Employment and Manufacturing Exports in Indonesia: An Input-Output Analysis

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Abstract

Manufactured exports have responded positively to trade reforms in Indonesia over the period of study (1985-95). Manufactured exports, in turn, have generated additional employment both directly and indirectly through inter-industrial linkages. In this paper we estimate the employment effects of manufactured exports in two sub-periods, 1985-90 and 1990-95, using the newly available 1995 input-output (I-O) table and the I-O tables from 1990 and 1985. In the latter period, despite continued rapid growth of production and exports, employment creation is far less robust than in the period of 1985-90. Although light industrial exports continued to expand, they did not generate as much incremental employment as in the past. Moreover, the distribution of employment effects changed dramatically between the two periods. In the former period, employment creation through manufactured exports was greatest in manufacturing but was also quite significant in primary and tertiary industries. However, in the latter period, primary employment creation was marginal and the largest gains were in services rather than in manufacturing. And in some light industrial sectors, particularly wood, it appears that slackened export growth led, via backward linkages, to reduced employment in the primary wood sector in the latter period.

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Introduction

Prior to the economic crisis that began in late 1997 and plunged the country into turmoil in 1998, the Indonesian economy had achieved an enviable record of economic growth and poverty alleviation. After almost two years of economic contraction, the economy began to expand in the latter half of 1999 and the recovery appears to be gathering momentum in early 2000. However, the severe contraction and its adverse social impact together with the revival of populism have given rise to sentiments favoring protection and a return to inward-looking development strategies. The slow progress in implementing reforms under the IMF restructuring package is evidently the result of conflicting views within the new government of President Wahid. The recent sacking of ministers and revamp of the cabinet indicates the problems are serious indeed.

In this context, it is important to accurately assess the record of the past, particularly regarding the period of deregulation and trade reform that began in the mid-1980s and continued until the crisis broke out in 1997. One important measure of the economic success of the reforms is the creation of employment and the important role the expansion of manufactured exports played in this achievement.

In this paper we re-examine changes in the structure of employment and decompose employment growth in Indonesia between 1985 and 1995. The most recent input-output table is for 1995 and enables us to compare changes that occurred between 1985-1990 and 1990-1995. It will be of interest to learn if the impressive record of employment creation recorded during the period 1985-1990 continued in the latter

period.[1] Trade liberalization, which began in earnest in 1987 (Fane and Condon 1996)

played a key role in enabling the expansion of labor-intensive manufacturing and exports

played a key role in this growth. We use updated estimates of trade reform up to 1995 to

examine this issue.

Trade Reform in Indonesia

The process of trade reform has been uneven in Indonesia, with a distinct

slowdown of reform between 1991-1994 compared with 1987-1991. For example, the

World Bank (1995) reported that the simple arithmetic average tariff plus surcharge was

20 per cent in 1990 and 19.5 per cent in 1994.[2] Using import weights, the average tariff

actually increased from 11 per cent in 1991 to 12.5 per cent in 1994. Non-tariff barriers

(NTBs) were estimated by the World Bank (1995) to cover 31.1 per cent of non-oil

manufacturing in 1991 and 30.6 per cent in 1994.[3] Indonesia's participation in the

successful Uruguay Round negotiations did not signal that significant trade reforms

would follow. This is because Indonesia's market access commitment was limited to

binding substantially all tariffs.[4] Nevertheless, major trade reforms were unilaterally

adopted in 1995. The May 1995 trade liberalization lowered tariff and non-tariff barriers,

but took place too late to really have much impact on production, employment or trade in

that year.

