

Aswicahyono, Haryo; Hill, Hal; Narjoko, Dionisius

**Working Paper**

## Indonesian industrialization: A latecomer adjusting to crises

WIDER Working Paper, No. 2011/53

**Provided in Cooperation with:**

United Nations University (UNU), World Institute for Development Economics Research (WIDER)

*Suggested Citation:* Aswicahyono, Haryo; Hill, Hal; Narjoko, Dionisius (2011) : Indonesian industrialization: A latecomer adjusting to crises, WIDER Working Paper, No. 2011/53, ISBN 978-92-9230-420-1, The United Nations University World Institute for Development Economics Research (UNU-WIDER), Helsinki

This Version is available at:

<https://hdl.handle.net/10419/54055>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

Working Paper No. 2011/53

## Indonesian Industrialization

A Latecomer Adjusting to Crises

Haryo Aswicahyono,<sup>1</sup> Hal Hill,<sup>2</sup>  
and Dionisius Narjoko<sup>3</sup>

September 2011

### Abstract

This paper examines Indonesia's industrialization performance and policies, including its latecomer status, its generally rapid growth since the mid-1960s, its pronounced policy and performance episodes, and its ambivalent embrace of globalization. Particular attention is accorded to the deep economic-political crisis of 1997–98 and its aftermath, with the benefit of a rich, firm level database. The crisis resulted in slower industrial growth, less industrial mobility, and sluggish formal sector employment growth. We also consider some of the general analytical and policy implications for developing country industrialization from the Indonesian experience.

Keywords: Indonesia, industrialization, economic crises, jobless growth

JEL classification: D22, J21, L60, O14

Copyright © UNU-WIDER 2011

<sup>1</sup>Centre for Strategic and International Studies, <sup>2</sup>Australian National University, <sup>3</sup>Economic Research Institute for ASEAN and East Asia, corresponding author's email: hal.hill@anu.edu.au

This study has been prepared within the UNU-WIDER project on Promoting Entrepreneurial Capacity, directed by Wim Naudé.

UNU-WIDER gratefully acknowledges the financial contributions to the project by the Finnish Ministry for Foreign Affairs, and the financial contributions to the research programme by the governments of Denmark (Ministry of Foreign Affairs), Finland (Finnish Ministry for Foreign Affairs), Sweden (Swedish International Development Cooperation Agency—Sida) and the United Kingdom (Department for International Development).

ISSN 1798-7237

ISBN 978-92-9230-420-1

## Acknowledgements

For helpful comments on earlier versions of this study, we are grateful to the editors and to participants at the UNU-WIDER, UNU-MERIT, and UNIDO international workshop, held in Maastricht, October 2009.

Tables and figures appear at the end of the paper.

*The World Institute for Development Economics Research (WIDER) was established by the United Nations University (UNU) as its first research and training centre and started work in Helsinki, Finland in 1985. The Institute undertakes applied research and policy analysis on structural changes affecting the developing and transitional economies, provides a forum for the advocacy of policies leading to robust, equitable and environmentally sustainable growth, and promotes capacity strengthening and training in the field of economic and social policy making. Work is carried out by staff researchers and visiting scholars in Helsinki and through networks of collaborating scholars and institutions around the world.*

*[www.wider.unu.edu](http://www.wider.unu.edu)*

*[publications@wider.unu.edu](mailto:publications@wider.unu.edu)*

UNU World Institute for Development Economics Research (UNU-WIDER)  
Katajanokanlaituri 6 B, 00160 Helsinki, Finland

Typescript prepared by Lisa Winkler at UNU-WIDER

The views expressed in this publication are those of the author(s). Publication does not imply endorsement by the Institute or the United Nations University, nor by the programme/project sponsors, of any of the views expressed.

## 1 Introduction

Indonesia, the fourth most populous nation in the world and the largest economy in South East Asia, has an unusual economic and industrial history, with its post-1945 independent history dominated by three major episodes. Through to the mid-1960s, it had barely commenced the process of modern industrialization. It lagged behind its Asian neighbours, experiencing neither the state-orchestrated heavy industrialization of China and India, nor the export-oriented growth then getting under way in the Asian newly industrialized economies. Its modern industrial sector, such as it was, was dominated by a few large state-owned enterprises, which in most cases had been established by Dutch commercial interests before the Pacific War, and subsequently taken over by the state as part of the 1957–58 nationalizations.

Then, in a sudden reversal of fortunes, the country began to experience very rapid industrialization from the late 1960s, with the manufacturing sector growing at more than 10 per cent per annum for most of the subsequent three decades. Initially this growth was import-substituting in nature, but from the mid-1980s a successful transition to export-orientated industrialization was engineered. That rapid growth was brought to an abrupt halt in 1997–98 with the Asian financial crisis, which resulted in a peak-to-trough growth collapse of more than 20 percentage points. Subsequently, growth recovered, but the effects on the nature and drivers of industrial growth appear to be profound.

The purpose of this paper is to provide an analytical narrative and interpretation of Indonesia's industrialization outcomes and policies, and to draw attention to the general lessons for late industrializers. The country's industrial experience is of general interest not only because of its size but also the lessons from its unusual history, particularly its pronounced episodes in development, its management of natural resource abundance, the continuing ambivalence towards globalization, adjustment to large external shocks, and major political and institutional transitions. These episodes of economic development and industrial policies also provide insights into how firms develop and respond to major events. The effects of the deep crisis of 1997–98, for example, can be examined with reference to an unusually rich firm level panel dataset. The dramatic events of this crisis and its aftermath, presaging major institutional changes, have also altered the country's industrial growth dynamics.

We organize the paper as follows: Section 2 provides a brief analytical narrative of Indonesian economic development, highlighting its generally strong economic performance since the late 1960s, in the context of pronounced variations in economic outcomes, policy environments, and external circumstances. In Section 3 we discuss the key features of its industrialization record, including rapid growth, structural change, the switch to export orientation in the 1980s, and its unusual ownership features. Section 4 examines how major economic crises impact on the industrial sector, with special reference to firm level impacts and responses in the wake of the Asian financial crisis. Section 5 investigates the phenomenon of 'jobless industrialization' during the period since 1998. The finally section sums up and assesses some broader implications from the Indonesian experience.

## 2 Indonesian economic development

The focus of this paper is industrialization, but it is important to understand the broader economic history context. By the mid-1960s, Indonesia was an economic basket case. Inflation was out of control, and the left-leaning government had withdrawn from most international organizations, preferring instead to be part of the Beijing–Pyongyang–Hanoi–Phnom Penh–Jakarta axis of ‘new economic forces’. Rudimentary national accounts estimates suggest that the country’s per capita income was about three-quarters of that half a century earlier (van der Eng 2002). The standard development economics textbook of the time, authored by one of the leading foreign authorities on the country, portrayed Indonesia as a ‘chronic economic dropout’ (Higgins 1968). Then, in one of the most remarkable reversals of fortune in recent economic history, the regime change in 1966 ushered in a period of rapid economic growth, with per capita income approximately quadrupling over the next three decades (Figure 1). This growth was largely fuelled by the adoption of broadly orthodox policies, including the restoration of macroeconomic stability, more open trade and investment policies, encouragement of the private sector, and investments in infrastructure and education. The 1970s oil boom, large overseas aid flows, the vigorous implementation of the green revolution and rural development more generally, and strong synergies with the then emerging regional superpower, Japan, greatly facilitated this rapid economic growth (Hill 2000).

Indonesia’s rapid growth came to a sudden and unanticipated halt in 1997, with the Asian financial crisis. Its economic contraction in 1998, of over 13 per cent, was the sharpest among the four crisis-affected East Asian economies, and one of the most severe in the modern era. The formal banking sector imploded and the currency fell to less than one-fifth its pre-crisis value. Moreover, the country experienced ‘twin crises’, in the sense that the economic crisis was accompanied by, and indeed precipitated, by regime collapse, resulting in the departure of President Soeharto in May 1998 after 32 years of authoritarian rule, and ushering in a period of political instability. Its territorial integrity was for a period threatened, and there were very serious ethnic and social disputes. From 1998 to 2004, there were five presidents, and there was a major reworking of its political institutions. As a result, the once stable and predictable commercial environment became much less certain. Nevertheless, and contrary to widespread expectations at the time, given the magnitude of the 1998 growth collapse, Indonesia recovered moderately fast, following the pattern of its East Asian neighbours. Its per capita income and most social indicators recovered to pre-crisis levels by around 2004.

Reflecting these developments, Indonesia also has an unusual macroeconomic history, experiencing two episodes of hyper-inflation (Figure 2). The most serious was in the mid-1960s, when inflation peaked at over 1,000 per cent. In 1998, a shorter episode saw inflation reach almost 100 per cent. Both events were associated with regime change, and had their origins in the loss of fiscal discipline, in turn caused by deep political instability. However, for the rest of the recent history, macroeconomic policy has been more prudent, with fiscal deficits rarely exceeding 3 per cent of GDP and inflation, while typically above that of the country’s major trading partners, has been in single digits apart from the 1970s resource booms. Exchange rate movements have largely reflected these inflation outcomes, in addition to the special case of the 1997–98 capital flight that triggered the exchange rate collapse, and periods of high commodity prices that have resulted in a stronger nominal or real exchange rate.

Since the impact of and response to the crisis are a significant part of our story, it is useful to provide a brief narrative of the major institutional and political economy changes that occurred in response to the crisis (Hill and Shiraishi 2007). There were seven in total. First, in contrast to the Soeharto era, there is now a weakened (though now directly elected) presidency, subject to a variety of checks and balances. Second, cabinet unity is significantly weakened, with a ‘rainbow coalition’ of disparate voices and interests. Third, the legislature has become much more powerful, in contrast to the Soeharto era when it was essentially a rubber stamp for all government legislation. In the new arrangements, the president’s party is in the minority, and members of parliament need to be persuaded or bought off. Fourth, civil society has become much more active. Long suppressed under Soeharto, think tanks have proliferated, a free press has flourished, and street protests are common and occasionally influential. Fifth, the role of the bureaucracy has changed; it is no longer an arm of the president, accountable directly to him, and subject to few pressures from the parliament and civil society. A sixth feature is that the historically underdeveloped legal system now formally has greatly enhanced independent power and authority, but not yet the capacity or resources to undertake its commercial law responsibilities. Finally, a major decentralization programme was introduced in January 2001, shifting substantial power and resources from the central government to the second level districts.

