Sectoral Engines of Growth in Developing Asia: Stylised Facts and Implications

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Abstract: This paper provides an analysis of developing Asia's growth experience from the point of view of its structural transformation during the last three decades. The most salient feature of this transformation has been the significant decrease in the share of agriculture and the parallel increase in the share of services. Using Kaldor's framework, the paper discusses whether industry plays the role of engine of growth in developing Asia. The empirical results show, first, that both industry and services play such a role; and second, that there is evidence of endogenous, growth-induced technological progress. Likewise, the technology-gap approach supports the view that technological spillovers have fostered growth in developing Asia.

Keywords: Asia, Kaldor's laws, structural transformation
JEL classification: O14, O47, O53

1. Introduction

Except for those countries exceptionally well endowed with natural resources such as oil, growth is always associated with the structural transformation of the economy. Indeed, the growth experience of the developed economies since the 19th century reveals that growth

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was associated with changes in the structure of the economy. More recently, the experience of the successful Asian economies (e.g., South Korea, Malaysia, Taiwan, etc.) also shows that high growth has been associated with deep changes in the structure of these economies. Moreover, many economists see the development of a modern industrial sector as the key for propelling structural transformation.

Structural transformation is reflected in changes in output and employment compositions. An economy that grows as a result of transformation generates new activities characterised by higher productivity and increasing returns to scale. The transition across different patterns of production and specialisation also involves upgrading to higher value-added activities within each sector through the introduction of new products and processes. These changes entail far-reaching transformations in terms of, among other things, economic geography and the skill content of output. It is the countries that can sustain multiple transitions across different stages of their structural transformation that grow successfully.

As Rodrik (2006) reminds readers, development economists of the 'old' school understood the key role that structural transformation plays in the course of development. Among these economists, it was probably Nicholas Kaldor (1966; 1967) who provided the most thorough explanation of why industry plays the role of "engine of growth." Indeed, the so-called 'Kaldor's Laws' provide a solid starting point for sector analyses of growth and structural change. Recently, Jaumotte and Spatafora (2007) discussed Asia's performance from a sectoral perspective.
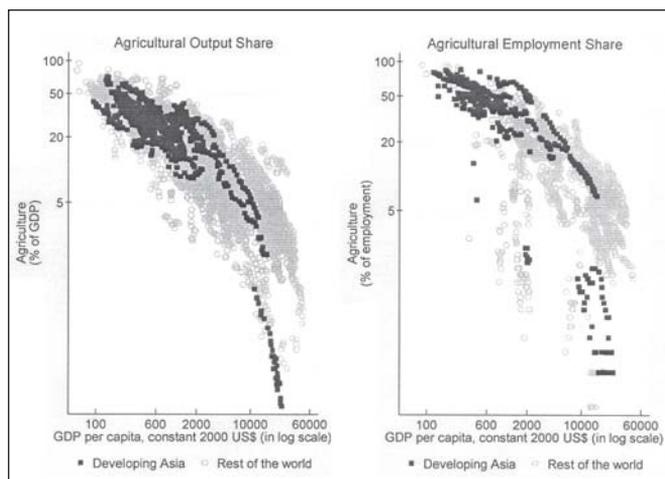
The purpose of this paper is to analyse developing Asia's growth experience in the context of structural transformation. Growth and structural transformation are inter-related, since countries do not grow by simply reproducing themselves on a larger scale. Generally (unless all sectors of the economy grow at identical rates), countries become different as they grow, not only in terms of *what* they produce, but also in terms of *how* they do it (i.e., by using different inputs, including methods of production).

Specifically, we attempt to answer the following questions: (i) What has been the extent of structural change in developing Asia during the last three decades? (ii) What is the contribution of the different sectors to the growth performance of the Asian economies? (iii) What is the contribution of structural change to productivity growth and catching up?

The rest of the paper is structured as follows. Section 2 documents the extent of structural transformation in developing Asia. Section 3 provides a brief summary of Kaldor's laws. Section 4 discusses the empirical evidence provided by the laws. Section 5 complements the analysis of growth and structural transformation in Asia through Kaldor's laws with an analysis of the importance of structure and technology diffusion. Section 6 summarises the main findings.
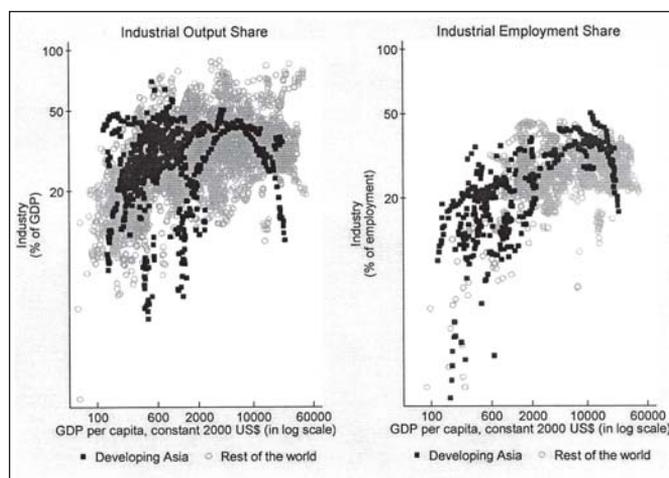
2. Structural Transformation in Developing Asia

During the last three decades, most countries in developing Asia have undergone massive structural changes, in particular in terms of changes in both output and employment sectoral shares. Figures 1, 2 and 3 show scatterplots of output and employment shares of agriculture, industry and services *vis-à-vis* income per capita, pooling data since 1970 for the whole world. Figure 1 shows that the shares of agricultural output (in total output) and employment (in total employment) decline as countries become richer. Figure 2 shows that as countries' income per capita increases so do the shares of output and employment in industry, although
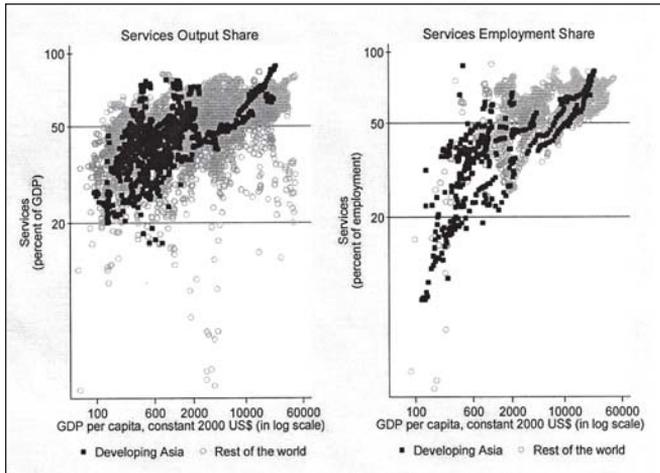
Figure 1: *Agricultural output and employment shares vs. per capita GDP, 1970–2004 (logarithmic scale)*

Figure 2: *Industry output and employment shares vs. per capita GDP, 1970–2004 (logarithmic scale)*

Figure 3: *Services output and employment shares vs. per capita GDP, 1970–2004 (logarithmic scale)*

there seems to be a point beyond which these two shares start declining. Figure 2 also shows a wide dispersion in these shares for a given income per capita. Finally, Figure 3 shows that the shares of output and employment in services clearly increase as income per capita increases. The relationship described between sectors' shares and income per capita is referred to as the 'logistic pattern.' It is based on Engle's law (demand explanation) and on the differential productivity growth rates across sectors (supply explanation).

The share of agricultural output in total output has declined significantly across developing Asia during the last thirty years. Especially significant are the declines that occurred in China and India; in the former from about 32 per cent in the 1970s to about 13 per cent in 2000-2004, and in India from about 42 per cent to about 23 per cent (during the same periods). In parallel with this decline, there has also been an increase in the share of services in all regions. The share of industry has increased significantly in some parts of developing Asia (e.g., ASEAN-4, Other Southeast Asia, Other South Asia), remained the same in China, and increased by a small margin in India.

