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THE INDONESIAN ECONOMY

TRADE AND INDUSTRIAL POLICIES

Edited by
Lili Yan Ing, Gordon H. Hanson and Sri Mulyani Indrawati

ROUTLEDGE

The Indonesian Economy

Against the backdrop of growing anti-globalisation sentiments and increasing fragmentation of the production process across countries, this book addresses how the Indonesian economy should respond and how Indonesia should shape its trade and industrial policies in this new world trade environment. The book introduces evaluation not on tariffs but on new trade instruments such as non-tariff measures (SPS, TBT, export measures and beyond border measures), and looks at industrial policies from a broader perspective such as investment, accessing inputs, labour, services, research and innovation policies.

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Routledge
Taylor & Francis Group
LONDON AND NEW YORK

First published 2018
by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

and by Routledge
711 Third Avenue, New York, NY 10017

Routledge is an imprint of the Taylor & Francis Group, an informa business

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data
A catalog record for this book has been requested

ISBN: 978-1-138-06193-4 (hbk)
ISBN: 978-1-315-16197-6 (ebk)

DOI: 10.4324/9781315161976

Typeset in Galliard
by Apex CoVantage, LLC

Dedicated to our children and their generations

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Preface

How should an emerging country like Indonesia respond to rising anti-globalisation sentiment and increasing production networks – a world of 'specialisation' where production is sliced and tasks are fragmented and conducted in different places? How should Indonesia position itself in the region and the world economy? What kind of trade and industrial interventions could improve its competitiveness?

The key message of this book is that Indonesia should not only pick particular industries to grow – by providing tax incentives or subsidies, or allocating large amounts of national spending to develop particular industries – at the cost of other industries and inefficiency of resource allocations. Instead, Indonesia should improve the basic conditions for all industries to grow – that is improve infrastructure, quality of workers, and access to finance – and adopt conducive trade and investment policies that ensure the growth of all industries.

Acknowledgements

We thank our students who keep asking us challenging questions. To our students: please keep asking questions, and for you, this book is presented.

The book continues the series ‘Production Networks in Southeast Asia’. We benefited from constructive discussions and comments from distinguished scholars, including Pak Boediono, Sjamsu Rahardja, Chatib Basri, Shujiro Urata, Fauziah Zen, Mohammad Ikhsan, Robert Simanjuntak, Lee Sung Joon, Martin Richardson, Fuku Kimura, Wing Thye Woo, Edimon Ginting, Tony Prasetiantono, Ahmad Jamli, Ernawati Munadi, Nanda Nuridzki, Anika Widiana, Anwar Nasution, Rinta Jaya, Arti Adji, IESP-UGM ’95, and colleagues at Gadjah Mada University, University of Indonesia, the Australian National University, LPEM-FEUI, CSIS, ERIA Research Network, Ministry of Finance of Indonesia, World Bank, IMF, UNCTAD, OECD, and WTO. This book was also enriched by discussions with Indonesian and ASEAN government official counterparts.

We thank Rizqy Anandhika and Abigail Ho for their excellent research assistance. We also thank our editorial team, Fadriani Trianingsih, Stefan Wesiak, and Kate Fornadel. Elisa Ayu provided generous administrative support.

The greatest gratitude goes, to our family and friends, for their endless encouragement and filling our days with unconditional love. Indonesia will be in a different world from now, but we hope this book will still be on next generations’ bookshelf.

1 Introduction

Lili Yan Ing and Sri Mulyani Indrawati

After close to 70 years of trade liberalisation, a series of recent events suggests that the tide may well be turning. First, international trade as a proportion of global gross domestic product (GDP) has stopped growing since 2005 (Figure 1.1). Second, the momentum for trade liberalisation at the multilateral level has been lost with the Doha Round's failure, and there is little hope of a revival. Even regional trade agreements, sometimes seen as alternatives to multilateral liberalisation, are under heavy attack, now even in the US (despite the Trade Facilitation Agreement that came into effect on 22 February 2017).

Most would agree that the Indonesian economy has been one of the promising economies in the last two decades and will be in the coming decades. Indonesia recorded average annual economic growth of 5.3 percent from 2000 to 2015 (Figure 1.2), and given its population growth and political stability, by 2050 it is expected to be the fourth largest economy based on purchasing power parity-GDP (IMF, 2016). In the last two decades, from 2000 to 2015, the Indonesian economy mainly relied on consumption, which contributed about 60 percent to GDP. Government expenditure also contributed significantly to the economy, as much as 28 percent, while investment and net exports contributed only around 9 percent and 4 percent, respectively. Despite the long period of economic growth, the question remains whether this has been good enough for Indonesia, a country with abundant natural resources and a population of 252 million, 50 percent of which are in the labour force. Or can Indonesia do more to stimulate its exports, investment, and industrial development?

Figure 1.3 shows Indonesia's total exports and imports from its early development until today. Despite Indonesia's efforts to raise exports, the average ratio of exports to GDP increased from an average of merely 23 percent in 1980–1995 to 27 percent in 2005–2015. Indonesia's trade was only slightly affected by the Global Financial Crisis in 2008–2009, but its consequences depressed demand for Indonesia's exports in the following years.

Total exports decreased from a record high of 223 billion US dollars in 2011 to 159 billion US dollars in 2015. Despite Indonesia's aggressive promotion of its primary industry; efforts at unilateral, regional, and multilateral engagement and reforms; and some success of its export diversification strategy, the manufacturing sector grew more slowly than the agricultural sector in 2009 (World

DOI: 10.4324/9781315161976-1

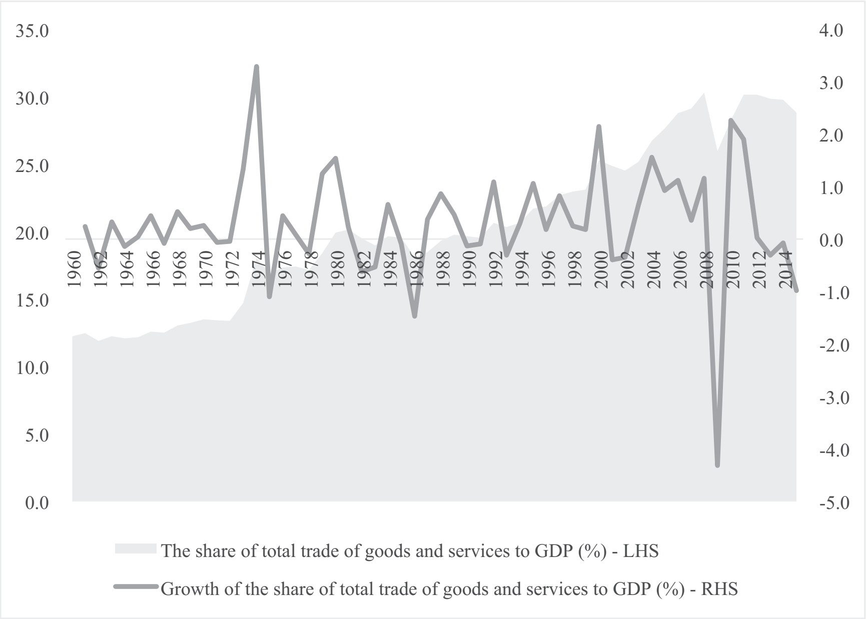

Figure 1.1 World trade

GDP = gross domestic product; LHS = left-hand side; RHS = right-hand side.

Source: Authors' calculations, based on Comtrade and World Development Indicators.

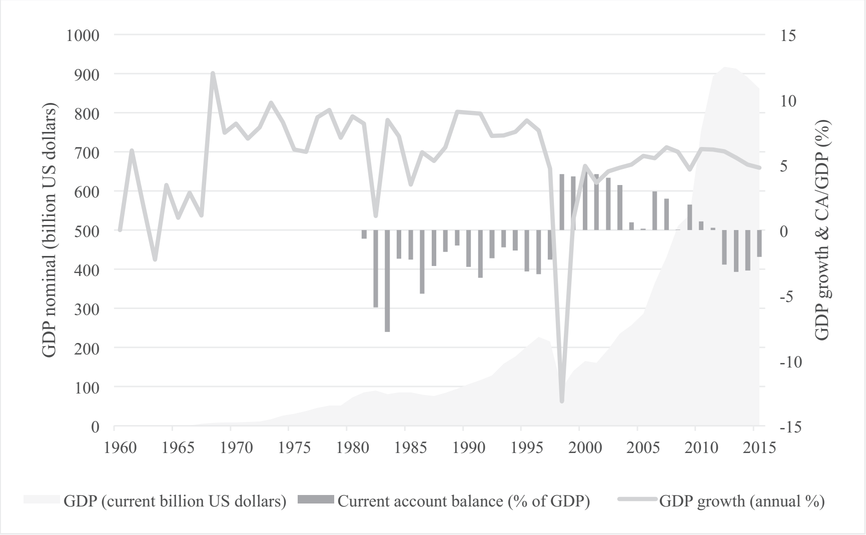

Figure 1.2 GDP, economic growth, and current account/GDP

GDP = gross domestic product; CA = current account

Source: World Development Indicators, World Bank, 2016.

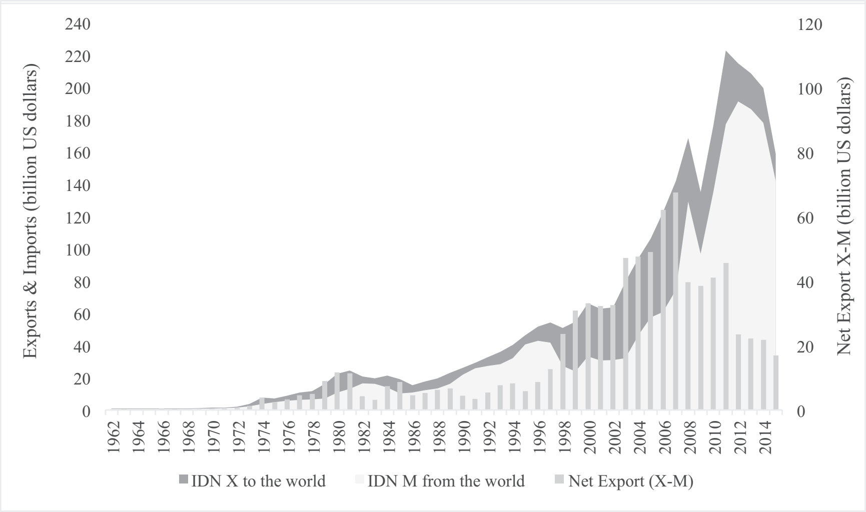

Figure 1.3 Indonesia's exports and imports (billion US dollars)
IDN = Indonesia; X = exports; M = imports
Source: Comtrade Database, 2016.

Bank, 2016), and manufactured goods contributed only 46 percent of Indonesia's total exports in 2016. Indonesia's exports still rely heavily on commodities – by 2015, six out of 10 main exported products were resource-intensive: coal, vegetable oils, gas, petroleum, ores, and rubber.

The world today is one of 'specialisation', where production is sliced and tasks are fragmented and conducted in different places – production at the optimal level of economies of scale will result in cost and resource allocation efficiency. How should an emerging country like Indonesia respond to this situation? How does Indonesia position itself in the world economy and in the region? What kind of trade and industrial interventions could improve its competitiveness?

The book consists of 10 main chapters; it reviews trade and industrial policies over the years, from Indonesia's early development in the 1960s up until 2015, and provides insights for designing trade and industrial policies in the new world trade environment. It covers discussions on the position of Indonesia in East Asia including the pace of industrialisation in Indonesia compared with its peers in Southeast Asia, and assesses why Indonesia is left behind in the production networks in the region. It also provides insights on unit labour cost and exchange rates; labour regulations; and policies on local content requirement, investment, and innovation.

The book's overall recommendation is for Indonesia not to pick only particular industries to grow – by providing tax incentives or subsidies or allocating large amount of national spending to develop particular industries – at the cost of other industries and inefficient human, natural, and budget resource allocation. Rather, Indonesia should improve the basic conditions for growth of all industries, which means improving infrastructure, skilled labour, and access to finance, and conduct a favourable trade and investment policy.

CHAPTER 2

In Chapter 2, Hanson examines patterns of export specialisation in East and Southeast Asia. There has been a long-running debate about the origins of Asia's export growth. One strand of literature emphasises the importance of market-oriented reforms that allow countries to realise a latent comparative advantage in manufacturing; another strand instead sees Asian success as the result of government intervention. He examines the temporal relationship between sectoral comparative advantage and aggregate capital accumulation for East and Southeast Asian countries.

There is a strong connection between capital accumulation at the country level and revealed comparative advantage in specific sectors that is approximately inverse U-shaped. Sectoral comparative advantage first increases and then decreases in capital abundance, where the inflection point varies both by sector and by country. Although China tends to reach peak comparative advantage at a level of capital per worker that is lower than that of other countries, aggregate capital accumulation does a remarkably good job of explaining the progression of comparative advantage across East and Southeast Asian economies. The speed of China's progress may be distinct, but the industrialisation path that it is following is not.

The findings suggest that we cannot make a strong case in favour of industrial policy on the basis of observed patterns of changing comparative advantage over time in the region. The scale of China's economy and its rapid pace of development have created an environment of continual change in export opportunities for other countries in East Asia. Because the pace of capital accumulation determines the speed with which an economy moves from comparative advantage to disadvantage in a sector, any country that achieves a high rate of capital accumulation, as China has over the last quarter century, will cycle through manufacturing sectors at an accelerated pace.

CHAPTER 3

In Chapter 3, Ing, Pangestu, and Cadot outline the many transformations Indonesia's international trade has undergone over the last 50 years, from 1960–2015. But there have also been recurring themes: the protection of domestic markets and industries; the development of domestic and strategic industries, including local content; a constant control over strategic resources; the downstream processing of resources; the creation and maintenance of self-sufficiency in various sectors; and the diversification of exports away from commodities. What differs are the instruments used and the beneficiaries of their use. Policy outcomes have also been influenced by external economic developments such as oil and commodity booms and global economic cycles, as well as by international cooperation, negotiations, and commitments. Changes in its growth and structure have reflected changes in the country's comparative advantages and trade and development policies, as well as inconstant global circumstances and the evolving rules of the multilateral, regional, and bilateral trade agreements in which Indonesia has participated.

Moreover, today trade policy instruments are no longer tariffs but non-tariff measures (NTMs). In view of the limited success of applying disciplines to NTMs at the regional and multilateral levels, the national level remains a crucial locus for the design of welfare-enhancing NTMs. The number of NTMs in Indonesia increased from 24 in 2000 to 634 in 2015, largely applying to the textile and agri-food sectors, which contribute about 18 percent to 24 percent of total NTMs. Some recent concerns include a certification system for steel alloys and more restrictive import regulations on mobile phones and tablets. Some of Indonesia's NTMs are defensible but in need of streamlining. At the same time, Indonesia also faces growing NTMs on its products, such as the US subsidies that tilt the level playing field of the US tyre market and South Korea's taxation of coal for power generation.

Indonesia could improve its business and investment climate by improving transparency and by streamlining NTMs. This would involve (1) clarifying and sorting their objectives (trade versus non-trade), (2) subjecting them to cost-benefit analysis, (3) strengthening capabilities in terms of regulatory design and conformity assessment (drawing on technical assistance from development partners), and (4) seeking mutual recognition of conformity-assessment procedures with key trading partners. The first two objectives have to do with the selection and design of measures that could bring societal benefits. The last two have to do with making them effective policy tools. One solution to this problem is to set up an independent regulatory-oversight body embedded within a National Economic Council (NEC). The NEC would gather representatives from line ministries and high-level government officials and have divisions in charge of trade facilitation, NTMs, the national single window, investment procedures and regulations, and economic cooperation, including trade agreements. The NTM division's mandate would include the review of all existing and upcoming NTMs. It can start with improving transparency of NTMs in Indonesia and the East Asian region.

CHAPTER 4

Aswicahyono and Hill in Chapter 4 provide insights on industrial policy in Indonesia since 1960, highlighting the 'Democratic era' after 2001. They start by observing that the Indonesian economy (1) went through an oil-driven growth period in the 1970s and early 1980s and the beginning of a costly heavy industry approach and import substitution strategy; (2) saw booming labour intensive-exports from the mid-1980s and a slowing down from the early 1990s due to an increase in competition in export markets, slower labour productivity, and real rupiah appreciation until the Asian Financial Crisis in 1997; and (3) has seen the recent development of industrial polices, particularly since 2001.

Their main argument is that industrial policy should not be interpreted narrowly to focus on government intervention in specific sectors in certain periods of time. Instead, they highlight seven key issues in industrial development. These cover the main factors behind the slow industrial growth – the macroeconomic policy environment, small and medium enterprises and firm mobility, commercial policy, governance and regulatory environment, the supply side from a skills and labour market perspective, and the supply side from a logistics and infrastructure perspective.

What sort of industry policy might Indonesia contemplate? Their conclusions are premised on four general observations. First, the major challenge is to achieve high economic growth in aggregate, consistent also with distributional and environmental objectives. The sectoral origins of this growth are of secondary concern. Second, as a corollary, the emphasis needs to be on productivity and efficiency, and thus on 'policies for industrial progress' rather than 'industry policy'. Third, it is important to keep in mind the Tinbergen 'assignment principle', that the number of independent instruments (i.e. policy levers) must be at least as great as the number of targets. In other words, policies need to be directed towards specific targets rather than vague catch-all objectives. Fourth, policies need to be administratively and politically feasible, in the sense of having a realistic prospect of implementation.

CHAPTER 5

In Chapter 5, Shepherd and Soejachmoen rechart the development of global value chains in Indonesia from a comparative perspective. In key sectors like electronics and automotive equipment, Indonesia's imports and exports skew towards final products, whereas other Southeast Asian countries tend to be more specialised in intermediate goods. Many forces are at work in producing this outcome, including the size of Indonesia's domestic market. But it is also important to look at the role played by policy, which is what this chapter focuses on.

One area where global value chain development in Indonesia is noticeably different from what is observed elsewhere in Southeast Asia is in the area of services. Global value chains (GVCs) are intensive users of services as inputs in their production processes for manufactured goods. Key sectors like transport and logistics, telecommunications, finance, and business services all potentially make it easier for goods exporters to reach world markets, both in terms of their own outputs and also for access to intermediate inputs from abroad. Incorporation of services inputs into manufacturing is less pronounced in Indonesia than elsewhere, and could be one factor that is holding back the development of GVCs.

There is evidence that services sector policies in Indonesia have significant explanatory power regarding this phenomenon. For many services firms, the only feasible way of entering a foreign market is through foreign direct investment (FDI). However, Indonesia maintains substantial policy restrictions affecting inward investment in services sectors, which holds back the sector from engaging in international trade. They argue that a more liberal approach to services trade in general, and services FDI in particular, could help Indonesian firms link up better with suppliers and purchasers abroad, which is a key part of developing competitive GVCs.

CHAPTER 6

In Chapter 6, Kuncoro argues that the export market is an avenue through which firms can learn to improve their products. To develop its products, a firm can learn from whatever technologies and information is available in the international market. But to learn from an export market, a firm must enter the market first, and this is not easy.

To grasp the dynamics of product development in Indonesian manufacturing, the study looks at the firm-level export decision vis-à-vis not exporting as signalling the existence of product development. The study examines factors behind such decisions, particularly factors that are internal to firms/industry such as ownership, financing, distribution network, skill intensity, research and development; as well as those external to the firm/industry such as infrastructure and government regulations. This paper explains not only in the incidence of exports but also in the persistence or the sustainability of exports, that is how long exporting can be maintained once market penetration has been achieved.

The results suggest that productivity is key to the persistence of exporting. Productivity itself is not a stand-alone variable. It is influenced by access to imported inputs, capital goods, external finance, machinery importation, and infrastructure. For this, maintaining openness is a must. Although Indonesia is still lagging behind other countries in Southeast Asia, at the more disaggregated level at least, in some branches like machinery and electronics Indonesia's manufacturing exports have moved in the direction of higher technological content, albeit at a very slow pace. Also, with investment in new machinery, textiles and garments cannot be called sunset industries yet.

CHAPTER 7

In Chapter 7, Prassetya analyses the competitiveness of Indonesia's manufacturing sector based on unit labour costs from 2003 to 2011. A competitive manufacturing sector is a key element of the early development trajectory of many successful emerging market economies. The chapter focuses in particular on the trend in manufacturing unit labour costs during the commodity boom in the decade after the Asian Financial Crisis, when, as suggested by an array of indicators, Indonesia's manufacturing sector lost competitiveness. The primary conclusion of the chapter is that a sharp increase in manufacturing unit labour costs is likely to have contributed to a decline in the competitiveness of Indonesia's manufacturing sector, and that this can be traced to relatively high inflation rather than increases in real wages and appreciation of the exchange rate; and low productivity growth. The chapter focuses mainly on the former and examines the factors driving the relatively high level of inflation in Indonesia during the commodity boom.

He argues that during the commodity boom period there was an appreciation of Indonesia's real exchange rate. This contributed to an increase in Indonesia's unit labour costs and a decline in Indonesia's manufacturing sector competitiveness. This paper argues that real appreciation during a commodity boom may be inevitable; but the increase in unit labour costs could be moderated if labour productivity increases to compensate, at least partially, the real appreciation. In Indonesia's case, not only did productivity growth in the manufacturing sector fail to offset the impact of such appreciation, it even failed to match that of partner countries whose real exchange rates were not affected by the commodity boom. According to his calculation, to offset the effect of real appreciation in the previous commodity boom period, Indonesia's productivity growth should have been five times higher than actual productivity growth.

He also argues that taming inflation is necessary but not sufficient to maintain competitiveness during a commodity boom period. Improvement in labour productivity and other aspects of the investment climate are crucial to mitigating the loss of competitiveness. He notes, however, that despite the best intentions and policy initiatives to pursue structural reforms during a commodity boom, cross-country experiences show this is a challenging task. Now that another commodity boom has ended, leaving Indonesia with lagging manufacturing sector competitiveness, the premium on undertaking structural reform is very high. Whether this momentum of 'bad times' can push for broad-based structural reforms is a crucial question for Indonesia's economy.

CHAPTER 8

In Chapter 8, Purnagunawan, Pratomo, and Suryadarma demonstrate that Indonesia's large population and low dependency ratio result in an abundant supply of labour; half of its total population is in the labour force, making it the fourth largest in the world. Such an abundance of labour makes it a key determinant of Indonesia's competitiveness. The period 2015–2030 is described as Indonesia's period of demographic dividend, as the share of dependents decreases relative to economically active persons. The productive utilisation of the workforce is expected to contribute to a rise in output during this period.

Labour productivity rose significantly between 2001 and 2015 in all sectors, with the manufacturing sector contributing higher productivity than the agriculture and services sectors. However, employment in manufacturing has grown relatively slowly since the early 2000s, mainly as a result of lower competitiveness of the industry due to domestic obstacles to job creation and a higher real exchange rate. In contrast, employment in the services sector has continued to grow far more rapidly than other sectors, with an average annual growth rate of 7.1 percent.

Several studies show that improving education and levels of skills in the work place is a key instrument for increasing productivity and competitiveness. This is anticipated by the government, as it has allocated 20 percent of the public budget for expenditure on education. However, some problems remain. Besides the relatively low quality of education, only a minority of business firms allow workers to continually acquire new skills by attending workplace training. The significant proportion of employees who are employed on short-term contracts diminishes investment in training and human capital development. Access to certified training courses is also limited in Indonesia – only a few less educated people have access to them, resulting in as many as half of all workers being possibly underqualified for their positions.

CHAPTER 9

In Chapter 9, Negara analyses how local content requirements (LCRs) affect productivity. LCRs are prohibited under World Trade Organization (WTO) rules (Article III:4 of the General Agreement on Tariffs and Trade 1994) as they are considered to be in violation of WTO provisions, particularly the national treatment principle. Nonetheless, many countries, including Indonesia, still use LCRs as part of their industrial policies. Countries implement LCRs for various reasons, including to protect local industries, to create employment, to boost exports, to enhance local innovation capacity, and to support their broader economic development.

This chapter examines the impact of LCRs on Indonesia's manufacturing sector, with a particular focus on the machinery and transport industry. Because LCRs discourage imports, it is expected they may affect firms' use of imported inputs. Negara employs the Indonesian manufacturing census data covering the period 1990 to 2013, and he finds a positive impact of imported inputs on firms' level of productivity, value added, output, exports, and employment in the manufacturing sector in Indonesia. His findings show the ineffectiveness of LCRs in terms of reducing firms' dependence on imported inputs. Hence, overly restrictive LCRs may adversely affect industrial performance and thus competitiveness.

CHAPTER 10

In Chapter 10, Sjöholm explains the importance of FDI over the last decades, globally as well as in Indonesia. He examines how FDI inflows affect value added in Indonesia and finds that value added of FDI firms is 6.6 times higher than that produced by non-FDI firms. Although the Indonesian market is not small, it is relatively modest compared with those of the large economies in East Asia, North America, and Europe. On average, 35 percent of the output produced by foreign firms in Indonesia is exported. At the same time, foreign firms generally have very high import shares, which results in limited backward linkages with domestic firms.

Sjöholm claims that FDI contributes to a structural change of the economy towards more high value added activities by employing more workers in the manufacturing sector, which has relatively higher value added, transforming them either from unemployed or underemployed or from relatively lower productivity sectors. The manufacturing sector is assessed to have labour productivity twice as high as the services sector and four times as high as the agricultural sector. Moreover, the essential contribution of foreign firms is that they are typically more integrated in international production networks, which gives them access to relatively sophisticated technology. The presence of FDI is also claimed to have positive spillover effects to domestic firms, which is channelled either through technology spillover or competition.

He concludes by highlighting the benefits of FDI, pointing out that high value added can lead to increased investment and higher tax revenues for the government. High value added may also benefit labour through higher wages, an effect that has been empirically confirmed in Indonesia. Instead of suggesting typical fiscal intensive for FDI such as providing subsidies, tax incentives, and protection, he suggests Indonesia should aim to attract 'high-quality' FDI by providing the environment necessary to attract foreign investors such as economic and political stability, skilled labour, and infrastructure; and improve trade and investment policies to ensure a 'fair' level of competition for all firms to grow. He emphasises that as Indonesia has the advantages of a relatively large domestic market and is located in a dynamic region, managing openness and improving a doing business environment will definitely secure FDI.

CHAPTER 11

In the final chapter, Chapter 11, Schulze and Schulze analyse innovative behaviour of the total of 1,299 manufacturing and service firms comprising 463 small, 451 medium, and 385 large firms in Indonesia using the World Enterprise Survey 2015. Some descriptive analyses show that large firms have a higher tendency to provide training for their employees.

Their analysis shows that innovation activity is highly concentrated, with one in five firms innovating at all, and that only 6 percent of the firms are being substantially innovative. They carry out a cluster analysis for the innovating firms and analyse empirically the determinants of innovation. They find that the determinants of innovation are firm size (medium and especially large firms are more likely to innovate), whether firms export, and market structure (firms in oligopolistic markets are more likely to innovate). Surprisingly, foreign ownership, import of inputs, and age of firms do not play a significant role in determining the level of innovation. One explanation could be that foreign firms tend to carry out innovation activities at their headquarters rather than at their foreign affiliates.

They also investigate the main obstacles to productivity enhancement and firm growth by cluster and find significant differences. Overall, highly innovative firms claim that lack of infrastructure, limited access to finance and skilled labour, corruption, crime, and lack of economic and political stability are major obstacles to conducting leading innovation. Non-innovating firms seem less concerned about potential obstacles than innovating firms, as innovating firms have to bear fixed sunk costs when they conduct innovation.

2 Export specialisation in East and Southeast Asia

Lessons from China's 'exceptional' development

Gordon H. Hanson

1. Introduction

East Asia is widely heralded for its achievements in export manufacturing. There is a long-running debate among economists about the origins of the region's success. One strand of the literature emphasises the importance of market-oriented reforms in the 1960s and 1970s that allowed the East Asian Tigers – Hong Kong, South Korea, Singapore, and Taiwan – to realise a latent comparative advantage in manufacturing (e.g. Corbo et al., 1985). These countries progressed, the story goes, from exporting labour-intensive goods to more advanced products by educating their populace and building their capital stocks. Another strand of the literature counters that growth in East Asia was instead the result of conscious interventions by the government to direct firms into particular lines of business (e.g. Wade, 1990; Amsden, 1992). This alternative view has it that Asia progressed not by 'getting prices right' but as a result of effective industrial policy.

China's spectacular economic growth has rekindled the debate about export development in Asia. The country is described as having manipulated its currency (Cline, 2010), subsidised favoured firms (Aghion et al., 2015), and concluded one-sided trade deals (Truman, 2010), generally in the interest of expanding its exports. The country's share of world manufacturing exports grew in dramatic fashion, from 1.2 percent in 1984 to 18.8 percent in 2013. Not surprisingly, growth of this magnitude has disrupted markets worldwide. In the US and other advanced countries, expanding trade with China has contributed to substantial losses in manufacturing employment and significant adjustments in labour market earnings (Autor and Dorn, 2013; Autor et al., 2013). In commodity-exporting countries, China's manufacturing growth has meant booming demand for minerals and raw materials (Costa et al., 2014).

Less well understood is whether China's industrial development is the result of the country simply realising its long-suppressed strength in manufacturing or whether the government somehow engineered this success. Answers to these questions are of paramount importance for the economies of Southeast Asia. Their development paths are affected by China's growth, with many economies in the region – including Indonesia, Malaysia, the Philippines, and Thailand – playing

DOI: 10.4324/9781315161976-2

the dual role of benefiting from China's ever-expanding increase in demand for raw materials and competing with China for space in manufacturing production networks centred in Asia. These countries also stand to learn from China's policy successes and failures in trying to promote export-led development.

One source of suspicion about China's export prowess derives from the country seeming to be too good at what it does. Rodrik (2006), for instance, finds that China manufactures products that are overly advanced for its stage of development. That is, China's export basket mirrors that of countries with much higher levels of labour productivity. His conclusion is that this outcome is likely the result of government policies that have channelled resources towards preferred sectors. China has grown, not by following its comparative advantage, but by the government helping firms discover where their capabilities lie (Hausmann and Rodrik, 2003). But, identifying the impact of industrial policy on economic development is an immensely difficult task (Harrison and Rodriguez-Clare, 2010).

Mindful of the challenges in explaining why Asia's exports have grown, in this chapter I ask a modest question: is the evolution of China's pattern of export specialisation different from that of other countries in East and Southeast Asia? I focus the analysis on the sectors that lie at the heart of China's export miracle, which are also key sectors in the industrial development of emerging Southeast Asian economies. China's re-emergence as a major trading nation coincided with a shift in its exports towards manufacturing and within manufacturing towards sectors organised around global production networks (Naughton, 1997). These sectors produce goods common to the Asian Tigers' early industrialisation (such as apparel, footwear, toys, and other semi-durable consumer items) as well as products that one associates with the digital economy (including mobile phone handsets, laptops, and home electronics). I document the role of these offshoring sectors in Asian economies, the characteristics that make these industries amenable to offshoring, and how specialisation in offshoring sectors evolves over the industrialisation process. Apart from China, I focus on eight countries in East and Southeast Asia, which span a wide range of economic development: Japan, South Korea, and Taiwan represent the more advanced countries in the region, while Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam represent the region's major emerging economies.

The cases of the production of Nike, Intel, and Samsung are indicative of the industry characteristics that facilitate offshoring. First, factor intensity varies across production stages (Feenstra and Hanson, 1997; Costinot and Vogel, 2010). Research and development (R&D) is skill intensive, the production of parts and components is often capital intensive, and the processing and assembly of components into final products is labour intensive, creating an incentive for firms to fragment production across borders. Second, technology permits the physical separation of production stages (Grossman and Rossi-Hansberg, 2008). Third, communication and transport costs are sufficiently low that firms are not deterred from locating design, parts production, and assembly in countries far from each other or from the location of final consumers.

The market-driven explanation of Asia's export success would imply that specialisation in offshoring sectors is primarily the result of comparative advantage. The structure of a country's exports should then be explained by its factor supplies. An industrial-policy interpretation of Asian export growth would instead require that specialisation patterns result from targeted government interventions that induce firms to produce goods that *go against* a country's current comparative advantage. Changes in export structure should then be unrelated to, or at best weakly related to, aggregate factor accumulation.

To provide context for the analysis, I first examine the industries in which offshoring is concentrated. Given empirical challenges in measuring global production sharing, I focus on a task for which offshoring can be readily observed: the assembly of inputs into final outputs for export.[1] Using data for the US, I show that offshoring sectors tend to be ones that are relatively intensive in the use of production (i.e. blue-collar) workers, pay low-wage workers relatively low wages, and exhibit relatively high variation in wages across workers within a sector. These characteristics are consistent with offshoring sectors embodying a relatively high degree of labour intensity in production and relatively high variation in skill intensity across production stages within an industry.

Next, I examine the temporal relationship between sectoral comparative advantage and aggregate capital accumulation for East and Southeast Asian countries. For economies with a comparative advantage in manufacturing, theory would suggest that as a country accumulates capital and raises its aggregate capital-labour ratio, it will push itself out of more labour-intensive goods and into more capital-intensive ones (Romalis, 2004). Consistent with Schott (2003), I find a strong relationship between capital accumulation at the national level and revealed comparative advantage in specific sectors that is approximately inversely U-shaped. Sectoral comparative advantage is first increasing and then decreasing in capital abundance, where the inflection point varies by sector, as Schott (2003) finds, and also by country. In most sectors I consider, China reaches peak comparative advantage at a level of capital per worker that is much lower than that of other countries. This is true in comparison both to other countries in East Asia, which industrialised decades before China, and to the countries of Southeast Asia, which like China are industrialising now.

In the final section of the chapter, I discuss what my findings have to say about the debate regarding Asia's export manufacturing success. That China acquires a comparative advantage in key sectors at an earlier stage of its development than other Asian economies is consistent with Rodrik's (2006) finding that China's production profile is more advanced than its per capita gross domestic product (GDP) would suggest. Some may interpret this pattern as an indication that the economies of Southeast Asia should emulate China's industrial policies to leapfrog other nations attempting to advance through export manufacturing. However, there is also good reason to be sceptical that China has successfully manipulated its development path. Capital accumulation in the aggregate does a good job of explaining the progression of China's comparative advantage. That the qualitative nature of this capital abundance–export specialisation nexus is similar for countries throughout East and Southeast Asia suggests that a common process of economic development is at work. The speed of China's progress may be distinct, but the industrialisation path it is following is not. I interpret these results to mean that one should be cautious in ascribing too much power to industrial policy in explaining East and Southeast Asia's export success. Instead, the data support factor accumulation as being an overriding factor in the region's export growth.

2. China's evolving comparative advantage

Renewed interest in the causes of export-led industrialisation in Asia is largely the result of China's momentous economic development. China's manufacturing export growth was unleashed by the economic reforms of Deng Xiaoping that freed resources to move from agriculture to industry, permitted private sector firms to grow at the expense of state-owned enterprises, and reduced barriers to foreign trade and investment. Although Deng's process of 'reform and opening' in China began in the early 1980s (Naughton, 2007), it was not until a decade later that export-led growth manifested itself in earnest. One impetus for China's export surge was the creation of Special Economic Zones (SEZs), which allowed private companies to set up export factories relatively free from government intervention (Yu and Tian, 2012). Many of these multinationals set up export processing plants, which assembled imported inputs into final outputs. China's entry into export manufacturing via export processing charted a path similar to the other East Asian economies that had come before it.

To measure a country's relative export strength by sector, I use the formulation of revealed comparative advantage (RCA) in Balassa (1965), defined in log values as:

$$\ln\left(\frac{X_{ist}/\sum_{s'} X_{is't}}{\sum_{i'} X_{i'st}/\sum_{i'}\sum_{s'} X_{i's't}}\right)$$

for exports X_{ist} in industry i by source country s in year t, where the numerator is the share of country s in world exports of industry i and the denominator is the share of country s in world exports of all goods (which I will define to be all merchandise trade, including both manufacturing and non-manufacturing sectors but excluding services). A positive log RCA index indicates an export advantage in a sector (country share of world industry exports > country share of world aggregate exports), whereas a negative log RCA index indicates an export disadvantage.

Although the Balassa RCA measure is ad hoc, it resembles a theoretically valid measure of comparative advantage derived from a multi-sector Eaton and Kortum (2002) model of a Ricardian economy, as examined by Costinot et al. (2013). It is straightforward to show that the deviation of the Balassa RCA index from its theoretical counterpart is due to the distorting effects of trade costs, which affect realised export values. As a practical matter, the Balassa RCA index tends to track this theoretical counterpart closely. Hanson et al. (2015) document that the Balassa RCA index is strongly positively correlated (correlation coefficient of 0.65) with a theoretically consistent measure of comparative advantage based on exporter-sector-year fixed effects estimated using the gravity model of trade.

Figure 2.1, taken from Autor et al. (2016), plots revealed comparative advantage for China in two broad sectors, manufacturing and primary commodities, where the latter group consists of foods, fuels, ores, and metals.[2] It was not until 1992 that China moved from disadvantage to advantage in manufacturing, as indicated by the appearance of positive log RCA values, and from advantage to disadvantage in primary commodities, as indicated by the appearance of negative log RCA values. The strength of China in manufacturing likely reflects at least in part its abundant supply of labour relative to the rest of the world (Amiti and Freund, 2010). The massive increase in China's industrial labour force – resulting from market reforms in agriculture that freed labour to move to manufacturing, the closing of inefficient state-owned industrial enterprises that allowed workers to reallocate to the private sector, and large-scale rural-to-urban migration that raised the effective labour supply for firms located in regions with relatively low-cost access to foreign markets – has turned the country into the leading producer of a wide range of labour-intensive products (Li et al., 2012). In later sections, we will see similar dramatic changes in industry specialisation patterns

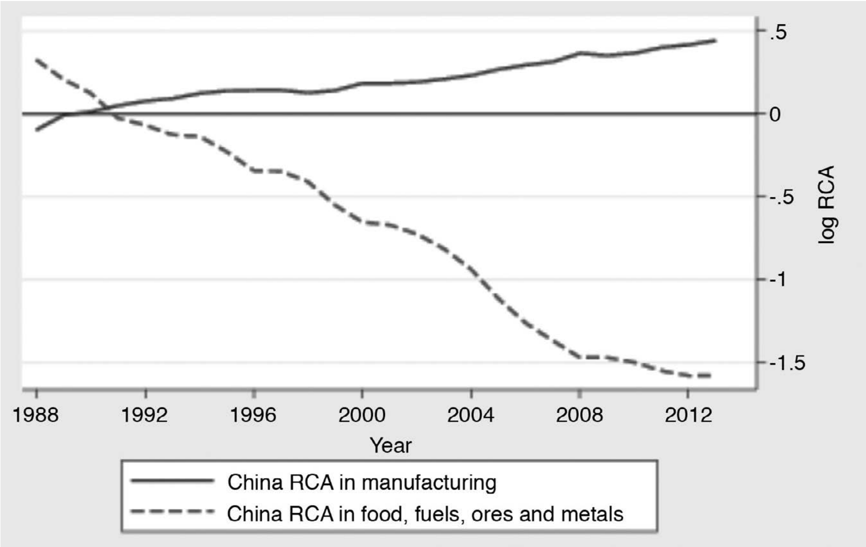

Figure 2.1 The evolution of China's comparative advantage

Source: World Development Indicators.

Note: RCA = Revealed Comparative Advantage when we examine the time path of comparative advantage for specific manufacturing industries in other economies of East and Southeast Asia.

Within manufacturing, China specialises in a subset of industries in which global production networks feature prominently (Feenstra and Hanson, 2005). The major offshoring sectors, whose characteristics I discuss in more detail in the following section, fall into 9 two-digit SITC industries: computers and office machines (SITC 75), TVs and telecommunications equipment (SITC 76), electrical machinery (SITC 77), road vehicles (SITC 78), furniture (SITC 82), travel goods (SITC 83), apparel (SITC 84), footwear (SITC 85), and toys, games, and miscellaneous manufactures (SITC 89). Figure 2.2 shows the share of these nine sectors in total exports (across the 70 two-digit SITC manufacturing and non-manufacturing industries) by country in East and Southeast Asia. Data are from Feenstra and Jensen (2012). In 1980, offshoring sectors accounted for 22.5 percent of China's merchandise trade, a figure just slightly below the worldwide average of 24.8 percent. China's share of exports in offshoring sectors began to rise sharply in the late 1980s, hitting 54.8 percent by 1990 (compared to an average of 44.6 percent across all countries), and then continued to rise during the next decade, reaching 67.6 percent in 2000, before dropping slightly to 63.4 percent in 2011 (compared to worldwide averages of 44.6 percent and 37.8 percent in these two years, respectively).

The other countries I consider are three from East Asia (Japan, South Korea, and Taiwan) and five from Southeast Asia (Malaysia, Thailand, the Philippines, Indonesia, and Viet Nam).[3] Like China, these Southeast Asian nations are ones that actively participate in global production chains; distinct from China, each has significant production in primary commodities (such that they tend to have lower shares of merchandise exports in manufacturing). China's average income falls below that of the first three Southeast Asian countries and above that of the last two.

In the relatively advanced economies of East Asia, shown in the upper panel of Figure 2.2, the share of offshoring sectors in merchandise trade was already high in the early 1980s and remained stable over the next three decades, averaging 53.0 percent in Japan and South Korea and 57.2 percent in Taiwan. The countries of Southeast Asia, shown in the bottom panel of Figure 2.2, display a pattern broadly similar to China. Their shares of offshoring sectors in merchandise exports rose sharply in the 1980s and 1990s before stabilising in the 2000s. At the upper end of this group, the Philippines averaged 78.4 percent of its merchandise exports in offshoring sectors for the 2001–2011 period, compared to 65.6 percent in Malaysia, 55.3 percent in Viet Nam, 51.5 percent in Thailand, and 29.7 percent in Indonesia. China's specialisation patterns thus fell in the upper half of this group. Among East and Southeast Asian economies, only Indonesia had a share of merchandise exports in offshoring sectors below the global average. Indonesia stood out in this group for being the least specialised in export manufacturing and the most specialised in primary commodities, a division that may change as the country continues to develop. It is the economy, then, that potentially has the most to learn from China's development.

