communication with the private sector.
(ix) Optimally, mistakes that result in "picking the losers" will occur.
(x) Promotion activities need to have the capacity to renew themselves, so that the cycle of discovery becomes an ongoing one.

Source: Rodrik (2007).

[217] Rodrik (2007, p. 107).

[218] In some cases, tax holidays are granted to sectors rather than to products (as Box 14.5 proposes). One of the recommendations in Chapter 15 is to revise the list and identify eligible products, and not entire sectors.

require public inputs (e.g., improve a port), other products will require market interventions (e.g., specific incentives to a group of firms that manufacture a product in which Indonesia could acquire comparative advantage), and in other instances no intervention will be needed. This will require consultations with the private sector. Finally, no matter what type of assistance is provided, this will have to follow the principles in Box 14.5.

All the above means that industrial policy should be conceived as a joint effort of the state and the private sector to diagnose the sources of blockage in new economic activities and propose solutions to them. Industrial and technological upgrading requires, first, purposeful effort in the form of industrial policy; and in particular, effective government action, public–private collaboration, and a government that does not take any particular stand on the activities to be promoted or the instruments to be deployed. It only requires the government to build the private–public institutional setting from which information on profitable activities and useful instruments of intervention can be extracted. The key issue is not whether to protect, but how to protect and promote industry in order to ensure technical progress leading to higher labor productivity. Secondly, industrial and technological upgrading requires a private sector that is willing to do its part of the deal, that is, to invest.

Understood in this way, industrial policy is a powerful tool for successful industrialization and structural change. Perhaps a market-driven development model could not, by itself, have accelerated transitions between different patterns of specialization and delivered the high growth rates that some Asian countries experienced. This is not because market-based successes were absent, but because theory suggests exactly the opposite, that market forces are unlikely to efficiently address the coordination problems that arise in the transition across production and trade patterns. Indeed, coordination failures are likely to arise in the transition from old to new patterns of production and trade specialization. This situation is characteristic of semi-industrialized countries, in which old comparative advantages in labor-intensive industries are being eroded, and new ones in capital and technology-intensive activities emerge only slowly.

15 Recommendations to Transform Indonesia's Economy during 2020–2024

15.1 Introduction

This final chapter presents specific recommendations (interventions) to the Government of Indonesia to incorporate into its medium-term plan for 2020–2024, with a view to transforming the economy, particularly the manufacturing sector. The objective underlying these recommendations is to contribute to a policy dialogue within the Indonesian government and between the government and the country's development partners. The recommendations are intended to be a coherent set of ideas that can be developed and implemented.

The design and implementation of these interventions should be consistent with the principles of modern industrial policy (MIP). In this sense, collaboration with the private sector in analyzing constraints and solutions is fundamental. Recall from the discussion in Chapter 14 that the role of the public sector in MIP is to provide (public) inputs to solve the market failures that affect the private sector. Hence, discussions with the private sector to understand its concerns (e.g., public inputs that the sector needs) are fundamental.

This chapter reaffirms the message in Chapter 1, namely the moderate optimism of the analysis in this report. This derives from the fact that while Indonesia will continue growing rapidly by international standards during 2020–2024 (slightly above 5% per annum on average), the analysis in Chapter 13 indicates that Indonesia could reach growth rates of 7%–8% per year over the period 2020–2024, only under conditions that are very unlikely to be met. To facilitate and speed up the transformation of its economy well beyond 2020–2024, Indonesia needs to continue implementing reforms, as well as design a system of MIP. This chapter will highlight a number of areas for policy reform and MIP.

Despite Indonesia's initial successes in diversifying its economy (discussed in Chapter 4) it is still relatively dependent on natural resources (Chapters 9 and 10), suggesting a need to implement policies to further diversify. The call for policies to grow nonresource sectors and thereby diversify the economy is not new, yet few resource-rich countries have been successful in doing so.[219] However, resource revenues can be used to fund public investments complementary to private investments, such as investments in human capital, public infrastructure, and possibly utilities.

Moving forward, it is important that Indonesia avoids the policy mistakes made in earlier decades that led to the relative stagnation of its manufacturing sector. These policies and their impacts include (i) the shift towards manufacturing that occurred later than in other high-performing East Asian economies, which can be attributed, at least partly, to Indonesia's natural resource abundance and especially to the effect of the oil boom on the structure of production and exports; (ii) the poor design and implementation of an industrial policy system; and (iii) Indonesia's failure to generate large indigenous manufacturing companies. The manufacturing sector that developed in Indonesia relied largely on Japanese foreign direct investment (FDI). Indeed, Indonesia became overwhelmingly dependent on Japanese FDI, especially after 1985, when Japan became the first foreign investor in Southeast Asia.

[219] Venables (2016).

