Development of SMEs in the Indonesian Economy

Mitsuhiro Hayashi

School of Economics,
Faculty of Economics and Commerce,
Australian National University

Abstract: This paper examines the development of manufacturing SMEs (small- and medium-scale enterprises) in Indonesia during 1986-96, using unpublished data of BPS (Statistics Indonesia). The contribution of SMEs to total manufacturing value added has remained relatively small, but their contribution to the Indonesian economy in terms of employment generation is significant. The analysis suggests that, in broad terms, SMEs can coexist with LEs (large-scale enterprises), by producing a unit of output with less capital but more labour than LEs. Labour productivity in SMEs and LEs increased at a similar rate during the period under study. Increase in labour productivity of SMEs in the machinery industry was faster than in other main product sectors. SMEs in the machinery industry also increased their TFP markedly, compared with both SMEs in other sectors and LEs in the same sector. Overall, these results question whether subcontracting can support the development of SMEs and improve their performance.

Key words: Indonesian manufacturing, small and medium scale enterprises, labour productivity

JEL Classification: D24, L11, O14, O53

Development of SMEs in the Indonesian Economy

1. Introduction

The Indonesian economy experienced significant economic growth during 1966-97. The manufacturing industry has played an increasing role in this process (Hill 1996). It is often said that the LE (large-scale enterprises) sector, supported by government policies and measures, has been an important player in rapidly expanding the Indonesian manufacturing sector (e.g., Berry and Levy 1999: 33). As our separate study (Hayashi 2002a) has shown, Japan's experience indicates that manufacturing SMEs (small- and medium-scale enterprises), which developed concurrently with LEs, played an essential role in the process of industrialisation and economic development in that country during the 1930s and the high growth period from the mid-1950s to the early 1970s. This study seeks to examine whether SME development also took place in Indonesia concurrently with LE development and to what degree the SME sector contributed to industrial and economic development.

Next section provides an overview of economic growth in general and of the manufacturing industry in particular since the mid-1960s. Specific attention will be given to the machinery industry. Thereafter, Section 3 examines the development of manufacturing SMEs in Indonesia. For the purpose of exploring SME development, in Section 4, economic performance and productivity growth of SMEs are compared with LEs, based on the nation-wide manufacturing statistical data. Section 5 observes subcontracting linkages in Indonesia as possible support arrangements for SME development, on the basis of existing literature.

2. Economic Development in Indonesia

Indonesia experienced rapid economic growth and structural transformation during the three decades before the onset of the 1997-98 crisis. The role of agriculture in terms of output and employment decreased, while that of industry increased (Table 1). In terms of exports, the share of primary products decreased from nearly 100 percent in the 1960s and 1970s to roughly 50 percent in the 1990s, while that of manufactured exports

rose to 50 percent (Table 2). These observations suggest that the manufacturing industry was crucial to the transformation of the economy.

Table 1 Growth and Sectoral Share of GDP in Indonesia, 1966-2000

(Unit: %)

	Agriculture	*Industry* [1]		*Services*	*Total*	
		Manufacturing only	*Total*		*without oil/gas*	*with oil/gas*
Growth [2]						
1966 - 1970	3.2	8.9	10.8	3.6	4.7	7.4
1970 - 1981	4.2	10.2	10.3	8.9	7.5	7.1
1981 - 1986	3.3	8.9	6.6	5.5	5.2	3.0
1986 - 1996	3.6	11.3	11.9	7.9	8.3	7.4
1996 - 2000	1.0	0.7	-0.8	-2.5	-1.2	-1.3
1966 - 1996	3.7	10.2	10.3	7.3	7.0	6.5
1966 - 2000	3.4	9.0	8.9	6.1	6.0	5.6
Sectoral Share [3]						
1966 - 1970	42.4	11.9	17.6	40.0	100.0	
1971 - 1981	33.8	14.7	24.1	42.1	100.0	
1982 - 1986	27.6	17.8	26.7	45.7	100.0	
1987 - 1996	21.3	23.1	33.3	45.4	100.0	
1997 - 2000	18.2	27.0	38.9	42.9	100.0	
Sectoral Contribution to Growth [4]						
1966 - 1970	28.9	22.5	40.4	30.7	100.0	
1970 - 1981	19.0	19.6	32.1	48.9	100.0	
1981 - 1986	17.7	30.2	33.9	48.4	100.0	
1986 - 1996	9.5	31.1	47.2	43.3	100.0	
1996 - 2000	-14.8	-15.5	25.7	89.1	100.0	

Notes: 1) Industry includes manufacturing, mining, utilities and construction.
2) The growth of GDP represents average annual growth rates based on 1983 constant prices in each period.
3) The sectoral share is calculated as an average for respective years in each period.
4) The contribution of each sector group to GDP growth is weighted by respective sectoral GDP shares.

Source: Calculated using van der Eng (2002: 172-3), updated for 1999 and 2000 with data from BPS's *National Income of Indonesia*.

Table 2 Sectoral Share of Export and Import Commodities in Indonesia, 1966-1999[1]

(Unit: %)

	Agriculture [2)]	*Mining* [3)]	*Manufacturing*	*Other*	*Total*
Exports					
1966 - 1970	52.8	44.6	2.1	0.5	100.0
1971 - 1975	36.7	61.7	1.4	0.2	100.0
1976 - 1980	25.5	72.4	2.0	0.1	100.0
1981 - 1985	13.3	79.0	7.2	0.5	100.0
1986 - 1990	20.9	50.8	28.3	0.0	100.0
1991 - 1996	16.5	34.3	49.2	0.0	100.0
1997 - 1999	15.8	26.9	47.3	10.0	100.0
Imports					
1966 - 1970	16.8	3.2	79.8	0.2	100.0
1971 - 1975	13.6	5.6	80.7	0.1	100.0
1976 - 1980	18.6	13.5	67.7	0.2	100.0
1981 - 1985	11.2	21.1	67.2	0.5	100.0
1986 - 1990	11.8	12.8	75.0	0.4	100.0
1991 - 1996	13.1	12.0	74.6	0.3	100.0
1997 - 1999	15.4	13.2	71.1	0.3	100.0

Notes: 1) The sectoral share of commodities in merchandise exports and imports (at current US$ prices) is calculated as an average of respective years in each period.
2) Agriculture includes food and agricultural raw materials.
3) Mining includes fuels (oil/gas), ores and metals.
Source: Calculated from World Bank, *World Development Indicators 2001*.

Most of the data available for examining the development of the manufacturing industry are provided by *Large and Medium Manufacturing Statistics*, an annual survey on manufacturing establishments with 20 or more workers.[1] For sectoral analysis in manufacturing, two- or three-digit International Standard Industrial Classification (ISIC) is used.[2] Specific attention will be paid to the machinery industry (ISIC 38).

[1] In 1996, this annual survey covered roughly 90 percent of manufacturing value added and 40 percent of employment, respectively. The rest was generated by firms with 19 or less workers. Since BPS's backcast data were not available to the author, this study used its original data. This means that the earlier data, particularly before the mid-1980s, were undervalued due to lower response rates and, as a consequence, the average annual growth rates are likely to be overestimated between the earlier and later years. The difference between the BPS original data and its backcast data for employment and value added tends to narrow from around 30 percent in 1980 to 10 percent in 1990 (Ito and Orii 2000).
[2] This and subsequent sections deal mainly with the non-oil/gas manufacturing industry and exclude oil and gas subsectors (ISIC 353 and 354).

Table 3 shows the growth pattern of real value added in the non-oil/gas manufacturing industry since 1971. Before the 1997-98 crisis, the manufacturing industry as a whole was expanding at an annual average growth rate of 14.1 percent during 1976-96.

Value added of the machinery industry (ISIC 38) expanded faster than that of manufacturing as a whole, except for some periods including the 1997-98 crisis. In the first half of the 1990s, the machinery industry contributed more to the growth of manufacturing value added than any other sector. All subsectors of the machinery industry, metalworking (ISIC 381), general machinery (ISIC 382), electrical machinery (ISIC 383), transport equipment (ISIC 384) and precision equipment (ISIC 385) grew rapidly during the 1970s and during 1985-96. Particularly since 1986, the economic boom, supported by a series of deregulation measures, accelerated the expansion of production in these machinery subsectors. For example, after its single-digit growth during 1980-85, the transport equipment subsector including automobile and motorcycle production recorded a high annual growth rate of more than 18 percent.[3] Subsequent to this high growth period, however, the machinery industry was seriously affected by the 1997-98 economic crisis, when value added of general machinery and transport equipment shrunk at annual rates of -26 and -8 percent, respectively. This resulted mainly from the reliance of the machinery industry on imported inputs and the limited size of domestic markets for luxury goods.

Table 3 also shows that the composition of manufacturing value added changed markedly since 1971, reflecting the different rates of growth among the sectors. The machinery industry (ISIC 38) accounted for 21 percent of manufacturing output in the second half of the 1990s, more than doubling its share in the past 30 years. It has become the second largest value added generator after the food processing industry. More specifically, electrical machinery (ISIC 383) and transport equipment (ISIC 384) substantially increased their output share, occupying respectively 7 and 8.7 percent in the late 1990s.

Table 3 Growth of and Sectoral Share in Real Value Added in Indonesia's Non-Oil/Gas Manufacturing Industry, 1971-1999[1)]

[3] See Aswicahyono, Basri and Hill (2000) for the automobile industry and Thee (1997) for the motorcycle industry. Both of them discussed in detail the characteristics, structure and performance of these subsectors in Indonesia.