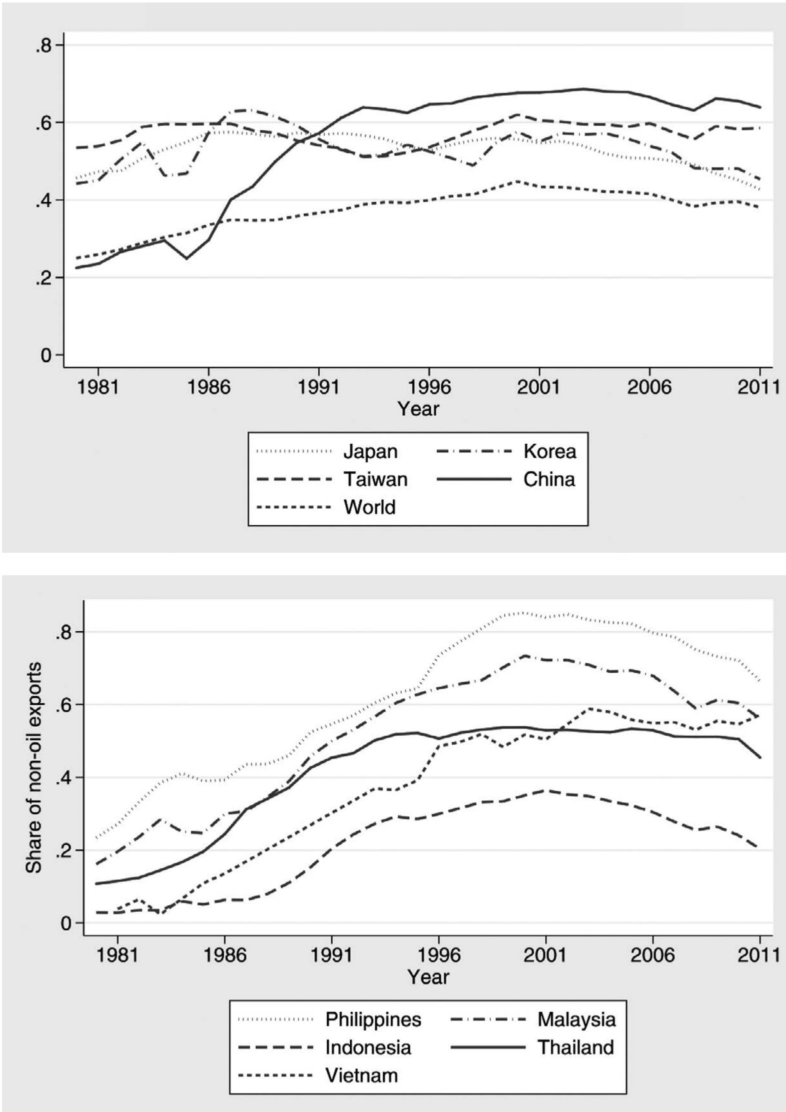

Figure 2.2 Specialisation in offshoring industries in East and Southeast Asia
Source: Author's calculations.

3. The characteristics of offshoring industries

Global production sharing is a well-documented feature of international trade (Feenstra and Hanson, 2003). As national economies become more integrated, firms fragment production across borders, thereby expanding trade in intermediate inputs (Johnson and Noguera, 2012a; Koopman et al., 2014) and creating vertical linkages in trade flows (Hummels et al., 2001). Economic reform in emerging economies, the proliferation of regional trade agreements, and improved global logistics have each helped propel the recent expansion in offshoring (Subramanian and Kessler, 2013; Baldwin and Okubo, 2014).

In theory, offshoring entails dividing industry production stages across countries. In one class of models (Feenstra and Hanson, 1997; Grossman and Rossi-Hansberg, 2008), production of a final good requires a continuum of inputs or tasks, which vary in their factor intensity or in their ease of being performed abroad. Changes in total factor productivity or in the cost of offshoring affect the range of inputs or tasks that firms in the skill-abundant North choose to locate in the labour-abundant South. A related class of models assumes that within industries production occurs sequentially (Yi, 2003; Antràs and Chor, 2013; Costinot et al., 2013; Fally and Hillberry, 2014). Variation in country capabilities in coordinating manufacturing or in handling more complex production determines how the sequence of production stages is organised internationally.

In this section, I first document the variation in offshoring across sectors and then examine the characteristics that distinguish offshoring sectors from other sectors.

3.1 Measuring offshoring

One source of data on offshoring comes from global production sharing. Firms commonly produce inputs at home and send these inputs abroad for further processing, before re-importing the finished product for distribution to consumers. This type of offshoring, at least in terms of how it is recorded in trade data, is typically limited to the labour-intensive task of final assembly. The advantage of using data on export assembly is that we can observe the offshoring of a well-defined production task with considerable precision.[4] The disadvantage is that they only capture one type of offshoring and miss that which may occur further up the production chain (e.g. the production of parts and components). Recognising these limitations, I proceed to compare the intensity of export assembly across industries in China and the US.

3.1.1 China

China's customs bureau classifies imports and exports according to 19 distinct trade regimes, each of which is subject to its own trade restrictions (Yu and Tian, 2012). The largest categories are for ordinary trade and export processing. Export processing plants in China import inputs via an in-bond arrangement (in which a bond is posted for the value of forgone import taxes), assemble or process the inputs into final outputs, and then export the goods abroad (at which point the bond is returned).[5] In 2010, processing trade accounted for 47 percent of China's manufacturing exports and 30 percent of its manufacturing imports, whereas ordinary trade accounted for 46 percent of manufacturing exports and 55 percent of manufacturing imports.[6] Until 1992, export processing plants were confined to export processing zones (EPZs) concentrated on the country's east coast. As China embraced global markets, the number of SEZs grew from 20 in 1991 to 150 in 2010. The arrival of multinational companies, which were first in line to participate in SEZs, pushed inflows of foreign direct investment from 0.7 percent of GDP during the 1980s to 4.2 percent of GDP during the 1990s and 2000s. Whereas the largest EPZs are still located in eastern coastal provinces, export processing now occurs throughout the country.

Figure 2.3 shows the share of export processing in total exports by industry in China over the period 1997 to 2012. There is substantial heterogeneity across sectors in the importance of export processing. In rubber products (which includes footwear), electrical machinery, and computers and electronic equipment, processing is the dominant export mode, accounting on average for over 80 percent of exports. In seven other industries – apparel, leather products (which also includes footwear), furniture, paper products, recording media, toys and sports equipment, and chemical fibres –processing trade is also a substantial activity, accounting for an average of 45 percent to 65 percent of exports. In 11 other industries – food processing, food manufacturing, beverages, tobacco, wood products, petroleum refining, raw chemicals, non-metallic minerals, ferrous metals, non-ferrous metals, and works of art – processing trade is much less consequential, accounting for on average less than one-third of industry exports.

3.1.2 United States

In China, we observe plants to which foreign firms contract assembly operations. In the US, we observe the counterpart of this activity: the re-import of goods that have been sent abroad for assembly. Data for the two countries thus complement each other.[7]

The US Offshore Assembly Program (OAP) provides direct observations on offshoring (Feenstra et al., 2000). Under the 9802 provision of the Harmonized System code, US firms may export component parts, have these assembled abroad, re-import the finished goods to the US, and pay import duties solely on the share attributable to foreign value added. The OAP accounts for a relatively small fraction of total US imports (less than 10 percent of US manufacturing imports in the typical year). It would not apply to many common types of offshoring. Nike, for instance, has its leather shoe uppers and rubber shoe soles produced abroad in countries such as South Korea and Taiwan, and shipped to Indonesia, Viet Nam, and other locations for assembly. The import of Nike shoes into the US would record little or no US content, as the physical component parts are largely foreign in origin. Of course, a substantial portion of the value of a Nike shoe is in its design, brand image, and trademark Swoosh. Yet, the value of this intellectual property is not exempted from duty when Nike shoes manufactured abroad are imported into the US. Nike's offshoring, and similar practices by other firms, is thus largely uncounted in 9802 trade flows.

For offshored goods that do embody US produced parts and components (e.g. Intel's semiconductors), the OAP is an illuminating source of data. Because

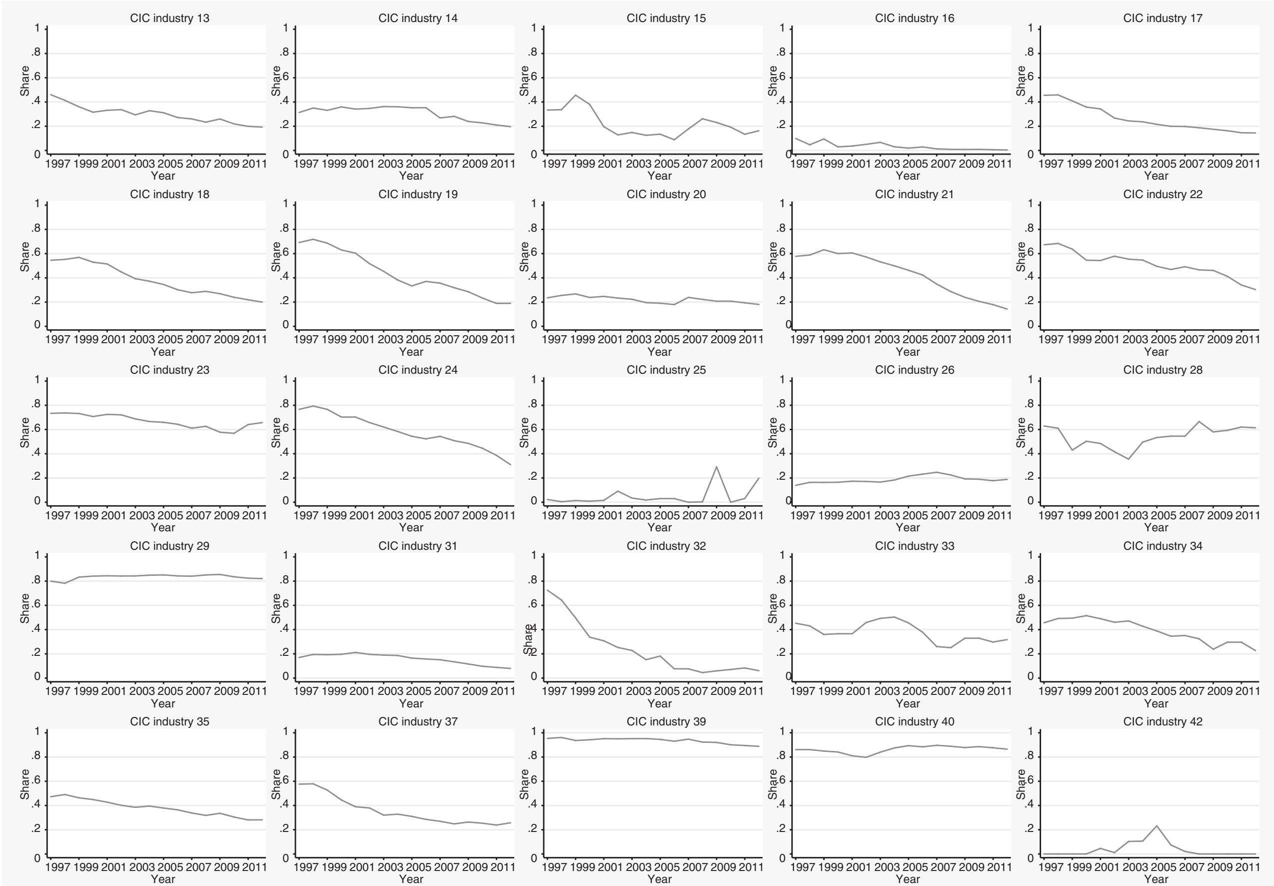

Figure 2.3 Share of processing exports in total industry in China

Source: Author's calculations.

duties at a US port of entry are paid only on the portion of the good that constitutes foreign value added, the administration of the OAP requires a separate accounting of the value of imports tied to foreign assembly. Trade data record dutiable OAP imports as the value added associated with foreign assembly services and non-dutiable OAP imports as the value embodied in US-made goods that were previously exported from the US for further processing abroad. This accounting makes it possible to estimate the value of US production that is shipped abroad for assembly for later re-import into the US as a finished product.

As a consequence of trade liberalisation, the usefulness of the OAP to measure US offshoring has diminished over time. Since the full implementation of the North American Free Trade Agreement (NAFTA), goods entering the US from Mexico that are deemed North American in origin are no longer subject to US duties. US offshoring to Mexico is thus no longer directly measurable in US trade data, as the entire value of the good enters the US duty-free. Additionally, the Information Technology Agreement (ITA) in 1996 exempted imports of many technology products from duty in the US, limiting the usefulness of the OAP programme for measuring offshoring in electronics.[8] Swenson (2005) reports that the US content of OAP imports peaked in 1997. In light of these data constraints, I focus on OAP imports up to 1994, one year prior to NAFTA and two years prior to the ITA.

I measure US offshoring as the share of non-dutiable OAP imports in US exports. This share represents the fraction of US exports that have returned to the US (after being assembled abroad) as imported goods. As mentioned, this measure undercounts US offshoring because it misses (1) trade no longer classified under the 9802 category because of trade liberalisation, (2) exports of US goods that will be processed by foreign suppliers for delivery to foreign markets, rather than to the US market, (3) goods that contain US intellectual property but no US-made physical components (e.g. Nike shoes or Apple iPhones), and (4) goods for which foreign processing embodies activities other than assembly.

Figure 2.4 shows offshoring measured as the share of non-dutiable US imports in US exports for two-digit Standard Industrial Classification (SIC) industries.[9] This is the share of US exports composed of US produced inputs that have been re-imported to the country for delivery to consumers. Similar to patterns observed for China, this form of offshoring is prevalent in just 5 of the 20 two-digit SIC industries: apparel (23), furniture (25), footwear and leather products (31), electronics and electrical machinery (36), and transportation equipment (37). There is virtually no offshoring in 11 other industries: food products (20), tobacco (21), lumber and wood products (24), printing and publishing (27), chemicals (28), petroleum (29), rubber (30), non-metallic minerals (32), fabricated metal products (34), industrial machinery (35), or instruments (38). These low offshoring industries are presumably ones in which using foreign plants for assembly is infeasible technologically or too costly in terms of the required transportation relative to the savings in production costs.

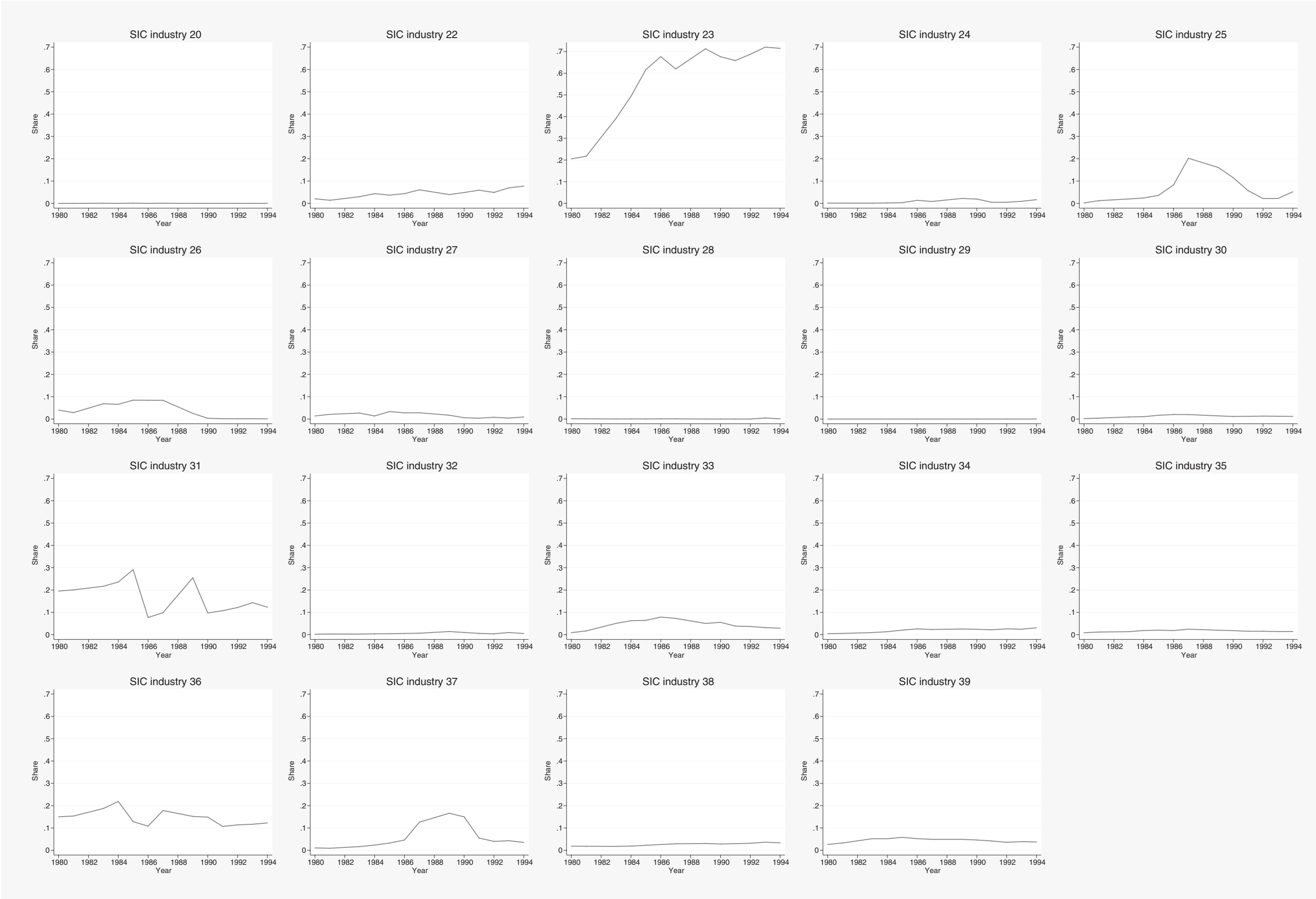

Figure 2.4 Offshoring content of US manufacturing exports

Source: Author's calculations.

Offshoring is small, but not zero, in four other industries: textiles (22), paper products (26), primary metals (33), and miscellaneous manufactures (39), which includes toys and games.

Comparing Figures 2.3 and 2.4 reveals that US offshoring-intensive industries are a proper subset of Chinese export processing-intensive industries. The industries in which global production sharing is common in both countries include apparel, furniture, footwear, electronics, electrical machinery, and transport equipment. The industries that appear as major export processing sectors in China but not as major export assembly sectors in the US include paper products, chemical fibres (part of textiles), and toys and games. The absence of US parts would mean that OAP imports would record no non-dutiable content when the shipments are unloaded at US ports.

Offshoring measures for China and the US are not fully comparable. US data capture inputs returned to the US after foreign assembly but miss inputs exported for assembly and shipment to third countries. Chinese trade data capture exports by assembly plants to all destination markets. Nevertheless, the data for the two countries tell a similar story. Offshoring in the form of export assembly is concentrated in a handful of sectors, including apparel, footwear, electronics, electrical appliances, transportation equipment, and toys and games. Offshoring by multinational enterprises is present in similar industries. Hanson et al. (2005) find that in 1994 the share of imported inputs for further processing in the sales of US multinationals to their foreign affiliates is highest in electronics, electrical machinery, and transportation equipment and lowest in chemicals and steel and metal products.[10]

3.2 What do offshoring industries have in common?

Theory predicts that offshoring is the consequence of firms locating individual stages of production in the countries in which they can be performed at least cost. What does the literature say about the empirical determinants of offshoring? Whereas empirical research on the consequences of offshoring is large (see, e.g. surveys in Crino, 2009; Harrison et al., 2011), corresponding work on the causes of offshoring is less abundant.[11]

From the theoretical literature (e.g. Grossman and Rossi-Hansberg, 2008), a natural starting point for analysis of the determinants of offshoring is variation in relative factor prices across countries. Using data on the OAP for 1980 to 2000, Swenson (2005) finds that the share of OAP imports that the US sources from a particular country is decreasing in that country's production costs and increasing in the production costs of competitor countries. Her results suggest that the US tends to source export assembly to countries with relatively low transport-cost-adjusted output per worker, which may indicate low wages for less-skilled labour.

In related work, Hanson et al. (2005), using data for 1994, find that the share of imports of inputs for further processing from the US parent firm, which captures affiliate demand for US-made intermediate inputs, is decreasing in the ratio of low-skilled wages to high-skilled wages in the host country of the affiliate and decreasing also in industry trade costs from the US to the host country. Demand for US-made inputs is thus lower in countries in which low-skilled labour is cheap relative to high-skilled labour.

Turning to the role of production tasks in global sourcing decisions, Oldenski (2012) uses US Bureau of Economic Analysis (BEA) data on US multinational enterprises in 2004 to examine the share of sales by US parent firms that is accounted for by imports from their foreign affiliates.[12] These imports include inputs and tasks offshored from the parent to the affiliate, as well as goods that may never have been produced in the US to begin with. A second view on task intensity comes from Fort's (2014) analysis of the US Census of Manufacturers in 2007, which reports the purchase of contract manufacturing services from both domestic and foreign sources. These results suggest that firms that adopt more sophisticated communication technology – which presumably lowers communication costs – also tend to engage more in offshoring.[13]

Additional evidence on trade costs and production sharing comes from Johnson and Noguera (2012b). Using data for 1970 to 2009, they find that the domestic content of gross bilateral exports – whose share declines steadily for most bilateral trade partners over the sample period – falls by more for country pairs that are nearer to each other and that enter into a regional trade agreement. They characterise the share of domestic value added in gross exports as being inversely related to production sharing, leading to their conclusion that geographic proximity and falling trade barriers tend to promote offshoring.

The literature thus identifies a role for relative factor costs, production task intensity, and communication and trade costs in determining the extent of industry offshoring. I next examine the characteristics of offshoring-intensive industries in further detail.

3.3 Offshoring and factor intensity

I first consider the skill intensity of production. To measure skill intensity, I use employment and earnings data from the US population census. Obviously, equilibrium skill intensity may itself be determined by the extent of offshoring. As offshoring expands, average skill intensity among the tasks that remain in the US may rise (Feenstra and Hanson, 1997). To account for the endogeneity of skill intensity to offshoring, I use data from 1980. This year is well before the increase in US trade with low-wage countries. It predates Mexico's unilateral trade liberalisation in 1986, China's turn towards export-led development in the early 1990s, and the demise of central planning worldwide after the fall of the Berlin Wall.

To measure the variation in skill intensity within industries, I estimate the within-industry log difference in wages for high-skill workers and low-skill workers. To the extent that wages capture labour productivity, the high skill–low skill wage gap will capture the variation in worker productivity inside industries. Also likely to matter is the absolute level of labour intensity. It is the most labour-intensive production tasks that firms may most desire to locate outside of a high-wage country such as the US (Swenson, 2005). To capture the skill intensity of the least skilled production tasks inside an industry, I use the level of wages for low-skill workers in an industry. To measure skill, I use age-adjusted average weekly earnings (annual wage and salary income/weeks worked last year), weighted by total hours worked per full-time equivalent worker (Census population weight × weeks worked last year × usual hours worked per week/2000). I define high-skill workers to be those at the 90th percentile of weekly earnings and low-skill workers to be those at the 10th percentile of weekly earnings.[14]

For two-digit US manufacturing industries in 1980, Figure 2.5a plots the difference in log wages at the 90th and 10th percentiles against the log of wages at the 10th percentile. I use two-digit industries in order to match census industry codes (for which earnings data are available) with SIC industry codes (for which trade data are available). Results are similar when using three-digit census industry codes, shown in Figure 2.5b, which may introduce more error in matching industries between census and SIC codes. The figure shows a vertical line at the median value across industries for the 10th percentile of earnings and a horizontal line at the median value across industries for the 90–10 earnings difference.

Offshoring industries predominate in the upper left quadrant of Figure 2.5, which indicates above median 90–10 earning differences and below median 10th percentile earnings levels. Five of the six sectors in the quadrant are intensive in offshoring. Four of the seven high offshoring industries (apparel, footwear, furniture, and toys and games) are also the four industries with the lowest wage for low-skill workers (weighted by hours worked to avoid the confounding effects of part-time work). Six of the 10 industries with an above median 90–10 earnings differential are high offshoring sectors (apparel, electrical machinery, computers and electronics, footwear, furniture, and toys and games). The non-offshoring industries in this group include scientific instruments, plastics, and tyres and rubber products. While these industries are not intensive in offshoring in the US, they are in China. Offshoring industries thus tend to be ones with large differences in wages paid to high-skill and low-skill workers – indicating wide variation in within industry skill intensity – and with low wages for low-skill workers – indicating intensity in the use of very low-skilled labour.

One offshoring industry, automobiles, does not fit this pattern. It is located in the lower right quadrant, indicating above mean earnings for low-skill labour and a below median 90–10 earnings differential. Automobiles is a clear outlier among offshoring industries. One possibility is that rent sharing resulting from heavy unionisation in automobile production may cause wages to be a poor measure of skill intensity in the sector (Borjas and Ramey, 1995).

Finally, I consider the correlation between offshoring and industry factor intensity, taking multiple factors into account. I again measure offshoring using non-dutiable US imports as a share of US exports, averaged over 1980 to 1994. As measures of factor intensity, I use log capital stock per production worker (capital intensity), log energy costs per production worker (energy intensity), the log ratio of non-production workers to production workers (skill intensity), and log average earnings of production workers (average skill level). Data are

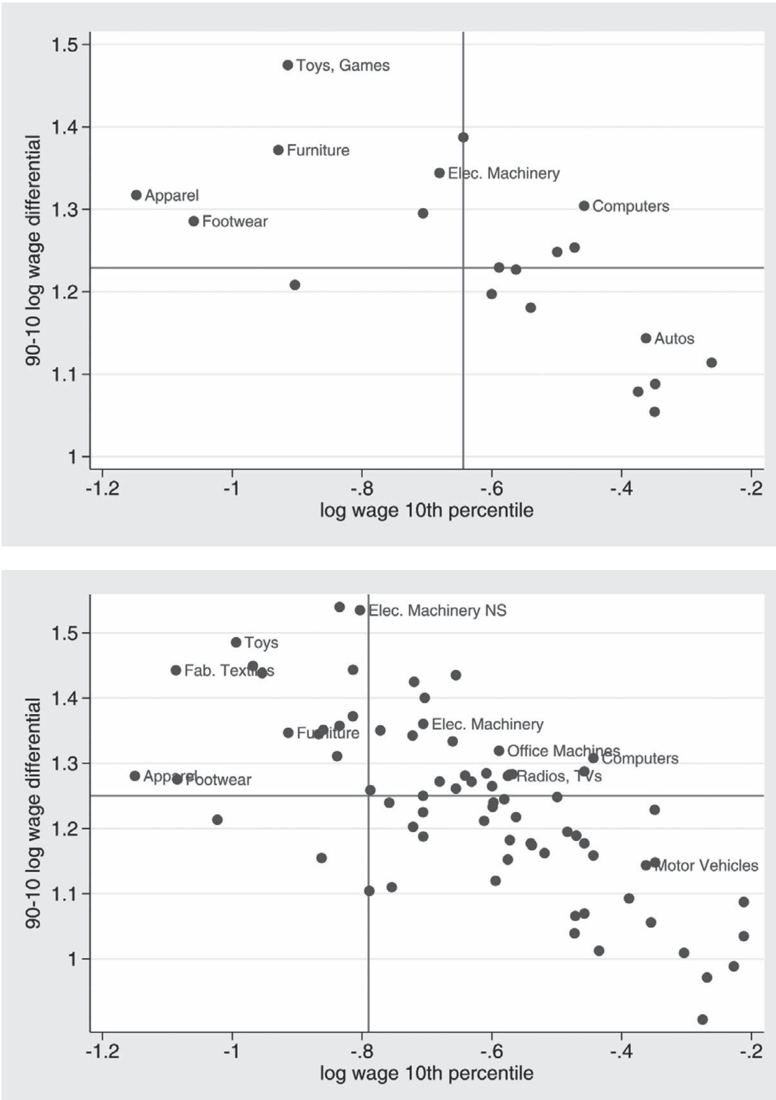

Figure 2.5 Skill intensity in US manufacturing industries, 1980

Source: Author's calculations.

from the National Bureau of Economic Research (NBER) Productivity Database. I use factor intensity averaged over 1974–1978 to target factor usage in the period before offshoring became a common practice in US industries. I choose 1974 and 1978 as cutoff years to avoid the distorting effects of oil price spikes in 1973 and 1979. I regress average offshoring for 1980–1994 on these four measures of factor intensity for 1974–1978 and report the resulting partial correlations between offshoring and each measure separately.

Figure 2.6 shows the partial correlations between offshoring and two of the four measures of factor intensity. There is a strong negative partial correlation between US offshoring in the 1980s and 1990s and initial capital intensity (Figure 2.6a), indicating that offshoring is more common in less capital-intensive

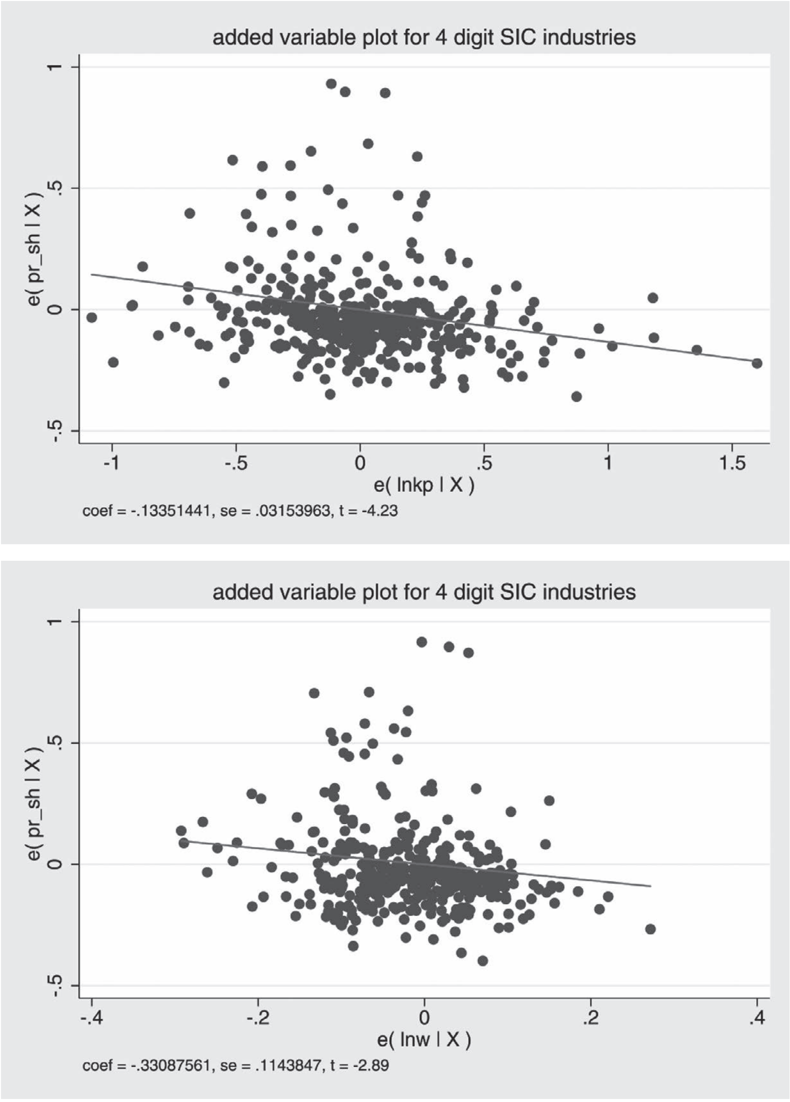

Figure 2.6 Partial correlation between offshoring and alternative measures of factor intensity

Source: Author's calculations.

sectors. Consistent with Figure 2.5, there is also a negative partial correlation between offshoring and average production worker earnings (Figure 2.6b). The increases in offshoring are associated with increasing intensity of non-production workers (Feenstra and Hanson, 1999); there is no indication that industries that ultimately engage in offshoring are more or less intensive in non-production workers to begin with.

The theoretical literature suggests that the industries in which firms are most likely to offshore production from high-wage to low-wage countries are ones with wide variation in factor intensity across tasks, substantial demand for tasks requiring low-skilled labour, production processes that facilitate geographically separating production tasks, and ease of communication and transportation across borders. Empirical research shows strong support for industry factor intensity and communication and trade costs as being important drivers of offshoring.

4. Comparative advantage in offshoring industries

The relative labour intensity of offshoring industries raises the prospect that industry specialisation in these sectors is driven by broader aggregate processes of factor accumulation and economic growth (Schott, 2003). As countries acquire human and physical capital and thereby raise their labour productivity, they may cycle through offshoring industries, moving from the less skill intensive (apparel, footwear, toys and games) to the more skill intensive (electronics, machinery, transport equipment). This cycle is likely to apply only to countries, such as China or South Korea, that begin with a comparative advantage in labour-intensive manufacturing. Countries, such as Argentina or South Africa, that begin instead with a comparative advantage in primary commodities may see no such evolution, as their resource abundance may channel investment into activities outside of manufacturing (Costa et al., 2014). It is unclear how this cycle will manifest itself in countries such as Indonesia and Thailand, which export a mix of primary commodities and manufactured goods. On the one hand, capital accumulation may pull these countries more strongly into manufacturing by deepening their comparative advantage in the sector. The deepening of capital markets may permit more risky investments in oil or mineral exploration, which steer these countries more strongly towards commodity exports. How capital accumulation relates to export specialisation is thus an empirical question.

I examine whether country specialisation in offshoring industries follows a well-defined development path. To do so, I plot the log Balassa RCA index at the two-digit product level against log aggregate capital per worker.

4.1 Does revealed comparative advantage measure comparative advantage?

Before turning to the data, it is worth considering methodological issues in how we measure specialisation in offshoring. The presence of imported intermediate inputs used to produce exports complicates using the RCA index to measure comparative advantage. Wang et al. (2013) calculate RCA using value added exports, defined to be gross exports less the estimated value of imported intermediate inputs used in export production. Reassuringly, RCA indexes for gross and value added exports appear to be strongly positively correlated, at least for the manufacturing sectors they examine.[15]

When focusing on sectors heavily engaged in export assembly, the problems introduced by using gross rather than value added exports may be less severe. Because assembly occurs at the end of the production chain, the country performing assembly will get credit for gross exports of the final good. Of course, upstream trade in intermediate inputs means that, if assembly's share of value added is small, both the last and next to last countries in the production chain will record nearly the same value for their exports. Two features of production, when present, help ameliorate this problem. One is production having a network or 'spider' structure – with many countries producing inputs that in an ultimate stage are assembled into a final output – rather than a sequential or 'snake' structure – in which countries process inputs in strict order (Baldwin and Okubo, 2014). The network structure tends to involve less back-and-forth trade than the sequential structure, which should result in less double counting in gross exports.

A second condition that helps ensure credit for gross exports in the RCA index goes to the country performing final assembly is an input-output structure in which inputs are purchased primarily from outside the industry in question. Uniqlo's chino trousers are in the apparel industry and use as direct inputs cotton fabric from the textile industry, steel zippers from the metal products industry, and buttons from the plastics industry. If the fabric, zippers, and buttons are imported, exports of chino trousers will lead to double counting in gross exports. But the apparel RCA index for, say, Indonesia will still indicate the country's comparative advantage in final apparel assembly. Many industries, however, purchase a substantial share of their inputs from themselves (Koopman et al., 2014). Intel's chips are classified as being part of the electronics industry and used as inputs silicon components also from that industry. The RCA index for electronics will thus give credit both to Taiwan, which fabricates silicon wafers, and to China, which assembles and tests integrated circuits, complicating inferring comparative advantage in final assembly from gross export data. The robustness of my results to adjusting for double counting in exports may consequently vary across sectors, with 'spider' sectors (e.g. apparel, mobile phones, footwear, furniture, laptops, road vehicles, TVs) possibly being less prone to double-counting-induced measurement error and 'snake' sectors (e.g. semiconductors) possibly being more prone to such error.

4.2 Capital accumulation and comparative advantage in offshoring industries

In Figure 2.7, I plot the log RCA index for an industry against log aggregate capital per working-age person (e.g. the capital stock and the working-age population measured in the economy as a whole). Data on country aggregate

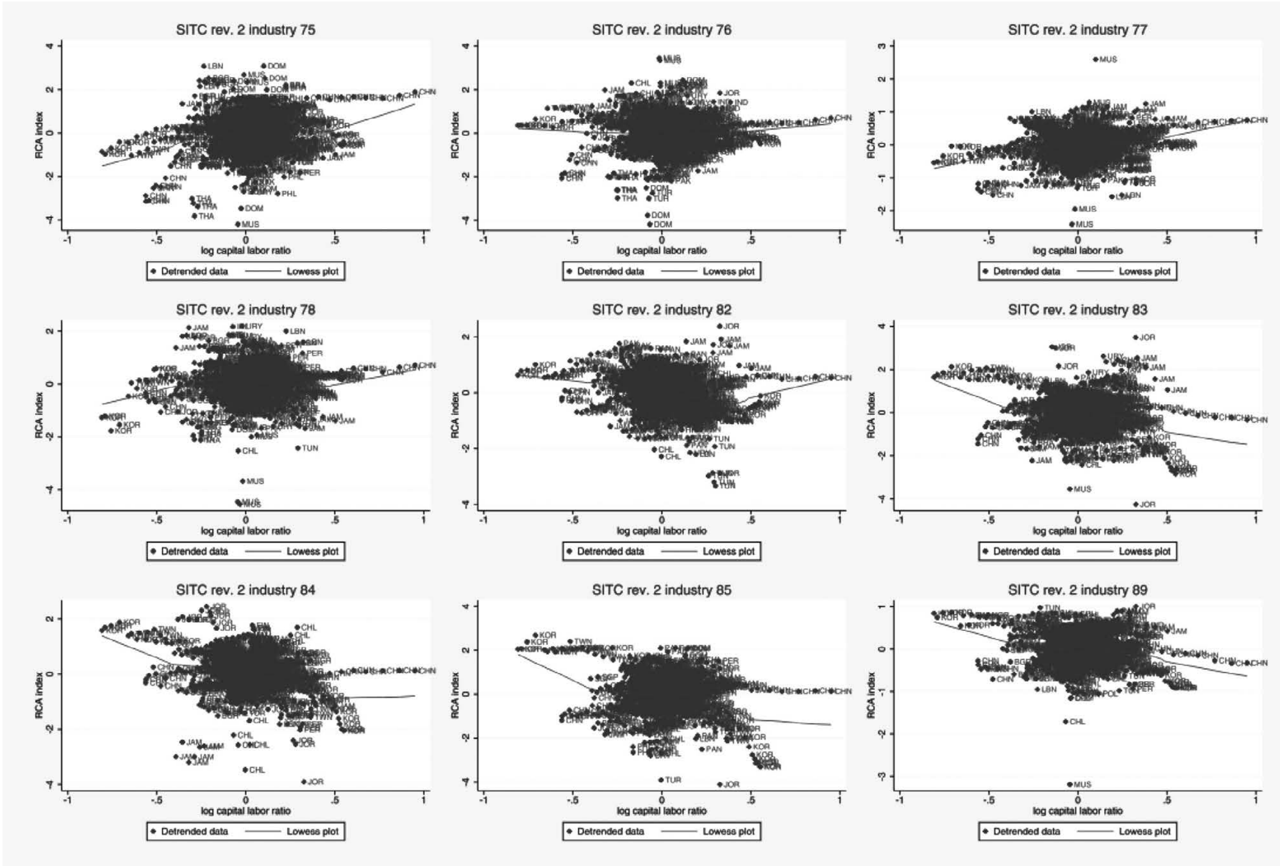

Figure 2.7 RCA in offshoring industries and country capital per worker

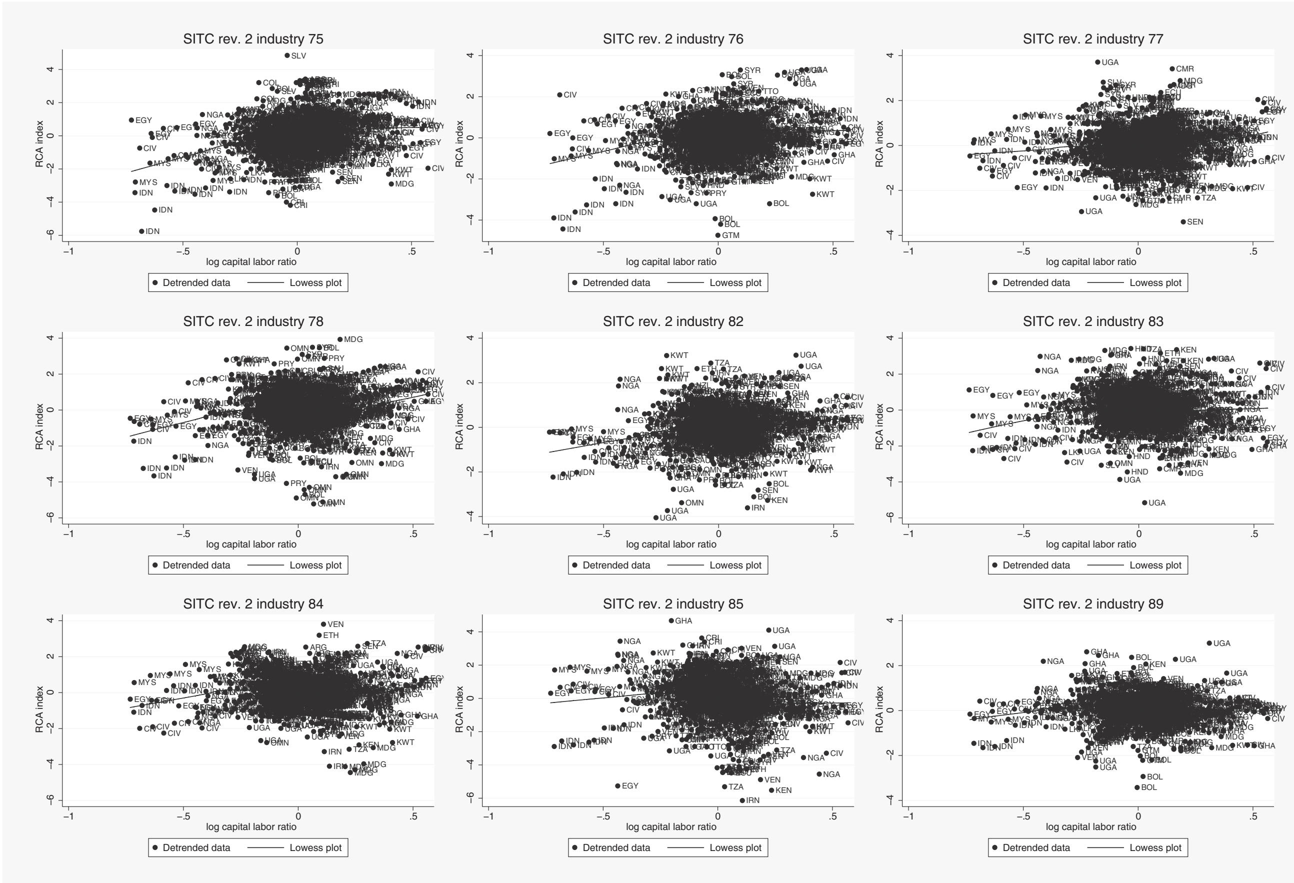

Figure 2.7 (Continued)

Source: Author's estimations.

capital stocks are from the Penn Work Tables; data on the working age population are from the World Bank World Development Indicators. The export data I use are again for the period 1980–2011 from Feenstra et al. (2005) for the 90 largest exporting countries, which collectively account for an average of 98 percent of world trade. I detrend both the RCA index and capital per worker by regressing values for each variable, pooled across countries, on year dummies and using the residuals from these industry-specific regressions in the analysis. To examine the connection between economic development and comparative advantage in offshoring-intensive industries, I split the sample into two groups of countries. I define manufacturing exporters to be countries that have an average share of manufacturing in total merchandise exports that is above the global mean (of 33 percent) over the period 1980–1984, which are the first five years of the sample; correspondingly, I define commodity exporters to be countries whose average share of manufacturing in merchandise exports for 1980–1984 is below the global mean for this period.