Over the period as a whole, trade reforms are estimated to have reduced the

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[1] Fujita and James (1997) estimate that light industrial exports induced employment of 3.1 million workers in 1990 up from 1.1 million in 1985.
[2] Prior to reforms in 1985, the simple average tariff was 37 per cent, the import weighted tariff was 22 per cent and the production weighted tariff (1987 production weights) was 29 per cent (World Bank 1995).
[3] In 1986, non-tariff barriers covered an estimated 46 per cent of non-oil manufacturing. The World Bank also reports production weighted average tariffs as falling from 15 per cent in 1991 to 10.4 per cent in 1994. These estimates, however, use 1987 production weights and may be quite misleading. Fane and Condon (1996) provide estimates using 1990 production weights.
[4] The bound rate for over 95% of Indonesia's 9000 plus tariff lines was set at 40%.

nominal rate of protection in non-oil manufacturing from 21 per cent in 1987 to 11 per cent in 1990 and, further, to 6 per cent in 1995. The effective rate of protection fell from 80 per cent in 1987 to 35 per cent in 1990 and, further, to 25 per cent in 1995.[5] Moreover, industries deemed to be export-competing were given a more level playing field with import-competing industries during this period of trade reform. Effective protection (or assistance) rose from –28 per cent in 1987 to –21 per cent in 1995 for export-competing sectors and fell from 46 per cent in 1987 to 19 per cent in 1995 for import-competing sectors.[6] The standard deviation of nominal and effective rates of protection in manufacturing was reduced greatly by these reforms (Fane and Condon 1996). The reduced anti-trade bias in the industrial policy regime fostered rapid growth in exports from non-oil manufacturing, with labor-intensive sectors such as textiles, apparel, footwear, wood products and miscellaneous manufactures all growing impressively.

Employment and Manufactured Exports

The composition of trade has certainly changed over the period of study. If one takes 1985 as the pre-trade reform year, the changes in the composition of exports between that year compared with 1990 and 1995 should be instructive of the impact of trade liberalization on export performance. In order to maintain consistency with the input-output table, we have reported trade composition using the ISIC classification (table 1).[7] It is clear that manufactured exports continued to expand rapidly between 1990-95 and that the composition of overall exports reflects this expansion. However,

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[5] The figures for 1987 and 1990 are from Fane and Phillips (1991) and Fane and Condon (1995). The figures for 1995 are estimated using data reported in Fane and Condon (1996).
[6] These figures are derived from Fane and Condon (1996)
[7] The industries listed in table 1 do not match up perfectly with those in the I-O tables (see appendix 1), but the differences are minor using the industrial classification.

the relative importance of exports of heavy and chemical industries had increased by 1995. Exports of machinery grew more than 10-fold in the period of 1990-95.[8]

Within light industries, wood products (excluding furniture) expanded more slowly after 1990, so that the share in total exports actually fell between 1990 and 1995. Textiles, apparel, footwear, paper, and miscellaneous or other manufactures continued to grow at a higher than average rate for exports as a whole. Hence, the share of light industries (wood excluded) in merchandise exports expanded from 3.4 per cent in 1985 to 13.0 per cent in 1990 and, further, to 18.2 per cent in 1995.

Methodology

In the framework of the input-output (I-O) model, the following balance equation can be derived:

$$X = A^d X + E + F^d \tag{1}$$

where X, A^d, E, and F^d denote an output vector, a domestic input coefficient matrix, a vector of exports, and a domestic final demand vector, respectively. Then, assuming X is an endogenous variable, the following solution may be derived:

$$X = R^d (F^d + E) \tag{2}$$

where $R^d = (I - A^d)$ is a domestic Leontief inverse matrix (where $(I-A^d)$ denotes the inversion of the domestic input coefficient matrix). This method allows us to take into account variations in the import content of intermediate and final demand. It is expected that exports of light industries use a higher proportion of imported intermediate inputs

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[8] It is likely that exports of electrical and non-electrical machinery expanded with the increase in multinational companies' activity in these sectors and that the expansion was related to the relative abundance of unskilled labor rather than growing comparative advantage in capital- or skill-intensive activities in Indonesia. Ramstetter (1999) provides some evidence regarding the importance of factor intensities in manufacturing exports in this regard.

than do manufactured goods for the domestic market, particularly after 1985, when a duty drawback (exemption) scheme was adopted for exporters.[9]

A vector of employment is decomposed as follows:

$$W = LX = LR^d F^d + LR^d E \tag{3}$$

where W is a vector of employment and L is a diagonal matrix of employment coefficients. The second term on the right side of (3) captures the effects on employment of exports. Therefore, the employment created by manufactured exports. W^e_m, is:

$$W^e_m = LR^d E_m \tag{4}$$

where $E_m = (0,..,0, e_1, .., e_n, 0,..0)$' denotes a vector of manufactured exports.[10]

