



Benchmarking developing Asia's manufacturing sector

Developing Asia's
manufacturing
sector

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Abstract

Purpose – The purpose of this paper is to document the transformation of developing Asia's manufacturing sector during the last three decades.

Design/methodology/approach – The paper briefly discusses the transformation during the last 30 years and benchmarks the sector by estimating a regression based on the logistic pattern of growth. It then summarizes the main findings.

Findings – It is found that: the share of developing Asia in world manufacturing output has increased significantly since the 1970s; the increase is concentrated in a number of countries, mostly the NIES, China, Indonesia, Malaysia, and Thailand; and there has been an important technological upgrading as the share of more technologically advanced manufacturers has increased. However, the increase is also concentrated in a reduced group of countries.

Originality/value – The findings in the paper should be of value to both other researchers and policy makers trying to understand industrialization.

Keywords Manufacturing industries, Distribution management, Benchmarking, Asia

Paper type Research paper

1. Introduction

In a recent paper, Rodrik (2006) has revived the long-standing but perhaps forgotten argument that rapid growth is associated first and foremost with the expansion of the industrial sector. While this idea was part of the toolkit of the development economists of the "old" school (Rodrik cites Lewis, 1954), Rodrik argues that it is somewhat paradoxical that recent thinking on policy reforms pays scant attention to structural transformation and industrial development. Indeed, many economists see the development of a modern industrial sector as the key for propelling the structural transformation of an economy and modern development textbooks (Ros, 2000; Ghatak, 2003; Thirlwall, 2006) emphasize the special role that industry (and in particular the manufacturing sector) plays in the development process.

The role attributed to manufacturing in the process of take-off and subsequent catch-up is usually a key element of sectoral studies of growth (Kaldor, 1966, 1967; Felipe *et al.*, 2007). It is no surprise, therefore, that economists and policy makers worry

JEL classification – O14, O47, O53

This paper represents the views of the authors and does not represent those of the Asian Development Bank, its Executive Directors, or the countries that they represent.

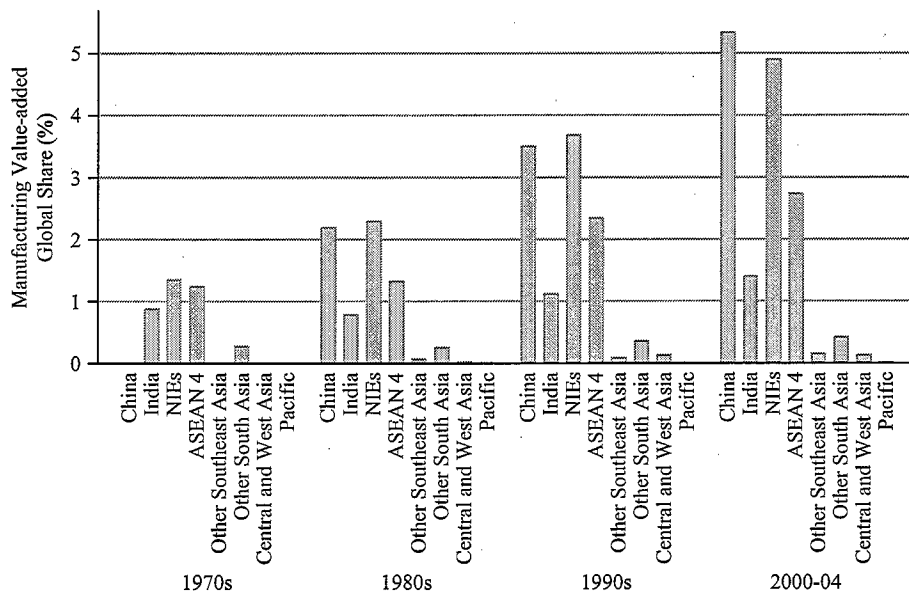


about swings in manufacturing. Though countries like Australia, Canada, New Zealand, the Scandinavian countries, and others relied heavily on the primary sector for their development, they all experienced periods of strong industrial growth and diversification as essential components of their sustained economic growth. Rodrik (2006) has argued that sustained growth requires a dynamic industrial base. One can, therefore, speak of the "logic of industrialization" (Nixson, 1990, p. 313) and understand why many developing countries have adopted strategies toward rapid industrialization, often starting with industries that use relatively simple technologies and that have the potential to be labor-intensive and thus absorb labor, such as textiles. The experience of the industrial economies appears to show that establishing a broad and robust domestic industrial base holds the key to successful development, and the reason why industrialization 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 specialization and learning, as well as favorable global market conditions, imply that the creation of leading industrial subsectors, along with related technological and social capabilities, remains a key policy challenge.

The objective of this paper is to provide an analysis of developing Asia's manufacturing sector during the last three decades and benchmark it with respect to the international regression line by estimating a logistic regression. The rest is structured as follows. In Section 2, we briefly discuss the transformation of developing Asia's manufacturing sector during the last three decades. Section 3 benchmarks the sector by estimating a regression based on the logistic pattern of growth. The final section summarizes the main findings.

2. Structural transformation in developing Asia's manufacturing sector

During the last three decades, most countries in developing Asia have undergone massive structural change, in particular in terms of changes in sectors' shares of both output and employment. The rise in developing Asia's share in world manufacturing value added during the last few decades has been significant (Figure 1). In particular, the joint share of the People's Republic of China (China hereafter), the NIEs (Hong Kong, Korea, Singapore, and Taiwan), and ASEAN-4 (Indonesia, Malaysia, Philippines, and Thailand) has more than doubled since the 1980s, representing in 2000-2004 close to 14 percent of the world's total. This increase is the result of a much faster growth of manufactured value added – 8-10 percent per annum since the 1970s – than in the rest of the world. In context, though, the share of China (the highest among all developing countries) is just over 5 percent of the world's manufacturing value added, significantly less than the shares of Japan or the United States (more than 20 percent each), while the share of India has barely increased. Growth in manufacturing value added has been substantially higher than that in GDP in many countries in developing Asia, including India, the NIEs (except Hong Kong, which registered a shrinkage), ASEAN-4 (except the Philippines, which also registered a decrease), as well as the economies under Other Southeast Asia (Cambodia, Lao PDR, Myanmar, and Vietnam) and Other South Asia (Bangladesh, Bhutan, Maldives, Nepal, Pakistan, and Sri Lanka). In China, however, manufacturing growth was slightly below that of GDP. Several of the ex-Soviet republics (Armenia, Azerbaijan, Kyrgyz Republic, Tajikistan) registered contraction in manufacturing value added after the breakup of the Soviet Union.



Notes: ASEAN 4 includes Indonesia, Malaysia, Philippines, and Thailand. Central and West Asia covers Armenia, Azerbaijan, Kazakhstan, Kyrgyz Republic, Mongolia, Tajikistan, Turkmenistan, and Uzbekistan. NIEs consist of Hong Kong, Korea, Singapore, and Taiwan. Other Southeast Asia comprises Cambodia, Lao PDR, Myanmar, and Vietnam. Other South Asia covers Bangladesh, Bhutan, Maldives, Nepal, Pakistan, and Sri Lanka. Pacific includes Fiji, Kiribati, Marshall Islands, Micronesia, Palau, Papua New Guinea, Samoa, Timor-Leste, Tonga, and Vanuatu
Sources: Authors' estimates based on data from the *World Development Indicators* World Bank 2006); and the Directorate General of Budget, Accounting and Statistics (2006) for Taiwan

Figure 1.
Share of global
manufacturing value
added, developing Asia

Figure 2 shows the scatterplot of the output share of manufacturing in output *vis-à-vis* income per capita for the whole world pooling data since 1970. The figure shows that as countries' income per capita increases so does the share of output in manufacturing, but there seems to be a point beyond which the share starts declining. The figure also shows a wide dispersion in this share for a given income per capita, from very low shares up to 50 percent.