Figure 2.7a plots RCA and capital per worker for manufacturing exporters; Figure 2.7b plots this relationship for commodity exporters. Consider, first, manufacturing exporters in Figure 2.7a. There is a contrast in outcomes between the more skill-intensive industries in one-digit sector 7, which is machinery and equipment, and those in the more labour-intensive one-digit sector 8, which is household articles. In three of the four sector 7 industries – computers (SITC 75), electrical machinery (SITC 77), and road vehicles (SITC 78) – there is a positive correlation between capital per worker and the RCA index. More capital abundant manufacturing exporters tend to have a stronger comparative advantage in machinery and equipment. This relationship is particularly pronounced for computers. In four of the five sector 8 industries – travel goods (SITC 83), apparel (SITC 84), footwear (SITC 85), and miscellaneous goods (SITC 89) – there is a negative correlation between capital per worker and revealed comparative advantage. Less capital abundant manufacturing exporters tend to have greater strength in household articles. This relationship is most apparent in apparel, footwear, and travel goods.

A key distinction between the sector 7 and sector 8 industries is in their factor intensity. Returning to Figure 2.5, three of the sector 7 offshoring industries – autos, computers, and electronics – are relatively skill intensive, as indicated by their relatively high values of weekly earnings for workers at the 10th percentile. All of the sector 8 industries – apparel (which in Figure 2.4 includes travel goods), footwear, furniture, and toys and games – are highly non-skill intensive, as seen in their very low values for 10th percentile earnings. It thus appears that manufacturing exporters in the later stages of development lose export advantage in offshoring industries intensive in less-skilled labour and acquire advantage in offshoring industries intensive in more-skilled workers.

Consider, next, outcomes for commodity exporters, shown in Figure 2.7b. We see quite different patterns from those in Figure 2.7a. For these countries, in the labour-intensive sector 8 industries there is zero correlation between the RCA index and capital per worker. Less capital abundant commodity exporters show no tendency to have stronger comparative advantage in apparel, footwear, furniture, or the other non-skill-intensive offshoring sectors. There is a very mild positive correlation between RCA and capital per worker in three of the four sector 7 industries: computers (SITC 75), telecommunications equipment (SITC 76), and transport equipment (SITC 78). Consistent with the theoretical ideas described at the beginning of this section, the relationship between capital accumulation and comparative advantage in offshoring industries appears to be stronger in countries that are oriented towards producing manufactured goods as opposed to producing primary commodities.

4.3 Export development paths in East and Southeast Asia

Does comparative advantage in offshoring sectors change as countries' factor abundance and labour productivity evolve? Because Figure 2.7 mixes cross-section and time-series evidence, we cannot infer whether the correlation between comparative advantage and capital per worker among manufacturing exporters is the result of differences between countries at different stages of development or of changes within countries over time. To isolate the within-country variation, I examine offshoring-intensive sectors in each East and Southeast Asia country individually.

To explore the connection between capital accumulation and comparative advantage, I project sectoral log RCA indexes onto a country's log aggregate capital-labour ratio over the period 1980–2011. I again measure the capital-labour ratio using data on country aggregate capital stocks from the Penn Work Tables and data on the working-age population from the World Bank World Development Indicators. Following the logic of Schott (2003) and Romalis (2004), the regressions plots that I report capture the general equilibrium relationship between a country's relative factor supplies and its pattern of export specialisation. At low levels of capital per worker, a country is likely to be relatively specialised in the most labour-intensive goods. As a country accumulates capital, it is likely to lose comparative advantage in these products and gain advantage in more capital-intensive goods. Thus, the general equilibrium relationship between comparative advantage and capital accumulation is likely to vary by industry. I also allow this relationship to differ by country. Cross-country heterogeneity in the impact of capital accumulation on comparative advantage may reflect the absence of factor price equalisation (such that countries use distinct production techniques in a given industry), differences in within-industry specialisation associated with offshoring (such that each country performs a distinct set of production tasks in an industry), or Ricardian motivations for comparative advantage (such that total factor productivity differs across countries in an industry).

Figures 2.8 and 2.9 show the comparative advantage–capital accumulation plots for two pairs of industries. The first pair is apparel and footwear, which are the most labour-intensive industries that engage in export processing. The second pair is computers and electrical machinery, which are among the least labour-intensive export-processing industries. To check robustness of the results

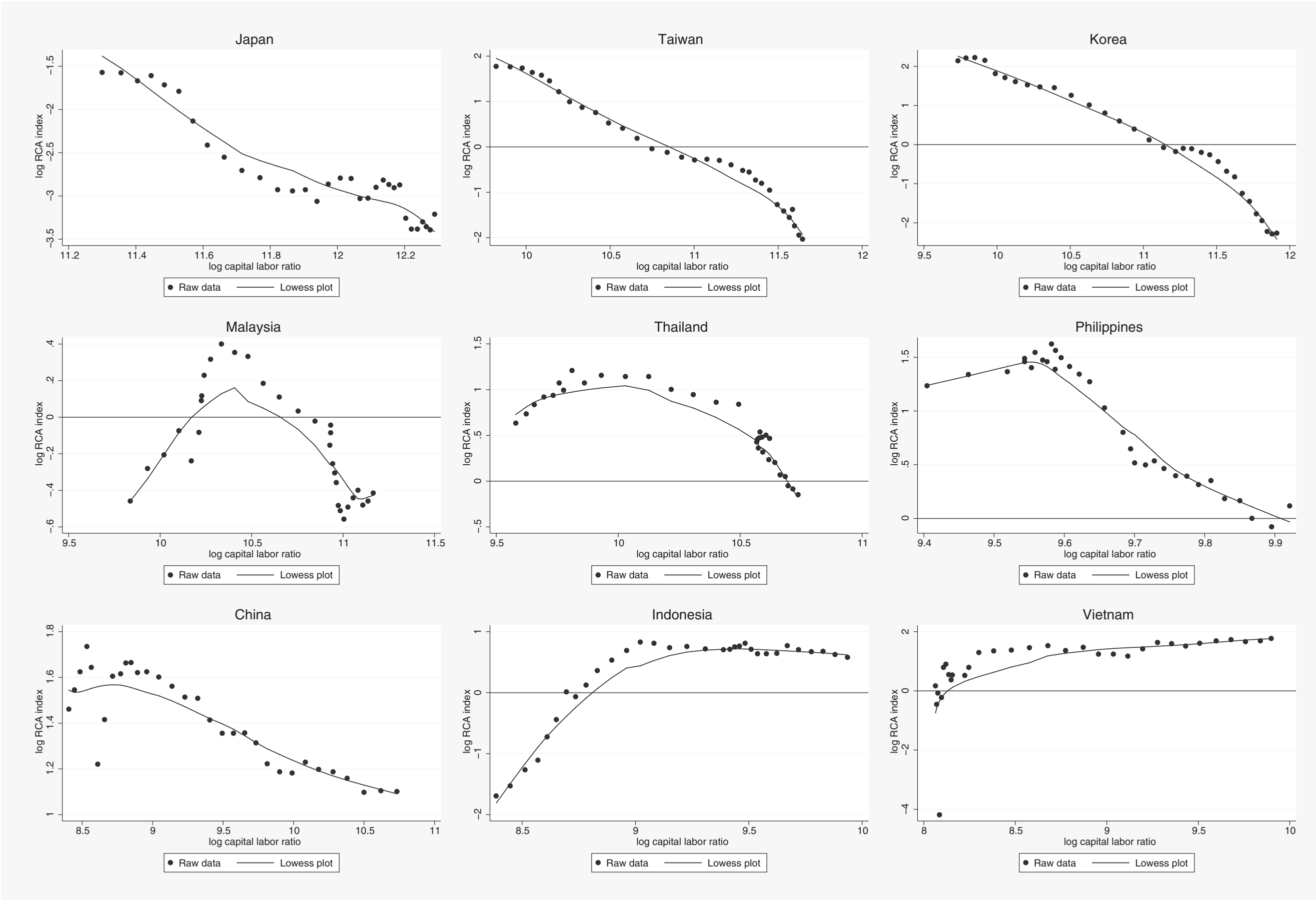

Figure 2.8 Revealed comparative advantage and capital accumulation in East and Southeast Asia (apparel and footwear)

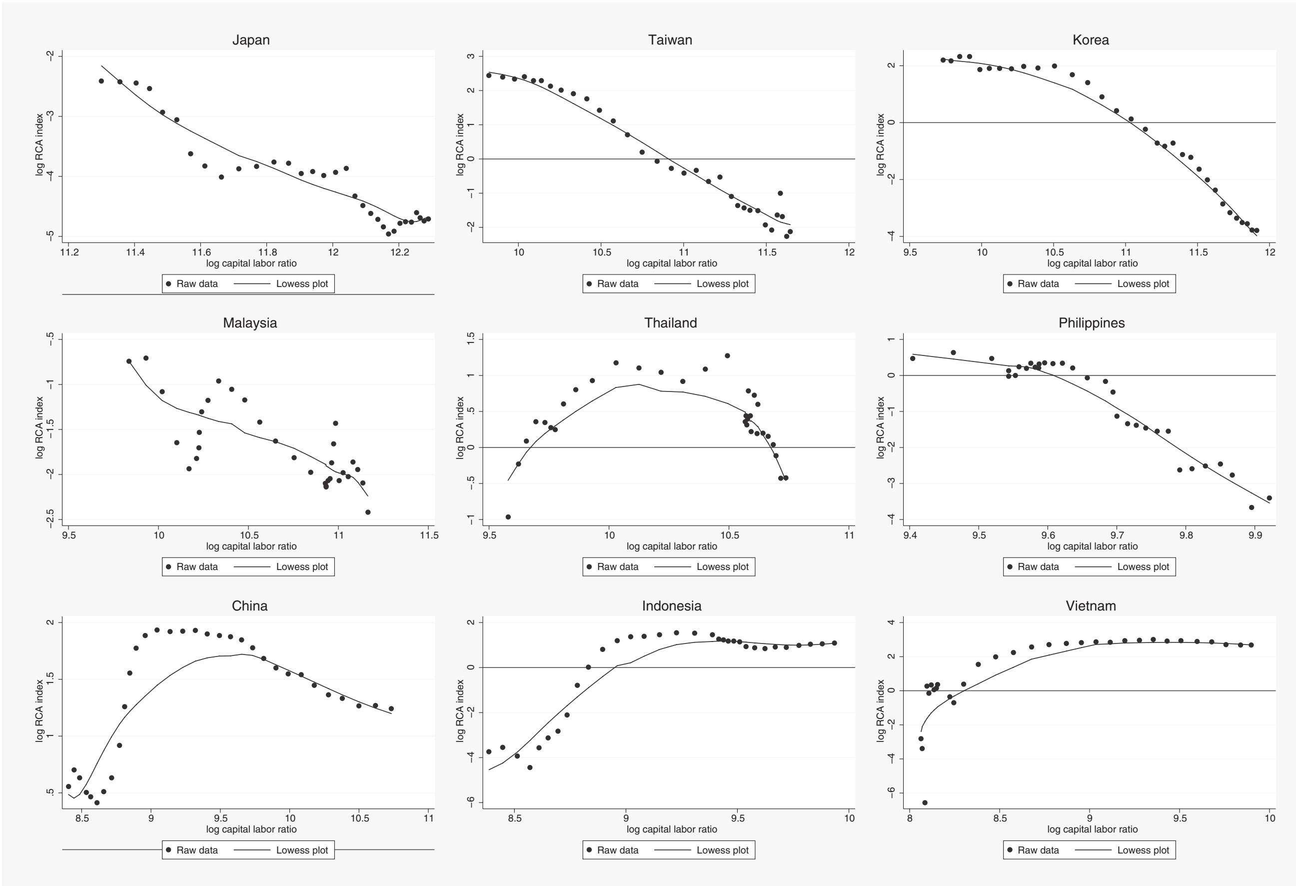

Figure 2.8 (Continued)

Source: Author's calculations.

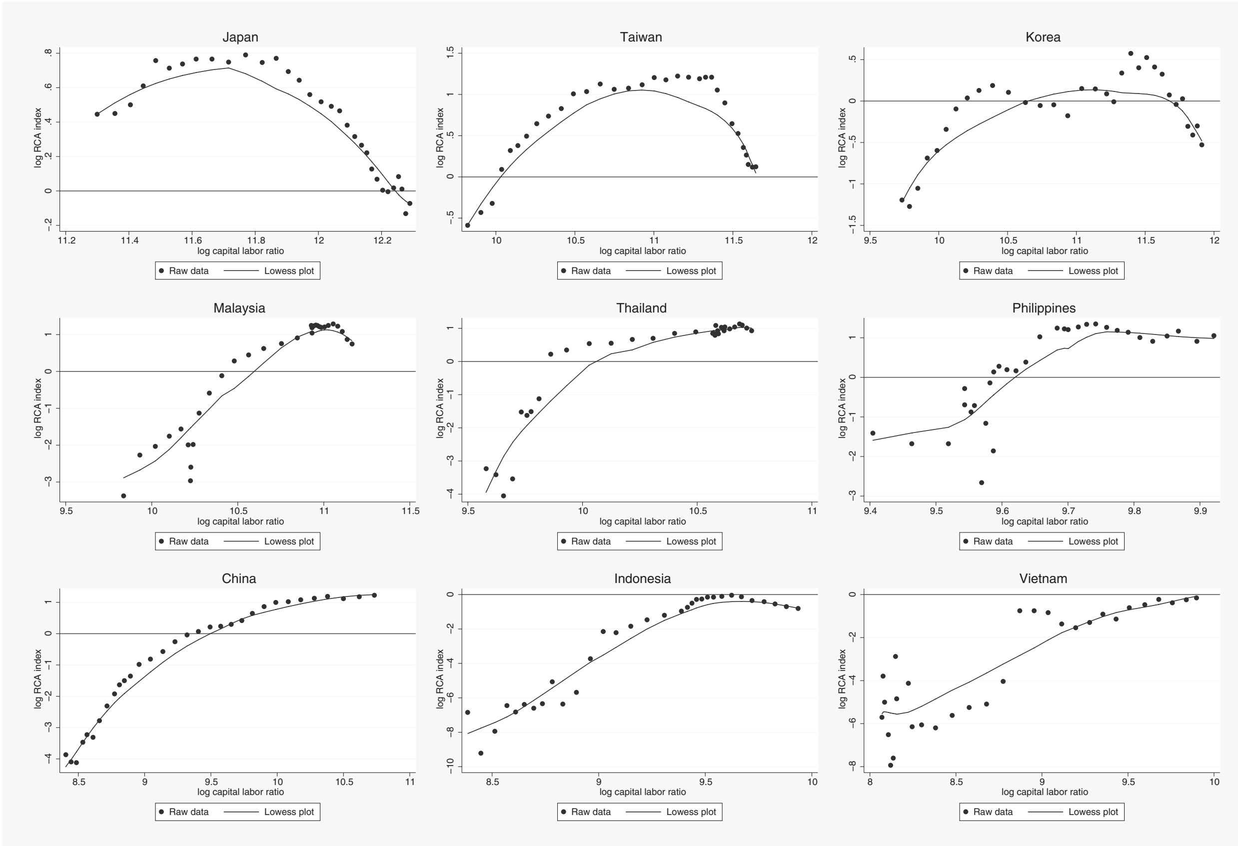

Figure 2.9 Revealed comparative advantage and capital accumulation in East and Southeast Asia (computers and electrical machinery)

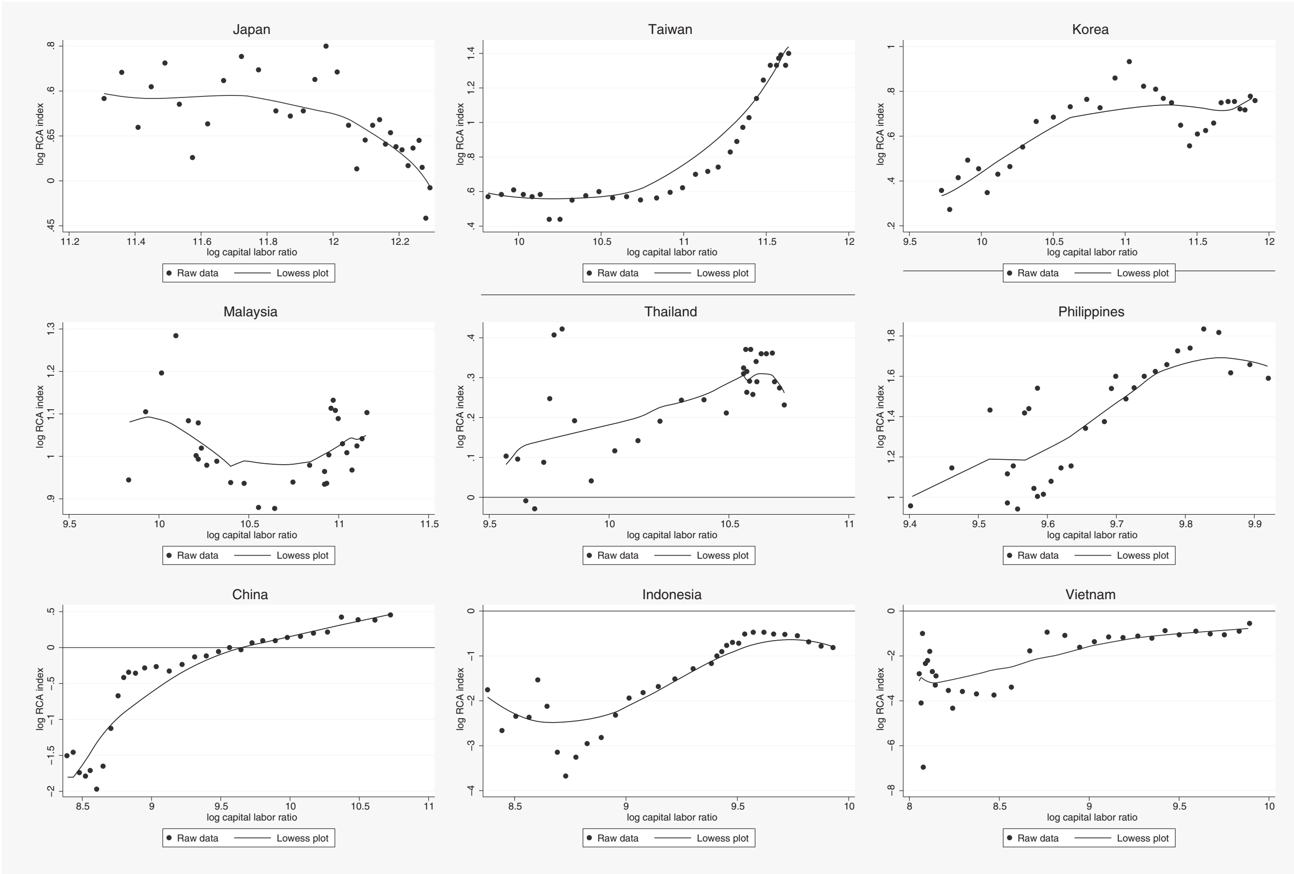

Figure 2.9 (Continued)

Source: Author's calculations.

for the two sets of industries shown in Figures 2.8 and 2.9, Appendix Figures 2.1.A and 2.1.B show results for four of the other export-processing intensive industries: travel goods, furniture, televisions and telecommunications equipment, and road vehicles.

Figure 2.8 shows RCA indexes for nine countries in apparel (SITC 84) and footwear (SITC 85). The first row has the three more advanced East Asian countries (Japan, Taiwan, and South Korea); the second row has the three higher-income Southeast Asian nations (Malaysia, Thailand, and the Philippines), and the third row has China, Indonesia, and Viet Nam. There is a well-defined relationship between RCA and capital per worker, but not one that is monotonic over the development process. For the high-income nations of Japan, South Korea, and Taiwan, RCA in apparel and footwear is non-increasing in capital per worker. In these countries, expanding the capital stock pushes down revealed comparative advantage in these labour-intensive sectors. For four of the other six nations – China, Malaysia, the Philippines, and Thailand – the relationship is inversely U-shaped. RCA increases in capital per worker at lower levels of capital accumulation and decreases in capital per worker at higher levels of capital accumulation. In Indonesia and Viet Nam, the two poorest countries in the group, the relationship is non-decreasing. RCA expands with capital per worker early in the industrialisation process and becomes invariant to capital per worker later in the industrialisation process.

What do the patterns in Figure 2.8 imply about the relationship between capital accumulation and specialisation in labour-intensive manufacturing over the development process? In terms of the level of comparative advantage, over the sample period Indonesia moves from disadvantage (negative log RCA) to advantage (positive log RCA) in both sectors, and Viet Nam also sees its existing advantages strengthen. At very low levels of capital per worker, countries in East and Southeast Asia appear to have a comparative disadvantage in even the most labour-intensive offshoring sectors. In the very early stages of development, the supply of capital available in an economy may be insufficient to support substantial export manufacturing of any kind, with agricultural goods and other commodities instead dominating exports. This situation may have characterised Indonesia and Viet Nam in the early 1980s. Yet, as these economies accumulated capital they rapidly acquired comparative advantage in apparel and footwear, with Indonesia moving into positive comparative advantage territory in both sectors by the late 1980s and Viet Nam doing so by the mid-1980s.

In the high-income nations of Asia, we see the creation of sunset industries. As these economies continue to accumulate capital (relative to the supply of labour), their comparative advantage in labour intensive sectors steadily erodes. South Korea and Taiwan reach comparative disadvantage in apparel and footwear by the middle of the sample period, whereas Malaysia, the Philippines, and Thailand reach comparative disadvantage in these sectors by the end of the sample period. Though China appears to be on the downward-sloping portion of the inverted U in apparel and footwear, it remains in a position of comparative advantage in both sectors over the entire 31-year time frame. Results for two other labour-intensive sectors, furniture and travel goods, are broadly similar to the patterns in Figure 2.8.

The general implication of these patterns is that continued capital accumulation will erode the comparative advantage of East and Southeast Asia in labour-intensive offshoring sectors. China has already reached the point where further capital accumulation erodes its relative position in apparel and footwear. Indonesia and Viet Nam may reach this point soon. Although the two countries retain a comparative advantage in these industries, they may be approaching the downward-sloping portion of the inverted U, such that continued capital accumulation pushes them into comparative disadvantage in the most labour-intensive manufacturing operations.

Turning to the more capital-intensive industries in Figure 2.9, computers (SITC 75) and electrical machinery (SITC 77), there is further evidence of a non-monotonic relationship between revealed comparative advantage and capital per worker. Now, it is the higher-income countries – Japan, South Korea, and Taiwan – that exhibit the inverse U-shape. In computers, all three countries display an inverted U relationship between RCA and capital per worker; in electrical machinery, two of the three countries – Japan and South Korea – display this pattern. An inverted U means that countries acquire comparative advantage through capital accumulation at lower levels of capital per worker and dis-acquire comparative advantage through capital accumulation at higher levels of capital accumulation. In contrast, China and the five nations of Southeast Asia are on the upward-sloping portion of the relationship: over the entire sample period, RCA increases in capital per worker in both sectors for each of these countries (though in Malaysia, the relationship between capital per worker and comparative advantage is volatile). In terms of the level of comparative advantage, China, Malaysia, Thailand, and the Philippines move from comparative disadvantage to advantage in computers. China does so as well in electrical machinery, a sector in which Malaysia, the Philippines, and Thailand retain their advantage. Indonesia and Viet Nam approach, but do not attain, comparative advantage over the sample period. Results for TVs, telecommunications equipment, and home electronics are similar to the patterns shown in Figure 2.9.

It is evident in the four industries considered in Figures 2.8 and 2.9 that China reaches peak comparative advantage at much lower levels of capital per worker than the other countries. Why this is the case is unclear. It could reflect China's continued transition from agriculture to manufacturing that has occurred over its process of reform and opening, greater efficiency of capital markets in China when compared to other lower-income Asian countries, or targeted interventions by the government. We return to the sources of difference in China's development path in the closing section.

4.4 Comparative advantage in East Asia

China's reliance on export processing to fuel its manufacturing growth mirrors earlier cases of industrial development in East Asia. Hong Kong, South Korea, Singapore, and Taiwan each began their industrialisation in the 1960s and 1970s by assembling final products in apparel, footwear, electronics, and toys (Naughton, 1997). They later moved on to producing the inputs used in assembly and finally to developing their own products and brands. Japan followed a similar process, decades earlier. Today, China is repeating this pattern of advancement (Schott, 2008). And Indonesia and Viet Nam appear to be following in China's footsteps.

To see how China's development compares to other countries in East Asia in greater detail, I search for common patterns in the evolution of sectoral comparative advantage. In Figure 2.10, I plot log RCA indexes for China, Japan, South Korea, and Taiwan over the extended period of 1962 to 2007 (Hanson et al., 2015). Pushing the initial year back to 1962 is helpful for uncovering export patterns in Japan, which began its export-led growth process much earlier than the other nations. To avoid any distorting effects from the global financial crisis, I cut off the series in 2007 (Levchenko et al., 2010). Unreported results suggest that the findings do not change materially if the series is pushed forward in time.

In Figure 2.10, Japan appears as the first mover in the region, being the first to acquire export advantage in industries intensive in export processing. In the early 1960s, the country had a positive log RCA index in four of the five more labour-intensive industries – apparel, footwear, travel goods, and miscellaneous products (e.g. toys and games) – but in only one of the less labour-intensive industries – televisions and telecommunications equipment. Its export advantages changed quickly in the 1960s and 1970s. By 1974, Japan had lost its comparative advantage in all of the low-skill industries, with RCA values dropping sharply in travel goods, apparel, and footwear. By 1970, Japan had a positive log RCA index in all of the higher-skill industries, which it maintained over the next two decades. In the 1990s, Japan's advantage slipped in two of these sectors, computers and telecommunications equipment, such that by the 2000s its advantage in the two industries had evaporated. The country has maintained export advantages in electrical machinery and road vehicles.

South Korea and Taiwan follow a path similar to Japan, but advanced forward in time. During the 1960s, the two countries' RCA indexes rose sharply in four of the five low-skill industries – apparel, footwear, travel goods, and miscellaneous industries. RCA values peaked in these industries at approximately the same time in the two countries: in apparel around 1970, in travel goods around 1980, and in footwear around 1984. Their comparative advantages then declined steadily in low-skill export-processing industries, falling into disadvantage during the 1990s. Declining advantage in low-skill industries was matched by rising advantage in higher-skill industries. The log RCA indexes in South Korea and Taiwan became positive in telecommunications equipment by the late 1960s, in electrical machinery in the early 1970s, and in computers in the early to mid-1980s. Only in road vehicles did the trajectories of the two countries diverge. South Korea acquired an advantage in road vehicles by the early 2000s, whereas Taiwan maintained a strong disadvantage in the sector throughout.

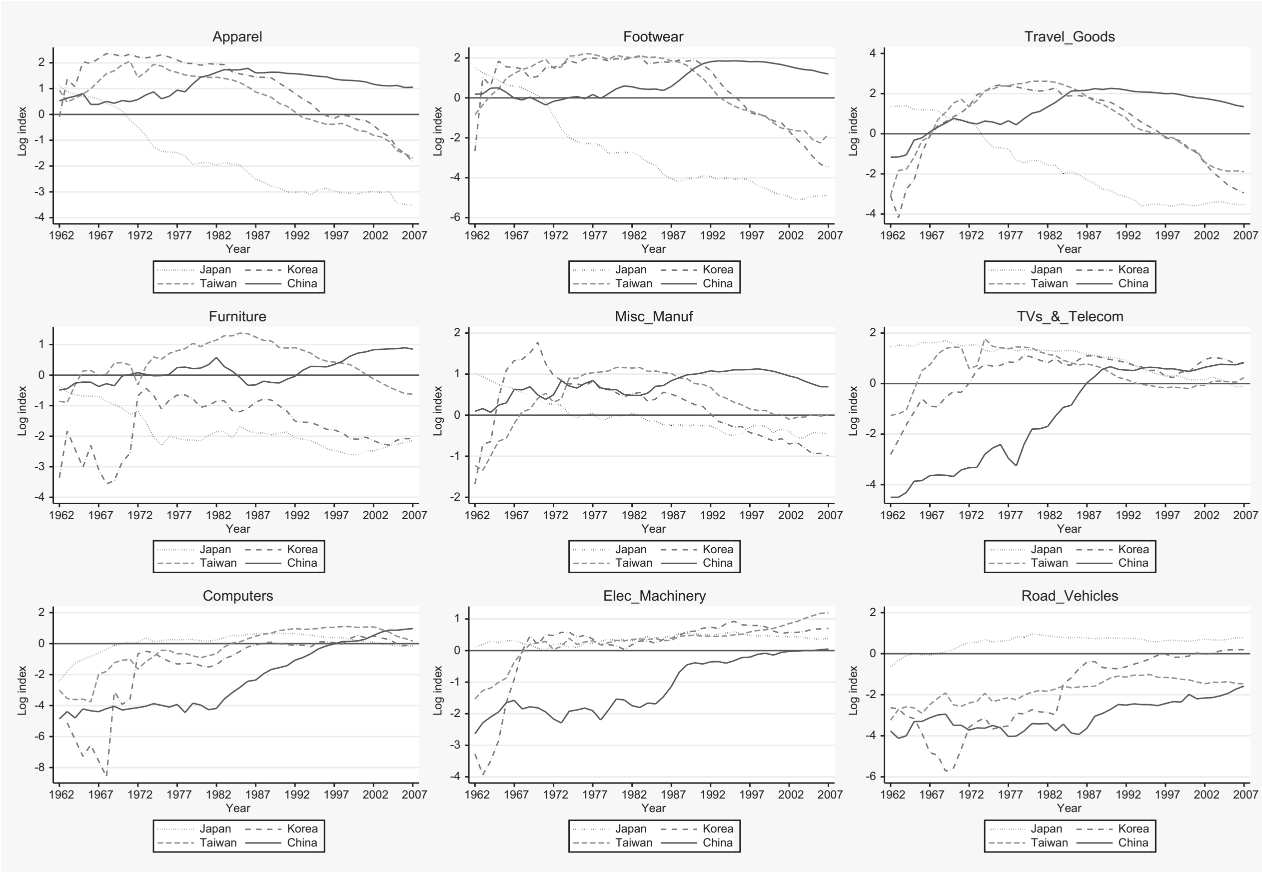

Figure 2.10 Revealed comparative advantage in East Asia, 1962–2007

Source: Author's estimations.

Within East Asia, China is the last mover. Before 1978, its export patterns were difficult to evaluate, given the economic distortions associated with central planning (Naughton, 2007). Beginning in the early to mid-1980s, following the onset of its market-oriented reforms, China's RCA indexes rose sharply in three of the five more labour-intensive industries, peaking at a value of 1.8 in apparel in 1986, 2.3 in travel goods in 1990, and 1.9 in footwear in 1995. A log RCA index of 2 indicates a country's share of world industry exports is 7.4 times its share of all merchandise exports. In the four less labour-intensive industries, China began with a strong comparative disadvantage, with RCA indexes at –2 or below in the 1970s. During the 1980s, its fortunes in these sectors changed rapidly. China's log RCA index became positive in televisions and telecommunications equipment in 1987, in computers in 1995, and in electrical machinery in 2004. In road vehicles, however, China retains a strong comparative disadvantage, even at the end of the sample period.

To compare development patterns in export-processing industries in East Asia more formally, I search for temporal shifts in country RCA expansion paths. Specifically, I estimate the leads and lags that yield maximum overlap in RCA indexes among the four countries for a given industry, where I force leads and lags to be common across the nine industries and further require South Korea and Taiwan together to have the same lag structure relative to Japan and to China. Figure 2.11 shows contemporaneous values of RCA indexes for South Korea and Taiwan along with 22-year lags for Japan and 12-year leads for China, which is the structure that maximises overlap in the four countries' RCA trajectories. There is strong overlap in RCA values in all industries except furniture. Whereas the catch-up of South Korea and Taiwan to Japan required more than two decades, China's catch-up has required only slightly more than one decade. Similar to the results in the previous section, China appears to acquire comparative advantage in manufacturing industries at low levels of capital per worker relative to other Asian nations. However, this difference is simply one of timing. It is abundantly clear in Figures 2.10 and 2.11 that the countries of East Asia cycle through manufacturing industries in a qualitatively similar manner.

4.5 Interpreting the results

What accounts for the common cycles of East Asian comparative advantage in offshoring industries in Figures 2.10 and 2.11? Possible explanations include the initial labour abundance of these economies, their rapid pace of accumulation of human and physical capital, and common industrial policies (Rodrik, 2006). The rapid catch-up of China to South Korea and Taiwan in comparison to their own catch-up to Japan is not explained by differential rates of growth in the capital stock among these countries. Whereas after 1980 capital per worker in China grew at 6.9 percent per year, it grew at comparable rates in South Korea and Taiwan for this period (7.5 percent and 6.6 percent, respectively) and at higher rates for the two countries over the entire 1962–2007 period (7.1 percent

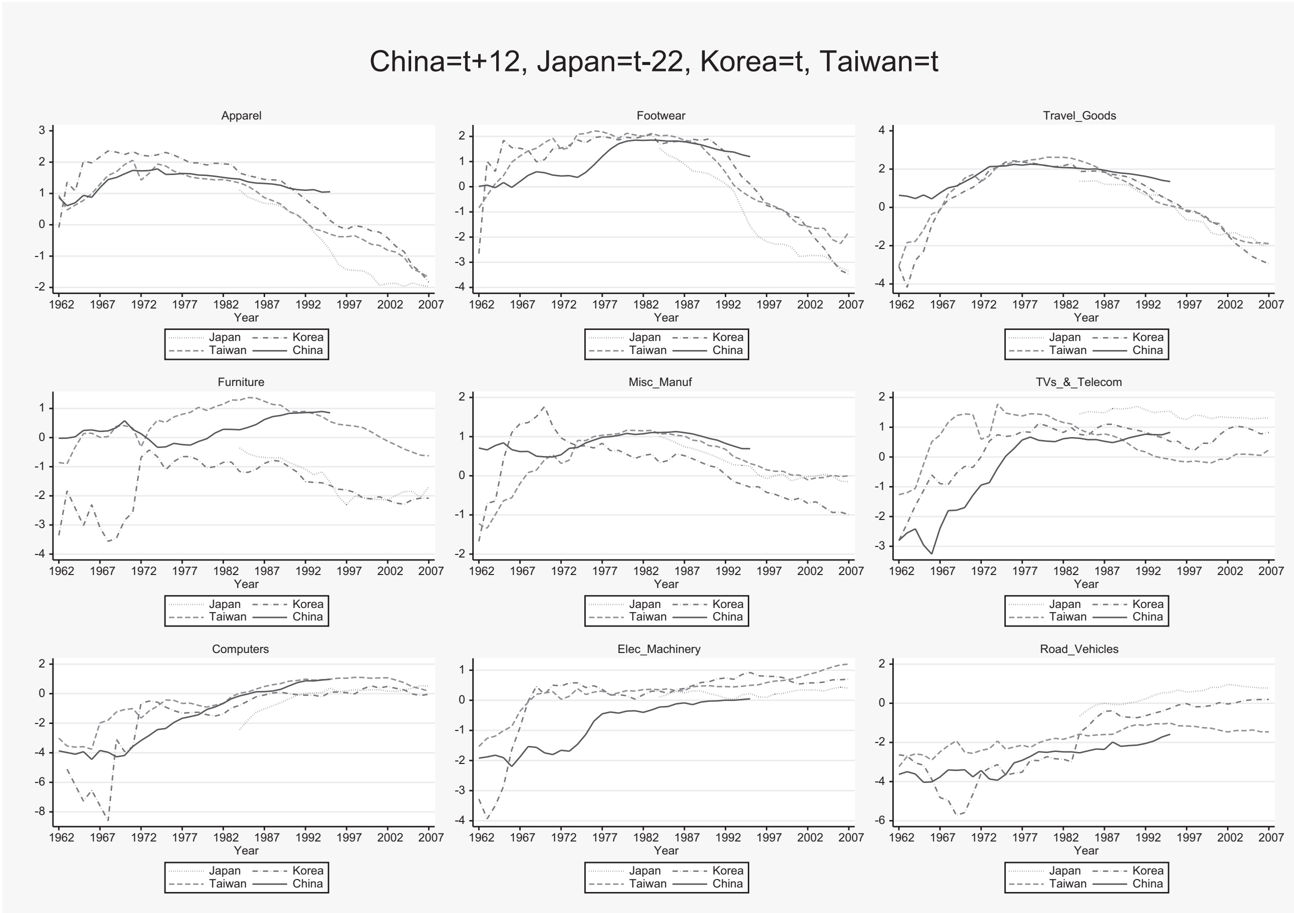

Figure 2.11 Leads and lags of revealed comparative advantage in East Asia

Source: Author's estimations.

and 8.3 percent, respectively). The reason for China's accelerated convergence to its East Asian industrial predecessors must lie elsewhere.

The patterns of industry evolution seen in Figures 2.8 to Figure 2.11 align with Schott (2003), who estimates the impact of capital accumulation on country specialisation patterns. Schott motivates his analysis using a version of the Heckscher-Ohlin model of trade, in which an extreme global distribution of relative factor supplies (or industry productivities) induces countries to specialise in distinct product mixes. Within a given cone of diversification, capital accumulation tends to have a monotonic impact on country production levels, either positive or negative. A labour-abundant country would tend to begin in a cone of diversification that has specialisation in labour-intensive products. As the country accumulates capital, it would expand output across all of the labour-intensive goods that it produces. Once the country accumulates sufficient capital to move into a new cone, the sign of the relationship between production and capital per worker may flip (or go from zero to positive). Further capital accumulation may yield contractions in output in more labour-intensive products and expansions in output in more capital-intensive ones.

The offshoring models in Feenstra and Hanson (1997) and Grossman and Rossi-Hansberg (2008) also have a Heckscher-Ohlin flavour. There is specialisation according to factor abundance, with this specialisation occurring across production stages rather than across industries. The empirical results in this section are suggestive of cones of diversification in production stages (Leamer, 1984). At low levels of capital per worker, countries specialise in export assembly in apparel, footwear, and other labour-intensive industries. Factor accumulation causes export assembly operations to expand. Indonesia's growth in the 1980s and 1990s, for instance, allowed it to attract ever-larger numbers of assembly plants in the garment and shoe industries, Nike prominent among them. Capital accumulation, however, will raise the relative wage of less-skilled labour, making a country less attractive as a destination for final assembly in very labour-intensive production. Ultimately, capital accumulation prices a country out of assembly in apparel and footwear, moving it into new activities.

Cycles of export-processing industry growth and decline are partially evident in Figures 2.8 and 2.9. Complicating the analysis is the fact that most countries accumulate capital only so quickly. Hence, we are often only able to observe one part of the inverted U. To see the full inverted U in all countries and in all industries, one needs to observe manufacturing exporters that grow sufficiently rapidly to move through multiple stages of industry evolution over the same period.

5. Discussion

The industrialisation of the East Asian Tigers from the 1960s to the 1980s inspired an intense debate about the process of economic development. Is this what happens when countries reduce market distortions and embrace their underlying comparative advantage? Does freer trade lead inexorably to faster economic growth? Or is the lesson instead that export-led development is not possible without thoughtful state intervention to guide resources towards potentially productive sectors? This debate acquired much greater importance once China began its process of reform and opening. Deng Xiaoping saw Singapore as a model for economic policy in China (Vogel, 2011) and consciously adopted many elements of the development strategy of the East Asian Tigers, whatever in truth that strategy happened to be. Now, it seems, the fate of the world economy is tied up in how and why East Asia has succeeded so spectacularly.

Evidence of government intervention in China abounds. The country, after all, still nominally follows the current five-year plan, which emerges out of a process of intense negotiation between government ministries. The pertinent question for China's export growth is how much do interventions in specific sectors actually matter for what China produces. It is undeniably true that China has industrialised and progressed up the quality ladder of products more rapidly than any other major country in the historical record. Yet, this rapid pace does not qualify as prima facie evidence that the features of China's development are unique. Owing to the economic isolation imposed by Mao, China began its period of export-led development at a level of labour productivity that was far below its potential. A market-driven process of convergence would on its own explain much of China's aggregate economic performance to date (Storesletten and Zilibotti, 2014).

Compelling evidence that the government deserves credit for China's export growth – beyond the aggregate reforms that reduced the size of the state-owned sector, freed labour to move to cities, and permitted foreign capital and technology to flow into the country – must come from the distinctiveness of China's development path. Here, the evidence seems to be lacking. The evolution of China's comparative advantage from strength in more-labour-intensive sectors to strength in more capital-intensive sectors is strikingly similar to that of Japan, South Korea, and Taiwan. Of course, if all four countries adopted similar industrial policies, a common path is exactly what we would observe. However, it is far from obvious why China would choose a time pattern of sectoral interventions identical to that of Japan, three and half decades later.

More damning for the government-intervention hypothesis is the strong correlation between comparative advantage and capital accumulation in East and Southeast Asia. To a first approximation, factor accumulation predicts Asian export capabilities in key manufacturing industries. These correlations do leave room for idiosyncratic national features to play a role. While the inverse U-shape of the relationship between comparative advantage and capital per worker is broadly similar across countries, the precise details of the relationship – in terms of the point of inflection at which additional capital per worker pushes a country from rising to falling comparative advantage and the slopes of the arms of the inverted U – do vary across countries. Hence, it is plausible that industrial policy may affect the micro-composition of production inside two-digit industry aggregates in a manner that jiggers inflections and slopes. Yet, these details leave industrial policy to explain only the residual variation in export-led development in Asia. The broad patterns of development in the region suggest that forces of comparative advantage are alive and well.