(Unit: %)

Sector[2]	*1971-75*	*1975-80*	*1980-85*	*1985-90*	*1990-96*	*1996-99*	*1976-96*	*1976-99*
Growth[3]								
Manufacturing	9.3	13.2	13.8	15.6	13.3	-1.8	14.1	11.9
Food (31)	6.2	8.2	9.0	13.2	6.4	7.2	9.9	9.6
Textiles and Apparel (32)	19.1	7.5	13.6	20.4	16.3	0.7	14.3	12.4
Wood and Paper (33+34)	19.5	21.4	19.5	22.2	9.3	1.7	18.2	15.9
Chemicals & Basic Metals (35+37)	-4.3	19.7	21.6	13.3	13.4	-8.2	16.3	12.7
Machinery (38)	39.3	21.4	10.1	17.1	22.2	-6.5	16.8	13.5
Metalworking (381)	22.1	12.0	19.8	8.3	20.3	-7.8	14.3	11.1
General Machinery (382)	54.4	11.7	8.5	18.4	16.4	-26.1	16.4	9.7
Electrical Machinery (383)	42.9	25.8	7.2	9.4	31.6	-1.4	17.7	15.0
Transport Equipment (384)	58.8	24.2	9.6	26.9	18.6	-8.2	17.2	13.5
Precision Equipment (385)	51.6	27.8	15.1	18.9	42.6	13.0	26.4	24.6
Other[4] (39+36)	22.8	18.2	13.6	7.8	15.6	-7.5	12.6	9.7
Sectoral Share[5]								
Food (31)	50.3	40.8	35.5	26.7	22.8	23.4		
Textiles and Apparel (32)	14.9	13.7	11.7	15.4	17.9	18.2		
Wood and Paper (33+34)	5.3	6.9	9.7	15.6	14.2	14.2		
Chemicals & Basic Metals (35+37)	16.5	17.4	21.2	23.6	21.0	19.0		
Machinery (38)	8.9	14.3	15.9	14.3	19.3	20.7		
Metalworking (381)	3.0	3.4	3.5	4.3	3.7	3.2		
General Machinery (382)	1.1	1.1	1.2	1.0	1.4	1.4		
Electrical Machinery (383)	2.3	4.3	4.2	2.7	4.7	7.0		
Transport Equipment (384)	2.5	5.4	6.9	6.2	9.3	8.7		
Precision Equipment (385)	0.0	0.1	0.1	0.1	0.2	0.4		
Other[4] (39+36)	4.1	6.9	6.0	4.4	4.8	4.5		
Total	100.0	100.0	100.0	100.0	100.0	100.0		

Table 3 Growth of and Sectoral Share in Real Value Added in Indonesia's Non-Oil/Gas Manufacturing Industry, 1971-1999 (continued)[1]

(Unit: %)

Sector [2]	*1971-75*	*1975-80*	*1980-85*	*1985-90*	*1990-96*	*1996-99*	*1976-96*	*1976-99*
Sectoral Contribution to Growth [6]								
Food (31)	29.1	24.6	23.4	22.0	10.8	-141.9		
Textiles and Apparel (32)	26.5	7.6	11.6	19.6	21.5	-10.7		
Wood and Paper (33+34)	9.7	10.9	13.8	21.6	9.8	-20.3		
Chemicals & Basic Metals (35+37)	-6.6	25.2	33.5	19.5	20.8	131.2		
Machinery (38)	32.6	22.5	11.7	15.2	31.6	113.3		
Metalworking (381)	5.8	3.0	4.6	2.2	5.5	20.6		
General Machinery (382)	5.3	1.0	0.6	1.1	1.7	30.1		
Electrical Machinery (383)	8.7	8.4	2.0	1.6	11.0	8.1		
Transport Equipment (384)	12.9	9.9	4.4	10.2	12.8	58.8		
Precision Equipment (385)	0.0	0.2	0.1	0.1	0.6	-4.3		
Other [4] (39+36)	8.7	9.2	6.0	2.1	5.5	28.4		
Total	100.0	100.0	100.0	100.0	100.0	100.0		

Notes: 1) This table uses the data for manufacturing firms with 20 or more employees, except for those between 1971 and 1973, where firms with 5 or more workers with use of power equipment or firms with 10 or more workers without use of power equipment are included. Oil and gas subsectors (ISIC 353 and 354) are excluded.
2) The numbers in parentheses indicate ISIC (International Standard Industrial Classification) code.
3) The growth indicates average annual growth rates in each period. Value added data in this and following tables of this study are deflated by the implicit GDP deflator for manufacturing (1993=100) from BPS's *National Income of Indonesia*, due to a lack of adequate and long-term sectoral and subsectoral deflators.
4) Other includes miscellaneous (ISIC 39) and non-metal/mineral (ISIC 36) products.
5) The (sub)sectoral share of value added is calculated as an average for respective years in each period. The observed periods for this share are: 1971-75, 1976-80, 1981-85, 1986-90, 1991-96, and 1997-99.
6) The contribution of each (sub)sector group to manufacturing value added growth is weighted by respective (sub)sectoral value added.

Source: Calculated from BPS, *Large and Medium Manufacturing Statistics.*

Table 4 indicates that employment in the Indonesian non-oil/gas manufacturing industry grew considerably by 6 to 12 percent per annum between 1971 and 1996, before slowing down to 0.2 percent during the recent crisis. Compared to the food processing industry (ISIC 31), employment growth in other industries tended to be significantly higher, except during the economic downturns of 1996-99.

Table 4 Growth of and Sectoral Share in Employment in Indonesia's Non-Oil/Gas Manufacturing Industry, 1971-1999[1]

Sector [2]	*Growth and Sectoral Share of Employment (%)* [3]					
	1971-75	*1975-80*	*1980-85*	*1985-90*	*1990-96*	*1996-99*
Growth						
Manufacturing (3)	8.7	6.4	11.7	9.7	8.0	0.2
Food (31)	3.9	2.5	10.0	3.4	4.7	0.3
Textiles and Apparel (32)	9.9	5.3	8.1	14.0	10.8	-0.3
Wood and Paper (33+34)	15.0	8.5	19.7	15.7	6.7	0.4
Chemicals/Basic Metals (35+37)	14.8	13.2	17.4	9.5	4.3	1.3
Machinery (38)	18.1	14.6	8.1	7.8	12.3	0.0
Metalworking (381)	7.0	12.8	7.7	6.4	12.5	-8.5
General Machinery (382)	15.1	6.2	6.8	13.1	6.8	0.8
Electrical Machinery (383)	17.8	29.2	3.1	6.6	18.6	11.7
Transport Equipment (384)	48.9	9.2	14.0	8.5	7.4	-8.6
Precision Equipment (385)	54.6	20.1	16.3	9.3	29.3	5.1
Other (39+36) [4]	13.1	6.9	13.8	7.6	10.5	0.1
Sectoral Share						
Food (31)	42.8	36.3	30.3	27.6	20.3	19.5
Textiles and Apparel (32)	27.8	27.0	24.3	24.4	32.1	31.7
Wood and Paper (33+34)	8.0	9.2	13.7	16.9	17.5	17.7
Chemicals/Basic Metals (35+37)	8.0	10.9	13.9	15.4	12.9	12.7
Machinery (38)	8.4	11.4	12.2	10.2	11.2	12.1
Metalworking (381)	3.4	4.0	3.9	3.3	3.5	3.1
General Machinery (382)	1.2	1.2	1.1	1.0	1.1	1.1
Electrical Machinery (383)	1.7	3.0	3.3	2.3	3.3	4.8
Transport Equipment (384)	2.0	3.1	3.8	3.5	3.1	2.7
Precision Equipment (385)	0.1	0.1	0.1	0.1	0.2	0.4
Other (39+36) [4]	5.0	5.2	5.6	5.5	6.0	6.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Notes: 1) This table uses the data for manufacturing firms with 20 or more employees, except for those between 1971 and 1973, where firms with 5 or more workers with use of power equipment or firms with 10 or more workers without use of power equipment are included. Oil and gas subsectors (ISIC 353 and 354) are excluded.
2) The numbers in parentheses indicate ISIC code.
3) The growth indicates average annual growth rates in each period, while the sectoral share is calculated as an average for respective years in each period. The observed periods for the sectoral share are: 1971-75, 1976-80, 1981-85, 1986-90, 1991-96, and 1997-99.
4) Other includes miscellaneous (ISIC 39) and non-metal/mineral (ISIC 36) products.

Source: Calculated from International Economic Data Bank (IEDB), *Stars* (database) based on UNIDO data (originally from BPS's employment data).

As a consequence of the rapid growth of the machinery industry (ISIC 38), it accounted for more than 12 percent of manufacturing employment in the latter half of

the 1990s. Metalworking (ISIC 381), electrical machinery (ISIC 383) and transport equipment (ISIC 384) occupied 3-5 percent of the manufacturing workforce by the late 1990s.

The sectoral composition of non-oil/gas manufactured exports and imports over the past 30 years is shown in Table 5, which refers to the data converted from SITC (Standard International Trade Classification) to ISIC by the International Economic Data Bank (IEDB). The sectoral share of manufactured exports has changed remarkably since the early 1970s. Similar to our observation above in relation to value added and employment, the food processing industry (ISIC 31) reduced its share of exports from more than 56 percent during the early 1970s to less than 10 percent in the late 1980s. The export share of textile and apparel (ISIC 32), wood and paper (ISIC 33+34) and machinery (ISIC 38) rose considerably from single-digit levels in the early 1970s.

Different from the patterns of exports, the composition of manufactured imports by sector did not change significantly after 1971. According to Table 5, the largest import sectors were chemicals and basic metals (ISIC 35+37) and machinery (ISIC 38), which together accounted for 75-85 percent of total manufactured imports during the entire period. The former sector occupied roughly 30 percent, and the latter sector around 50 percent of imports. Among machinery imports, general machinery (ISIC 382), electrical machinery (ISIC 383) and transport equipment (ISIC 384) were outstanding. High import-dependency on machinery, chemicals and basic metals remained unchanged in Indonesian industrial structure. This finding is consistent with Hayashi (1996: 14-5), which observed that the machinery sector in Indonesia is highly dependent on imported inputs. An increase in demand induces a large increase in imported intermediate goods through direct and indirect linkages. This implies a lack of sufficient supporting industries that supply raw materials and intermediate inputs to the machinery sector in Indonesia.