Tables I and II show decadal averages of the manufacturing share in output and employment. The NIES have undergone deindustrialization as between the 1970s and 2000-2004 manufacturing lost weight in total output, although it must be noted that it is a process affecting particularly Hong Kong, and to a much lesser extent Taiwan Korea and Singapore (I these two, the share of manufacturing has remained since the 1980s at about 27 percent since the 1980s). In the case of Hong Kong, deindustrialization is the result of transferring production facilities to China. In terms of manufacturing employment, all four NIES have deindustrialized, especially also 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. These developments should not be interpreted as "failure" of these economies, but as the result of the natural and dynamic process of development, i.e. the transition to service-led economies. Rowthorn and

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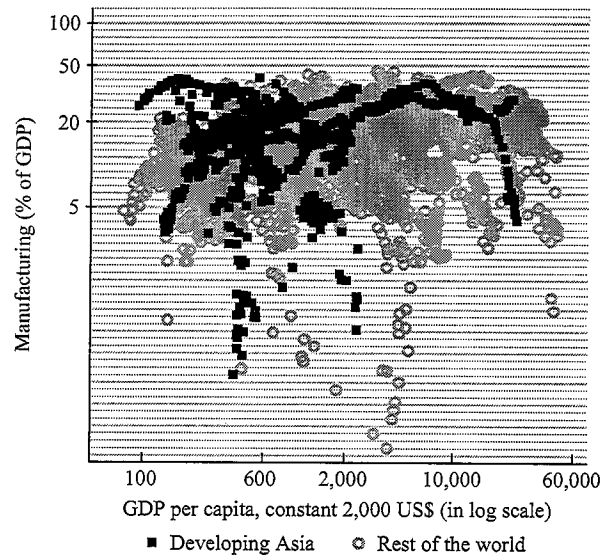


Figure 2.
Manufacturing output
share vs per capita GDP,
all countries, 1970-2004
(logarithmic scale)

Source: World Development Indicators Online (World Bank 2006)

Ramaswamy (1997, 1999) have noted that this group of countries is going through a process similar to that of the OECD countries[1].

India's manufacturing output share has remained stable at about 15-16 percent since the 1970s, while the share of manufacturing employment has been at around 11 percent during the periods under consideration. The ASEAN-4 countries (except the Philippines), Cambodia and Lao, PDR have increased their manufacturing shares significantly, both in terms of output and employment. Although Indonesia, Malaysia, and Thailand are cases of what can be labeled as "successful industrialization," this must be qualified with the following two observations. First, other than Singapore, South Korea, Taiwan, Malaysia, and the Kyrgyz Republic, none of the other countries in Table II had in 2000-2004 a share of employment in manufacturing as high as that of the OECD average. Second, in terms of labor productivity, there is still a large differential between most developing Asian countries and the OECD average. Indeed, it appears that many countries across developing Asia have industrialized at low levels of productivity (Figure 3). This could be due to two reasons:

- (1) that the product mix of new employment has been towards relatively low productivity industries; and/or
- (2) that the increase in employment has taken place in low productivity techniques.

Developing Asia's increasing share in world manufacturing value added has been accompanied by a significant degree of structural transformation. Table III shows the structure of manufacturing output of developing Asia by decadal averages (except latest subperiod). In the 1970s, food and beverages; textiles; and apparel, leather, and footwear accounted for about 39 percent of developing Asia's total manufacturing, while electrical and nonelectrical machinery and transport equipment accounted for about 17 percent. By 2000-2003, the former three accounted for a substantially lower

	1970s	1980s	1990s	2000-2004	Developing Asia's manufacturing sector
China	37.27	36.26	32.90 ^h	34.50 ⁱ	101
India	15.32	16.43	16.58	15.71	
<i>NIEs</i>					
Hong Kong	–	21.18	9.43	4.32	
Korea	21.61	27.51	27.14	27.82	
Singapore	24.84 ^a	26.09	26.11	27.39	
Taiwan	32.43	34.95	27.11	22.80	
<i>ASEAN-4</i>					
Indonesia	10.42	15.35	23.72	29.04	
Malaysia	16.82	20.42	27.05	31.21	
Philippines	25.72	25.03	23.29	22.94	
Thailand	18.98	23.32	29.55	34.00	
<i>Other Southeast Asia</i>					
Cambodia	–	–	11.08	19.40	
Lao PDR	–	9.27 ^d	14.20	18.67	
Myanmar	9.64	9.07	6.90	8.49 ^m	
Vietnam	–	19.69 ^e	15.23	19.94	
<i>Other South Asia</i>					
Bangladesh	–	13.76	14.87	15.73	
Bhutan	–	5.29	10.39	7.79 ⁿ	
Nepal	4.11	5.24	8.77	8.85	
Pakistan	15.89	15.98	16.44	15.99	
Sri Lanka	19.02	15.39	15.68	15.90	
<i>Central and West Asia</i>					
Armenia	–	–	27.56	22.68	
Azerbaijan	–	–	14.08	7.87	
Kazakhstan	–	–	13.30 ⁱ	16.33	
Kyrgyzstan	–	–	20.04	16.19	
Mongolia	–	31.04	18.70	6.37	
Tajikistan	–	27.70 ^e	25.43	32.35	
Turkmenistan	–	–	26.30 ^j	15.47 ^m	
Uzbekistan	–	25.06 ^f	11.96 ^j	9.40	
<i>Pacific Islands</i>					
Fiji	11.79	10.59	14.44	15.02 ⁿ	
Kiribati	1.62 ^b	1.16	0.98	0.89 ⁿ	
Marshall Islands	–	–	1.63	4.54 ^o	
Micronesia	–	0.40 ^g	–	–	
Papua New Guinea	7.26	10.06	8.89	8.50 ^m	
Palau	–	–	0.97	1.19 ⁿ	
Samoa	–	–	17.10 ^j	15.37	
Timor-Leste	–	–	2.78 ^k	3.29	
Tonga	6.63 ^a	5.42	4.85	4.61	
Vanuatu	3.90 ^c	4.45	4.88	4.21 ^o	

Notes: –, Means that data are not available; ^arefers to 1975-1979 average; ^brefers to 1978-1979 average; ^crefers to 1979; ^drefers to 1989; ^erefers to 1985-1989 average; ^frefers to 1987-1989 average; ^grefers to 1983; ^hrefers to 1990-1992 average; ⁱrefers to 1992-1999 average; ^jrefers to 1994-1999 average; ^krefers to 1999; ^lrefers to 2000; ^mrefers to 2000-2003 average; ⁿrefers to 2000-2002 average; ^orefers to 2000-2001 average

Sources: World Development Indicators (World Bank 2006); Directorate General of Budget, Accounting and Statistics, Taiwan (various years)

Table I.
Developing Asia
manufacturing output
shares by decade

	Manufacturing as percent of total employment		
	1980s	1990s	2000-2004
China	15.11 ^a	13.47	11.16 ^g
India	11.05 ^b	10.92 ^b	11.22 ^b
<i>NIES</i>			
Hong Kong	35.89	19.02	10.20 ^h
Singapore	27.91	24.53	18.31 ⁱ
South Korea	23.93	23.40	19.44
Taiwan	33.41	28.66	27.40
<i>ASEAN-4</i>			
Indonesia	9.68 ^c	11.73	13.15 ^g
Malaysia	15.95	22.59	21.94
Philippines	9.93	10.06	9.65
Thailand	8.87	12.33	14.58
<i>Other</i>			
Azerbaijan	—	9.36 ^e	5.44 ^g
Kyrgyzstan	—	20.11	19.19
Pakistan	13.66	10.99	12.66
Vietnam	—	8.32 ^f	10.33
OECD	21.58 ^d	19.20 ^d	16.89 ^d

Notes: ^aRefers to the period 1987-1989; ^bfor India, the figure for each decade refers only to a single year, as follows: 1983, 1993/1994, 1999/2000; ^crefers to the average for the years 1980, 1982, 1985, and 1989; ^dfor OECD, the number of countries covered each decade are: 18 for the 1980s; 20 for the 1990s; 21 for 2000-2004; ^erefers to the period 1992-1999; ^frefers to the period 1996-1999; ^grefers to the period 2000-2002; ^hrefers to the period 2000-2001; ⁱrefers to the period 2001-2003; — means data are not available