The share of employment in agriculture has also declined across most of developing Asia, except in Central and West Asia (although in 2000-2004, agriculture was still the largest employer in developing Asia in 12 out of 23 countries for which data was available). This is the result of the convulsion that the region underwent after the collapse of the Soviet Union. In general, the decline in agricultural employment has occurred at a much slower pace than that in output.

As in the case of output share, there has been a general increase in the share of employment in services in all regions. Employment in industry has increased significantly in the ASEAN-4 countries (except the Philippines) and by a small margin in India; it has not

changed in China; and has suffered a decline in the NIEs (especially Hong Kong) and across most of Central and West Asia.

The NIEs have undergone severe de-industrialisation as manufacturing has lost significant weight in total output between the 1970s and 2000-2004 (Rowthorn and Ramaswamy 1997; 1999; Pieper 2000). This is not a negative phenomenon, but the natural consequence of the industrial dynamism of these economies, that is, the transition to service-led economies. It is a feature of economic development that reflects their success. In terms of manufacturing employment, all four NIEs have clearly de-industrialised, especially Hong Kong, where the share decreased by about 25 percentage points in two decades. The declines in the other three economies are significant but smaller. Rowthorn and Ramaswamy (1997; 1999) have noted that this group of countries is going through a process similar to that of the OECD countries, although it must be noted that it is a process affecting Taiwan and, especially, Hong Kong, and to a much lesser extent South Korea and Singapore.[1] This is the result of transferring production facilities to China. In South Korea and Singapore, the share of manufacturing has remained at about 27 per cent since the 1980s. Felipe and Estrada (2007) provide a recent analysis of developing Asia's manufacturing sector.

The ASEAN-4 countries and Other Southeast Asia have increased their manufacturing shares significantly, both in terms of output and employment. The exception is the Philippines, which had the highest manufacturing output share among the ASEAN-4 in the 1970s, but by 2000-04 the share had decreased by about three percentage points and was the lowest in the group.

Although Indonesia, Malaysia and Thailand are cases of what can be labeled as 'successful industrialisation', this must be qualified with the following two observations. First, other than South Korea, Taiwan, Malaysia and the Kyrgyz Republic, no other country in developing Asia had in 2000-2004 a share of employment in manufacturing as high as that of the OECD countries. Second, in terms of labour productivity (Figure 4), there is a large differential between most developing Asian countries and the OECD average. Indeed, it appears that many countries across developing Asia have industrialised at low levels of productivity. This could be due to two reasons: (a) that the product mix of new employment has been towards relatively low productivity industries; and/or (b) that the increase in employment has taken place in low productivity techniques.

Other than the NIEs, today's level of productivity in the rest of the developing Asia is still below the OECD average during the early 1970s. The level of productivity in the secondary sector is significantly higher than that in agriculture. And the level of labour productivity in the service sector is above that in industry and manufacturing. Labour productivity in industry in the Philippines in 2000-2004 was below the 1978 level, and in Indonesia it has barely increased. In most countries, labour productivity in agriculture is still very low.

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[1] Wu (2004:258-260) argues that both public and private circles in Hong Kong "remain interested in 're-industrialisation'" after 1997. The reasons are twofold. First, de-industrialisation brings hardship for the poor, worsens income distribution and, as a consequence, threatens social stability. Second, Hong Kong has specialised in services that are China-oriented. However, Hong Kong may lose this privileged position once Shanghai flourishes as a service centre. Wu goes on to argue that both private and private circles in Hong Kong tried to prevent the city's de-industrialisation, but could not stop it due to the lack of any industrial policy in the 1970s.
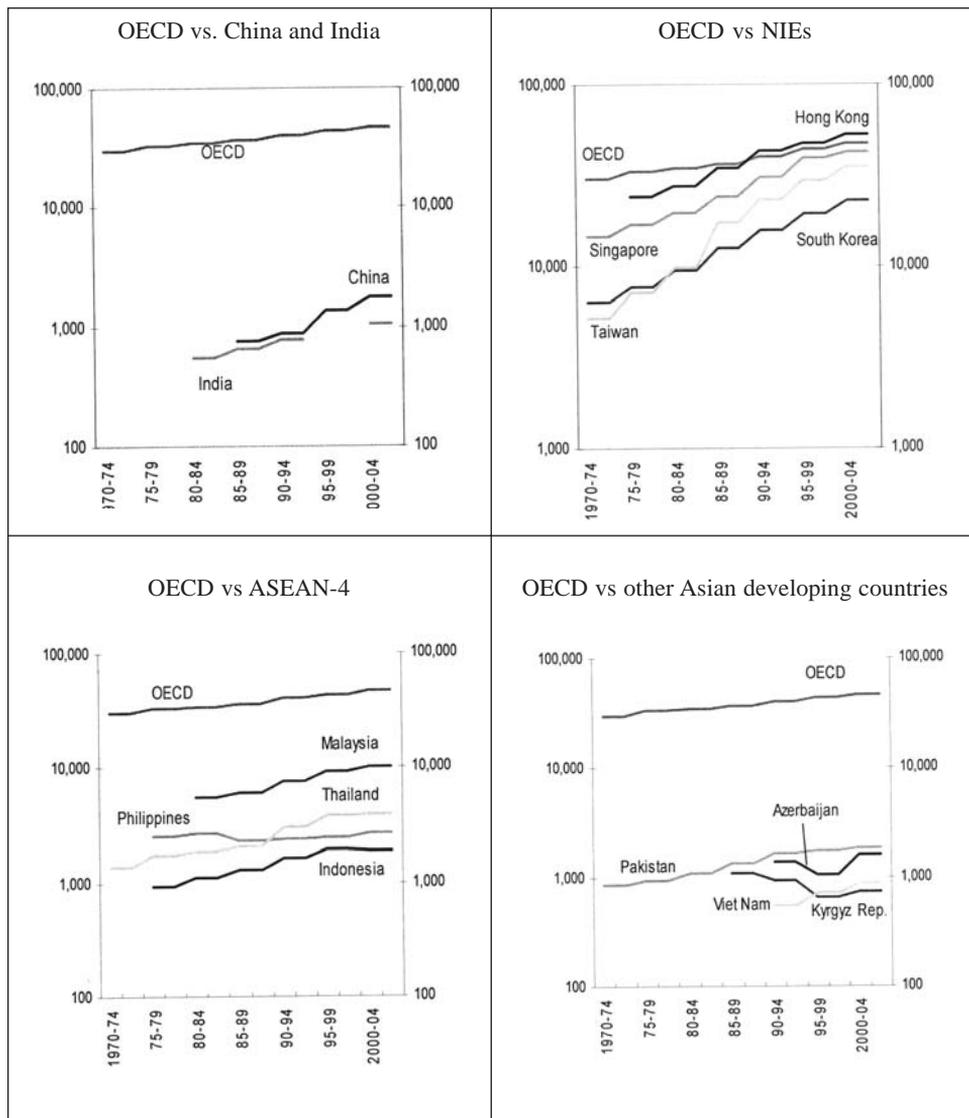
Note: The 1980–1985, 1986–1989, 1990–1995, and 2000–2004 data for India refer only to 1983, 1988, 1994, and 2000 figures, respectively. Similarly, the 2000–2004 data for China, Indonesia, Kyrgyz Republic, and Pakistan refer only to 2000–2002; the 1986–1989 data for Indonesia only to 1989; the 1976–1979 data for the Philippines only to 1978; and the 1970–1975 data for Pakistan only to 1973–1975.

Source: Authors' estimates.

Figure 4: *Total labour productivity (constant 2000 USD, logarithmic scale)*

Only the NIEs have achieved labour productivity levels that approach those of the OECD countries, and within this group, Singapore and Hong Kong are city-states with very small rural sectors. South Korea and Taiwan are significantly behind. Moreover, although in all Asian countries, productivity has improved significantly (with the noted exception of the Philippines), the absolute gap with respect to the OECD productivity level has widened. In the case of Malaysia, the country with the highest productivity levels outside the OECD and the NIEs, the absolute productivity differential with respect to the OECD in industry has almost doubled, from USD21,786 in 1980-85 to USD38,946 in 2000-04, despite the fact that Malaysia's productivity in industry increased by a factor of 1.7. In other countries and sectors the gap has widened by even larger amounts.