As we will argue below, these changes have profound implications for economic policy settings, for the conduct of economic policy, and for institutional development more generally. We provide illustrations below on how they have affected the pattern of industrialization since the late 1990s.

### **3 Indonesian industrialization: a broad overview**

Turning now to the industrialization story, four key features characterize outcomes and the policy environment (Hill 1997). First, after decades of stagnation, Indonesia began to experience very rapid industrialization following the major political change and economic reforms of 1966–67. Annual industrial growth was at least 9 per cent in all but two of the 27 years, 1970–96 (Figure 3). Initially, catch-up and import substitution were the principal drivers. There was a decade of oil-driven growth, and the beginnings of a brief and costly heavy industry strategy. From the mid-1980s, labour-intensive exports became a significant engine of growth. This growth came to an abrupt halt with the crisis of 1997–98. The contraction in the manufacturing sector was about the same as for the economy as a whole of 13 per cent. Thereafter, positive growth has been recorded from 1999, but at lower rates than pre-crisis. For reasons we discuss below, the Asian financial crisis appears to have been a turning point for the industrial sector, with its growth falling below the economy-wide average for the first time since the 1960s. As a result of this rapid growth, from 1965 to 1997 the share of the manufacturing sector in GDP more than trebled (Figure 3). Since the crisis, the share of manufacturing has tended to decline slightly, triggering fears of a premature ‘deindustrialization’.

Second, within manufacturing, structural change has been equally rapid (Table 1). Since the 1970s, there has been a shift towards a more diversified industrial structure, away from the earlier dominance of simple consumer goods and resource processing. The major labour-intensive and footloose industries grew rapidly during the switch towards export orientation in the mid-1980s. Textiles, garments, and footwear were the major

drivers of this export growth. Wood products expanded fast in response to the prohibition on the export of unprocessed timber, before encountering environmental constraints in the 1990s. Heavy industry grew quickly through to the mid-1980s in response to protection and major state investments. Within machinery and equipment, the automotive industry grew rapidly under the impetus of prohibitive protection for most of the Soeharto period, but collapsed in 1998–99. Electronics has become increasingly important and export-oriented, but never as prominent as in neighbouring East Asian economies.

Third, Indonesia became a significant industrial exporter from the mid-1980s (Figure 4). In retrospect, the 1980s were a crucial period in Indonesian economic history. At the beginning of the decade, as oil prices first tapered off and then fell sharply, the country was highly exposed to the international oil market. Oil, gas, and related minerals provided about two-thirds of government revenue and almost three-quarters of merchandise exports. Indonesia could well have followed other major developing OPEC members—notably Mexico and Nigeria—into a debt crisis.<sup>1</sup> Instead, the decline in oil prices triggered a major reassessment of trade and industry policy. The political economy pendulum swung in favour of the technocrats and their supporters who advocated a more liberal economic agenda, including reduced protection, a more open posture towards foreign investment, and simplified export procedures (Basri and Hill 2004).

Initially, manufactured exports were concentrated in resource-based activities, especially plywood, reflecting the country's natural resource endowments and the prohibition of unprocessed commodities (Table 2). Its industrial export base began to widen significantly as the reforms took hold, with textiles, garments, footwear, electronics, furniture, sporting goods, and toys also registering rapid growth. The share of labour-intensive products in total manufactured exports increased in the wake of the 1980s reforms, from about 45 per cent in the mid-1980s to 61 per cent by 1996. These reforms 'worked' in the sense that there was the strong and immediate export response observed above. Indonesia grew quickly out of the early 1980s recession and, although external debt rose sharply in the mid-1980s, debt/GDP ratios remained comfortable and began declining at the end of the decade. The reforms were also good for equity, as employment expanded significantly in the new export-oriented factories on Java. For the first time in its history, Indonesia became 'East Asian' in the sense of emerging as a major industrial exporter. Since around 1990, export performance has been more erratic. Growth began to slow in the early 1990s as a result of increased competition in export markets, a slackening in the reform momentum, slower productivity growth, and the real Rupiah appreciation. In the post-crisis era, export growth has also generally slowed, around an increasingly volatile trend, for reasons to be discussed shortly.

A fourth feature is the country's ownership patterns, which are unusual in some respects. Reliable estimates are now dated, and relate to the pre-1997 period, but are still broadly indicative of the patterns. There are high levels of ownership concentration,

---

<sup>1</sup> See Gelb and Associates (1988) for a comparative assessment of the management of the 1970s oil boom in selected developing countries. Indonesia emerges as the country which most effectively recycled its windfall oil boom revenues, and which adjusted most quickly to the downturn in prices.

both in the sense of corporate conglomeration and seller concentration. Claessens, Djankov, and Lang (2000) have documented the former, finding that Indonesia exhibited the highest level of corporate concentration in East Asia in 1996, with the top ten families owning 57.7 per cent of listed corporate assets, but many were short-lived operations reflecting their rent-seeking origins.<sup>2</sup> In terms of plant level industrial concentration, Bird (1999) found high levels of concentration, typical of those in relatively small, late-industrializing economies. Over the period 1975–93, concentration levels were declining steadily, though in the latter year the simple average 4-firm concentration ratio was still 54 per cent. Concentration ratios were significantly lower once allowance is made for imports.

Indonesia's industrial ownership patterns reflect the interplay of history, policy, and industrial organization factors (Table 3). In the mid-1960s, no foreign capital was present, and the 'commanding heights' of the economy were in state hands. The state-owned enterprises (SOE) sector continued to be important throughout the Soeharto era. The oil boom period financed a major expansion in the SOE sector, initially in heavy industry, and later in several costly high-tech projects. Meanwhile, foreign investment returned to the country from the late 1960s in response to the newly liberal policy regime and generous fiscal incentives. As is the case in most countries, domestic firms are the major players in Indonesian industry, accounting for more than 50 per cent of manufacturing value added in most 2-digit industries. Among domestic firms, SOEs are important in certain 'strategic' industries, such as fertilizer, steel, and cement, together with some firms that were inherited from the pre-1966 nationalizations (e.g., sugar processing) and never subsequently relinquished. During the Asian financial crisis, the SOE sector in general contracted, especially in the case of the prestige projects, which were heavily dependent on direct government support. Foreign ownership has risen steadily since the economy was opened up in the late 1960s. The share of these firms in non-oil manufacturing value added rose from about 23 per cent in 1975 to 37 per cent in 2005 (Table 3). The share rose higher still in the wake of the crisis, in response to policy liberalizations and the opportunity for foreign firms to buy distressed local assets. Moreover, as we will document below, foreign firms have been better able to endure the crisis. As is evident in the 2-digit ownership data, and consistent with industrial organization theory, multi-national enterprises are important in the international standard industrial classification (ISIC) 38, dominated by electronics and the automotive industry. They are also important in basic metals (principally steel and related products), the chemical industries, and a few labour-intensive activities (textiles, garments, footwear, and miscellaneous manufactures) where knowledge of export markets is important.

#### **4 Economic crises: firm level impacts and responses<sup>3</sup>**

---

<sup>2</sup> That is, in terms of the shares of its leading conglomerates in output and capitalization. Note, however, that the mid-1990s data were dominated by Soeharto-linked conglomerates that have since been largely dismantled, and thus the figure would be lower now.

<sup>3</sup> This section draws on Aswicahyono, Hill, and Narjoko (2010).

We referred above to the general impacts of the 1997–98 economic crisis, including the deep but short-lived growth collapse, the general slowdown in the manufacturing sector, and indifferent export performance. In this and the following section, we examine first in more detail the firm level impacts and second, the employment effects.

A feature of rapid industrialization and well-functioning product and factor markets is high levels of firm mobility across size groups. In an earlier study of Indonesian industrialisation (Aswicahyono, Bird, and Hill 1996), we found there was considerable evidence of this mobility, in particular of firms ‘graduating’ to larger size groups. We were able to examine this phenomenon through very detailed firm level analysis, made possible by the fact that each firm in the annual survey is identified by a consistently designated code that enables it to be traced over time. One of the results of this earlier analysis was to demonstrate that the widely discussed phenomenon that the share of small firms in industrial output was apparently declining, could actually be interpreted positively, not as a sign that these firms were being pushed out in the process of the rapid industrialization—the commonly held perception at the time—but rather that they were vacating the smaller size groups and graduating to larger groupings. This result was shown by comparing the share of total output by firm-size at the ‘current year’, the basis for the gloomy conclusion, and the ‘initial year’, the basis for the positive interpretation.

In this paper, we repeat the exercise through to the year 2005. That is, we trace through each firm over the period 1990–2005, and assign it to a firm-size grouping. These are chosen arbitrarily but plausibly as firms with 20–99 workers, 100–499 workers, and more than 500 workers.<sup>4</sup> We then estimated output (and employment, though not shown here) by the three size groups, based on each firm’s size in the current year and the initial year, with the latter being either 1990 or the year the firm commenced operation. The results are presented in Table 4. There is little change in the size share based on current size, with the share of small firms rising slightly pre-crisis, then falling somewhat, while the largest firms were most affected by the economic crisis. However, based on size in the initial year, the small firm share rose quite quickly through to the crisis, but then began to decline from 2001.

Thus the crisis and its immediate aftermath appear to have marked a turning point in this process of firm mobility. Until the crisis, smaller firms continued to display the dynamism evident in the pre-crisis period. However, after the crisis, the pace of graduation slowed, and the small firm share in both series declined. These results are not necessarily cause for concern, as they could simply reflect a longer-term process of industrial consolidation. They may also reflect the effects of the crisis, from which smaller firms experienced greater adjustment difficulties, or the increased competitive pressures that occurred as firms sought to survive.