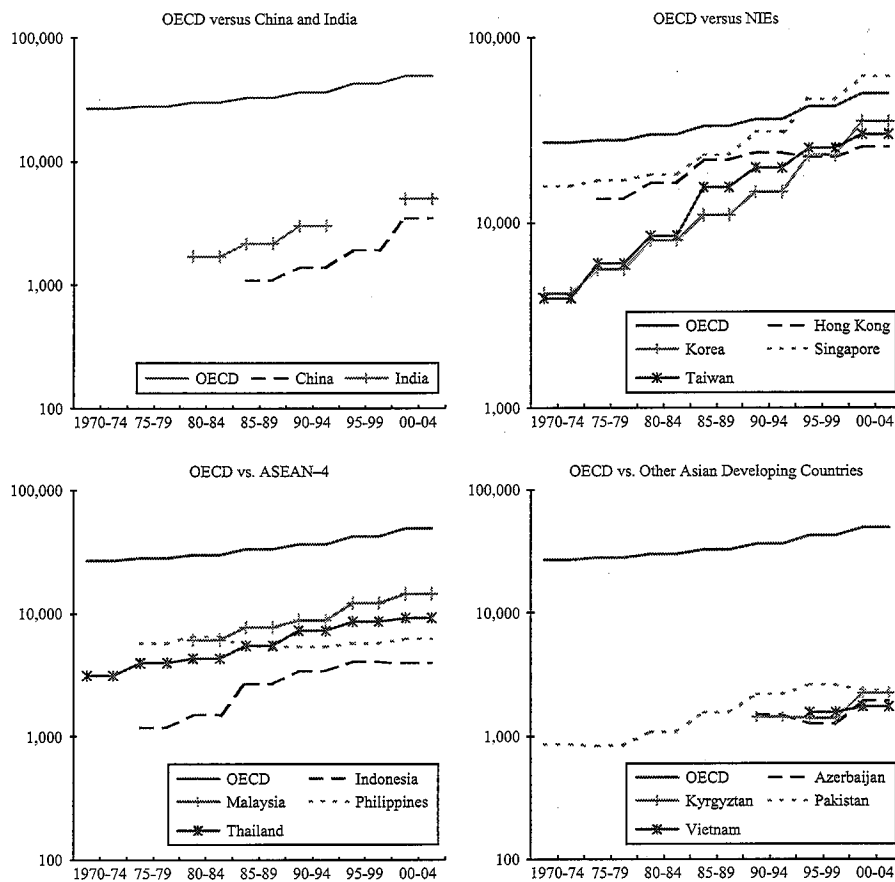
Sources: LABORSTA (International Labour Statistics Organization); Directorate General of Budget, Accounting and Statistics, Taiwan (various years); Anant *et al.* (2006)

Table II.
Developing Asia
manufacturing
employment shares by
decade

22 percent, while the latter three accounted for about 34 percent. This shows a very clear change (upgrade) in the structure of manufacturing production. It also shows that the production structure has become slightly more diversified, especially compared to the 1970s. Appendix Table AI shows this information disaggregated by country.

If we group the different branches of the manufacturing sector according to the level of technology[2] (Table IV), we can see that developing Asia's shares in the four categories have increased substantially between the 1970s and 2000/2003: from 4.85 to 12.75 percent in low technology; from 2.54 percent to 8.42 percent in medium technology and low economies of scale; from 2.11 to 11.34 percent in medium technology and medium economies of scale; and from 2.19 to 11.33 percent in high technology. It is also worth noting that China's shares have increased in all four categories. On the other hand, the shares of the NIES and ASEAN-4 increased until the 1990s, but then decreased in 2000-2003.

Asian Development Bank (2007) provides evidence that the manufacturing sectors in a number of Asian economies, especially Korea, 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, as the production of more sophisticated manufactured products leads to faster growth, for it enlarges the potential for catch-up.



Notes: The 1980-84, 1985-89, 1990-94, and 2000-04 data for India refer only to 1983, 1988, 1994, and 2000 figures, respectively. The 2000-04 figures for China, Indonesia, Kyrgyz Rep., and Pakistan refer only to 2000-02. The 1985-89 figure for Indonesia pertains only to 1989. The 1975-79 figure for the Philippines refers only to 1978. The 1970-74 figure for Pakistan refers only to 1973-74
Source: Authors' calculations

Figure 3.
Manufacturing labor
productivity, logarithmic
scale (US \$2000)

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.

Summing up, the two most significant features of the transformation of developing Asia's manufacturing sector are, first, its increasing share in world total manufacturing output; and second, its technological upgrade, as reflected in the increasing production of more technologically advanced products.

3. How large is developing Asia's manufacturing sector? A logistic regression

Often cross-country comparisons of the size of the sector shares of the economy are made in absolute terms without realizing that countries may be at different levels of development. The theory underlying the logistic pattern of growth model (Chenery, 1960; Kuznets, 1966, 1971; Chenery and Taylor, 1968; Chenery and Syrquin, 1975)

Type	1970s	1980s	1990s	2000-2003
Food and beverages	19.40	14.14	12.45	12.55
Textiles	14.77	11.02	7.11	5.84
Apparel, leather, and footwear	5.27	4.89	4.74	4.20
Wood and wood products	3.01	2.10	2.01	1.82
Paper and paper products	2.20	2.10	2.09	2.28
Printing and publishing	2.11	1.95	2.58	1.89
Industrial chemicals	9.41	10.19	10.21	11.45
Petroleum and coal products	4.90	4.73	4.07	3.57
Rubber and plastic products	4.55	4.84	4.38	3.85
Nonmetal mineral products	4.46	5.42	5.34	4.60
Basic metals	5.86	7.75	7.60	7.71
Metal products	3.43	4.24	4.23	3.42
Nonelectrical machinery	3.88	8.32	8.58	8.66
Electrical machinery	8.07	9.43	13.69	16.57
Transport equipment	5.74	5.49	8.28	9.26
Others	2.94	3.39	2.62	2.33
Total	100.00	100.00	100.00	100.00

Table III.
Manufacturing structure
by decade, developing
Asia (percent of total
manufacturing)

Source: Authors' computations based on data from INDSTAT (UNIDO, 2005)

indicates that this is incorrect as sectors' shares vary with income per capita. This is the result of Engels' law, namely, the empirical observation that the proportion of consumer expenditure on foodstuffs, the principal product of the agricultural sector, declines as per capita income rises, i.e. the income-elasticity of demand for food is less than unity. Hence, there is a decline in the agricultural share, which in turn leads to a decline in the sector's share of the labor force in the course of economic development. And as the income elasticity of demand for manufactures tends to be relatively high in developing countries and relatively lower in the rich countries, the share of manufacturing in output and employment rises at first and falls later on.

To this purpose, we estimate econometrically the elasticity of the manufacturing share with respect to income per capita by hypothesizing the relationship $S_i = e^{a_1 y^{a_2}}$ between the manufacturing output share (S_i) and income per capita (y). This relationship can be estimated econometrically by taking logarithms as $\ln S_i = a_1 + a_2 \ln y$. The elasticity is given by the estimate of a_2 (\hat{a}_2). However, given the possibility of a hump-shaped relationship between both variables (Figure 2), we hypothesize the nonlinear relationship $S_i = e^{a_1 y^{a_2 + a_3 \ln y}}$, which can also be estimated by taking logarithms. The income elasticity is then given by $\eta_i = a_2 + 2a_3 \ln y$, which varies with y . The regression also includes two additional regressors. First, we introduce population, a proxy market size. Moreover, the change in the size of population also reflects the change in the actual or potential labor supply. Second, as many Asian economies have followed an export-oriented development path, export performance, which depends largely on the expansion of the overseas market, is an important factor affecting the changing share of the secondary sector in total product. For this reason, we estimate the regression for the manufacturing sector including the trade ratio in GDP (Tr)[3]. Hence we estimate:

$$\ln S_{MA} = a_1 + a_2 \ln y + a_3 (\ln y)^2 + a_4 \ln(\text{Tr}) + a_5 \ln(P) + u, \quad (1)$$