Estimates of Employment Creation

The method outlined in the previous section was applied using I-O tables for 1985, 1990 and 1995 (BPS 1990, BPS 1994, and BPS 1998). The published employment tables (BPS 1990, table 8, BPS 1994, vol. 2, table 9 and BPS 1998, vol. 2, table 9) were drawn upon to estimate the employment induced by exports in each of the three years. The I-O tables are of the "competitive import type" using current prices. The computation was accomplished using the 66-sector classification (see appendix 1) and the results were aggregated into five sectors and total employment (see table 2).

Estimates of employment induced by all manufactured exports (food processing, light industries, heavy and chemical industries)[11] are shown in terms of the number of

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[9] The import content for textiles, apparel, footwear and miscellaneous manufactures is likely to be higher than for wood products, however.

[10] The total employment induced by exports is composed of employment induced by primary and manufactured exports. Employment may be induced directly or indirectly. For example, an exported manufactured good may require intermediate inputs produced by domestic manufacturers, as well as by primary and tertiary (service sector) producers. Thus, employment may be generated directly or indirectly through inter-industrial linkages.

[11] Petroleum refineries are excluded from manufacturing and are included in the primary sector. See appendix 1.

employees and the per cent of total employment induced (table 2). Similarly, estimates of employment induced by primary exports (agriculture, forestry, fisheries, mining, crude oil & natural gas and petroleum refineries) are provided (table 3).

1985-90: Rapid Expansion in Employment

In 1985 manufactured exports induced employment of an estimated 1.71 million Indonesians (2.7 per cent of the employed labor force of 62.5 million).[12] In contrast, primary exports induced employment for an estimated 1.82 million Indonesians or 2.9 per cent of the workforce. Between 1985 and 1990 employment induced by manufactured exports rose to an estimated 4.84 million (table 2), equivalent to 6.4 per cent of the total employed workforce of 75.9 million. In contrast, employment induced by primary exports fell to an estimated 1.20 million in 1990 (table 3) or just 1.6 per cent of the workforce. This decline was associated with a large expansion of exports in wood and food processing industries between 1985 and 1990 (table 1).[13]

The amount of primary employment induced indirectly by manufactured exports increased by about 0.87 million between 1985 and 1990. This was much greater than the direct loss of employment in the primary sector from the decline in primary exports during the period (compare table 2, row 1 columns 1 and 2 with the same in table 3). Light industrial exports account for a fair portion of the increment in primary employment induced by manufactured exports (see table 4 row 1, columns 1 and 2). Employment in the primary sector created by backward linkages from manufactured exports is disaggregated (table 5). Between 1985 and 1990, there was a large increase in

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[12] Employed labor force estimates are from Asian Development Bank (ADB, 1999).
[13] Caution should be used in interpreting the number of primary sector jobs induced by sectors such as the wood processing industry. In the absence of the processing factories, exports of raw material (i.e., logs and sawn timber) are likely to have been much larger.

primary sector employment induced by manufactured exports in most sub-sectors, whether in agriculture, forestry, fisheries, mining or petroleum. The largest increment is in wood with a gain of 0.18 million jobs. Backward linkages from the plywood and wood furniture exports account for the expansion of employment in this primary sector. Oil palm employment (induced by exports of processed palm cooking oil) also increased by a substantial amount (about 0.06 million).

Between 1985 and 1990 the estimated employment created by manufactured exports rose at an annual compound growth rate of 23.16 per cent and accounted for over 23 per cent of incremental employment. Of the increment in employment induced by manufactured exports between 1985 and 1990, 60 per cent was induced in the manufacturing sector. Over 47 per cent of the total increment in employment is estimated to have been created in light industries. Much of this gain in employment was directly induced by light industrial exports (compare table 4, row 3, columns 1 and 2 with the same in table 2).