The Asian Development Bank (2007) provides evidence that the manufacturing sectors of a number of Asian economies, especially South Korea and Malaysia; Singapore and Taiwan, have undergone important transformations and shifted their manufacturing output to more technology- and scale-intensive subsectors. This shift upward is an important component of what structural change is about - the production of more sophisticated manufactured products leads to faster growth for it enlarges the potential for catch-up. In China and India the shift to more technology- and scale-intensive subsectors is taking place more slowly; while in most other Asian countries, the evidence is lacking.

Although in decline with respect to the average of the 1980s, the share of China's manufacturing subsector in total output has been traditionally very high. It still accounts for about 34.5 per cent of total output, only matched in developing Asia by Malaysia, Thailand and Tajikistan. The share of manufacturing employment, on the other hand, has declined from about 15 per cent in the 1980s to 11 per cent now. China has effectively lost millions of manufacturing jobs since the 1990s due to the restructuring process of its state-owned enterprises since the economic reform period began in 1979. However, it is worth noting that this decline is occurring at a much lower level of income than it did in the industrial countries. Moreover, less than a fifth of China's labour force is employed in manufacturing, mining, and construction combined (Banister 2005). The share of India's manufacturing output has remained stable at about 15-16 per cent since the 1970s, while the share of manufacturing employment has been at around 11 per cent during the periods under consideration.

3. Structural Change, Industrialisation and Kaldor's Laws

In order to understand the potential role of developing Asia's transformation, it is important to view these changes in light of the development theory literature. It is in this context that the Kaldorian sectoral growth facts or laws (Kaldor 1966; 1967) become very relevant as an approach to the issue of how structural change has affected growth in developing Asia, and what is the role that the different sectors have played. The Kaldorian facts bring together the notion of 'engine of growth' sectors, 'economies of scale' and 'sectoral shifts' in a simple yet informative way. This framework recognises that some sectors may play a more important role in pulling the rest of the economy and in generating productivity gains through economies of scale.

Kaldor's laws allow us to address empirically the following questions: (i) Is manufacturing an engine of growth in Asia? (ii) Can services play a role as engine of growth? (iii) What are

the most dynamic sectors in Asian countries? (iv) Can we expect continued growth in Asia, given the recent sectoral developments?

It should be noted that we view Kaldor's laws more as a series of stylised facts and historical regularities rather than a theory of economic development. These facts are compatible with a diverse range of theories of growth. What is important is that the correlations embedded in Kaldor's laws are presented at the sectoral level and, hence, are helpful in analysing and comparing patterns of economic growth, and the role of structure. In this sense, our objective is 'estimating', rather than 'testing', these laws, following the distinction put forward by Leamer and Levinsohn (1995).

Though Australia, Canada, New Zealand, the Scandinavian countries, and others relied heavily on the primary sector for their development, they all experienced periods of strong industrial growth and diversification as essential components of their sustained economic growth. Rodrik (2006) has argued that sustained growth requires a dynamic industrial base. One can, therefore, speak of the "logic of industrialisation" (Nixson 1990: 313) and understand why many developing countries have adopted strategies toward rapid industrialisation, often starting with industries such as textiles, clothing, and shoes that use relatively simple technologies and which have the potential to be labour-intensive and thus absorb labour. The experience of the industrial economies shows that establishing a broad and robust domestic industrial base holds the key to successful development, and the reason that industrialisation matters lies in the potential for strong productivity and income growth of the sector. This potential is associated also with a strong investment drive in the sector, rapidly rising productivity, and a growing share of the sector in total output and employment. The presence of scale economies, associated with the secondary sector, gains from specialisation and learning, as well as favourable global market conditions, implying that
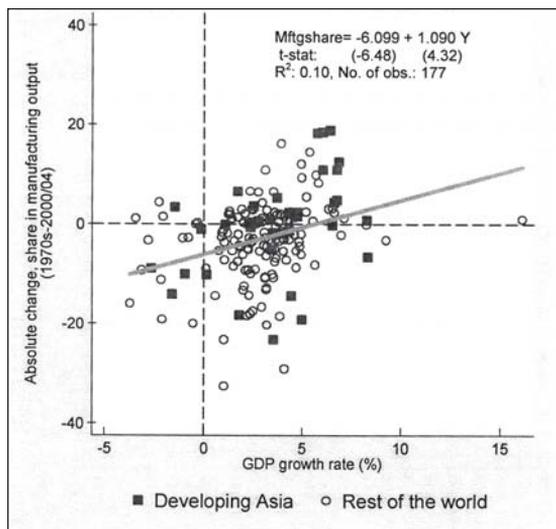
Note: Positive change in the share indicates that the share at the end of the period was higher.
Source: Authors' estimates based on data from the World Development Indicators.
Figure 5: *Output growth vs. change in manufacturing output share*

the creation of leading industrial subsectors, along with related technological and social capabilities, remains a key policy challenge. Today, there is wide variety across countries in terms of resource endowments, pace of capital accumulation, and policy choices. This implies that there is ample room for diversity in industrial development.

Figure 5 shows the 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-2000/04. The Figure documents the positive correlation between both variables. Among the countries in the first quadrant with the highest increases in the manufacturing share and in the output growth rate are Cambodia, Indonesia, South Korea, Lao PDR, Malaysia, and Thailand.

Notwithstanding these observations, given the high growth rate that the service sector of a number of Asian countries has achieved recently, and consequently the increasing share of services in total output, one may wonder if industrialisation is a step that may be bypassed today.

3.1 Kaldor's Laws

Kaldor's *first law* states that the faster the rate of growth of manufacturing output, the faster the rate of growth of GDP, giving to manufacturing the role of engine of growth. The characteristics of manufacturing, and industry in general, as a sector with strong input-output linkages, confer this sector this potential. This role is based not only on this aspect, but also on the fact that capital accumulation and technical progress are strongest in the industrial sector, having important spillover effects on the rest of the economy. This means that the stronger the rate of growth of manufacturing, the stronger the rate of growth of the rest of the economy. Kaldor viewed the high growth rate characteristics of middle-income countries as an attribute of the process of industrialisation.

In his seminal work and for empirical purposes, Kaldor specified the laws as relationships between growth rates because he estimated a cross-section of countries with data at two points in time. Kaldor's first law, that is, that manufacturing acts as the engine of growth, can be examined through a regression of non manufacturing output growth ($\hat{Y}_{nm}$) on manufacturing output growth ($\hat{Y}_m$), and therefore be specified as:

$$\hat{Y}_{nm} = a_1 + a_2 \hat{Y}_m \tag{1}$$

where a_2 indicates the strength and size of the impact (elasticity) of the manufacturing sector's growth on the rest of the economy. This coefficient, therefore, can be viewed as the main indicator of the 'engine of growth' role of this sector. Similar regressions are estimated for agriculture, industry and services to assess their capacity as engines of growth.[2]

Kaldor's *second law* states that there is a strong positive relationship between the growth of manufacturing production and the growth of manufacturing productivity. This law is also known as *Verdoorn´s Law* and has been interpreted as evidence in support of

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[2] A regression of total output growth on manufacturing output could yield spurious results as, by definition, total output growth is the weighted sum of output growth of the different sectors. Although the impact of this accounting identity on the coefficient can easily be corrected, it will also affect the standard error of coefficient a_2 and hence we prefer to use Equation (1).

the existence of increasing returns in the manufacturing sector (for example, McCombie *et al.* 2002). The expansion of output leads to a process of macro-dynamic increasing returns that derive productivity gains. This can also be interpreted from the point of view of employment creation: sectors subject to scale economies have lower employment elasticities with respect to output, as productivity grows as a by-product of output expansion.[3] As productivity growth equals output growth minus employment growth, regressing productivity on total growth, that is, the original Verdoorn specification, could induce spurious correlation.[4] For this reason, Verdoorns' law, that is, the induced productivity growth effect linked to increasing returns, is specified as a regression of manufacturing employment growth ($\hat{e}_m$) on manufacturing output growth ($\hat{Y}_m$). Algebraically,

$$\hat{e}_m = b_1 + b_2 \hat{Y}_m \tag{2}$$

Kaldor's hypothesis is that output expansion induces a less than proportional employment expansion that leads to productivity gains. The coefficient b_2, the elasticity of employment with respect to output, is an indicator of the degree of increasing returns. The closer it is to 1, the smaller the induced productivity growth and returns to scale. Traditionally, estimates of the coefficient for manufacturing are close to 0.5. With a few assumptions about the capital-output ratio, a 0.5 coefficient implies increasing returns in a standard production function (see Ros 2000:130-133). The interpretation of this coefficient is that each additional percentage point in the growth of output is associated with a 0.5 per cent increase in employment and a 0.5 per cent increase in growth productivity. As in the case of the first law, similar regressions are estimated for agriculture, industry and services.