Group	N	1970s	N	1980s	N	1990s	N	2000/2003
<i>1. Low economies of scale/low technology</i>								
<i>World</i>								
Developing Asia	14	4.85	19	10.37	17	12.26	11	12.75
OECD	22	81.91	23	75.78	23	73.40	17	78.40
LAC	20	4.35	22	5.10	21	7.41	8	3.08
SSA	31	1.80	31	1.82	23	1.08	5	0.12
Rest of the World	20	7.08	30	6.93	33	5.85	25	5.66
Total	107	100.00	125	100.00	117	100.00	66	100.00
<i>Developing Asia</i>								
China			1	3.62	1	3.78	1	6.74
India	1	0.77	1	0.69	1	0.68	1	0.91
NIEs	4	2.31	4	3.65	4	4.28	3	3.26
ASEAN-4	4	1.42	4	1.96	4	2.97	2	1.51
Other Southeast Asia			1	0.01	1	0.02	2	0.17
Other South Asia	3	0.32	5	0.40	4	0.51	2	0.16
Central and West Asia					1	0.02		
Pacific DMCs	2	0.03	3	0.04	1	0.01		
Total	14	4.85	19	10.37	17	12.26	11	12.75
<i>2. Low economies/medium technology</i>								
<i>World</i>								
Developing Asia	14	2.54	19	6.10	17	8.23	11	8.42
OECD	22	91.47	23	88.26	23	84.97	17	86.56
LAC	20	1.90	22	2.14	21	3.81	8	1.65
SSA	30	0.98	31	0.93	23	0.51	5	0.07
Rest of the World	20	3.11	30	2.58	33	2.49	25	3.30
Total	106	100.00	125	100.00	117	100.00	66	100.00
<i>Developing Asia</i>								
China			1	1.91	1	1.87	1	3.47
India	1	0.35	1	0.31	1	0.34	1	0.53
NIEs	4	1.64	4	2.87	4	3.82	3	3.35
ASEAN-4	4	0.48	4	0.93	4	2.10	2	0.99
Other Southeast Asia			1	0.01	1	0.01	2	0.04
Other South Asia	3	0.06	5	0.06	4	0.09	2	0.04
Central and West Asia					1	0.00		
Pacific DMCs	2	0.01	3	0.01	1	0.00		
Total	14	2.54	19	6.10	17	8.23	11	8.42
<i>3. Medium economies/medium technology</i>								
<i>World</i>								
Developing Asia	14	2.11	19	7.90	17	10.82	11	11.34
OECD	22	88.87	23	81.40	23	77.79	17	80.96
LAC	19	2.26	22	3.41	21	5.23	8	2.01
SSA	29	1.35	30	1.36	23	0.76	4	0.03
Rest of the World	20	5.41	29	5.92	33	5.40	25	5.66
Total	104	100.00	123	100.00	117	100.00	65	100.00
<i>Developing Asia</i>								
China			1	3.70	1	3.95	1	6.20
India	1	0.59	1	0.70	1	0.74	1	0.90
NIEs	4	1.04	4	2.51	4	4.55	3	3.58
ASEAN-4	4	0.41	4	0.83	4	1.43	2	0.59
Other Southeast Asia			1	0.01	1	0.01	2	0.06

(continued)

Table IV.
 Share of world
 manufacturing by type of
 technology and decade
 (percent)

Group	N	1970s	N	1980s	N	1990s	N	2000/2003
Other South Asia	3	0.06	5	0.14	4	0.14	2	0.02
Central and West Asia					1	0.00		
Pacific DMCs	2	0.01	3	0.01	1	0.00		
Total	14	2.11	19	7.90	17	10.82	11	11.34
<i>4. Medium or strong economies/medium or strong technology</i>								
<i>World</i>								
Developing Asia	14	2.14	18	6.21	17	9.41	11	11.33
OECD	22	90.10	23	86.49	23	81.96	17	82.68
LAC	20	1.53	22	2.42	21	4.62	8	1.39
SSA	30	0.69	31	0.79	23	0.36	4	0.01
Rest of the World	20	4.54	30	4.09	33	3.64	25	4.58
Total	106	100.00	124	100.00	117	100.00	65	100.00
<i>Developing Asia</i>								
China			1	2.57	1	2.57	1	4.89
India	1	0.54	1	0.56	1	0.59	1	0.69
NIEs	4	1.19	4	2.44	4	4.74	3	4.78
ASEAN-4	4	0.34	4	0.55	4	1.42	2	0.93
Other Southeast Asia					1	0.01	2	0.02
Other South Asia	3	0.07	5	0.10	4	0.09	2	0.01
Central and West Asia					1	0.00		
Pacific Islands	2	0.01	3	0.00	1	0.00		
Total	14	2.14	18	6.21	17	9.41	11	11.33

Notes: *N* denotes number of countries; OECD is the Organization for Economic Cooperation and Development. LAC refers to Latin American and the Caribbean. SSA is Sub Saharan Africa. ASEAN-4 includes Indonesia, Malaysia, Philippines, and Thailand. Central and West Asia covers only Mongolia. NIEs consist of Hong Kong, Korea, Singapore, and Taiwan. Other Southeast Asia comprises Myanmar and Vietnam. Other South Asia covers Bangladesh, Bhutan, Nepal, Pakistan, and Sri Lanka. Pacific includes Fiji, Papua New Guinea, Samoa, and Tonga

Source: Authors' computation based on data from UNIDO INDSTAT (UNIDO, 2005)

Table IV.

where S_{MA} is the manufacturing share in GDP; u is the error term; $\eta_{MA} = (\hat{\alpha}_2 + 2\hat{\alpha}_3 \ln y^*)$ is the estimated elasticity of the share with respect to income per capita at each income per capita (y^* is actual income per capita); and the symbol $\hat{\alpha}$ denotes the estimated coefficient. Regression (1) was estimated with cross-sectional data for 1975, 1985, 1995, and 2000 (i.e. four separate regressions) using ordinary least squares[4].

Point elasticities for 1975, 1985, 1995, and 2000 are shown in Table V[5]. A one percentage point in income per capita leads, on average, to a less-than-one percentage point increase in output and employment shares in manufacturing. This elasticity increased between 1975 and 1985, but then decreased for 1995 and 2000. Moreover, since the relationship between the logarithm of the manufacturing share and the logarithm of income per capita is nonlinear (a hump-shaped relationship), the actual elasticity varies with income per capita. The hump-shaped relationship implies that the elasticity of the manufacturing share is relatively high (positive, i.e. the share increases as income per capita increases) when a country is poor and then falls as the country becomes rich (becomes negative, i.e. the share decreases as income per capita increases). The range is shown in brackets[6]. In 1975, the elasticities varied between

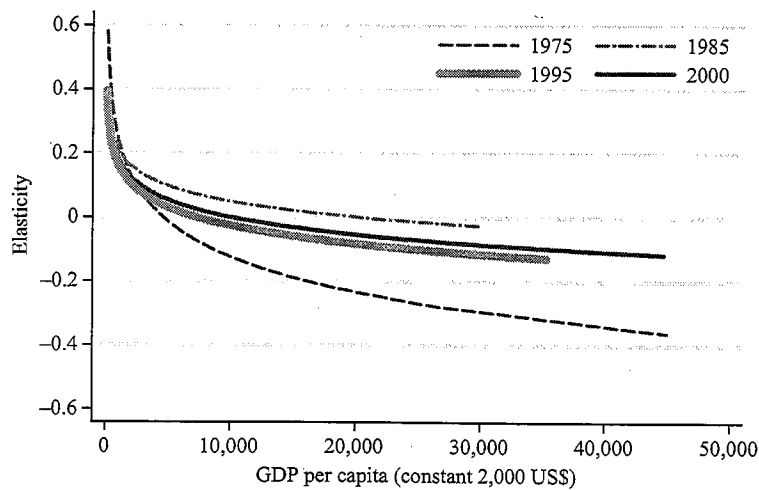
	Point estimate elasticity	Elasticity range
1975 <i>R</i> -squared No. countries	0.158 (3.58)*** 0.22 89	[-0.362, 0.581]
1985 <i>R</i> -squared No. countries	0.168 (5.36)*** 0.41 120	[-0.026, 0.376]
1995 <i>R</i> -squared No. countries	0.114 (4.72)*** 0.37 158	[-0.129, 0.335]
2000 <i>R</i> -squared No. countries	0.128 (4.45)*** 0.33 161	[-0.116, 0.367]
	<i>Five countries with highest income elasticity</i>	<i>Five countries with lowest income elasticity</i>
	<i>World</i>	<i>World</i>
1975	Burundi (0.58), Nepal (0.55), China (0.55), China (0.54), India (0.54), Malawi (0.54), Burkina Faso (0.51)	United Arab Emirates (-0.36), Kuwait (-0.28), Japan (-0.24), USA (-0.23), Denmark (-0.22)
1985	Ethiopia (0.38), Burundi (0.34), Malawi (0.34), Nepal (0.33), Uganda (0.33)	United Arab Emirates (-0.03), Switzerland (-0.03), Japan (-0.02), Norway (-0.01), USA (-0.01)
1995	Burundi (0.34), Malawi (0.32), Niger (0.31), Mozambique (0.31), Tajikistan (0.30)	Japan (-0.13), Luxembourg (-0.12), Switzerland (-0.12), USA (-0.11)
2000	Congo D.R. (0.37), Sierra Leone (0.33), Malawi (0.32), Niger (0.32), Guinea-Bissau (0.32)	Luxembourg (-0.12), Japan (-0.10), Norway (-0.10), USA (-0.10), Switzerland (-0.10)
	<i>Asia</i>	<i>Asia</i>
	Nepal (0.55), China (0.55), China (0.54), India (0.48), Pakistan (0.44), Indonesia (0.43)	Korea (0.10), Fiji (0.16), Malaysia (0.19), Philippines (0.27), Papua New Guinea (0.31)
	Nepal (0.33), Bangladesh (0.30), India (0.30), China (0.29), Bhutan (0.28)	Hong Kong (0.03), Singapore (0.04), Taiwan (0.09), Korea (0.11), Malaysia (0.16)
	Tajikistan (0.30), Nepal (0.29), Cambodia (0.28), Kyrgyz (0.28), Lao PDR (0.27)	Hong Kong (-0.09), Singapore (-0.08), Taiwan (-0.04), Korea (-0.02), Malaysia (0.06)
	Tajikistan (0.32), Nepal (0.29), Kyrgyzstan (0.28), Cambodia (0.27), Lao PDR (0.26)	Hong Kong (-0.07), Singapore (-0.06), Taiwan (-0.03), Korea (-0.01), Malaysia (0.07)

