Multinational presence and labour productivity differentials in Indonesian manufacturing, 1975–2001

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MULTINATIONAL PRESENCE AND LABOUR PRODUCTIVITY DIFFERENTIALS IN INDONESIAN MANUFACTURING, 1975–2001

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Foreign multinational corporations (MNCs) have accounted for important shares of employment and production in Indonesian manufacturing since 1975, and these shares increased especially rapidly in the early to mid-1990s. These increases were concentrated in the machinery industries and in MNCs with large foreign ownership shares, and continued through the crisis of 1997–98 and beyond, despite apparently large withdrawals of inward foreign direct investment in 1998 and subsequent years. MNCs generally had much higher average labour productivity than local plants and, after controlling for plant-level variation in electricity consumption per employee, size and vintage, we found that these differentials persisted in about three-quarters of the cases examined. However, there was also large variation in MNC presence and in MNC–local productivity differentials across industries and time, with statistically insignificant differentials most common in apparel and footwear, as well as in MNCs with small foreign-ownership shares.

INTRODUCTION

Foreign multinational corporations (MNCs) have played an important role in many of Indonesia's manufacturing industries over the last three decades. Employment and production (value added) of MNCs increased especially rapidly, both absolutely and relative to Indonesian totals, during the rapid economic growth of the early and mid-1990s. Moreover, contrary to the impression created by large outflows of foreign direct investment (FDI) after the crisis of 1997–98, manufacturing MNCs' employment and production, and their shares of total manufacturing employment and production, continued to increase through 2001. The first purpose of this paper is to analyse trends since 1975, highlighting the large variation in shares of MNCs across time, industry and foreign ownership group, and to examine some of the factors responsible for the observed patterns.

The contribution of MNCs in developing economies stems largely from their tendency to possess superior firm-specific assets to non-MNCs. These assets

include production technology, management know-how and marketing networks. This enables MNCs to raise the productivity of the factors they use, including labour. Because most local firms in Indonesia are non-MNCs, comparisons of MNCs and local firms are essentially comparisons of MNCs and non-MNCs. Correspondingly, MNCs in Indonesia are generally expected to be more productive than local firms in some respect.[1] It is often asserted that MNCs restrict the access of firms in which they have a minority share to the MNCs' firm-specific assets such as production technology, leading to the expectation that productivity may be relatively low in minority-foreign MNCs (Moran 2001). However, previous evidence indicates that this is not always the case in Indonesian manufacturing (Blomström and Sjöholm 1999; Takii 2004; Takii and Ramstetter 2000, 2003).[2] Past studies of these issues in Indonesia have generally assumed that technology was very similar among manufacturing industries. They have also focused on relatively short periods of time. Thus, the second major purpose of this study is to allow for more differences in technology among industries and to examine variation in labour productivity over longer periods. However, data constraints require that we simplify considerably the specification of production technology when examining long-run trends.

The next section examines trends in and patterns of MNC presence in Indonesian manufacturing. We then compare average labour productivity in MNCs and local plants. In all of these analyses we distinguish three ownership groups of MNCs—minority-foreign MNCs, with foreign ownership shares of 10–49%, majority-foreign MNCs, with foreign ownership shares of 50–89%, and heavily-foreign MNCs, with foreign ownership shares of 90% or more—and investigate whether there are important differences among these groups, as is often hypothesised. The concluding section summarises the main results, emphasising that all groups of MNCs tend to have higher labour productivity than local plants.

THE MULTINATIONAL PRESENCE IN INDONESIAN MANUFACTURING
Indonesia has long welcomed MNCs and actively encouraged FDI as part of its effort to promote economic growth and industrialisation, though it has also sought to regulate those MNCs in several respects. Patterns of MNC presence have varied greatly over time and across industries, partly in response to changes in the macroeconomic environment and economic policies.

The Macroeconomic Environment, Economic Policies and Aggregate Trends
Before 1985 the economy was heavily dependent on oil and gas—a sector in which MNCs played key roles. Manufacturing remained rather limited, account-

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[1]Several related studies indicate that the presence of MNCs leads to higher labour productivity or total factor productivity in local firms, i.e. to positive productivity spillovers (Blomström and Sjöholm 1999; Hill 1988: 107–17, 1990a, 1990b; Sjöholm 1998, 1999a, 1999b, 2000; Takii 2004, 2005).

[2]Evidence for Malaysia (Menon 1998; Oguchi *et al.* 2002) and Thailand (Ramstetter 2002b, 2004) differs from the Indonesian evidence in suggesting that MNCs are often not more productive than local plants in individual industries, but is similar in suggesting that MNCs' productivity levels are not systematically related to foreign ownership shares in Thailand.

ing for an average of 9% of the workforce and 13% of GDP at current prices in the 1975–85 decade (table 1). Although economic growth averaged a respectable 6.2% per year during this decade, it slowed markedly toward the end of the period, to 2.2–4.2% in 1982–83 and 1985 (BPS [Central Statistics Agency], unpublished data and <www.bps.go.id>), as large declines in oil and gas prices reduced exports and government revenue. Indonesia's policy makers responded with far-reaching reforms. Perhaps the most important was the rationalisation and reduction of previously high levels of import protection, which often penalised exporters. Measures to promote non-oil exports, many of them manufactures, were also adopted. Partly as a result of these efforts, economic growth recovered in 1986–88 and accelerated to 6.5–8.2% annually in 1989–96, while manufacturing's shares of employment and GDP rose to 13% and 26%, respectively, by 1995–97 (table 1).

There were also important shifts in Indonesia's policies toward MNCs. According to Pangestu (1996: 150), these were in part a response to changes in external conditions and resource availability. In the early years of the New Order regime, for example, there were no restrictions on foreign ownership, because the government's primary concern was to restore economic stability.[3] However, high oil prices reduced concern about stability in the 1970s, while rising nationalism contributed to the promulgation of various restrictions on MNCs, including closure of some sectors to foreign investment and restrictions on foreign ownership shares. Requirements on divestment, minimum capital investment and local content were also introduced. These restrictions were gradually relaxed from the late 1980s. In 1994 a formal deregulation removed restrictions on foreign ownership shares and minimum capital requirements, and relaxed divestment rules.

Rapid growth and industrialisation were both causes and results of even larger increases in inward FDI from foreign-domiciled MNCs during the economic boom of the late 1980s and the early to mid-1990s. Policy changes and external factors also encouraged FDI in this period.[4] Net inward FDI flows—gross inward remittances less withdrawals by foreigners—as reported in Indonesia's balance of payments increased from an annual average of $0.3 billion in 1975–85 to $0.7 billion in 1986–91, $2.0 billion in 1992–94 and $5.1 billion in 1995–97 (table 1).[5] The ratio of these flows to GDP also rose markedly, from only 0.3% in 1975–85 to 2.3% in 1995–97.