1990-95: Slow-down in Employment Creation

In the interval of 1990-95, manufactured exports are estimated to have created an additional 0.96 million jobs. Total employment induced by manufactured exports represented 7.2 per cent of the employed workforce of 80.1 million.[14] In other words, growth in employment induced by manufactured exports had slowed down to just 3.7 per cent per annum, a much lower growth rate than in the period 1985-90. Employment induced by primary exports continued to decrease between 1990 and 1995, falling to just

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[14] The estimated economically active population, including those not employed seeking work, in 1995 (BPS, Statistical Yearbook 1995) was 86.4 million compared with 77.8 million in 1990 (ADB, 1999). The growth rate of the economically active population is about 2.05 per cent per annum over this period.

0.69 million (table 3) although there was an increase in the value of primary exports between 1990 and 1995.

A major change in the distribution of employment created by manufactured exports also occurred between 1990-95. The amount of additional primary employment induced indirectly by manufactured exports was only slightly over 0.03 million, far less than the loss in primary employment generated over the period directly by primary exports. Between 1990 and 1995, there was a contraction in jobs indirectly induced by manufactured exports in the primary wood sector (table 5). The reduced rate of expansion of wood exports between 1990 and 1995 is chiefly due to slower growth in the plywood sector.[15] However, as can be seen in table 5, employment generated indirectly in primary tree crop sectors continued to expand between 1990 and 1995 (rubber, coconuts, and oil palm).[16] Backward linkages from manufactured exports to primary sectors supplying raw materials remained significant but did not expand as rapidly as in the previous period.

Manufactured exports between 1990 and 1995 induced only 0.26 million new manufacturing jobs, most of which were in light industry (table 2). Therefore, most of the employment induced by manufactured exports was in the tertiary sector (services, etc.) with a total increment of 0.67 million jobs. Light industrial exports created most of the employment induced by manufactured exports (59 per cent). Aside from the primary sector, light industry exports accounted for the bulk of employment induced in manufacturing (65 per cent) and in services (58 per cent).

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[15] James (1996) shows that plywood exports fell in value by 7.2 per cent in 1995 compared with 1994 and fell in volume by 7.3 per cent. From 1993-95 export volume of plywood (SITC 634) fell by an estimated 11.5 per cent.

It is important to put the slow-down in employment expansion induced by manufactured exports in the first half of the 1990s in proper perspective. The expansion of employment created by manufactured exports was from a much higher base than in the previous period. Overall growth in the labor force slowed considerably compared with the previous period.[17] According to census data, overall employment growth between 1990-95 was just 2.2 per cent, down from 3.2 per cent in the 1980-90 period and nearly 4.0 per cent in 1985-90. The excess of the rate of growth of employment over that of the economically active population would be expected to result in a decline in measured unemployment. However, it appears 1995 is somewhat unusual in this regard.[18]

Overall employment in manufacturing rose at an estimated rate of 4.1 per cent and that of services grew by 4.9 per cent per annum between 1990-95 (Manning and Junankar, 1998). However, this implies a low employment elasticity of manufacturing growth given the double-digit rise in real manufacturing value added during 1990-95 (Manning and Junankar 1998). The positive growth in manufacturing and services employment can be contrasted with negative growth in agricultural employment (–0.6 per cent per annum) over the same period. Thus, despite the slow-down in employment creation through manufactured exports, structural change continued to advance in Indonesia.

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[16] The slow-down in expansion of wood product exports may indicate that easily harvested logs are becoming scarce. At the same time, expansion of tree crop production and exports may reflect the on-going conversion of forests into agricultural estates.

[17] Jones (1994) estimated that the overall expansion in the labor force during the 1990s would be around 19 per cent compared with 33 per cent in the 1980s.

[18] Manning and Junankar (1998) report that official unemployment was reported to be unusually high in 1995, possibly reflecting a change in the definition used compared with other years. As a percentage of the economically active population, unemployment was 7.3 per cent in 1995 but was only 2.4 per cent in 1990. Part of the reason for this was a rise in the labor force participation rate between 1990 and 1995 of about 1 per cent from 43.4 to 44.3 per cent of the population (ADB 1999).