Source: Authors' estimates

Table V.
Estimates of income
elasticities of
manufacturing output

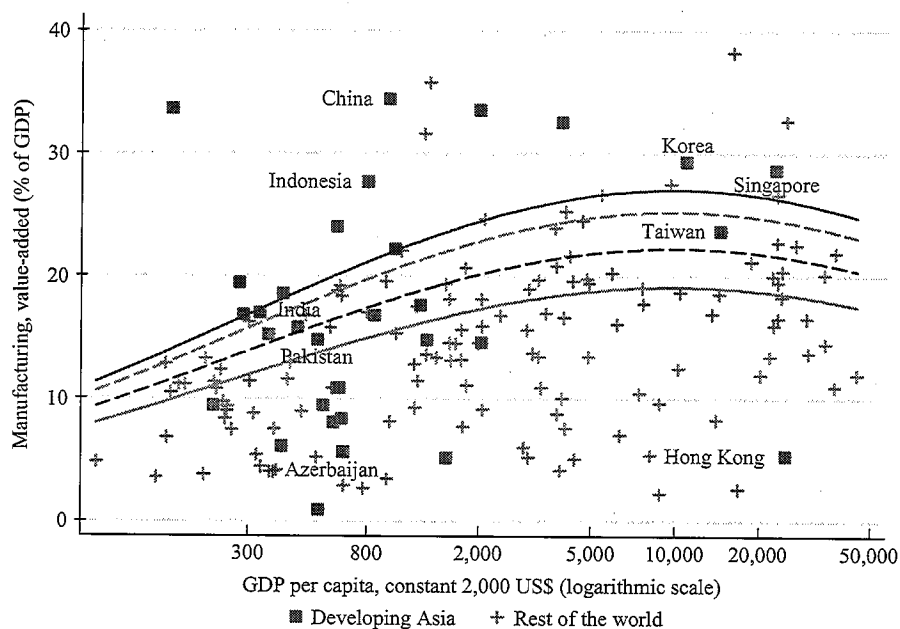
0.58 for the poor countries and -0.36 for the rich countries. On the other hand, in 2000, they ranged from 0.36 for the poor countries to -0.11 for the rich countries. The five countries with the lowest and highest elasticities are shown in the bottom of Table V. Figure 4 graphs the complete range of income elasticities for 1975, 1985, 1995, and 2000 *vis-à-vis* income per capita. As noted above, the elasticities increased between 1975 and 1985 (i.e. the curves shifted upwards), but then decreased in 1995 and 2000 (i.e. the curves shifted downward).

Figure 5 shows the predicted regression line for 2000 for two different population values, 50 and 100 million (fixing the trade share at the sample's average value, 78 percent); as well as for two different trade ratios, 30 percent and 100 percent (fixing population at 100 million). The estimated regression coefficients are shown in Note 3 in Figure 5. Results indicate that population size matters: doubling population from 50 to 100 million increases the manufacturing share by about two percentage points for low income per capita and by about three percentage points at high income per capita (see second and third columns in Note 4 in Figure 5); and that openness also matters: increasing the trade ratio from 30 to 100 percent increases the manufacturing share by six percentage points for low income per capita and by about eight percentage points for high income per capita (see fourth and fifth columns in Note 4 in Figure 5). The regression results also allow us to calculate the turning point, that is, the point at which the elasticity turns from positive into negative (i.e. the manufacturing share becomes highest, at which point the income elasticity is zero). This occurs at $\$9,998$ (dollars of 2000). Note 4 in Figure 5 indicates that, at this value (i.e. about $\$10,000$), the manufacturing share becomes highest. This share depends on the population and trade share combinations (e.g. 22.3 percent for a population of 50 million and



Notes: Elasticities were computed using the following equations:
 $\epsilon_{75} = 1.333 + (2 \times (-0.079)) \ln y^*$; $\epsilon_{85} = 0.684 + (2 \times (-0.034)) \ln y^*$;
 $\epsilon_{95} = 0.721 + (2 \times (-0.041)) \ln y^*$; $\epsilon_{02} = 0.711 + (2 \times (-0.039)) \ln y^*$
 where y^* is actual income per capita
 Source: Authors' estimates

Figure 4.
Income elasticities of
manufacturing output



Notes:

- (1) The dashed lines refer to the prediction for varying populations (lower line is for 50 million while upper line is for 100 million), for a trade ratio of 78%.
- (2) The continuous lines refer to the prediction for varying trade openness (lower line refers to an openness of 30% while the upper line is for 100%) for a population of 100 million.
- (3) Estimated Regression:

$$\ln S_i = -4.628 + 0.711 \ln y - 0.039 (\ln y)^2 + 0.289 Tr + 0.180 \ln P$$

$$t\text{-stat: } (-4.05)** \quad (2.97)** \quad (-2.55)** \quad (2.76)*** \quad (5.92)***$$

where S_i = manufacturing output share; y = GDP per capita; P = Population;
 Tr = Trade ratio

“***” and “**” mean significant at 1% and 5%, respectively.

- (4) Predicted manufacturing output shares at various income levels for varying trade ratio and population

Income per capita (\$)	Average openness (78% of GDP)		Population: 100 million	
	Population: 50 million	Population: 100 million	Trade ratio: 30%	Trade ratio: 100%
500	15.777	17.879	13.536	19.162
1,000	18.178	20.601	15.597	22.078
5,000	21.894	24.812	18.785	26.592
10,000	22.304	25.276	19.136	27.089
15,000	22.163	25.116	19.015	26.918
20,000	21.894	24.812	18.785	26.592
25,000	21.593	24.470	18.526	26.226

Source: Authors' estimates

Figure 5.
Fitted regression line of
manufacturing output
shares vs GDP per capita,
2000

openness of 78 percent). This maximum share remains approximately constant up to \$15,000 and then it starts declining.

Actual and predicted shares (i.e. where the latter is each country's expected share given its income per capita, population and trade ratio) for developing Asia are shown in Table VI. Countries can be divided into three groups, depending on whether:

- (1) the actual share is higher than the predicted one;
- (2) the actual share is lower than the predicted; or whether
- (3) predicted and actual shares are about the same and the country is on or very close to the regression line.