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[3]See Pangestu (2002) for details of foreign investment policy under the New Order regime.

[4]External factors included strong growth and/or appreciating currencies in important home economies such as Hong Kong, Japan, South Korea, Singapore and Taiwan, which made their MNCs bullish on the prospects in Indonesia, other Southeast Asian economies and China. Increasingly sophisticated networks also evolved among manufacturing MNCs in Singapore, Malaysia and Thailand, making it easier for Indonesia-based MNCs to become increasingly involved in these networks by the mid to late 1990s.

[5]This is the most widely used estimate of FDI, and refers to equity and loans from foreign-owned multinational groups to affiliates in Indonesia in which the foreign group has ownership shares of 10% or more. Indonesian estimates of FDI originate in Bank Indonesia and are taken from International Monetary Fund, *International Financial Statistics*, 1994 Yearbook and January 2005 CD–ROM. This measure ignores outward FDI by Indonesians, estimates of which are available only from 1993, creating the possibility that estimates for earlier years confuse inward and outward FDI. However, outward FDI was probably very small in 1975–92.

TABLE 1 *FDI Flows, Employment and Value Added*

	1975–85	1986–91	1992–94	1995–97	1998–99	2000–01
FDI flows in all industries (annual averages, units as noted)						
Indonesian estimates (current $ million)	266	746	1,963	5,072	–1,551	–3,764
Indonesian estimates (current Rp trillion)	171	1,341	4,116	12,629	–12,564	–34,433
Ratio to GDP (%)	0.3	0.8	1.2	2.3	–1.2	–2.5
Estimates of 26 investors[a] (current $ million)	–	–	–	3,819	2,170	1,826
Development Assistance Committee (DAC) (22 investors)	538	268	1,095	2,762	2,318	1,089
Employment (period averages, '000, except as noted)						
All industries, labour force statistics[b]	54,724	72,826	79,919	84,287	88,245	90,323
Average of annual growth rates (%)[b]	3.2	3.5	2.4	2.1	1.0	1.1
Manufacturing, labour force statistics[b]	4,959	6,733	9,293	10,705	10,725	11,864
Average of annual growth rates (%)[b]	5.6	5.7	11.2	1.3	2.3	2.5
Ratio to all industries (%)	9.1	9.2	11.6	12.7	12.2	13.1
L&M plants, industrial statistics[c]	981	2,232	3,567	4,143	4,179	4,376
Ratio to manufacturing labour force (%)	20	33	38	39	39	37
Foreign L&M plants, industrial statistics[c]	115	223	559	777	857	937
Value added (period averages, current Rp trillion, except as noted)						
All industries, national accounts	54.38	174.68	331.92	538.26	1,028	1,357
Average of annual real growth rates (%)	6.2	6.4	6.8	6.9	–6.2	4.2
Average of annual deflator inflation rates (%)	14.5	8.5	8.1	10.4	44.7	10.2
Manufacturing, national accounts	6.97	32.99	74.82	138.10	262.39	338.47
Average of annual real growth rates (%)	12.2	10.5	10.6	9.2	–3.8	5.0
Average of annual deflator inflation rates (%)	15.1	9.2	8.3	13.1	37.8	7.2
Ratio to all industries (%)	12.8	18.9	22.5	25.7	25.5	24.9
L&M plants, industrial statistics[c]	2.85	18.11	50.37	82.58	173.02	253.24
Ratio to manufacturing value added (%)	41	55	67	60	66	75
Foreign L&M plants, industrial statistics[c]	0.76	4.06	13.04	26.17	62.94	90.59

[a]Estimates from 22 DAC countries plus South Korea, Malaysia, Singapore and Thailand; Malaysian estimates refer to equity investment, where the investor has an effective voice in management.

[b]Labour force estimates are for 1976 onward, labour force growth rates for 1977 onward.

[c]L&M plants = large and medium-sized plants (with 20 or more employees) included in the annual BPS industrial surveys.

Sources: Asian Development Bank, *Key Indicators of Developing Asian and Pacific Countries*, 1990–2004 issues; Bank Negara Malaysia (2004); Bank of Thailand (2004); BPS (<www.bps.go.id> and unpublished data); International Monetary Fund, *International Financial Statistics*, 1994 Yearbook and January 2005 CD–ROM; OECD (2004); Singapore Department of Statistics, *Singapore Investment Abroad*, 2000–01 and 2001–02 issues; Korea Federation of Banks (1999); Export–Import Bank of Korea, *Overseas Direct Investment Statistics Yearbook*, 2001–04 issues; Takii and Ramstetter (2004): appendix tables 2a–2e, 3a–3e.

Indonesian estimates suggest there was then an abrupt reversal, with FDI inflows turning strongly negative, to average –$1.6 billion in 1998–99 and –$3.8 billion in 2000–01. These declines have often been interpreted as reflecting loss of MNC confidence in Indonesia, due in part to the large depreciation of the rupiah, from an average of Rp 2,500/$ in 1995–97 to Rp 9,138/$ in 1998–2001, lower economic growth, averaging –6.2% in 1998–99 and 4.2% in 2000–01, and stagnant industrialisation (i.e. unchanging shares of manufacturing in total GDP and employment). A number of policy-related factors, including the perceived inability of post-Soeharto governments to manage the economy, decentralisation, which resulted in the proliferation of regulations on MNCs, more onerous labour market regulations, an increasingly militant labour movement, and the revival of economic nationalism, are also thought to have contributed to the downturn in FDI.

However, in marked contrast to trends observed in Indonesian estimates of FDI, our estimates of employment and production (value added) in manufacturing MNCs, which are based on BPS industrial survey data, suggest that MNC presence continued to increase at a modest rate after the crisis, both absolutely and relative to manufacturing totals.[6] For example, after growing rather steadily from an average of 115,000 in 1975–85 to 223,000 in 1986–91, and then jumping to 777,000 in 1995–97, the number of employees in manufacturing MNCs continued increasing to 937,000 in 2000–01 (table 1). MNC shares of employment in large and medium-sized manufacturing plants (those with 20 or more employees) first fell from 12% to 10% between 1975–85 and 1986–91, but then increased to 19% in 1995–97 and 21% after 1998 (table 2). MNC shares of total manufacturing employment as reported in the labour force surveys were much smaller, reflecting the existence of many small manufacturing plants not covered by the industrial surveys. In addition, these shares increased more steadily, from averages of 2% in 1975–85 to 3% in 1986–91, 7% in 1995–97, and 8% thereafter. This probably reflects the fact that industrial survey coverage was markedly poorer in earlier years and that some local plants increased in size (see below).