Indonesia's government must play an important role during 2020–2024 in avoiding these earlier mistakes and shifting the economy toward a more diversified and complex manufacturing sector. The question is thus not whether it should intervene, but rather what type of interventions it should implement and how. The challenge for Indonesia will be to coordinate its effective record of macroeconomic management with industrial policy, both of which should be oriented toward reindustrialization and catching up.

The recommendations derive directly from the discussions in previous chapters. They are divided into three groups and address:

(i) the need to increase potential and balance-of-payments-constrained (BOPC) growth rates during 2020–2024, which will involve manufacturing-biased structural change (based on the analyses in Chapters 2 and 13);
(ii) recommendations for the manufacturing sector:
    a. the need to foster firm growth, since the large majority of firms in the manufacturing sector are micro firms (based on the analysis in Chapter 6);
    b. the need to rethink the system of incentives targeted at the manufacturing sector and to better tailor the incentives to the sector's characteristics—labor-intensive production by a labor-abundant economy with small firms (in terms of employment) producing products that are not highly complex (based on the analysis in Chapter 7);
    c. constraints to employment and sales growth (based on the analysis in Chapter 8);
    d. diversification, upgrading, and the role of global value chains (GVCs) (based on the analyses in Chapters 9 and 10); and
(iii) the supporting fiscal and monetary policies that can encourage growth (based on the analyses in Chapters 11 and 12).

The recommendations are respectively discussed in sections 15.2, 15.3, and 15.4.

15.2 Increase Potential and Balance-of-Payments Constrained Growth Rates. Policy should focus on their determinants.

The general policy recommendation stemming from the analysis in Chapters 2 and 13 can be summarized as follows: economic policies for long-term growth in Indonesia should be targeted at increasing the country's potential and, in particular, BOPC growth rates. The focus should be, as discussed in Chapter 2, on the determinants of labor productivity growth and the elasticity of demand for exports. This is the central message to drive the 2020–2024 medium-term plan.

Currently, Indonesia's BOPC growth rate appears as the most binding constraint on growth in the medium-term, which suggests that policy actions should pay special attention to international competitiveness. However, even in an optimistic scenario (Chapter 13), potential growth is also unlikely to increase significantly beyond the 6% threshold. Thus, an appropriate strategy needs to focus on measures to simultaneously foster both the BOPC and potential growth rates, in order to relax the constraints presently limiting Indonesia's growth performance.

The models discussed in Chapter 2 highlight two main objectives for policy intervention:

(i) increase labor productivity growth rate to boost potential growth, and
(ii) increase the income elasticity of exports (a summary of the export basket nonprice characteristics) to boost the BOPC growth rate.

The evidence presented in Chapter 2 provides a consistent picture of the key factors that policies should focus on to pursue both objectives simultaneously. In particular, manufacturing-biased structural

change, in the form of an expansion of the share of manufacturing employment, should be a primary policy target. This is because of its beneficial effects on productivity growth, economic complexity, and export sophistication. However, such an outcome is difficult to achieve given current world conditions, with today's developing countries finding it difficult to increase manufacturing employment shares as a result of (i) labor-saving technological progress, and (ii) manufacturing employment migration to the People's Republic of China (PRC).[220] The reality is that most employment is created in the nontradable service sector.[221] As noted in Chapter 1, the share of employment in tradable activities in Indonesia has decreased by 20 percentage points since the mid-1970s. During this period, the share of manufacturing employment increased to the current share of (slightly above) 14%, still far from the shares the advanced economies achieved in the process of becoming rich—shares of over 20% and often 30%. It will be very difficult for Indonesia to significantly increase the share of employment in manufacturing in 2020–2024. Having said this, policies will have to focus on opening niches (to simultaneously diversify and upgrade) in as many different manufacturing activities as possible.

There is a wide range of possible measures that could foster Indonesia's manufacturing employment, which complicates policy design. Nonetheless, building on the evidence in Chapter 2, this report suggests that policy should focus on factors that could increase manufacturing employment (despite acknowledging the difficulties), while also directly boosting aggregate labor productivity growth in the economy and the income elasticity of exports. The latter is a measure of the competitiveness of a country's export package. The analysis in the report indicates that increasing this elasticity is of paramount importance.

Specifically, policy should focus on

(i) primary education, and overall human capital, to allow a better matching between workers' skills and firms' requirements;[222]
(ii) relaxing constraints that limit firm size, for example, energy costs and red tape (section 15.3.1 below on constraints to firm growth);
(iii) systemic financial deepening to relax firms' credit constraints (section 15.3.3 below on firms' constraints to employment and output growth);
(iv) measures to boost FDI and integration into GVCs—policies should differentiate between different types of FDI, with joint ventures shown to have the highest labor productivity (section 15.3.4 below on diversification, upgrading, and the role of GVCs); and
(v) fiscal and monetary policy coordination to maintain a stable macro environment in relation to inflation and the exchange rate, thus reducing risk for exporting firms (section 15.4 below on fiscal and monetary policies).