Table 5 Sectoral Share of Indonesia's Non-Oil/Gas Manufactured Exports and Imports, 1971-1999[1)]

Sector [2]	*Sectoral Share of Exports and Imports (%)* [3]					
	1971-75	*1976-80*	*1981-85*	*1986-90*	*1991-96*	*1997-99*
Exports						
Food (31)	55.9	37.2	15.5	9.8	8.2	9.9
Textiles and Apparel (32)	1.4	4.3	12.5	22.4	27.2	20.8
Wood and Paper (33+34)	4.9	13.7	31.0	39.0	26.4	21.8
Chemicals/Basic Metals (35+37)	28.6	30.3	31.1	21.5	20.6	21.5
Machinery (38)	8.7	13.5	8.3	4.0	13.7	19.9
Metalworking (381)	4.8	2.2	1.4	1.5	2.6	3.1
General Machinery (382)	1.6	0.6	0.2	0.1	1.7	4.3
Electrical Machinery (383)	0.4	4.4	5.3	1.4	6.9	9.6
Transport Equipment (384)	0.8	1.8	1.3	0.7	1.8	2.0
Precision Equipment (385)	0.3	0.7	0.1	0.3	0.7	0.9
Other (39+36) [4]	0.5	1.0	1.6	3.3	3.9	6.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
Imports						
Food (31)	8.2	15.2	6.8	4.5	5.1	7.9
Textiles and Apparel (32)	6.9	3.5	2.0	3.2	5.5	6.7
Wood and Paper (33+34)	3.0	3.3	3.3	3.9	3.9	4.8
Chemicals/Basic Metals (35+37)	30.2	28.8	32.3	35.5	30.7	30.3
Machinery (38)	48.4	46.9	53.4	50.9	52.8	48.0
Metalworking (381)	6.4	6.7	7.1	4.8	5.3	5.4
General Machinery (382)	17.1	14.3	19.9	21.5	21.7	19.0
Electrical Machinery (383)	7.8	10.2	8.7	8.3	10.6	11.8
Transport Equipment (384)	15.3	13.8	15.4	13.1	12.6	9.6
Precision Equipment (385)	1.8	1.9	2.3	2.6	2.2	2.0
Other (39+36) [4]	3.3	2.3	2.2	2.0	2.0	2.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Notes: 1) Oil and gas subsectors (ISIC 353 and 354) are excluded.
2) The numbers in parentheses indicate ISIC code. The data were converted from SITC (Standard International Trade Classification) to ISIC by the International Economic Data Bank (IEDB).
3) The sectoral share is calculated as an average for respective years in each period.
4) Other includes miscellaneous (ISIC 39) and non-metal/mineral (ISIC 36) products.

Source: Calculated from International Economic Data Bank (IEDB), *Stars* (database).

3 SME Development in Indonesia

There are several definitions of SMEs and different definitions are used by various Indonesian government agencies. This section first defines SMEs suitable for the purpose of this study. In the next part, SME policies and measures in Indonesia are reviewed in order to understand the general conditions under which SMEs developed. Thereafter, the section provides an overview of the development of SMEs in the manufacturing industry, particularly the machinery sector.

3.1 Definition of SMEs in This Study

The Indonesian government often perceived the promotion of SMEs not as an aspect of industrial development but of social development. It tended to support micro and smaller SMEs. Berry and Levy (1999: 31) state that LEs and micro- or very small-scale enterprises have received a large part of the incentives which the Indonesian government provided. These enterprises occupied a considerable share of output and workforce. In contrast, medium-scale viable firms have received limited attention and occupied a modest share in production and employment.[4] The experience of these medium-scale enterprises with 100 to 300 workers has hardly been highlighted in the context of Indonesia.

Consequently, most SME definitions in Indonesia cover only smaller SMEs and do not include larger SMEs. As indicated in Table 6, BPS (the former Central Bureau of Statistics, currently Statistics Indonesia) defines firms with four or less workers, those with 5 to 19 workers and those with 20 to 99 workers as household, small-scale, and medium-scale enterprises, respectively. The Indonesian Ministry of Industry and Trade (MOIT) defines manufacturing SMEs on the basis of the value of their assets (excluding land and buildings). Firms with assets of less than Rp 200 million are small-scale enterprises and those with assets of Rp 200 million to Rp 5 billion are small- and medium-scale enterprises. The Indonesian Small Business Law of 1995, which aimed to foster SMEs for the purpose of promoting a fair and equitable society, defines small-scale enterprises as firms with assets (excluding land and buildings) of less than Rp 200

[4] As stated above, in Indonesia dynamic SMEs do not have a broad base in industrial structure and are ignored at policy levels as being too big to be small and too small to big. Berry and Levy (1999: 31) characterised this industrial phenomenon in Indonesia as a "missing middle." The "missing middle" results in the underutilisation of productive capability that viable SMEs potentially have.

million or with sales of less than Rp 1 billion. This definition has been used by Bank Indonesia, the central bank, and by the State Ministry of Cooperatives and Small & Medium Enterprises (MOCSME).

Table 6 Definition of Manufacturing SMEs in Asian and Pacific Countries

Country/ Organization		*Definition of Manufacturing SMEs*	
		Criterion	*Size* [1]
Indonesia	BPS[2]	Employment	SMEs < 100
	MOIT[2]	Assets	SMEs < Rp 5 billion (US$ 0.7 million)
	Bank Indonesia/ MOCSME[2]	Assets	SMEs ≤ Rp 10 billion (US$ 1.4 million)
		Sales	SMEs ≤ Rp 50 billion (US$ 7 million)
Japan		Employment	SMEs < 300
		Invested Capital	SMEs < ¥ 300 million (US$ 3 million)
Korea		Employment	SMEs ≤ 300
Malaysia		Invested Capital	SMEs ≤ MR 2.5 million (US$ 0.7 million)
Philippines		Employment	SMEs < 200
		Assets	SMEs ≤ P 60 million (US$ 1.5 million)
Singapore		Assets	SMEs ≤ S$ 15 million (US$ 9 million)
Taiwan		Employment	SMEs < 200
		Invested Capital	SMEs ≤ NT$ 60 million (US$ 2 million)
Thailand	Bank of Thailand	Employment	SMEs < 300
	MOI[3]	Employment	SMEs < 200
	MOI[3]	Assets	SMEs < 100 million baht (US$ 2.7 million)
Canada		Employment	SMEs < 500
		Sales	SMEs ≤ CDN$ 20 million (US$ 14 million)
USA		Employment	SMEs < 500

Notes: 1) Figures in parentheses in this column indicate the amount in terms of US dollars converted by respective exchange rates at the end of 1999 (IMF, *International Financial Statistics*). Indonesia: US$ = Rp7,085, Japan: US$ = ¥102.20, Malaysia: US$ = MR3.80, Philippines: US$ = P40.31, Singapore: US$ = S$1.67, Taiwan: US$ = NT$31.40, Thailand: US$ = 37.52baht, and Canada: US$ = CDN$1.44.

2) BPS = Statistics Indonesia, MOIT = Ministry of Industry and Trade, and MOCSME = the State Ministry of Cooperatives and Small & Medium Enterprises.

3) MOI = Ministry of Industry.

Sources: APEC (1994: 10-2) and JSBRI (1998: 6).

Table 6 indicates that most of the neighbouring countries adopt the number of workers as their main criterion which distinguishes SMEs from LEs and they often use the size of 200 to 500 employees as a cutoff between SMEs and LEs. For instance, Japan, South Korea and Thailand regard manufacturing firms as SMEs if their number of employees is less than 300 workers. In addition, this study aims to cover not only SMEs that can be promoters of distributional or welfare goals but specifically SMEs that can be a driving force in the process of industrialisation. Attention is paid to the "missing middle" or potential and dynamic SMEs. For these reasons, it seems appropriate to define in this study SMEs in Indonesia as enterprises with 299 or less employees.[5]

3.2 Policies and Measures for SME Development in Indonesia

The Indonesian government has advocated the importance of SMEs in many official statements. It has formulated and implemented various types of policies and measures aimed at the development of the SME sector. For example, in Repelita VI (the Sixth Five-year Development Plan during 1994/95-1998/99), the government emphasised the promotion of SMEs, aiming mainly at 1) creating employment and 2) improving huge imbalances of income distribution across regions and ethnic groups. Table 7 provides a chronological overview of the policies, programs and organisations relevant to the promotion of SMEs in Indonesia.

The Indonesian government has tried almost all types of SME support at one time or another (Table 7). The BIPIK (small industries development) program was introduced in 1974 and carried out as one of the main technical support programs for small-scale industry. Under this program, technical assistance was extended to small enterprises through UPTs (technical service units) staffed by TPLs (extension field officers). After the BIPIK program finished in 1994, the PIKM (small-scale enterprises development) project was launched and has continued until now. However, because of budget constraints and institutional problems, the UPTs-TPL system has not functioned

[5] In support of this definition, we can refer to Goeltom (1995: 18) who, in her empirical analysis on the effects of financial reforms in Indonesia on the manufacturing industry, classified firms as small if the number of employees is less than 100, medium if the number of employees is between 100 and 500, and large if the number of employees is more than 500. This definition allowed her to evaluate in detail the impact of financial liberalisation on larger SMEs that have not usually been focused on.

well. Consequently, the PIKM has not been able to provide small industry with sufficient technical support.

Table 7 Policies, Programs and Organisations for SME Development in Indonesia

Technology	1969	MIDC (Metal Industry Development Center) established.
	1974	BIPIK (Small Industries Development) Program formulated as a technical support program for SMEs.
	1979	Under BIPIK program, LIK and PIK (Small Industrial Estates) constructed and technical assistance extended to SMEs in or near LIK/PIK mainly through UPT (Technical Service Units) staffed by TPL (Extension Field Officers).
	1994	BIPIK program finished and PIKM (Small-scale Enterprises Development Project) launched.
Marketing	1979	Reservation Scheme introduced to protect markets for SMEs.
	1999	Anti-Monopoly Law enacted.
Financing	1971	PT ASKRINDO established as a state-owned credit insurance company.
	1973	KIK (Credit for Small Investment) and KMKP (Credit for Working Capital) introduced as government-subsidised credit programs for SMEs.
	1973	PT BAHANA founded as a state-owned venture capital company.
	1974	KK (Small Credit) administered by BRI (Indonesian People's Bank) launched and later (1984) changed to KUPEDES scheme (General Rural Savings Program) aimed at promoting small business.
	1989	SME Loans from state-owned enterprises (1 to 5 % benefits) introduced.
	1990	Government-subsidised credit programs for SMEs (KIK/KMKP) abolished and unsubsidised KUK (Credit for Small Businesses) scheme introduced.
	1998	The Liquidity Credit Scheme restarted.
	1999	The responsibility of directed credit programs transferred from Bank Indonesia (the central bank) to PT PNM (State-owned Corporation for SMEs) and Bank Export Indonesia.
	2000	Major government credit programs for SMEs, including KUK, abolished.
General	1973	Ministry of Light Industry and Ministry of Heavy Industry merged into Ministry of Industry.
	1976	Deletion (localisation) Programs for commercial cars introduced (motorcycles in 1977 and some other products such as diesel engines and tractors later on).
	1978	Directorate General for Small-scale Industry established (in Ministry of Industry).
	1984	Foster Father (*Bapak Angkat*) Program introduced to support SMEs.
	1991	Foster Father-Business Partner Linkage extended to a national movement.
	1991	SENTRAs (Groups of Small-scale Industry) in industrial clusters organised as KOPINKRA (Small-scale Handicraft Cooperatives).
	1993	Deletion Programs for the commercial cars finished and Incentive Systems adopted.
	1993	Ministry of Cooperatives started handling small business development.
	1995	Basic Law for Promoting Small-scale Enterprises enacted.
	1997	Foster Father (*Bapak Angkat*) Program changed to Partnership Program (*Kemitraan*).
	1998	Ministry of Cooperatives and Small Business added medium business development to its responsibilities.
	1998	SME promotion emphasised in People's Economy as a national slogan.
	1999	New Automobile Policy announced and Incentive Systems finished.