As mentioned earlier, rather than interpreting the Kaldorian model of growth as a theoretical explanation of the 'ultimate' causes of growth, these hypotheses are formulated empirically and interpreted as stylised facts that can shed light on the questions posed at the start of the section. Thus, these two hypotheses provide a set of growth facts at the sectoral level that can be used in conjunction with several theoretical interpretations to formulate a well-informed analysis of the growth performance of the Asian countries. As indicated above, Kaldor's laws, when viewed as a set of empirical regularities, appear to be consistent with many growth models that do not rely on diminishing returns to capital. The division of labour and ideas-driven growth models of Romer (1986; 1990), Lucas (1988) and Aghion and Howitt (1992) are all consistent with Kaldor's second law, although they are set up in economies without an explicit sectoral structure.

Kaldor's *third law* states that when manufacturing grows, the rest of the sectors (not subject to increasing returns) will transfer labour to manufacturing, raising the overall productivity of the economy. Dynamic sectors absorb workers from the stagnant ones in

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[3] It is also the result of a second mechanism. This is that employment growth in industry tends to increase the rate of growth of productivity in other sectors. This is the consequence of diminishing returns to labour in other sectors and the absorption of surplus labour from these sectors as well as of faster increase in the flow of goods into consumption.

[4] Using the original Verdoorn equation $\hat{p}_m = \alpha + \beta Y_m$, where $\hat{p}_m \equiv \hat{Y}_m - \hat{e}_m$ is growth of productivity, we can rearrange to obtain (2) as $\hat{e}_m = -\alpha + (1-\beta)\hat{Y}_m$.

which the level and growth of labour productivity is very low. This raises the overall productivity level of the economy and its rate of growth. The key mechanisms that explain how structural change affects productivity growth through compositional effects were developed by Baumol *et al.* (1985) and by Baumol *et al.* (1989). According to their view, backward economies with a large pool of employment in low productivity activities (normally agriculture) experience a bonus from structural change. This 'structural bonus' arises as a result of the transfer of labour from low to high productivity activities. This will automatically increase the productivity *level* of the economy. This happens even if this transfer of resources constitutes mainly a shift from agriculture to services. However, as the logistic pattern of structural change drives resources towards services, and given that productivity growth in this sector is usually slower than in industry, countries experience a 'structural burden.' This 'burden' means that the process of structural change has a negative impact on productivity *growth*. In the limit, as most of the labour force has moved into the services activities, economies experience 'asymptotic stagnancy' as productivity growth is mostly determined by the services sector.[5]

The relationship between Kaldor's third law and Baumol's asymptotic stagnancy theory is evident. the importance of a sector depends not only on its role in generating scale economies, but also on how it absorbs resources from other sectors, leading to the 'structural bonus' and 'structural burden' effects. Although a sector with low productivity growth can absorb resources from agriculture leading to increased productivity levels, this source of economic growth is asymptotically exhausted. In the transition process, Kaldor's third law will be an important source of growth but, in the limit, induced productivity growth is the key to generating growth (see Fagerberg 2000; Timmer and Szirmai 2000).

4. An Examination of Kaldor's Laws

Regressions of Kaldor's first two laws were conducted using a panel of 17 developing Asian countries for 1980-2004. The panel is unbalanced as data for some countries for some years are missing at the beginning of the sample. The lack of consistent time-series data on employment for Bangladesh, India, and Lao PDR, prevented us from including these countries in the regression of the second law. The exploitation of both cross-sectional and time series

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[5] This description of how resource transfers in the process of structural change affect growth is very useful to analyse compositional effects. However, three aspects have to be noted. First, the concept of asymptotic stagnancy is a *relative* one. That is, growth is driven by activities whose productivity grows at a relatively slower rate than industry but productivity growth may still be high in absolute terms. Secondly, it is assumed that services are necessarily a slow productivity growth sector. However, the distinction between stagnant and dynamic sectors has become blurred in recent decades by technological advances that have provoked very important changes in the organisation and productivity of many services activities. Finally, although it is almost tautological that employment shifts towards the more labour-intensive activities, the model does not consider that growth in the different sectors is interdependent. That is, the expansion of some activities, especially those with increasing returns, can have an important impact on productivity in other activities. New growth theory has emphasised how the expansion of markets leads to increased division of labour and intermediate products leading to more sophisticated production processes that can be enjoyed by all the sectors in the economy. Similarly, some activities with more traditional input-output linkages can act as engines of growth through backward and forward effects on other sectors. Innovation and knowledge accumulation are but another source of sectoral spillovers that link together the developments of different sectors independently of their relative size in the economy.

data allowed us to include all relevant information that would be thrown away in pure cross-sectional average estimates. Unlike in Kaldor's original work, equations (1) and (2) wereestimated not in growth rates but in log levels using cointegration techniques, as the traditional growth rates specification may be simply capturing business cycle correlations that are not the focus of our investigation. Moreover, it is the relationship in levels that captures the technological and equilibrium relationship between the variables. It is for this reason that cointegration matters. Therefore, Kaldor's first law was estimated in log-levels as:

$$\ln Y_{nm}^{it} = \alpha_{1i} + \alpha_2 \ln Y_m^{it} \tag{3}$$

where Y_{nm}^{it} denotes the level of non manufacturing output for country i at time t; Y_m^{it} denotes manufacturing output; and α_{1i} is the fixed-effect for each of the countries. This equation was also used in the estimation of the corresponding relationships for agriculture, industry and services.

And the second law was estimated as:

$$\ln e_m^{it} = \beta_{1i} + \beta_2 \ln Y_m^{it} \tag{4}$$

where e_m^{it} denotes manufacturing employment. This panel of time-series allowed us to address other potentially relevant problems. The first one was the bias that might be associated from the endogeneity of the regressors. Although our interest was in the stylised fact stemming from the reduced form, and not in a structural interpretation, endogeneity may induce biases in the estimated coefficients. For this reason we used a Fully Modified Ordinary Least Squares (FMOLS) panel cointegration estimator, as advocated by Pedroni (2000). This is an estimator for heterogeneous panels. It allowed to us obtain a panel estimate of the coefficient as well as country-specific coefficients. The FMOLS estimator is a semi-parametric method that takes into account leads and lags to account for possible endogeneity of the right side variables and mis-specified dynamics. A homogeneous cointegration vector was estimated, but fixed effects and short-run dynamics were allowed to be unit-specific.