	Predicted	Actual
China	27.31	34.50
India	19.55	15.85
<i>NIES</i>		
Hong Kong	21.72	5.39
Korea	22.04	29.42
Singapore	21.68	28.73
Taiwan	20.82	23.76
<i>ASEAN-4</i>		
Indonesia	21.90	27.75
Malaysia	25.51	32.60
Philippines	21.53	22.23
Thailand	23.93	33.59
<i>Other Southeast Asia</i>		
Cambodia	11.84	16.86
Lao PDR	8.95	17.00
Vietnam	17.96	18.56
<i>Other South Asia</i>		
Bangladesh	13.54	15.23
Bhutan	7.75	8.06
Nepal	10.18	9.44
Pakistan	14.31	14.81
Sri Lanka	15.37	16.83
<i>Central and West Asia</i>		
Armenia	9.83	24.07
Azerbaijan	11.99	5.64
Kazakhstan	16.48	17.66
Kyrgyzstan	9.29	19.46
Mongolia	9.92	6.13
Tajikistan	9.86	33.66
Turkmenistan	13.67	10.85
Uzbekistan	12.20	9.44
<i>Pacific Islands</i>		
Fiji	10.98	14.62
Kiribati	5.05	0.90
Papua New Guinea	13.00	8.36
Samoa	7.16	14.82
Tonga	5.99	5.16

Table VI.
Predicted vs actual
manufacturing output
shares (year 2000)

Source: Authors' estimates

In the first group of countries we find China, the NIES except Hong Kong, the ASEAN-4 except the Philippines, Cambodia, Lao PDR, Armenia, Kyrgyz Republic, Tajikistan, Fiji, and Samoa. China and the NIES's very high manufacturing shares are the result of explicit industrialization policies as the basis for their development (Wang and Li, 1995 on China). Although in decline with respect to the average of the 1980s, the share of the manufacturing subsector in total output in China has been traditionally much higher than anywhere else. It still accounts for about 34.5 percent 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 percent in the 1980s to 11 percent at present.

In the second group we find India, Hong Kong, Azerbaijan, Mongolia, Turkmenistan, Uzbekistan, Kiribati, and Papua New Guinea. The case of Hong Kong was already discussed above: this economy has undergone deindustrialization as a result of the transfer of manufacturing plants to China. Today it is one of the most service-oriented economies in the world. The other interesting case in this group is India. Why is India's manufacturing share in GDP about four percentage points lower than what it should be (i.e. India's manufacturing base is relatively small by international standards, after controlling for income per capita, population size, and openness to trade). Economists have not been able to agree on the causes, or resolve the issue empirically. A review of the literature indicates that a combination of factors, which includes the reservation policy (as of January 2007, the manufacture of 237 items was reserved for small and medium-sized companies), the "license-permit Raj" (which lasted until 1991 and was responsible for India's large administrative machinery) and the somewhat restrictive labor laws (although this is very controversial and unsettled), combined with lack of adequate physical, social and regulatory infrastructure, are responsible for the relatively underperformance of the sector[7].

Finally, the rest of the countries (i.e. the Philippines, Viet Nam, Other South Asia, Kazakhstan, and Tonga) are in the third group. In the case of the Philippines, although the share is well predicted (and therefore it is not low when benchmarked), it is important to note that this country had the highest manufacturing output share among the ASEAN-4 in the 1970s, but by 2000-2004 the share had decreased by about three percentage points and was the lowest in the group. Its industrialization policies have been a failure with the result that its actual manufacturing share is much lower than that of Indonesia and, especially, Malaysia and Thailand. So what are the reasons for the lack of industrialization? This is a tricky question given that in the 1950s a sophisticated manufacturing sector emerged, bolstered by protection and a well-developed human capital base. As in the case of India, several reasons account for the poor performance of the sector: an uncompetitive cost structure, fast liberalization and poor infrastructure, and distributive conflicts and dysfunctional institutions that have prevented the development of the appropriate institutional prerequisites for sustained growth[8].

Finally, the regression line was also estimated for 2005. Actual and predicted values are shown in Table VII (the rest of the results are available upon request). A couple of important issues are worth mentioning. First, China's predicted and actual shares are now about the same (actual share is approximately the same as in 2000). China's higher income per capita and trade openness in 2005 put the country exactly on the line. Second, India is ten percentage points below the predicted regression line (i.e. lower

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	Predicted	Actual
China	33.71	33.48
India	25.42	15.99
<i>NIEs</i>		
Hong Kong	17.72	3.42
Rep. of Korea	19.78	28.37
Singapore	17.20	28.05
Taiwan	17.84	23.21
<i>ASEAN-4</i>		
Indonesia	21.94	27.71
Malaysia	22.07	29.79
Philippines	20.69	23.26
Thailand	23.40	34.80
<i>Other Southeast Asia</i>		
Cambodia	12.98	17.85
Lao PDR	8.99	20.56
Vietnam	19.72	20.63
<i>Other South Asia</i>		
Bangladesh	15.60	16.53
Bhutan	7.60	7.32
Nepal	10.03	7.92
Pakistan	16.63	18.56
Sri Lanka	14.42	14.80
<i>Central and West Asia</i>		
Armenia	9.89	20.94
Azerbaijan	13.73	7.02
Kazakhstan	15.79	12.83
Kyrgyz Republic	9.28	14.41
Mongolia	9.96	4.13
Tajikistan	8.60	23.72
Uzbekistan	13.86	9.10
<i>Pacific Islands</i>		
Fiji	9.61	13.15
Palau	5.10	0.38
Vanuatu	6.49	3.58

Table VII.
Predicted vs actual
manufacturing output
shares (year 2005)

Notes: $\ln S_i = -4.598 + 0.715 \ln y - 0.041(\ln y)^2 + 0.220Tr + 0.196 \ln Pt$ -stat: (-4.18)*** (2.87)*** (-2.56)** (1.82)* (5.21)***, where S_i = manufacturing output share; y = GDP per capita; P = population; Tr = trade ratio. *, **, and *** mean significant at 10, 5 and 1 percent, respectively

share than it should have). While India's income per capita and openness have increased, the country's manufacturing share has not.

4. Conclusions

This paper has, first, described the changes in developing Asia's manufacturing sector during the last three decades. Second, it has used a logistic regression in order to benchmark countries' share of manufacturing output in GDP with respect to the international regression line. The most salient conclusions are as follows:

- The share of developing Asia in world manufacturing output has increased significantly since the 1970s. However, the increase is concentrated in a number of countries, mostly the NIES, China, Indonesia, Malaysia and Thailand.
- Simultaneously, the NIES have started experiencing a deindustrialization process, very clear in the case of Hong Kong (in terms of both output and employment shares). This is the result of the maturation of this economy and the transfer of production facilities to China.
- There has been an important technological upgrading as the share of more technologically advanced manufactures has increased.
- The productivity levels of most countries across developing Asia are still very far from those of the OECD. The exception is the NIES.
- China, the NIES (except Hong Kong), ASEAN-4 (except the Philippines), Cambodia, Lao PDR, Armenia, Kyrgyz Republic, Tajikistan, Fiji, and Samoa have actual manufacturing shares significantly higher than those predicted by a logistic regression that controls for income per capita, the trade share and population.
- India is the most significant case of a country with an actual manufacturing share lower (by four percentage points) than what corresponds given its income per capita, trade share and population. The actual manufacturing share of Hong Kong is very low due to the transfer of manufacturing activities to China. The Philippines predicted share is very close to its actual, but it is significantly lower than that of the other ASEAN-4 countries.
- The trade share and population are statistically significant variables in the logistic regression. Doubling population from 50 to 100 million increases the manufacturing share by about two percentage points at low income per capita and by about three percentage points at high income per capita. And increasing the trade ratio from 30 to 100 percent increases the manufacturing share by six percentage points at low income per capita and by about eight percentage points at high income per capita. The results also indicate that the maximum manufacturing share, between 19 percent and 27 percent (depending on the population and trade share combinations), corresponds to an income per capita of about \$10,000 (of the year 2000).