There are no general data to support the latter proposition. But there is presumptive evidence to advance the hypothesis that the barriers for smaller firms increasing their scale have risen since the crisis, particularly in access to finance. This arises due to the

---

<sup>4</sup> That is, approximately corresponding to small, medium and large firms respectively. Experimentation with different size groups revealed that the general conclusions are not sensitive to the definition of size groups.

credit rationing devices that are commonly put in place after crises, which invariably support larger firms with better collateral and credit histories (Stiglitz and Weiss 1981). The underlying argument is that banks have more difficulty differentiating between ‘good’ and ‘bad’ loan applicants after the crisis and, as a result, banks are more likely to adopt more stringent lending policies, favouring those who were able to provide more collateral and/or an established credit history. There is some evidence from East Asia in the late 1990s supporting this view. As Gosh and Gosh (1999) and Ding, Domac, and Ferri (1998) have argued, not only was there credit rationing during the crisis, but also small and medium-sized firms were more adversely affected than larger ones.

Indonesia’s banking sector was the most severely affected among the East Asian crisis economies, resulting in a significant renationalization of banks and reform of the regulatory regime. However, as Rosengard et al. (2007) note, these reforms have had the unintended consequence of limiting the access of small enterprises to formal sector financial institutions. Based on the questionable premise that larger financial institutions are less likely to fail than smaller ones, the country’s small, community-based institutions have been instructed to merge with larger, centralized units, and among the latter ‘... innovative microfinance services were viewed with suspicion and hostility’. (ibid.: 87)

Transition matrices of the size distribution of firms support the conclusion that the speed of firm mobility slowed after the crisis. These matrices are computed for the pre- and post-crisis periods, defined here as 1992–96 and 2001–04 (Table 5). They show the distribution of firms for the same three size groups according to the initial and final year of each sub-period. Thus, of the small firms in 1992, by 1996 90.6 per cent were still small, while 8.8 per cent and 0.6 per cent had graduated to the medium and large groups respectively. A clear result over the two sub-periods is that there is less mobility: more small firms remained small after the crisis as compared to before it. A similar conclusion holds for the medium-sized firms.

We can further extend the analysis of firm level dynamics by examining two additional aspects: the patterns of firm level entry and exit, and the rates of expansion and contraction for ‘surviving’ firms. Here, too, we undertake this analysis by tracking the history of each firm enumerated in the survey. An earlier study by Narjoko (2006) examined these patterns in the pre-crisis and crisis periods. This analysis extends the examination through to 2004, by which time manufacturing output had returned to pre-crisis levels and was growing moderately strongly. Specifically, we examine two interrelated phenomena: the entry and exit rates of firms over time and, among the survivors, expansion and contraction rates.

First, with respect to entry and exit rates, the analysis can be conducted with reference to number of plants, employment, or value added. The story is broadly similar, and so we present results only for the rates by number of firms.<sup>5</sup> The following definitions are used for entry and exit rates, for industry  $j$  and time periods  $t$  and  $t-1$

---

<sup>5</sup> The additional data for other variables are available from the authors on request.

$$\text{Entry rate}_{j,t} = \frac{NEP_{j,t}}{NTP_{j,t-1}}$$

$$\text{Exit rate}_{j,t} = \frac{NXP_{j,t}}{NTP_{j,t-1}},$$

where

$NEP_{j,t}$  = total number of plants that enter industry  $j$  between  $t$  and  $t-1$ ,

$NXP_{j,t}$  = total number of plants that exit industry  $j$  between  $t$  and  $t-1$ ,

$NTP_{j,t-1}$  = total number of plants in industry  $j$  in  $t-1$ .

We identify four separate sub-periods: pre-crisis (1993–96), crisis (1996–99), early post-crisis (1999–2002), and return to growth (2002–04). Before the crisis, as would be expected, there were high plant-entry rates, and these were almost double the exit rates (Figure 5). Note also, however, and consistent with industrial dynamism, that the exit rates were not insignificant. As the crisis hit, entry rates fell to approximately half the pre-crisis figure, while exit rates rose and began to exceed entry rates. These trends applied to practically all industry groups, but especially to textiles, clothing, and footwear, wood products, and non-metallic minerals (respectively ISIC 32, 33, 36). They also apply to most firm and ownership groups, though with considerable variations (see Narjoko (2006) and for a summary Narjoko and Hill (2007)).

While this response is as would be expected, some trends are puzzling. In particular, the immediate crisis response of exit rates exceeding entry rates has persisted through to 2004, by which time positive economic growth had resumed for four years. Moreover, entry rates have continued to decline, in contrast to what might have been the expected outcome of a sharp decline during the crisis and recovery thereafter. At least two possible conjectures are plausible here. One is that there is a delayed response of firms: the initial adjustment is to reduce output, switch output composition, extend credit lines, live off past capital and so on, in the hope that firms can trade through the difficulties. Especially for well-established firms, such strategies can endure for several years. Hence, the exit rates are spread out over several years, as illustrated in Figure 5, rather than a single large reduction in the crisis period. The second conjecture relates to the extended decline in entry rates, for five years after the crisis. Here the likely explanation is that potential new entrants were holding back, observing the continuing exit process, in addition to the fact that there were high levels of excess capacity following the crisis. The difficulties in accessing finance and rising competitive pressures, as noted above, have arguably resulted in increased barriers to entry.

What happened to firms that survived the crisis? We follow the usual definitions of expansion and contraction rates (see for example Davis, Haltiwanger, and Shuh 1996), with reference to employment in industry  $j$  and time period  $t$

$$\text{Expansion rate}_{j,t} = \frac{EMPL\_POS_{j,t}}{EMPL\_T_{j,t-1}}$$

$$\text{Contraction rate}_{j,t} = \left| \frac{EMPL\_NEG_{j,t}}{EMPL\_T_{j,t-1}} \right|$$

where

$EMPL\_POS_{j,t}$  = total employment of plants that expanded between  $t$  and  $t-1$ ,

$EMPL\_NEG_{j,t}$  = total employment for plants that contracted between  $t$  and  $t-1$ ,

$EMPL\_T_{j,t}$  = total employment in year  $t$ .

Here, too, as would be expected, expansion rates exceeded contraction rates prior to the crisis (Figure 6). During the crisis, expansion rates declined, but contraction rates increased and the two rates converged. Thereafter, the pre-crisis pattern of expansion exceeding contraction resumed, although the gap between the two narrowed, that is, the net expansion rate was lower. There are also differences among major industry groups, with a similar division as for the entry and exit rates. In particular, growth has originated more from the expansion of existing plants than the entry of new ones in the resource-based and capital-intensive industries, such as food products and processing, paper products, chemicals, and machinery and equipment (respectively ISIC 31, 34, 35, and 38).

The picture for firm dynamics can be summarized by decomposing employment growth into that due to entry/exit on the one hand and expansion/contraction on the other. We conduct the analysis with reference to employment effects rather than plants, and thus the terms are referred to as ‘entry rate 2’ and ‘exit rate 2’ to differentiate them from those above. That is

$$\text{Entry rate } 2_{j,t} = \frac{EMPL\_EN_{j,t}}{EMPL\_T_{j,t-1}}$$

$$\text{Exit rate } 2_{j,t} = \frac{EMPL\_EX_{j,t}}{EMPL\_T_{j,t-1}}$$

where

$EMPL\_EN_{j,t}$  = total employment of plants that entered industry  $j$  between  $t$  and  $t-1$ ,

$EMPL\_EX_{j,t}$  = total employment of plants that exited industry  $j$  between  $t$  and  $t-1$ .

So, employment growth decomposition  $_{j,t} = \text{entry rate } 2_{j,t} + \text{expansion rate }_{j,t}$   
 $+ \text{exit rate } 2_{j,t} + \text{contraction rate }_{j,t}$

Figure 7 presents the results of the decomposition. The results show that, since the crisis, expansion has become more important than entry for employment over time. The inference is therefore that, in the wake of the crisis, most of the growth originated from what may be termed ‘insiders’ that is firms who were able to survive the crisis, and adapt more quickly to the significantly altered policy and commercial environment. As Narjoko (2006) demonstrates for the period through to 2000, specific firm attributes were commonly associated with these outcomes, in particular prior export orientation and foreign ownership. In addition, firms that maintained credit lines or had low debt generally survived and were able to respond more quickly to the economic recovery from 2000. Potential new entrants were apparently deterred by real or perceived barriers to entry, including the more unpredictable business and political environment, and a much more cautious financial sector.

## 5 Jobless industrialization?<sup>6</sup>

At the same time as firm mobility and dynamics appeared to have declined, output growth since the crisis has become considerably less employment-elastic, resulting in the formerly major engine of Indonesian employment growth becoming much less significant. To probe this relationship, we undertake three sets of calculations: the relationship between output and employment growth in Indonesia by sector before and after the Asian financial crisis, the Indonesian employment manufacturing record in comparative Asian perspective, and Indonesia’s industrial employment dynamics among the major firm-size groups.<sup>7</sup>

We commence with the observation that employment growth is the outcome of a simple identity, that is, it is the product of output growth and the elasticity of employment growth with respect to output growth. Hence,

$$\Delta N = \Delta Y(\Delta N/\Delta Y)$$

To understand employment growth, the left-side variable in the equation, we therefore need data on the two right-side variables. Our analysis commences with the aggregate picture for the major sectors in Indonesia, pre- and post-crisis, followed by a comparison of the industrial sectors for Indonesia and several neighbouring economies. Since we are focusing on longer-term trends, and the crisis years were so atypical, we present data for two sub-periods, 1990–96, corresponding to the later years of the long Asian boom, and 2000–08, by which time the immediate crisis impacts had been

---

<sup>6</sup> This section draws on Aswicahyono, Hill, and Narjoko (2011).

<sup>7</sup> In the paper on which this section draws, we also present estimates of employment-output and employment-wage elasticities. These results generally confirm those from the more aggregated sectoral estimates.

resolved and economic growth had resumed, but before the global financial crisis had any major impact.

Table 6 shows output and employment growth for the two periods, together with the implied output elasticities.<sup>8</sup> We also present for each sector the differences between the two periods for the three series, and the rankings of these differences.

*Aggregate output growth* was considerably slower in the second period, at about two-thirds of that in 1990–96. However, the slowdown was not uniform across sectors. In fact, the data point to major changes in the drivers of Indonesian economic dynamism pre- and post-crisis. Two sectors actually grew faster: agriculture, reflecting generally buoyant commodity prices and competitive exchange rates, and transport and telecommunications, driven by technological changes and substantial deregulations.