The second problem that could arise is that there may be a high degree of correlation between the different variables across countries. World shocks affecting variables such as the terms of trade may induce cross-sectional correlation and also correlation between the regressed variables that is unrelated to the Kaldorian hypotheses that are the focus of the analysis. For this reason, we also provided estimates of the panel cointegration coefficients including heterogeneous (country-specific) unobserved components estimated by obtaining principal components.[6] This estimate allowed for a high degree of heterogeneity as well, but assumed common slope coefficients. These estimates are referred to as UC (Unobserved Component) elasticities. Therefore, Equations (3) and (4) were augmented with the principal component (PC):

$$\ln Y_{nm}^{it} = \delta_{1i} + \delta_2 \ln Y_m^{it} + \delta_{3i} PC^t \tag{5}$$

and

$$\ln e_m^{it} = \lambda_{1i} + \lambda_2 \ln Y_m^{it} + \lambda_{2i} PC^t \tag{6}$$

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[6] See Forni *et al.* (2001). In practice, we included only the first principal component in the model.
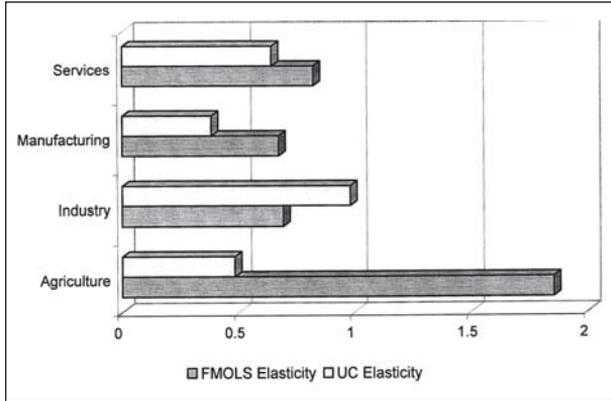
Source: Authors' estimates.
Figure 6: *Engine of growth effects (elasticities)*

Table 1. Engine of growth elasticities by country

	Services	Manufacturing	Industry	Agriculture
Bangladesh	1.03	0.65	1.06	1.80
Cambodia	1.05	0.28	2.55	2.83
China	0.90	0.67	0.57	2.58
Hong Kong	0.20*	-0.75*	0.3	-0.71
India	0.60	0.84	0.79	2.28
Indonesia	1.00	0.51	0.87	2.02
Lao PDR	1.03	0.44	0.40*	1.78
Malaysia	0.91	0.57	0.84	3.79
Myanmar	0.75	0.86	0.46	0.42
Pakistan	0.89	0.85	0.87	1.29
Philippines	0.55	1.18	0.77	1.88
Singapore	0.89	0.96	0.83	-1.41
South Korea	1.03	0.66	0.83	5.51
Sri Lanka	0.74	0.58	0.92	2.88
Thailand	1.16	0.61	0.84	2.65
Vietnam	0.93	0.75	0.98	2.09
Taiwan	0.46	1.67	0.44	-0.28

Note: Authors' FMOLS estimates. (*) Denotes insignificance at the 5%
      confidence level.

4.1 Kaldor's First Law: Estimation Results

Estimation results of the first law, summarised in Figure 6, show the estimated long-run
elasticities of output of the rest of the economy with respect to output in each one of the
sectors. Cointegration tests showed that all variables in this specification were cointegrated.

See Appendix Table 1 (Pedroni's (2000) panel ADF statistic for heterogeneous panels are provided). The sector with the largest engine of growth elasticity, after controlling for common shocks, is industry. This is followed by services and manufacturing. Agriculture appears to have a very large impact using the FMOLS estimate. The introduction of the unobserved component (UC elasticity) reduces the size of the elasticity significantly. This is because agricultural output is likely to be highly correlated across countries due to common shocks stemming from, for example, climate conditions and terms of trade shocks. The larger elasticity of industry relative to manufacturing reflects the fact that industrial activities such as electricity and other utilities have important forward and backward linkages with the rest of the economy.

These results also indicate that both industry and services have acted as the engines of growth in developing Asia during the period analysed. It is important to note that services have a larger impact than manufacturing. This is not due to mere compositional effects, as we have avoided this source of spuriousness by using the output of the rest of the sectors, and not total output, as the dependent variable.

Individual country results are shown in Table 1. The strongest elasticities of the service sector was found in Thailand, South Korea, Cambodia, Bangladesh and Lao PDR, respectively; whereas for manufacturing, Taiwan and the Philippines present the largest effects. Cambodia and Bangladesh have significantly larger elasticities for overall industry than for manufacturing. This may reflect the importance of utilities or construction in these countries. The results for Hong Kong show a surprisingly low elasticity for services and a negative (though insignificant) elasticity for manufacturing. The reason for these results is that the non services sector in Hong Kong is only a very small fraction of output (15% in 2003), therefore making the results not reliable. The FMOLS results for agriculture are biased as in this sector, common shocks account for a large fraction of the variation of output. Detailed results of the panel regressions are presented in Appendix Tables 2A & 2B.

4.2. Kaldor's Second Law: Estimation Results

Figure 7 provides the panel employment elasticities for the different sectors and for the total economy. These provide the basis for the analysis of the second law.[7] The results show that the sector with the lowest employment elasticity (highest degree of induced productivity growth) is manufacturing, with an elasticity of 0.5, in line with the traditional estimates of this effect. This is followed by industry and services. Although in the case of services, the UC estimation produced unreliable results,[8] the estimated elasticity of 0.68 indicates a substantial degree of increasing returns in this sector, as it is statistically different from one. Agriculture shows the highest employment elasticity, and the UC estimate is not significantly different from one. The fact that the total employment elasticity for all the sectors is the lowest reflects the fact that inter-sectoral transfers of labour between sectors also play an important role in inducing productivity growth.

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[7] The Verdoorn effect equations are all cointegrated except in the case of agriculture, where we could not reject the null of no panel-cointegration.

[8] The first principal component accounted for less than 25 per cent of the total variance, indicating only small cross-sectional correlation. For this reason, we prefer to rely on the FMOLS estimation for this sector.
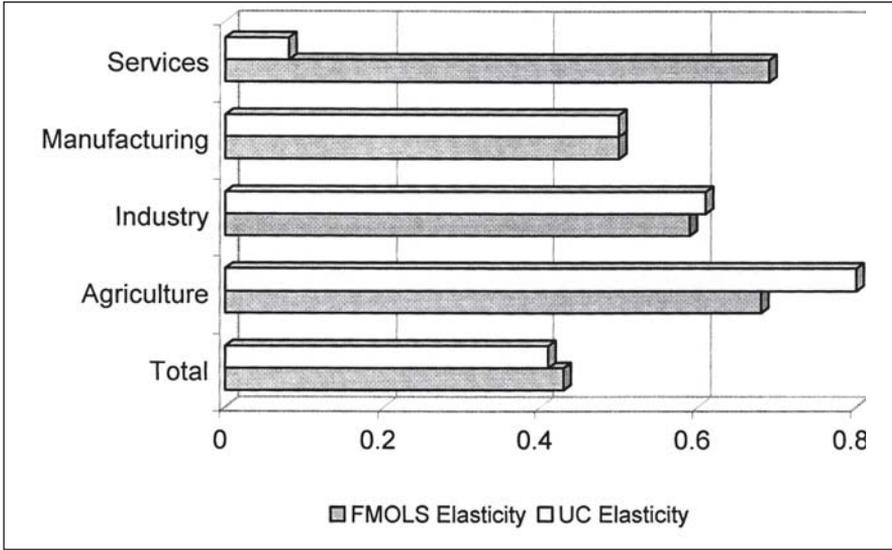
Figure 7: *Employment elasticities with respect to output: the Verdoorn effect*

Table 2: Employment elasticities by country

	Total	Industry	Agriculture	Services	Manufacturing
Cambodia	0.86	1.39	1.15	1.42	1.20
China	0.22	0.10	n.a.	0.75	n.a.
Hong Kong	0.29	1.30	1.26	0.6	1.17
Indonesia	0.41	0.98	0.31	0.48	0.47
Malaysia	0.48	0.64	n.a.	0.58	0.55
Myanmar	0.53	0.57	0.34	0.45	0.40*
Pakistan	0.41	0.28	0.68	0.70	0.20
Philippines	0.84	1.01	0.50	1.05	0.81
Singapore	0.40	0.19	0.96	0.48	0.12
South Korea	0.32	0.26	n.a.	0.68	0.14
Sri Lanka	0.37	0.37	0.76	0.68	0.28
Thailand	0.35	0.59	n.a.	0.67	0.53
Vietnam	0.34	0.35	0.60	0.68	n.a.
Taiwan	0.25	0.21	0.82	0.41	0.14

Note: Authors' FMOLS estimates; 'n.a.' denotes not available and (*) denotes insignificance at the 5% confidence level.