Notes

1. However, Wan (2004, pp. 258-60) notes that although Hong Kong's growth has continued even with the loss of manufacturing jobs, after 1997 both private and public circles remain interested in "reindustrialization".
2. This was done by dividing all manufacturing branches into four groups according to level of technology and scale. Group 1 corresponds to the manufacturing branches with the lowest technology and scale economies, e.g. food and beverages, tobacco, wearing apparel, leather products. Group 2 consists of plastic and rubber products, paper, among others. Group 3 consists of iron and steel, nonmineral products, among others. Group 4 consists of products with the highest technology and scale economies, such as electrical and nonelectrical machinery, industrial chemicals, professional equipment, transport equipment, among others.

3. The investment ratio was also included as an additional variable as increases in investment favors the expansion of the secondary sector. It is also an important variable that influences the composition of demand. The majority of investment expenditure involves the purchase of manufactured goods such as prefabricated buildings, construction materials and producer durables. For this reason, a high rate of investment should be reflected in a high share of a manufacturing in both output and employment. Results were not satisfactory and hence this variable was dropped.
4. The developers of the logistic model, however, did not agree regarding the interpretation of logistic regressions. Chenery argued that it was justifiable to interpret cross-sectional results as normal growth functions (Chenery, 1960, p. 635). Kuznets, on the other hand, argued that cross-sectional results could not be used to infer time-series patterns (Kuznets, 1966, p. 436). The issue is crucial as it boils down to the correct interpretation of the patterns of development: cross-sections are snapshots at one point in time that help situate a country's performance *vis-à-vis* that of other countries. However, "development patterns" refer to the structural changes that have occurred within a relative long span. Moreover, patterns will be relevant (in the sense of helping devise policies that can foster growth) if they appear in countries' experience over time and if understanding them guides policy formation. Jameson (1982) took up the issue and tested the growth patterns hypothesis with data for 89 developing countries, he found that the time series estimates violated the expected results: 45 percent of the sample countries deviated from the expected pattern (either the slope of the primary or of the secondary sectors had incorrect sign). He concluded that "time-series for countries in the postwar [...] cannot be used as evidence favoring the existence of patterns of development [...] Kuznets' suggestion was correct and claims of patterns of behavior must be confined to cross-section data" (Jameson, 1982, p. 432).
5. The point elasticity is calculated as $\eta_{MA} = (\hat{a}_2 + 2\hat{a}_3 \ln \bar{y}^*)$ using the average income per capita (\bar{y}^*) of all countries.
6. The range shows the smallest and highest elasticities calculated as $\eta_{MA} = (\hat{a}_2 + 2\hat{a}_3 \ln \bar{y}^*)$ using the income per capita of each country.
7. See, for example, Lewis (2004, Chapter 8), Besley and Burgess (2004), Kochhar *et al.* (2006), Roy (2004), Deshpande (2004), Anant *et al.* (2006).
8. See, for example, Asian Development Bank (2005), Aldaba *et al.* (2005), Hill (2003), Ofreneo (2003), Prichett (2003).

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Appendix

DMC	1970s											Total				
	Food and beverages	Textiles	Apparel, leather, and footwear	Wood and wood products	Paper and paper products	Printing and publishing	Industrial chemicals	Petroleum and coal products	Rubber and plastic products	Nonmetal mineral products	Basic metals		Metal products	Nonelectrical machinery	Electrical machinery	Transport equipment
People's Rep. of China																
India	11.19	20.53	0.99	0.63	2.57	2.03	14.79	2.60	2.46	3.80	11.78	3.16	7.67	7.23	7.38	1.14
<i>NIES</i>																
Hong Kong	5.18	17.96	26.60	1.93	1.27	3.70	1.66	0.00	9.22	0.94	1.15	7.50	2.19	11.41	2.60	6.68
Rep. of Korea	18.41	14.43	5.76	2.81	2.17	2.03	9.45	5.51	4.28	5.29	6.62	3.05	3.26	8.17	5.96	2.80
Singapore	6.87	2.59	3.77	4.19	1.06	3.66	5.02	16.79	3.60	2.97	2.03	4.84	7.53	19.00	12.70	3.39
Taiwan	16.42	7.98	5.05	3.27	2.14	5.26	6.28	5.19	4.76	5.20	4.20	4.77	9.50	9.04	4.91	6.02
<i>ASEAN-4</i>																
Indonesia	39.41	14.68	1.50	3.77	1.61	1.55	11.21	0.00	4.42	6.84	0.71	3.37	1.46	4.10	4.98	0.39
Malaysia	25.06	5.38	1.52	12.66	0.85	4.32	6.28	3.09	12.23	4.33	2.94	3.79	2.86	9.74	3.29	1.08
Philippines	37.22	7.56	2.69	4.46	3.85	1.46	12.30	7.65	3.26	4.39	3.47	2.51	1.35	3.11	4.08	0.65
Thailand	41.53	15.53	0.59	3.61	1.47	1.41	5.26	6.29	2.94	7.33	2.42	3.01	0.71	2.06	4.63	0.39
<i>Other Southeast Asia</i>																
Myanmar																
Viet Nam																
<i>Other South Asia</i>																
Bangladesh	31.44	37.26	1.64	0.30	2.27	0.68	13.59	0.43	0.50	1.80	3.85	1.22	0.57	2.05	1.38	1.63
Bhutan																
Nepal																
Pakistan	30.45	27.78	2.04	0.26	1.61	1.22	11.20	5.27	1.80	4.43	3.06	1.62	1.84	3.31	2.99	1.11
Sri Lanka	23.06	13.86	6.66	1.78	3.59	0.84	8.80	5.36	6.31	8.48	1.59	4.01	3.29	4.29	1.83	1.24
<i>Pacific Islands</i>																
Cook Islands																
Fiji	63.14	0.00	2.03	8.64	1.74	3.25	2.57	0.00	1.98	5.26	0.00	5.68	1.44	0.89	3.01	0.37
Papua New Guinea	36.90	0.17	0.59	15.86	1.14	3.29	5.23	0.00	0.75	2.61	0.39	5.79	8.27	2.06	13.67	3.23
Tonga																
<i>1980s</i>																
People's Rep. of China	12.36	12.33	3.07	1.45	2.05	1.18	11.45	4.79	3.69	6.89	9.54	4.36	13.81	5.94	3.88	3.20
India	11.81	14.13	1.40	0.53	1.81	1.88	14.82	3.85	3.17	4.80	12.18	2.88	8.50	8.41	8.50	1.32
<i>NIES</i>																
Hong Kong	5.52	14.77	24.59	1.29	1.67	4.93	1.61	0.02	8.46	1.01	0.69	7.02	4.05	13.74	2.36	8.26
Rep. of Korea	13.13	10.35	5.88	1.58	2.26	2.29	8.78	3.95	5.31	4.66	7.59	4.44	5.32	12.95	8.23	3.26

Developing Asia's
manufacturing
sector

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Table AI.
Share of manufacturing
subsector, by
decade-developing Asia

(continued)

Table AI.