Sources: Thee (1994: 101-11), internal documents prepared by the Indonesian Ministry of Industry and Trade, and author's interview survey.

As financial support programs, the government initiated the KIK (credit for small investment) and the KMKP (credit for working capital) in 1973 and continued them in the 1980s. In 1990, however, because of high default rates and budget constraints of the government, such subsidised credit programs were abolished and, instead, the non-subsidised KUK (credit for small businesses) scheme was established (Thee 1994: 101-4). During the last five to ten years, the main credit programs available to SMEs have been: 1) the KUK (credit for small businesses) scheme, which requires banks in Indonesia to allocate 20 percent of their lending to small-scale firms; and 2) the Liquidity Credit Scheme, which restarted in 1998 and provided credits to farmers, cooperatives and SMEs. Despite these programs, only around 10 percent of SMEs use bank credit and the remaining 90 percent do not receive loans from formal financial institutions (Urata 2000: 16-32).

From 1976 to 1993, the government attempted to foster small- and medium-scale parts supplier firms through the Deletion (localisation) programs for some import-substitution products, such as commercial vehicles, motorcycles and diesel engines. Recognising that inter-firm linkages would be a key to the development of SMEs, the Indonesian government initiated a forced subcontracting program, known as the Bapak Angkat (foster-father) program.[6] However, these programs did not achieve significant results. LEs did not participate in the programs in a positive way, because the forced subcontracting linkages tended to provide them with only limited benefits.

Even though several ministries and organisations in the government sector such as MOIT and MOCSME have experimented with various kinds of programs for the promotion and protection of SMEs, most of them were not effective or did not function well. Thee (1994) attributed these outcomes to insufficient institutional capabilities of the government sector as well as inadequate design of policies and programs. Berry, Rodriguez and Sandee (2001: 377) suggested that unproductive assistance to small firms extended by public agencies be ascribed to a philosophy that the government should guide and help weaker groups in society, many of which comprise people who work in the SME sector. Such motivations have induced the government to extend free support services not to viable medium-scale enterprises but to innumerable micro- and small-scale enterprises. By spreading the effort over so many firms, the public sector

[6] The "Foster Father-Business Partner" partnership and linkage program (Program Kemitraan dan Keterkaitan Bapak Angkat-Mitra Usaha) was introduced in 1984 to promote the development of local SMEs. The program urged LEs as the "Foster Fathers" to support SMEs as small "Business Partners" through the establishment of subcontracting relationships. The government expected LEs to provide SMEs through these forced linkages with assistance in the areas of technology, management, marketing, financing and so on. For further details, see Thee (1994: 106-7).

has tended to provide “one-shot” support to micro- and small-sized enterprises only, without sufficient follow-up services.

3.3 An Overview of SME Development in Indonesia

Indonesia experienced dynamic economic development through the rapid growth of its manufacturing industry after the early 1970s. The LE sector, particularly in those subsectors that allowed specialisation in labour-intensive assembling operations and a shift toward export-oriented production, played an important role in this remarkable industrial development (Berry, Rodriguez and Sandee 2001: 364). How did the SME sector contribute to the development of the manufacturing industry?

Table 8 indicates that LEs with 300 or more employees recorded generally higher growth rates of value added and employment than SMEs with 299 or less employees. During 1986-99, value added and employment of SMEs in manufacturing as a whole expanded at average annual rates of 6.4 percent and 4.5 percent, lower than those of LEs. Annual value added growth of smaller SMEs (including microenterprises) with 19 or less workers was less than 4 percent, while that of medium and larger SMEs with 20 to 99 workers and with 100 to 299 workers was 7.5 percent and 8.1 percent, respectively.

During 1996-99, however, output in the entire manufacturing SME sector decreased by 0.1 percent per annum, significantly less than the decrease of output in the LE sector of 3.2 percent. Within the SME sector, medium to larger SMEs with 20 to 299 employees responded more flexibly to the sudden changes in economic conditions than smaller SMEs with 19 or less employees.

It is necessary to recognise that the impact of the economic crisis on SMEs has been different in each case. Tambunan (2000: 143-53, 160-1) pointed out that the influence of the financial crisis on SMEs depends on the kinds of products, types of input materials and destination of products. Sato (2000) stated, based on her case study of the metalworking industry in Java, that an evaluation of the damage caused by the crisis to the SME sector is not easy, because sufficient statistical data for small firms with 19 or less employees are not available. In addition, she noted that the impact on SMEs is quite heterogeneous according to factors such as firm size (even within SMEs), sector (even within metalworking), location and market orientation.

Table 8 Growth of Value Added and Employment in Indonesia's Non-Oil/Gas Manufacturing Industry by Firm Size, 1986-1999[1)]

Sector/Firm Size[2)]	*Average Annual Growth Rates* (%)[3)]					
	1986 -1996		*1996 - 1999*		*1986 - 1999*	
	Value Added	*Employment*	*Value Added*	*Employment*	*Value Added*	*Employment*
Manufacturing						
1 - 19	7.7	6.6	-7.8	-2.6	3.9	4.4
20 - 99	9.4	5.7	1.3	-1.6	7.5	3.9
100 - 299	8.8	7.8	5.7	-0.2	8.1	5.9
SMEs	8.5	6.6	-0.1	-2.3	6.4	4.5
LEs	13.3	11.1	-3.2	0.6	9.3	8.6
All Firm Sizes	11.8	7.7	-2.4	-1.5	8.3	5.5
Food (31)						
1 - 19	6.8	7.2	-6.8	-4.8	3.5	4.3
20 - 99	7.9	4.2	4.9	-1.7	7.2	2.8
100 - 299	9.5	5.2	20.4	1.7	11.9	4.4
SMEs	7.8	6.9	5.3	-4.3	7.2	4.2
LEs	9.4	4.5	7.2	0.6	8.9	3.6
All Firm Sizes	8.9	6.5	6.7	-3.5	8.4	4.1
Textile and Apparel (32)						
1 - 19	11.9	8.5	-12.5	-2.2	5.7	5.9
20 - 99	2.8	5.1	0.0	-3.4	2.1	3.1
100 - 299	4.2	8.4	14.8	-0.1	6.6	6.4
SMEs	7.1	8.0	-0.3	-2.1	5.3	5.6
LEs	10.3	16.0	-0.6	0.0	7.7	12.1
All Firm Sizes	9.5	11.2	-0.5	-1.0	7.1	8.3
Machinery (38)						
1 - 19	8.7	5.1	-9.9	-2.8	4.1	3.2
20 - 99	9.8	6.4	12.0	-0.4	10.3	4.8
100 - 299	13.4	8.4	-4.6	-3.7	8.9	5.5
SMEs	11.7	6.1	-1.4	-2.6	8.5	4.1
LEs	22.5	13.5	-7.7	1.0	14.7	10.5
All Firm Sizes	19.7	9.1	-6.6	-0.8	13.0	6.8

Notes: 1) Oil and gas subsectors (ISIC 353 and 354) are excluded.
2) The numbers in parentheses represent ISIC industrial code. Firm size is indicated in terms of the number of employees: SMEs = firms with 299 or less workers; and LEs = those with 300 or more workers.
3) The growth of value added is calculated using 1993 constant prices.

Sources: Calculated from BPS, unpublished data of *Large and Medium Manufacturing Statistics*, *Economic Census* (1986 and 1996), and *Statistical Year Book of Indonesia*.

The selected sectors in Table 8, food (ISIC 31), textiles and apparel (ISIC 32) and machinery (ISIC 38) show almost the same trend as manufacturing as a whole. SMEs as a whole in the machinery sector recorded a higher growth of value added during 1986-99 than their counterpart SMEs in manufacturing as a whole and in other selected sectors. In terms of the growth of value added and employment, medium and larger machinery SMEs with 20 to 299 employees were outstanding during 1986-96. They were able to take advantage of an opportunity to supply parts and components to rapidly growing LEs during the period of high growth.

Table 9 indicates changes in the size distribution of the Indonesian non-oil/gas manufacturing industry in terms of numbers of establishment, employment and value added since the mid-1970s. In accordance with the typical patterns of size structure in developing economies, the Indonesian economy shows that the shares of SMEs are dominant in terms of establishments and labour force, while LEs generate the majority of manufacturing value added.[7]

The SME group as a whole occupied nearly 100 percent of total establishments, without significant changes across sectors and over time. Among SMEs, those with 19 or less employees formed 95-99 percent of the total. In the case of the machinery sector (ISIC 38), the share of smaller SMEs with 19 or less workers was slightly lower than the two other sectors and manufacturing as a whole and, instead, that of medium and larger SMEs with 20 to 99 workers and with 100 to 299 workers was higher. However, the overwhelming majority of establishments consisted of SMEs.

In manufacturing employment, SMEs also dominated, but their shares declined continuously. In the 1970s, smaller SMEs with 19 or less workers employed more than 80 percent of the total workforce in manufacturing.[8] The employment share of this SME group decreased to 68 percent in 1986 and around 60 percent in the second half of the 1990s. The share of medium and larger SMEs in employment did not change much during 1986-9, and remained above 5 to 6 percent. As a consequence, the employment share of the entire SME sector with 299 or less workers declined from 80 percent to 70 percent between 1986 and 1999. These changes reflect the growth patterns of

[7] Based on the 1986 BPS data, Hill (1992: 244) also stated that the size distribution of Indonesian manufacturing resembles the typical developing country pattern in terms of output and employment.

[8] The levels of the employment and output share of smaller SMEs with 19 or less employees were remarkably different in the 1970s and in 1986. This gap implies that the 1974/75 census and 1979 survey overestimated employment and output of smaller SMEs and/or underestimated those of the remaining firm groups with 20 or more employees. Therefore, it is better to consider the figures of employment and output in the 1970s as rough indications of trend.

employment between different firm size groups, in which LEs grew more rapidly in creating employment than SMEs.