Table 2 shows the employment elasticities by country. China's employment elasticity of industry is very low. This is followed by the elasticties for Singapore, Taiwan and South Korea. The latter are the most mature economies in the sample. In the case of services,

Taiwan, Singapore, Myanmar, Indonesia and Hong Kong have the lowest employment elasticities. With the exceptions of Myanmar and Indonesia, these economies are also more advanced. It appears that economies that are either growing very rapidly or that are already more mature, are the most capable of generating induced productivity growth in both sectors and also enjoy increasing returns. This sectoral dynamism is important to avoid the 'middle income trap'. Detailed results of the panel regressions are presented in Appendix Tables 3A and 3B.

4.3. Kaldor's Third Law

Discussions of Kaldor's third law have been carried out in regression context with little success (see McCombie 1980).[9] Traditional estimates suffer from spurious correlation and identification problems. A more useful approach consists in decomposing the growth rate of labour productivity ($\hat{q}$) into three components (see also Jaumotte and Spatafora 2007):

$$\hat{q}_t = \frac{\sum_{i=1}^{3} \overbrace{q_{0i}(\lambda_{ti} - \lambda_{0i})}^{I} + \sum_{i=1}^{3} \overbrace{(q_{ti} - q_{0i})(\lambda_{ti} - \lambda_{0i})}^{II} + \sum_{i=1}^{3} \overbrace{(q_{ti} - q_{0i})\lambda_{0i}}^{III}}{q_0} \qquad (7)$$

where $\hat{q}$ denotes the level of labour productivity,   is the growth rate of labour productivity, and λ denotes the sector's employment share in total employment (both variables in periods 0 and t; i refers to the three sectors, agriculture, industry and services). What is the interpretation of the three terms in the decomposition?

(i)   The first term (*I*) is the static structural reallocation effect (SSRE). This is the contribution to productivity *levels* of the transfer of resources from low to high productivity sectors. It is related to Baumol's structural bonus hypothesis. We expect that the transfer will increase the average level of productivity of the economy as employment shares shift from agriculture to services. This effect is calculated by shifting employment shares keeping initial productivity levels of each sector constant.

(ii)   The second term second term *(II)* is the dynamic structural reallocation effect (DSRE). It represents the contribution of the resource transfer to productivity growth and it is related to Baumol's structural burden hypothesis that as employment transfers towards services, a sector with (in general, though not always) lower productivity growth, reduces the overall productivity growth of the economy. The effect is calculated as the interaction between employment shifts and productivity growth.

(iii) The final term (*III*) is the within-sector productivity growth (WS). It is the contribution of productivity growth within each sector to overall productivity growth. This is the

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[9] Recently, Wells and Thirlwall (2003) estimated Kaldor's laws with data for African countries. The third law is a regression of overall productivity growth on the growth of industry and the growth of employment outside industry. The coefficient of industry's growth was positive while that of employment growth outside industry was negative, indicating that the slower the employment growth outside industry, the faster the overall productivity grows.

growth of productivity that is not explained by sectoral shifts. It is calculated by keeping employment shares constant and allowing productivity levels to change.

The importance of making the distinction between the static and dynamic structural reallocation effects is that it helps distinguish between the structural bonus and burden effects of employment reallocation. Countries with large agricultural sectors have a lot to gain from the bonus of surplus labour in low productivity activities. However, if the growth of employment is predominantly in sectors with lower scope for productivity growth, there is a burden effect. If productivity growth in services is lower than in manufacturing, this imposes a 'relative' burden (though not absolute). Note, however, that in Kaldor's interpretation, this reallocation is 'induced' by growth of the leading sector. This hypothesis cannot be examined directly by shift-share analysis, but it is clear that it is the growing sectors that will draw resources from those contracting.

The contribution of sectoral shifts to productivity growth embedded in the third law is presented in Figures 8, 9, and 10. We have decomposed productivity growth into its three components for three different sub-periods, 1980-1989, 1990-1999 and 2000-2004. The average contribution of each effect throughout 1980-2004 is approximately 33 per cent for the Static Structural Reallocation effect (SSRE), -14 per cent for the Dynamic Structural Reallocation effect (DSRE), and 81 per cent for within sector productivity growth effect (WS). For 1980-1989, these percentages are 15.6 per cent, -22 per cent and 106.5 per cent, respectively. For 1990-1999, they are 40 per cent, -6 per cent and 66 per cent, respectively; whereas for the final period the corresponding figures are 44 per cent, -13 per cent and 69 per cent, respectively. This shows that the SSRE gained importance during the last fifteen years. The figures, however, mask large differences across countries. Nevertheless, they point towards the WS effect as the main driver of overall productivity growth. WS is related to productivity gains stemming from scale economies and, importantly, technology absorption from frontier
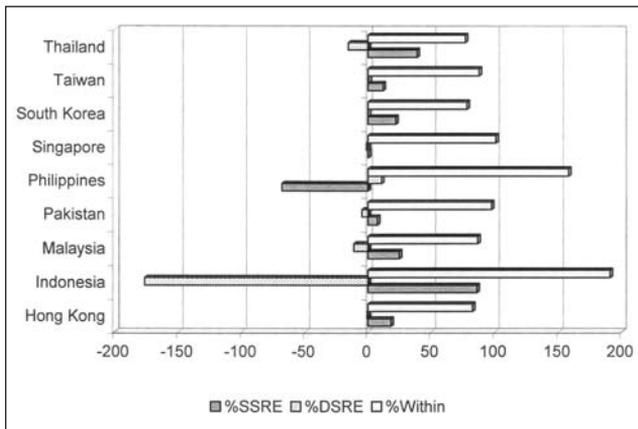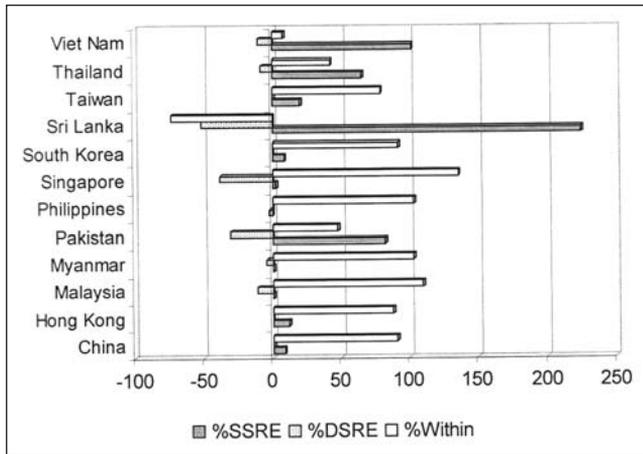

Source: Authors' estimates.

Figure 8: *Productivity growth decomposition*
(% contribution of each effect, 1980-1989)
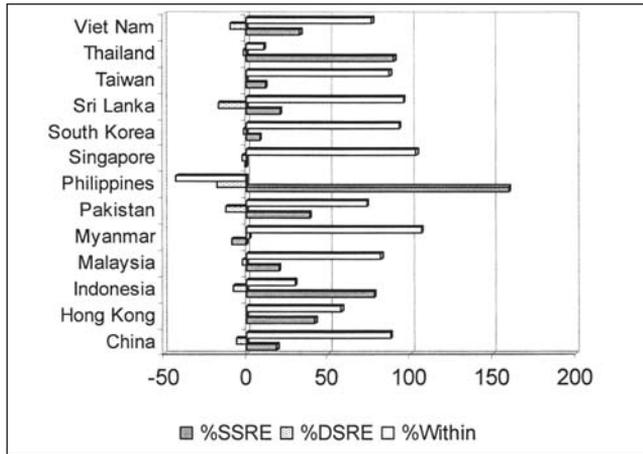
Source: Authors' estimates.