6. Export development paths in Southeast Asia

What do these results mean for how the countries of Southeast Asia should orient their policies towards international trade and support for specific industries? Two implications are apparent. First, one cannot make a strong case in favour of industrial policy on the basis of observed patterns of changing comparative advantage over time in the region. The level of aggregate capital per worker appears to be a dominant factor in determining the sectors in which countries have a comparative advantage at any moment in time. Further, the level of capital per worker determines when countries make the transition from capital accumulation detracting from rather than adding to comparative advantage in a sector. Any role for industrial policy in reordering the sectors in which countries have a comparative advantage thus seems to be secondary. Claims by policymakers that countries can use industrial policy to dramatically realign their comparative advantage should be greeted with scepticism. Despite China's continuing five-year planning apparatus and myriad policy interventions, its export development path has followed those of other nations in East Asia in near lockstep, though at a remove of one to two decades.

Second, the scale of China's economy and its rapid pace of development have created an environment of continual change in export opportunities for other nations in East and Southeast Asia. Because the pace of capital accumulation determines the speed with which an economy moves from comparative advantage to disadvantage in a sector, any country which achieves a high rate of capital accumulation, as China has over the last quarter century, will cycle through manufacturing sectors at an accelerated pace. For instance, because China is now on the downward-sloping portion of its inverted U in the apparel and footwear sectors (as illustrated in Figure 2.8), further capital accumulation will continue to erode China's advantage in these industries. This erosion will create opportunities for other countries to step in and fill China's wake. Indeed, China's diminishing comparative advantage in apparel and footwear may explain why the relationship between capital per worker and comparative advantage in these two sectors has been flat since the early 2000s in both Indonesia and Viet Nam: China's progressive deterioration in its advantage in these industries is changing competitive pressures felt by other countries, perhaps allowing them to continue to accumulate capital without eroding their competitive position. Just as China's arrival onto the export-manufacturing scene in the early 1990s created strong labour-market pressures on countries that were producing labour-intensive manufactured goods at the time, China's progressive exodus from these sectors (as a share of its total exports) may weaken these pressures in the near term.

These results do not mean that economic policy has no role to play in helping countries promote export growth. Countries will progress from labour-intensive to skill-intensive manufacturing sectors the more quickly they build their capital

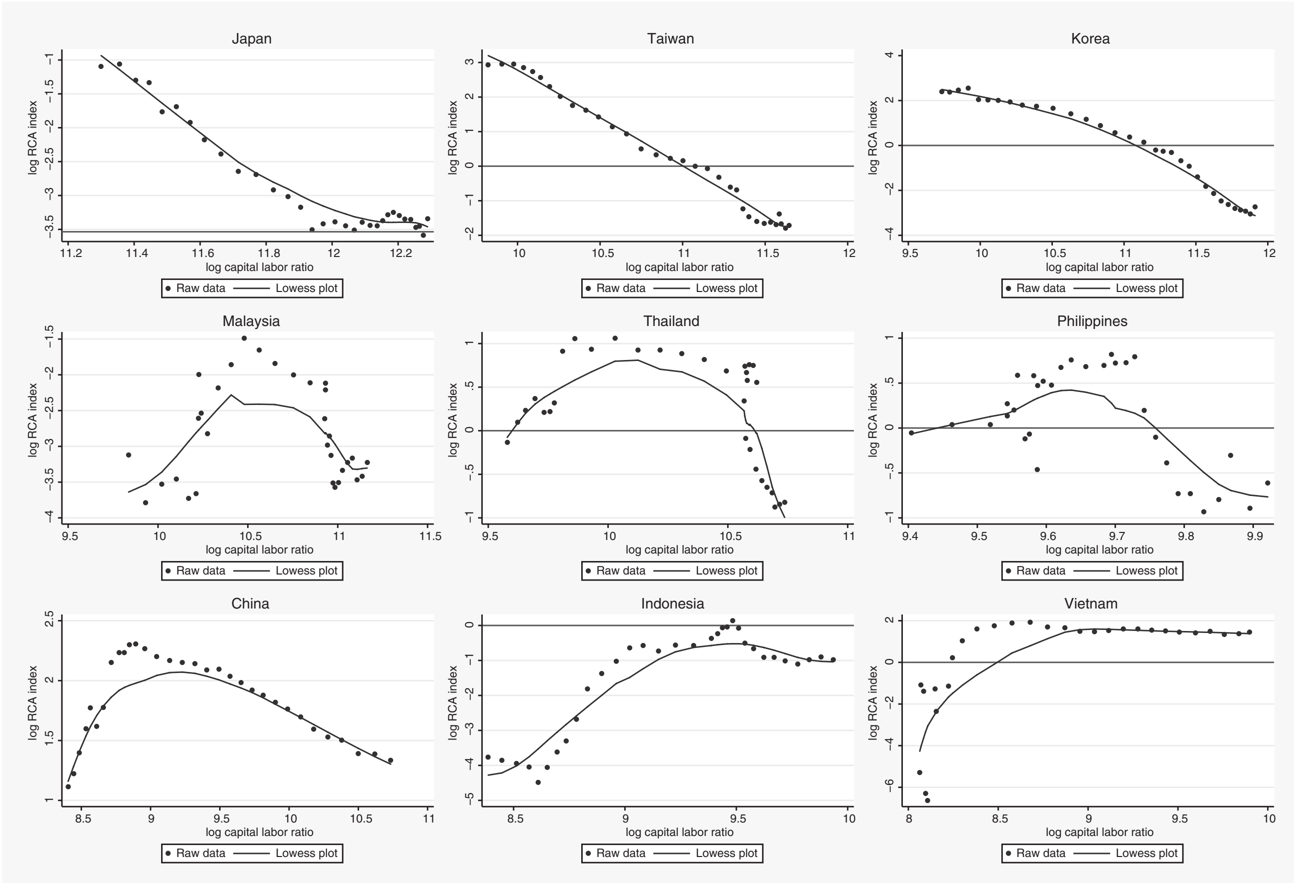

Figure 2.1a RCA in travel goods and furniture in Asia

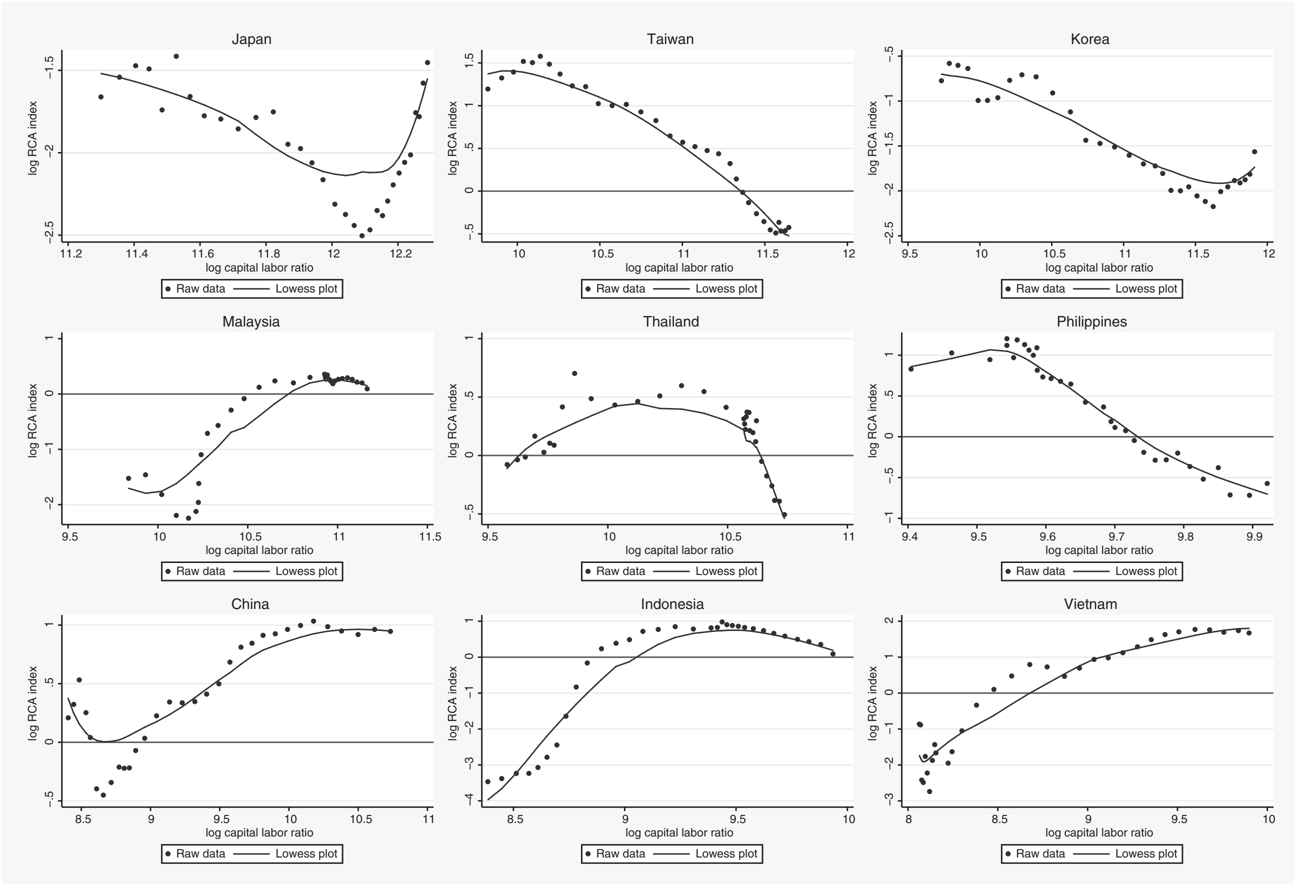

Figure 2.1a (Continued)

Source: Author's estimations.

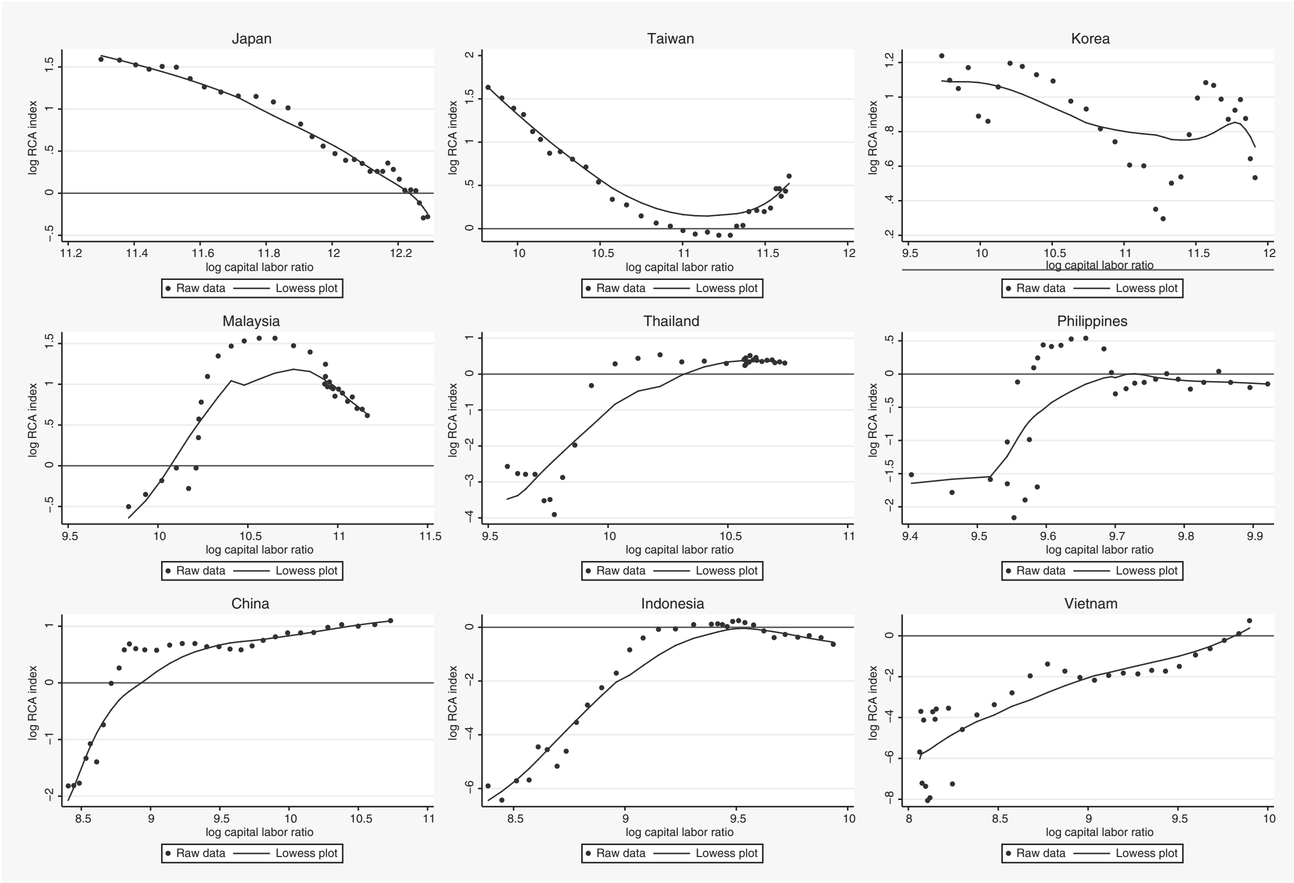

Figure 2.1b RCA in home electronics and road vehicles in Asia

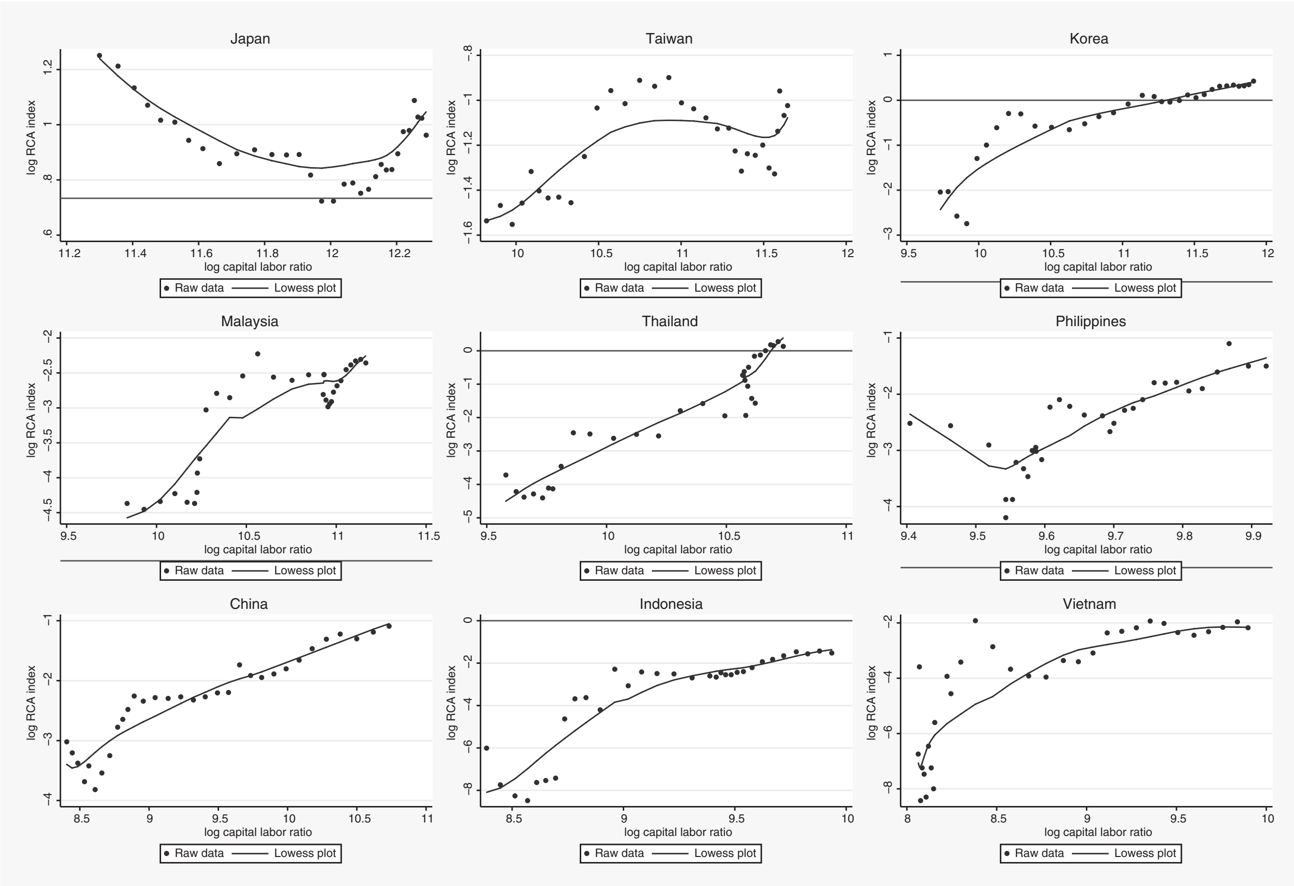

Figure 2.1b (Continued)

Source: Author's estimations.

abundance. This suggests that countries could enhance their pace of export development by removing disincentives to capital accumulation, easing restrictions on foreign direct investment, and avoiding trade policies, such as import tariffs, that reallocate resources away from export production. The tight relationship between capital per worker and comparative advantage allows countries to forecast how their comparative advantage will shift across sectors in the future (though the noted heterogeneity across countries in turning points for advantage to disadvantage may imply that countries will not be well positioned to determine when they reach the maximum point on the inverted U). This knowledge may help countries plan complementary investments in transportation infrastructure, education, and worker training that are well suited for the sectors in which their advantages will be strengthening.

Notes

1 A growing literature uses export assembly to study offshoring (e.g. Feenstra et al., 2000; Feenstra and Hanson, 2005; Swenson, 2005; Bergin et al., 2009; Koopman et al., 2012; Manova and Yu, 2012; Brandt and Morrow, 2013).
2 The denominator in China's RCA index is the country's share of world merchandise exports. Following World Bank definitions, manufacturing includes SITC sectors 5 (chemicals), 6 (basic manufactures except for division 68), 7 (machinery and transport equipment), and 8 (miscellaneous manufactured goods). Food, fuels, ores, and metals include SITC sectors 0 (food and live animals), 1 (beverages and tobacco), 2 (crude materials), 3 (mineral fuels), and 4 (animal and vegetable oils and fats), and division 68 (non-ferrous metals).
3 I exclude Hong Kong and Singapore owing to the fact they serve as entrepôts, which complicates the comparison of their trade data to that of other economies.
4 The standard practice in the literature is to infer the magnitude of global production sharing from indirect measures, including (1) the share of imported intermediate inputs in industry total material purchases (e.g. Feenstra and Hanson, 1999), (2) the share of imports of inputs for further processing in firm total sales (e.g. Hanson et al. 2005), (3) the share of intra-firm trade in total industry trade (e.g. Antràs and Chor, 2013), (4) the share of foreign value added in industry gross exports (e.g. Johnson and Noguera, 2012), and (5) the 'downstreamness' of production by a country in an industry (e.g. Fally and Hillberry, 2014; Chor et al. 2014).
5 Under the less common practice of processing with assembly, the foreign client in the transaction retains ownership of the imported materials; under the more common practice of processing with imported materials, the Chinese firm assumes ownership of these inputs. Yu and Tian (2012) report that in 2010 processing with imported materials accounted for 85 percent of processing exports.
6 Other significant categories of exports include warehousing trade (2.2 percent of manufacturing exports in 2010) and entrepôt trade in bonded areas (2.3 percent of manufacturing exports in 2010).
7 Much export processing in China is at the behest of Hong Kong or Taiwanese multinational firms and not of US multinational firms.
8 The ITA began in 1996 with an initial group of 29 WTO signatories and now includes 73 WTO members.
9 The dutiable share of US imports includes all forms of foreign value added, be it assembly services or materials and other inputs.

10 Apparel and footwear do not appear as industries in which US multinationals use foreign subsidiaries to process US-manufactured inputs, as these are goods in which assembly is primarily contracted to arm's-length suppliers.
11 In referencing the literature, I exclude work on the boundaries of the multinational firm (see, e.g. Antràs and Yeaple, 2012; Antràs and Chor, 2013; Bernard et al., 2010) and on inter-industry trade in intermediate inputs (e.g. Johnson and Noguera, 2012; Koopman et al., 2012; Fally and Hillberry, 2014), neither of which takes as its explicit focus how production tasks within an industry are divided across borders.
12 See Costinot et al. (2011) for an analysis of routine-task intensity and the share of industry trade that is intra-firm.
13 In related work, Antràs et al. (2014) combine Fort's (2014) data with the Commodity Flows Survey, which provides highly disaggregated product-level data on the countries from which US plants import specific goods. They use these data to estimate the determinants of the fixed costs of sourcing inputs to particular countries.
14 Using the 75th percentile for high-skill workers and the 25th percentile for low-skill workers yields similar results.
15 The correlation is weaker for business services.

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3 Indonesia's trade policies in the new world trade*

Lili Yan Ing, Mari Elka Pangestu, and Olivier Cadot

1. Introduction

Indonesia's international trade has undergone many transformations over the last 50 years. Changes in its growth and structure have reflected changes in the country's comparative advantages and trade and development policies, as well as fluctuated global circumstances and the evolving rules of the multilateral, regional, and bilateral trade agreements in which Indonesia has participated.

After close to 70 years of trade liberalisation, a series of recent events (among others Brexit, leaving the UK set to depart from the European Union, and Donald Trump winning the US presidential election with his 'America First' policy) suggest that the tide may well be turning. International trade as a proportion of global gross domestic product (GDP) has stopped growing in the last decade, including in Indonesia. The growth of the share of Indonesia's trade to total GDP averaged –1.3 percent from 2000 to 2015 (Figure 3.1). In

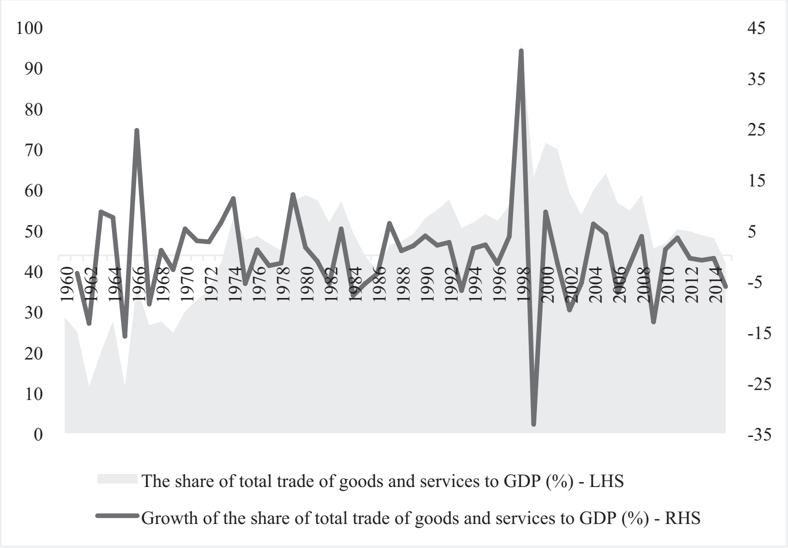

Figure 3.1 Indonesia's total trade

Source: Authors' calculations, based on Comtrade and World Development Indicators.

DOI: 10.4324/9781315161976-3

addition, trade liberalisation at the multilateral level has stumbled, and regional trade agreements, sometimes seen as alternatives to multilateral liberalisation, are under heavy attack, now even in the US. While Indonesia, together with the other Association of Southeast Asian Nations (ASEAN) countries, has moved forward its agenda on regional integration, this has been challenged by the growing protectionist sentiments.

At the same time, we live in a world where production is sliced and tasks are fragmented and conducted in different places, and there are growing concerns over health, safety, and environmental protection. How should an emerging country like Indonesia respond to this situation?

Section 2 illustrates the stages of designing trade policies over the last 50 years, from 1965 to 2015. Section 3 observes trade policy instruments in the new world trade, which are mainly non-tariff measures, in Indonesia. Section 4 concludes.

2. Indonesia's trade policy over 50 years

Section 2 focuses on Indonesia's trade policy, its aims, the instruments used by different governments to implement it, and its evolution over the last 50 years (Box 3.1).

Box 3.1 Five phases of Indonesia's trade policy, 1965–2015

(1) From chaos to rehabilitation: 1965–1971

Soekarno's Old Order ended in chaos and was characterised by trade controls, including import bans, quotas, tariffs, and foreign-exchange allocation. Soeharto's New Order, in contrast, unified the exchange rate, opened up the capital account, welcomed foreign investment, and normalised trade policy.

(2) Import substitution: 1971–1985

An oil boom sparked an episode of so-called Dutch disease and increased Indonesia's dependency on oil exports and revenues. The government's import-substitution policy escalated effective rates of protection. Some policies promoted local content, strategic industries, and directed lending, while others banned timber and rattan exports. This period also saw the devaluation of the rupiah in 1978, continued import substitution, and import licensing that benefited vested interests.

(3) Devaluation, bold deregulation, and export diversification: 1985–1999

The end of the oil boom, in the mid-1980s, coincided with a world-wide recession. The government responded with a bold deregulation and aggressive export-diversification strategy. Indonesia's trade policy was influenced by the 1992 ASEAN Free Trade Area (AFTA), liberalisation in the lead-up to the Bogor Goals of the 1994 Asia-Pacific Economic Cooperation (APEC) Leaders' Meeting, and the formation of the World Trade Organization (WTO) in 1995. But at the same time import monopolies emerged and a national car was developed. Economic overheating in Asia during 1993–1997 culminated in the 1997–1998 Asian Financial Crisis, which caused dramatic economic, financial, and political upheaval.

(4) Recovery and soul-searching: 1999–2004

The International Monetary Fund (IMF) programme dominated this phase, as did the removal of all import restrictions, a reduction of tariffs, the importing of agricultural products, and major institutional changes, including the establishment of *Bulog* (the National Logistics Agency). Ambivalence during 2002–2004 saw the reintroduction of import and export restrictions and instances of creeping protectionism. As chair of ASEAN in 2003, Indonesia initiated the ASEAN Community and participated in the ASEAN+1 free-trade agreements (FTAs), having signed the ASEAN-China Free Trade Agreement in 2002.

(5) More reform, more Dutch disease, and the Global Financial Crisis: 2004–2015

The Yudhoyono government sought to simplify trade policy, reducing trade restrictions and increasing transparency. In international trade negotiations, Indonesia adopted a multitrack approach: multilateral, regional, and bilateral. A commodity boom during 2004–2011 saw exports triple and brought on a second episode of Dutch disease. During 2012–2014, in the wake of the Global Financial Crisis and the collapse of commodity prices, exports declined and created a trade deficit. Creeping protectionism led to many trade restrictions being reintroduced, while ambivalence about openness did little to solve the ongoing problem of how to diversify exports.

2.1 From chaos to rehabilitation: 1965–1971

2.1.1 End of the Old Order: 1965–1966

During the Old Order (1950–1965), the main objectives of trade policy were to raise public revenue and control foreign-exchange earnings, combined with a growing emphasis on increasing indigenous Indonesian control over all aspects of economic activity. Under President Soekarno's Guided Economy and *Berdikari* (self-reliance) principles, economic policy veered towards centralised planning, nationalisation, and government control of foreign trade. Import restrictions limited foreign-exchange earnings; imports were replaced by domestically produced substitutes, wherever possible; and state-owned enterprises were used as a base for industrial development. Exports were mainly resource based: eight commodities accounted for 80–90 percent of exports, the two most important being rubber and, increasingly, oil and oil products. The other major export commodities were tobacco, tea, coffee, palm oil, copra, and tin ore.

2.1.2 Beginning of the New Order: 1966–1971

In the transition to the New Order, President Soeharto's government, which was advised by Western-trained economists, responded to the inherited chaos by substantially liberalising trade and investment policies. Part of a rehabilitation and stabilisation programme, these policies aimed to ration scarce foreign exchange more effectively and influence the level and composition of imports. The recognition that there had been inadequate investment in maintaining and expanding production in the oil industry and by agricultural estates led to an open-door policy on foreign investment in 1967. In mid-1967, new foreign exchange regulations gave additional incentives to exporters and extra protection to import-competing industries (Arndt, 1967).

2.2 Import substitution and government intervention: 1971–1985

In the period after rehabilitation, Indonesia's economic and political circumstances were changed dramatically by an oil boom that alleviated foreign exchange shortages and increased public revenues (Grenville, 1974).[1] Trade and other policies were introduced to foster import substitution in rice and in manufacturing, beginning with consumer goods and followed by intermediate and capital goods.

Rising oil revenues provided more room for the government to increase its intervention in the economy, and new state-owned enterprises were created in strategic industries such as cement, fertilisers, and aircraft. Oil revenues were channelled through state-owned banks and provided as low-interest credit to priority recipients such as plantations, downstream developers of plywood and similar products, and import-substitution industries. Non-oil export specialisation focused on primary commodities and import-substitution manufacturing, creating a bias against other sectors. Although international trade increased significantly during this period, non-oil exports had few opportunities to facilitate development (Rice, 1983) and the protection regime that promoted industrialisation hindered exports. As Warr (1992) notes, Indonesia's most protected industries continued to be those with the least comparative advantage.

In 1978, several steps were taken to try to offset the declining competitiveness of non-oil tradables compared with oil tradables, or Dutch disease, in anticipation of a fall in oil prices. The rupiah was devalued by 50 percent, tariffs on around 1,000 goods were reduced by 50 percent, and import taxes were reduced by

50 percent. There was an emphasis on the need to promote non-oil exports and reduce the export dependence on oil (Dick, 1979). Policymakers attempted to offset the bias against exports and counter Dutch disease by introducing an export certification scheme. This scheme amounted to a subsidy, because the reimbursements of duties paid by exporters on their imported inputs tended to be more than the duties themselves. Some of this subsidy helped to start the production and export of textiles and garments.

In 1979, however, oil prices rose rather than fell, halting the push for further deregulation and liberalisation (Dick, 1979). With monetary authorities unable to sterilise oil revenues, the effects of Dutch disease created inflationary pressures and eroded the export price advantage gained by the 1978 devaluation. Because no other measures were taken to ensure the competitiveness of exports (such as reducing high cost-economy factors), non-oil exports stagnated. Real effective exchange rates came back to 1978 levels after two years, and tariff reductions were also rolled back as exporters failed to conduct further reforms (Pangestu, 1997).

A further reduction of tariffs and import sales taxes was undertaken at the beginning of 1981. The official reason given was that Indonesia needed to comply with the multilateral General Agreement on Tariffs and Trade (GATT) and its Tokyo Round of negotiations. When oil prices finally began to fall in 1981, in the wake of a global recession, the government limited the impacts by taking effective macroeconomic decisions in the fiscal and financial sectors. These decisions included cutting government expenditure and devaluing the rupiah by 28 percent in March 1983, introducing reforms to the banking system (Arndt, 1983), and reforming taxation (Booth, 1984). But owing to the policy of limiting imports to save foreign exchange and protect domestic industries during downturns, trade policy became more protectionist. In addition, vested interests pressed for import substitution, especially for cement, chemicals, fertilisers, and motor vehicle engines. Because tariffs were already high, the increase in protection during 1982–1985 involved a range of quantitative restrictions on imports and the establishment of an 'approved importer' system (*tata niaga impor*). Log exports were also banned, to encourage domestic processing of raw materials and increase value added, and ostensibly to prevent the over-exploitation of natural resources. By the end of this period, protection and regulatory controls remained high, economic growth and industrialisation were still driven by government controls and state-owned enterprises, and 80 percent of Indonesia's exports and government revenues continued to be derived from oil.

2.3 Devaluation, bold deregulation, and export diversification: 1985–1999

2.3.1 Deregulation and export orientation: 1985–1996

In 1985, amid a sharp slowdown in economic growth to only 2.5 percent, and with oil prices expected to decline, a strong push for deregulation and reform emerged. The main aim was to diversify exports and public revenues away from the dominance of oil. The government introduced several bold measures and reforms as part of this strategy.

First, in 1985, it decided to 'close down' Indonesian customs, one of the most corrupt institutions at the time, by asking all customs officials to take a leave of absence. A Swiss surveyor company, Société Générale de Surveillance (SGS), was contracted to take over customs clearance (Dick, 1985). The intention was to reduce the costs of exporting and importing and to prepare Indonesian customs to work more efficiently in the future.

Second, in 1986, Indonesia substantially improved its duty drawback scheme by introducing the 6 May Policy Package (Muir, 1986: 22–3). A year earlier, under US pressure, Indonesia had become a signatory to the GATT Code on Subsidies and Countervailing Duties. The subsidy component of the export certification scheme was removed by basing the calculations on an audited input-output basis, and the administration of the scheme was made transparent and became better governed – and included arm's-length processing – under an independent entity. At the same time, many tariffs were reduced and a new, lower ceiling of 40 percent was put in place, refining the tariff schedule by reducing the number of split lines. In September 1986, the rupiah was devalued by 31 percent against the US dollar.

Third, during 1986–1990, a series of trade-reform packages removed non-tariff barriers (NTBs) – in line, this time, with conventional wisdom – and replaced them with more transparent, equivalent tariffs (Pangestu, 1987; Wymenga, 1991). Removing two monopolies on imports of steel and plastic and granting them to associates of President Soeharto, in November 1988, was probably the most significant reform. However, import licensing still covered 65 percent of food crops, mainly rice.

Fourth, there was an announcement in 1986 that there would be three more deregulation packages. The results of these reforms were positive: non-oil exports grew by around 30 percent in 1987–1988 (Hill, 1987) – albeit from a low base – and by 17 percent annually during 1989–1994. Exporters credited the boost in exports to the devaluation and reforms, especially the efficient and 'clean' mechanism of duty reimbursement that enabled them to produce with internationally priced inputs. Exports of resource-based manufactured goods (such as furniture, rubber products, and processed wood) and labour-intensive manufactured goods (such as textiles, garments, and footwear) increased rapidly. Garment companies appear to have been the main beneficiaries of the duty drawback scheme. By 1989, of 22 billion US dollars of exports, the share of oil had fallen to 38 percent, compared with 65 percent in 1981.

During this period, Indonesia's internationalisation came of age and affected domestic policies and reforms. Besides the bold deregulations undertaken during 1985–1988, Indonesia's increased confidence about opening up was evident when, in early 1992, it finally supported the creation of the AFTA, agreeing to reduce tariffs on intra-ASEAN trade to zero by 2005 (Tomich, 1992). This was shortly followed by two even more important reforms: the decision to allow 100 percent foreign ownership of export-oriented companies; and Indonesia's introduction, in 1995, of a comprehensive tariff reduction programme to meet its obligations to the newly created WTO (and to ASEAN countries via the AFTA by 2005).

Despite the internationalisation of Indonesia's economy and the reforms undertaken since the mid-1980s, cronyism favouring those close to the centre of power, including Soeharto's children, increased. Policy interventions created import monopolies, forestry concessions, privatised toll roads, and private TV stations. One of the most obvious examples was the national car policy introduced in 1996. Under this policy, a joint venture between one of Soeharto's sons and Kia Motors of the Republic of Korea (henceforth South Korea) was given the privilege of importing fully built cars into Indonesia duty-free, before the WTO halted it. This case ironically provides a lesson on how international commitments in the end disciplined such policies and provided Indonesia its first experience in dealing with the WTO. After consultations failed in May 1997, Japan, the European Union, and the US requested a panel be created to arbitrate the dispute, and the case was one of the first to test the WTO dispute-settlement process. Indonesia ultimately lost the case because it had violated the most sacred principle of GATT 1994 – Article I:1 on most-favoured nation (MFN) treatment.

2.3.2 The Asian Financial Crisis and the IMF program: 1997–1999

The 1997–1998 Asian Financial Crisis, which started in Thailand in July 1997, quickly spread to other Asian economies. Amid pronouncements of Indonesia's fundamentals being sound, the government introduced a deregulation package in September 1997. A month later, however, it resorted to an IMF loan programme that aimed to shore up business confidence, but in the end created distrust of the government's ability to manage the crisis.

Despite the package offered by the IMF, the closure of 16 banks at the end of 1997 exposed Indonesia's vulnerabilities and led to a crisis of confidence, which in turn led to a sharp increase in capital outflows in late 1997 and into 1998. The rupiah has been floated since August 1997 as it had depreciated from 2,500 Indonesian rupiah to 17,000 Indonesian rupiah against the US dollar by January 1998 (Soesastro and Chatib Basri, 1998). The severity of the economic crisis led, however, to a 13 percent contraction in GDP, an inflation rate of 58 percent, a 244 percent drop in the exchange rate, and the collapse of the banking sector and many affiliated companies in 1998. All of this happened in uncertain political circumstances and amid deteriorating domestic security. Severe problems experienced by the corporate and banking sectors hindered trade, as it was difficult for Indonesian businesses to finance imports or obtain pre-financing for their exports (Pangestu and Habir, 2002).

2.4 Recovery and soul-searching: 1999–2004

The massive currency depreciation boosted exports, but the currencies of other Asian countries also depreciated and therefore these countries' exports competed against Indonesia's (Thee, 2002). Although the exports of some products increased, total non-oil and gas exports contracted by 5.1 percent in 1999. Non-oil and gas exports increased in subsequent years, initially because of price competitiveness due to the weak rupiah, but also because of increased demand, especially for palm oil and mining products.

Indonesia noticed to experience competitiveness problems since 2004, particularly in its labour-intensive sectors (World Bank, 2012). Between 1999 and 2004, the share of textiles and footwear in non-oil and gas exports dropped from 21 percent to 16 percent and grew by only 1.3 percent, on average, largely because of a decline in investment, an appreciation of the nominal exchange rate, and other factors such as rising wages and logistics costs and the WTO's phasing out of quotas of its Multi Fiber Agreement (MFA)[2] that raised the cost of production of Indonesia's exports of manufactured goods. Net foreign direct investment was negative between 1999 and 2003, with outflows of 2.8 percent and 1.9 percent of GDP in 1999 and 2000 (Basri and Soesastro, 2005).

Despite reforms of lowering input tariffs, the government seemed hesitant to commit to deeper structural reforms during 1999–2004. The government, through the Ministry of Industry and Trade, also reintroduced the requirement that sugar, steel, and textiles could be imported only by certain licensed importers. It reintroduced export bans on logs in 2001 and on rattan in 2004. By 2008, Indonesia had applied low tariffs, but these low tariffs were offset by a proliferation of NTBs, such as those on beef, sugar, rice, and steel. Furthermore, in the aftermath of the Asian Financial Crisis, resentment arose about foreign involvement in the Indonesian economy. Against this background, protectionist policies became easy and popular instruments to deploy to shield Indonesian businesses from international competition.

Global commodity prices started to increase in 2003, partly as a result of increased demand from China. High international commodity prices marked a shift in the structural balance of production in Indonesia, where manufacturing was no longer considered as attractive for businesses as the commodity-based and non-tradable sectors. This marked the beginning of a second period of Dutch disease.

2.5 More reforms, more Dutch disease, and the Global Financial Crisis: 2004–2015

2.5.1 The Ministry of Trade, Timnas PEPI, and reforms

In October 2004, in the country's first direct elections, Susilo Bambang Yudhoyono was elected president. By 2003, the new government had started to focus on implementing structural reforms to regain confidence, attract investment, and rebuild the real sector. In 2004, the Ministry of Trade was again separated from the Ministry of Industry and Trade. It was tasked with increasing investment and creating a conducive investment climate, increasing export growth, and improving the efficiency and effectiveness of domestic distribution. One of the outcomes was the passage of Law No. 25/2007 on Investment.[3]

Apart from introducing cross-border measures and taking part in trade negotiations, Indonesia undertook a number of other important reforms and institution-building activities. Important domestically was stabilising prices and institutionalising databases for decisions on the import of basic foods. Lessons were learned from spikes in domestic prices, such as the increase in rice prices in 2006 (McCulloch and Timmer, 2008) and the sharp rise in food prices in 2008 prior to the Global Financial Crisis. The government also committed to improving investment and exports by revitalising the National Team for the Enhancement of Exports and Investment (Timnas PEPI) in 2006, which was led directly by the president and chaired by the coordinating minister of economic affairs.[4] During 2008–2011, Timnas PEPI contributed to legislation and regulations, monitored implementation, and dealt with ad hoc problem-solving related to investment and trade. On top of introducing unilateral reforms, the government responded to its ASEAN commitment by simplifying border-clearance procedures through initiatives such as the Indonesia National Single Window and INATRADE (an electronic system of export and import licensing).

2.5.2 Resource-based export boom and competitiveness

Indonesia's exports almost tripled during 2004–2011, from 71 billion US dollars to 201 billion US dollars, with an average growth rate of 16 percent per year. Much of this growth rode on commodity prices and on high levels of demand for raw materials in China and, to a lesser extent, India. Indonesia's exports of palm oil and coal increased dramatically in this period. In 2012, in the aftermath of the Global Financial Crisis of 2008, Indonesia's trade balance went into deficit for the first time in 50 years.

Indonesia's resource-based exports continue to dominate. Resource-intensive industries, such as oil and gas, mining, agriculture, and forestry, accounted for 96 percent of total exports in 1980, 62 percent in 1990, and 41 percent in 2000. Nonetheless, the share of exports of mining products in total exports increased sharply from 5 percent in 2000 to 18 percent in 2013. The share of other resource-intensive goods, particularly palm oil, also increased significantly, so that by 2013 around 60 percent of Indonesia's exports were resource based. Meanwhile, the share of exports of manufactured goods in total exports decreased from 59 percent in 2000 to 41 percent in 2013. Furthermore, manufactured exports did not diversify much, and continued to be dominated in the 1990s by unskilled-labour-intensive goods such as textiles, clothing, and footwear, with moderate increases in the 2000s in semi-skilled-labour-intensive goods such as electronics and transport parts and components.

By 2013, 9 out of 10 of Indonesia's main export commodities were resource-intensive: coal, natural gas, vegetable oils, petroleum, rubber, paper, copper, residual petroleum, and nickel. Footwear was the exception, while textiles ranked 11th. These 10 main commodities contributed more than 50 percent of the value of total exports. This was reminiscent of the early 1960s – when 8 out of 10 of Indonesia's main export commodities were resource-intensive (Thomas and Panglaykim, 1966) – despite the government-stated strategy since then of diversifying exports. The share of machinery goods and parts in exports remained low.[5] In Indonesia, in 2010, this share remained at 13 percent of total exports, and lagged behind those of the Philippines, Singapore, China, Malaysia, the Philippines, Thailand, and Viet Nam.