15.3 Recommendations for the Manufacturing Sector

After highlighting the role of manufacturing-biased structural change in raising the potential and BOPC growth rates, the chapter proceeds by providing detailed recommendations on five specific areas: firm growth (Chapter 6); reform packages, the incentive system, and Industry 4.0 (Chapter 7); constraints to employment and output growth (Chapter 8); and diversification, upgrading, and the role of GVCs (Chapters 9 and 10).

[220] Felipe, Mehta, and Rhee (2018).
[221] Chen, Kam, and Mehta (2018).
[222] The emphasis on primary education here is to reflect the regression analysis results in the table in Box 2.2. The recommendations in section 15.3 are more specific on secondary, vocational, and tertiary education.

15.3.1 Address constraints to firm size by encouraging the entry of large firms and by supporting the growth of small and medium-sized enterprises. Tackle regional disparities by encouraging new firms to locate outside Jakarta.

Micro and small firms dominate the manufacturing sector in Indonesia, representing 99% of the total number of firms and over 60% of employment. Large firms, however, generate the vast majority of value added across most manufacturing branches and are the most productive, highlighting the importance of encouraging firm growth and the entry of large firms. Joint ventures also tend to be highly productive and should be encouraged. The food sector is the largest sector by size, employment, or value added.

- Indonesia's private sector needs to create new large firms; and existing medium-sized firms need to expand.
  - (i) Streamline the process of obtaining licenses and permits to encourage entry, and in particular the entry of large firms seeking to engage in high-tech and high value-added manufacturing.
  - (ii) Design a system of incentives that encourages the formation of joint ventures between domestic and foreign companies (the latter tend to be large and more productive) to generate links with other (foreign) firms and to facilitate technology transfer.
  - (iii) Facilitate/encourage firm growth for incumbent small and medium-sized firms looking to expand their operations by, for example, ensuring that there are no taxes that penalize small firms, removing red tape, helping them gain access to markets, and creating a competitive culture.
  - (iv) Provide financing facilities aimed at medium-sized firms with the goal of nudging more firms to grow, particularly those in high value-added manufacturing.
  - (v) For incumbent large firms, ensure that streamlined export procedures are in place. Improve market knowledge of and networks in manufacturing products for large firms.
  - (vi) Continue attracting large FDI firms.

- Encourage firm entry and expansion beyond Greater Jakarta.
  - (i) Find out why manufacturing firms are reluctant to open new businesses outside Jakarta. Address their concerns if valid. Determine what it would take to attract them in terms of procedures, land acquisition, information, incentives, infrastructure, etc.
  - (ii) Use the information obtained from firms to continue efforts to develop special economic zones (SEZs) in provinces outside Greater Jakarta, to promote the manufacturing sector elsewhere in the country.
  - (iii) Encourage medium and large firms to operate in regions outside of Greater Jakarta by providing them with financial incentives (tax breaks, exemption of import duties, etc.).
  - (iv) Improve access to transportation and logistics in provinces by leveraging existing infrastructures and facilities (such as a bonded logistics center), focusing on small and medium-sized firms that want to expand their production. Acknowledging that infrastructure is sector specific, engage in communication with the private sector to understand its needs. Where possible, focus investment on infrastructure that is broadly in demand.
  - (v) Identify opportunities in each location outside Jakarta given its comparative advantage.

15.3.2 Build on the reform packages, revise the incentive system, and ensure that Industry 4.0 is a useful strategy to make manufacturing an important engine of growth.

Indonesia's incentive system needs to acknowledge the types of firms the country currently has (i.e., micro and small firms) and to create systems that allow them to succeed and to grow. Moreover, the system needs to focus on the sectors where it has or can easily develop a comparative advantage. This is not to say that Indonesia cannot offer incentives to develop sectors where it does not have a comparative advantage, but sectors with a comparative advantage should not be neglected.

- **Build on the reform packages passed by the Jokowi administration to provide further support to firms in the manufacturing sector.**
  - (i) Do not "over reform." Focus on those key reforms that are easiest to understand and implement, and which would yield the most benefits. Follow up their implementation and results.
  - (ii) Focus on reforms that address specific firm-level significant constraints (section 15.3.3).
  - (iii) Integrate the online single submission (OSS) of business licensing platform into all local governments' licensing systems. Create a system (web portal) that consolidates all the incentives available to firms and communicate this widely beyond East Java and the Jakarta area.
  - (iv) Provide an English version of the OSS website to facilitate business licensing applications of foreign investors using the system.
  - (v) Expedite the land acquisition process for firms looking to engage in high-value manufacturing within the priority sectors identified by the government. Consider a system of special treatment for these companies.