By contrast, there was a major slowdown in three sectors, mining and utilities, manufacturing, and construction, with growth rates in the second period less than half those of the first. The explanations for these outcomes are both sector-specific and economy-wide. Construction growth pre-crisis was at unsustainable levels, and it was hard hit by the crisis. Growth since then has been subdued, owing in part to financing constraints and reduced public sector investments. The latter factors also explain slower utilities growth, while mining growth has been slow as a result of the uncertain exploration and taxation environment, and notwithstanding historically high commodity prices.

The slowdown in manufacturing growth, from well above the economy-wide average to just below it, is the most puzzling result. As a tradable goods sector, like agriculture, it benefited from the competitive boost of a depreciating exchange rate in the wake of the Asian financial crisis. Moreover, the sector faced no significant demand-side constraints until the recent global financial crisis. Global manufacturing growth was rapid, there was a continuous relocation of the industry to developing economies, and unlike agriculture there have been no major external trade barriers.

The picture is similarly varied for *employment growth*, except that the slowdown was less pronounced as compared to output. That is, employment growth in the second period was about three-quarters of that in the first, and this in a context where aggregate labour supply is anyway gradually beginning to decline. Here too there is considerable variation across sectors. The two major differences are the turnaround in agriculture, to slightly positive growth compared to the earlier contraction, and the collapse in manufacturing growth. Employment in all the other sectors grew more slowly, in some cases by a significant margin. Some of these outcomes reflect a continuation of significant labour-saving technological changes, such as the major transformation in trade patterns, from traditional petty trade to modern malls and retail outlets, in addition to the ubiquitous mobile telecommunications revolution, and the rapid growth of civil aviation and motorized land transport.

---

<sup>8</sup> Henceforth for convenience we will refer to output employment elasticities as ‘output elasticities’ and employment-wage elasticities as ‘wage elasticities’.

The bottom panel presents the implied output elasticities. These indicate whether the slowdown in non-agricultural employment is due mainly to slower output growth or less employment-elastic output growth. The aggregate picture is that output elasticity rose slightly. However, the increase is almost entirely due to the change in agriculture, from labour-shedding to slightly positive growth. With the exception of mining and utilities, which employ few workers, and a slight increase in construction, the general picture is less elastic employment growth. In particular, the elasticities fell sharply for three major employers of labour—manufacturing, trade, and transport and communications. The explanation in the case of the latter two is clear: there was a major change in the technology with which the service was provided, that is, owing to the proliferation of modern shopping malls, rapidly expanding civil aviation and so on. Even in a low-wage economy like Indonesia, all these activities are much more capital-intensive than the services they replaced. However, there was no such exogenous labour-displacing technology sweeping through manufacturing. The explanation for the declining output-employment elasticities in manufacturing therefore has to lie elsewhere, in the commercial environment and factors affecting the willingness of employers to hire labour.

To sum up on the Indonesian employment picture, growth in aggregate was marginally slower after the crisis. But this conceals major sectoral differences. Agriculture returned to positive growth, reflecting Indonesia's diverse natural resource advantages in the context of high commodity prices. Construction employment growth fell sharply, but this was entirely due to lower output growth. Employment growth slowed significantly in some of the service sectors experiencing rapid technological change, even though output growth was strong. Manufacturing is unique in that it is the only major sector to experience more than a halving in both its output growth and its output elasticity.

It is useful to compare these results to outcomes in neighbouring developing economies, to ascertain whether any of these trends are evident. Here also we conduct the analysis for the pre- and post-crisis periods, with respect to output and employment growth, and the implied elasticities. Table 7 presents the results.

In the pre-crisis period, the pace of Indonesian industrialization was similar to its rapidly industrializing neighbours, Malaysia and Thailand, and much faster than Korea and the Philippines. Industrial growth in the three South East Asian growth economies—Indonesia, Malaysia, and Thailand—slowed sharply after the crisis, most of all in Malaysia and the least in Thailand. The Philippine growth rate accelerated slightly, from a weak base, while Korean growth slowed somewhat. Thus from a growth perspective, Indonesia is well within South East Asian norms.

The employment picture is also broadly similar. The three South East Asian economies experienced a very sharp growth slowdown. Malaysian manufacturing employment actually shrunk, reflecting the fact that this higher wage economy has been progressively shedding its labour-intensive segments. Employment growth in Thailand was slightly stronger, but the absolute growth decline was sharper than in Indonesia. Korean and Philippine employment growth was anaemic throughout, contracting in the former case since 2000. Thus, here also Indonesia does not emerge as a regional outlier.

The output elasticities declined significantly in all five economies. As noted, they turned negative for Korea and Malaysia. The rates of decline are broadly similar for Indonesia,

the Philippines, and Thailand. In fact, although Thailand's output elasticity remains the highest of the five, the rate of decline in Indonesia is the lowest among the South East Asian sample.

To sum up so far, on the basis of the aggregated sectoral data, Indonesia has experienced a pronounced slowdown in industrial employment growth since the Asian financial crisis. Manufacturing was the only sector to experience both a marked deceleration in output growth and a major decline in output elasticity. This therefore suggests that there were sector-specific factors at work in the country's industrial labour market. However, in comparative East Asian terms, the Indonesian industrial record is not an outlier. Other fast-industrializing middle-income developing countries registered similar declines in both output growth and output elasticities. Among the four comparators, the Thai experience is arguably the most relevant. Korea has clearly moved out of the labour-intensive phase of industrialization, while Malaysia is in transition. In both cases, very low or even negative employment-output elasticities are not surprising. Growth in the Philippines has been slower throughout. The widespread presumption in Indonesia is that the tightening of the labour market regulations since 2000 is the principal explanation for the sharp drop in its output elasticity. Yet, although Thailand's output and employment growth remain somewhat higher, its output elasticity has fallen just as fast. This is in spite of the fact that the Thai labour market is not as heavily regulated as Indonesia's, and has not been subject to the regulatory tightening since the Asian financial crisis. In other words, there appear to be more general factors at work affecting the patterns of South East Asian industrialization and employment, in addition to labour market policies.

We now turn to the more disaggregated Indonesian industrial census data to shed light on these issues. Indonesia has two main industrial statistics series, the annual survey of establishments with at least 20 employees, known as *Statistik Industri* (SI), and the decennial economic census of all industrial establishments (*Sensus Ekonomi*, henceforth SE). We present results from the SE series which, although conducted only once every decade, are more comprehensive in scope, covering all firms with at least five employees, as compared to the SI cut-off of 20 employees. The SE data are probably also more reliable, since it is a census and therefore there was a more concerted attempt to collect data for all firms.

The SEs were conducted in 1986, 1996 and 2006. These periods thus neatly coincide with major sub-periods. That is, 1986–96 was the decade of reform and rapid growth, while 1996–2006 encompasses the crisis and return to slower growth. To investigate the impacts across firms of different size, we classify establishments into three (arbitrary) groups, 'large' (100+ employees), 'medium' (20–99), and 'small' (5–19). Alternative size classifications do not affect the results. The disaggregation by size is relevant to our paper since we conjecture that scale may influence firm responses to economic events and regulations. For example, smaller firms may be more resilient to adverse economic shocks, and they may fall outside the regulatory net. We examine the industrial statistics at the 2-digit ISIC level of industrial classification. We further combine the industries into a broader factor intensity grouping, 'labour-intensive' (ISIC 32, 33, 39), 'resource-

based' (ISIC 31, 34, 35), and 'capital-intensive' (ISIC 36-38), since industries within these groupings share some similar characteristics and response patterns.<sup>9</sup>

The raw data on manufacturing employment are revealing. Table 8 summarizes the results for the three SE by size groups. Employment grew quite rapidly over the whole period 1986–2006, by 7.3 per cent per annum. However, there was a marked slowdown between the two sub-periods, with growth declining from 10.1 per cent in the first decade to just 4.6 per cent in the second. There were also some significant compositional shifts. In both 1986 and 1996, the large firms accounted for just over half of the employment, whereas by 2006 the small firms had become the dominant employer. The medium firm share declined throughout the period. Employment in both the large and small firms grew rapidly in the first decade, by 10.3 per cent and 11.4 per cent respectively. But from 1996 to 2006, large firm employment barely increased, at just 1 per cent per annum, whereas small firm employment continued to expand quickly, by 8.8 per cent. Medium firm employment growth also declined, but not to the same extent as the large firms.<sup>10</sup>

Thus there has clearly been a sharp slowdown in Indonesia's industrial employment growth since the Asian financial crisis, especially compared to the 'reform decade', 1986–96. This has occurred because of the slower industrial growth, and most particularly because of the much lower output-employment elasticity. Among the sectors, manufacturing is unusual in this respect, in that there has been both slower output growth and lower employment elasticity. This growth slowdown appears to have occurred across all major manufacturing sectors. There have also been significant compositional shifts since the Asian financial crises, with almost all of the industrial employment growth coming from small firms. Firms in the 'factory sector', with 20 plus workers, seem to have virtually stopped hiring over this period.

Linking these conclusions back to the discussion in Section 2 of the paper, the explanation for these outcomes is broadly as follows. In the intermediate aftermath of the crisis, there was a major boost to competitiveness from the rapidly depreciating nominal exchange rate. But this did not translate into employment growth since much of the formal sector of the economy was incapacitated by corporate debt workouts, the exodus of foreign investors, and the freezing up of financial markets. Also, regulatory and policy uncertainty increased in the transition from authoritarian to democratic rule, and the major decentralization initiative of 2001. The latter especially affected access to

---

<sup>9</sup> The labour-intensive industries are textiles, garments, and footwear, wood products and furniture, and miscellaneous manufactures. The resource-based are food and related products, paper products, and chemical, rubber and plastic products. The capital-intensive group includes non-metallic minerals, steel products, and metal and machine goods, electronics and automobiles. More elaborate classifications could be employed, but they are unlikely to affect our results significantly. If Indonesia were a major participant in global electronics production networks (which it is not), then strictly speaking the components assembly industry should be classified as labour-intensive.