Value added measured in current prices increased much more rapidly than employment, largely because inflation accelerated significantly during the crisis (table 1). MNC shares of value added in large and medium-sized manufacturing plants were higher than corresponding shares of employment, but increased more slowly, from 22% in 1986–91 to 32% in 1995–97 and 36% thereafter (table 3). Here again, MNC shares of manufacturing GDP estimates were smaller than shares of large and medium-sized plants and increased more steadily, from averages of 11–12% before 1991 to 19% in 1995–97 and 24–27% thereafter. Thus these data indicate that, although some prominent manufacturing MNCs such as Sony Electronics Indonesia withdrew after the crisis, the growth of employment and production in new or expanding MNC plants far exceeded the reductions that occurred as a result of MNC plants being scaled back or closed.

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[6]Data for MNCs are not published by BPS, but have been compiled by the authors from raw factory-level data for 1975–2001 from the industrial surveys, provided by BPS. See Takii and Ramstetter (2004) for details by MNC ownership group and industry for 1975–2001.

TABLE 2 *MNC Shares of Employment in Large and Medium-sized Plants*
(% shares of industry totals, period averages)

Industry, Ownership Group	1975–85	1986–91	1992–94	1995–97	1998–99	2000–01
Manufacturing	12	10	16	19	21	21
Heavily-foreign	2	2	4	6	9	11
Majority-foreign	7	5	7	7	7	6
MNCs/manufacturing labour force[a]	2	3	6	7	8	8
Food	4	6	7	9	10	10
Heavily-foreign	1	1	1	2	2	3
Majority-foreign	2	2	3	3	4	4
Textiles	14	12	13	14	16	15
Heavily-foreign	2	2	3	4	7	7
Majority-foreign	11	8	8	7	7	6
Apparel	4	8	19	23	25	25
Heavily-foreign	0	3	7	11	14	17
Majority-foreign	3	3	7	5	4	3
Footwear	23	32	48	48	46	46
Heavily-foreign	15	11	12	14	17	17
Majority-foreign	8	19	28	24	19	16
Chemicals	21	17	18	22	24	29
Heavily-foreign	8	1	1	4	8	14
Majority-foreign	11	11	11	12	10	9
Rubber	14	15	14	16	18	20
Heavily-foreign	6	6	4	6	6	6
Majority-foreign	5	5	6	6	6	8
Plastics	10	3	8	11	10	14
Heavily-foreign	2	0	2	4	6	8
Majority-foreign	6	2	3	4	3	3
Metal products	22	16	21	25	25	26
Heavily-foreign	1	0	2	4	9	12
Majority-foreign	13	9	12	13	10	10
Electric & precision machinery	37	22	44	56	63	65
Heavily-foreign	18	1	17	31	44	48
Majority-foreign	17	16	18	17	12	11
Transport machinery	12	14	18	24	33	38
Heavily-foreign	0	0	2	4	9	9
Majority-foreign	8	8	8	12	13	11
Other manufacturing	9	7	10	12	13	14
Heavily-foreign	1	1	2	3	5	7
Majority-foreign	5	3	4	4	4	4

[a]Excludes 1975.

Sources: Takii and Ramstetter (2004): appendix tables 2a–2e; table 1 of this paper.

TABLE 3 *MNC Shares of Value Added in Large and Medium-sized Plants*
(% shares of industry totals, period averages)

Industry, Ownership Group	1975–85	1986–91	1992–94	1995–97	1998–99	2000–01
Manufacturing	**27**	**22**	**26**	**32**	**36**	**36**
Heavily-foreign	4	2	3	7	14	15
Majority-foreign	17	12	12	14	13	10
MNCs/manufacturing GDP	11	12	17	19	24	27
Food	**15**	**13**	**13**	**19**	**25**	**19**
Heavily-foreign	3	1	1	4	7	5
Majority-foreign	9	4	6	8	9	10
Textiles	**30**	**24**	**19**	**23**	**34**	**27**
Heavily-foreign	3	3	2	4	13	11
Majority-foreign	26	19	13	14	19	12
Apparel	**4**	**9**	**24**	**33**	**37**	**34**
Heavily-foreign	0	3	8	15	17	23
Majority-foreign	3	4	8	6	8	4
Footwear	**68**	**36**	**42**	**47**	**58**	**56**
Heavily-foreign	30	9	13	14	23	24
Majority-foreign	38	24	23	25	26	15
Chemicals	**37**	**35**	**45**	**48**	**59**	**40**
Heavily-foreign	10	2	2	7	14	15
Majority-foreign	21	22	30	30	30	18
Rubber	**25**	**25**	**30**	**34**	**28**	**33**
Heavily-foreign	11	7	6	7	8	9
Majority-foreign	11	7	13	24	16	19
Plastics	**46**	**12**	**12**	**29**	**31**	**22**
Heavily-foreign	1	0	3	13	19	13
Majority-foreign	38	6	6	7	8	6
Metal products	**43**	**42**	**50**	**49**	**54**	**44**
Heavily-foreign	3	1	2	7	13	11
Majority-foreign	26	17	22	25	27	26
Electric & precision machinery	**55**	**39**	**50**	**53**	**76**	**75**
Heavily-foreign	16	1	16	31	62	60
Majority-foreign	35	28	19	15	8	9
Transport machinery	**18**	**41**	**31**	**39**	**37**	**64**
Heavily-foreign	0	0	0	3	6	10
Majority-foreign	13	13	9	11	11	6
Other manufacturing	**23**	**17**	**20**	**25**	**23**	**22**
Heavily-foreign	2	1	2	3	7	6
Majority-foreign	15	9	8	11	8	6

Sources: Takii and Ramstetter (2004): appendix tables 3a–3e; table 1 of this paper.

Data Issues

How does one reconcile the seemingly contradictory stories told by the FDI data and the data on manufacturing MNCs? One important possibility is that withdrawals of FDI after the crisis were concentrated in non-manufacturing sectors. Alternative estimates of realised FDI stocks in manufacturing from the Investment Coordinating Board (BKPM) might tempt one to draw this conclusion, as they indicate an increase of $8 billion between the end of 1997 and mid-2000.[7] However, these estimates refer only to new remittances, exclude withdrawals, and include contributions of local partners in joint ventures. These definitional differences, and the lack of industry detail in the balance of payments estimates, make it impossible to ascertain whether the large withdrawals of FDI reported in the balance of payments originated in manufacturing or non-manufacturing sectors.

A second possibility is that manufacturing MNCs simultaneously experienced large declines in FDI and modest growth of employment and value added. This would be most likely to occur if negative FDI resulted from (1) withdrawals of proceeds from sales of non-fixed assets, such as stocks and bonds, and disposal of cash holdings (note that sales of fixed assets would probably be reflected in employment and production trends); or (2) increases in equity and loans from other (primarily local) sources. In post-crisis Indonesia, the former seems a distinct possibility, but there are no data that allow one to ascertain how important this factor actually was.