- **Improve the current incentive system to target medium and large firms trying to undertake high-value activities.**
  - (i) Reduce uncertainty, lack of clarity, and implementation problems that surround the incentive system.
  - (ii) Provide incentives only when there is a market failure and after discussing the need with the private sector. Incentives should be grounded on the principles of modern industrial policy (Box 14.5).
  - (iii) Review the system of incentives to the manufacturing sector with a view to making it consistent with Industry 4.0 and the administration's policy priorities. Build on the recent revision of eligibility requirements for tax holidays and continue updating it based on the take-up rate, and on the complexity of specific products eligible (see Table 10.6). Box 14.5 (principle [iv]) is explicit that incentives should be provided to activities and not to entire sectors, as it is done now (see some cases in Table 7.2).
  - (iv) Provide fiscal incentives based on performance (e.g., number of jobs created, exports, research and development (R&D), expenditure, or commitment to upgrade product quality).
  - (v) Make incentives such as tax holidays available to specific products within the five priority sectors (food manufacture, textiles, automotive, electronics, and chemicals) where Indonesian firms can make inroads (i.e., products in which Indonesia could quickly acquire significant comparative advantage).
  - (vi) Reduce the eligibility criteria for import duties to include more medium-sized firms. This can be done by improving access to the Ease of Import Facility for Export Purposes (KITE).

(vii) Assess the costs and benefits of the fiscal measures (particularly tax incentives) and revise the incentive schemes on a regular basis (led by an independent fiscal commission).
(viii) Communicate and clarify incentives and procedures that manufacturing firms receive when operating in industrial zones, bonded zones, and SEZs.

- **Establish a public innovation infrastructure, facilitate technology adoption, and develop workforce skills to help the manufacturing sector reap the benefits of Industry 4.0.**
  (i) Strengthen the innovation ecosystem in which public and private higher education institutions, central and local governments, and the private sector, including companies, financiers, and possible entrepreneurs, cooperate on innovation and R&D, with the goal of creating manufacturing clusters.
  (ii) Finalize the list of incentives for technology adoption and R&D to stimulate upgrading. Provide incentives for technology adoption to facilitate and stimulate upgrading activities of existing manufacturing firms and encourage foreign firms to work with local universities and research and training institutes to upgrade the workforce. Incentivize higher education institutions and industry partnerships to commercialize new products and solutions through a well-resourced competitive funding process, such as an innovation fund, accompanied by policy reforms that allow higher education institutions to generate and use external resources with flexibility.
  (iii) Organize conferences to facilitate transmission of product knowledge and export business practices.
  (iv) Focus on enhancing productivity and job quality to reap the benefits of Industry 4.0 by
    a. identifying the set of skills that are necessary to work in high-tech manufacturing, focusing on products and the skills that firms need to create those products and improve enterprise efficiency;
    b. assessing the existing supply of skills and identifying additional training needs in the manufacturing sector given the changing nature of production due to new technologies and new products;
    c. developing collaborative partnerships between industry and providers of education and training (e.g., technical colleges, universities, private training providers) for the provision of demand-driven workplace and vocational training to develop appropriate practical skills for high value-added manufacturing; and
    d. developing managerial and organizational capabilities and leadership skills by strengthening short-duration skills programs in secondary and tertiary education systems as well as traditional tertiary managerial programs; and by incentivizing midcareer development through within-company training and participation in postgraduate programs.

15.3.3 Address firm-specific constraints to employment and output growth.

Chapter 8 tested the extent to which standard complaints by the private sector (i.e., financing difficulties and tax burden; infrastructure bottlenecks; institutional factors; limited access to land and labor; and regulatory and licensing burden) are or are not critical constraints that impact employment and sales growth. The analysis in Chapter 8 indicated that these constraints had a greater impact on a firm's sales growth than on its employment growth. Improvements in these areas can be considered as policy targets to improve the general business climate for firms.

By distinguishing firms by size, age, technology group, ownership, market orientation, and sector, the results in Chapter 8 indicate that the following types of firms face the greatest number of constraints: (i) medium- and large-sized firms (in terms of employment), (ii) low-tech firms, (iii) old firms (operating for more than 15 years), (iv) domestically oriented firms, and (v) domestically owned firms. The following policy recommendations address the common constraints to these enterprises:

(i) Invest in electricity generation, transmission, and distribution to ensure affordable, reliable, and sustainable electricity supply.
(ii) Facilitate land acquisition, which could be done by reducing the corresponding number of procedures and requirements.
(iii) Examine and respond to the restricting effects of labor regulations (e.g., regulations related to severance payments and layoff procedures).
(iv) Ease issuance of licenses and permits.
(v) Address crime, theft, and disorder.