Conclusion

Economic growth between 1985 and 1995 was quite high in Indonesia and manufacturing value-added grew at double-digit real rates over this entire period (Timmer, 1999).   Manufactured exports, particularly of light industrial products, performed remarkably well and demonstrably responded to the trade liberalization undertaken after 1985.   However, in some light industries, export performance began to weaken toward the end of the period of 1990-95 compared with 1985-90.   This was particularly the case in wood and may be indicative of supply-side constraints in availability of raw material.

The slow progress in trade reform during the period of 1991-94 may have contributed to the slightly slower growth of non-oil manufactured exports, between 1990-95 compared with 1985-90.   However, the main problem was not in any real slackening of export growth, but in the apparently much lower elasticity of employment with respect to manufacturing exports and production found in the latter period.   In part, the explanation for the decline in the employment elasticity of manufacturing growth may be a shift of production and investment in the latter period to capital-intensive industries (Manning and Jayasuriya 1996).

The slow-down in employment creation due to exports found in this study for 1990-95 compared with earlier periods may indicate that growth in employment became less dependent on export expansion and was related more closely to domestic demand growth.   Concerns about the over-heating of the economy, slower export growth and a rising current account deficit were recognized (Nasution 1995, James 1995, and Bird

1996) although they were later dismissed (perhaps prematurely in light of the crisis that soon followed).

It remains to reconcile the seemingly robust economic expansion of the period with the rise in the official unemployment rate reported in 1995. Labor market segmentation and rigidities, rising real wages, improved enforcement of labor regulations and minimum wage laws, and shortages of suitably trained potential employees may help explain this apparent paradox. In addition there is the rise in labor force participation and changes in the definition of unemployment.

Another set of issues surrounding the prospects for expansion of labor-intensive manufacturing activity and exports has been that of competitiveness. The fear that Indonesia was "losing competitiveness" in labor-intensive industries was oft expressed in the period prior to the crisis. With the substantial nominal devaluation of the rupiah, these concerns have lessened somewhat. In present circumstances, the view that Indonesia must rush to promote "higher value-added" and technology-intensive industry is heard less often. At present there is an obvious need to generate as much employment as possible in private sector businesses. A logical manner of doing so would be through a combination of trade, investment and labor-market reforms. Unfortunately, such reforms appear to face strong resistance among interest groups and officialdom.

References

Asian Development Bank. 1999. *Key Indicators of Developing Asian and Pacific Countries*, New York: Oxford University Press.

Australian National University. 1997. Trade Data from the International Economic Development Bank.

Badan Pusat Statistik. 1998. *Indonesian Input-Output Table, 1995*, 2 volumes, Jakarta.

_____ 1994. *Indonesian Input-Output Table, 1990*, 2 volumes, Jakarta.

_____ 1990. *Indonesian Input-Output Table, 1985*, Jakarta

_____ 1995. *Statistical Yearbook of Indonesia*, Jakarta.

Bird, Kelly. 1996. "Survey of Recent Developments," *Bulletin of Indonesian Economic Studies*, 32 (1): 3-32.

Fane, George and Tim Condon. 1995. "Measuring De-regulation in Indonesia," Paper presented to the Economists Conference, Adelaide University, Adelaide, September.

_____ 1996. "Trade Reform in Indonesia, 1987-95," *Bulletin of Indonesian Economic Studies*, 32 (3): 33-54.

Fane George and Chris Phillips. 1991. "Effective Protection in Indonesia in 1987," *Bulletin of Indonesian Economic Studies*, 27 (1): 105-25.

Fujita, Natsuki and William E. James. 1997. "Employment Creation and Manufactured Exports in Indonesia: 1980-90," *Bulletin of Indonesian Economic Studies*, 33 (1): 103-15.

International Monetary Fund. 1999. *International Financial Statistics Yearbook,* Washington, D.C.

James, William E. 1996. "Indonesia: Non-Oil and Non-Gas Export Performance in 1995 and Prospects for 1996," Paper presented at the 5th Convention of the East Asian Economic Association, Sheraton Royal Orchid Hotel, Bangkok, October.

_____ 1995. "Survey of Recent Developments," *Bulletin of Indonesian Economic Studies*, 31 (3): 3-32.

Jones, Gavin. 1994. "Labour Force and Employment," in Hal Hill (ed.), *Indonesia's New Order: The Dynamics of Socio-economic Transformation*, Allen & Unwin, Sydney.