During 1986-99, around 80 percent of employment in food processing (ISIC 31) was at SMEs with 299 or less workers. In this industry, scale economies are less significant and the necessity for on-site processing may actually provide advantages to small-scale operations (Hill 1992: 246). On the other hand, the share of employment at SMEs in the textile and apparel (ISIC 32) and machinery (ISIC 38) sectors clearly decreased over the period.

The share of LEs in value added exceeded that of SMEs and generally increased after the mid-1970s. In manufacturing as a whole, the share of smaller SMEs in value added decreased from more than 20 percent in the 1970s to roughly 10 percent in the latter half of the 1990s. This is the main explanation for the decrease in the share of the entire SME sector in value added. Food (ISIC 31), textiles and apparel (ISIC 32) and machinery (ISIC 38) reveal similar trends over time in the share of value added between different firm size groups.

Although the share of SMEs in value added was relatively small and decreased since the mid-1970s, it is evident that the SME sector contributed significantly to the Indonesian economy in terms of the number of establishments and employment. In addition, it should be noted that our analysis of the size distribution of manufacturing firms was based on the data in the years shown in Table 9 (current year series). If this study had used the data classified by firm size in a specific base year or in the year when firms started operations (initial year series), the trend in the share of SMEs in value added would have been different. Aswicahyono, Bird and Hill (1996: 353-4) investigated the distribution of value added by firm size, employing the data based on both the current year and initial year series. According to their analysis on the basis of the current year classification, the share of smaller firms with 20-99 workers in value added declined gradually after the late 1970s. On the other hand, their observation on the data of the initial year series revealed a dynamism of SMEs, showing that the share of the 20-99 firm group in value added was substantially higher than that of the counterpart group based on the current year series, and that the medium group with 100-499 workers expanded remarkably after the mid-1980s. This implies that firms starting from small- and medium-scale operations tend to grow more dynamically than those from large-scale operations.

Table 9 Share of SMEs in Indonesia's Non-Oil/Gas Manufacturing Industry, 1974/75-1999[1)]

Sector[2)]	*Share of SMEs in All Firm Sizes* (%)[3)]											
	Number of Establishments				*Number of Employees*				*Value Added*			
	1-19	*20-99*	*100-299*	*1-299*	*1-19*	*20-99*	*100-299*	*1-299*	*1-19*	*20-99*	*100-299*	*1-299*
Manufacturing												
1974/75	99.5	0.4	-	-	86.5	-	-	-	22.1	-	-	-
1979	99.5	-	-	-	80.6	-	-	-	22.4	-	-	-
1986	99.2	0.6	0.1	99.9	67.5	6.7	5.8	80.0	15.4	7.3	14.0	36.7
1991	99.3	0.5	0.1	99.9	61.5	5.6	6.4	73.5	11.8	5.7	16.1	33.6
1996	99.2	0.6	0.1	99.9	61.2	5.6	5.9	72.7	10.7	5.9	10.7	27.3
1999	99.1	0.6	0.2	99.9	59.2	5.6	6.1	70.9	9.0	6.6	13.6	29.2
Food (31)												
1974/75	99.5	0.4	-	-	85.3	-	-	-	21.7	-	-	-
1979	99.6	-	-	-	85.7	-	-	-	24.2	-	-	-
1986	99.2	0.6	0.1	99.9	70.9	5.9	3.7	80.5	16.7	5.6	8.1	30.4
1991	99.4	0.4	0.1	99.9	73.8	5.2	3.3	82.3	11.0	3.8	16.9	31.7
1996	99.4	0.4	0.1	99.9	75.7	4.7	3.3	83.7	13.6	5.1	8.5	27.2
1999	99.3	0.5	0.1	99.9	72.8	5.0	3.8	81.6	9.1	4.8	12.3	26.2
Textiles and Apparel (32)												
1974/75	98.6	1.2	-	-	73.8	-	-	-	15.6	-	-	-
1979	98.9	-	-	-	62.8	-	-	-	18.9	-	-	-
1986	98.3	1.3	0.2	99.8	49.1	10.3	8.0	67.4	8.5	6.6	10.4	25.5
1991	98.8	0.8	0.2	99.8	40.2	6.3	7.9	54.4	17.2	4.6	8.9	30.7
1996	98.8	0.8	0.2	99.8	38.4	5.9	6.2	50.5	10.5	3.5	6.3	20.3
1999	98.6	0.9	0.2	99.7	37.0	5.5	6.4	48.9	7.1	3.6	9.8	20.5
Machinery (38)												
1975[2)]	97.4	1.9	-	-	58.2	-	-	-	10.2	-	-	-
1979	98.0	-	-	-	55.0	-	-	-	14.3	-	-	-
1986	96.9	2.2	0.6	99.7	39.5	12.2	14.5	66.2	7.3	8.6	18.4	34.3
1991	95.7	2.7	1.0	99.4	29.2	10.6	14.4	54.2	4.6	6.9	17.9	29.4
1996	96.2	2.4	0.8	99.4	27.1	9.4	13.6	50.1	2.8	3.6	10.8	17.2
1999	95.7	2.8	0.9	99.4	25.5	9.5	12.4	47.4	2.5	6.3	11.4	20.2

Notes: 1) Oil and gas subsectors (ISIC 353 and 354) are excluded.
2) The numbers in parentheses indicate ISIC industrial code.
3) The numbers in the column headings indicate firm size in terms of the number of employees. The mark (-) illustrates unavailability of the data.

Sources: Calculated from BPS, unpublished data of *Large and Medium Manufacturing Statistics*, *Economic Census* (1974/75, 1986 and 1996), and *Statistical Year Book of Indonesia*.

4 Economic Performance and Productivity Growth of the Indonesian Manufacturing Industry by Firm Size

This section analyses the development of SMEs in Indonesia, based on the national-level statistical data. The economic performance of manufacturing enterprises by firm size is discussed in the first part, while the growth of labour productivity and total factor productivity (TFP) are calculated for SMEs and LEs separately in the second part.

4.1 Economic Performance of SMEs and LEs in Indonesia

It is useful to compare economic performance of manufacturing SMEs and LEs in order to understand the characteristics of production structure in both groups. For this purpose, our study uses the unpublished *Large and Medium Manufacturing Statistics* of BPS, which gives value added (Y), the number of employees (L), and wage rates (ω, defined as total labour costs divided by the number of workers) by firm scale during 1986-99. As explained before, since BPS's backcast data were not available to the author, our study uses its original data. This study estimates capital stock (K) excluding land in 1993 constant prices (Hayashi 2002a: Appendix 4.1). Because of difficulties in estimating capital stock for SMEs with 19 or less workers, these smaller SMEs are not included in our analysis.[9]

What patterns of scale differentials in the economic performance of firms can be found in the Indonesian non-oil/gas manufacturing industry? Are such observations in Indonesia consistent with theoretically expected patterns or those obtained from Japan's experience, as discussed in our parallel study (Hayashi 2002a)? Table 10 shows productivities, capital intensity, wage rates and income share of labour by firm size in 1986, 1996 and 1999.

Some previous studies (e.g., Berry and Mazumdar 1991: 52; Tajima 1978: 12-5) discussed conditions under which SMEs can compete with LEs. According to the theoretical framework presented in these studies, when capital intensity rises consistently with firm size, labour productivity tends to increase, but (assuming constant returns to scale) less than proportionately to capital intensity, which leads to a decrease in capital productivity. Wages are likely to escalate with firm scale, which is

[9] Since no time series data on annual investment for firms with 19 or less workers has to our knowledge been available, it is extremely difficult to estimate capital stock for those smaller SMEs.

one of the reasons for the increase in capital intensity. However, unless profitability is to decline with firm size, wage rates have to increase less than labour productivity, so that a higher share of value added can be used for investment in fixed capital.

Table 10 Economic Performance of Indonesia's Non-Oil/Gas Industry by Firm Size in 1986, 1996 and 1999[1)]

Firm Size[2)]	*Indices of Indicators (Firm Size 20-49 = 100)*[3)]				
	K/L	*Y/L*	*Y/K*	*ù*	*ù L/Y* ($\hat{a}$)
Manufacturing in *1986*					
20 - 49	100	100	100	100	100
50 - 99	257	165	64	146	89
100 - 299	350	281	80	204	73
300 - 999	378	350	93	203	58
1,000 -	320	388	121	218	56
Manufacturing in *1996*					
20 - 49	100	100	100	100	100
50 - 99	256	262	102	143	55
100 - 299	421	293	69	187	64
300 - 999	431	316	73	209	66
1,000 -	361	499	138	245	49
Manufacturing in *1999*					
20 - 49	100	100	100	100	100
50 - 99	222	258	116	159	61
100 - 299	356	317	89	164	52
300 - 999	342	367	107	172	47
1,000 -	356	335	94	166	50

Notes: 1) Oil and gas subsectors (ISIC 353 and 354) are excluded.
2) Firm size is indicated by the number of employees.
3) Y = value added, L = the number of employees, K = capital stock, ω = wages per employee (wage rates), Y/L = labour productivity, K/L = capital-labour ratio, Y/K = capital productivity, and $\omega L/Y$ = income share of labour.

Source: Calculated from BPS, unpublished data of *Large and Medium Manufacturing Statistics*.

The aggregate manufacturing data for Indonesia indicate a similar trend in three different years before and after the crisis, 1986, 1996 and 1999. Table 10 shows that capital intensity (K/L) rises with firm size, albeit with some irregularities. In 1986 and 1996, the peaks in the capital-labour ratio were found in the second largest scale group with 300 to 999 employees. In 1999, on the other hand, capital intensity increased up to a peak in the range of 100 to 299 employees, before levelling off.

Labour productivity (Y/L) increased with size, except for 1999, when the second largest size group recorded the highest productivity level. Capital productivity (Y/K) was not consistent with expected patterns. The output-capital ratio first decreased, then increased as firms are larger. Wage rates (ω) rose with firm scale, with an anomaly in 1999, when the second largest size group provided the highest wages. The income share of labour ($\omega L/Y$ or β) fell almost monotonously, with small irregularities in 1996 and 1999. In accordance with normal predictions, labour productivity rose less steeply than capital intensity with the scale of firms, except for anomalies in the largest size group in 1986 and 1996. Similarly, differences in wages between firm groups by scale are less than those in labour productivity.