These recommendations will benefit firms across different dimensions of size, age, technological group, ownership, and market orientation, and will benefit both employment and sales growth. Further policies that will be needed to address the specific constraints of some types of firms are the following:

(i) Analyze the specific constraints that high tax rates impose on small firms, in particular on employment and sales growth, and adjust tax rates accordingly.
(ii) Increase access to finance and streamline the tax administration system for high-tech firms to remove constraints to higher sales growth.
(iii) Enhance the skills and capabilities of workers by providing job-specific training and by improving the organizational capabilities of managers and entrepreneurs to ease constraints for low-tech firms.
(iv) Rationalize customs and trade regulations to ease constraints on sales growth for foreign-owned enterprises and for exporters.
(v) Regulate unfair competition from the informal sector to encourage sales growth among formal firms in the food manufacture and rubber sectors.
(vi) Improve transport and telecommunications infrastructure to encourage the growth of firms in the textile and chemical sectors.

15.3.4 Diversify, upgrade, and strengthen linkages with global value chains.

Indonesia's manufacturing sector lacks complexity, and the connection of its firms to GVCs is mostly as a supplier of natural resources. A coherent strategy to upgrade and diversify can only be the result of joint work between the public sector and the thousands of firms that constitute Indonesia's manufacturing private sector.

- **Strengthen the linkages of domestic firms within GVCs, allowing firms to benefit from technology transfer and knowledge spillovers.**
  (i) Provide support for the development of new activities within firms (e.g., new products, processes, and functions within GVCs) and entry into (new) GVCs. Policies should be smart, time limited, and specify targets related to indicators of GVC performance (e.g., new product development or upgrading within the value chain).

(ii) Encourage foreign firms' participation in value chains (e.g., by sourcing inputs from upstream domestic firms), while ensuring that they operate in a noncaptive way, that is, create incentives for foreign firms to share knowledge and technology with upstream suppliers and facilitate upgrading.
(iii) Develop local supplier networks in collaboration with foreign firms—for example, supplier development programs—to increase the domestic value-added share in value chains.
(iv) Implement local value added content requirements, taking into account local capabilities. Likewise, apply the local content requirement when engaging in infrastructure development.
(v) Devote resources to encourage domestic small and medium-sized enterprises (SMEs) to become part of industrial clusters and industrial zones, allowing for interaction with foreign firms (e.g., reserve some percentage of the land for SMEs under special conditions).

- Strengthen business development services to support the entrance of SMEs into GVCs; and help upgrade their product mix once inside.
  (i) This is a public service but could be delivered by the private sector, foreign or domestic companies, or possibly a combination.
  (ii) Provide training to SMEs on trade issues related to production capabilities, market research, logistics, marketing plans, banking, international law, partners' search, and legal issues.
  (iii) Ensure that SMEs are aware of relevant standards, certification, and accreditation, and provide them with the knowledge and incentives to meet global standards.
  (iv) Act as an intermediary for SMEs to find GVCs they can enter. Efforts in this regard can be channeled through industry and trade associations, providing them with resources to link domestic firms to GVCs.
  (v) Provide information for SMEs to identify appropriate GVCs and GVC partners, by leveraging work currently done by Eximbank. Focus the efforts of Eximbank on generating opportunities for SMEs to enter into GVCs.
  (vi) Ensure that SMEs have access to and are engaged in innovation and technology capacity efforts.
  (vii) Target upgrading efforts and policies at the product level (in priority sectors) for firms that participate in GVCs, and set clear requirements for firms, in terms of participation and upgrading within GVCs, to benefit from incentives.

- Upgrade resource-based activities.
  (i) Use international markets as the quality standard to identify specific ways for upgrading resource-based manufacturing activities through active collaboration between resource suppliers (primary sector) and resource-processing firms (manufacturing).
  (ii) Facilitate standard setting and certification in resource-based production (e.g., develop domestic standard setting and certification activity; and provide incentives and information for firms to achieve international standards and obtain international certification).
  (iii) Work with downstream firms to identify the capabilities necessary to further process natural resources as a means of generating additional comparative advantages in processing activities and gaining a larger share of value added from resource-based sectors.
  (iv) Use policy (e.g., export taxes on exportable raw materials, and subsidies and tax breaks on downstream production) to encourage downstream engagement in resource-based value chains (i.e., processing activity) and to expand the domestic raw material content that is used in downstream processing firms.

(v) Use policy (e.g., related to industrial zones and innovation policy) to further develop upstream and downstream linkages in complementary markets—including services—as a means of raising domestic content and shifting comparative advantage within value chains.
(vi) Invest in specific infrastructure necessary to engage in more complex products and more complex value chains. Investment in information and communication technology (ICT) infrastructure, in particular, is likely to facilitate movement into higher value-added and more high-tech production.