<sup>10</sup> One caveat to be attached to these results is that the employment data are all 'head count' estimates. We do not have data on the intensity of work, that is hours worked, by firm-size. While the estimates for L and M firms are likely to closely resemble some 'full time equivalent' employment figure, that for the S firms could well be lower, owing to seasonality factors and more variable output and work patterns. Hence, it is possible, but not certain, that the rising S share is an overstatement.

natural resources, on which several Indonesian manufacturing activities depend. Intensified labour market regulations and infrastructure constraints emerged as serious problems after 2000. From about 2003, rising commodity prices and the return of foreign capital began to put pressure on the exchange rate, with a significant real appreciation commencing around 2005. By then, all the earlier competitiveness advantages from the exchange rate depreciation had been eroded. These events occurred in the context of intensified international competition, particularly from China, but also other lower wage competitors, notably Vietnam.

These factors operated as economy-wide influences, in addition to sector-specific effects. For example, tighter labour market regulations had an adverse effect on the traditional labour-intensive sectors, textiles, clothing and footwear, in addition to the breakdown in the formerly effective operation of the import drawback facility for export-oriented firms. The more cumbersome export-import procedures and a less inviting foreign investment regime meant that Indonesia has been a relatively minor participant in the rapidly expanding global production networks centred on 'fragmentation trade'. Natural resource based activities were affected by interruptions to reliable raw material supplies.

Does this slower manufacturing employment growth matter? The answer to this question depends on the explanation for the slower growth. It is of concern to the extent that a major link in the transmission mechanism from growth to poverty alleviation has been weakened. That is, fewer Indonesian workers are now drawn into the relatively better paid jobs in the manufacturing sector. Moreover, most of the industrial jobs now being created are in small firms, where employment conditions are generally inferior to those of the larger units, especially to the extent that smaller firms are able to evade labour protection measures. As argued above, the much slower job employment growth is principally the result of Indonesia's declining international competitiveness, underlining again the crucial link between macro level economic reform and poverty alleviation.

Nevertheless, it is important not to overstate the problems, for at least three reasons. First, the Indonesian record is not that different from its neighbours, including the traditionally dynamic Thai economy where intensified labour market regulation has not occurred. This suggests that the changes observed in this paper are part of a generalized regional phenomenon, in which rising competition from China and the demise of very labour-intensive segments are important factors explaining slower employment growth.

Second, we have shown that more jobs are being created in other sectors. The fastest growth has occurred in several service sectors, reflecting technological advancement, deregulation, and at the margin the switch to non-tradables as a result of the appreciating real exchange rate since around 2003. Agriculture has reversed the earlier decline, reflecting buoyant commodity prices, and reminding us of Indonesia's resource-based economic diversity. It is an overstatement to assert, as some have, that Indonesia is experiencing premature deindustrialization, but there is certainly an industrial deceleration evident, and it seems to have become a permanent feature of Indonesia. Is this structural shift in employment patterns a cause for concern? 'Industrial fundamentalists' would assert that it is, on the grounds that there are greater externalities associated with industrialization, such as inter-industry linkage creation

and skill formation. But such views are of dubious validity, as shown by the existence of many high-income service and resource-based economies in the world.

## **6 Summing up and lessons**

Indonesia's industrialization experience is of interest for a number of reasons. It has industrialized rapidly since the late 1960s. There have been pronounced episodes in its industrialization outcomes and policy orientation. It managed the transition from import-substituting to export-oriented industrialization quite successfully. It has had to navigate through a series of large external shocks, some positive (such as rising commodity prices for its abundant natural resource endowments) and others negative (downside terms of trade movements and economic crises). Analysis of these various events is greatly facilitated by its good industrial statistical base, including firm level data over time.

Two major turning points are clearly evident in its industrial history. The first is a straightforward story of a dramatic change in policy direction in the mid-1960s, ushering in the mostly rapid industrial growth over the past four decades. This is a conventional episode of a well-managed policy reform producing the dividend of rapid socio-economic development, including a significant industrial transformation.

The second turning point, of 1997–98, is a more complex story. The economy in aggregate recovered quite quickly from the exceptionally severe economic crisis. But the effects on industry have been mixed. Although manufacturing output growth has recovered, the industrial dynamics have been altered quite profoundly. Growth has been slower than the economy-wide average, and manufacturing is no longer the leading growth engine it was prior to the crisis. Manufacturing employment growth has also slowed appreciably, and in the formal manufacturing sector it is now anaemic. Firm dynamism also appears to have declined significantly.

The general implication from our analysis is that the fortunes of the manufacturing sector are closely linked to those of the economy as a whole, and in turn to the macroeconomic policy environment. Industry policy may matter—although in Indonesia it has generally been ineffective—but the exchange rate, monetary policy, the state of infrastructure, openness to trade and investment, education outcomes, and labour market regulations are much more important. Moreover, it is not obvious that the changing relative fortunes of the country's manufacturing sector are cause for concern, except to the extent that the root cause may be a problem of competitiveness related to excessive regulatory policies and under-investment in key supply-side inputs. But these are also economy-wide issues, and they need to be addressed through economy-wide, not sectoral, approaches.

## References

- Aswicahyono, H. H., K. Bird, and H. Hill (1996). 'What Happens to Industrial Structure when Countries Liberalise? Indonesia since the mid-1980s', *Journal of Development Studies*, 32 (3): 340–63.
- Aswicahyono, H. H., H. Hill, and D. Narjoko (2010). 'Industrialisation after a Deep Economic Crisis: Indonesia', *Journal of Development Studies*, 46 (4): 1084–108.
- (2011). 'Indonesian Industrialization: Jobless Growth?'. In C. Manning and S. Sumarto (eds), *Indonesia Update 2011*. Singapore Institute of Southeast Asian Studies.
- Basri, M. C., and H. Hill (2004). 'Ideas, Interests and Oil Prices: The Political Economy of Trade Reform during Soeharto's Indonesia', *World Economy*, 27 (5): 633–56.
- Bird, K. (1999). 'Industrial Concentration in Indonesia', *Bulletin of Indonesian Economic Studies*, 35 (1): 43–73.
- Claessens, S., S. Djankov, and L. H. P. Lang (2000). 'The Separation of Ownership and Control in East Asian Corporations', *Journal of Financial Economics*, 58 (1–2): 81–112.
- Davis, S. L., J. C. Haltiwanger, and S. Shuh (1996). *Job Creation and Destruction*. Cambridge, MA: MIT Press.
- Ding, W., Domac, I., and Ferri, G. (1998). 'Is there a Credit Crunch in East Asia?'. Policy Research Working Paper 1959. Washington, DC: World Bank.
- Gelb, A. and Associates (1988). *Oil Windfalls: Blessing or Curse?*. New York: Oxford University Press for the World Bank.
- Gosh, S. R., and A. R. Gosh (1999). 'East Asia in the Aftermath: Was there a Crunch?'. Working Paper 38. Washington, DC: IMF.
- Higgins, B. (1968). *Economic Development*, 2nd edition. New York: W.W. Norton.
- Hill, H. (1997). *Indonesia's Industrial Transformation*. Singapore: Institute of Southeast Asian Studies.
- (2000). *The Indonesian Economy*, 2nd edition. Cambridge: Cambridge University Press.
- Hill, H., and T. Shiraishi (2007). 'Indonesia after the Asian Crisis', *Asian Economic Policy Review*, 2 (1): 123–41.
- Narjoko, D. A. (2006). *Indonesian Manufacturing and the Economic Crisis of 1997/98*. PhD Thesis. Canberra: Australian National University.
- Narjoko, D. A., and H. Hill (2007). 'Winners and Losers during a Deep Economic Crisis: Firm-level Evidence from Indonesian Manufacturing', *Asian Economic Journal*, 21 (4): 343–68.
- Rosengard, J., R. Patten, D. Johnston, and W. Koesoemo (2007). 'The Promise and the Peril of Microfinance Institutions in Indonesia', *Bulletin of Indonesian Economic Studies*, 43 (1): 87–112.

- Stiglitz, J. E., and A. Weiss (1981). 'Credit Rationing in Markets with Imperfect Information', *American Economic Review*, 71 (3): 393–410.
- van der Eng, P. (2002). 'Indonesia's Growth Performance in the Twentieth Century'. In A. Maddison, D. S. Prasada Rao, and W. F. Shepherd (eds), *The Asian Economies in the Twentieth Century*. Cheltenham: Edward Elgar.

Table 1: The changing structure of manufacturing output

(% of value added, firms with 20+ workers)	1975	1980	1985	1990	1995	2000	2005	2009
Food, beverage, and tobacco	44.4	38.2	32.6	23.0	22.3	21.2	24.7	25.3
Textile, leather products and footwear	10.7	13.3	14.0	19.7	17.8	16.1	11.9	12.6
Wood and wood products	2.4	5.7	8.7	12.1	8.2	5.4	3.9	2.3
Paper and printing	4.7	4.0	3.8	4.7	4.8	6.3	7.7	6.8
Fertilizers, chemicals, and rubber	22.4	18.0	16.0	12.8	13.1	14.8	17.2	20.5
Cement and non-metallic mineral	2.6	4.2	5.0	3.8	3.6	3.5	5.1	5.0
Iron and basic steel	0.7	3.1	7.2	8.0	7.5	3.6	2.7	3.4
Transport equipment machinery, and	12.1	13.4	12.5	15.5	21.9	27.0	24.8	21.9
Other manufacturing products	0.1	0.1	0.2	0.5	0.7	2.1	1.9	2.2

Source: computed from unpublished data from Badan Pusat Statistik, Central Board of Statistics, Indonesia, Statistik Industri.