A third possibility is that Indonesia's balance of payments may overestimate the fall in FDI flows after the crisis, and there is evidence of this from investing country estimates of outward FDI flows. For example, FDI flows to Indonesia from 22 Development Assistance Committee (DAC) members, including Japan, the United States, Canada, Australia, New Zealand and most Western European economies, remained strongly positive, despite falling from an annual average of $2.8 billion in 1995–97 to $2.3 billion in 1998–99, and $1.1 billion in 2000–01 (table 1). If FDI flows from four Asian investors (South Korea, Malaysia, Singapore and Thailand) are added to the DAC totals, the decline was initially larger but subsequently smaller, from $3.8 billion to $2.2 billion and $1.8 billion, respectively. Because these 26 countries account for the vast majority of FDI in Indonesia, the investing country data strongly suggest that FDI flows did not fall so far as to become negative.[8] Investing country data are thus more consistent with the trends observed in the industrial survey data than with Indonesia's balance of payments data. However, it is also important to recognise that all estimates of

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[7]BKPM data come from Investment Coordinating Board (1997) and Board of Investment and State-owned Enterprise Development (2000).

[8]According to the BKPM data (footnote 7) these 26 economies combined to account for 56% of realised FDI stocks in non-oil, non-finance industries in 1997 and 59% in mid-2000. Hong Kong and Taiwan were the major investors not included in this group, and they combined to account for 18% and 17%, respectively, of cumulative FDI in 1997 and mid-2000. Shares of other investors, including joint ventures involving firms from multiple countries, were also large, 24% and 23%, respectively. However, because European and US MNCs account for the vast majority of the FDI in the large oil and gas sector, the 26 economies covered in table 1 probably accounted for much larger shares of total FDI than the BKPM data suggest.

FDI are subject to large margins of error, and that there are often large gaps between home and host country estimates.

A fourth possibility is that the coverage of the industrial survey data may have improved, thereby inflating estimates of the growth of employment and value added in MNCs after the crisis. As indicated above, coverage does appear to have improved between the mid-1980s and the 1990s. Employment in the large and medium-sized plants covered in the industrial surveys rose from an average of 20% of manufacturing employment reported in the labour force surveys in 1975–85 to 33% in 1986–91 and 37–39% thereafter (table 1). That this increase is due to improved coverage is suggested by a comparison of the raw datasets used in this study with BPS's backcast datasets, which attempt to include estimates for non-reporting plants and correct mistakes in the raw datasets.[9] However, the changes in coverage were apparently far more pronounced for local plants than for MNCs, which were relatively well known to surveyors. Comparisons of both the raw and backcast datasets with labour force survey estimates also suggest that changes in industrial survey coverage of employment were not large after 1992. Similar patterns are observed in the value added data before the crisis. However, there was a sharp fall in the share of large and medium-sized plants in manufacturing GDP, from an average of 67% in 1992–94 to 60% in 1995–97, before it rebounded to 66% in 1998–99 and 75% in 2000–01. This share was particularly low in 1997 (48%, Takii and Ramstetter 2004: appendix table 3e; BPS, <www.bps.go.id>). The absence of similar fluctuations in the shares of large and medium-sized plants in manufacturing employment suggests that the fluctuations in shares of manufacturing GDP resulted primarily from sizeable changes in the output of large and medium-sized plants compared to small ones. Estimation errors in both the industrial statistics and the national accounts may also have been involved.

This study relies on the BPS industrial survey data, because the primary concern here is to analyse patterns and trends in MNC employment, production and labour productivity. Although Indonesia's industrial surveys are unusually rich, four characteristics need to be kept in mind when using these data. First, the surveys cover only large and medium-sized plants, with 20 or more employees. This is not a significant problem in this context because it is not meaningful to compare MNCs, which tend to be relatively large, with small local plants. Second, as noted above, the coverage of these surveys apparently improved markedly in the 1980s, and has generally been better in the 1990s than in previous decades. One possible reason for this increase is that a larger proportion of plants exceeded the 20-person threshold in recent years, but better sample coverage was probably an important factor as well. Third, BPS estimates variables for numerous non-reporting plants based on information from surveys of previous years and/or from the non-reporting plant's industry. Thus, some of the changes observed over time in these data may result from errors in data estimation or changes in survey coverage. Fourth, when compiling the raw datasets we found a number of inconsistencies

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[9]For example, the ratio of raw data-based estimates of manufacturing employment to estimates based on the 1998 backcast data increased from 86% in 1985–89 to 91% in 1991–93 and 95% in 1994–95 (Takii and Ramstetter 2000). See this source for further details on the backcast datasets and comparisons with raw data for 1985–98.

and apparent mistakes in information on foreign ownership shares. We attempted to correct these problems, making adjustments when foreign shares for one or two years in the middle of a series differed greatly from estimates for surrounding years.[10] Despite such problems, these data are some of the best of their kind in the developing world, and probably yield an accurate depiction of Indonesian manufacturing.

Patterns of Multinational Presence by Industry and Ownership Share
The industry distribution of MNC employment and production has changed markedly over the years. For example, among the 10 individual industries examined in this study, textiles and chemicals accounted for relatively large proportions of total manufacturing MNC employment and production through 1991, but smaller proportions thereafter (table 4). Electric, electronic and precision machinery (hereafter electric and precision machinery, for brevity) was a large industry for MNCs in 1975–85, but its share of manufacturing MNC totals fell in 1986–91, before increasing again to become the largest industry in terms of MNC activity in 2000–01. MNC production in apparel and footwear has always been rather small, but MNC employment in these industries increased to high levels after 1992. Conversely, MNCs in transport machinery (mainly motor vehicle plants) have always employed a small number of workers, although their share of production was large in 1986–97 and 2000–01—the decline in 1998–99 reflecting the heavy impact of the crisis on this MNC-dominated industry.

Despite increases in overall manufacturing, the degree of MNC presence has varied greatly among individual industries and over time. As in numerous other countries, MNC presence in Indonesia has tended to be larger in electric and precision machinery than in most other industries. In this subsector, a high proportion of costs is devoted to production of intangible assets that can easily be shared across long distances, such as product designs. It is also possible to divide production into many stages with distinctly different factor requirements. This aids decentralisation of production and reduction of costs through locating labour-intensive operations in low-wage economies such as Indonesia. However, Indonesia's electric and precision machinery industries did not become very large until the mid-1990s, and MNC shares of employment and value added in the industry were 56% or less through 1995–97 (tables 2 and 3). MNC shares also dipped to low levels (22% of employment and 39% of value added) in 1986–91 after the withdrawal of two large MNCs, Fairchild in 1985 and National Semiconductor in 1986 (Pangestu 2002: 48). After the crisis, however, MNC shares increased markedly, to about two-thirds of employment and three-quarters of production (tables 2 and 3), as MNCs continued to expand (table 4), while local plants grew more slowly.