Compared to Japan in our parallel study (Hayashi 2002a), Indonesia does not show regular patterns in a set of indicators representing the production structure of firms classified by scale. Tajima (1978: 16-27) suggested three possible reasons for these irregularities in developing economies. As a primary reason, he raised statistical problems such as the limited number of sample firms and inaccurate data, particularly for capital stock. This reason is relevant to the case of Indonesia, where the number of sample establishments in the manufacturing industry as a whole in 1996 is around 23,000, far less than that of Japan, observed in our separate study (Hayashi 2002a).[10] Irregularities are more frequently observed in sectoral performance, because individual characteristics tend to appear in a relatively small sample size.[11] As described above, capital productivity behaves in an irregular fashion in Indonesia. This may be due partly to the limitations of the capital stock estimates.

[10] The annual survey of *Large and Medium Manufacturing Statistics* has been conducted in the form of a complete enumeration. In this survey, questionnaires are delivered to all establishments that are considered to employ 20 or more workers and are recorded in the *Manufacturing Industry Directory* compiled by BPS. However, it seems that a large number of eligible firms are not covered in the directory. In fact, this study found several firms in our sample which were not listed in the directory. In addition, the number of manufacturing establishments with 20 or more workers in Indonesia is not large, because of the nascent stage of industrial development. For reference, the number of sample enterprises in Japan in 1957 was more than 400,000.

[11] In a preliminary analysis based on the data in 1996, our study confirmed this tendency in Indonesia.

Tajima's second reason originates from heterogeneity, which often appears in the process of industrialisation in developing economies. The coexistence of traditional and modern production systems, which are likely to have extremely different capital intensities, causes an anomaly in capital-related indicators. For example, compared to other industries, the chemical and basic metal industries in Indonesia are disproportionately dependent on capital-intensive technology. Non-*pribumi* firms seem to be far more capital-intensive than *pribumi* firms. These kinds of heterogeneity may distort capital productivity in Indonesia.

The third reason is related to policy stance of governments towards different-scale enterprises. As noted in the previous section, the Indonesian government has introduced and implemented industrial policy measures in favour of LEs. This policy distortion usually generates irregularities in economic performance between different-scale firm groups in the manufacturing sector.

However, our analysis of the Indonesian manufacturing industry generally indicates that: 1) capital intensity, labour productivity, and wage rates rise with firm size; 2) the income share of labour declines with firm scale; 3) the differentials in labour productivity between firm groups by scale are larger than those in wage rates; 4) the differentials in the capital-labour ratio by firm size are larger than those in labour productivity in some cases; and 5) capital productivity falls with firm scale in some cases. These findings confirm that SMEs can in principle coexist with LEs, by producing a unit of output with less capital but more labour than LEs (Berry and Mazumdar 1991: 52; Tajima 1978: 27).

4.2 Productivity Growth of SMEs and LEs in Indonesia

As was already observed, the Indonesian non-oil/gas manufacturing industry grew rapidly during the decade prior to the 1997-98 economic crisis. This high growth in manufacturing was led by not only LEs but also SMEs. Table 8 showed that, during 1986-96, SMEs increased value added and employment at annual rates of 8.5 percent and 6.6 percent, while LEs raised them at 13.3 percent and 11.1 percent.

This subsection examines the evolution of dynamic forces operative in the manufacturing industry, and assesses changes in productivity for both SMEs and LEs. Similar to the previous subsection, this subsection also uses the unpublished *Large and Medium Manufacturing Statistics* of BPS to obtain the data of value added (*Y*), the

number of employees (L), wage rates (ω), capital stock (K) at a benchmark year and capital fixed investment (I) for SMEs with 20 to 299 employees and LEs with 300 or more employees during 1986-99.[12]

Table 11 displays the average annual growth rates of labour productivity (Y/L) for SMEs and LEs in manufacturing as a whole and several selected sectors/subsectors over the period 1986-96. Labour productivity is a useful indicator, because it can represent the efficiency of labour (as an abundant resource in Indonesia) in generating output. In manufacturing as a whole, average labour productivity for SMEs and LEs increased at annual rates of 2.3 percent and 2.2 percent, respectively. The food industry (ISIC 31) maintained high annual labour productivity growth of 4.2 percent and 5 percent for SMEs and LEs, respectively, while labour productivity in the textile and apparel industry (ISIC 32) recorded negative growth at -2.9 percent and -5.6 percent for SMEs and LEs. As already indicated in Table 8, even though output in the textile and apparel industry grew remarkably at the rate of 9.5 percent annually during 1986-96, employment increased more rapidly at the annual rate of 11.2 percent. This rapid absorption of employment in the textile and apparel sector is the main explanation for the negative growth rates of labour productivity for SMEs and LEs.

In the machinery sector (ISIC 38), LEs achieved high rates of increase in labour productivity over the period 1986-96. Significant is transport equipment, under which automobile assembling (ISIC 38431), automobile parts (ISIC 38432+38433) and bicycle (ISIC 38443+38444) producing firms all raised labour productivity at more than 20 percent per annum. This implies that LEs improved labour productivity under the conditions in which the demand for their products rapidly grew during the economic boom. On the other hand, the SME sector in the machinery industry raised labour productivity at 4.8 percent annually. Still, most of the machinery subsectors showed a sufficient performance in labour productivity growth. Within the transport equipment subsector, automobile parts (ISIC 38432+38433) and bicycles (ISIC 38443+38444) increased their labour productivity at 8.8 percent and 6.8 percent per year, respectively, under the expansion of their markets in the high economic growth period.

[12] As stated in Section 2, this study uses not BPS's backcast data but its original data. All data are in real terms at 1993 constant prices. Value added (Y), wage rates (ω) and capital fixed investment (I) are deflated by implicit GDP deflator for manufacturing industry from the Indonesian national accounts, consumer price indices from *World Development Indicators 2001* (World Bank) and implicit deflator for gross fixed capital formation from the Indonesian national accounts, respectively. With regard to the capital stock estimates, see Hayashi (2002a: Appendix 4.1).

Table 11 Growth of Labour Productivity and Total Factor Productivity (TFP) in Indonesia's Non-Oil/Gas Manufacturing Industry, 1986-1996[1)]

Sector[2)]	*Average Annual Growth Rates* (%)[3)]			
	SMEs[4)]		*LEs*[4)]	
	Y/L	*TFP*	*Y/L*	*TFP*
Manufacturing	2.3	1.9	2.2	2.3
Food and Beverages (31)	4.2	-3.5	5.0	-4.0
Textiles and Apparel (32)	-2.9	-6.5	-5.6	2.1
Machinery (38)	4.8	7.5	8.9	4.9
Metalworking (381)	5.9	3.9	2.6	7.0
General Machinery (382)	9.7	16.3	11.3	-19.8
Electrical Equipment (383)	3.6	11.3	8.6	8.6
Automobile Assembling (38431)	-	-	26.7	16.0
Automobile Parts (38432+33)	8.8	10.6	24.2	11.5
Bicycle (38443+44)	6.8	-0.2	22.7	11.4

Notes: 1) Oil and gas subsectors (ISIC 353 and 354) are excluded.
2) The numbers in parentheses indicate ISIC (International Standard Industrial Classification) code.
3) The data at 1993 constant prices are used to calculate the growth of labour productivity and TFP.
4) SMEs = firms with 20 to 299 workers, LEs = those with 300 or more workers.
Source: Calculated from BPS, unpublished data of *Large and Medium Manufacturing Statistics*.

Table 11 also shows changes in total factor productivity (TFP), which can indicate technological progress in a broad sense defined as the residual not explained by increases in factor inputs. In this study, the labour input is not adjusted for quality changes, due to the data constraints. The data for capital stock are weak (Hayashi 2002a: Appendix 4.1). The growth of TFP is measured simply as the residual between output growth and factor input increases.[13]

Several studies measured TFP growth in Indonesia. Aswicahyono (1998) and Timmer (1999) are recent and comprehensive studies that focused on TFP in Indonesia's manufacturing industry over the long-term period. They estimated TFP for each sector in the manufacturing industry with the use of technically sophisticated methods. However, no TFP estimates have been undertaken for Indonesia by firm size

[13] Under these conditions, our rough estimates of TFP growth, of course, include observational and approximation errors and do not purely draw technological or institutional development. For further details of this type of growth accounting and the associated errors, see Hayami (1997: 116-9).

category (Berry, Rodriguez and Sandee 2001: 367). Despite its simple approach, this study is the first to measure TFP growth for SMEs and LEs separately.

For the estimates of TFP growth, the following Cobb-Douglas production function is assumed:

$$Y = AF(K, L) \tag{4.1}$$

where manufacturing value added Y is produced from capital K and labour L under the conditions of neutral technological change and constant returns to scale. By taking total derivatives of equation (4.1) with respect to time (t) and dividing all terms by Y, the Cobb-Douglas production function can be written as:

$$g(Y) = g(A) + \alpha g(K) + \beta g(L) \tag{4.2}$$

where g indicates the growth rates, and α and β represent the income shares of capital and labour, respectively, as equivalent with production elasticities of capital and labour.[14] $g(A)$ is a residual in the growth of Y after the effects of increases in K and L are subtracted. Since value added Y is the sum of capital and labour incomes, α and β add up to one ($\alpha + \beta = 1$). Subsequently, by subtracting $g(L)$ from both sides of equation (4.2), the growth of labour productivity can be approximated by:

$$g(Y/L) = g(A) + \alpha g(K/L) \tag{4.3}$$

The data for Y, K, L and α ($\alpha = 1 - \beta$) by firm size during 1986-96 are available from the unpublished BPS source *Large and Medium Manufacturing Statistics*, as explained before. With the use of these data, $g(A)$, the growth of residual or TFP, can be calculated by subtracting measured $\alpha g(K/L)$ from measured $g(Y/L)$ based on the relation of equation (4.3).

In the manufacturing industry as a whole, TFP for SMEs grew at 1.9 percent per year, which is slightly lower than that for LEs of 2.3 percent. Both manufacturing SMEs and LEs in Indonesia demonstrated technological advance during 1986-96. The levels of these TFP growth rates are similar to those given by Osada (1994: 482) and

[14] For TFP estimates in this study, income share of labour (β) is calculated as the average of $\omega L/Y$ in 1986 and 1996. After that, income share of capital (α) can simply be obtained by subtracting β from 1.