Table 2: Manufactured exports by factor-intensity, 1980–2009

	1980	1985	1990	1995	2000	2005	2009
Unskilled labour-Intensive	170.9	663.3	4201.4	10573.3	13429.4	13786.8	14945.9
	34.2	32.5	46.5	46.1	38.1	34.3	32.0
Resource-based, labour-intensive	77.0	957.2	3083.6	4722.0	3413.6	2904.6	2043.0
	15.4	46.8	34.1	20.6	9.7	7.2	4.4
Resource-based, capital-intensive	115.4	241.8	997.9	2406.0	4749.4	5975.0	8516.2
	23.1	11.8	11.0	10.5	13.5	14.9	18.2
Electronics	97.1	80.9	205.4	2944.3	9072.2	10050.2	9545.3
	19.5	4.0	2.3	12.8	25.7	25.0	20.4
Footloose capital-intensive	38.6	100.6	552.7	2311.2	4576.1	7448.0	11717.6
	7.7	4.9	6.1	10.1	13.0	18.5	25.1
Total	499.0	2043.8	9040.8	22956.8	35240.7	40164.6	46768.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: the first row for each series refers to totals in US\$ millions, while the second refers to its percentage share of the total

Source: computed from unpublished data from Badan Pusat Statistik, Central Board of Statistics, Indonesia, Statistik Industri.

Table 3: Concentration and foreign ownership by sector, 1990–2005

Concentration (CR4)		1990	1993	1996	1999	2002	2005
31	Food, beverages, and tobacco	59	69	59	57	56	60
32	Textile, clothes, and leather industry	29	32	28	29	30	42
33	Wood and wood products	22	24	26	25	29	33
34	Paper and paper products	61	57	61	70	73	64
36	Non-metallic mineral products	61	59	59	63	66	66
37	Basic metal industries	80	73	79	79	74	66
38	Fabricated metal, machinery, and equipment	74	75	74	67	69	71
39	Other manufacturing industries	61	66	61	62	73	79
1-ULI	Unskilled, labour-intensive	30	33	29	30	32	43
2-RLI	Resource-based, labour-intensive	48	57	51	50	51	57
3-RCI	Resource-based, capital-intensive	65	62	64	67	66	61
4-ELE	Electronics	74	68	68	57	55	67
5-FCI	Footloose capital-intensive	73	78	78	75	72	72
	Non-oil and gas manufacturing	54	56	56	54	57	58
Foreign ownership (share, in %)		1990	1993	1996	1999	2002	2005
31	Food, beverages, and tobacco	8.5	9.7	14.0	15.8	9.4	24.9
32	Textile, clothes and leather industry	17.8	21.8	29.3	37.4	32.1	32.8
33	Wood and wood products	10.1	11.7	22.9	15.8	11.6	11.2
34	Paper and paper products	30.2	14.9	33.8	23.5	46.4	29.0
35	Chemicals and chemical products	33.1	36.6	43.0	44.8	29.7	26.3
36	Non-metallic mineral products	18.0	23.3	33.4	34.6	28.3	35.9
37	Basic metal industries	24.8	35.3	24.3	43.1	29.4	30.5
38	Fabricated metal, machinery, and equipment	46.1	36.4	42.4	58.0	67.6	68.3
39	Other manufacturing industries	19.5	44.4	51.9	56.1	33.7	46.9
1-ULI	Unskilled labour-intensive	16.2	21.1	27.3	35.4	28.8	30.0
2-RLI	Resource-based, labour-intensive	9.0	10.2	16.8	15.9	9.8	22.8
3-RCI	Resource-based, capital-intensive	29.5	32.5	35.9	40.0	34.9	29.9
4-ELE	Electronics	41.7	43.0	48.7	82.4	71.5	68.9
5-FCI	Footloose capital-intensive	47.2	34.7	39.5	44.0	66.0	68.1
	Non-oil and gas manufacturing	21.9	23.4	30.9	35.5	33.5	37.2

Source: computed from unpublished data from Badan Pusat Statistik, Central Board of Statistics, Indonesia, Statistik Industri.

Table 4: Manufacturing output by size group, 1990–2005

Current size (% VA)			
	Small	Medium	Large
	L=20–99	L=100–499	L=500+
1990	7	27	66
1991	6	28	66
1992	7	28	64
1993	7	23	70
1994	7	23	70
1995	7	22	71
1996	7	21	73
1997	8	27	65
1998	8	24	68
1999	7	25	68
2000	7	24	68
2001	9	24	68
2002	7	24	69
2003	6	23	70
2004	6	25	69
2005	5	25	70

Initial size (% VA)			
	Small	Medium	Large
	L=20–99	L=100–499	L=500+
1990	7	27	66
1991	7	28	65
1992	10	31	59
1993	10	31	58
1994	11	29	60
1995	13	29	59
1996	12	31	57
1997	14	38	48
1998	14	32	54
1999	12	33	54
2000	13	31	56
2001	15	31	54
2002	13	31	56
2003	13	31	56
2004	13	32	55
2005	12	33	55

Source: computed from unpublished data from Badan Pusat Statistik, Central Board of Statistics, Indonesia, Statistik Industri.

Table 5: Transition matrices

## a. Distribution of plants (% total plants), 1992 and 1996

		1996		
		S=20–	M=100–	L=500+
1992	S=20–99	90.6	8.8	0.6
	M=100–			
	499	13.1	75.4	11.5
	L=500+	1.9	13.1	85.1

## b. Distribution of plants (% total plants), 2001 and 2004

		2004		
		S=20–	M=100–	L=500+
2001	S=20–99	96.1	3.7	0.1
	M=100–			
	499	10.9	84.3	4.8
	L=500+	0.9	11.8	87.3

Source: computed from unpublished data from Badan Pusat Statistik, Central Board of Statistics, Indonesia, Statistik Industri.

Table 6: Indonesia: sectoral output and employment growth, 1990–2008

	1990–96	2000–08	Change	Ranking
<i>GDP growth (%)</i>				
Agriculture	3.1	3.9	0.8	2
Mining and utilities	5.3	1.5	-3.8	5
Manufacturing	11.2	5.2	-6	6
Construction	13.7	6.5	-7.3	7
Wholesale trade	8.9	5.8	-3	4
Transport	8.2	10.1	1.9	1
Other activities	6.4	5.8	-0.7	3
Total	7.9	5.3	-2.6	
<i>Employment growth (%)</i>				
Agriculture	-1.7	0.2	1.9	1
Mining and utilities	6	3.7	-2.3	3
Manufacturing	6	0.9	-5	5
Construction	10.8	5.7	-5.1	6
Wholesale trade	6.5	1.7	-4.8	4
Transport	9.4	3.9	-5.5	7
Other activities	4.6	3.6	-1	2
Total	2.3	1.7	-0.6	
<i>Implied output elasticities</i>				
Agriculture	-0.56	0.05	0.6	2
Mining and utilities	1.14	2.56	1.4	1
Manufacturing	0.53	0.18	-0.4	5
Construction	0.78	0.88	0.1	3
Wholesale trade	0.74	0.3	-0.4	6
Transport	1.14	0.38	-0.8	7
Other activities	0.71	0.62	-0.1	4
Total	0.29	0.32		

Source: ADB statistical database system (<https://sdfs.adb.org/sdfs/index.jsp>).

Table 7: East Asian manufacturing output and employment growth, 1988–2008

	1988–96	2000–08	Change	Reverse ranking
<i>GDP growth (%)</i>				
Indonesia	11.3	4.7	-6.5	2
Malaysia	13.9	4.3	-9.7	1
Philippines	3	4.2	1.2	5
Thailand	11.2	6	-5.1	3
Korea	7.5	6.3	-1.2	4
<i>Employment growth (%)</i>				
Indonesia	7.6	0.9	-6.7	3
Malaysia	8.6	-1.4	-10	1
Philippines	2.4	0.7	-1.7	4
Thailand	9.9	2	-7.9	2
Korea	0.2	-1	-1.1	5
<i>Implied output elasticities</i>				
Indonesia	0.67	0.2	-0.47	4
Malaysia	0.62	-0.32	-0.94	1
Philippines	0.78	0.17	-0.62	2
Thailand	0.88	0.33	-0.55	3
Korea	0.02	-0.16	-0.18	5

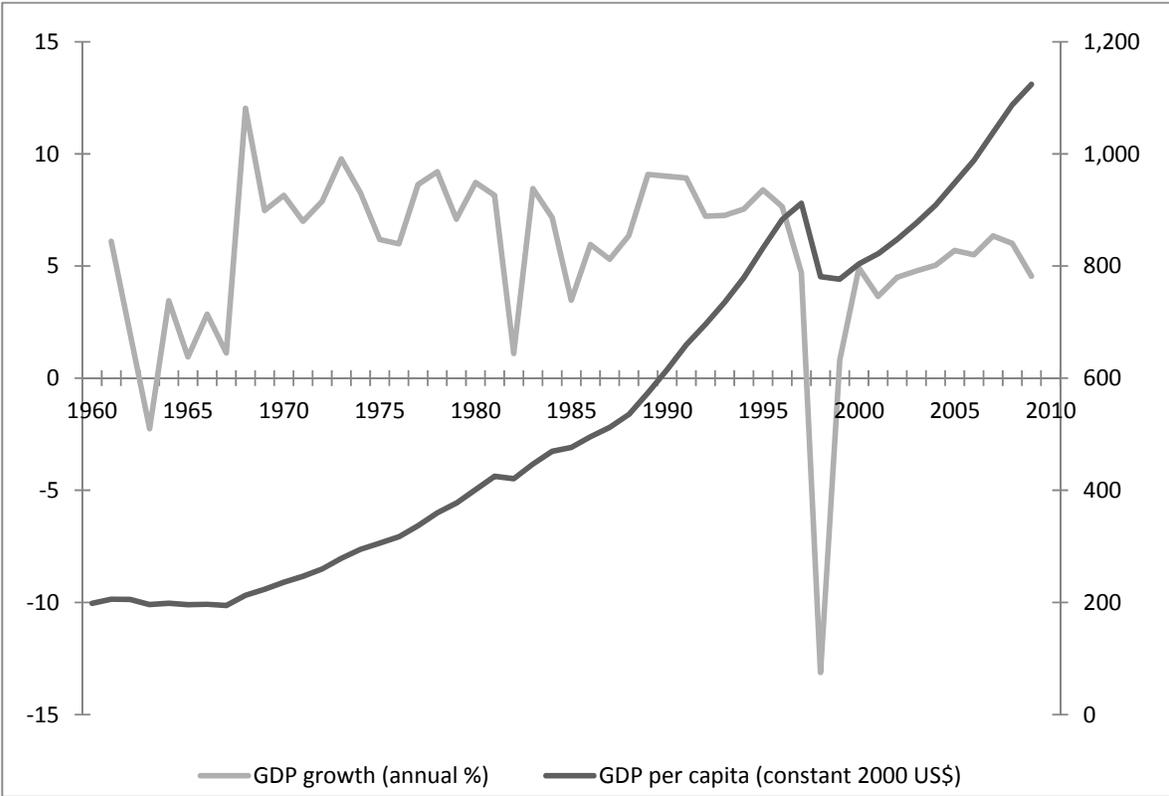
Source: ADB statistical database system (<https://sdbs.adb.org/sdbs/index.jsp>).