Transport machinery is another industry in which MNC shares increased rapidly after the crisis, to 38% of employment and 64% of value added in 2000–01 (tables 2 and 3). There was also a large increase in the MNC share of value added between 1975–85 and 1986–91, and a more gradual increase in MNC shares of employment. In this industry, too, intangible asset development accounts for a

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[10]See Takii and Ramstetter (2004: 11, 33–34) for details on the method used to correct ownership shares.

TABLE 4 *Manufacturing Employment and Value Added*
in Foreign L&M Plants, by Sector[a]
(period averages)

Industry	1975–85	1986–91	1992–94	1995–97	1998–99	2000–01
Employment ('000)						
Food	7	21	37	49	58	58
Textiles	32	44	75	88	100	96
Apparel	1	12	64	90	104	123
Footwear	2	13	110	141	120	116
Chemicals	13	20	29	40	46	59
Rubber	5	18	19	20	23	29
Plastics	2	2	10	18	15	25
Metal products	9	12	25	38	31	35
Electric & precision machinery	12	12	53	103	138	157
Transport machinery	4	11	19	30	35	45
Other manufacturing	30	57	119	161	187	194
Total	**115**	**223**	**559**	**777**	**857**	**937**
Value added (current Rp billion)						
Food	50	295	793	1,676	5,274	5,687
Textiles	90	450	1,046	2,132	6,860	5,442
Apparel	1	42	575	1,028	2,705	3,024
Footwear	11	68	715	1,194	3,093	3,302
Chemicals	116	622	2,030	3,813	11,210	10,419
Rubber	27	164	344	530	1,074	1,805
Plastics	18	35	129	564	1,134	1,074
Metal products	46	309	898	1,598	3,038	3,763
Electric & precision machinery	67	210	1,054	3,148	9,627	19,157
Transport machinery	32	495	1,528	2,709	5,213	16,927
Other manufacturing	304	1,370	3,932	7,778	13,713	19,990
Total	**763**	**4,060**	**13,043**	**26,171**	**62,941**	**90,589**

[a]L&M plants = large and medium-sized plants, with 20 or more employees, included in the annual BPS industrial surveys.

Source: Takii and Ramstetter (2004): appendix tables 2a–2e, 3a–3e.

large proportion of costs, but operations tend to be more capital intensive, which reduces the benefits from location in low-wage economies. Import protection remains relatively high in this industry (James and Ramstetter 2005), especially in the motor vehicles subsector where most MNCs are active, and this has encouraged MNCs to set up manufacturing plants in Indonesia. However, the evidence suggests that both MNCs and local plants remain very inefficient in this industry (Aswicahyono *et al.* 2000; Ito 2004).

   MNCs have also played an important role in the rapid growth of Indonesia's footwear and apparel industries. Here again the ability to use labour-intensive production methods and to transfer product designs easily from abroad gives Indonesian plants in these industries some strong competitive advantages. In

footwear, MNC shares of employment grew from about one-quarter in 1975–85 to slightly less than half after 1992 (table 2). Corresponding shares of value added were actually much larger in 1975–85, at over two-thirds (table 3), but absolute production levels were very small (table 4). Although MNC shares were initially much smaller in apparel—only 4% of both employment and value added in 1975–85 and 8–9% in 1986–91—they increased markedly after 1992 to roughly one-quarter of employment and one-third of production after the crisis.[11]

Chemicals and metal products are two industries that tend to be more capital intensive than others. MNCs have accounted for large and increasing shares of production in these industries, between 35% and 50%, except during and immediately after the crisis in 1998–99, when they rose to 59% in chemicals and 54% in metal products (table 3). MNC shares of employment were much smaller than shares of value added in these industries, at 29% or less (table 2). The absolute level of MNC production and employment was much larger in chemicals than in metal products (table 4).

After 1992 there was an important trend toward higher shares for heavily-foreign MNCs (those with foreign ownership shares of 90% or more). Shares of these MNCs increased from 2% of manufacturing employment and production in 1986–91 to 6% of employment and 7% of production in 1995–97 and then to 11% of employment and 15% of production in 2000–01 (tables 2 and 3). Meanwhile, shares of majority-foreign MNCs (those with foreign ownership shares of 50–89%) and minority-foreign MNCs (those with foreign ownership shares of 10–49%) in manufacturing remained largely unchanged during most of the post-1992 period.[12] In this period, majority-foreign MNCs accounted for 6–7% of employment and 10–14% of production, while minority-foreign MNCs had a 5% share of employment and 9–12% shares of production. This followed trends toward lower shares of production between 1975–85 and 1986–91 in total manufacturing and in most individual industries (7 of 11) for both heavily-foreign MNCs and majority-foreign MNCs. Some of these trends (e.g. in electric and precision machinery) were related to changes in ownership or closures of some large firms, but declines in corresponding employment shares were generally smaller and less common, suggesting that production shares fluctuated more than employment shares in these ownership groups.

The removal of ownership restrictions on MNCs in the late 1980s and early 1990s was clearly an important reason for the trend toward higher shares for heavily-foreign MNCs. Consequently, increases in the shares of heavily-foreign MNCs were observed in almost all industries, with rubber being the one exception. Another cause of this trend was the changing industrial distribution of MNC operations in Indonesian manufacturing—in particular, the rapid growth of MNCs in electric and precision machinery. In this industry, shares of heavily-foreign MNCs reached 48% of employment and 60% of production in 2000–01, and this industry alone accounted for 25% of the employment in, and 42% of the production by, all heavily-foreign MNCs. It is important to recognise that many of the MNCs in the

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[11]A part of the increase in the share of apparel resulted from the reclassification of some textile products as apparel from 1990 forward.

[12]Shares of minority-foreign plants are not shown in tables 2 and 3 to save space, but can be calculated from the information provided in the tables.

industry were large exporters, and would probably have been granted exemptions from ownership restrictions even before these were removed. Correspondingly, the combined share of related products in Indonesian exports rose from 0–1% in 1986–90 to 4–6% in 1992–94, 7–9% in 1994–99 and 14–15% in 2000–02.[13] These changes are important, and indicate that Indonesia is finally being integrated into the network of MNCs that dominate this industry in Southeast Asia.