DMC	Food and beverages	Textiles	Apparel, leather, and footwear	Wood and wood products	Paper and paper products	Printing and publishing	Industrial chemicals	Petroleum and coal products	Rubber and plastic products	Nonmetal mineral products	Basic metals	Metal products	Nonelectrical machinery	Electrical machinery	Transport equipment	Others	Total
Singapore	5.32	0.84	3.36	1.99	1.45	4.15	9.12	9.46	2.69	2.29	1.43	6.11	10.01	29.95	8.92	2.92	100.00
Taiwan	10.95	7.66	6.79	2.83	2.72	3.08	7.86	6.41	7.37	3.77	5.92	4.30	5.82	12.47	6.00	6.04	100.00
ASEAN-4																	
Indonesia	26.90	11.40	2.45	10.71	1.71	1.56	11.09	0.00	5.37	5.20	7.26	4.68	1.19	3.45	6.57	0.46	100.00
Malaysia	20.23	3.67	2.48	7.81	1.28	3.67	11.72	2.76	3.68	6.40	3.60	3.38	2.80	15.81	4.12	1.59	100.00
Philippines	35.76	5.44	5.27	4.32	2.69	1.39	11.46	10.10	3.35	3.26	4.64	1.96	1.22	5.69	2.48	0.96	100.00
Thailand	33.40	10.37	3.03	1.94	1.56	7.13	5.83	5.52	6.31	7.50	3.96	2.64	0.27	4.85	4.38	1.30	100.00
Other Southeast Asia																	
Myanmar	34.13	0.00	0.00	15.65	0.00	0.00	0.00	0.00	19.13	4.68	19.64	1.89	0.00	0.00	0.00	4.88	100.00
Viet Nam																	
Other South Asia																	
Bangladesh	23.96	31.36	4.96	0.87	2.50	1.13	17.46	4.38	0.57	2.00	3.53	1.40	1.30	2.42	1.41	0.77	100.00
Bhutan	19.64	5.27	0.00	19.85	0.29	1.09	22.86	0.00	2.49	27.99	0.00	0.51	0.00	0.00	0.00	0.00	100.00
Nepal	41.30	15.96	8.10	2.48	1.13	0.94	6.05	0.00	2.21	13.00	3.02	2.83	0.00	2.24	0.00	0.75	100.00
Pakistan	30.94	18.14	2.37	0.39	1.15	1.06	14.29	6.01	1.80	7.75	6.20	1.06	2.14	3.25	2.89	0.55	100.00
Sri Lanka	49.60	7.84	9.30	1.60	1.98	1.52	4.36	5.74	5.06	6.46	0.85	1.50	0.92	1.12	0.69	1.46	100.00
Pacific Islands																	
Cook	10.95	7.66	6.79	2.83	2.72	3.08	7.86	6.41	7.37	3.77	5.92	4.30	5.82	12.47	6.00	6.04	100.00
Islands																	
Fiji	59.99	3.03	1.67	8.30	2.15	4.18	4.45	0.00	2.41	4.58	0.00	4.97	0.86	0.28	2.43	0.71	100.00
Papua New Guinea	52.67	0.13	0.59	17.35	1.22	2.71	3.20	0.00	0.97	3.18	0.55	7.37	5.22	0.53	4.29	0.00	100.00
Tonga	69.24	0.00	4.01	8.66	0.69	3.17	1.61	0.00	0.00	5.36	0.00	5.12	0.00	0.66	0.87	0.61	100.00
1990s																	
People's Rep. of China	14.66	8.02	4.48	1.31	1.95	1.14	11.44	3.62	3.43	7.34	10.24	3.34	9.19	10.35	6.35	3.15	100.00
India	12.08	9.97	2.79	0.39	1.80	1.53	19.14	4.49	3.28	4.66	12.17	2.52	7.39	7.30	8.69	1.75	100.00
NIIs																	
Hong Kong	10.44	13.06	16.00	0.52	2.20	11.43	2.36	0.10	3.90	1.87	0.87	5.08	8.97	12.25	3.72	7.24	100.00
Rep. of Korea	9.34	6.01	4.52	1.86	2.29	2.52	8.89	3.58	4.78	4.73	6.89	5.00	8.93	16.85	11.68	2.11	100.00
Singapore	3.70	0.33	1.31	0.93	1.34	4.51	10.03	5.82	2.97	1.93	0.67	6.29	27.32	22.92	7.05	2.86	100.00
Taiwan	9.22	6.43	3.89	1.96	2.20	1.32	9.04	7.21	7.11	4.53	7.06	6.74	4.79	17.35	7.61	3.54	100.00
ASEAN-4																	
Indonesia	20.05	10.29	7.11	8.77	3.92	1.81	9.83	0.13	4.48	2.91	7.60	3.74	1.55	6.09	10.64	1.08	100.00
Malaysia	9.75	3.01	2.16	6.95	1.59	2.63	9.31	2.69	7.93	5.26	3.08	4.02	5.07	29.41	5.15	1.99	100.00
Philippines	33.25	3.39	6.30	1.92	2.01	1.54	13.09	7.88	3.39	4.40	5.07	1.72	1.34	10.06	3.68	1.26	100.00
Thailand	15.52	9.24	7.32	1.56	1.09	15.42	2.31	8.89	2.89	6.00	3.00	2.06	10.96	6.69	5.16	1.80	100.00

(continued)

DMC	Food and beverages	Textiles	Apparel, leather, and footwear	Wood and wood products	Paper and paper products	Printing and publishing	Industrial chemicals	Petroleum and coal products	Rubber and plastic products	Nonmetallic mineral products	Basic metals	Metal products	Non-electrical machinery	Electrical machinery	Transport equipment	Others	Total
<i>Other Southeast Asia</i>																	
Myanmar	36.20	0.00	1.39	9.96	0.00	0.00	23.28	0.00	5.99	8.20	9.92	0.35	0.00	0.00	0.00	4.74	100.00
Viet Nam																	
<i>Other South Asia</i>																	
Bangladesh	25.08	16.72	21.60	0.76	1.75	2.11	12.81	0.51	0.54	4.92	2.85	1.20	0.33	4.04	4.27	0.50	100.00
Bhutan																	
Nepal	32.26	26.25	11.07	2.62	1.14	0.97	4.80	0.03	2.56	9.92	2.29	3.61	0.01	1.82	0.00	0.54	100.00
Pakistan	22.89	25.06	2.80	0.37	1.54	2.00	15.50	3.26	1.42	7.76	3.13	0.81	2.09	5.43	3.05	0.88	100.00
Sri Lanka	40.00	3.87	20.25	0.89	1.40	1.13	5.26	1.56	6.41	4.49	0.95	1.05	1.63	1.39	1.98	2.63	100.00
<i>Central and West Asia</i>																	
Mongolia	36.80	17.58	21.14	4.28	0.00	1.59	1.14	0.00	0.00	3.98	0.15	2.41	0.00	0.64	0.00	10.29	100.00
<i>Pacific Islands</i>																	
Cook																	
Islands	9.22	6.43	3.89	1.96	2.20	1.32	9.04	7.21	7.11	4.53	7.06	6.74	4.79	17.35	7.61	3.54	100.00
Fiji	48.73	12.67	0.96	10.44	3.37	5.76	5.41	0.00	2.33	3.70	0.00	3.66	0.99	0.00	1.07	0.92	100.00
Papua New Guinea																	
Tonga																	
<i>2000-2003</i>																	
<i>People's</i>																	
Rep. of																	
China	14.30	6.25	4.73	1.35	2.16	1.07	11.59	3.95	3.57	5.48	9.40	3.20	7.34	15.63	7.59	2.38	100.00
India	13.22	9.01	2.78	0.52	2.33	1.55	20.77	5.61	3.63	5.68	10.19	2.66	6.81	5.87	7.18	2.20	100.00
NiS																	
Hong Kong	9.31	11.19	8.89	0.19	1.29	19.87	3.68	0.00	1.78	3.00	1.09	2.62	5.57	19.54	5.36	6.63	100.00
Rep. of																	
Korea	8.19	4.81	3.12	1.44	2.25	2.47	9.53	2.48	4.17	4.00	6.48	4.06	11.28	19.76	14.06	1.91	100.00
Singapore	2.34	0.18	0.76	0.70	0.78	3.54	17.35	4.20	2.86	1.03	0.29	5.37	21.95	26.08	8.16	4.42	100.00
Taiwan																	
<i>ASEAN4</i>																	
Indonesia	21.25	8.84	7.17	8.67	5.51	1.53	11.01	0.09	4.45	0.04	4.68	2.50	2.90	8.30	11.93	1.15	100.00
Malaysia	8.39	2.18	1.75	5.75	2.11	1.99	8.08	8.63	6.96	4.91	2.64	3.17	9.10	27.11	4.98	2.25	100.00
Philippines																	
Thailand																	
<i>Other Southeast Asia</i>																	
Myanmar	59.85	0.00	1.25	0.89	0.00	0.00	0.00	0.00	6.54	0.37	12.20	2.80	5.07	3.16	5.71	2.15	100.00
Viet Nam	30.19	4.55	16.42	2.36	1.75	2.21	6.26	0.41	3.42	10.37	2.17	2.62	2.37	5.81	6.92	1.97	100.00
<i>Other South Asia</i>																	
Bangladesh																	
Bhutan																	
Nepal	45.42	10.48	8.78	1.50	1.46	2.12	10.40	0.00	3.98	6.43	2.26	5.23	0.07	1.57	0.07	0.21	100.00
Pakistan																	
Sri Lanka	38.57	10.48	20.81	0.64	1.95	0.68	3.76	3.11	7.12	4.30	0.21	0.75	1.71	1.64	2.29	1.96	100.00

Source: Authors' calculations based on data from INDSTAT (UNIDO 2005)