Timmer (1999: 86-7), which estimated 3.6 percent during 1985-90 and 2.1 percent during 1991-95, respectively, as the aggregate TFP growth in manufacturing.

SMEs in the food processing (ISIC 31) and textile and apparel (ISIC 32) industries recorded annual TFP growth of -3.5 percent and -6.5 percent, respectively. Value added and labour productivity for SMEs and LEs in the food processing sector increased at remarkable rates. However, the growth of capital input was more rapid than that of output. As a consequence, TFP growth for both firm groups became negative. This result is not significantly different from that of Osada (1994: 482), which indicated annual TFP growth of -1 percent for the food processing industry during 1985-90.

In the textile and apparel industry, some possible explanations for the negative TFP growth of the SME group may be considered. A significant increase in investment in this industry during the period of export boom seems to have surpassed the capacity of SMEs to absorb it. A series of economic reforms since the early 1980s may have had some adverse effects on an improvement of efficiency for textile and apparel SMEs. However, TFP for LEs increased at a modest rate of 2.1 percent per year and the textile and apparel industry as a whole including both SMEs and LEs indicated a positive growth of 1 percent per annum. This rate is lower, but not substantially different from that of Aswicahyono (1998: 218) and Timmer (1999: 87), which presented annual TFP growth rates of 2.4 percent during 1989-93 and 3.6 percent during 1991-95, respectively.

In the machinery industry (ISIC 38), SMEs and LEs showed TFP growth of 7.5 percent and 4.9 percent per year, respectively. Most of the machinery subsectors recorded significant TFP growth of SMEs and LEs, with some exceptions such as general machinery (ISIC 382). SMEs in automobile parts (ISIC 38432+38433) experienced rapid TFP growth of more than 10 percent annually. These estimates are consistent with those of Timmer (1999: 87), which reported that TFP in the machinery sector as a whole grew at an average rate of 6.9 percent per annum during 1991-95.

SMEs in the Indonesian machinery sector increased TFP to a significant degree during 1986-96. How were these SMEs able to achieve such high rates of TFP change? An increase in TFP can be achieved through the development of technology. Technological upgrading in this context includes not only investment in better machinery and equipment but also improvement in production technology, product design, quality management, workplace organisation, inventory management and so on.

However, as Berry, Rodriguez and Sandee (2001: 363) pointed out, the majority of SMEs are generally less able to improve such areas successfully on their own than LEs. From this point of view, subcontracting ties with LEs may possibly have been an important source of technological improvement for SMEs, as described in our separate study (Hayashi 2002a). It seems reasonable to hypothesise that the rapid TFP growth of Indonesian machinery SMEs in 1986-96 can be attributed to some extent to the role of subcontracting in providing them with opportunities to acquire knowledge of how to upgrade technological capabilities.

In general, due to the sectoral characteristics such as the divisibility of production processes and the products for use as intermediate inputs, SMEs and LEs in the machinery industry tend to establish subcontracting linkages more frequently than other manufacturing industries (Odaka 1978: 245-6).[15] Van Diermen (1997: 171) concluded that vertical inter-firm linkages in garment and wood furniture subsectors in Jakarta were not very frequent and did not play a significant role in the development of SMEs. Other studies, for instance, Berry and Levy (1999) and Sandee, Andadari and Sulandjari (2000), discussed subcontracting SMEs in garment and furniture sectors in Indonesia. However, most of the case studies on subcontracting in Indonesia deal with the machinery industry. For example, Harianto (1996: 60) pointed out that subcontracting linkages in the machinery sector (bicycle and pumps for oil as his specific cases) have been intense because of the nature of the production processes and technologies, the quality standard required in the final markets and the competitiveness of the markets. Altogether, these studies suggest that vertical inter-firm linkages occur relatively more frequently in the machinery sector than in other sectors.

The high TFP growth of SMEs in automobile parts corresponds to the remarkable TFP growth of LEs in automobile assembling (ISIC 38431) and LEs in automobile parts. The latter groups are business counterparts for the former group as principal firms or higher-layer supplier firms. This suggests that small-medium automotive parts supplier firms obtained benefits such as knowledge of production technology and advice on management from large automobile assembler firms or large automotive component supplier firms, possibly through their subcontracting linkages.

5 SME and Subcontracting in Indonesia

[15] Of course, the extent of such interrelations varies from country to country.

Many of the case studies on subcontracting linkages in the Indonesian manufacturing industry focused on the machinery sector. Based on the available literature, Table 12 summarises several types of support for small-medium supplier firms extended by large parent firms through subcontracting transactions in the machinery industry in Indonesia.

Thee (1985) reported subcontracting linkages between small-scale metalworking and machinery parts supplier firms and large-scale diesel engine assembler firms in the early 1980s. This case study found that some kinds of assistance were provided to small firms through vertical inter-firm linkages such as QC (quality control) support, credit, supply of raw materials and managerial training (Table 12). Thee concluded, however, that subcontracting networks remained weak and fluid, and did not sufficiently improve the technical and other capabilities of SMEs. The results of Thee's study may reflect the stage of Indonesian industrial development in the early 1980s, when the market was not expanding rapidly, the economy was still in its industrial infancy, and technological gaps between what small enterprises could manage and what large assemblers expected were considerable (Hill 2001: 249).

In the 1990s, several studies investigated the role of subcontracting in SME development. Harianto (1996) analysed characteristics of subcontracting transactions in local Indonesian firms in the early 1990s, taking bicycle, pumps for oil and trading of garment products as his cases. A large manufacturer of oil pumps provided its subcontracting SMEs with support in several areas, particularly technology and finance. Similarly, a large bicycle assembler firm extended technical, QC and managerial support to small-scale supplier firms through the dispatch of engineers. The parent firm sometimes involved its subcontractors in parts design and organised study tours that took them to foreign bicycle industries in, for example, Taiwan. Through subcontracting, the bicycle assembler firm also gave its parts supplier firms opportunities to negotiate price levels based on the cost plus fee method. Harianto found that the expected benefits from subcontracting transactions prevented both supplier and assembler firms from pursuing short-term gains by behaving opportunistically. The bicycle assembler firm recognised the benefits of subcontracting linkages including information on the technical and managerial reliability of supplier SMEs, while SME parts suppliers perceived gains such as information on the production plans of the assembler firm and large and continuous orders in the longer term.

Table 12 Support from Parent Firms through Subcontracting Linkages in Indonesia's Machinery Industry

	Diesel Engines	*Pump Units for Oil*	*Bicycles*	*Motorcycles*
Technical Support	・provision of QC support ・provision of technical specification	・provision of technical support in production processes and inspection via dispatch of 6 experts ・selection of proper production equipment	・provision of technical and QC support through dispatch of experts ・dispatch of suppliers to foreign markets as study tour ・involvement of suppliers in design phase	・preparation for training programs in QC and production technologies (e.g., dies making) ・frequent evaluation on suppliers' performance (e.g., QCD)
Financial Support and Price Setting	・provision of loans for suppliers ・provision of credit guarantees for suppliers ・lending of machinery ・price negotiation between parent and supplier firms	・setting of favourable payment ・conditions provision of loan guarantees for ・suppliers supply of used equipment at low cost	・setting of favourable payment conditions (limited) ・price negotiation, adopting cost plus fee method	・provision of loan guarantees for suppliers
Supply of Input Materials	・provision of raw materials	・supply of input materials	・supply of input materials (very limited)	・supply of input materials
Managerial Support	・provision of managerial training for small industry	・provision of managerial support through dispatch of experts	・provision of managerial support	・preparation for training programs in managerial fields (e.g., accounting)
Other Support		・assistance in establishing supplier firms	・assistance in establishing supplier firms ・assistance in finding other customers	・assistance in establishing supplier firms ・support by higher tier suppliers to lower tier suppliers
Observation Period	・the first half of the 1980s	・the early 1990s	・the early 1990s	・the mid-1990s

Sources: Diesel engines: Thee (1985); pump units for oil and bicycles: Harianto (1996); and motorcycles: Sato (1998).

Sato (1998) traced the development of subcontracting networks in the Indonesian motorcycle industry in the mid-1990s. She observed that lower-layer (second- and third-layer) parts supplier firms had emerged relatively recently and that

under multi-strata subcontracting chains, SME support had been extended by both higher-tier supplier firms and assembler firms. In her case study, one large-scale motorcycle manufacturer provided assistance in establishing a first-tier supplier firm owned by an ex-employee. The first-tier parts producer, in turn, assisted its employees to spin out of the firm to establish new enterprises that served it as second- or third-tier supplier firms. It provided these spin-off supplier firms with various forms of assistance including technical, managerial, marketing and financial support.

Supratikno (1998) investigated subcontracting arrangements as a competitive strategy and production organisation for assembler firms in the mid-1990s, looking in detail at three assembler firms engaged in the production of motorcycles, diesel engines and brass handicrafts. Supratikno concluded that subcontracting relationships can facilitate the growth of supplier SMEs and help them overcome development constraints such as unstable markets and low quality and technology, although the contribution of subcontracting to the competitiveness of parent firms was not significant.

Other than the machinery industry, subcontracting linkages in the garment and furniture industries have been studied. On the basis of case studies involving rattan furniture, wooden furniture and garments production, Berry and Levy (1999: 50) pointed out that subcontracting is a prevailing way of channelling SME products into export markets and that it has played an important role in disseminating technologies relevant for export production to SMEs. A case study focusing on the wooden furniture industry in Jepara (Central Java) allowed Sandee, Andadari and Sulandjari (2000: 190) to conclude that QC, standardisation and sophisticated finishing provided by LEs through subcontracting ties enabled small-scale furniture producers to participate in export production.

These case studies demonstrate that in the 1990s subcontracting networks beneficial to SME development have emerged in Indonesia's manufacturing industry, particularly the machinery industry.[16] Larger SMEs as well as competent LEs often played an essential role in activating subcontracting in Indonesia. The emergence of those subcontracting ties can be seen as a response to rapid market expansion and industrial development which increased the opportunities for firms to explore mutually beneficial subcontracting relations. Through vertical inter-firm linkages, SMEs have

[16] This development of subcontracting linkages between SMEs and LEs was consistent with government policy such as the deletion programs and the Bapak Angkat (foster-father) programs. However, the above case studies did not indicate that these government programs significantly supported the promotion of subcontracting transactions in the private sector in a direct or indirect manner.

been offered various forms of support, particularly in the areas of technology and marketing. The above findings on the evolution of subcontracting ties between SMEs and LEs are not very unusual cases but a recent tendency especially in the machinery industry (Hill 2001: 263).