- Diversify away from resource-based production by identifying both short jumps and strategic gambles.
  (i) Focus initially on sectors in which Indonesia has a (revealed) comparative advantage (e.g., textiles and the motor vehicles sectors), with efforts to increase the scale of production and the domestic value-added share.
  (ii) Target gradual diversification—create value added and jobs by diversifying into new products that are (partly) based on existing production capabilities.
  (iii) The analysis in Chapter 9 (Table 9.1) suggests the following value chains as good candidates for further upgrading and diversification: fabricated metals, electrical equipment, and machinery and equipment in the case of upstream GVC participation; and non-metallic minerals, computing and machinery equipment, and furniture, in the case of downstream participation. This should be part of a strategy to be decided with companies in these chains.
  (iv) Use tax incentives and subsidies to encourage production, inward FDI, and intersectoral linkages and cooperation in non-resource-based sectors. Target incentives at upstream or downstream firms depending on the appropriate positioning of Indonesia within particular value chains (i.e., considering the analysis in Chapter 9).
  (v) The analysis in Chapter 10 (Table 10.4) indicates that product complexity is already relatively high in a number of sectors, for example, motor vehicles and machinery and equipment. Increasing the scale of production in these sectors and further diversifying within these sectors can be an important channel for upgrading. This should be part of a strategy to be decided with companies that export these products. Likewise, identify particular product segments to support within the targeted sectors, based on current comparative advantage and capabilities, and possibilities for diversification and upgrading (e.g., the production of pianos in the furniture sector, and artificial fibers in the textiles sector), based on the analysis in Chapter 10, Table 10.4. Products in Table 10.4 require a "Competitiveness Policy" (Figure 14.1) to improve the conditions of these sectors.
  (vi) Within the targeted sectors, use the analysis in this report to identify particular complementary sets of products that could be targeted for specific interventions. The analysis in Chapter 10 identifies a number of these products across a variety of sectors, with opportunities for such "gradual" diversification, especially in the chemicals sector and the electronics and computer sector (see Table 10.5 for examples). This should be part of a strategy to be decided with companies that export these products. Products in Table 10.5 require a "Parsimonious Industrial Policy" (Figure 14.1) to help companies acquire comparative advantage in them.
  (vii) Table 10.3 shows that Indonesia's top 10 complex exports rank 200th–600th (out of 5,111 products) in the complexity classification, and none is exported in significant amounts, much less with RCA>1. Table A10.1 in Appendix 10.1 lists the 100 most complex products (out of 5,111).

If Indonesia is willing to take strategic bets (Figure 14.1), this list (or an extended list beyond the top 100) could be used for in-depth analysis and discussion. Note that the list of 59 products reported in Table 10.4 contains five products in the top 500 most complex. Likewise, the list of 69 products reported in Table 10.5 contains four products in the top 500. Supporting these products (vertical interventions; see Table 14.1) would be a political decison given how far Indonesia's capabilities are from those required to produce and export them. This is a risky strategy but worth discussing to expedite reaching upper-middle-income status.

(viii) Contribute to the reduction in the current account deficit:

a. Encourage imports of intermediates to upgrade production in sectors identified as strategic GVC sectors, that is, where Indonesia has or can create a revealed comparative advantage (Table 9.1), and sectors where the potential to export is strong. At the same time, limit imports in sectors where this is not the case.

b. Encourage intermediate imports in sectors where Indonesia has a comparative advantage in downstream production (i.e., where it needs to source inputs). Simultaneously, discourage imports in sectors where Indonesia has a comparative advantage in upstream GVC activity, and where intermediate inputs compete with domestic inputs and where imported final goods may compete with and crowd out the development of local production (Chapter 9).

15.4 Improve coordination of monetary and fiscal policies to support higher growth.

This final section addresses the role of fiscal and monetary policies supporting growth (Chapters 11 and 12). As noted in Chapter 11, growth and macro policies need to be considered jointly, that is, by analyzing long-term development policies (including industrial policy) together with short-term macroeconomic policy. This is because development strategies require close coordination between the macroeconomic regime and industrial policy, both oriented to reindustrialization and catching up.

Chapters 11 and 12 discussed how growth is financed and who finances it, along with the extent to which the financial burden of growth on Indonesia's private sector is showing signs of rising financial fragility. Indonesia's domestic private balance is negative, as shown in Chapter 11. Historically, this has been a fairly reliable signal of rising financial fragility across a range of countries. The domestic private sector balance can be decomposed into the contributions of the household sector, the firm sector, and the financial sector. The decomposition for Indonesia shows that firms are bearing the financial burden of growth.