Indonesia had come through the 2008 Global Financial Crisis relatively unscathed, with annual GDP growth averaging 5.9 percent between 2008 and 2014, compared with average world growth of just 1.8 percent (World Bank, 2015). But the competitiveness of non-commodity based exports continued to decline, partly because of the effects of Dutch disease and partly because of a range of problems in Indonesia's business environment, such as physical and soft infrastructure bottlenecks, inefficient logistics, tax administration and legal uncertainties for large and medium firms, and difficulty of access to finance for small and micro enterprises (Ing and Varela, 2012).

During 2009–2014, there appeared to have been a growing ambivalence about the direction of Indonesia's trade policy: while Indonesia promoted more openness, at the same time it applied a number of obvious protectionist measures such as reintroducing a ban on rattan exports, reinstating import controls on agricultural products, and implementing a ban on raw-mineral exports in 2014 under Law No. 4/2009 on Mineral and Coal Mining. Another example, Law No. 7/2014 on Trade gives the Ministry of Trade more control, strengthens previous government import and export regulations on quotas and bans, allows the temporary changing of tariffs to improve national competitiveness, and stipulates that trade negotiations must be approved by parliament. The government also attempted to reintroduce local-content requirements.

2.5.3 Indonesia's stance in regional agreements

Indonesia adopted a multitrack trade strategy in 2004. The cornerstone has been the country's regional agreements, with ASEAN at the centre. Indonesia's trade with its FTA partners accounts for 67 percent of its total trade, slightly higher than the ASEAN average. By September 2014, Indonesia had six regional FTAs and one bilateral FTA in effect: the ASEAN Free Trade Area, which then transformed into the more comprehensive ASEAN Economic Community in 2015; the ASEAN-Australia and New Zealand Free Trade Agreement; the ASEAN-China Free Trade Agreement; the ASEAN-India Free Trade Agreement; the ASEAN-Japan Comprehensive Economic Partnership; the ASEAN-Korea Free Trade Agreement; and the bilateral Indonesia-Japan Economic Partnership Agreement.[6]

As part of a process to consolidate the existing ASEAN+1 FTAs, in November 2011 ASEAN's 10 members and its six FTA partners agreed to form the East Asia Regional Comprehensive Economic Partnership. This partnership was designed around the open-regionalism principle of ratcheting up to best practices;

its bottom-up approach will aim for comprehensive coverage but will start with goods and then move on to services and investment. Other important principles are ASEAN-X, which allows those not ready to join at this stage to join at a later stage, and an open accession clause to allow for new members.

Has regional integration benefited Indonesia? An economy with a relatively small share of trade relative to GDP, such as Indonesia, may enjoy only a small gain from FTAs (Feridhanusetyawan and Pangestu, 2003).[7] The usage rate of FTAs in Indonesia is still relatively low, ranging from 25 percent to 41 percent for exports and from 6 percent to 34 percent for imports. In a survey-based analysis of the use of FTAs in ASEAN countries, Ing et al. (2014) find that this rate has much to do with the margin of preferences – or the difference between preferential tariff rates and most-favoured-nation (MFN) tariff rates – which was only 3.5 percent in 2010. In 2013, the ad-valorem equivalent of the cost of complying with the rules of origin of ASEAN and ASEAN+1 FTAs was 3.0 percent, across sectors (Cadot and Ing, 2014). In addition, Ing et al. (2014) find that 60 percent of the firms they surveyed across ASEAN countries claimed that there was little information available on FTAs. Despite the new legislation and the low uptake of FTAs, Indonesia's commitment to these agreements at least offers hope of driving domestic reforms and multilateralising regional commitments.

3. New World Trade Instruments: non-tariff measures

While tariffs disciplined by the WTO were already low in 2003, new trade policy instruments, non-tariff measures (NTMs) were proliferating in the world. NTMs are measures other than tariffs that affect international trade in goods. They can take many forms such as regulations, quantitative restrictions, price measures, and others, listed in UNCTAD's Multi Agency Support Team's (MAST) classification (UNCTAD, 2013a), which today is the authoritative classification of NTMs (Table 3.1). The MAST classification divides NTMs into measures applying to imports (categories A to O) versus measures applying to exports (category P). The detailed classification of import-related measures (15 categories) compared with export-related ones (1 category) reflects the view that mercantilist considerations typically lead countries to restrict imports more than exports, so that monitoring is more important on the import side. Having said that, export restrictions should not be downplayed, as they have recently spread and proved highly disruptive to world trade.

As NTMs have tended to proliferate in recent years while tariffs were reduced, in particular in ASEAN (Ing et al., 2016), concerns have been rising about their potential use as surrogate protectionist instruments. The average tariff applied by ASEAN countries declined from 8.92 percent in 2000 to 4.52 percent in 2015, whereas the number of non-tariff measures applied by the 10 ASEAN countries rose from 1,634 measures to 5,975 measures over the same period (Ing et al., 2016).[8] The complexity and potential opacity of NTMs could make

Table 3.1 The MAST classification

A	Sanitary and phyto-sanitary (SPS) measures
B	Technical barrier to trade (TBT) measures
C	Pre-shipment inspection (PSI)
D	Contingent protection
E	Non-automatic licensing and quantitative restrictions
F	Price-control measures and taxes
G	Finance measures
H	Measures affecting competition
I	Trade-related investment measures (TRIM)
J	Distribution restrictions
K	Restrictions on after-sales services
L	Subsidies
M	Government procurement restrictions
N	Intellectual property
O	Rules of origin
P	Export-related measures

Source: UNCTAD (2013a).

them privileged vehicles for special interests to stifle competition without attracting public attention; a number of instances – some of which are discussed later – indeed suggest that they have been used in that way.

But NTMs also play a critical role in protecting consumers against defective products that even the most reputable producers sometimes put on the market, as witnessed by the 2013 recall of nearly 13 million cars, including by Toyota and Honda, because of potentially lethal airbag inflators; or the discovery of plastic particles in Mars candy bars, which led Singapore to ban them in 2016. Moreover, Volkswagen's large-scale cheating on US emissions tests in 2015 shows that more than soft incentives are required; strict enforcement is critical to the effectiveness of NTMs.

Thus, NTMs are necessary policy instruments to promote public welfare; but, like many instruments of public policy, they can be poorly designed or deliberately abused for political-economy purposes, highlighting the need for adequate institutional setups that include checks and balances. This section explores the relevant evidence and trade-offs at the regional, multilateral, and country levels, focusing on the case of Indonesia; we also propose an institutional setup to promote optimal decision-making.

3.1 Non-tariff measures in regional and multilateral contexts

Worldwide, the most widespread types of NTMs are sanitary and phyto-sanitary (SPS) measures, which cover about 15 percent of all world trade (but a much larger proportion of trade in agri-food products),[9] and technical barrier to trade

(TBT) measures, which cover about a third of world trade, based on partial data collected by UNCTAD (UNCTAD, 2013b). These are technical measures, which, as noted, primarily address non-trade issues. For instance, a prominent type of SPS measure, Maximum Residual Limit (MRL) of pesticides in fruit and vegetables, is primarily aimed at protecting human health.[10] Other types of NTMs exclusively focus on restricting trade, such as quantitative restrictions, distribution restrictions, forced marketing channels, and so on (categories D–O in Table 3.1), are less systematically monitored, so no data exists on their incidence.[11] Export measures are fairly rare, at least on a permanent basis, but have tended to spread recently.[12]

Even when NTMs do not have explicit trade-restricting purposes, they can de facto restrict trade through several channels. They can impose compliance costs on companies leading them to raise prices, reducing demand and consumer surplus. These effects are typically measured through tariff ad valorem equivalents (AVEs); on the basis of the 2015 UNCTAD data, Cadot and Gourdon (2016) estimate those AVEs at around 3 percent for SPS measures and 5 percent for TBT measures worldwide.

At the multilateral level, to limit the ability of NTMs to disrupt trade, multilateral disciplines on their use have been put in place during and since the Uruguay Round. The main ones are contained in the WTO's SPS and TBT agreements. For instance, Article 5.2 of the SPS agreement requires measures to be based on scientific evidence, while the TBT agreement mandates that measures be justified (by non-trade purposes) and are proportionate to their objectives. These agreements are useful constraints on the ability of governments to distort NTMs for political purposes, exposing them to litigation by their trading partners under the WTO's dispute-settlement procedure.

At the regional level, irrespective of their stringency, NTMs can also restrict trade by fragmenting markets when they are not harmonised. Cadot and Gourdon (2016) estimate that large efficiency gains could be reaped by simple agreements such as the mutual recognition of conformity-assessment procedures. However, the effect of regulatory harmonisation can be complex, in particular for developing countries. On one hand, harmonisation on stiff northern standards, often encouraged by 'deep-integration' clauses in north-south FTAs, can impose excessive compliance costs on producers in southern countries, eroding their competitiveness in other southern markets (Disdier et al., 2015). On the other hand, Morocco's experience shows that harmonisation on stiff northern standards can partly insulate the southern partner's domestic market from competition by low-cost, low-quality producers located in countries with loose social and environmental standards, enabling local producers to raise their markups and upgrade capital (Augier et al., 2016). When there is enough trust between different regulatory systems, mutual recognition can be a less risky and complex route to regulatory convergence; also, short of mutual recognition of regulations, countries can recognise each other's certification and conformity-assessment procedures. However, this may be difficult to achieve in the presence of large gaps in administrative capabilities, which often characterise countries at highly different income levels.

Efforts to reduce regulatory differences and non-tariff barriers between countries within trading blocs have not always been very successful so far. In the case of ASEAN, as it is a heterogeneous trading bloc with both advanced countries and least developed countries (LDCs), there are wide and persistent gaps in the stringency of regulations and the ability of national regulatory systems to enforce them. In such a context, and in the absence of supra-national bodies with coercive power like the European Commission or the European Court of Justice, harmonisation may not be a realistic prospect; even mutual recognition of regulations may be difficult to achieve.

In view of the limited success in applying disciplines to NTMs at the multilateral and regional levels, the national level remains a crucial locus for the design of welfare-enhancing NTMs. We now turn to evidence for Indonesia and to a specific policy proposal.

3.2 Non-tariff measures in Indonesia

The simultaneous reduction of tariffs and proliferation of NTMs observed at the level of ASEAN can also be observed in Indonesia, where the average applied tariff rate declined from 8.02 percent to 4.72 percent while the number of NTMs increased from 24 to 634 over 2000–2015 (Figure 3.2).[13]

The large number of Indonesia's NTMs are in the form of SPS and TBT measures, which, in principle, address consumer-safety issues, although there are exceptions, discussed herein (Table 3.2).

Some of Indonesia's NTMs are defensible but in need of streamlining. For instance, Indonesia levies an ad valorem tax at various rates on luxury products (Table 3.3). There are benefits and costs to a luxury tax system. From an income-redistribution perspective (abstracting from trade concerns), given the complexity of design and implementation of a progressive income tax, it can make sense to differentiate consumption taxes by product type, with higher rates on items consumed by high-income households. Some Organisation for Economic Co-operation and Development (OECD) countries used to have similar structures of indirect taxes before they were phased out or harmonised.[14] In addition, some of the products affected by high luxury tax rates, such as cars with engines of more than three litres cylinder capacity, also involve negative environmental externalities, making a luxury tax doubly efficient (reducing inequality and correcting externalities). However, a luxury tax can be ineffective if it is easy to avoid. For instance, if it is levied on the ex-factory price of domestically produced cars, automobile producers can manipulate transfer prices between production units and dealers to minimise the tax base, eroding tax revenue, and making the tax de facto discriminatory if importers cannot do the same trick. This could make the luxury tax potentially actionable at the WTO. In the case of Indonesia, the structure of luxury tax rates also lacks a clear rationale (see Table 3.3).

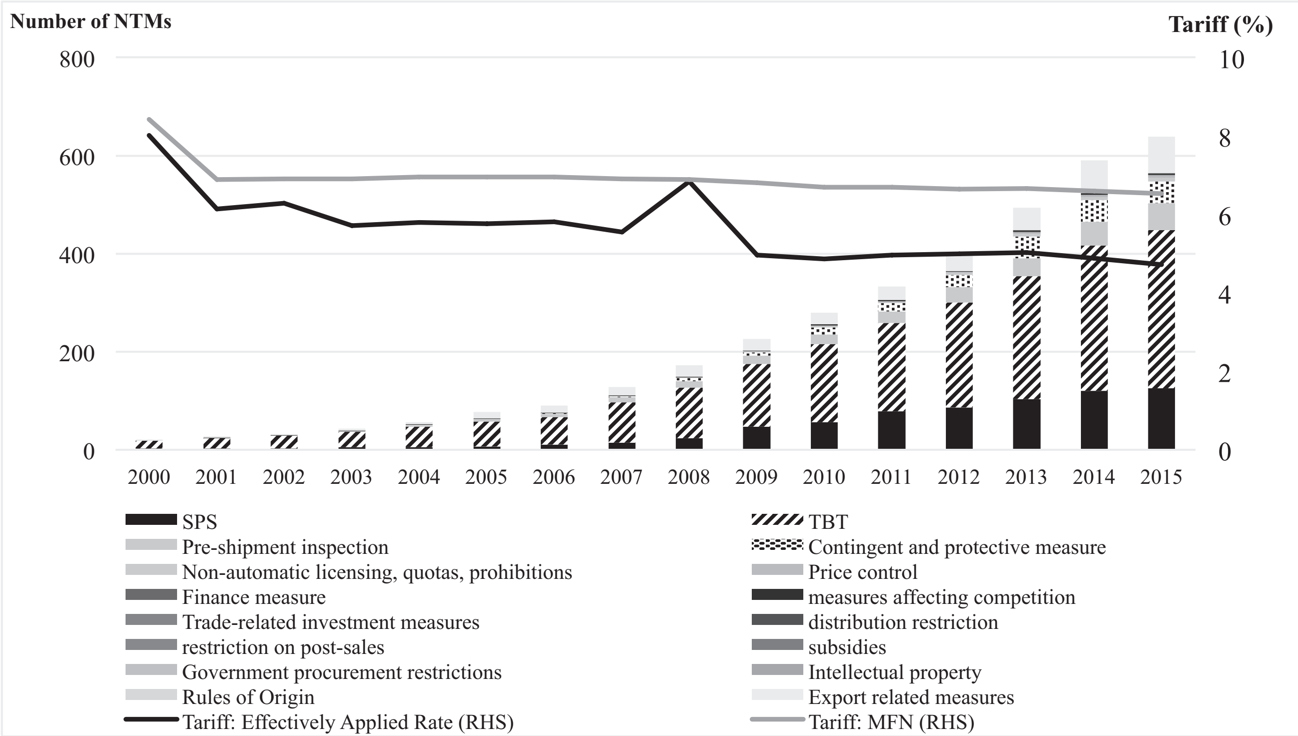

Figure 3.2 Tariffs and non-tariff measures in Indonesia, 2000–2015

NTMs = non-tariff measures; TBT = technical barriers to trade; SPS = sanitary and phytosanitary; RHS = right-hand side; MFN = most-favoured nation

Source: Authors' calculations, based on ERIA-UNCTAD NTM database, 2016.

Table 3.2 Indonesia's non-tariff measures, by type of measure

Code	*NTM by Type*	*Number of NTMs*	*Percent*
A	Sanitary and phytosanitary (SPS)	125	19.7%
B	Technical barriers to trade (TBT)	321	50.6%
C	Pre-shipment inspection and other formalities	53	8.4%
D	Contingent trade protective measures	44	6.9%
E	Non-automatic licensing, quotas, prohibitions, and quantity control measures for other than SPS or TBT reasons	8	1.3%
F–O	Price control and taxes, finance, competition, TRIM, distribution restrictions, restriction on after sales services, subsidies, government procurement restriction, intellectual property and rules of origin	9	1.4%
P	Export measures	74	11.7%
	Total coded NTMs	634	100.0%

NTMs = non-tariff measures.

Source: http://asean.i-tip.org (accessed on 8 June 2016).

Note: The NTM Classification is based on UNCTAD (2013a).

Table 3.3 Indonesia's luxury tax

Summary description	*Rate range*
Articles of clothing and apparel, consumer goods	
Specified clothes and goods made of leather	40
Suitcases, executive bags and boxes, and purses with an import ≥ 5,000,000 Indonesian rupiah	40
Watches, clocks	40
Carpets made of special material	40, 50
Goods made of crystal, marble, or granite	40
Automobiles	
Sedans or station wagons with a cylinder capacity up to 1,500 cc	30
Motor vehicles other than sedans and station wagons with a cylinder capacity up to 1,500 cc	10, 30
Motor vehicles of 1,500 to 2,500 cc with a capacity of fewer than 10 passengers	40
Diesel sedans and station wagons with a capacity of more than 2,500 cc	125
Sedans and station wagons with a cylinder capacity of more than 3,000 cc	125
Motor vehicles with a capacity of 10 to 15 passengers	10
Special purpose vehicles for golf	50

Summary description	*Rate range*
Motorcycles	
Motorcycles with a cylinder capacity of 250 to 500 cc	60
Motorcycles with a cylinder capacity of more than 500 cc	125
Other	
Ships, vessels, and yachts	75
Aircrafts (hot air balloons and gliders)	40, 50
Firearms, air and gas weapons, except for national use	50
Goods made of crystal, marble, or granite	40
Caravan trailers and semi-trailers for housing and camping	125

cc = cubic centimetre.

Source: Government Decree No. 22/2014, Finance Minister Regulations No. 130/PMK.011/2013 and No. 106/PMK.010/2015.

Other measures have less clear-cut justifications. Although measures other than categories A–C have low coverage ratios in Indonesia in UNCTAD's database, the WTO's 2013 trade policy review (TPR) also notes that the country runs a complex licensing system with multiple objectives. Indonesia's licensing system (which was notified to the WTO) is non-automatic and acts, in some cases, as a quantitative restriction (QR) system. Official justifications for the licensing system include health, safety, and environmental objectives (objectives normally associated with SPS and TBT measures rather than licensing), the prevention of smuggling, and the encouragement of domestic production. The latter objective is relevant for some agri-food products (rice, sugar, animals, and animal products), as well as some textiles and other products.

The data in Table 3.4 suggests that the textiles and agri-food sectors account for a substantial chunk of Indonesia's NTMs. The textile sector is protected in many countries because, being labour-intensive, it is a substantial provider of low-skill employment, in particular for women. As for the agri-food sector, it is heavily regulated in many countries for public health reasons; it is also often protected to prevent the erosion of rural incomes and stem the flow of rural-urban migration.

Protecting the income of Indonesia's small-scale rice farmers is a legitimate policy objective, but it is not entirely clear to what extent the country's current trade-restriction system succeeds in this regard. Trade theory suggests that QRs protect essentially market power when there are few domestic operators. In Indonesia, the rice sector's market structure is characterised by a small number of millers with substantial market power on the buying side. Large intermediation margins may have contributed to the stagnation of producer prices as much as foreign competition. Replacing the QR with a tariff, encouraging entry and competition in the milling sector, and ensuring that small-scale rice farmers

Table 3.4 Indonesia's non-tariff measures, by sector

HS Code	*Product Group*	*Percentage*		
		Affected by 1 NTM	*Affected by 2 NTMs*	*Affected by 3 NTMs or more*
01–05	Animal and animal products	0.2%	0.1%	8.5%
06–15	Vegetable products	1.1%	0.2%	6.9%
16–24	Foodstuffs	0.7%	0.0%	6.2%
25–27	Mineral products	0.7%	0.5%	1.7%
28–38	Chemicals and allied industries	0.7%	3.1%	7.9%
39–40	Plastics/rubbers	0.3%	0.2%	1.6%
41–43	Raw hides, skins, leather, and furs	0.6%	0.4%	0.4%
44–49	Wood and wood products	0.3%	0.3%	5.4%
50–63	Textiles	0.0%	3.0%	14.8%
64–67	Footwear/headgear	0.0%	0.1%	0.5%
68–71	Stone/glass	1.1%	0.3%	1.1%
72–83	Metals	0.3%	0.2%	5.7%
84–85	Machinery/electrical	1.5%	4.4%	7.6%
86–89	Transportation	1.8%	1.3%	4.1%
90–99	Miscellaneous	0.6%	0.8%	2.5%
Total		10%	15%	75%

NTMs = non-tariff measures.

Source: http://asean.i-tip.org (accessed on 8 June 2016).

effectively benefit from competition between buyers (in essence, shifting the nature of the intervention from trade policy to competition policy) might be a reform worth considering. A good start would be to conduct a thorough value-chain analysis assessing the size and evolution of intermediation margins in the rice sector.

Other than the textile and agri-food sectors, Indonesia also runs a complex licensing and certification system for steel alloys (Box 3.2). The measures, put in place in 2014 together with a safeguard clause following a first train of measures taken in 2009, responded to concerns about the safety of certain imported steel products and the disruption of the domestic market that their rapid rise could provoke.

Box 3.2 Indonesia's certification system for steel alloys

On 2 June 2014, the Indonesian Ministry of Trade issued Decree No. 28/M-DAG/PER/6/2014 restricting import licensing for steel alloys. With the new decree, steel alloy importers need to obtain a license as Importer Manufacturer (IP) or Registered Importer (IT) from the Trade Ministry (art. 3(1) of Decree No. 28/M-DAG/PER/6/2014). Other restrictions include the obligation of verification or technical inspection in the country of origin (art. 16). The regulation was introduced to contain a large stream of steel alloy imports.

Source: Global Trade Alert, notified on 02 June 2014.

The combination of trade and non-trade concerns led to a complex system that raised issues both for Indonesia's trading partners and for its own private sector. Economies including Japan, South Korea, the European Union, and Taiwan have raised 'specific trade concerns' at the WTO about the introduction of mandatory certification for hot-rolled steel sheets and coils and certain steel plates and sheets. Even Indonesia's own productive sector took issue with the measures. In view of their large contribution to manufacturing employment, sending negative signals through measures of this type may not be desirable from the broad perspective of the government's relationship with foreign investors. Thus, the drop in imports illustrated in Figure 3.3 came at the price of substantial disruption in the relationship with key investors and employment providers, whereas international experience shows that

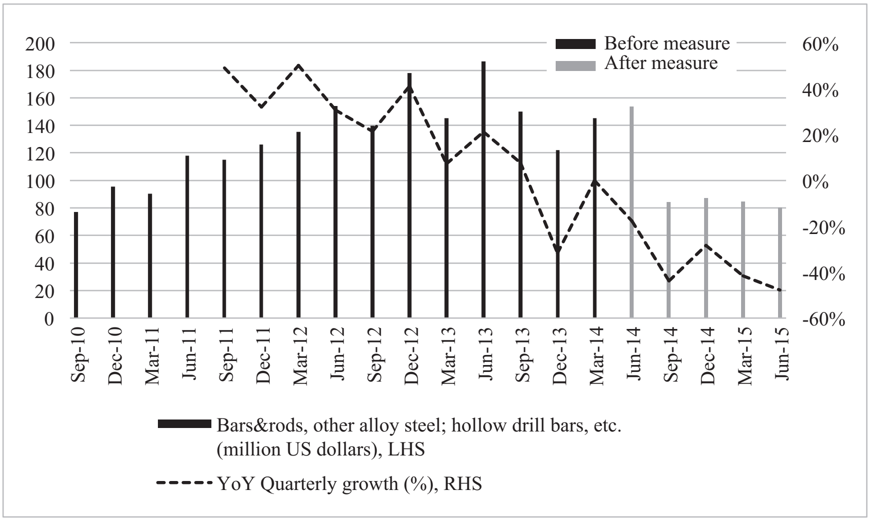

Figure 3.3 Indonesia's imports of steel HS 7728 from the world (in million US dollars)

LHS = left-hand side; YoY = year-on-year; RHS = right-hand side

Source: Authors' calculations, based on Comtrade for trade data and GTA data for NTMs, 2016.

Note: Grey bar = level at the NTM implementation.

steel-protection measures typically save very small numbers of jobs at a very high economic cost.

In addition, Indonesia also runs a complex trade-regulation system for mobile phones and tablets, justified by a mixture of health and infant-industry concerns (Box 3.3). The former concerns are unlikely to be dominant, as these products are largely standardised worldwide and multinationals are unlikely to alter the design of mobile phones for the Indonesian market alone. Moreover, health concerns linked to the use of mobile phones, while regularly reported in the media, have not been confirmed by scientific evidence so far, while the SPS agreement requires measures to be science based.

Box 3.3 More restrictive import regulations on mobile phones and tablets

On 27 December 2012, the Ministry of Trade issued Regulation No. 82/2012 regarding the importation of cellular phones, handheld computers, and tablets. The minister of trade justified the measure through a combination of non-trade regulatory concerns and infant-industry protection, stating that '[t]his Regulation of the Minister of Trade is issued to support the Health, Safety, Security and Environment and to support the industrialiswation of cellular phones and computers in the future.'

The decree mainly covers additional notification obligations, quality standards, and technical requirements that will complicate the importation of the aforementioned products. For instance, Article 4(1)(i) requires the importer to be in the business for a 'minimum period of 3 years'. This constitutes a complete import ban in the case of start-ups in this sector. In most cases, at the product level (as opposed to the firm level) the regulation will complicate the importation process but not stop it.

Source: Global Trade Alert, *Measure #4184, notified on 26 February 2013.*

The result of these measures has been a substantial drop in imports of mobile phones between 2012 and 2013 (Figure 3.4). Their success in encouraging viable and competitive domestic production and employment generation has not yet been subjected to rigorous impact evaluation.

All in all, Indonesia's NTMs could be streamlined for better results and better alignment with the government's overall objective of enhanced integration in the world economy. This could be achieved through scrutiny of the NTMs' objectives and their performance in achieving those objectives (in terms of effectiveness and cost to the economy at large) and through better coordination between trade and competition policies (to ensure that

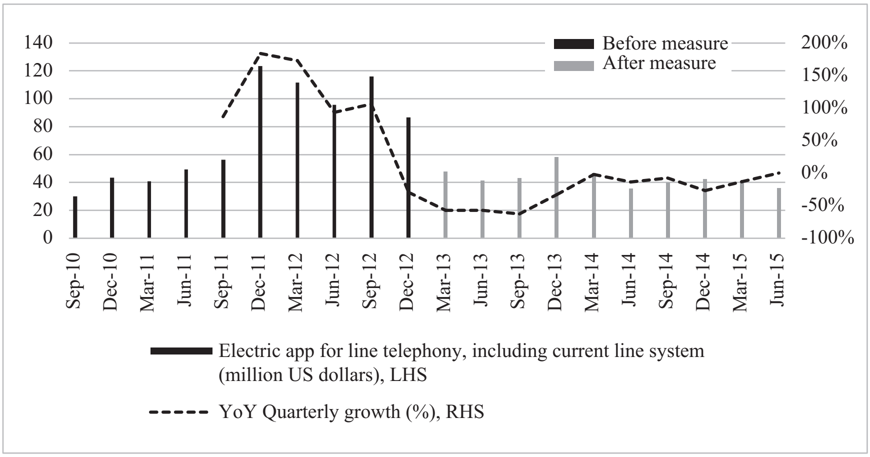

Figure 3.4 Indonesia's imports of mobile phones HS 8517 from the world (in million US dollars)

LHS = left-hand side; YoY = year-on-year; RHS = right-hand side

Source: Authors' calculations, based on Comtrade for trade data and GTA data for NTMs, 2016.

Note: Grey bar = level at the NTM implementation.

policy gains accrue to their intended beneficiaries rather than comforting established positions).

3.3 Non-tariff measures faced by Indonesian exporters

Indonesia's exports are also challenged to comply with a number of non-tariff measures imposed by other countries. For instance, the US has restricted imports of automobile tyres from a number of countries, in particular China, through a special type of safeguard clause applying only to China during its WTO accession period,[15] while simultaneously encouraging foreign direct investment through competition-distorting domestic subsidies (Box 3.4). This will bring consequences on Indonesia's exports of tyres (Figure 3.5).

Box 3.4 US subsidies that tilt the playing field

In 2012, the State of South Carolina, together with sub-state entities, provided an incentives package to Michelin for the expansion of a tyre manufacturing plant in Lexington and a new tyre plant in Starr. The estimated 123 million US dollar package included subsidies for projects in Lexington and Anderson Counties. The Lexington County portion included about 45 million US dollars over 30 years in property tax abatements from the county and a state grant of 1.5 million US dollars, in addition to other unspecified subsidies which are not included in the total.

The package for Anderson County's new plant included property tax abatements worth about 52 million US dollars over 40 years. The state offered a 7.6 million US dollar grant for site preparation, 6.47 million US dollars in job tax credits, 4.86 million US dollars in 'economic impact zone' equipment credits, 4.77 million US dollars in job development credits, and 1.12 million US dollars in job training.

The package includes state guarantees and other financial incentives that are likely to affect the restructuring and performance of firms facing international competition, whether from imports, in export markets, or from foreign subsidiaries.

Source: Global Trade Alert, United States of America/State of South Carolina: Incentives to Michelin; *Measure #8585, notified on 13 April 2015.*

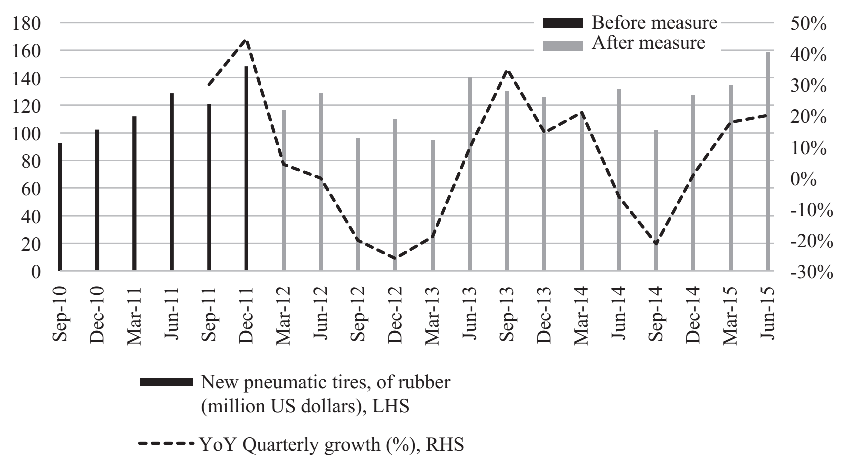

Figure 3.5 Indonesia's exports of tyres HS 4011 to the US (in million US dollars)

LHS = left-hand side; YoY = year-on-year; RHS = right-hand side

Source: Authors' calculations, based on Comtrade for trade data and GTA data for NTMs, 2016.

Note: Grey bar = level at the NTM implementation.

South Korea also recently raised taxes on the use of coal for power generation, while reducing taxes on other fuels, in particular natural gas (Box 3.5). As Indonesia is a coal exporter, it is penalised by these tax changes (Figure 3.6). From an environmental perspective, coal is the most polluting fuel for electricity generation and the biggest contributor to global warming, while natural gas is

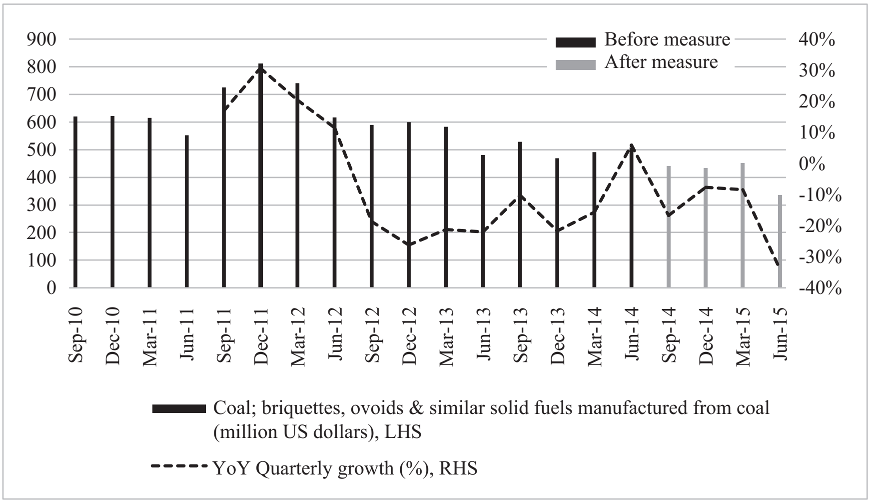

Figure 3.6 Indonesia's exports of coal HS 2701 to South Korea (in million US dollars)

LHS = left-hand side; YoY = year-on-year; RHS = right-hand side

Source: Authors' calculations, based on Comtrade for trade data and GTA data for NTMs, 2016.

Note: Grey bar = level at the NTM implementation.

the least. Thus, tax differentials favouring the use of gas at the expense of coal are global public goods and are consistent with the commitments made at the Paris Conference. This case highlights the need for Indonesia to develop an export-diversification strategy targeting dynamic and environmentally sound sectors.

Box 3.5 South Korea's taxation of coal for power generation

Starting from 1 July 2014, an individual consumption tax has been imposed on imported coal used for power generation. Coal used for purposes besides power generation was exempted from this tax. On the same day, taxes on other alternative imported fuels – liquefied natural gas (LNG), kerosene, and propane – were lowered.

The idea of the tax policy revision was introduced in November 2013 through a government press release. It said that the purpose of this measure is to tackle the excessive electricity consumption and to rationalise the domestic energy price structure.

Tariff changes on 1 July 2014:

Coal for power generation: (1) Net calorific value below 5,000 kcal/kg: 0 → 17 Korean won (ca. 0.016 US dollar) per kg; and (2) Net calorific value above 5,000 kcal/kg: 0 → 19 Korean won (ca. 0.018 US dollar) per kg

Other fuels: (1) LNG: 60 → 42 Korean won (ca. 0.056 → 0.039 US dollar) per kg; (2) Kerosene: 90 → 63 Korean won (ca. 0.085 → 0.059 US dollar) per litre; and (3) Propane: 20 → 14 Korean won (ca. 0.019 → 0.013 US dollar) per kg

Source: Global Trade Alert, Republic of Korea: Revision of taxes on imported energy resources, *Measure #7504, notified on 16 October 2014*

These two examples should be construed not as suggesting that Indonesia should adopt distortionary and self-defeating instruments like the US's targeted safeguards on automotive tyres (which have been widely criticised as high-cost and ineffective) or subsidies for foreign investors, but instead that it should pursue active export-diversification strategies to minimise its vulnerability to politically motivated measures abroad.

4. Conclusion and development

Indonesia's trade policy has undergone many transformations over the last 50 years, but there have been recurring themes: the protection of domestic markets and industries; the development of domestic and strategic industries, including local content; a constant control over strategic resources; the downstream processing of resources; the creation and maintenance of self-sufficiency in various sectors; a preference for domestic ownership over foreign ownership; and the diversification of exports away from commodities. What differs are the instruments used and the beneficiaries of their use. Policy outcomes have also been influenced by external economic developments such as oil and commodity booms and global economic cycles, as well as by international cooperation, negotiations, and commitments.

Episodes of trade reform in the 1980s and early 1990s pointed to the influential role of technocrats in implementing trade and other reforms in response to economic downturns. The net result was a diversification of exports and a structural transformation that ushered Indonesia into a golden era of high economic growth. When the Asian Financial Crisis struck in 1997, it highlighted the vulnerabilities caused by poor governance and a lack of institutions, and revealed the excesses involved in protecting certain activities that were linked to vested interests. During the crisis, the technocrats managed the risk of policy reversals by convincing the top political command to use multilateral and regional economic integration initiatives to lock in reforms.

What of the future of trade policy and its instruments? Today, Indonesia is a different country. The economy has recovered from the deep financial and political crises of 1997–1998 and the political transition to democracy has increased Indonesia's confidence as a sovereign nation, and it now has the capacity to determine the course of its own development. The fundamental issue of competitiveness has yet to be addressed, and thus the identification of new sources of competitiveness and export growth has not been coupled with supporting policies.

Moreover, today trade policy instruments are no longer tariffs but non-tariff measures. Indonesia could improve its business and investment climate by improving transparency and streamlining NTMs. This would involve (1) clarifying and sorting their objectives (trade vs. non-trade), (2) subjecting them to cost-benefit analysis, (3) strengthening capabilities in terms of regulatory design and conformity assessment (drawing on technical assistance from development partners), and (4) seeking mutual recognition of conformity-assessment procedures with key trading partners. The first two objectives have to do with the selection and design of measures that could bring societal benefits. The last two have to do with making them effective policy tools.

Clarifying and sorting the objectives of NTMs would help better target them. All too often, ill-defined consumer-safety arguments are invoked to justify measures that have primarily trade-protection purposes. This often obfuscates the issues, preventing a sound debate. Trade-protection measures may not always be ill-advised or incompatible with WTO rules. From an economic standpoint, trade protection may have an option value if it prevents irreversible plant closures and job destruction during a turbulent period, which may itself prove temporary. That is why safeguard clauses exist at the WTO, and there is no need to hide such legitimate motivations. Infant-industry arguments are also time-honoured in economics, and there is no reason not to state them clearly as the sole or primary purpose of specific measures.

Once objectives are clear, cost-benefit analysis can be performed relative to those objectives. For instance, steel protection often causes substantial economic harm to save very few jobs, especially in the case of Indonesia where steel-using industries are major job providers. It is in those terms that the national debate over such measures should be cast, rather than hidden behind consumer-safety or other considerations of limited relevance.

Because of their typically narrow mandates and limited economic expertise, line ministries and government agencies are not always equipped to lay out clearly the economic rationale of measures that they propose, and even less to evaluate their costs and benefits from a broader societal perspective. Authority over NTMs is fragmented over many ministries and agencies with no institutional mechanism to internalise spillovers (say, between different actors like upstream and downstream industries or between different objectives like environmental protection and competitiveness). As a result, trade-offs and conflicts are typically resolved politically, with the most powerful ministries winning, rather than in a rational, welfare-maximising way.

One solution to this problem is to set up an independent regulatory-oversight body embedded within a National Economic Council. The National Economic Council would gather representatives from line ministries and high-level government officials and have divisions in charge of trade facilitation, NTMs, the national single window, investment procedures and regulations, and economic cooperation, including trade agreements.

The NTM division's mandate would include the review of all existing and upcoming NTMs. Most importantly, the division would be endowed with a technical secretariat capable of carrying out analytical reviews, that is going substantially beyond the box-checking exercise typically involved in regulatory impact assessment. To add value, it would need independent research capabilities to identify where real problems are and recommend feasible and socially optimal solutions. For that, its secretariat would need to be staffed with good quality economists and trade or investment lawyers capable of conducting logical, factual, and quantitative analysis and of defending it effectively, requiring a mixture of junior and senior staffing. It would also need a dispute-settlement mechanism to resolve disputes for the common good and not just through bargaining. This could entail a collective decision-making procedure, higher-level arbitrage, or both. The proposed setup is illustrated in Figure 3.7. The left-hand side of the figure shows entry points into the regulatory-review process (private-sector complaints, non-government organisation petitions, or the National Economic Council's self-initiation of cases).

As illustrated in the case of the rice sector, trade and competition-policy issues are often intertwined. Therefore, for maximum coherence, competition-policy issues should also be brought under the purview of the National Economic Council and could be merged with the NTM (regulatory-review) division. With such an institutional setup, Indonesia would be equipped to streamline and

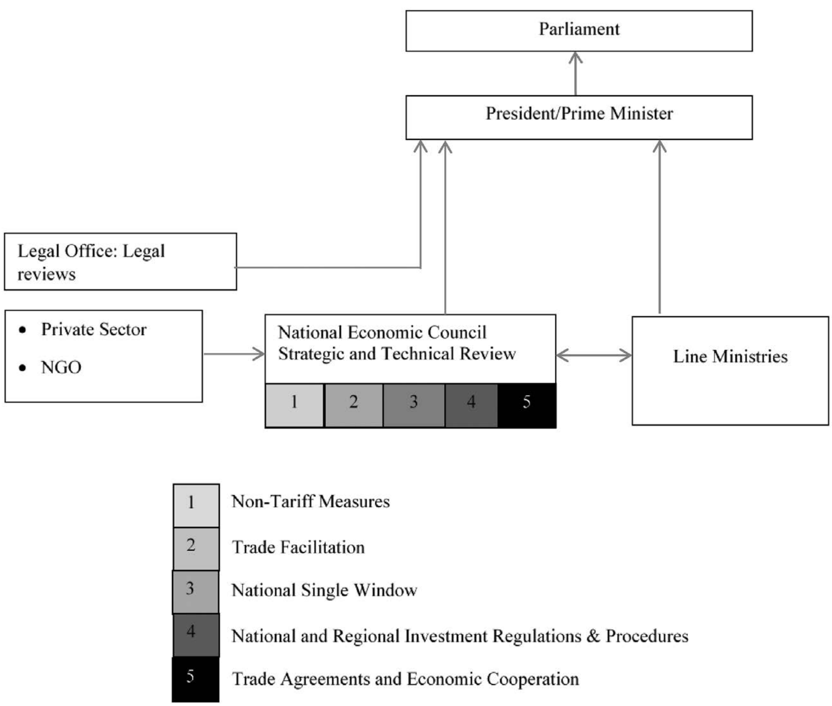

Figure 3.7 An institutional setup for regulatory reviews

NGO = non-government organisation

Source: Ing et al. (2016).

improve its regulatory environment in a dynamic way, by constantly subjecting regulations to economic scrutiny.

The world is a different place now: there have been increases in demand for customer protection (health, safety) and environmental protection and the production process is fragmented across countries worldwide. Indonesia needs to see trade from the point of view of the new paradigm, where production is based on production networks and global value chains. There is a need to have competitive inputs, whether goods or services and whether procured domestically or internationally; many countries would then be engaged directly and indirectly in producing final goods. To benefit as much as possible from being part of these networks and value chains, Indonesia needs to continue integrating with the world economy and create an environment more conducive to the smooth flow of goods, services, and people. The focus should shift from protecting or favouring certain sectors to increasing customer protection and facilitating producers to grow by improving access to inputs and materials, and to developing policies that promote human capital development, research and development, and innovation, that will increase productivity.

Appendix

This appendix describes the construction of the regulatory distance measure underlying Figures 3.8a and 3.8b and of the graphs themselves.