Since nation-wide statistical data on inter-firm linkages are available in Japan, it is possible to measure the impact of subcontracting on the development of SMEs in a quantitative and comprehensive way. However, the lack of such data in Indonesia has prevented us from generalising the role of subcontracting in supporting the SME sector. Therefore, several studies described in this study and other literature that focused on SMEs and vertical inter-firm linkages in Indonesia used a descriptive and case study approach with the use of micro-level and qualitative information. Similarly, this study itself also cannot sufficiently examine the relationships between subcontracting and changes in productivity of SMEs. For the purpose of overcoming such constraints, we have investigated (or will investigate) SME development through subcontracting in Indonesia based on a micro-level survey that covers not only qualitative but also quantitative aspects.

6. Conclusion

The Indonesian economy grew rapidly and its structure transformed substantially during the three decades before the 1997-98 crisis. Agriculture lost its dominant share in output and employment, while industry, in particular manufacturing, gained prominence.

Although Indonesia formulated a variety of policies for the promotion of SMEs, most of them were not effective or did not work well, due to inadequate designs of programs and insufficient implementation capabilities of the government sector. The performance of the LE sector was generally better than that of the SME sector. However, along with LEs, SMEs developed reasonably well in terms of output and employment growth. In particular, SMEs in the machinery sector recorded good results. The share of SMEs in value added was relatively small, but the SME sector contributed to a great extent to the Indonesian economy in terms of the number of establishments and labour force. The impact of the 1997-98 crisis on SMEs was different in each case.

The analysis of economic performance in the Indonesian manufacturing industry by firm size indicates that: 1) capital intensity, labour productivity, and wage rates rise with firm size; 2) the income share of labour declines with firm size; 3) the differentials in labour productivity between firm groups by size are larger than those in wage rates; 4) the differentials in capital-labour ratio by firm size are larger than those in labour productivity in some cases; and 5) capital productivity falls with firm size in some cases. Despite several irregularities, these findings support in broad terms the suggestion that SMEs can coexist with LEs, by producing a unit of output with less capital but more labour than LEs (Berry and Mazumdar 1991: 52; Tajima 1978: 27).

In Indonesian manufacturing as a whole, SMEs and LEs increased labour productivity at a similar rate during 1986-96. SMEs in the machinery industry increased labour productivity faster than SMEs in other main sectors. SMEs in the machinery industry also increased their TFP markedly, compared with SMEs in other key sectors, and even compared with LEs in the same sector. The machinery sector stands out for its closer subcontracting ties between SMEs and LEs than in other sectors. It therefore seems that subcontracting ties may help understand the better performance of SMEs in this sector, as they may have contributed to improvements in efficiency and technology during the economic boom period 1986-96. Thus, similar to Berry, Rodriguez and Sandee (2001), our separate studies (Hayashi 2002a, 2002b, etc.) seek to test the hypothesis that subcontracting was a key factor in improving the performance of SMEs in Indonesia.

As Hill (2001: 270) pointed out, more micro-level SME case studies are required to understand the factors affecting dynamic changes in the performance of the Indonesian SMEs. Our separate papers provide a detailed investigation into how, to what extent and why subcontracting has contributed to the development of SMEs in the machinery industry.

References

APEC, 1994, *The APEC Survey on Small and Medium Enterprises*, Singapore: APEC Secretariat.

Aswicahyono, H., 1998, *Total Factor Productivity in Indonesian Manufacturing, 1975-1993*, unpublished PhD Thesis, Canberra: the Australian National University.

Aswicahyono, H., M. C. Basri and H. Hill, 2000, "How not to Industrialise?: Indonesia's Automotive Industry," *Bulletin of Indonesian Economic Studies*, Vol. 36, No. 1, pp. 209-41.

Aswicahyono, H., K. Bird and H. Hill, 1996, "What Happens to Industrial Structure When Countries Liberalise?: Indonesia since the Mid-1980s," *Journal of Development Studies*, Vol. 32, No. 3, pp. 340-63.

Berry A. and B. Levy, 1999, "Technical, Marketing and Financial Support for Indonesia's Small and Medium Industrial Exporters," in Levy, B., A. Berry and J. B. Nugent; with J. F. Escandon *et al*., *Fulfilling the Export Potential of Small and Medium Firms*, Dordrecht: Kluwer Academic Publishers.

Berry, A. and D. Mazumdar, 1991, "Small-scale Industry in the Asian-Pacific Region," *Asian-Pacific Economic Literature*, Vol. 5, No. 2, pp. 35-67.

Berry, A., E. Rodriguez and H. Sandee, 2001, "Small and Medium Enterprise Dynamics in Indonesia," *Bulletin of Indonesian Economic Studies*, Vol. 37, No. 3, pp. 363-84.

Goeltom, M. S., 1995, *Indonesia's Financial Liberalization: An Empirical Analysis of 1981-88 Panel Data*, Singapore: Institute of Southeast Asian Studies.

Harianto, F., 1996, "Study on Subcontracting in Indonesian Domestic Firms," in M. Pangestu (ed.), *Small-scale Business Development and Competition Policy*, Jakarta: Centre for Strategic and International Studies.

Hayami, Y., 1997, *Development Economics: From the Poverty to the Wealth of Nations*, New York: Oxford University Press.

Hayashi, M, 1996, *Structural Changes in the Indonesian Industry and Trade*, IDCJ Working Paper Series No. 52, Tokyo: International Development Center of Japan.

Hayashi, M, 2002a, *SME Development and Subcontracting in Indonesia: A Comparison with Japan's Historical Experience*, Canberra: the Australian National University.

Hayashi, M., 2002b, "The Role of Subcontracting in SME Development in Indonesia: Micro-level Evidence from the Metalworking and Machinery Industry," *Journal of Asian Economics*, Vol. 13, No. 1, pp. 1-26.

Hill, H., 1992, "Manufacturing Industry," in Booth, A. (ed.), *The Oil Boom and After: Indonesian Economic Policy and Performance in the Soeharto Era*, Oxford: Oxford University Press.

Hill, H., 1996, *The Indonesian Economy since 1966: Southeast Asia's Emerging Giant*, Cambridge: Cambridge University Press.

Hill, H., 2001, "Small and Medium Enterprises in Indonesia: Old Policy Challenges for a New Administration," *Asian Survey*, Vol. 41, No. 2, pp. 248-70.

Ito, T. and K. Orii, 2000, "Toward Constructing an Asian Manufacturing Database: Thailand and Indonesia," in Odaka, K., Y. Kiyokawa and M. Kuboniwa (eds.), *Constructing a Historical Macroeconomic Database for Trans-Asian Regions: International Research Workshop on the Asian Historical Statistics Database: An Appraisal of Project Outcomes and Future Research Directions*, Tokyo: Hitotsubashi University, Institute of Economic Research.

JSBRI, 1998, *Asia Chusho Kigyo no Genjyo ni kansuru Chosa Kenkyu* (A Study on the Present Conditions of Asian SMEs), Tokyo: Japan Small Business Research Institute.

Odaka, K., 1978, "Shitauke-sei Kikai Kogyo-ron Jyosetsu (Some Observations on the Role of Subcontracting Firms in the Development of Machinery Industry)," *Keizai Kenkyu* (Economic Review), Vol. 29, No. 3, pp. 243-50.

Osada, H., 1994, "Trade Liberalization and FDI Incentives in Indonesia: The Impact on Industrial Productivity," *Developing Economies*, Vol. 32, No. 4, pp. 479-91.

Sandee, H., R. K. Andadari and S. Sulandjari, 2000, "Small Firm Development during Good Times and Bad: the Jepara Furniture Industry," in Manning, C. and P. van Diermen (eds.), *Indonesia in Transition: Social Aspects of Reformasi and Crisis*, Singapore: Institute of Southeast Asian Studies.

Sato, Y., 1998, "The Machinery Component Industry in Indonesia: Emerging Subcontracting Networks," in Sato, Y. (ed.), *Changing Industrial Structures and Business Strategies in Indonesia*, Tokyo: Institute of Developing Economies.

Sato, Y., 2000, "How did the Crisis Affect Small and Medium-sized Enterprises?: from a Field Study of the Metal-working Industry in Java," *Developing Economies*, Vol. 38, No. 4, pp. 572-95.

Supratikno, H., 1998, *Competitive Strategy, Production Organization and Inter-firm Collaboration: A Case Study of Subcontracting Arrangements in Three Manufacturing Firms in Indonesia*, Amsterdam: Vrije Universiteit.

Tajima, M., 1978, *Small-Medium Scale Manufacturing Industry: Further Discussion in a Comparative Study of Japan and Developing Nations*, IDCJ Working Paper Series No. 8, Tokyo: International Development Center of Japan.

Tambunan, T. T. H., 2000, *Development of Small-scale Industries during the New Order Government in Indonesia*, Aldershot: Ashgate.

Thee, K. W., 1985, "Kaitan-Kaitan Vertikal Antar Perusahaan dan Pengembangan Sistem Subkontraktor di Indonesia: Beberapa Hasil Studi Permulaan (Vertical Inter-firm Linkages and the Development of Subcontracting System in Indonesia: Some Case Studies)," *Masyarakat Indonesia*, Vol. 12, No. 3, pp. 219-31).

Thee, K. W., 1994, "Indonesia," in Meyanathan, S. D. (ed.), *Industrial Structures and the Development of Small and Medium Enterprise Linkages: Examples from East Asia*, Washington, D.C.: World Bank.

Thee, K. W., 1997, "The Development of the Motorcycle Industry in Indonesia," in Pangestu, M. and Y. Sato (eds.), *Waves of Change in Indonesia's Manufacturing Industry*, Tokyo: Institute of Developing Economies.

Timmer, M. 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*, Vol. 35, No. 1, pp. 75-97.

Urata, S., 2000, *Policy Recommendation for SME Promotion in the Republic of Indonesia*, Tokyo: Ministry of International Trade and Industry (MITI).

Van der Eng, P., 2002, "Indonesia's Growth Performance in the Twentieth Century," in Maddison, A. and W.S. Shepherd (eds.), *The Asian Economies in the Twentieth Century*, London: Edward Elgar.

Van Diermen, P., 1997, *Small Business in Indonesia*, Aldershot: Ashgate.