Another reason for the increase in heavily-foreign MNCs is that several local joint-venture partners found themselves much more heavily indebted after the financial crisis, and were forced to sell their shares to foreign MNCs. For example, in about 70 Japanese MNCs in Indonesian manufacturing the foreign ownership share increased from under 90% in November 1996 to 90% or more by November 2001. Many of these MNCs were in chemicals (including pharmaceuticals), electric machinery, textiles and auto parts.[14]

COMPARING LABOUR PRODUCTIVITY
IN MULTINATIONALS AND LOCAL PLANTS

Economists generally expect MNCs to be more productive than non-MNCs, because they are thought to have relatively large endowments of firm-specific, generally intangible assets. This section focuses specifically on a comparison of labour productivity in MNCs and local plants. MNCs are also often thought to restrict the access of minority-foreign affiliates to these firm-specific assets in order to avoid losing control of them. This in turn implies that minority-foreign MNCs may be less productive than other MNCs. On the other hand, MNCs also want to facilitate profitability and growth in their affiliates, and thus have an incentive to share firm-specific assets to the extent that this raises profitability. The relative strength of these conflicting incentives and their effects on labour productivity levels is thus an empirical issue, which is examined in detail below.

Labour Productivity Differentials

It is apparent from the previous section that MNC shares of production have tended to be larger than corresponding shares of employment, implying that average labour productivity (value added per worker) was higher in MNCs than in local plants. The simple comparisons in table 5 confirm this basic pattern, and

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[13]These are the combined shares of office and computing machinery (SITC [Standard Industrial Trade Classification] 75), telecommunications machinery (SITC 76), other electrical machinery (SITC 77), professional and scientific instruments (SITC 87), and photographic and optical equipment (SITC 88) (ICSEAD 2004).

[14]Data cited in the text are from Toyo Keizai, *Kaigai Shinshutsu Kigyou Souran – Kuni Betsu* [Japanese Overseas Investment by Country], various years. The trend toward larger foreign ownership shares appears to have continued thereafter, as several Japanese parents increased or planned to increase their ownership shares in their auto affiliates in Indonesia. These parents include Honda (49% to 51% in 2002), Nissan (35% to 75% in September 2001), Daihatsu (40% to 61.75%, announced in August 2002), Suzuki (49% to 90%, announced in November 2002), Hino (60.15% to 90% of its manufacturing firm, announced in January 2003) and Toyota (49% to 95% of its manufacturing firm, announced in February 2003). Data for auto parents are taken from press releases on the home pages of these companies.

TABLE 5 *Differences in Labour Productivity between MNCs and Local Plants*
(% period average of value added per worker)

Industry, Ownership Group	1975–85	1986–91	1992–94	1995–97	1998–99	2000–01
Manufacturing						
Heavily-foreign	542	351	164	375	401	281
Majority-foreign	594	533	487	501	562	436
Minority-foreign	388	499	650	745	707	468
Food						
Heavily-foreign	505	508	322	448	677	347
Majority-foreign	608	394	445	441	398	382
Minority-foreign	183	437	226	283	394	289
Textiles						
Heavily-foreign	230	156	78	108	247	124
Majority-foreign	442	474	313	366	412	218
Minority-foreign	168	139	281	266	175	113
Apparel						
Heavily-foreign[a]	–78	–10	83	108	158	662
Majority-foreign[b]	–36	58	102	163	368	132
Minority-foreign[c]	–36	–20	107	134	167	78
Footwear						
Heavily-foreign[d]	202	80	83	67	138	95
Majority-foreign[b]	288	245	14	80	172	183
Minority-foreign[e]	–	26	–2	4	38	50
Chemicals						
Heavily-foreign	190	270	214	325	381	168
Majority-foreign	295	271	465	379	524	246
Minority-foreign	375	392	334	345	555	147
Rubber						
Heavily-foreign	134	181	106	152	104	178
Majority-foreign	161	104	80	198	193	193
Minority-foreign	42	303	99	24	18	–6
Plastics						
Heavily-foreign[f]	24	1	125	2,076	418	232
Majority-foreign	1,431	387	185	221	310	234
Minority-foreign	650	680	145	322	195	167
Metal products						
Heavily-foreign	1,534	344	148	149	264	121
Majority-foreign	394	402	728	553	1,166	816
Minority-foreign	182	280	513	238	487	242
Electric & precision machinery						
Heavily-foreign[g]	146	–32	119	90	229	109
Majority-foreign	355	271	83	146	86	41
Minority-foreign	324	277	135	77	56	44
Transport machinery						
Heavily-foreign[h]	–	–	–54	450	161	225
Majority-foreign	228	288	257	281	214	121
Minority-foreign	139	527	283	360	509	832
Other manufacturing						
Heavily-foreign	938	410	200	265	454	246
Majority-foreign	743	786	561	591	487	395
Minority-foreign	334	410	1,406	1,705	1,294	664

[a]Excludes 1975–79, 1982–84, 1986–87. [b]Excludes 1975–81. [c]Excludes 1975–79, 1984. [d]Excludes 1982–85, 1987–88.
[e]Excludes 1975–87.   [f]Excludes 1985–88. [g]Excludes 1986–89. [h]Excludes 1975–91.

Source: Takii and Ramstetter (2004): appendix tables 4a–4d.

indicate that labour productivity differentials were often very large in Indonesian manufacturing between 1975 and 2001. If all manufacturing is combined, average labour productivity was 388% to 745% higher in minority-foreign plants than in local plants, 436% to 594% higher in majority-foreign plants, and 164% to 542% larger in heavily-foreign plants. On average, labour productivity in all manufacturing combined was highest in majority-foreign MNCs in 1975–91, but highest in minority-foreign MNCs in 1992–2001. Among MNCs it was lowest in minority-foreign MNCs in 1975–85 and in heavily-foreign plants in 1986–2001.

In addition to large variation over time, there was great variation across industries. Differentials between MNCs and local plants tended to be quite large (100% or more) for all MNC ownership groups in food, textiles, chemicals, plastics, metal products, transport machinery and other manufacturing. Large differentials were also observed for majority- and heavily-foreign MNCs in rubber. A few exceptions to these patterns were observed for heavily-foreign MNCs, in textiles in 1992–94, plastics in 1975–91 and transport machinery in 1992–94, and for majority-foreign MNCs in rubber in 1992–94. This list includes several industries where relatively capital-intensive production techniques tend to be used. Consistently small differentials (below 100%) were not observed for majority-foreign or heavily-foreign MNCs in any of the industries listed in table 5, but they were observed for most periods in minority-foreign MNCs in footwear and rubber. For other industry–ownership group combinations, there was notable variation in differentials over time. In apparel, differentials tended to be small or negative through 1991 and larger thereafter. In footwear, differentials were large for majority-foreign MNCs in 1975–91 and 1998–2001 and for heavily-foreign MNCs in 1975–85 and 1998–99, but small in other periods. In electric and precision machinery there were pronounced fluctuations, with differentials being large for heavily-foreign MNCs in 1975–85, 1992–94, and 1998–2001, for majority-foreign MNCs in 1975–91 and 1995–97, and for minority-foreign MNCs in 1975–94. Labour-intensive techniques tend to dominate in these three industries.