A policy mix led and implemented jointly by the Ministry of Finance and Bank Indonesia (BI) can reduce this burden without sacrificing the goal of faster growth. There are two overarching and intertwined themes. First, Chapter 11 showed that the burden of financing economic growth falls on Indonesia's firms. Financial balances show that firms are continuously in a position of deficit vis-à-vis the household, financial, international, and government sectors. The government's financial position is also one of deficit with the other sectors, but the fiscal rule limits this deficit to 3% of gross domestic product (GDP). As a result, firms have to carry any remaining financial burden in the absence of a significant improvement in the current account balance. Chapter 12 then showed that the firms' financial positions may have worsened as Indonesia's expansion continued.

The second theme is that while Indonesia's macroeconomic policy mix might appear similar to what academic macroeconomists have labeled monetary dominance, there are important interrelationships between monetary and fiscal policies, especially with regard to the budgets and operations of the government

and BI. The relevance of this second point to the first is that both monetary and fiscal policies directly and indirectly impact upon firms' financial positions, but in different ways. When a policy stimulates the economy, looser monetary policy reduces the domestic private sector's financial position while looser fiscal policy does the opposite. When monetary policy tightens to slow the economy and reduce inflationary pressures, again, the financial positions in the private sector matter. If the private sector's financial positions are robust, then rising interest rates can have the standard effect of slowing spending. If, however, the private sector's positions are fragile, then a slower economy can make them still worse, while higher interest rates can further exacerbate problems. Finally, rupiah depreciation consistent with BI's inflation target has already occurred at least twice in the past 5 years. BI already recognizes that private sector financial positions that are overly susceptible to rupiah depreciation can be inconsistent with achieving its policy goals. It is also inconsistent with a robust firm sector that is able to bear the financial burden of growth.

These two themes result in three organizing principles for the proposals: (i) firms' financial positions must be robust; (ii) the policy mix must be flexible and consistent with the interdependence of fiscal and monetary policies, the goal of robust private sector financial positions, Indonesia's preference for independent monetary policy, and the government budget position consistent with BI's independence; and (iii) macroeconomic risks arising from financial fragility in the private sector must be reduced as they can slow economic expansion.

Because the proposals in this section are conceptually different from those discussed in sections 15.2 and 15.2, their presentation and discussion follow a different format.

15.4.1 Organizing principle 1: The firm sector's financial position must be robust.

Proposal:
Ensure that the financial positions of the firm sector and state-owned enterprises are robust to changes in interest rates, rupiah depreciation, and other significant macroeconomic events (such as the 2013 "taper tantrum" in the United States, or the Federal Reserve Bank's current path of interest rate increases) that affect the financial environment that firms operate in, at all stages of the business cycle.

Specific measure:

- BI must develop tools for reducing systematic risk in the event the financial positions of the firm sector are not robust by
  - (i) regularly conducting sensitivity analyses on key variables;
  - (ii) requiring firms to submit information to BI that would enable it to regularly carry out sensitivity analysis to evaluate how changes to its policy stance can affect firm sector financial positions; and
  - (iii) alternatively, requiring firms to undertake this analysis by themselves using BI's projections of various macroeconomic variables.

Comments: (a) BI already requires firms to report on their net liabilities in foreign currencies and to take steps related to partially hedging, ensuring sufficient liquidity, and maintaining solid credit ratings. (b) Rupiah depreciation consistent with BI's inflation target has already occurred at least twice in the past 5 years. (c) BI already recognizes that private sector financial positions that are overly susceptible to rupiah depreciation can be inconsistent with achieving its policy goals and has implemented regulatory requirements to reduce these risks.

15.4.2 Organizing principle 2: The policy mix must be flexible in a manner consistent with (i) the interdependence of fiscal and monetary policies, (ii) the goal of robust private sector financial positions, and (iii) Indonesia's preference for independent monetary policy and a government budget position consistent with BI's independence.

Proposal:

Make the fiscal rule an additional tool for BI to manage inflation.

Note: The fiscal rule constrains the government's balance from accommodating the domestic private sector balance in a way that monetary policy cannot. Thus, there is no guarantee that a deficit of 3% of GDP is the appropriate maximum at any point in time—3% might be too small or too large to aid BI's efforts to slow inflation. In the latter case, a smaller deficit might enable the central bank to keep interest rates lower.

Specific measures:

- Set maximum or minimum government deficit or surplus levels for a given period.