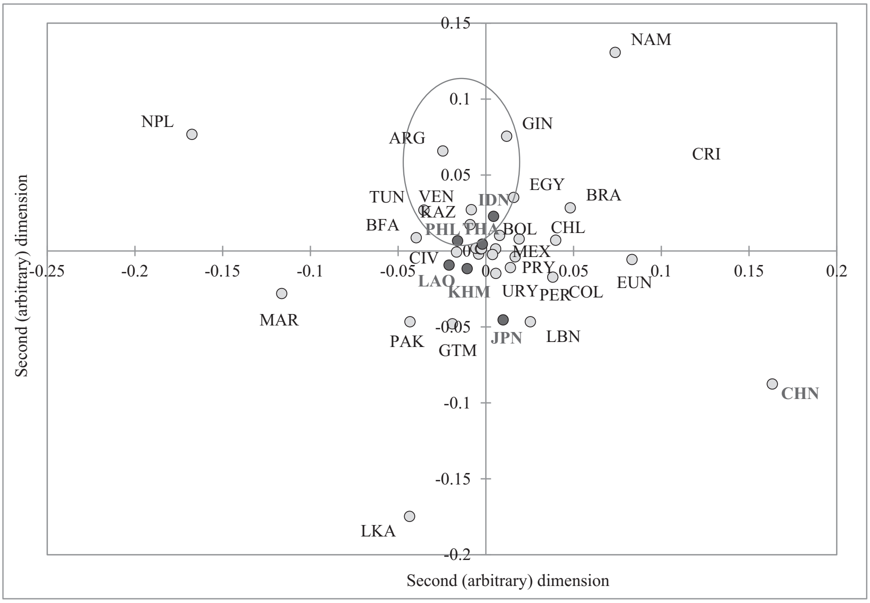

Figure 3.8a Regulatory distance between countries

Source: Authors' calculations.

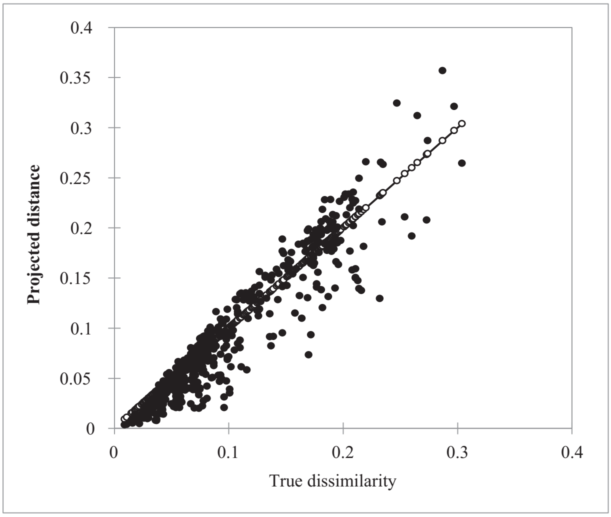

Figure 3.8b Distortion due to two-dimensional projection of regulatory distances
Source: Authors' calculations, based on UNCTAD NTM database, 2016.

Regulatory distance

Step 1. Suppose that country *i* imposes an NTM of type *n* (say, B840 in the MAST classification, i.e. inspection requirements) on a certain product *k* defined at the HS6 level. If country *j* also imposes B840 on product *k*, for the measure-product pair (*n*, *k*), we code our regulatory distance (RD) variable as zero. If, by contrast, country *j* does not impose B840 on that product (say, it imposes no NTM or, another one), we code the RD variable as one for the measure-product pair (*n*, *k*).

Step 2. Then, we aggregate our RD variable over all measures and all products (several thousand cells) to get an overall measure of regulatory distance. Let N be the number of NTMs and K the number of products. The extensive-margin regulatory distance between countries i and j, D_{ij}, is

$$D_{ij} = \frac{1}{NK} \sum_k \sum_n | I_{ink} - I_{jnk} \tag{1}$$

that is the sum of the absolute values of the differences in NTM application status.

Multidimensional scaling

This appendix details the method used to generate the two-dimensional projection of regulatory distances in Section 2. Let i and j stand for index countries and D_{ij} stand for the distance between i and j. The dissimilarity matrix

$$\Delta = \begin{bmatrix} D_{11} & \dots & D_{1m} \\ \dots & \dots & \\ D_{ml} & \dots & D_{mm} \end{bmatrix} \tag{2}$$

is a square, symmetric matrix with zeroes on the diagonal and bilateral distances off the diagonal. Multidimensional scaling (MDS) consists of finding m coordinate vectors x_i (one for each country) such that, using an appropriate distance metric (noted || ||),

$$D_{ij} \simeq || x_i = x_j || \tag{3}$$

that is the projection of the individuals onto a space of less than m dimensions represents reasonably well their true dissimilarity. If the space had m dimension, the representation would be perfect; as the number of dimensions shrinks (e.g. to two in a plane projection such as the one in Figure 3.8b), the distortion potentially grows.

The most usual way of formulating the problem is to minimize a quadratic loss function:

$$\min_{x_1,\ldots,x_m} \sum_{i<j} \left(D_{ij} - || x_i - x_j || \right)^2 \tag{4}$$

shows the distortion imposed by MDS onto a two-dimensional space for our RD measure by plotting true dissimilarities (true values of the RD) on the horizontal axis and represented ones on the vertical axis.

Notes

* The chapter is mainly driven by our paper on 'Fifty Years of Trade Policy in Indonesia: New World Trade, Old Treatments' (Pangestu et al., 2015).

1 The price of oil more than tripled between April 1972 and January 1974.

2 During 1995–2005, as the WTO phased out quotas that had been part of its Multi Fiber Arrangement (MFA) for textiles and clothing (James et al., 2003), competition increased in the European and US markets from lower-cost producers such as Bangladesh and Viet Nam.[20] The greatest competition, however, came from China; its accession to the WTO in 2001 allowed it to take advantage of the phasing out of these quotas.

3 The new investment law combined Law No. 6/1968 on Domestic Investment and Law No. 1/1967 on Foreign Investment. It included principles of transparency and national treatment, a negative-list approach, and protection against nationalisation, as well as provisions for dispute settlement. The criteria for the negative list became clearer, although implementation proved complicated.

4 Timnas PEPI could not work optimally as a platform for coordinating investment and export policies, because support in the form of a full-time secretariat of professionals did not materialise.

5 The share of machinery goods in exports is a widely used measure of the degree of participation in international production networks.

6 After the signing of the FTA between Pakistan and Malaysia (amounting to a 16 percent difference in the import duties on Malaysian and Indonesian exports to Pakistan), many Indonesian palm-oil exporters were competed out of the Pakistani market. Pressure from these exporters led Indonesia to negotiate a partial FTA, a preferential trade agreement, with Pakistan. This agreement focused on a number of exports, such as palm oil from Indonesia and kino oranges from Pakistan (to offset Indonesia's competitive disadvantage in mandarin oranges from China under the ASEAN – China Free Trade Agreement).

7 The impacts of the AFTA on the trade of ASEAN countries also show this tendency (Okabe and Urata, 2014).

8 A study by Kee et al. (2009) finds that the data suggested that tariffs and non-tariff barriers were complements rather than substitutes; that is, products that had high tariffs were also those having stringent NTBs. However, the data they used dated back to 2001 and included a large number of instruments, like quantitative restrictions, that have been phased out.

9 For instance, UNCTAD (2013b) notes that 71 percent of live animal products and 69 percent of fruit and vegetables are covered by SPS measures.

10 However, even MRLs can be manipulated for political-economy purposes: for instance, Foletti (2014) finds that countries tend to impose less stringent MRLs on pesticides that they produce domestically.

11 In some cases, the notion of 'incidence' has no clear meaning. For instance, rules of origin apply to all goods imported from partners in a given trade bloc; thus, coverage and frequency ratios are 100 percent but only vis-à-vis certain trading partners, making them non comparable with coverage/frequency ratios for other types of measures.

12 Export restrictions on agricultural commodities spread widely during the temporary price spikes of 2007–2011, with highly disruptive effects on world trade. As these measures were typically temporary, sometimes unofficial, and not notified to the WTO, there is no overall statistics on their incidence. However, they suddenly appeared as a major policy issue addressed by no multilateral discipline or coordination mechanism. Beyond temporary measures, commodity markets are affected by a large number of distortions discussed in Hoekman and Martin (2012).

13 However, the apparent proliferation of NTMs over time may also reflect improved monitoring and disclosure.

14 For instance, France had differentiated VAT rates with higher rates of luxury items before VAT rates were harmonised with other Common market countries.

15 On the US's 2009 measures on Chinese tyres under the Transitional Product-Specific Safeguard Mechanism, see Hufbauer and Lowry (2012) or Charnovitz and Hoekman (2013). These measures, which, unlike standard safeguard measures, specifically targeted China, essentially encouraged imports from China's competitors, including Indonesia.

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4 Indonesian industrialization and industrial policy

Catching up, slowing down, muddling through

Haryo Aswicahyono and Hal Hill

1. Introduction

This chapter provides a policy-oriented analytical narrative of Indonesian industrialisation, examining the period since the 1960s but with particular emphasis on the 'reformasi era' this century. We focus on four broad sets of issues, which constitute the main themes of the chapter.

The first is the episodic nature of Indonesian industrialisation, driven in turn by three sets of factors: latecomer catch-up, particularly in the first half of the Soeharto era; the swings in policy regimes reflecting government priorities and interest group pressures; and external circumstances, especially commodity prices and global economic shocks. We also examine here the factors explaining the slower industrial growth recorded since the Asian Financial Crisis (AFC), including the sometimes muddled debate concerning the 'deindustrialisation' issue.

The second issue is the policy environment, and in particular the absence of a coherent industrialisation strategy over most of this period. While Indonesian macroeconomic management has generally been effective, as in most countries microeconomic policy has often been hostage to powerful vested interests. Significant sections – perhaps the majority – of the influential Indonesian policy community remain ambivalent about the merits of globalisation, and economic liberalism more generally. Combined with a largely unreformed bureaucracy, a complex regulatory environment, and a sizeable state enterprise sector, economic nationalism has always been a powerful factor in policymaking. As a result, economic policy has swung between periods of reform and regress, depending on the quality of national economic leadership and on which groups are in the political ascendancy. Although the modalities of policy influence and reform differ, these debates and outcomes transcend both the 32 years of authoritarian Soeharto rule and the subsequent democratic era.

Third, Indonesia does not easily fit into the 'East Asian' model of outward-looking economic development. Its polity has been less willing to unambiguously embrace export orientation. Unlike most of its neighbours, it is a resource-rich economy, and therefore it is more subject to the political economy challenges of resource abundance, not least of which are widespread rent-seeking and occasional periods of exchange rate volatility. Indonesia is also an extremely

DOI: 10.4324/9781315161976-4

large and heterogeneous geographical entity, which poses particular challenges for regional and global economic integration. Indonesia is therefore a good deal less open than its immediate neighbours, Singapore and Malaysia (and also Thailand). Apart from brief periods of openness, mainly in the decade from the mid-1960s and during the 1980s reforms, the attitude towards foreign investment has been cautious and hesitant. The Korean (and earlier Japanese) models of 'guided' industrial policy, led by dynamic, internationally oriented conglomerates, have always had great intellectual appeal. But the supportive policies that underpin this successful strategy, including high-quality education, public support for research and development (R&D), strict performance conditionality associated with industry assistance, and highly efficient physical infrastructure, have rarely been present to the requisite level (Thee, 1994).

Fourth, these issues in turn inform the policy agenda for reform. Although our focus is on the industrial sector, most of these reform issues are economy-wide by definition. That is, they relate to the business environment, the labour market, the education system, commercial policy, and so on. Our discussion of policy issues is based on the premise that that there is nothing 'special' about the manufacturing sector. In fact, theory provides very little guidance as to whether there is a case for sector-specific interventions. At undistorted prices, a priori, a dollar of value added arguably generates the same social welfare whether it originates from agriculture, industry, or services, and from import-competing or exporting activities, keeping in mind also that protection for one sector is a tax on other sectors. That is, unless there are specific distributional or externality considerations that would justify special promotion of one sector over another, and moreover, that this industry policy intervention is a more effective means of achieving the specified distributional or externality objective. We recognise that this is a controversial assertion in some quarters, particularly the school of thought that maintains that industrialisation is the 'accelerator' of economic development.[1]

One general observation needs to be emphasised at the outset. It is not an exaggeration to characterise Indonesian economic performance as a 'miracle', as the World Bank did for several East Asian economies in the early 1990s: at the three key points of its history, when the outlook appeared exceptionally gloomy, Indonesia proved the pessimists wrong. After the sudden declaration of independence in 1945, the country was able to forge a sense of national identity and to preserve its territorial integrity. In 1965–1966, during a period of hyperinflation and horrendous political and social turmoil, and against a backdrop of decades of economic stagnation and decline, the new regime ushered in three decades of unparalleled economic growth and prosperity. In 1998, during one of the deepest economic crises in modern economic history, and without a roadmap for the transition from authoritarian to democratic rule, Indonesia not only managed to restore economic growth but it also evolved into the most vibrant democracy in Southeast Asia. More than anything else, these macroeconomic and political observations should dominate any analysis of Indonesia's past achievements and future prospects. It is important to keep this consideration in mind as we switch from the remarkable achievements of the big picture to the complex and challenging minutiae of industrial policy.

This chapter is organised as follows. Section 2 reviews the structure and performance of Indonesian industry, while section 3 provides an analysis of salient policy issues. Section 4 draws out some policy implications.[2]

2. An analytical survey of Indonesian industrialisation

Indonesian industrialisation is a well-documented story. In the mid-1960s, the country was one of the least industrialised among the major developing countries, lagging behind not only the Asian giants – China and India – but also most of its Association of Southeast Asian Nations (ASEAN) neighbours (McCawley, 1981; Hill, 1997). After decades of stagnation, the country then began to experience very rapid industrialisation following the major political changes and economic reforms of 1966–1967. Annual industrial growth was at least 9 percent in all but two of the 27 years during the period 1970–1996 (Figure 4.1). 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

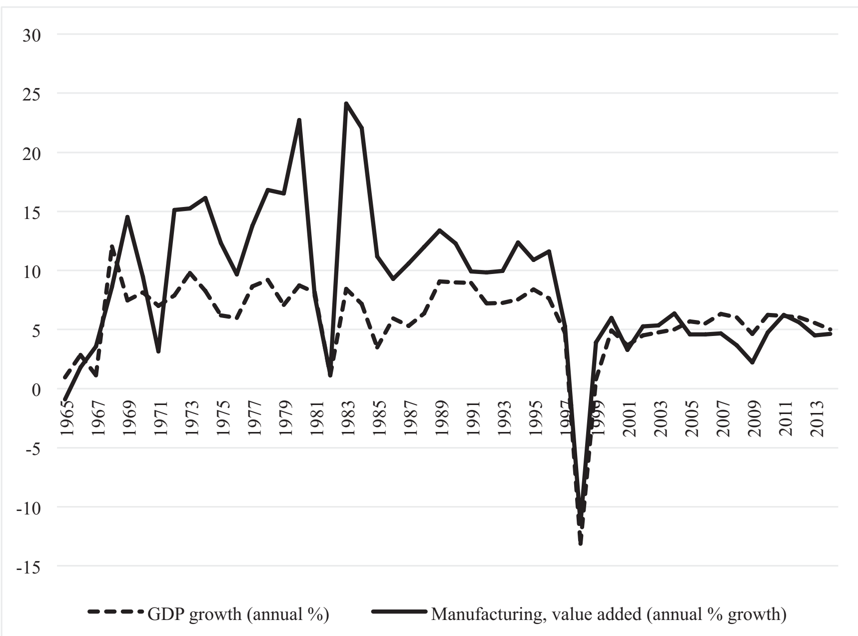

Figure 4.1 Economic and industrial growth, 1965–2015 (annual growth of GDP and manufacturing value added)

Source: Authors' calculations based on World Development Indicators, World Bank.

of 1997–1998. The contraction in the manufacturing sector was about the same as for the economy as a whole, at 13 percent. Thereafter, positive growth has been recorded from 1999, but at lower rates than pre-crisis. For reasons we will discuss, the AFC 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 gross domestic product (GDP) more than trebled (Figure 4.2). Since the crisis, the share of manufacturing has tended to decline slightly, triggering fears of a premature 'deindustrialisation'.

Within manufacturing, structural change has been equally rapid (Table 4.1). 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

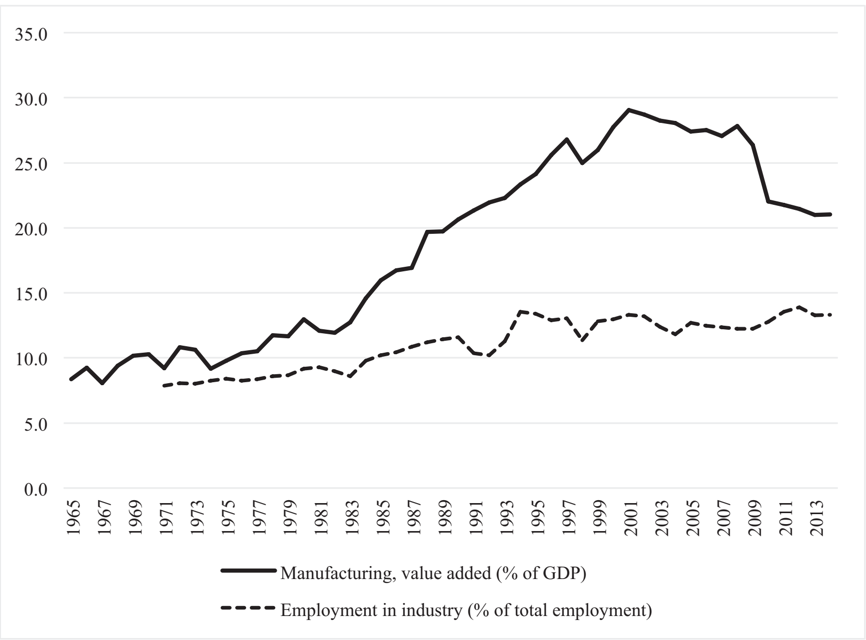

Figure 4.2 Share of manufacturing, 1965–2015 (annual share of manufacturing in GDP, employment)

Source: Authors' calculations based on World Development Indicators, World Bank.

Table 4.1 The changing structure of manufacturing, 1975–2015 (as percentage of MVA, by two-digit ISIC)

	1975	*1980*	*1985*	*1990*	*1995*	*2000*	*2005*	*2010*	*2013*
31. Manufacture of Food, Beverages and Tobacco	44.4	38.2	32.6	23	22.3	21.2	24.7	25.6	27.4
32. Textile, Wearing Apparel and Leather Industries	10.7	13.3	14	19.7	17.8	16.1	11.9	9.7	7.3
33. Manufacture of Wood and Wood Products, and Wood's Derivative	2.4	5.7	8.7	12.1	8.2	5.4	3.9	2.8	2.3
34. Manufacture of Paper and Paper Products, and Printing and Publishing	4.7	4	3.8	4.7	4.8	6.3	7.7	6.1	5.2
35. Manufacture of Chemicals Rubber and Plastic Products	22.4	18	16	12.8	13.1	14.8	17.2	19.4	19.1
36. Manufacture of Non-Metallic Mineral Products	2.6	4.2	5	3.8	3.6	3.5	5.1	3.8	3.4
37. Basic Metal Industries	0.7	3.1	7.2	8	7.5	3.6	2.7	6.8	8.1
38. Manufacture of Fabricated Metal Products, Machinery and Equipment	12.1	13.4	12.5	15.5	21.9	27	24.8	25.0	26.6
39. Other Manufacturing Industries	0.1	0.1	0.2	0.5	0.7	2.1	1.9	0.9	0.7

MVA = manufacturing value added.

Source: Authors' calculations based on Statistic Industry.

industry grew rapidly under the impetus of prohibitive protection for most of the Soeharto period, but collapsed in 1998–1999. Electronics has become increasingly important and export-oriented, but never as prominent as in neighbouring East Asian economies.

Indonesia became a significant industrial exporter from the mid-1980s (Figure 4.3). In retrospect, the 1980s was 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 (Organization of the Petroleum Exporting Countries) members – notably Mexico and Nigeria – into a debt crisis. 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, 2001).

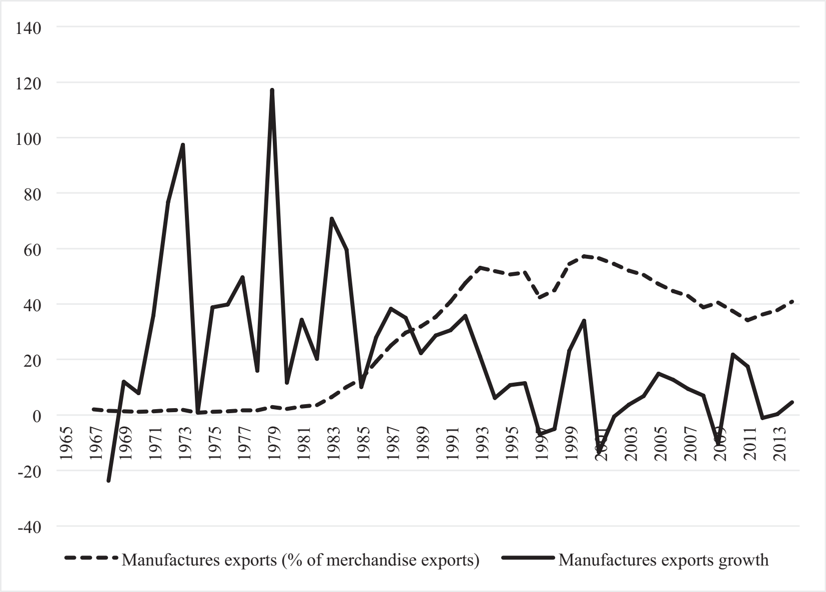

Figure 4.3 Manufactured exports, 1965–2015 (manufacturing export growth and shares, annual)

Source: Authors' calculations based on World Development Indicators, World Bank.

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 4.2). Indonesia's 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 percent in the mid-1980s to 61 percent in 1996. These reforms 'worked' in the sense that there was the strong and immediate export response observed as noted earlier. 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 from 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' as it emerged 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 discussed later.

Table 4.2 Composition of manufactured exports, 1980–2015 (top five manufactured exports, and as percentage of total)

		1980	1985	1990	1995	2000	2005	2010	2014
Unskilled Labour-Intensive		170,867,605	663,259,237	4,201,370,665	10,573,314,468	13,429,432,792	13,786,811,938	18,356,727,995	23,818,339,496
8510	Footwear	1,450,026	7,919,363	561,207,936	1,998,139,264	1,605,066,354	1,348,462,400	2,428,728,651	3,972,412,556
8973	Jewellery of gold, silver or platinum	124,218	7,004,954	54,982,616	330,312,704	105,737,378	84,981,844	223,271,938	2,116,980,607
8459	Other outer garments and clothing, knitted	2,103,163	3,122,774	198,342,496	282,293,792	397,843,933	713,000,284	1,059,983,083	1,491,798,603
8219	Other furniture and parts	1,186,770	6,225,885	126,605,040	501,273,824	917,715,187	1,247,117,236	1,427,880,859	1,255,611,495
6514	Yarn contain. 85% by wgt. of synth. fibres, not for. sale	2,764,149	8,560,236	45,377,344	351,002,176	710,047,176	865,986,165	1,034,971,827	1,081,330,496
Resource-Based	Labour-Intensive	77,048,960	957,163,001	3,083,587,579	4,721,953,724	3,413,556,228	2,904,563,213	1,994,889,436	2,164,730,666
6342	Plywood consisting of sheets of wood	55,376,452	797,002,880	2,606,712,576	3,233,867,008	1,790,107,447	1,193,502,623	1,064,748,624	1,262,323,035
6353	Builders' carpentry and joinery	2,991,013	3,441,262	196,696,256	643,897,344	640,617,279	726,969,594	340,410,915	354,335,344
6354	Manufactures of wood for domestic/decorative use	870,336	2,477,956	61,949,276	96,207,200	175,067,031	206,169,113	226,861,152	157,777,857
6639	Articles of ceramic materials, n.e.s.	2,930	1,771	173,817	2,907,539	20,020,025	36,830,143	92,594,367	109,853,308
6624	Non-refract. ceramic bricks, tiles, pipes and sim. prod.	98,966	46,022	3,015,787	13,639,762	70,852,346	114,143,886	97,009,532	88,201,752
Resource-Based	Capital-Intensive	115,360,526	241,790,057	997,855,745	2,406,003,121	4,749,442,339	5,975,016,922	10,689,891,198	11,729,668,068
6415	Paper and paperboard, in rolls or sheets, n.e.s.	–	1,652,727	82,626,640	369,856,416	650,620,270	1,048,673,056	2,116,686,978	1,957,760,682
6251	Tyres, pneumatic, new, of a kind used on motor cars	–	–	20,312,040	40,470,712	173,539,903	496,532,692	1,145,005,354	1,276,954,771
6911	Structures and parts of struc.; iron/steel; plates	1,580,352	–	6,202,197	48,869,576	35,468,644	60,555,220	211,248,016	691,707,486

(*Continued*)

Table 4.2 (Continued)

		1980	1985	1990	1995	2000	2005	2010	2014
5146	Single or complex oxygen-function amino-compounds	1,667,757	8,069,969	39,628,316	128,514,680	221,978,768	241,332,893	468,763,074	630,968,171
5112	Cyclic hydrocarbons	–	24,147	630,000	20,498,434	131,616,805	111,534,580	739,704,542	555,664,886
Electronics		97,123,929	80,937,000	205,353,892	2,944,291,072	9,072,153,628	10,050,176,797	12,525,408,327	11,579,183,559
7518	Office machines, n.e.s.	–	179	4,000	43,610	965,446	2,059,815	1,039,712,272	1,279,947,020
7731	Insulated, elect. wire, cable, bars, strip and the like	61,051	429	6,229,828	71,499,264	327,704,728	503,067,482	894,994,675	1,155,503,016
7611	Television receivers, colour	–	177,701	2,077,636	23,409,448	313,997,402	274,276,702	1,159,189,446	970,432,086
7721	Elect. app. such as switches, relays, fuses, plugs etc.	547,520	2,820	365,692	89,817,824	255,072,388	381,620,342	633,599,878	948,781,582
7638	Other sound recorders and reproducers	74,050	–	1,931,316	686,186,176	788,529,569	1,270,537,243	1,887,291,105	855,366,646
Footloose Capital-Intensive		38,555,759	100,622,408	552,675,080	2,311,227,939	4,576,104,910	7,448,033,955	13,475,091,881	19,926,163,690
7810	Passenger motor cars, for transport of pass. and goods	2,114	47,675	7,036,486	21,355,660	7,275,072	245,790,340	1,025,835,182	2,637,306,227
7849	Other parts and accessories of motor vehicles	3,571,006	183,909	6,442,776	48,084,336	221,753,676	757,861,852	1,170,713,940	1,619,938,904
5989	Chemical products and preparations, n.e.s.	6,103	57,833	9,752,755	36,422,360	94,470,219	133,605,518	672,873,443	1,368,837,817
5121	Acyclic alcohols and their halogenated derivatives	6,139,348	5,969,280	12,711,179	96,242,088	247,758,450	433,181,985	741,434,906	1,145,412,756
7239	Parts of the machinery of 723.41 to 723.46	–	437,700	10,364,912	30,847,606	83,363,398	260,777,423	551,619,939	681,488,419

Source: Authors' calculations based on UN Comtrade.

Indonesia's ownership patterns warrant attention as they 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, both in terms of corporate conglomeration and seller concentration. Claessens et al. (2000) document the former, finding that Indonesia exhibited the highest level of corporate concentration in East Asia in 1996, with the top 10 families owning 57.7 percent of listed corporate assets.[3] In terms of plant-level industrial concentration, Bird (1999) finds high levels of concentration, typical of those in relatively small, late-industrialising economies. Over the period 1975–1993, concentration levels were declining steadily, though in the latter year the simple average four-firm concentration ratio was still 54 percent. Concentration ratios were significantly lower once allowance is made for imports. Indonesia's industrial ownership patterns reflect the interplay of history, policy, and industrial organisation factors (Table 4.3). In the mid-1960s, no foreign capital was present, and the 'commanding heights' of the economy, such as they were, were in state hands. The state-owned enterprise (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 that have since been largely dismantled. Meanwhile, foreign investment returned to the country from the late 1960s in response to the newly liberal policy regime and generous fiscal incentives (Lindblad, 2015). As is the case in most countries, domestic firms are the major players in Indonesian industry, accounting for more than 50 percent of manufacturing value added in most two-digit industries. Among domestic firms, SOEs are important in certain 'strategic' industries, such as fertiliser, steel, and cement, together

Table 4.3 Ownership patterns in manufacturing, 1975–2015 (as percentage of MVA by foreign, government, private, joint ventures)

	P	*G*	*F*	*PG*	*PF*	*GF*	*PGF*		*P*	*F+PF*	*G+PG+ GF+PGF*
1980	54.4	14.9	5.3	1.2	22.5	1.7	0.1	1980	54.4	27.8	17.9
1985	57.6	19.5	1.3	1.0	17.5	2.2	1.0	1985	57.6	18.7	23.7
1990	63.0	14.3	2.4	0.9	17.1	1.0	1.4	1990	63.0	19.4	17.6
1995	60.7	9.5	3.7	0.9	23.7	1.3	0.2	1995	60.7	27.4	11.9
2001	50.3	15.0	8.7	0.6	20.9	4.0	0.5	2001	50.3	29.6	20.1
2005	54.2	7.3	9.0	1.3	25.4	1.6	1.3	2005	54.2	34.3	11.5
2009	44.2	4.9	17.2	1.8	29.7	1.3	0.9	2009	44.2	46.9	8.9
2011	48.0	4.9	17.4	3.0	25.0	0.9	0.8	2011	48.0	42.5	9.6
2013	59.0	2.7	15.2	1.9	20.4	0.7	0.1	2013	59.0	35.6	5.4

F = foreign; G = government; P = private; MVA = manufacturing value added; JV = joint venture.

Source: Authors' calculations based on Survey on Large and Medium Enterprises, Statistics Indonesia.

with some firms that were inherited from the pre-1966 nationalisations (e.g. sugar processing) and never subsequently relinquished. During the AFC, 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 percent in 1975 to 37 percent in 2005. The share rose higher still in the wake of the crisis, in response to policy liberalisations and the opportunity for foreign firms to buy distressed local assets. Moreover, foreign firms were better able to endure the crisis. As is evident in the two-digit ownership data, and consistent with industrial organisation theory, multinational enterprises are important in 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.

3. Development policy issues and challenges

With this overview as context, we now examine seven key and interrelated policy issues. The industrial policy debate touches upon practically every aspect of development policy, and so the orientation of our discussion is directed more to breadth than to depth. Owing to the space constraint, our analysis is necessarily abbreviated. The references contain more detailed information.

3.1 Slower industrial growth and 'deindustrialisation'

Should the slower industrial growth noted earlier be a cause for concern? The first point to note is that the focus should be the aggregate rate of growth, and not the sectors. A priori, achieving the same rate of growth but with different sectoral contributions is no cause for concern. Moreover, the factors explaining the slower industrial growth need to be unpacked. As would be expected, this is a multi-factor story. The first is the role of China as a manufacturing export superpower in lowering the global price of manufactures, especially at the middle and lower end of the factor intensities. This is also a factor contributing to the slower growth in other Southeast Asian economies.[4] Second, Indonesia's buoyant terms of trade has had the familiar 'Dutch disease' effects of squeezing the non-commodity tradable goods sectors, especially manufacturing (although the question of why the 1970s oil boom did not result in markedly slower industrial growth still needs to be asked). A third factor has been various aspects of the post-crisis policy environment that have adversely affected the international competitiveness of Indonesian manufacturing. Among the latter have been uncompetitive labour market regulations, poor infrastructure, and an uncertain business environment. We return to these issues shortly.

This slower industrial growth has triggered a vigorous policy debate about the alleged 'deindustrialisation'. Technically the use of the term is misleading, as the manufacturing sector continues to register positive, albeit slower, growth. There have also been widespread calls for a renewed emphasis on 'industry policy', which are generally couched as demands for increased manufacturing protection. However, proponents of old-fashioned industry policy in Indonesia overlook the fact that, according to our unpublished estimates, the share of manufacturing value added in GDP is actually larger than what would be expected on the basis of Indonesia's per capita GDP.

3.2 The macroeconomic policy environment

Indonesia's macroeconomic environment has generally played a supportive role in the sense that, except for the positive economic growth that has been maintained almost continuously since 1966, inflation has rarely been out of control, and the exchange rate has generally not been seriously misaligned. Inflation was brought under control surprisingly quickly in the late 1960s, and a moderately strong inflation-aversion bias has been built into macroeconomic policy settings ever since. Except for the enormously costly bank bailouts during the AFC, fiscal policy has been prudent for most of the period through the 'balanced budget rule' adopted during the Soeharto period and the 2003 Fiscal Law subsequently. During the era of fixed exchange rates, the government on occasion employed exchange rates proactively to maintain competitiveness for tradable sectors, particularly with the large devaluations of 1978, 1983, and 1986. The post-AFC monetary policy regime of inflation targeting and a floating rate has been implemented quite effectively, with the result that the nominal exchange rate has accommodated the country's variable terms of trade and investment expectations as manifested in international capital movements.

3.3 Small and medium-sized enterprises and firm mobility

The size distribution of firms and their mobility across different size groups are important indicators of economic development – the former of a country's broader industrial organisation, the latter of general business flexibility. Indonesia's industrial structure shows the typical pattern of large firms producing most of the output, while small firms and household enterprises employ most of the workforce. There is also the usual pronounced clustering by firm size across sub-sectors. For example, within the manufacturing sector, smaller firms are generally located within the more labour-intensive and less scale-intensive industries, such as food processing and garments.

A feature of rapid industrialisation and well-functioning product and factor markets is high levels of firm mobility across size groups. In our earlier research on Indonesia, we found there was considerable evidence of this mobility, in particular of firms 'graduating' to larger size groups. In a subsequent paper (Aswicahyono et al., 2010), 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 groupings are chosen arbitrarily but plausibly as firms with 20–99 workers, 100–499 workers, and more than 500 workers. We then estimate output 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. 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 maintained their dynamism. However, after the crisis, the pace of graduation slowed, and the small firm share in both series declined.

We then calculate transition matrices of the size distribution of firms, compute for the pre- and post-crisis periods, defined here as 1992–1996 and 2001–2004, respectively. These support the conclusion that the speed of firm mobility slowed after the crisis. 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 percent were still small, while 8.8 percent and 0.6 percent had graduated to the medium and large groups, respectively. A clear result over the two sub-periods is that there was less mobility: more small firms remained small after the crisis as compared to before it. We earlier conjecture that this outcome could well be explained by the fact that the barriers to smaller firms increasing their scale have risen since the crisis, particularly in access to finance. This arises due to the credit rationing devices that are commonly put in place after crises – they invariably support larger firms with better collateral and credit histories. Indonesia's post-AFC banking reforms appear to have had the unintended consequence of limiting the access of small enterprises to formal sector financial institutions (Rosengard and Prasetyantoko, 2011). Pending further research, we conjecture that this outcome is still a plausible characterisation of Indonesian manufacturing.

3.4 Commercial policy – precariously open?

In its international orientation, Indonesia has ranged from isolation and disengagement to highly open economic policy settings (Pangestu et al., 2015). Underpinning these variable outcomes has been the interplay of two broad influences. On the one hand, there is an enduring and widespread community distrust of globalisation and economic liberalism. But on the other, there was the disastrous experience of turning inwards during the 1950s and early 1960s, combined with the pragmatic reality of outward-looking East Asian economic integration, including also Indonesia's commitments to its ASEAN neighbours. The result has been that, for most of the period, Indonesia has been moderately open, if somewhat uneasily so.

Table 4.4 provides summary proxy indicators of revealed trade and investment openness since the 1960s, indicators that are subject to the usual well-known

Table 4.4 Indicators of economic openness, Indonesia and neighbours, 2014

	(X + M)/ GDP	*Stock FDI/ GDP*	*Tariff*	*Trade Freedom Ranking*
Indonesia	39.9	28.5	2.3	75
China	41.5	10.5	3.6	110
India	38.3	12.3	7.0	124
Malaysia	131.0	39.6	4.3	72
Thailand	112.5	49.2	6.2	87

Source: Authors' calculations. Data on trade an investment openness, and tariff are from World Development Indicators, World Bank, 2014, and data on trade freedom ranking is from Trade Freedom Heritage.

caveats. Perhaps surprisingly, Indonesia did not turn inwards during and after the AFC. The International Monetary Fund (IMF) programme was one obvious constraint, but there were other factors at work. As in the 1960s and 1980s, the crisis empowered the technocrats, at least in the Ministry of Finance. The large currency depreciation ameliorated some of the pressures for protection. Also no other countries in the neighbourhood turned inward at that time; indeed, the two developing Asian giants – China and India – continued to reform. However, as in the 1970s the pendulum began to swing back towards greater interventionism as the commodity boom of the 2000s developed. This led again to intensified protectionist pressures and a more restrictive approach towards foreign investment. Whether the earlier relationship between the country's terms of trade and trade openness still exists remains to be seen. The declining terms of trade from around 2013 appears to have halted the trend towards increasing economic nationalism, but a major reversal is not yet evident (Patunru and Rahardja, 2015). The series of packages released from September 2015 are at least a hopeful beginning.

3.5 Governance and the regulatory environment

While Indonesia has experienced a dramatic remaking of its political institutions, in many respects there has been surprisingly little change in the economic institutions that govern the business environment. Indeed, the investment climate has arguably become less certain and predictable. The main driver of this change has of course been the diffusion of political power, and therefore rents, both within the central government and between the central and local governments. That is, whereas the allocation of rents was tightly controlled and centralised during the New Order (*Orde Baru*), with the Soeharto family, its close associates and the military the principal arbiters, the more diffused and open political systems since 1999 have reshaped the business environment. To some extent, post-Soeharto Indonesia perhaps illustrates the proposition that 'the only thing worse than organized corruption is disorganized corruption.'

Table 4.5 Governance and business indicators, Indonesia and neighbours

	Corruption Perception Index	*Ease of Doing Business*	*Global Competitiveness*	*Governance Index*
Indonesia	88	109	37	95
India	76	130	55	115
China	83	84	28	71
Malaysia	54	18	18	35
Thailand	76	49	32	72

Source: Authors' calculations based on: Corruption Perception Index 2015: Transparency International; Ease of Doing Business: Doing Business 2014, World Bank; Global Competitiveness: The Global Competitiveness Report 2015, World Economic Forum; Governance Index: The Worldwide Governance Indicators Governance Effectiveness 2014, World Bank.

Although highly subjective and subject to well-known limitations, the various comparative indicators do demonstrate the importance of continuing governance reform in Indonesia. Two of the most widely employed indicators are presented in Table 4.5. The former reminds us that Indonesia continues to rank quite poorly in terms of ease of doing business, with no discernible improvement over the past decade. The latter illustrates that the investment community has the perception that levels of corruption remain very high, although the country's ranking has improved in recent years. Taken together, the indicators strongly suggest that, first, the regulatory regime imposes additional costs on Indonesian business, the most efficient solution to which is major regulatory simplification rather than costly tax incentives; and second, that conferring additional discretionary authority on an already corruption-prone bureaucracy is a highly risky strategy. An important determinant of these rankings is the very slow pace of bureaucratic reform (McLeod, 2005), notwithstanding the progress achieved in building independent checks on bureaucratic excess through the operations of the KPK (*Komisi Pemberantasan Korupsi*; Corruption Eradication Commission).

3.6 The supply side: (I) skills and the labour market

Indonesia has achieved impressive gains in education since the 1970s in overcoming the colonial era backlog, with major expansions in enrolments at all levels. The country is now close to achieving universal literacy for its school-age population, and there is a strong commitment to education funding, through a law that mandates that 20 percent of the government's budget shall be allocated to the sector, net of transfers and subsidies. However, the country lags in terms of high post-primary dropout rates, and also according to most comparative 'quality' indicators, such as international examination performance. Figure 4.4 summarises Indonesia's education indicators in comparative perspective. While as noted the quantitative expansion – here proxied by the Barro-Lee years of schooling – has increased significantly, Indonesia continues to lag on quality

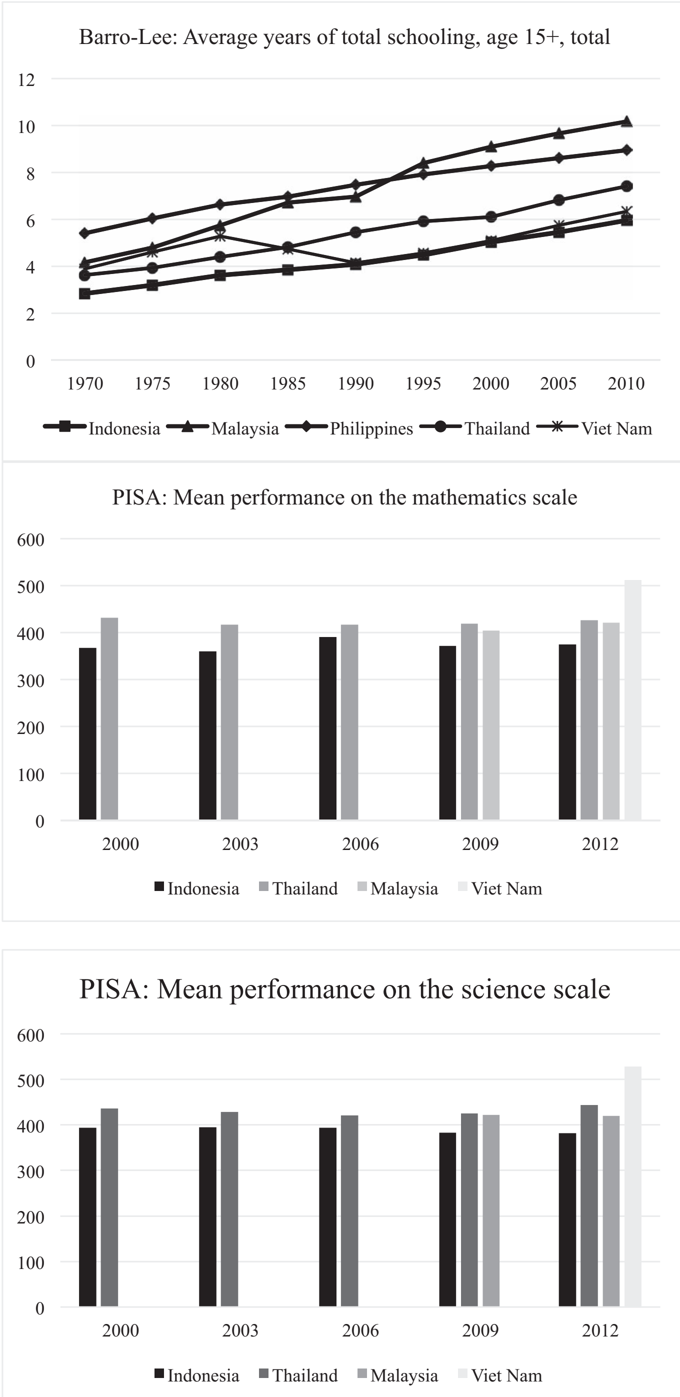

Figure 4.4 Education indicators, Indonesia and neighbours

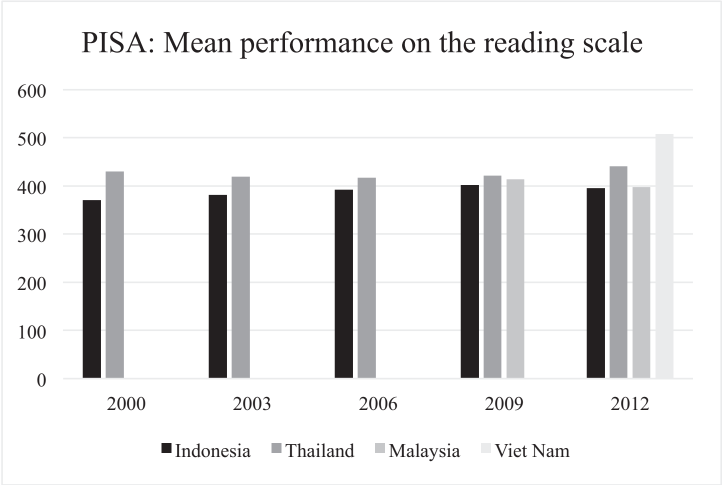

Figure 4.4 (Continued)

Source: Authors' calculations based on the World Bank Education Statistic (EdStats).

indicators. Recent survey research indicates that, while the increased higher funding allocations are important, major policy reforms need to be introduced (Suryadarma and Jones, eds., 2014).