Negative differentials, suggesting higher labour productivity in local plants than in MNCs, were extremely rare. The few negative differentials were observed for most ownership groups in apparel in 1975–91, for minority-foreign MNCs in footwear in 1992–94 and rubber in 2000–01, and for heavily-foreign MNCs in electric and precision machinery in 1986–91 and transport machinery in 1992–94. With the exception of rubber in 2000–01, these comparisons all involved very small numbers of MNCs, and it is thus difficult to attach much significance to these observations.

Comparisons after Controlling for Other Influences on Labour Productivity

Comparisons of productivity differentials like those in table 5 are an instructive starting point, but they suffer an important shortcoming. They cannot distinguish between differences in labour productivity that result from the presence of foreign ownership and those that result from variation in other factors related to labour productivity, such as factor intensity, plant size and plant vintage (Blomström and Sjöholm 1999; Ramstetter 2004; Takii and Ramstetter 2000). For example, MNCs may have higher labour productivity simply because they are more capital intensive or because they are larger, allowing them to realise scale economies, not because they are foreign. Plant vintage may have one of two

in all 60 samples. The third set of control variables attempts to account for the effects of plant vintage, by identifying plants that first reported positive employ-ment and value added in three of the earlier periods examined, 1975–85, 1986–91 and 1992–94, with plants first reporting in the recent period(s) being the control group.[15] Results for these dummies varied more across industries than did those for other control variables, and corresponding coefficients were statistically insignificant in a number of cases. For example, establishments founded before 1985 had significantly lower labour productivity in all five relevant periods in food, textiles and metal products, and in three or four periods in apparel, chemi-cals and plastics; moreover, these older plants never had significantly higher labour productivity. In general, correlations between labour productivity and vintage were negative or statistically insignificant.

Although previous estimates of equations similar to (1) indicated large varia-tion across years (Takii and Ramstetter 2000, 2003), estimates are made for six pooled periods in this study. Reflecting large changes in related policies and macroeconomic trends, the periods 1975–85, 1986–91, 1992–94, 1995–97, 1998–99 and 2000 are distinguished.[16] The pooling approach is used because it is often dif-ficult to make sense of the large annual variation in estimates, and because the more important concern here is to compare productivity differentials across peri-ods rather than individual years.[17] Pooling restricts all slope coefficients to be equal for each year in a sample period, but part of the annual variation is accounted for by specifying a set of year dummies that allow intercepts (b_0 + $b_9(Dy_{it})$) to differ across years.

Because the dependent variable is the log of value added per employee, coef-ficients on foreign ownership dummies (b_3, b_4, b_5) can be interpreted as percent-age differences in average labour productivity between respective foreign ownership groups (heavily-foreign, majority-foreign and minority-foreign plants) and local plants, after accounting for plant-level variation in electric power per employee and the measures of size and vintage explained above. Not surprisingly, accounting for variation in these other variables greatly reduces the size of productivity differentials between MNCs and local plants. For example, in contrast to the simple comparisons in table 5, coefficients on foreign ownership dummies revealed large differentials (exceeding 100%) in very few of the com-parisons (9 of 177) made in table 6. Large differentials were observed in earlier periods (1975–85 or 1986–91) for footwear (majority- and heavily-foreign MNCs), plastics (minority-foreign MNCs), metal products (heavily-foreign MNCs) and electric and precision machinery (minority-foreign MNCs). Large differentials

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[15]Although the period dummies are a reasonable proxy for vintage in plants that have always had 20 or more employees and always reported data in the industrial surveys, this variable also captures the characteristics of plants that first employed 20 or more workers and/or reported data in a period.

[16]Some factory identification codes differed between 2001 and 1975–2000. Because this makes it impossible to calculate vintage and year dummies ($Ds7585_{it}$, $Ds8691_{it}$, $Ds9294_{it}$ and Dy_{it}), 2001 data are excluded from these estimates, and from the revised (March 2005) version of Takii and Ramstetter (2004).

[17]We thank Hal Hill and an anonymous referee for this suggestion.

TABLE 6 *Differences in Average Labour Productivity*
between MNCs and Local Plants from Estimates of Equation (1)
(%)

Industry, Ownership Group, Indicator		1975–85	1986–91	1992–94	1995–97	1998–99	2000–01
Food	Heavily-foreign	79	40	38	34	52	44
	Majority-foreign	66	64	51	23	ns	44
	Minority-foreign	ns	31	ns	ns	36	ns
	Adjusted R-squared	0.50	0.44	0.44	0.42	0.44	0.45
	Wald: Heavily = Majority = Minority	*	*	ns	ns	ns	ns
Textiles	Heavily-foreign	54	33	ns	21	80	71
	Majority-foreign	70	61	48	64	71	80
	Minority-foreign	ns	ns	27	39	60	62
	Adjusted R-squared	0.48	0.35	0.37	0.41	0.45	0.39
	Wald: Heavily = Majority = Minority	**	**	*	**	ns	ns
Apparel	Heavily-foreign	–57	–45	ns	ns	ns	ns
	Majority-foreign	ns	ns	18	ns	46	ns
	Minority-foreign	ns	–65	ns	ns	ns	ns
	Adjusted R-squared	0.42	0.24	0.26	0.24	0.32	0.28
	Wald: Heavily = Majority = Minority	ns	**	ns	ns	*	ns
Footwear	Heavily-foreign	174	ns	ns	ns	36	ns
	Majority-foreign	143	ns	ns	ns	ns	ns
	Minority-foreign	–	45	ns	–32	ns	ns
	Adjusted R-squared	0.37	0.18	0.11	0.17	0.29	0.29
	Wald: Heavily = Majority = Minority	**	ns	ns	ns	ns	ns
Chemicals	Heavily-foreign	54	67	53	71	78	72
	Majority-foreign	86	72	89	86	101	100
	Minority-foreign	63	76	79	72	69	67
	Adjusted R-squared	0.52	0.50	0.49	0.45	0.46	0.54
	Wald: Heavily = Majority = Minority	**	ns	ns	ns	ns	ns
Rubber	Heavily-foreign	65	47	55	50	48	88
	Majority-foreign	63	41	59	60	44	78
	Minority-foreign	ns	55	50	ns	ns	ns
	Adjusted R-squared	0.44	0.35	0.35	0.39	0.32	0.28
	Wald: Heavily = Majority = Minority	**	ns	ns	*	ns	*
Plastics	Heavily-foreign	–46	ns	ns	46	100	60
	Majority-foreign	89	94	ns	38	60	61
	Minority-foreign	109	104	ns	56	59	ns
	Adjusted R-squared	0.45	0.33	0.37	0.33	0.36	0.40
	Wald: Heavily = Majority = Minority	**	ns	ns	ns	ns	*
Metal products	Heavily-foreign	149	50	45	ns	51	46
	Majority-foreign	63	66	68	50	64	89
	Minority-foreign	41	39	48	47	45	ns
	Adjusted R-squared	0.60	0.40	0.39	0.37	0.44	0.48
	Wald: Heavily = Majority = Minority	**	ns	ns	ns	ns	ns
Electric & precision machinery	Heavily-foreign	ns	ns	ns	ns	45	60
	Majority-foreign	79	82	36	47	50	75
	Minority-foreign	107	73	45	ns	ns	ns
	Adjusted R-squared	0.51	0.39	0.32	0.36	0.31	0.39
	Wald: Heavily = Majority = Minority	**	ns	ns	**	ns	ns
Transport machinery	Heavily-foreign	–	–	–68	ns	59	77
	Majority-foreign	50	49	43	69	74	108
	Minority-foreign	36	64	ns	49	63	120
	Adjusted R-squared	0.54	0.45	0.43	0.39	0.44	0.56
	Wald: Heavily = Majority = Minority	**	**	**	*	ns	ns