Table 8: Indonesian manufacturing employment by firm size, 1986, 1996, and 2006

Total ('000)	Large	Medium	Small	Total
1986	1,331	345	770	2,446
1996	3,545	609	2,273	6,427
2006	3,921	823	5,297	10,041
<i>Composition (% of total)</i>				
1986	54	14	32	100
1996	55	10	35	100
2006	39	8	53	100
<i>Growth (annual average, %)</i>				
1986–96	10	6	11	10
1996–2006	1	3	9	5
1986–2006	6	4	10	7

Source: computed from unpublished data from Badan Pusat Statistik, Central Board of Statistics, Indonesia, Sensus Ekonomi (1986, 1996, and 2006).

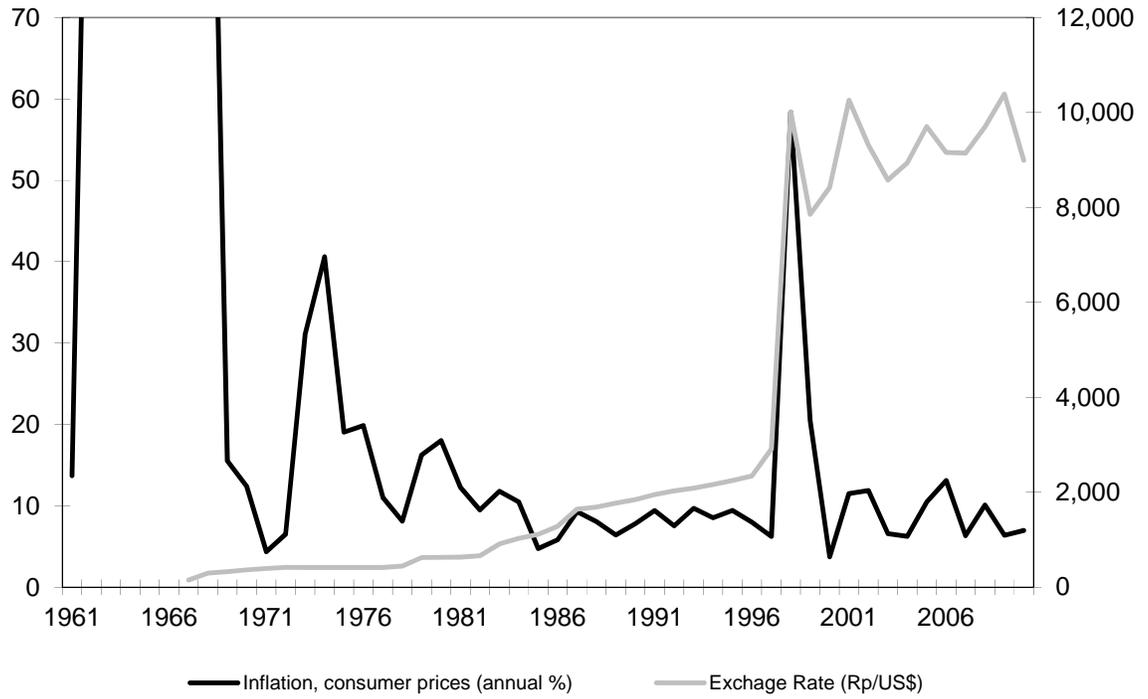
Figure 1: GDP per capita and economic growth, 1960–2010



Note: GDP per capita measured on the right axis, GDP growth on the left axis.

Source: computed from World Bank World Development Indicators, online database.

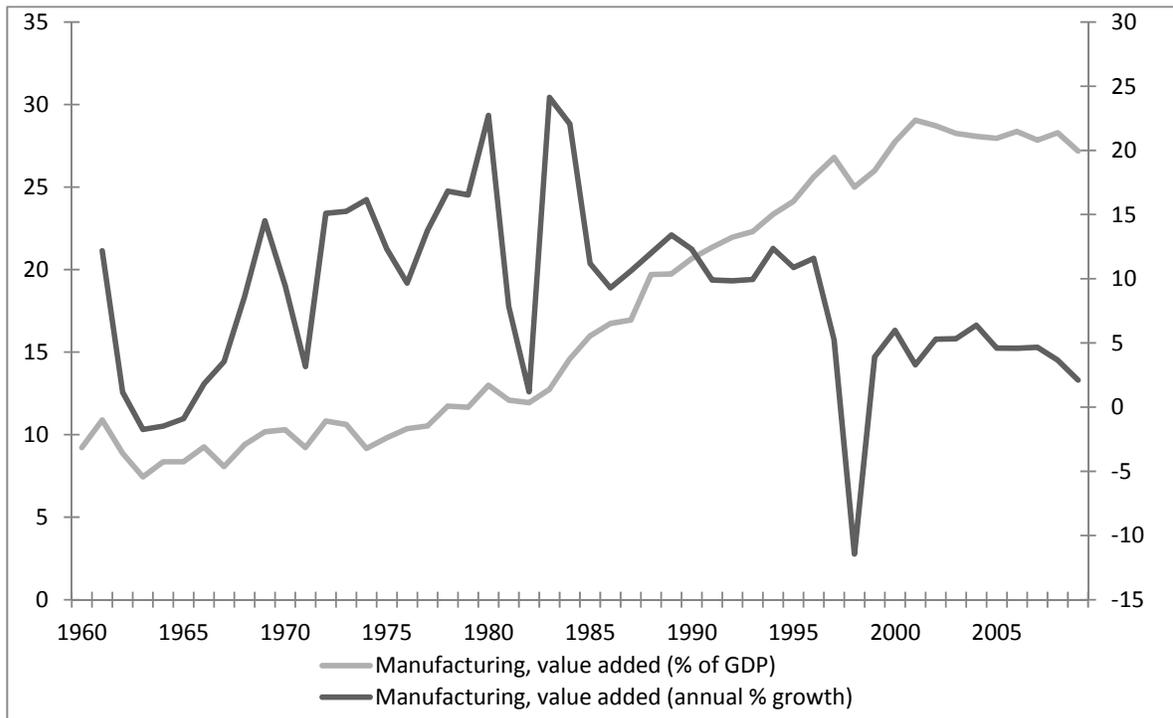
Figure 2: Inflation and the exchange rate, 1960–2009



Note: inflation is measured on the left axis, exchange rate on the right axis.

Source: computed from World Bank World Development Indicators, online database.

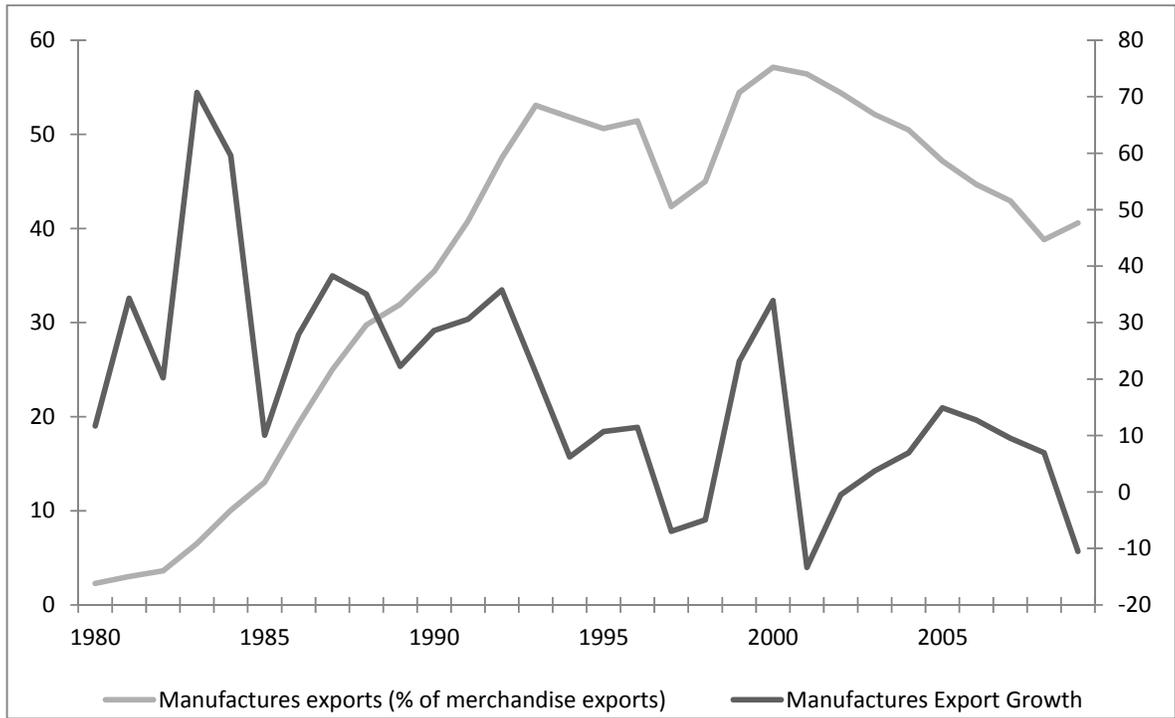
Figure 3: Manufacturing growth and share of GDP, 1960–2009



Note: manufacturing growth measured on the right axis, manufacturing share on the left axis.

Source: computed from World Bank World Development Indicators, online database.