These educational challenges are compounded by related labour market problems of weak formal sector employment growth and skill mismatches.[5] Over the period 1966–1996, formal sector employment and modern sector wages grew strongly. The AFC resulted in a sharp fall in formal sector employment and real wages. Because the labour market was flexible, much of the impact was on the latter. The sudden democratic transition unleashed powerful 'pro-labour' sentiments, which resulted in labour's freedom to organise, rapidly increasing mandated minimum real wages, and punitive severance pay provisions. The first of these changes was of course welcome, but the latter two, combined with slower growth, resulted in anaemic formal sector employment growth for much of the period since 2000, especially in the manufacturing sector, which had been the source of much of the dynamic employment growth (Aswicahyono et al., 2010). Combined with the strong real exchange rate over much of this period, the result was that Indonesia lost competitiveness in international markets for labour-intensive manufactures.[6]

3.7 The supply side: (II) logistics and infrastructure

In contrast to the large-scale transformative infrastructure investments during the Soeharto era, Indonesia also now lags in the efficient provision of physical infrastructure (McCawley, 2015). Infrastructure receives high priority in official policy statements through the formulation of master plans and logistics blueprints to reduce transport costs and increase reliability. There are hopeful signs that the Joko Widodo administration will be able to translate the rhetoric into reality, especially as fuel and related subsidies have been reduced substantially since late 2014. In the meantime, inter-island transport costs are very high in this, the world's largest archipelagic state. High transport costs push up the general cost structure, particularly for more remote regions, and thus there are large inter-regional price differences. For example, Sandee (2016) presents comparative data demonstrating that Indonesian logistics costs are considerably higher than its more efficient neighbours. He also draws attention to the problems at the country's major port, Tanjung Priok, where throughput doubled over the period 2007–2013, but over this period there was no expansion in facilities. For comparative purposes, Figure 4.5 reports the results from the annual World

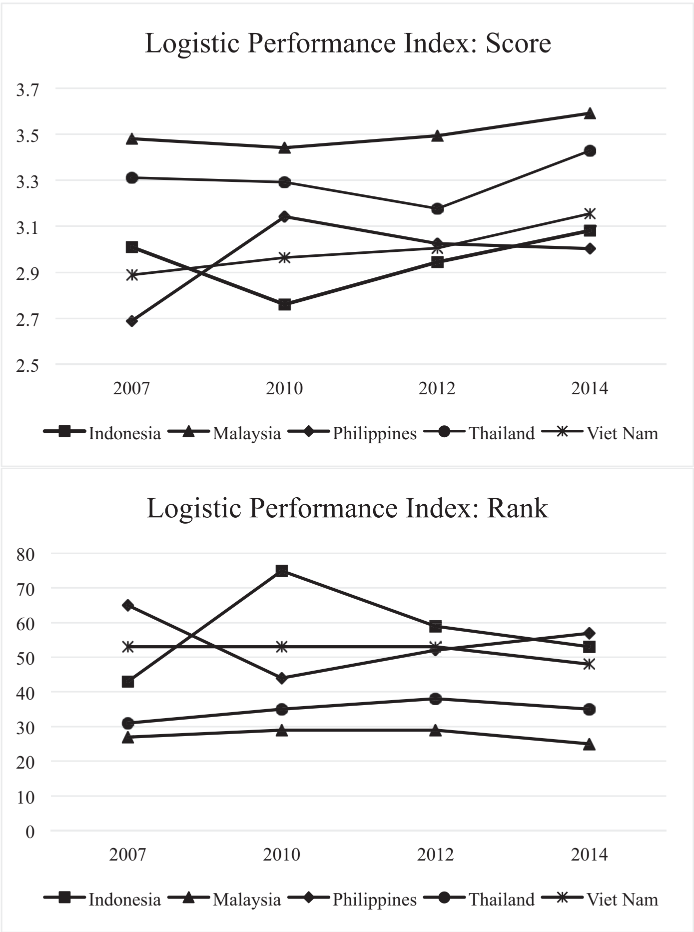

Figure 4.5 Logistics indicators, Indonesia and neighbours, 2007–2014

Source: Authors' calculations based on Logistics Performance Index, World Bank.

Bank's Logistics Performance Index (LPI), confirming the fact that Indonesia lags its ASEAN neighbours except for the Philippines. The problems derive from both limited infrastructure investment and regulatory barriers. The under-investment in infrastructure since the late 1990s has contributed to the low quality and quantity of roads, ports, and railways. As a percentage of GDP, Indonesia's infrastructure expenditure is about half of that in the Soeharto era. Regulatory constraints on competition and efficient service provision compound the problems.

4. Looking forward: industrial policy options for Indonesia

In light of this analysis, what sort of industry policy might Indonesia contemplate? Our conclusions are premised on five general observations. First, the major challenge is to achieve high economic growth in the aggregate, consistent also with distributional and environmental objectives. The sectoral origins of this growth are of secondary concern. Second, as a corollary, the emphasis needs to be on productivity and efficiency, and thus on 'policies for industrial progress', rather than 'industry policy'. Third, it is important to keep in mind the Tinbergen 'assignment principle', that the number of independent instruments (i.e. policy levers) must be at least as great as the number of targets. In other words, policies need to be directed towards specific targets rather than vague catch-all objectives. Fourth, the policies need to be administratively and politically feasible, in the sense of having a realistic prospect of implementation.

Related to the latter point, fifth, Indonesia has had a very mixed record with industry policy. For example, there is no compelling evidence that any of the historically most protected industries in Indonesia, such as the automotive, steel, petrochemical, and other heavy industries, subsequently became spearheads of industrial growth. In fact, on the contrary, using export growth or productivity growth as a performance indicator, not surprisingly the most dynamic sectors have been traditional labour-intensive industries. These industries were historically penalised by the protection accorded to the upstream sectors, and they have performed best when liberal trade and investment reforms have been in the ascendancy.[7]

Such a result should not be surprising to any serious student of the political economy of import protection in Indonesia. According to the most detailed study of the subject, by Basri (2001), the most important determinant of variations in inter-industry protection has been what he termed the 'crony' variable. Basri's study is for the period through to the mid-1990s, which was also the period of rapid industrialisation. Whether this analytical framework has the same explanatory power for the democratic period, when political power was rapidly diffused and patterns of corruption much less systematic, remains an open question. There is however persistence in the patterns of protection, with the most protected industries in the latter period similar to those of the earlier period (Marks and Rahardja, 2012).

A second instrument of industrial policy has been state-owned enterprises. Indonesia has traditionally had a large SOE sector, partly as a result of the nationalisations during the Soekarno period and partly those financed during commodity booms. Measuring their performance accurately is hindered by the lack of reliable financial data, and the many implicit subsidies received and exactions imposed on them. By any indicator, however, these SOEs have generally performed poorly, owing to political interference, multiple (and sometimes conflicting) objectives, and a reluctance to delegate managerial autonomy. Moreover, there is no evidence from the case study material that they have played a catalytic role, directly or indirectly, as technological innovators.

Third, fiscal incentives have been employed intermittently, but with limited impact. They were introduced from 1967 onwards when Indonesia sought to re-establish its international commercial reputation. The investment regime became more restrictive from the mid-1970s, and the Investment Coordinating Board, known by its acronym BKPM, attempted to impose conditionality in the granting of incentives. However, it lacked the analytical expertise to implement any sort of formal industry policy. Its effectiveness anyway was diminished by widespread corruption and cumbersome administrative procedures. Fiscal incentives were largely abolished during the major tax reforms of 1984, and they played no role in the successful period of export-oriented industrialisation during that decade. Some incentives have been reintroduced in recent years, but with little impact.

A fourth tool of industry policy has been the provision of subsidised finance. State-owned banks dominated the financial sector until 1983, and they offered a range of subsidised lending programmes. Command lending to politically well-connected borrowers was widespread, as was bribery to secure this cheaper credit. Studies of these programmes generally concluded that there was no systematic difference in commercial success between recipients of subsidised and non-subsidised loans. This was because the value of the subsidies was diluted by the illegal payments, and because, in the system of credit rationing, loans were extended as much on the basis of political connections as commercial viability.

Finally, from the early 1980s, the Indonesian government embarked on a range of ambitious 'high-tech' projects under the direction of Research and Technology Minister (and later President) B.J. Habibie. The most important of these was the *Industri Pesawat Terbang Nusantara* (IPTN), or Indonesian Aerospace Industry project to develop Indonesia's first domestically produced airplanes. There was a range of other projects, including shipbuilding and munitions. These were mostly cases of 'back-to-front' industrialisation, in that Indonesia then possessed a very limited industrial base of supplier firms with advanced engineering competence. Therefore, the aircraft factory was somehow intended to leapfrog the process of technological development. These projects collapsed during the AFC, when the government was no longer able to bankroll them. The country had little to show for the estimated 3 billion US dollars invested in these high-tech projects.[8]

Bearing these observations in mind, we now briefly discuss a range of issues related to Indonesian industry policy debates.

4.1 Connecting to global production networks

These vertically integrated, many-country, cross-border production and buying operations are now the major form of intra-East Asian trade. Within ASEAN alone, they account for almost 50 percent of trade within the region (Athukorala, 2010). Although concentrated principally in the electronics and automotive industries, they are an organisational structure that is relevant to any products that combine discrete production processes with diverse factor intensities. Most of this trade is intra-firm in nature, and thus it is dominated by multinational enterprises. Indonesia is a relatively minor participant in these networks, and is thus missing out on major commercial opportunities and employment creation. In 2010–2011, for example, it accounted for 0.5 percent of global 'network trade', much lower than its Southeast Asian neighbours, Malaysia (2.6 percent), the Philippines (1.2 percent), and Thailand (1.6 percent). A key feature of these networks is the range of factor intensities of activities within them, from highly technology-intensive to simple assembly operations, and thus facilitating the potential entry of reforming latecomers.

The reasons for this under-performance are both well-known (Soejachmoen, 2012), and amenable to policy intervention. Participation in the *global production networks* requires open trade and investment policies, because the parts and components frequently cross international boundaries, and much of the production occurs within multinational enterprises. They also require highly efficient logistics infrastructure, including port movements, customs procedures, and port-to-factory transport. Competitive labour inputs have to be available, across the range from unskilled to managerial staff. In these three key areas, Indonesia lags, as demonstrated by the comparative indicators presented in the previous section. Yet they are all amenable to relatively straightforward policy reforms, of the sort that Indonesia undertook during the 1980s.

4.2 Trade policy and regional architecture

The absence of progress with the Doha Round has led to a proliferation of preferential trading arrangements. Apart from the special case of ASEAN, Indonesia has not been an active participant in these arrangements. The impact of these preferential trading arrangements is mixed. In some circumstances, they may offer preferential market access. But frequently this market access is limited by the many exemptions clauses and by rules-of-origin requirements. In any case, network trade in electronics occurs largely outside these preferential deals, because the former is fundamentally incompatible with them. Progress with broader region-wide trading arrangements is also problematic.

The implications for Indonesia are threefold. First, unilateral reform is the only certain way forward to deliver increased productivity. Major trade breakthroughs are not in prospect; even if they were, those of any significance would be open to all countries. Second, there is no case for Indonesia adopting a 'mercantilist' approach to trade policy in the sense of making reform at home conditional on these trade deals. Domestic reform benefits the home country directly. Moreover, Indonesia is too small an economy relative to the majors (US, European Union, China, Japan) to be able to extract significant concessions. The one bilateral deal it has with a major, Japan, has not delivered significant results, even in areas of significant interest to Indonesia, notably labour exports. Third, ASEAN is very likely to continue to be the cornerstone of Indonesia's international commercial diplomacy. The ASEAN Economic Community has already commenced and, although it contains numerous loopholes and exemptions, it will reduce commercial barriers within the region, to which Indonesia will have to adjust. Indonesia will also be bound by other extra-regional ASEAN trade policy agreements, some of which will be significant, such as the ASEAN-China Free Trade Area.

4.3 'Hilirisasi' and the promotion of heavy industry

Over the course of industrialisation, scale, industry composition, and factor intensities change significantly. Should the Indonesian government intervene in this process, for example by directly hastening the transition to an industrial structure that is technologically more advanced, through tariffs, financial incentives, and direct ownership? That is should the government select particular industries, or even firms, for special assistance, on the premise of anticipating changing comparative advantage, or removing the bottlenecks that may be holding back industrial upgrading?

In certain circumstances, there may be a case for this form of intervention, but it should desirably meet the following criteria before a plausible 'public interest' case could be made:

1. Is there a convincing case that the Indonesian bureaucracy has the specialised knowledge of markets and technology, superior to that of major multinational enterprises, to be able to make such a decision?
2. Related, given the widespread vulnerability to capture within the Indonesian bureaucracy, how will the risk of rent-seeking be addressed? What sort of market test, performance requirement, or conditionality will be enforced on the recipients?
3. Is the global industrial structure 'oligopolistic', with relatively few suppliers, and are these suppliers deliberately restricting access to their specialised technology?
4. Is Indonesia's lack of competitiveness in a particular sector the result of some sort of market failure or technology barrier, or is it rather a result of the high-cost domestic economy, inadequate education system, complex regulations, and domestically imposed barriers to international technology transfer? To the extent that it is mainly the latter, the solution is to address the problems at their source, not to embark on costly and risky industry policy.

Any strategy for industrial upgrading also needs to confront the fact that Indonesia currently spends a minuscule amount on research and development, about 0.1 percent of GDP. Its advanced education foundations are under-developed. And the uncertain legal environment related to intellectual property rights deters private sector research and development. A forward-looking industrial policy should therefore address these issues. Moreover, smart industry policy can address the public good arguments for investing in 'non-rival' activities where there are significant externalities that cannot be easily appropriated by a single firm, and which therefore act to deter private investors. Examples include the setting of standards, testing facilities, advanced laboratory facilities that are not necessarily product-related, and other support for advanced scientific research. By definition, these investments are not firm-specific, and in some cases not even industry-specific.

4.4 Finance, especially for small and medium-sized enterprises

Over the past quarter century, Indonesia has made important progress in its financial development in two respects. First, in the wake of the AFC, the formal financial sector has been rehabilitated, through bank recapitalisation (albeit at great fiscal cost to the nation), more effective prudential supervision and regulation, and some liberalisation regulations governing the entry of foreign banks. Second, Indonesia has a history of successful micro-credit innovation. Following the costly and ineffective experiment with subsidised credit programmes in the 1970s and early 1980s, the 1980s financial reforms saw the introduction of an array of flexible, market-oriented innovations tailored to meet the special needs of micro enterprises. Having re-established financial stability, including during the 2008–2009 global financial crisis, the challenge now is to ensure that the country's financial institutions support broader development objectives, including particularly small and medium-sized enterprises, in the directions advocated by Rosengard and Prasetyantoko (2011).

Tax and other investment measures are widely used to attract foreign direct investment, both at the aggregate country level and, to the extent that these incentives are industry or even firm-specific, as a tool of industry policy. Their appeal is obvious, as a signal to business that the country is 'open for business', and to compete with the many other countries offering these packages. The case for offering such incentives is more compelling in transition economies that have recently opened up to international trade and investment, and which have high levels of political and commercial uncertainty. However, Indonesia can hardly be described as a transition economy, while the case against these incentives, or at least for using them sparingly, is compelling. First, they have fiscal implications, to the extent that they erode the revenue base. Second, in comparative surveys, investors typically do not rank these incentives highly, as compared to infrastructure quality, political and legal certainty, labour availability, regulatory simplicity, and other factors. Third, the criteria for granting these incentives are often vague, in conflict with other government objectives, and subject to corruption concerns.

For example, a key objective of the Indonesian government is support for domestic small and medium-sized enterprises, yet investment incentives go overwhelmingly to large, mainly foreign-owned firms. Moreover, investment agencies like Indonesia's Investment Coordinating Board (BKPM) typically do not have the requisite technical skills and deep industry knowledge to guide the selection of industrial projects. In addition, conventional investment criteria are of less utility the more globalised are production processes. One example is the use of domestic value added as a policy objective. The spread of global production networks as a result of the 'slicing up' of production processes inevitably results in less, not more, value added at each production stage.

Indonesia's experience with investment incentives is also relevant. As part of the major tax and liberalisation reforms in the mid-1980s, the government abolished most incentives. The investment response was decisive: by the end of that decade, the country was receiving record levels of foreign direct investment, and most of it was in export-oriented manufacturing and the newly opened services sectors. That is, these flows diversified away from the traditional recipient sectors of natural resources and import-substituting industry.

Notes

1 See Szirmai et al. (eds., 2013) for a recent and comprehensive survey.

2 Note also that we use the terms 'industry' and 'manufacturing' interchangeably. That is, we do not examine other sub-sectors of the formal national accounts definition of industry – utilities, mining, and construction.

3 That is, in terms of the shares of its leading conglomerates in output and capitalisation. Note, however, that the mid-1990s data were dominated by Soeharto-linked conglomerates that have since been largely dismantled. More recent estimates of the dominant conglomerates prepared by Carney and Hamilton-Hart (2015) reflect these changes, while also documenting the continued prominence of several Soeharto-era commercial groups.

4 The story is of course more complicated than this. China's scale has also reordered East Asian production networks, and therefore country competitive advantages need to be realigned with these emerging networks. Indonesia has also benefited greatly from China's industrial appetite, through historically high commodity export prices for most of this century.

5 See Manning (2014) and his earlier writings, on which this paragraph draws.

6 In a separate analysis (Aswicahyono and Hill, 2015), we show that average wages grew significantly faster than labour productivity over the period 2000–2012, resulting in unit labour costs more than doubling. The sharpest increase in unit labour costs occurred in the early 2000s, and again over the period after 2010. Nevertheless, Indonesia was not alone in this growing labour market populism, resulting in rising unit labour costs in several neighbouring economies.

7 These propositions were empirically tested for Soeharto era industry policy by Hill (1996).

8 Meanwhile, the government's non-politicised research institute, LIPI, the Indonesian Institute of Sciences, has been starved of resources since its establishment in the 1950s.

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5 Why is Indonesia left behind in regional production networks?

Ben Shepherd and Moekti Soejachmoen

1. Introduction

Production networks – or global value chains (GVCs) – are generally well-developed in the Association of Southeast Asian Nations (ASEAN) region in sectors like electrical products and transport equipment. Indeed, East and Southeast Asia is considered one of the homes of this business model, which relies on production fragmentation across borders, and trading in tasks. This way of producing output holds open the possibility of a fundamentally different development paradigm than the one that prevailed for much of the twentieth century in most countries. Under that framework, countries often focused on developing full supply chains in sectors deemed 'key'. The process is a very difficult one, and in many cases, the result was a set of less productive upstream companies supported by protection and subsidies, which in turn hurt the competitiveness of downstream firms, such that they themselves also requested protection and subsidies. Such a model is ultimately untenable, and is unlikely to bring sustained improvements in total factor productivity – the main source of long-run growth.

Of course, static specialisation is only one lens through which a GVC-based development model can be seen. Another important way of looking at it emphasises its dynamic features. Instead of trying to develop all functions simultaneously, GVC development typically starts with specialisation in low value added activities like assembly. Although many policymakers believe it is important to 'move up' into higher value added activities, it is important to emphasise that in a labour surplus economy – typical in much of the developing world – specialisation in labour-intensive activities, albeit relatively unskilled ones, can have important economic and development gains. For instance, it can be a way of bringing people into the labour market (from non-market agriculture, for example). This dynamic is true of historically excluded groups like women in sectors like ready-made apparel.

As the labour surplus is absorbed, however, there will naturally be upward pressure on costs and, in the context of global competition, it is possible that labour-intensive operations will begin to shift to other lower-income economies. Such a shift is already getting underway in the case of China and Viet Nam,

DOI: 10.4324/9781315161976-5

for example. At such a time, it is important that a country has laid the foundations to move up into higher value added activities, such as component manufacture, and then research and development, as well as marketing and distribution. Clearly, the basis of these activities is, in large part, human capital. Developing educational capacities and ensuring they are widely spread throughout the community is a key part of laying the groundwork for effective moving up. It is also important to have a business environment that encourages GVC lead firms to make large, relationship-specific investments. Enforcement of contracts and other private property rights is key, as is good governance. The salience of these issues within the GVC paradigm is helpful in the context of broader concerns about economic and social development post-2015.

The GVC paradigm is attractive because it allows countries to specialise more strongly, developing only those parts of the value chain where they have a comparative advantage. Other countries develop the other parts. A lead firm, typically from a high-income country like Japan, and increasingly South Korea, coordinates this complex interplay of activities, and brings the set of inputs together in one or more assembly locations before final shipment to end markets, again often in the developed world. Many countries in ASEAN have found this approach appealing, and have enjoyed considerable success in developing GVC relationships in sectors like electronics and transport equipment.

Against this background, though, it has been suggested that Indonesia's performance is less than stellar. This chapter investigates that contention empirically, and in particular attempts to identify precise ways in which Indonesia's performance in GVC sectors differs from that of other ASEAN countries perceived as more successful. We indeed find evidence that GVCs are less developed in key sectors in Indonesia than elsewhere in ASEAN. Of course, it is then important to try and identify the most important reasons. Our approach does not claim to be comprehensive, but instead focuses on one salient feature of the data: services. Services like transport, telecommunications, and logistics are key inputs into the overall production processes of GVCs. It is important that firms have access to competitive offerings in these areas – regardless of whether the preferred supplier is a domestic or foreign firm. Yet this is exactly an area where Indonesia's position is noticeably different from that of its ASEAN colleagues: its reliance on foreign services inputs is lower than observed elsewhere. It is therefore quite likely that part of the competitiveness challenge faced by Indonesian firms that could potentially join GVCs is related to their ability to access competitive services inputs.

Many factors influence service sector performance, but policy is particularly important. With that in mind, we investigate applied services policies in Indonesia compared with ASEAN countries, as well as with the other BRIICS countries (Brazil, Russia, India, Indonesia, China, and South Africa). We find strong evidence that Indonesia's services trade policy is relatively restrictive. This evidence sits well with the observed lesser reliance of local firms on foreign services inputs, and could well be an important source of the competitiveness problem. We identify a number of key issues, like foreign equity limits and limits on competition policy, that hinder potential foreign entrants in services – with likely flow-on effects to goods markets.

The chapter proceeds as follows. Section 2 discusses Indonesia's position in GVCs, focusing on a comparison with other ASEAN countries in the electrical equipment and transport equipment sectors. Section 3 looks at the role of services in boosting export competitiveness, particularly for producers that could be part of a GVC. Section 4 concludes and presents policy recommendations.

2. Indonesia in production networks

As noted at the outset, Indonesia is commonly thought to have been less successful in integrating itself into GVCs than some other ASEAN countries. The first step in the analysis is to bring some data to bear on this question, so that we can have an accurate view of Indonesia's position in GVCs operating in the region. It is not possible to cover all sectors, so the focus is on just two that are probably the most active on a region-wide basis: electrical equipment and transport equipment, which are discussed in more detail in Boxes 5.1 and 5.2, respectively.

The starting point for the analysis is to characterise Indonesia's trade patterns in these two GVC sectors, in comparison with other ASEAN countries. Figures 5.1 and 5.2 show gross exports by end use, that is distinguishing between final goods and intermediates, for electrical equipment and transport equipment, respectively. It is immediately apparent that the total value of Indonesia's exports is relatively small given the size of its economy. The pattern is stronger in electrical equipment than in transport equipment, but in both cases it is clear from the

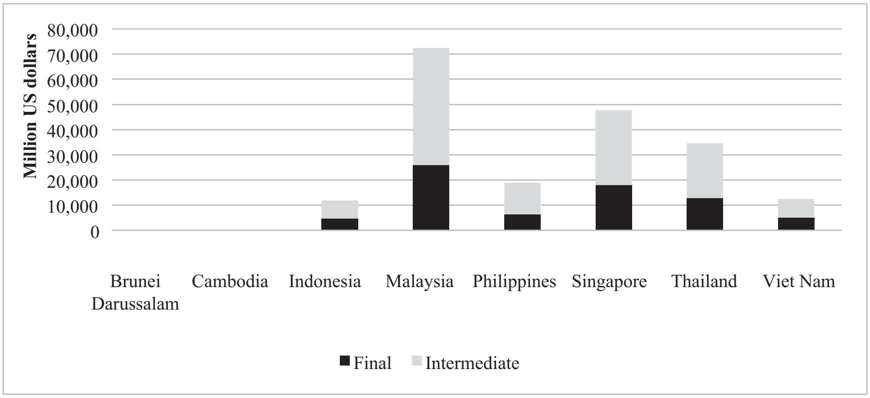


Figure 5.1 Gross exports by end use, electrical equipment, 2011

Source: Authors' calculations based on OECD-WTO TiVA database.

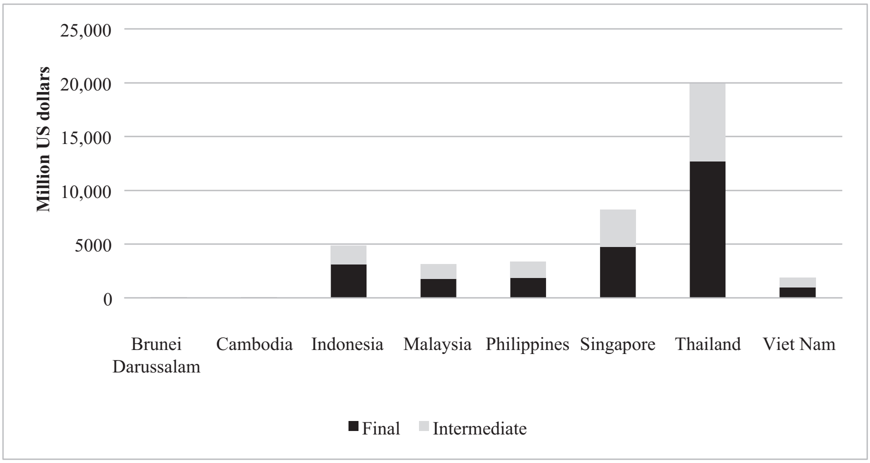


Figure 5.2 Gross exports by end use, transport equipment, 2011

Source: Authors' calculations based on OECD-WTO TiVA database.

figures that on a per capita basis, Indonesia's exports in both sectors are relatively limited compared with other ASEAN countries.

A second point that needs to be stressed is the balance between final and intermediate goods in gross exports. GVC activity is typically associated with a significant proportion of intermediate goods trade. However, Indonesia's exports are somewhat more skewed towards final goods than is the case for other ASEAN countries. This point is particularly true for transport equipment, where 76 percent of Indonesia's gross exports are made up of final goods, compared with 45 percent for Thailand, a hub for Japanese GVCs in this sector.

Box 5.1 Electronics industry in Indonesia

The electronics sector is one of the most dynamic, largest, and fastest-growing industries in the world. In fact, the electronics sector has become an engine of export growth in some Asian countries. This sector is extensively fragmented in its production processes, and this fragmentation allows more countries with different levels of income and technology to participate in the production network by specialising in their niche markets.

However, Indonesia, Southeast Asia's largest economy, is lagging behind in its export performance, despite the fact that the electronics industry is one of its six priority industries. The electronics sector in Indonesia only began to develop in the 1970s. Prior to that, the sector was very under-developed and only consisted of a small number of importers, repairers, service centres, and a few assemblers. The number of firms in the electronics sector varied over the period 1990–2007. There was a slight decrease in 1998 due to the Asian Financial Crisis (AFC), which hit Indonesia severely. The period 2000–2003 saw another dip due to declining demand in the world electronics market.

The electronics sector in Indonesia is dominated by the electronics components subsector in terms of number of firms and real value added, as well as the number of workers. Right before the crisis, all subsectors showed a promising trend and continuing increases in real value added. However, the 1997 AFC caused an abrupt decline in both subsectors, resulting in a significant decline in real value added in 1998. Real value added dropped from around 40 billion Indonesian rupiah to 30 billion Indonesian rupiah in electronics components and from 22 billion Indonesian rupiah to 15 billion Indonesian rupiah in consumer electronics. While consumer electronics was able to rebound in the following year, electronics components continued to experience a decline in real value added in 1999.

The import share of the electronics sector is much higher than its export share, indicating the high dependency of this sector on imported inputs. Only a small number of firms have the capability to conduct modification, design, and engineering innovation. The sole agents (ATPM) import parts and components from their principals. Even local producers have to import their main parts and components.

The imported input share in electronics components was 50 percent on average and 33 percent for consumer electronics. Although strong reliance on imported inputs is a feature of global production networks, it also reflects the failure of the government's effort to develop domestic supporting industries for the electronics sector.

One reason for the under-developed local supporting industry is low absorptive capacity owing to inadequately trained and skilled local employees. Many firms have to provide skills training and productivity development in-house. This is may not be a problem for large firms, but small and medium firms may find it difficult to offer the necessary in-house training for newly recruited employees.

There is a dichotomy in the electronics sector in Indonesia. For the high-end products, the industry is dominated by foreign companies, while for the low-end products it is dominated by local companies. One example of a successful fully domestic electronics firm is PT Hartono Istana Teknologi with the Polytron brand name. This firm was established in 1975 as PT Indonesian Electronics & Engineering, a subsidiary of the successful cigarette company, PT Jarum Kudus. From the beginning it did not want any foreign investment, because it did not want to pay royalties to a foreign principal. With two factories in East Java, its main products are television sets, mobile phones, refrigerators, and audio sets. It has been successfully exporting products to the European market, although under different names.

The foreign investment share increased significantly during the crisis period. Just before the crisis, at least three joint venture firms (PT Sharp

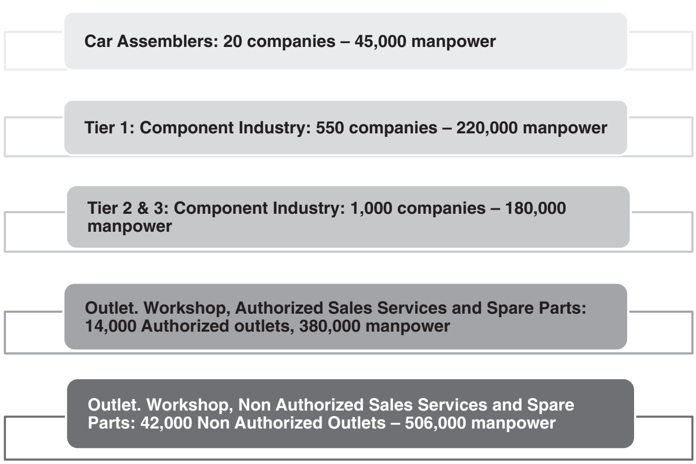
Semiconductor Indonesia, PT NEC Semiconductor Indonesia, and PT Panasonic Semiconductor Indonesia) were established to produce active components (components that require electrical power to operate), mainly semiconductor devices and integrated circuits (ICs). Another reason for the increase in foreign participation was a foreign direct investment fire sale of Indonesian companies because of excess capacity and asset prices falling drastically as a result of real exchange rate depreciation.

Source: Authors.

Box 5.2 Automotive industry in Indonesia

Similar to the electronics industry, the automotive industry is also one of the priority sectors in Indonesia because it became one of the central pillars of Indonesian manufacturing due to strong growth in the Indonesian economy. The automotive sector in Indonesia was established in 1927, but was mainly for trading activities; assembly activities were very limited, and the import of cars was not regulated. Rapid development of assembly activities started in the early 1970s because of the oil boom. Automobile assembly production fluctuated over time with an increasing trend. Big slumps occurred several times due to significant events. The most notable was in 1998, when the AFC hit Indonesia badly. Another dip took place in 2006 caused by the adverse impact of the steep rise in domestic fuel prices. The last sharp production decline was in 2009 following the global financial crisis. During 2009–2013, domestic car sales in Indonesia doubled because of better economic conditions and interest rate policies that supported car sales.

Indonesia's automotive industry structure is described in the following graph:



Source: Ministry of Industry Republic of Indonesia, 2015; Indonesia Automotive Industry, 2015; Indonesia Australia Business Week, 2015.

The automotive sector in Indonesia can be categorised into three groups – (1) auto parts, (2) assembly, and (3) body maker. These body maker firms converted commercial vehicles, especially small category I vehicles (minibuses and vans), into passenger cars in the form of minivans (Thee, 2005).

The first-tier or original equipment manufacturers dominated the market for branded or genuine parts, concentrating on highest-value products. The second tier, which are usually joint ventures between local and foreign companies (often Japanese), are involved in the production of spare parts that are sold directly to the first tier or directly to customers. This tier can comply with strict requirements of official equipment manufacturers (OEM), and some of them can actually create new parts and components and sell them to the OEM.

The assembly subsector is highly concentrated as a result of protectionist government policies, where the government virtually selected the major domestic business groups that were to participate in the industry (Aswicahyono et al., 2000). This sub-sector relies on foreign partners; all assemblers are joint ventures with only a small number of very large Indonesian firms. Almost all assemblers are owned by one of the three largest automobile enterprises in Indonesia: Astra, Indomobil, and Krama Yudha. The auto parts firms are less concentrated, because in general they are more labour-intensive and less dominated by the large firms. Some of these firms are not owned by the large automotive companies. Because of the lower barriers to entry and in response to rising domestic demand for cars (this will increase future demand for auto parts for car production and replacement), the auto parts industry grew rapidly over the past two decades.

Source: Authors.

GVCs are not just about exports, but also rely heavily on imports. Figures 5.3 and 5.4 break down sectoral imports by end use, in a similar way as was done for exports in Figures 5.1 and 5.2. It is again apparent that relative to its size, Indonesia is not a particularly large trader in these two key GVC sectors. In electrical equipment, it is outstripped in terms of imports by Malaysia and Thailand. In transport equipment, only regional hub Thailand has a comparable level of total imports, but the other countries are much smaller in population terms. It is also important to highlight the split between intermediate and final goods imports: in both sectors, Indonesia's trade is relatively more skewed towards final goods, as was the case for exports. Seeing this pattern on the import as well as the export side suggests that GVC development in Indonesia is indeed less than is seen elsewhere in the ASEAN region.

One possible explanation for the different trade patterns observed in Indonesia relative to ASEAN partners in these two GVC sectors is market size. Other

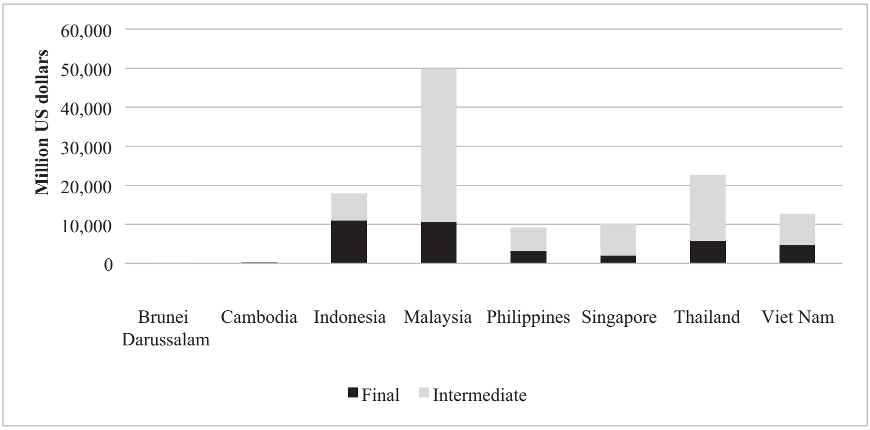


Figure 5.3 Gross imports by end use, electrical equipment, 2011
Source: Authors' calculations based on OECD-WTO TiVA database.

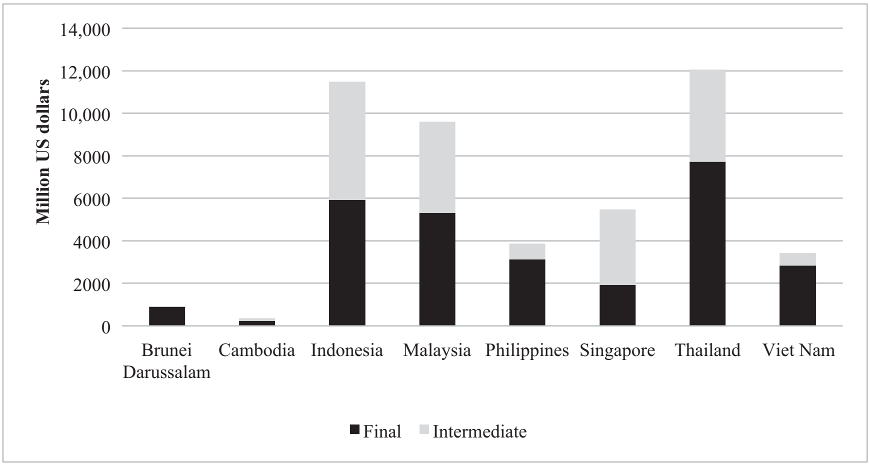


Figure 5.4 Gross imports by end use, transport equipment, 2011
Source: Authors' calculations based on OECD-WTO TiVA database.

than Indonesia, ASEAN countries are small to mid-sized in terms of population, and typically small in terms of GDP. In such environments, there are clear limits on the development of full sectors, in the sense that there may not be the critical mass necessary to support creation and maintenance of full supply chains, particularly capital-intensive parts. As a result, there is an incentive to specialise and cooperate across borders relatively early on in industrial development. This mindset sits well with the GVC development model, which also emphasises specialisation, trading in tasks, and eventually moving up to higher value added activities, but not the development of full supply chains in each country. With a large domestic market like Indonesia's, the mindset could be quite different, in that it may appear more feasible to develop full supply chains in key sectors, rather than just particular supply chain tasks. Such an approach to development would be consistent with a greater proportion of final goods in trade, but poses difficulties for the deployment of GVCs.

We can examine additional evidence to see whether or not Indonesia's development of the electrical products and transport equipment industries is perhaps more focused than elsewhere in the domestic market. A relevant piece of data is the share of domestic value added in gross exports. In sectors where GVCs and task-based specialisation are extensive, we would expect to see falling shares of domestic value added. In the GVC context, domestic and foreign value added are seen as complements, not substitutes, because it is typically observed that as domestic value added shares fall over time within countries, total value added grows at a faster rate, so that domestic value added in dollar terms increases even as its share in the total falls. Similarly, by comparing domestic value added shares across countries, we can see where this complementarity is playing out most fully.

With this approach in mind, Figures 5.5 and 5.6 present a breakdown of value added shares by source for the two sectors under consideration. In electrical equipment, Indonesia's domestic value added share is the highest in ASEAN

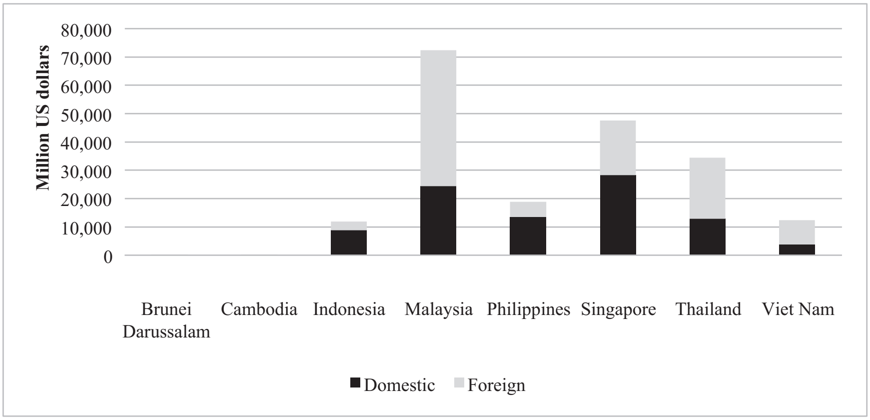


Figure 5.5 Value added content of gross exports, by source, electrical equipment, 2011

Source: Authors' calculations based on OECD-WTO TiVA database.

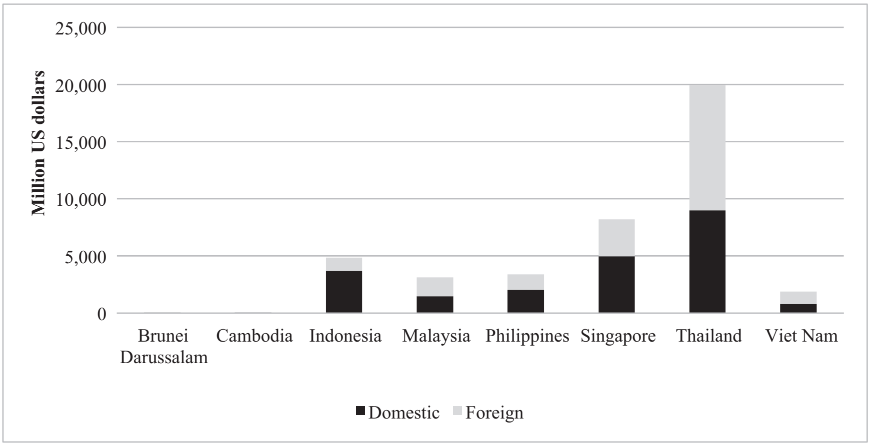


Figure 5.6 Value added content of gross exports, by source, transport equipment, 2011

Source: Authors' calculations based on OECD-WTO TiVA database.