Figure 9: *Productivity growth decomposition (% contribution of each effect, 1990-1999)*

Source: Authors' estimates.

Figure 10: *Productivity growth decomposition (% contribution of each effect, 2000-2004)*

economies such as the US, Japan and Europe.[10] The impact of the SSRE is non negligible, accounting for one-third of productivity growth. This effect is mainly the result of the transfer of labour from agriculture into services. As expected, the DSRE is negative and related to the structural burden hypothesis.

During 1980-1989, within sector productivity growth (WS) drove productivity growth. The exception was Indonesia, where the negative impact of DSRE is very large. SSRE is

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[10] Technology adoption can be thought of as a function of explicit R&D investment, human capital, FDI and also the structural composition of output in the sector.

small for most countries except Indonesia and Thailand. During 1990-1999, SSRE acquired a more relevant role, driving productivity growth in countries such as the Philippines, Indonesia and Thailand. In 2000-2004, SSRE was the main driver of productivity growth in Sri Lanka, Vietnam, Pakistan and Thailand. This effect is usually larger for economies with large agricultural surplus labour and high growth. It is worth noting that, in the case of China, within sector productivity growth has been the main driver of total productivity growth during the last 15 years despite having a large share of employment in agriculture. For economies like Hong Kong, Singapore, and South Korea, within sector productivity growth has been also the main driver of productivity growth, as one would expect, given their levels of economic development and smaller shares of agricultural employment. In general, DSRE is small, reflecting the fact that services sector productivity growth has not lagged too far behind that of industry.

The main conclusions of this section allow us to answer the four questions posed at the start of Section 3:

(i) Is manufacturing an engine of growth in developing Asia? Manufacturing, and especially the wider industrial sector, appears to act as an engine of growth as it drives growth in other sectors, and is subject to strong economies of scale. That is, there is still a traditional role for industry as an engine of growth. However, the industrial sector does not appear to drive employment transfers from agriculture, which is an important source of productivity gains.

(ii) Can services play a role as engine of growth? The evidence shows that services have a strong and large impact on the growth of the other sectors. Indeed, this impact is larger than that of industry. Although to a lesser extent than in industry, services appear to have significant productivity growth-inducing effects through the exploitation of scale economies. Services also appear to be driving productivity gains through factor re-allocation effects.

(iii) What are the most dynamic sectors in developing Asian countries? Although there are important differences across countries, both industry and services can be thought of as the dynamic sectors of Asian economies. The evidence points towards a key role for industry but, very importantly, services appear to have been able to play this dynamic role as well. The old distinction between industry and services as the dynamic and stagnant sectors of an economy, respectively, does not appear to hold true in the context of the Asian countries.

(iv) Can we expect continued growth in Asia, given the recent developments at the sector level? The scope for growth is still very large. This is because productivity growth is likely to continue in many Asian economies through two sources. First, factor re-allocation toward services, especially for the middle-low income countries in the sample, is not likely to be exhausted as a source of growth in the short run. Second, within-sector productivity growth through catching-up and exploitation of scale economies is likely to continue being the main driver of productivity gains in the future.

Overall, this implies that there is significant evidence of endogenous, growth-induced technological progress in developing Asia.

5. Production Structure Similarities, Technology Diffusion and Catch up

In this section, we address the third question posed in the introduction, namely, 'what is the contribution of structural change to productivity growth and catching up'? While regression analysis of the first two Kaldorian hypotheses for the Asian countries has provided significant evidence of endogenous, growth-induced technological progress, for countries lagging behind the technological frontier endogenous technological progress will be partly dependent on the acquisition and mastering of more advanced production techniques from the leader countries, which in turn will be determined by such factors as national R&D, human capital and trade openness.

Furthermore, if technology is (at least to a certain extent) sector-specific, its diffusion from the most advanced to the less advanced countries will be more intense and faster, the higher the degree of structural (or sectoral) similarity between them. As a result, *ceteris paribus*, technological progress will be faster for a less-advanced country the more its production structure resembles that of the technological leader. This reasoning is in line with Abramovitz (1986; 1993) who has argued that the extent to which developing economies can benefit from the superior technology developed in advanced countries depends on their 'absorption capability.' The latter is itself a composite variable, determined by social as well as economic and structural factors, such as the degree of 'technological congruence' with countries on the technological frontier.

Here, we propose a simple approach to measure the significance of the extent to which the productivity growth performance of the Asian countries has benefited from technological spillovers from the most advanced countries flowing via a 'structural channel'.

First, in the spirit of the technology-gap approach to growth and convergence (Gerschenkron 1962; Nelson and Wright 1992), we defined a measure of the potential for technology transfer from the most advanced to the less advanced countries as given by the labour productivity ratio between the two, that is,

$$GAP_i(t) = \frac{q_L(t)}{q_i(t)} \tag{8}$$

where t denotes time, $q_L(t)$ is the level of labour productivity in the technologically most-advanced country and $q_i(t)$ is its counterpart in the less-advanced country i.

Second, we devised a measure of structural similarity making use of Krugman's specialisation index (or K-index) developed by Midelfart-Knarvirk *et al.* (2000). [11] At each point in time, the index was constructed as the sum over the k sectors of the absolute differences between the sectors' shares of value-added in country i and in the technological leader. Its value ranged between zero and two and increased with degree of specialisation,

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[11] When applied to country-level bilateral comparisons, it is constructed as: $K_{iL}(t) = \sum_k abs\left[v_i^k(t) - v_L^k(t)\right]$,

where $v_i^k(t) \equiv \dfrac{x_i^k(t)}{\sum_k x_i^k(t)}$ and $x_i^k(t)$ denotes value-added of country i in sector k at time t and $v_L^k(t)$ refers to the technological leader. Instead of value-added, Midelfart-Knarvirk *et al.* (2000) employed the gross value of output as a measure of activity level, on the grounds that this makes the results of the analysis less likely to be biased by the effects of structural shifts in outsourcing to other sectors. This option was precluded by data unavailability in our case.

that is, it is higher the more a country's production structure differs from that of the technological leader. For instance, a K-index value of 0.5 indicates that 25 per cent of the production structure of country i is out of line with that of the technologically most-advanced country, in the sense that one-quarter of its total output does not correspond to the average sectoral composition in the latter.[12]

In this way, one can build a structurally-weighted gap-variable by first designing a measure of structural weights as

$$W_{iL}(t) = 1 - \frac{K_{iL}(t)}{2} \tag{9}$$

where $0 \leq W_{iL}(t) \leq 1$, which increases with the degree of structural similarity, that is as $K_{iL}(t)$ falls. The structurally-weighted gap-variable is

$$SWGAP_i(t) = W_{iL} \times GAP_i(t) \tag{10}$$

This variable can then be introduced in a growth regression (see Temple 1999) to capture the idea that the impact of technology spillovers on the less-advanced countries' growth performance will be dependent not only on the size of the technology gap but also on the degree of structural similarity between technological leaders and followers. We examined this hypothesis by making use of a simple reduced-form growth equation.

Given the nature of the hypothesis under examination, finely sectorally disaggregated data are essential for estimation proposes. Taking this into account, we restricted our attention to manufacturing and constructed the structural weights $W_{iL}(t)$ using United Nations Industrial Development Organization (UNIDO) data for 28 sectors.[13] The remaining data weretaken from the World Bank World Development Indicators (WDI) and the International Labour Organization (ILO).[14]

To smooth out cyclical effects, structural weights $W_{iL}(t)$ were computed as 3-year moving-averages of annual values. The regression was estimated by means of panel data techniques using an unbalanced panel of annual data over 1982-2002 for nine Asian countries - Bangladesh, China, Hong Kong, Indonesia, Malaysia, Singapore, South Korea, Sri Lanka and Taiwan. The regression estimated is

$$\hat{q}_{it} = \alpha_i + \sum_{j=1}^{2} \beta_i GAP_{it}^j + \sum_{j=1}^{2} \theta_j SWGAP_{it}^j \tag{11}$$

where q_{it} is the rate of labour productivity growth in country i and the gap variables are constructed taking both the USA and Japan as the two technological-leaders with respect to the less-advanced Asian countries in our sample. We used the fixed-effects Least Squares

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[12] The upper bound of the index equals two because, by construction, it takes into account both positive and negative deviations across sectors. Thus, when calculating the 'implied-percentage deviation' the value in question must be halved: in the example (0.5/2) per cent is 25 per cent.