– = no plants in ownership group.
ns = coefficient or Wald statistic not significantly different from zero at the 5% level.
Tests of coefficient significance based on heteroscedasticity-consistent errors.
** = Wald statistic significant at 1% level or better; * = Wald statistic significant at 5% level.

Source: Takii and Ramstetter (2004): appendix table 5.

were also observed in recent years (1998–99 or 2000), for chemicals (majority-foreign MNCs), plastics (heavily-foreign MNCs) and transport machinery (majority- and minority-foreign MNCs). Insignificant differentials were observed in 30% (53 of 177) of the comparisons, and were concentrated in apparel and footwear, as well as in minority-foreign MNCs.

On the other hand, results were consistent with the patterns observed in table 5 in that most foreign ownership coefficients were significantly positive. This was observed in two-thirds (118 of 177) of the ownership–period combinations examined (table 6). Positive and significant differentials were consistently observed for all ownership groups and periods in only one industry, chemicals. Although inconsistent across ownership groups, positive and significant differentials were also common in food (13 of 18 comparisons), textiles (15 of 18), rubber (14 of 18), plastics (12 of 18), metal products (16 of 18), electric and precision machinery (11 of 18) and transport machinery (13 of 16). Positive and significant differentials were not very common in apparel (2 of 18 comparisons) and footwear (4 of 17 comparisons), and these two industries also accounted for most (4 of 6) of the few negative and significant differentials observed.

By ownership group, positive and significant differentials were most common for majority-foreign MNCs, being observed for all six periods in six industries (textiles, chemicals, rubber, metal products, electric and precision machinery, and transport machinery) and in five of six periods for two more (food and plastics) (table 6). Positive and significant differentials were also observed for heavily-foreign MNCs for five or six periods in half of the industries examined (food, textiles, chemicals, rubber, and metal products). However, positive and significant differentials were less common for minority-foreign MNCs, being observed in five or more periods in only three industries (chemicals, metal products and transport machinery).

Majority-foreign MNCs also had higher labour productivity than minority-foreign MNCs in the vast majority of cases for which comparisons were possible (41 of 52 cases), but heavily-foreign MNCs had higher labour productivity than minority-foreign MNCs in only slightly more than half the cases in which comparisons were possible (28 of 49). This latter finding is somewhat puzzling from a theoretical point of view.[18] However, similar results have been obtained for Thai manufacturing, and the relatively low labour productivity in heavily-foreign MNCs in Indonesia reflects their tendency to be concentrated in labour-intensive assembly operations, which are especially large in electric and precision machinery and in apparel.[19]

[18]It also contrasts with results from related studies suggesting that heavily-foreign MNCs have the highest export propensities, followed by majority-foreign MNCs and then minority-foreign MNCs (Ramstetter 1999).

[19]In Thai manufacturing, wholly-foreign MNCs (100% foreign owned) often have lower labour productivity than other MNCs and local plants (Ramstetter 2004), but there is a strong positive correlation between foreign ownership shares and the probability of a plant having a high export propensity (Ramstetter 2002a).

CONCLUDING REMARKS

This paper first documents the important role MNCs have played in many of Indonesia's manufacturing industries over the last three decades. Employment and production (value added) of MNCs increased steadily through the early 1990s, and the rates of increase then accelerated markedly, both absolutely and relative to Indonesian totals, during the rapid economic growth of the early and mid-1990s. These increases were concentrated in the machinery industries and in majority-foreign MNCs, and continued through and after the crisis of 1997–98, despite apparently large withdrawals of inward FDI in 1998 and subsequent years. MNCs also tended to account for much larger shares of manufacturing production than of manufacturing employment. Correspondingly, MNCs generally had much higher average labour productivity than local plants, and we found these differentials to persist in about three-quarters of the cases examined, after accounting for plant-level variation in electricity consumption per worker, size and vintage. However, there was also large variation in MNC presence and productivity differentials among industries and over time. Statistically insignificant differentials were most common in apparel and footwear, as well as in minority-foreign MNCs, while positive and statistically significant differentials were most common in chemicals, metal products and transport machinery, and in majority-foreign MNCs. Majority-foreign MNCs also tended to have the highest average labour productivity of MNC groups.

These conclusions are subject to two important qualifications. First, the methodology employed in this study is simple, and it is possible that systematic use of more sophisticated methodologies such as those in Takii (2004) could generate different results. However, such analysis would probably have to be limited to the post-1988 period because of data constraints. Second, alternative methodologies for dealing with important data issues such as the existence of apparent outliers and errors in reporting and data entry could affect the results generated. In this respect, it would be particularly useful to obtain a recent backcast dataset to help check which observations are unreasonable outliers and which are meaningful data points. In particular, it would be helpful to see if newer data generate results consistent with previous findings; the latter suggested that the backcast datasets are more reliable than the raw datasets, but that analysis of labour productivity differentials using the two datasets produced similar results (Takii and Ramstetter 2000).

Despite these qualifications, our results support the growing literature suggesting that significant and positive productivity differentials between MNCs and local plants have been rather common in Indonesian manufacturing. The major contribution of the study is to show that these results obtain over many industries and periods from 1975 forward, not just in the more limited periods analysed in many previous studies. The results also highlight the fact that minority-foreign and heavily-foreign MNCs often appear to have relatively low labour productivity compared with majority-foreign MNCs. This result is inconsistent with theoretical expectations for heavily-foreign MNCs, which tend to be concentrated in labour-intensive assembly operations in industries such as electric and precision machinery and apparel. On the other hand, results for minority-foreign MNCs are consistent with expectations, as is the more general finding that all groups of MNCs tend to have higher labour productivity than local plants.

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