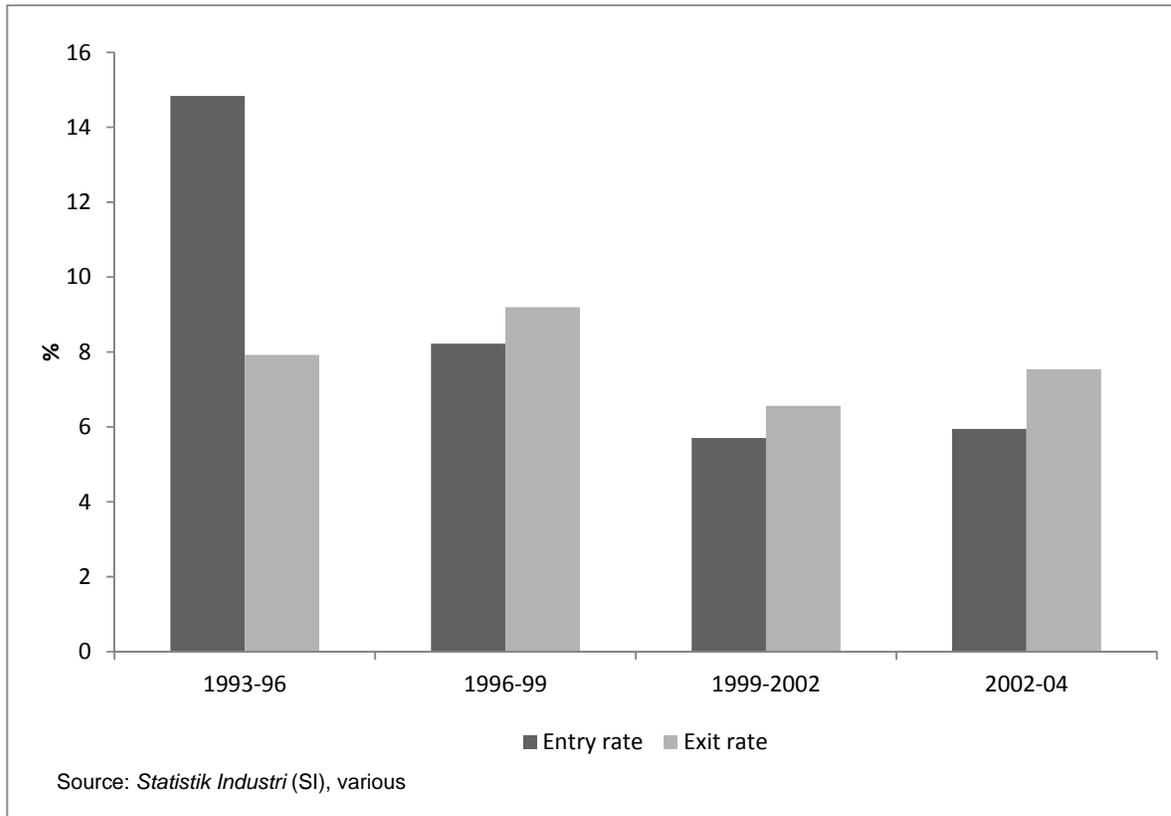
Figure 4: Manufacturing export growth and share, 1980–2009



Note: manufacturing growth measured on the left axis, manufacturing share on the right axis.

Source: Badan Pusat Statistik, Central Board of Statistics, Indonesia (exports) annual

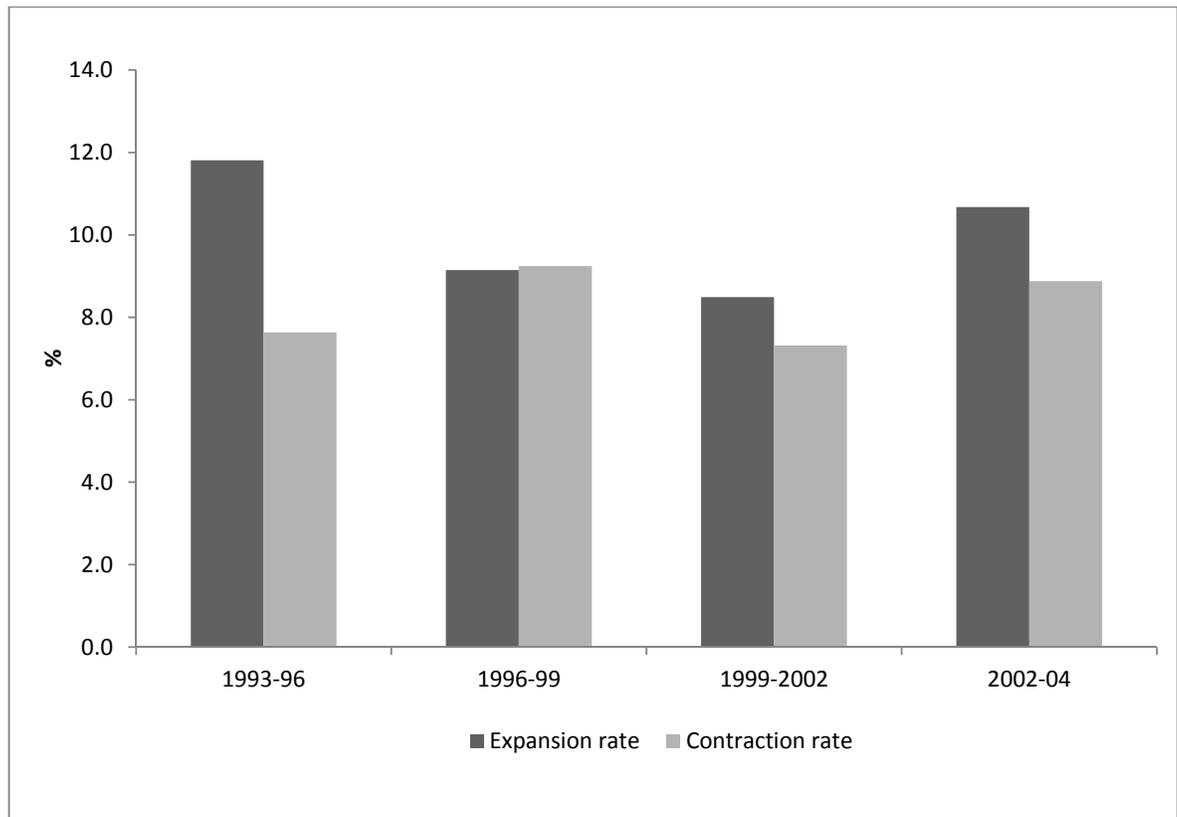
Figure 5: Entry and exit rates in manufacturing, 1993–2004



Note: % based on number of plants.

Source: computed from unpublished data from Badan Pusat Statistik, Central Board of Statistics, Indonesia, *Statistik Industri*.

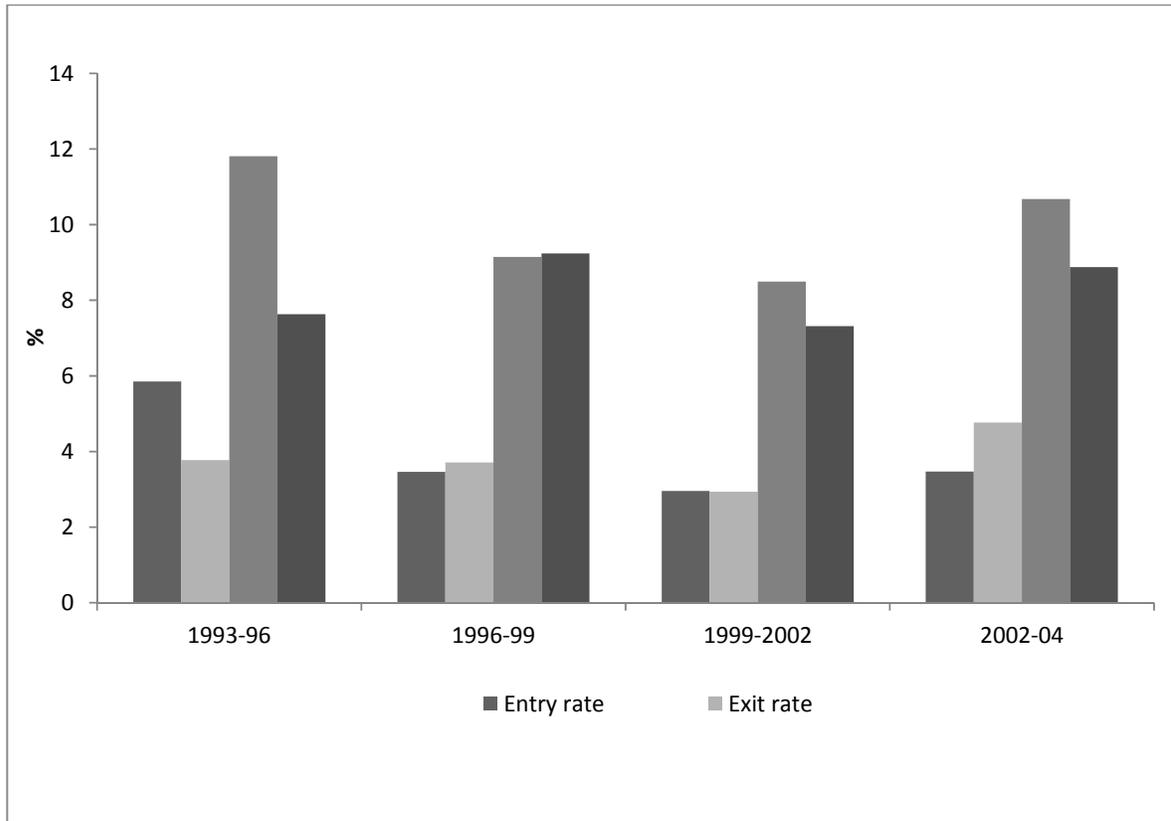
Figure 6: Expansion and contraction rates in manufacturing, 1993–2004



Note: % based on employment.

Source: computed from unpublished data from Badan Pusat Statistik, Central Board of Statistics, Indonesia, Statistik Industri.

Figure 7: Decomposition of employment growth, 1993–2004



Note: entry and exit rate in the figure are defined in terms of employment (i.e., entry rate 2 and exit rate 2, see text).

Source: computed from unpublished data from Badan Pusat Statistik, Central Board of Statistics, Indonesia, Statistik Industri.