[13] The data are from the UNIDO 'Industrial Statistics Database' 2006 at the 3-digit level of ISIC Code (Revision 2).

[14] The source of the manufacturing value-added series for the US is the Department of Commerce, Bureau of Economic Analysis.

Table 3. Technology gap regression

Variables	Coefficient	Standard error	t-value
GAP_JP	-0.008	0.005	-1.85
GAP_JP(-1)	0.050*	0.020	2.54
SWGAP_JP	0.050**	0.017	2.95
SWGAP_JP(-1)	-0.050	0.037	-1.31
GAP_US	0.016	0.008	1.95
GAP_US(-1)	-0.064**	0.020	-3.16
SWGAP_US	-0.070**	0.025	-2.77
SWGAP_US(-1)	0.074**	0.025	2.92

Note: * and ** indicate significance at the 5% and 1% levels, respectively; _JP and _US denote that the leader country is Japan or the United States, respectively; (-1) indicates the first lag.

Dummy Variables (LSDV) estimator and, since we are dealing with annual data and a fairly short time-series, we allowed for just one lag. Results are reported in Table 3.[15]

The R-squared of the regression is 0.49, suggesting that the gap and structurally-weighted gap variables explain roughly half of the variation in labour productivity growth. GAP_JP is not statistically significant; however, it becomes highly significant and takes on the expected positive sign when it is interacted with W_{iL} (t) to take account of structural similarities, that is, in SWGAP_JP. The coefficient of GAP_JP(-1) is also significant and positive so that, overall, one can read the results in Table 1 as supporting the view that Japan, as the technological-leader country in the region, plays a significant role as a source of technological spillovers to the other Asian countries in our sample.

When the technological gap is measured with respect to the USA, results are different. Both the structurally-weighted gap variable SWGAP_US and its first lag SWGAP_US(-1) turn out to be significant at the 1 per cent level, but the former takes on a negative sign so that the overall impact of the two on labour productivity growth is negligible. Furthermore, the first lag of the GAP_US variable is also negative and significant.

6. Conclusion

The most salient feature of developing Asia's transformation during the last three decades has been the significant decrease in the share of agriculture and the parallel increase in the share of services. Some parts of developing Asia have clearly industrialised in the sense that the shares of industry and manufacturing in total output have increased (e.g., Indonesia, Malaysia, Thailand). But many other countries in the region have not seen an increase in these shares. The richest economies in the region, the NIEs, are undergoing a de-industrialisation process. This simply reflects their shift to high value-added services.

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[15] The introduction of more lags of the independent variables did not change the results qualitatively. Moreover, estimation of a dynamic version of the growth regression using the Generalised Method of Moments resulted in an insignificant coefficient on the lagged dependent variable, leading us to favour the static-version results reported in Table 3.

Various other countries in the region have had difficulties in industrialising. India and the Philippines are among the most significant examples, although recent data for India seem to indicate that its manufacturing share has increased. Others (e.g., the Pacific economies) face industrialisation as a very difficult process, since they have limited opportunities to start with. It is important to note that the patterns of structural transformation of output and employment are different, as the decline in agricultural employment is taking place at a much slower pace than that of output. This has led, in many countries across the region, to rather 'asymmetric' output and employment structures. Indeed, one could say that much of the region looks like a service economy in terms of output, but like an agricultural economy in terms of employment. An additional important feature of structural change in developing Asia is that, despite its rapid growth, the level of labour productivity in most of the region still lags far behind that of industrial countries. Given that investments were made in highly productive industry and services segments of the economy, this implies that there are still many other large segments of the economy with very low productivity. It therefore seems that structural transformation in developing Asia is taking place through a combination of modern and sophisticated industry and services with high and rising productivity levels, with many other backward ones (probably where a large part of the labour from agriculture is being transferred) that operate at very low productivity levels.

Regressions of Kaldor's laws indicate that both industry and services appear to have acted as engines of growth in the Asian economies. The manufacturing sector is subject to strong increasing returns, although the degree of increasing returns in services is non-negligible too. Although employment in industry and manufacturing is shrinking as a share of total employment, this does not necessarily imply that their role as the most dynamic sectors has decreased. Induced productivity growth in manufacturing can indeed be seen as the reason for its decline as a share of output for countries that had previously industrialised. Notable exceptions are China and India. In the former, industrial activity remains relatively very important and in the latter large-scale industrialisation has not occurred. Services appear to have contributed largely to growth as they drag employment from the less productive agricultural sector. Although induced productivity growth in services is smaller than in industry, services appear to be a remarkably dynamic sector. Both factors together have contributed to the importance of services as an engine of growth. In the limit and as the large reserves of employment in agriculture are exhausted, the contribution of services to productivity growth is likely to decrease as its productivity growth is lower than that of industry.

This will largely depend on the composition of services between dynamic and stagnant activities. However, there is no reason to believe that, in the medium run, growth will decline due to the increase in the share of services in total output. There are three main reasons for this:

(i)   There is still a very large scope for structural change, especially in the less developed economies of Asia.

(ii) The role of the dynamic industrial sector remains very relevant for economies where industrialisation occurred previously.

(iii) The scope of within-sector productivity growth is still very large. This is likely to be facilitated by structural change itself, which increases the capacity of Asian economies to absorb foreign technology. This catching-up process is likely to lead to important productivity gains in services.

Finally, the technology-gap approach, as formalised in the framework used here, provides a simple way to analyse the impact of technology diffusion on the growth performance of the Asian countries. The results support the view that technological spillovers foster growth when Japan is taken as the technological-leader, but this is not the case when the leader-country is the USA. Structural similarity seems to be playing a significant part in the process of technology diffusion both from Japan and the US, although the overall influence from the latter is fairly small.

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Appendix

Table 1: Panel Cointegration Tests

	1st Law	2nd Law
Total	n.a.	-4.23
Industry	-2.68	-4.21
Manufacturing	-2.26	-2.43
Services	-3.23	-2.67
Agriculture	-2.86	-2.29

Note: the reported statistic is the *t*-ratio of the ADF test for the null hypothesis of no-cointegration in the heterogeneous panel, which is distributed as a N(0,1) under the null. Bold values indicate rejection of the null of no cointegration.

Table 2A: Kaldor's 1st Law, FMOLS estimation results

Sector	Elasticity	*t*-ratio	No. Obs	No. of Countries
Agriculture	1.85	64.82	397	17
Industry	0.69	114.13	397	17
Manufacturing	0.67	93.03	397	17
Services	0.82	119.96	397	17

Table 2B: Kaldor's 1st Law, estimation results controlling for common shocks

Sector	Elasticity	*t*-ratio	No. Obs	No. of Countries
Agriculture	0.48	1.62	397	17
Industry	0.98	29.30	397	17
Manufacturing	0.38	5.20	397	17
Services	0.64	7.56	397	17

Table 3A. Kaldor's 2nd Law, FMOLS estimation results

Sector	Elasticity	*t*-ratio	No. Obs	No. of Countries
Total	0.43	60.45	300	14
Agriculture	0.23	11.9	300	14
Industry	0.59	31.7	300	14
Manufacturing	0.50	30.33	264	12
Services	0.68	66.18	300	14

Table 3B: Kaldor's 2nd Law, estimation results controlling for common shocks

Sector	Elasticity	*t*-ratio	No. Obs	No. of Countries
Total	0.41	3.79	300	14
Agriculture	0.70	2.68	300	14
Industry	0.61	5.63	300	14
Manufacturing	0.50	6.14	264	12
Services	0.08	1.12	300	14