  Comments: (a) The government's budget position becomes another tool for meeting the central bank's legal mandate of price stability. (b) Within the context of an additional tool for inflation targeting, the budget can increase the likelihood of meeting the central bank's inflation target. (c) This flexible fiscal rule can be under the control of BI, the Ministry of Finance (or a relevant government agency), both entities, a larger committee similar to the Inflation Targeting, Monitoring, and Control Team (TPI), or TPI itself. (d) A macroeconomic policy mix that includes the government's budget position as a tool blends increased flexibility with credibility. In practice, the flexible fiscal rule is set for a particular period, for example, a fiscal or calendar year, a quarter, or a rolling four-quarter average. (e) As is the current practice for BI's monetary policy decisions, the entity or entities responsible for setting the flexible fiscal rule must explain its/their choice and decisions for the fiscal rule after each policy meeting. (f) Given a mandate of complementing a credible, inflation targeting central bank, the ability to tie the government's budget position more consistently to BI's mandated policy goals will enhance the ability to achieve these goals. (g) This is particularly so since the government's budget position has different effects on the private sector's financial positions compared to those of standard monetary policy tools.

- Create alternative instruments consistent with the goal of price stability, that are also consistent with (i) preventing or not worsening fragile financial positions in the corporate sector; and (ii) enabling the government to achieve targets set by a flexible fiscal rule as described above.

  Comments: (a) Instead of, or complementary to, higher interest rates on refinance, which can significantly worsen financial positions when BI wants to slow the economy, impose a tax or fee on borrowing costs. This will raise revenues and close the government's financial position, while not threatening firms' financial positions since firms pay taxes only after meeting debt obligations. In the event that firms do not have sufficient before-tax profits to pay the tax, the tax can become a deferred tax liability that the firm is still liable to pay. (b) Fees or taxes can be set and adjusted as a policy tool by the Ministry of Finance (or another appropriate government entity), BI, both of these entities together, or a committee that includes both but is larger, such as those committees currently in place to support inflation targeting.

15.4.3 Organizing principle 3: Macroeconomic risks arising from financial fragility in the private sector must be reduced as they can slow economic expansion.

Proposal:
Shift the financial burden of growth within the private sector, from the firm sector to the household and financial sectors.

Specific measures:

- Broaden and deepen the household sector's access to financial products to improve the firm sector's financial balance.

  Comments: (a) This should be done in such a way that it does not risk pushing the household sector into financial fragility, or results in a large increase in procyclicality of the household sector's spending. In other words, designed responsibly and robustly, increased household debt (for mortgages, for instance) enables growth that relies less on reducing the firm sector's financial position. (b) While the household sector's debt might increase, a key criterion for success is that the ability to service debt should not worsen. For example, longer-term mortgages can enable increased home ownership, which can increase the sector's debt in absolute terms and also relative to income, while not necessarily raising the costs of servicing debt relative to income. Increased access to credit for big-ticket household expenditures like cars and appliances have a similar effect, but again requires caution to keep the likelihood of significant increases in debt service relative to income low.

- Provide targeted lending to the firm sector consistent with preferences or areas of focus related to the goal of faster growth, under terms that can be adjusted in response to macroeconomic events.

  Comments: (a) Balancing the need to finance growth with the need to ensure sustainable financial positions in parts of the corporate sector that are important to achieving faster growth requires that the financing terms do not increase the economy's vulnerability to macroeconomic events such as recession, higher interest rates, rupiah depreciation, inflation, and so forth. (b) Financing arrangements should be such that borrowers ongoing debt-service requirements on debts previously incurred will be able to make repayments when macroeconomic conditions are difficult and/or threaten systemic stability. (c) Regardless of where responsibility lies for providing such financing, the loans should be guaranteed by BI or by the government (which, in such circumstances, should receive special funding from BI as is already required under exceptional macroeconomic circumstances). (d) Similarly, if creditors are other than the government or BI, for cases in which debt service requirements on previously incurred debt are temporarily eased, the government or BI should be liable for the difference between payments originally due and those made by borrowers. An alternative is for lenders to instead acquire an equity position in a borrower equal to this difference that can later be sold or repurchased by the borrower. (e) In the event that borrowers' forgone debt service is paid to lenders by the government or BI, this amount is either canceled, added to the debt service payments ultimately due from borrowers (but here paid to the government or BI), or result in a non-voting equity position acquired by the government, BI, or another appropriate government or government-owned entity that can ultimately sell it back to the borrower or sell it to the private sector.

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A Joint ADB–BAPPENAS Report

Indonesia's gross domestic product growth rate declined significantly after the Asian financial crisis (AFC) of 1997–1998. The country's potential and balance-of-payments growth rates are only about 5.5% and 3%, respectively. One important reason is that the country's industrialization pace declined after the AFC. Today, Indonesia is still exporting many unprocessed natural resources and simple manufactures (not complex products) with a low income elasticity of demand. This report analyzes how Indonesia's manufacturing sector could diversify and upgrade during 2020–2024 and beyond. This is essential if Indonesia is to attain upper-middle-income status as soon as possible. Policy makers and the private sector need to collaborate to identify the coordination failures that hamper the discovery of those products that Indonesia could successfully produce and export. These must be complex products with a high income elasticity of demand. The report proposes a number of policies to expedite this process.

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