Manning, Chris and S. Jayasuriya. 1996. "Survey of Recent Developments," *Bulletin of Indonesian Economic Studies*, 35 (2): 3-45.

Manning, Chris and P.N. Juanankar. 1998. "Choosy Youth or Unwanted Youth? A Survey of Unemployment," *Bulletin of Indonesian Economic Studies*, 34 (1): 55-94.

Nasution, Anwar. 1995. "Survey of Recent Developments," *Bulletin of Indonesian Economic Studies*, 31 (2): 3-40.

Ramstetter, Eric D. 1999. "Trade Propensities and Foreign Ownership Shares in Indonesian Manufacturing," *Bulletin of Indonesian Economic Studies*, 35 (2): 43-66.

Timmer, Marcel P. 1999. "Indonesia's Ascent on the Technology Ladder: Capital Stock and Total Factor Productivity in Indonesian Manufacturing, 1975-95," *Bulletin of Indonesian Economic Studies*, 35 (1): 75-98.

World Bank. 1995. *Indonesia: Improving Efficiency and Equity, Changes in the Public Sector's Role*, Report No. 14006-IND. Washington, D.C.

Table 1.   Composition of Exports: Indonesia

	1985	1990	1995	1985	1990	1995
	(mil. US$, current prices)			(%)		
Total Merchandise Exports	18,587.0	25,675.0	45,417.0	100.00	100.00	100.00
Manufacturing, excl. petroleum refineries:	3,498.1	10,852.0	26,781.1	18.82	42.27	58.97
Food, Beverages & Tobacco	597.9	901.4	2,143.6	3.22	3.51	4.72
Light Manufacturing:	1,825.8	6,738.1	13,598.2	9.82	26.24	29.94
Textiles, Apparel, Leather	588.4	3,007.4	6,343.4	3.17	11.71	13.97
Bamboo, Wood and Rattan	1,195.2	3,398.3	5,327.3	6.43	13.24	11.73
Paper and Paper Products	27.5	201.8	1,269.0	0.15	0.79	2.79
Manufacture of Other Products, nec	14.6	130.6	658.5	0.08	0.51	1.45
Heavy & Chemical Industries:	1,074.4	3,212.5	11,039.3	6.73	17.98	24.31
Industrial Chemicals	153.2	459.0	1,308.0	0.82	1.79	2.88
Other Chemical Products	70.2	161.8	287.0	0.38	0.63	0.63
Rubber and Plastic Products	20.8	882.0	3,155.0	0.11	3.44	6.95
Non-Metallic Mineral Products	32.3	240.4	357.8	0.17	0.94	0.79
Iron and Steel	33.9	254.1	415.1	0.18	0.99	0.91
Non-Ferrous Metal Products	617.2	591.7	895.9	3.32	2.30	1.97
Fabricated Metal Products	20.2	223.0	794.9	0.11	0.87	1.75
Electrical and Non-Electrical Machinery	123.9	281.2	3,350.5	0.67	1.10	7.38
Transport Equipment	2.6	119.3	475.1	0.01	0.46	1.05

Source: Australian National University (1997) and authors' compilations.

Table 2. Primary and Non-Primary Employment Induced by Manufactured Exports, 1985-95 (no./%)

	1985	1990	1995
Primary Sectors	353,824	1,219,394	1,253,591
	20.7	25.2	21.6
Food Processing	28,612	240,345	192,647
	1.7	5.0	3.3
Light Industries	854,007	2,332,953	2,503,295
	50.0	48.2	43.2
Heavy & Chemical Industries	152,954	336,350	471,139
	9.0	7.0	8.1
Services, etc.	317,337	706,818	1,372,236
	18.6	14.6	23.7
Total	1,706,734	4,835,860	5,792,908
	100.0	100.0	100.0

Source: Authors' estimates.

Table 3. Primary and Non-Primary Employment Induced by Primary Exports, 1985-95 (no./%)

	1985	1990	1995
Primary Sectors	1,447,457	945,119	518,155
	79.3	78.8	74.8
Food Processing	3,538	3,437	1,847
	0.2	0.3	0.3
Light Industries	27,216	16,405	7,052
	1.5	1.4	1.0
Heavy & Chemical Industries	19,446	20,522	11,538
	1.1	1.7	1.7
Services, etc.	318,028	213,149	154,281
	18.0	17.8	22.3
Total	1,815,685	1,198,632	692,873
	100.0	100.0	100.0

Source: Authors' estimates.

Table 4. Primary and Non-Primary Employment Induced by Light Industrial Exports, 1985-95 (no./%)

	1985	1990	1995
Primary Sectors	92,564	372,204	375,415
	8.3	12.0	21.6
Food Processing	2,112	6,136	4,711
	0.2	0.2	3.3
Light Industries	848,471	2,319,063	2,478,478
	75.6	74.7	43.2
Heavy & Chemical Industries	8,729	27,927	40,041
	0.8	0.9	8.1
Services, etc.	168,812	380,283	771,501
	15.1	12.2	23.7
Total	1,120,688	3,105,613	3,670,145
	100.0	100.0	100.0

Source: Authors' estimates.

Table 5. Disaggregation of Primary Sector Employment Induced by Manufactured Exports, 1985-95 (no./%)

	1985	1990	1995
Padi	43,023	39,478	39,888
Legumes	81	123,350	92,056
Maize	9,103	134,960	126,511
Root crops	6,847	26,486	25,467
Vegetables & fruit	3,441	40,453	56,386
Other food crops	26,213	7,215	7,366
Rubber	132,881	157,675	170,535
Sugarcane	10,424	39,638	23,074
Coconut	4,229	44,789	87,438
Oil palm	3,574	59,266	103,063
Tobacco	1,027	9,825	9,594
Coffee	1,624	37,785	38,769
Tea	4,535	27,166	16,885
Cloves	1,306	7,374	4,753
Fiber Crops	589	24,226	35,800
Other estate crops	740	2,919	5,775
Other agriculture	5,913	5,097	22,219
Livestock	2,098	32,230	22,627
Slaughtering	1,600	15,750	10,893
Poultry & poultry products	1,336	9,591	9,159
Wood	70,409	247,790	232,605
Other forest products	2,780	15,803	17,960
Fisheries	1,668	80,716	61,646
Coal & metal ore	15,789	14,997	16,994
Crude oil, natural gas	400	1,332	2,205
Other mining	1,851	12,430	12,386
Petroleum refining	343	1,053	1,537
Total	353,824	1,219,394	1,253,591

Source: Table 2 and authors' estimates.

APPENDIX 1: SECTORAL CLASSIFICATION

Primary Sector

Paddy

Beans

Maize

Root crops

Vegetables and fruits

Other food crops

Rubber

Sugarcane

Coconut

Oil palm

Tobacco

Coffee

Tea

Clove

Fiber crops

Other estate crops

Other agriculture

Livestock

Slaughtering

Poultry and its product

Wood

Other forest products

Fishery

Coal and metal ore mining

Crude oil, natural gas and geothermal mining

Other mining and quarrying

Petroleum refinery

Food Sector

Manufacture of food processing and preserving

Manufacture of oil and fat

Rice milling

Manufacture of flour, all kinds

Sugar factory

Manufacture of other food products

Manufacture of beverages

Manufacture of cigarettes

Light Industries

Yarn spinning

Manufacture of textile, wearing apparel and leather

Manufacture of bamboo, wood and rattan products

Manufacture of paper, paper products and cardboard

Manufacture of other products not elsewhere classified

Heavy & Chemical Industries

Manufacture of fertilizer and pesticide

Manufacture of chemicals

Manufacture of rubber and plastic wares

Manufacture of non metallic mineral products

Manufacture of cement

Manufacture of basic iron and steel

Manufacture of non ferrous basic metal

Manufacture of fabricated metal products

Manufacture of machine, electrical machinery and apparatus

Manufacture of transport equipment and its repair

Services etc.

Electricity, gas and water supply

Construction

Trade

Restaurant and hotel

Railway transport

Road transport

Water transport

Air transport

Services allied to transport

Communication

Financial intermediaries

Real estate and business service
General government and defense
Social and community services
Other services
Unspecified sector