(73 percent), compared with only 30 percent in Viet Nam. Of course, the stage of the value chain where specialisation takes place is relevant to this comparison, as Viet Nam is primarily an assembly hub, which is relatively low value added. Nonetheless, the pattern is repeated in transport equipment, where Indonesia's domestic value added share is again much higher (76 percent) than Viet Nam's (42 percent). Taking these two pieces of evidence together, it indeed seems that domestic market focus is stronger in Indonesia than in other ASEAN countries, and that as a result, value chain internationalisation is less pronounced. It is indeed plausible that GVCs are less involved in Indonesia in terms of production sharing because its development emphasis is on full supply chains and domestic market linkages, rather than narrower task-based specialisation and production sharing across countries.

The upshot from this section is that there is indeed data-driven substance to the idea that GVC activity is less developed in Indonesia than elsewhere in ASEAN, at least in these two key sectors of transport equipment and electrical equipment. Indonesia's trade on the import as well as the export sides is more skewed towards final goods than is seen in ASEAN comparators. In addition, the domestic value added share is noticeably higher. Taken together, the evidence is consistent with a lesser degree of international integration in these two sectors, which tends to integrate a lesser degree of GVC activity. It is plausible that Indonesia's large domestic market goes part of the way towards explaining this divergence with the rest of ASEAN. However, there are important efficiency gains to be reaped from international production sharing and increased specialisation. As a result, it is important to examine whether there are any policy factors that impede GVC development in Indonesia. To be comprehensive, a wide variety of policies would need to be considered. This chapter focuses on just one that appears to be of particular relevance: service sector regulation. The remainder of the chapter examines the services content of gross exports in GVC sectors, and then relates observed differences across countries back to the policy environment.

3. Services for export competitiveness

The domestic value added share in gross exports, as analysed earlier, includes all goods and services sectors. GVC analysis has dealt in most detail with input-output relationships among goods sectors, but an emerging literature is showing that services are also important (Box 5.3). For example, productivity in upstream services sectors is an important determinant of downstream export competitiveness in goods sectors (Hoekman and Shepherd, Forthcoming). Sectors such as telecommunications and transport are particularly important in the context of GVCs that need to be able to coordinate suppliers in different countries and move goods quickly and reliably between facilities.

Box 5.3 The role of services in global value chains

A value chain consists of a set of interrelated activities in the production cycle, which begins at research and development, design, and production, and continues through marketing and thereafter sales services. The global value chain describes a phenomenon where the stages of the value chain can be relocated into several countries depending on their comparative advantage.

One simple graph that can explain the value chain easily is the smile graph. This graph shows that the services at the beginning and at the end of the value chain provide higher value added than the middle part. It shows that the services sector is important in manufacturing, and one way for a country to increase the value added of its industry is to add more services into the process.

The services content incorporated in goods is not only large but rising. The process of blending together goods and services in manufacturing is called ‘servicification’. Services are used throughout the value chain to upgrade the quality of products, lower costs, and enhance efficiency. The provision of services by manufacturers allows them to differentiate and customise goods. It includes the use of global positioning systems for tracking the shipment of inputs and outputs.

APEC (2015) contains a case study of a consumer electronics manufacturing firm in Indonesia, focusing on the role of services in the value chain. Electronics firms tend to use services, particularly energy, more intensively than other firms in the economy. Raw materials (physical inputs) account for 78 percent of total costs in the electronics sector, versus 85 percent for all firms. The difference between the two figures is essentially accounted for by differences in the level of services inputs. The particular company studied in the chapter uses 87 different services at various points in the value chain, with 31 percent provided by arm's-length third parties, 38 percent provided by other companies in the same group, and the remainder supplied in-house. This evidence supports the view advanced in this chapter to the effect that services are crucial for value chain performance. Internationalisation of service supply is not directly addressed in the case study, but from general principles it is clear that firms should be able to access services from whichever suppliers they consider optimal in terms of factors such as quality and price, with the aim of achieving the most efficient production structure possible.

Regulation is a key determinant of service sector performance. Regulations can, intentionally or unwittingly, create barriers to entry that support rent-seeking behaviour and inefficient incumbents. They can also add to the operating costs of business in the services sector. Both types of regulations have a negative impact on observed service sector productivity, and by extension, on productivity in manufacturing sectors – including potential GVC sectors – that use services to produce goods.

Of particular interest in the international context is trade policy, as one set of service sector regulations. Conceptually, services trade policy encompasses all regulations that distinguish between foreign and domestic service providers by providing superior market conditions (either for entry or ongoing operations) to domestic firms. The General Agreement on Trade in Services (GATS) established some limits on the types of policies that can be put in place, but bindings are based on policies from the 1990s, and applied policies are typically much more liberal. In addition to explicit discrimination, it can also be important to look at domestic regulations that apply to domestic and foreign operators, but can potentially increase costs or reduce sectoral efficiency. There is evidence linking higher trade costs (due to more restrictive policies) to lower firm-level productivity, as in the case of goods (Miroudot et al., 2012).

Before looking at the available policy indicators, it is important to get a sense of the extent to which services enter into the production functions of domestic firms actually or potentially engaged in GVCs. Again, we focus on two sectors – electrical equipment and transport equipment. As in the analysis of value added in the previous section, we distinguish between domestically and foreign sourced services.

Results from the analysis are presented in Figures 5.7 and 5.8. Two points are worth noting. First, all across ASEAN, the share of services value added in gross exports is significant, ranging from nearly 20 percent in Brunei Darussalam to

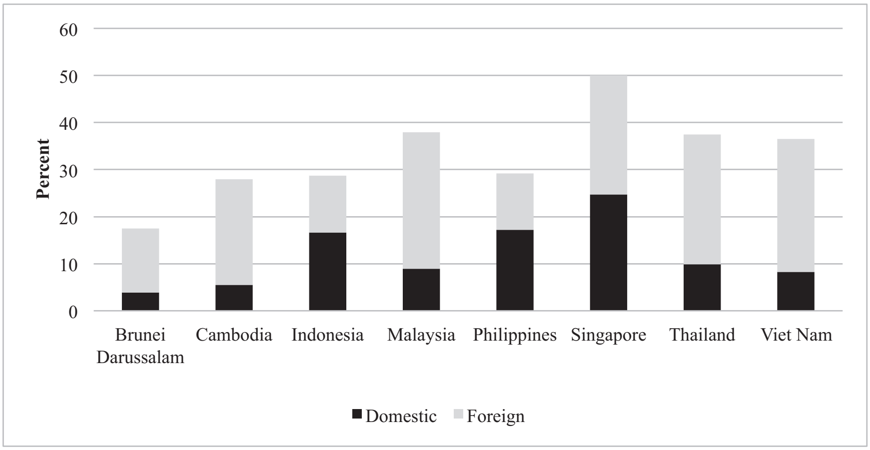


Figure 5.7 Services value added share in gross exports, by source, electrical equipment, 2011

Source: Authors' calculations based on OECD-WTO TiVA database.

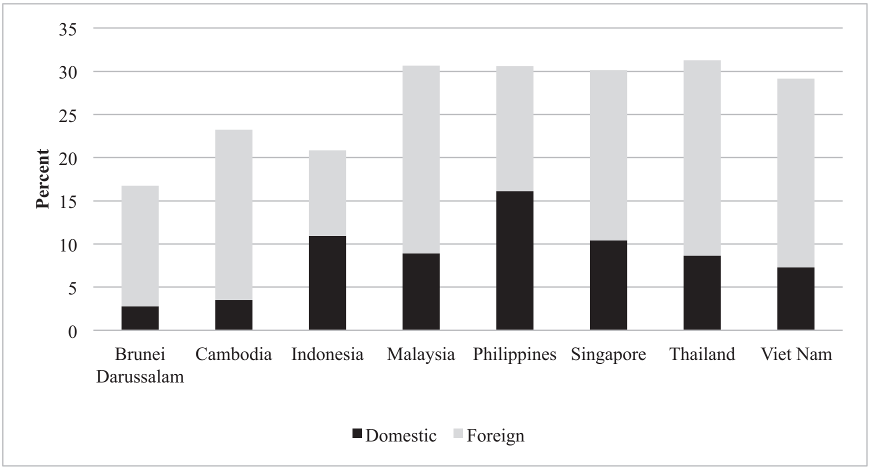


Figure 5.8 Services value added share in gross exports, by source, transport equipment, 2011

Source: Authors' calculations based on OECD-WTO TiVA database.

50 percent in Singapore in the case of electrical equipment, and from just over 15 percent in Brunei to over 30 percent in Thailand in the case of transport equipment. Indonesia has a fairly typical level of reliance on services in the case of electrical equipment, with a total value added share of around 30 percent. Services content is a little lower in Indonesia than in comparator countries in the second sector, transport equipment, but it is still significant at over 20 percent.

The second point is that domestic shares vary considerably across ASEAN countries. Nonetheless, Indonesia's domestic share is second highest in electrical equipment at 17 percent, and highest in transport equipment at 11 percent (relative to gross exports in both cases). Importantly, its foreign share, again relative to gross exports, is second lowest in electrical equipment (12 percent), and lowest in transport equipment (10 percent).

Taking the two figures together, it is clear that Indonesian firms in GVC sectors experience difficulty in accessing the world market for services. As a result, it is likely that costs are higher than they need to be, while quality and variety are lower – the typical economic effects we expect from a lower than optimal degree of international market integration. It is significant that the proportion of foreign services value added in gross exports is relatively low in Indonesia, and it is much higher in countries that are known to be more integrated into GVCs, such as Malaysia for electrical equipment and Thailand for transport equipment. Given the reliance by GVCs on competitive services offerings in key areas like transport and telecommunications, as well as logistics, professional services, and business services, it is likely that facilitating increased reliance of domestic firms on foreign service providers could provide a boost to GVC-linked activity.

This analysis leads to the question of why observed reliance on foreign service suppliers is lower in Indonesia than elsewhere. There are many potential reasons, but it is important to analyse the role of policy. One mechanism that could be in action is that more restrictive than average services trade policies shift demand to domestic suppliers, likely at the expense of higher quality and lower cost. At issue, therefore, are Indonesia's applied service sector policies, in principle the full range of regulatory measures that influence the ability of foreign service suppliers to contest markets and operate effectively.

Measuring applied services policies is very challenging because it is necessary to summarise a wide range of policies. By contrast, protection in goods markets is often summarised using tariffs; however, most services sectors do not use these kinds of mechanisms to discriminate between foreign and domestic production. Related to this issue is the difficulty of quantification. Again, tariffs in goods markets have a simple interpretation in terms of an ad valorem tax. In services markets, it is necessary to convert unscaled indices into tax equivalents in much the same way as is done for non-tariff measures in the case of goods.

One measure of applied services trade restrictiveness is given by the World Bank's Services Trade Restrictiveness Index (STRI). Borchert et al. (2012) provide an overview of the STRI and its accompanying database. The analysis covers 103 countries and five sectors, focusing on the key modes of supply in each sector. Regulations are captured essentially over the 2008–2010 period, and focus on most-favoured nation policies (i.e. regulations that apply to all trading partners in the same way); accounting for preferential policies under regional agreements is very challenging in the services context.

A key output of the World Bank project is a set of numerical summaries of applied services trade policies. These are the STRIs, one for each sector and

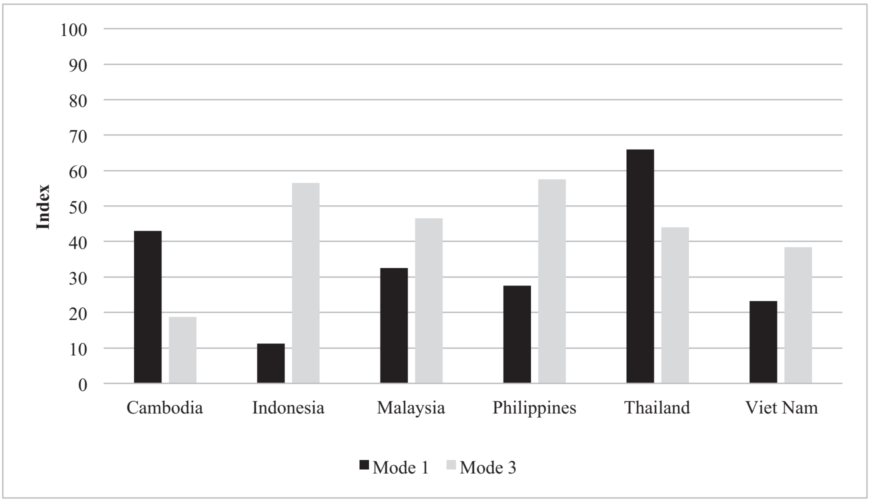


Figure 5.9 Overall services trade restrictiveness index for ASEAN countries, latest available year

Source: Authors' calculations based on OECD-WTO TiVA database, 2011.

mode combination, and an overall measure that attempts to summarise the full information set. The indices are scaled to lie between 0 (completely liberal) and 100 (completely restricted), but there is no quantification in terms of tax equivalents, so it is important to focus on ordinal rather than cardinal interpretations. In other words, a score of 50 rather than 25 indicates that one country has a more restrictive policy environment than another, but it is not fair to say without more evidence that it is 'twice' as restrictive.

Figure 5.9 presents the overall STRI for ASEAN countries for which data are available from the World Bank. Each country is represented by two bars, one each for modes 1 and 3. In the context of international trade in services, GATS mode 3 (sales by foreign affiliates) remains crucial for entry in most sectors, so most attention will be devoted to scores in that area. Focusing on mode 3 shows that Indonesia's services trade environment is indeed relatively restrictive by comparison with other ASEAN member states: Indonesia's score is the highest recorded by any ASEAN country. At least on a most-favoured nation basis, it appears that it is still relatively difficult for foreign firms to establish affiliate operations in Indonesia that sell services to local firms, including manufacturers and exporters.

The contrast between modes 1 and 3 is very striking in Indonesia's case. Practice in ASEAN varies, but in Indonesia mode 1 is much more liberal than mode 3; indeed, whereas the country has the highest score of the group for mode 3, it has the lowest (least restrictive) for mode 1. In theory, then, foreign service suppliers should be reasonably free to provide services in a pure cross-border sense (mode 1), even if foreign establishment (mode 3) is challenging. It is important to be realistic about the production technology of most services, however: physical proximity between producer and consumer is often favoured for a variety of reasons, and in a number of cases is even a technological requirement. In particular for backbone services like many transport subsectors, logistics, and telecommunications, mode 3 remains the key means by which foreign services firms can contest markets. If Indonesia is to improve its firms' ability to access world services markets, policymakers will need to give renewed attention to measures that restrict the ability of foreign providers to establish a legal presence in the country.

In pushing the analysis further, it is important to do two things. First, this chapter has so far focused on Indonesia's competitive position and policies relative to its ASEAN partners. But that is not the only peer group of relevance to Indonesia's growth and development prospects. The country is also seen as important emerging market by many analysts, and is included in the BRIICS group, so it is also important to examine Indonesia's performance relative to that benchmark. Second, it is important to move beyond a consideration of the overall position to look at sectoral particularities, especially in sectors like transport, logistics, and telecommunications, which are important for GVC development and competitiveness.

The remainder of this section addresses both issues. To do so, it moves away from the World Bank's STRI towards the index (also called an STRI) developed by the Organisation for Economic Co-operation and Development (OECD). That measure covers a smaller number of countries (42), but is more up to date as of 2015 and has greatly expanded sectoral reach (22 sectors, counting subsectors individually). The OECD STRI primarily focuses on that organisation's member countries, but also includes the BRIICS countries as a point of comparison.

The OECD does not produce an overall STRI in the way the World Bank does, so we proceed more intuitively to give an idea of the general comparison between Indonesia and its BRIICS peers. Taking the simple average by country across all sectors suggests that Indonesia is the most restrictive of the BRIICS countries when it comes to trade in services, with a score of 0.467, compared with 0.261 for the most liberal country, South Africa. Of particular importance for Indonesia is the comparison with RCEP negotiating partners China (0.414) and India (0.462). As with the World Bank STRI, it is not possible to draw quantitative conclusions about how much more restrictive Indonesia is than these two countries. The important conclusion is simply that services markets are, on average, more closed in Indonesia than elsewhere.

Another way of looking at the data are to consider the number of sectors in which Indonesia is the most restrictive BRIICS country. That is the case in almost half the considered sectors (9 out of 22). India and Russia are each most restrictive in five sectors, and China in three. This analysis supports the simple averages discussed in the previous paragraph: seen from this angle as well, there is a solid basis in the indices to argue that Indonesia is the most restrictive of the BRIICS countries when it comes to trade in services.

On a sectoral level, Indonesia stands out as particularly restrictive relative to its BRIICS peers in commercial banking, construction, distribution, freight forwarding, maritime transport, and telecommunications – focusing on just those sectors that are of relevance to GVC activity. Restrictions on the ability of local firms to access globally competitive services offerings in these sectors can severely impact manufacturers' productivity and competitiveness. Indeed, it is hard to understand the relative restrictiveness of policies in some of these sectors, given their close connection to GVC activities. Freight forwarding is one such case: as a key logistics subsector, it is an important determinant of a country's ability to link to global markets, both in terms of facilitating exports and imports of intermediates, capital goods, and other commercially important products. The same applies to maritime transport. Indonesia is an archipelagic nation, and as such has a higher than usual level of reliance on maritime transport. As such, restrictions in that sector carry particular economic costs, in this case not only for manufacturers, but also for consumers.

Of course, many different types of policy measures go into the OECD STRI. It is important to undertake further analysis in order to identify the source of the relatively restrictive policy settings seen in Indonesia. OECD (2015) provides an indication of what the main culprits might be, sector by sector. That paper breaks down the sectoral STRIs into components related to the following subsets of policies: restrictions on foreign entry; barriers to competition; restrictions on the movement of natural persons; regulatory transparency; and other discriminatory measures. It can immediately be seen that in the majority of sectors, the most restrictive aspects of Indonesia's policies relate to restrictions on foreign entry (i.e. barriers to mode 3 trade in services). This result sits well with the analysis of the World Bank's STRI presented earlier, in which the key problem on an overall level was also seen to lie with mode 3 restrictions. In addition, there are also significant barriers to competition in some sectors, such as telecommunications, and some transport and logistics sub-sectors. These barriers are particularly problematic because they suggest that incumbents may be able to earn economic rents, because there is no effective threat of entry from the competitive fringe. Firms in that situation have little incentive to innovate, improve quality, or raise customer service. Rather, their incentive is to do what they have always done, and charge as high a price as possible. Clearly, a major element of services sector reform to boost competitiveness has to be extension of market disciplines – competition first among them – to sectors that are currently somewhat insulated.

A number of sectors that are of importance from a GVC development standpoint have significant trade restrictions in terms of mode 3 barriers, or policies that restrict competition. Examples include telecommunications, air transport, cargo handling, freight forwarding, and legal and accounting services. All of these sectors enter into the typical production function of a GVC manufacturer. So restrictive trade policy measures tend to take prices up, reduce quality and variety, and thereby negatively affect downstream manufacturing competitiveness.

It is important to go behind these details to examine the types of measures that may be responsible for Indonesia's apparently quite restrictive services trade policy environment, at least when it comes to mode 3. OECD (2015) argues that a large share of the restrictive measures is in fact not sector specific, but instead apply generally to all sectors. For instance, some senior management positions are reserved for Indonesian nationals – a measure that impedes the inward movement of foreign experts, including experts in management, and has the potential to make it much harder for foreign invested businesses to bring their proprietary business model with them. This point is an important one, because businesses that are successful in the world market have a way of providing services that is unique, including in the way management systems are deployed to ensure adherence to quality standards. Interfering with that model is unlikely to make it perform better. So the goal of ensuring employment for a small number of well-placed nationals is likely to reduce overall efficiency, and worsen sectoral performance downstream – which in turn means that those industries employ fewer people than they otherwise would. In all likelihood, the costs of these policies are larger than any gains that might result from them.

Another important issue is equity limitations, that is restrictions on the amount of a firm that can be owned by foreign interests (see Box 5.4 for further details). Such restrictions apply in a number of sectors, and distort the decisions of foreign firms looking to enter the Indonesian market via mode 3. The ASEAN Economic Community aims to eliminate these kinds of restrictions for intra-ASEAN foreign direct investment, but it is not clear that that programme has yet been successfully implemented across the board. More fundamentally, it is important to recognise that the world's most efficient service providers do not necessarily come from within ASEAN. As a result, there is a clear interest in reducing equity limitations more broadly, ideally on a most-favoured nation basis, so key competitors from the world market can enter the Indonesian services sector, with corresponding benefits to prices, quality, and variety.

Box 5.4 Negative list of investment

The government of Indonesia revised the Negative Investment List (DNI) in February 2016 to attract more investment. In the revision, the government allowed greater foreign ownership in 64 business fields and opened another 20 that were previously only allowed for domestic players. The fields that are opened up to 100 percent foreign ownership include the film industry and its distribution business, cold storage, restaurants, and pharmaceutical raw materials. The revision also expands the partnership between investors (domestic and foreign) and local micro, small, and medium enterprises from 48 fields to 110.

On top of attracting investment, the government's purpose for the revision is also to diversify investment outside Java, which accounts for 42 percent of total investments in Indonesia in 2015. In addition, the decision to open several business fields up to 100 percent foreign ownership is an effort to promote technological transfer and/or attract foreign financing, as the financing of several sectors could not be provided from the domestic side.

In the electronics sector, the vast majority of business areas are open to foreign direct investment, although foreign direct investment in certain types of electronics activities has certain conditions or restrictions. The smartphone manufacturing industry is an example: the government has announced a 30 percent minimum local content requirement for the manufacturing of 4G Long Term Evolution (LTE) smartphones, which came into force on 1 January 2017. Areas that are closed to foreign direct investment include the electronics retail trade and telecommunications/aids to shipping navigation and vessel traffic information system (VTIS). Electronic manufacturers in the country are also obliged to apply the national industrial standard (SNI) in televisions, clothes, irons, washing machines, and air conditioners, among other products. The government has appointed an independent Product Certification Institution (LSP) to issue the certificates.

In the automotive sector, 100 percent foreign participation is allowed. Some areas are closed for foreign direct investment such as automotive retail, and parts and components retail.

Source: Authors.

In terms of distortions to competition, a significant issue for Indonesia is the role of SOEs in some sectors. According to OECD (2015), there is at least one SOE in the following sectors: air transport, banking, broadcasting, construction, courier services, distribution, insurance, maritime transport, logistics, and telecommunications. Experience in other countries shows that the most crucial reform is not necessarily changing these ownership structures, but instead is introducing effective competition on a level playing field. SOEs need to be subject to the general disciplines of competition law, and more importantly, the competition authority needs to have the power, independence, and political backing to make it possible to go after infringements forcefully. Once a sector is competitive, there can potentially be additional efficiency gains from moving ownership into private hands, but the key reform is really competition focused. For instance, Australia's telecommunications sector is highly competitive, even though the historical supplier remains under majority government control. The company has to compete on the same basis as all others, and new entrants have had frequent resort to the competition authorities to ensure that issues like network access are fairly dealt with.

The air transport sector – one that is particularly important for moving high-value parts and components within GVCs (Arvis and Shepherd, 2016) – is a case in point. An equity restriction is in place, set at 50 percent for domestic and international traffic. Perhaps even more seriously, the flag carrier, Garuda, is exempted from competition law. As a result, there is no real competitive regime governing take-off and landing slots, and fares are regulated on domestic routes. This market environment makes it difficult for foreign providers to be competitive, even though there are now well-established low-cost carriers in ASEAN. It is likely that difficulties in moving goods by air quickly and reliably hampers the performance of manufacturing firms that could potentially be part of GVCs.

4. Conclusion and policy implications

This chapter has presented data consistent with the argument that services sector performance – and especially the state of regulations governing market access – represents a significant drag on Indonesia's manufacturing sector, and holds back its involvement in GVCs. The focus here has been on electrical products and transport equipment, but the argument likely holds for other sectors too. Services are key inputs into the production processes of many GVCs, so the ability of firms to access competitively priced, reliable, high-quality offerings is a crucial determinant of competitiveness.

What can policymakers in Indonesia do to try and improve the situation? In answering this question, it is important to be mindful of the way in which services sector reforms should be sequenced. First, the government's priority should be on strengthening the competition policy framework, and removing measures that exempt particular operators or sectors (like some aspects of air transport) from its scope. Market disciplines can spur productivity growth and efficiency gains, which have significant flow-on effects on downstream manufacturing industries. Reinforcing competition policy and strengthening competition authorities are key priorities moving forward, with an emphasis on the services sector.

Second, it is important to liberalise market access conditions in GATS mode 3 (commercial presence). The available evidence suggests that Indonesia is quite restrictive on this front. Yet geographical proximity between supplier and consumer remains important in the services context, so in all likelihood these measures have a strongly distortionary effect. Liberalising them could allow local firms, including manufacturers, to access services from the world market, achieving the best combination of price and quality. The result would be to boost the productivity of manufacturers, including exporters. At the same time, the need to trade services without significant barriers is important to the broader operational viability of GVCs, so liberalising entry in this way would make it possible to extend the GVC business model more broadly. Linked to this agenda, but coming as the final stage of reform, would be a programme to divest from state-owned enterprises in the services sector. It is unlikely that state ownership does much to promote performance – indeed, it may even hold it back. Social goals, such as widespread access, of course remain important, but other mechanisms are more efficient, such as consumption subsidies for low-income people. In any event, introducing competition and lowering market entry barriers is likely to result in lower, not higher, prices in many cases, although regulated domestic airfares may be an exception.

Third, and related to the other two, Indonesia needs to lock in these kinds of reforms, including through the use of external anchors like trade agreements. In theory, some restrictive measures should already have been removed in the ASEAN context – but more work needs to be done to ensure implementation on the ground. Similarly, in the context of ASEAN+, ASEAN++, and eventually the Regional Comprehensive Economic partnership (RCEP), there is scope to be ambitious in terms of the level of services liberalisation undertaken. Although care is needed with this kind of preferential liberalisation, as it may lead to trade diversion, the available evidence suggests that at least for mode 1 trade, the effect is less apparent than for goods (Miroudot and Shepherd, 2014). Empirical evidence is not yet in for mode 3, but there is scope to use open 'rules of origin' (based on legal establishment, for example) to favour the broadest possible market access arrangements.

Clearly, reforming services markets is not enough on its own to catapult Indonesia into the leading ranks of GVC performance in East and Southeast Asia. Nonetheless, it is an important element. More broadly, though, there will need to be a shift in governmental and potentially also commercial thinking, away from the domestic market and towards regional and global markets. Rather than looking to serve the admittedly large domestic market, firms, supported by the government, should be looking to develop enduring export competitiveness at a global level. Large though it is, Indonesia's market in gross domestic product terms is still considerably smaller than the main developed country markets like the US and the European Union. Leveraging GVCs to break further into these markets should be a priority, and recent developments in ASEAN, combined with necessary reforms, certainly provide the basis to do so.

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6 Development of exports in Indonesian manufacturing

A look at micro data

Ari Kuncoro

1. Background

How a country or a firm can sustain its exports in the international market has received a great deal of attention. Most of the existing literature has focused on the interaction between productivity and trade (Damijan et al., 2010; Crespi et al., 2008; MacGarvie, 2006). Empirically, this is tantamount to investigating the direction of causality between exports and productivity. One hypothesis is that being an exporter is a result of a self-selection process in which only more productive firms go into export markets simply because high entry costs do not allow low-productivity firms do so.

Once exports are established, the next issue is product upgrading, that is whether manufacturing or manufacturing exports move to higher value added products. Products upgrading is a must if a firm or country wants to stay competitive (Wagner, 2007; MacGarvie, 2006; Crespi et al., 2008). The export market is the avenue through which firms can learn to improve their products. It is suggested that competition pressure in the international market has forced firms to learn from whatever technologies and information is available to stay competitive.

The international market not only has become the source of imported inputs and machinery, but also the source of financing. Chaney (2005) extends the export and productivity upgrading link to incorporate a liquidity constraint.[1] With this new development, the biggest impediment to export upgrading is not only low productivity but also lack of access to finance (Manova, 2008; Muuls, 2008).

The last two decades saw the evolution of production methods from the concentration of all stages of production in a single factory or a few factories to production networks. As a consequence, the use of domestic raw materials and intermediate inputs may decline as they are replaced by imported ones if they are not of the same quality. The use of imported inputs is not only limited to those involved directly in international value chains. A firm willing to upgrade the quality of its products may also use imported inputs simply because they are not available from domestic producers. The use of imported inputs may also be accompanied by research and development (R&D), particularly in the

DOI: 10.4324/9781315161976-6

production process and not necessarily in product innovation. Because product quality is unobservable, exporting activity itself in contrast to non-exporting can also be considered as product upgrading, even if there is no change in product line.

To grasp the dynamic of the development of manufacturing exports, the study first looks at the structural change in Indonesian exports in manufacturing at the industry level (Standard International Trade Classification, SITC). It also examines factors behind the structural change in Indonesian exports in manufacturing at the firm level through firm entry and exit, particularly factors that are internal to firms and industries such as ownership, financing, distribution network, skill intensity, and R&D, as well as those external to firms and industries such as infrastructure and government regulations. We are interested not only in the incidence of exports, but also in the persistence or the sustainability of exports, that is how long can exports be maintained once market penetration has been achieved.

2. Signalling export development: a look at micro-data

2.1 Structure of manufacturing exports

Due the difficulty of observing product development in micro-data, export development in broad terms is defined as going to the export market. The data set then would cover both exporter and non-exporter. The logic is that unless a firm possesses high-quality products, it would be difficult to compete in export markets.

The evolution of export product features like quality, sophistication, and so on cannot be observed from annual manufacturing surveys. Indirectly, however, at the firm level, export orientation, productivity decomposition, and the entry-exit of exporting activities can be used to extract information on product development. This is tantamount to a signal extracting problem. Analysis at a more aggregated level, for example at two-digit ISIC (International Standard Industrial Classification), can only provide a hint of the direction or signal a change (Table 6.1). The subsequent tables make use of information from the surveys by aggregating it into two-digit ISIC.[2]

One striking feature is the dominance of food. Starting with a modest share in 1991 (12.1 percent), it reached its peak in 2000 with a commanding share of 40.9 percent. In 2013, it still retained the largest share with 34.1 percent of total manufacturing exports. Chemicals came in second place in 2013, with a 22.1 percent share, down from 37.1 percent, which was the highest share in 2010. Machinery had the third largest share. Although by no means small, its share has never exceeded 20 percent, a reflection of Indonesia's stagnating if not declining involvement in international production networks (Ando and Kimura, 2013). The large share of food in manufacturing exports also explains the Indonesia choice of the 'easy way' to go to export markets, particularly due

Table 6.1 Distribution of manufacturing exports (as percentage of total manufacturing)

	1991	*1996*	*2000*	*2006*	*2010*	*2013*
Food	12.1	11.7	40.9	21.1	15.6	34.1
Textiles	21.3	29.2	20.2	17.0	13.2	14.0
Wood	36.9	36.9	13.9	9.1	3.9	2.7
Paper	3.6	3.6	5.1	6.0	5.8	5.1
Chemical	13.9	13.9	5.0	19.8	37.1	22.1
Non-metals	1.6	1.6	2.0	2.6	0.6	2.0
Basic metal	2.8	2.8	4.8	2.6	4.7	3.0
Machinery	6.4	6.4	6.8	19.8	16.1	14.7
Others	1.4	1.4	1.4	2.0	2.9	2.3

Source: Author's calculations based on annual manufacturing surveys, 1991–2013.

Table 6.2 Ranking of logistic performance index

Country	*2007*	*2010*	*2014*
Singapore	1	2	5
Malaysia	27	29	25
China	30	27	28
Thailand	31	35	35
Indonesia	43	75	53
Viet Nam	53	53	48
Philippines	63	44	57
Cambodia	81	129	83
Bangladesh	87	79	108
Lao PDR	117	113	139

Source: World Bank, 2014.

to factors that contribute to the high cost of doing business in Indonesia, such as high logistic costs and regulatory burden (Table 6.2 and Figure 6.1).

Indonesia dropped quickly in the ranking within a short time, from 43rd place in 2007 to 75th place in 2010, due to a significant decline in its overall score. Its score improved in 2014, but it only partially recovered in rank, to 53rd, which means other countries were doing much better than Indonesia. This also suggests that there is fierce competition among countries in 'the middle of the table' to improve competitiveness through their logistics systems.

In terms of real growth in the aftermath of the Asian Financial Crisis (AFC), the period from 2000 to 2006 was a consolidation period (Table 6.3), during

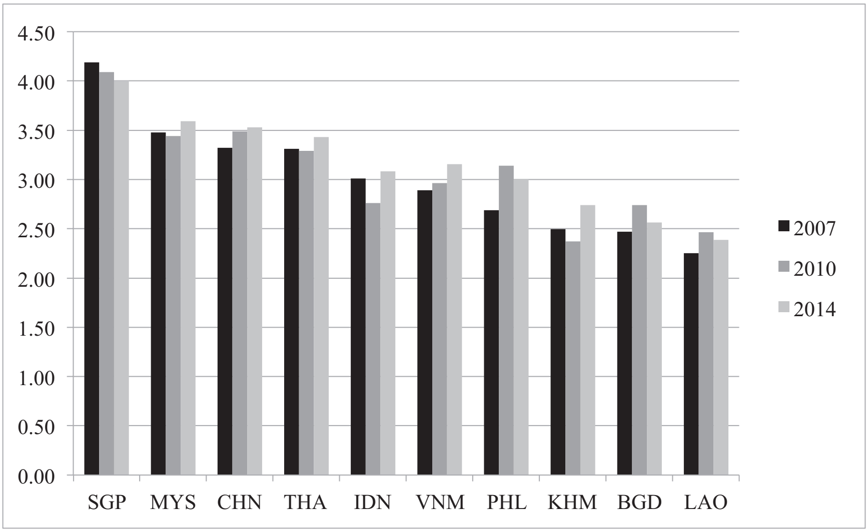

Figure 6.1 Logistic performance index (score)

Source: World Bank, 2014.

Notes: BGD = Bangladesh, CHN = China, IDN = Indonesia, KHM = Cambodia, LAO = Lao PDR, MYS = Malaysia, PHL = Philippines, SGP = Singapore, THA = Thailand, VNM = Viet Nam.

Table 6.3 Real export growth, 2000–2013

Industry	*2000–2006*	*2006–2013*
Food, Beverages and Tobacco (31)	–5.0	14.2
Textiles, Garments, Leather and Shoes (32)	–8.5	4.8
Wood and Wood Products (33)	–10.2	–9.4
Paper and Printing (34)	–7.3	7.4
Chemicals, Fertiliser, Rubber and Plastics (35)	32.5	8.3
Cement and Non-metal (36)	6.9	3.5
Basic Metals (37)	–9.6	3.7
Machinery (38)	26.2	1.5
Others (39)	7.2	6.7

Source: Author's calculations based on annual manufacturing survey.

which only chemicals and machinery registered positive growth. From 2006 to 2013, wood continued to post negative growth, but the other industries began to show significant improvements. Machinery, however, slackened as exports needed to find new destinations as well as product upgrading to maintain growth.[3]

Within the food sector, the evolution is towards a more capital-intensive processed food industry at the expense of more traditional branches such as rice and sugar, dried foods, and beverages. What is interesting is the resurging of tobacco exports (Table 6.4) despite the national anti-smoking campaign having gained momentum recently. So it seems domestic excess supply is being turned into exports. The takeover of several domestic producers by foreign multinationals may also have played a part in this resurgence.

In chemicals, the former dominance of rubber and plastic products was taken over by basic chemicals and fertiliser in 2013. A surge in basic chemicals and fertiliser in 2013 may reflect the excess capacity in the industry (Figure 6.2a). In machinery, electronics, though in decline, still had the largest share of the industry's exports in 2013 (Figure 6.2b). Since 1991, the shares of transportation equipment and automotive parts have steadily grown, reflecting the role of

Table 6.4 Food industry exports (percent of total food)

Year	*Processed Food*	*Sugar*	*Beverage*	*Tobacco*
1991	65.4	17.6	1.8	15.2
1996	75.5	15.7	2.3	6.6
2000	58.6	33.2	7.2	0.9
2006	74.6	13.2	0.3	11.3
2010	78.5	11.4	1.4	8.7
2013	74.5	8.0	0.8	16.7

Source: Author's calculations based on annual manufacturing survey, 1991–2013.

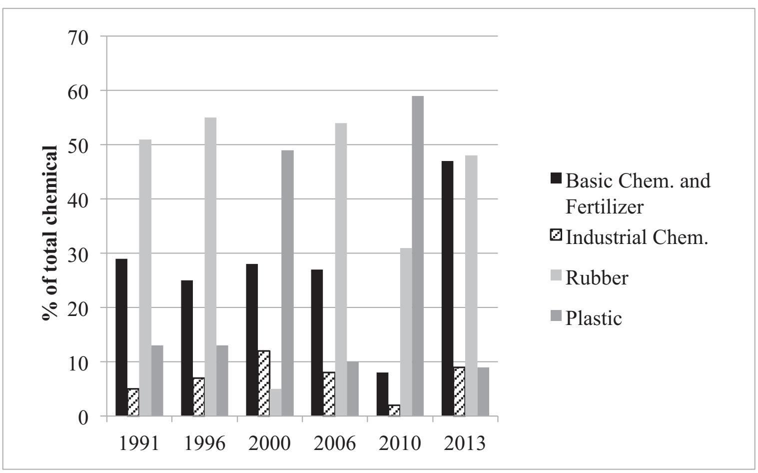

Figure 6.2a Manufacturing chemical exports

Source: Author's calculations based on annual manufacturing surveys, 1991–2013.

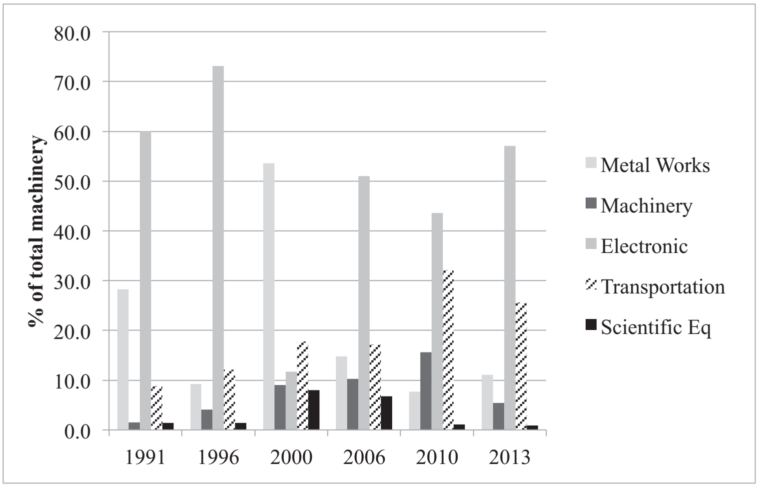

Figure 6.2b Machinery exports

Source: Author's calculations based on annual manufacturing surveys, 1991–2013.

Japanese multinationals in the industry's international value chain. The year 2010 seemed to be exceptionally good for transportation, as it reached its highest-ever share of 32 percent. By 2013, its trend was back to its normal pattern.

Table 6.5 depicts exports at the five-digit ISIC level. The criteria used is that an industry must have a share of at least 5 percent of the total two-digit industry in which it belongs. The table compares the top four foreign exchange earners before the AFC – food, machinery, chemicals, and textiles. At the bottom of the table is the Herfindahl index, which is the sum of squared export shares within the respective two-digit ISIC industrial categories. The smaller the figure, the more evenly exports are distributed.

Food is the only industry with an increasing Herfindahl index, which means food exports are increasingly made up of fewer products. Exports are dominated by palm cooking oil, followed by other non-palm-based cooking oils.

As indicated by a decreasing share of textiles in Indonesian manufacturing, the industry is restructuring itself for the future by shifting more towards garments with a degree of involvement in the international value chain that is higher than for textiles. The share of garment exports in the industry (ISIC 32) in 2013 is at the top of the table, at 30.3 percent, compared with 12.4 percent in 1996 (third place).

In chemicals, crumb rubber remained dominant, though its share fell from 38.2 percent in 1996 to 30.9 in 2013. A more dynamic pattern can be seen in the rest of the industry. Other non-organic and consumer housewares had

Table 6.5 Manufacturing export performer

1996			*2013*		
Industry	*Code*	*(%)*	*Industry*	*Code*	*(%)*
Food, Beverages and Tobacco (ISIC 31)					
Frozen seafood	31144	22.3	Palm cooking oil	31154	26.4
Palm cooking oil	31154	11.3	Other cooking oil	31151	23.8
Other cooking oil	31151	11.1	Cigarette kretek	31420	15.0
Coffee peeling	31163	5.7	Frozen seafood	31144	12.8
Chocolate peeling	31164	5.5			
Rice mill	31262	5.4			
Herfindahl index = 0.091			Herfindahl index = 0.168		
Textiles, Garments, Leather and Footwear (ISIC 32)					
Weaving	32114	28.4	Garments	32210	30.3
Fibre preparation	32111	27.3	Fibre preparation	32111	17.8
Garments	32210	12.4	Weaving	32114	13.0
Sporting shoes	32412	11.8	Clothing printing	32116	6.8
Knitting	32130	9.9			
Herfindahl index = 0.195			Herfindahl index = 0.031		
Chemicals, Fertiliser, Rubber and Plastic products					
Crumb rubber	35523	38.2	Crumb rubber	35523	30.9
Chlorine and alkaline	35511	15.5	Non-organic gas	35112	11.9
Other non-organic	35119	7.5	Synthetic resin	35131	10.3
Fertiliser	35112	6.7	Fertiliser	35112	6.2
Consumer houseware	35695	6.6	Chlorine and alkaline	35511	5.7
Herfindahl index = 0.000142			Herfindahl index = 0.000107		
Machinery, Electronic, Transportation and Scientific Equipment					
Radio and television	38321	51.8	Radio and television	38321	23.7
Recording media	38324	13.0	Automotive components	38433	14.9
Motorcycle	38441	6.7	Electricity accumulator	38391	11.2
			Other electricity equipment	38399	10.4
			Electric and phone wire	38396	5.3
Herfindahl index = 0.293			Herfindahl index = 0.109		

Source: Author's calculations based on annual manufacturing surveys, 1996–2013.

dropped out of the top five by 2013, replaced by synthetic resin and non-organic gas. The Herfindahl index is very small and decreasing, which suggests the industry's exports (ISIC 35) are well-distributed across sub-branches.

Machinery showed greater dynamism. In terms of its export share, the industry is still dominated by radios and televisions, but their share dropped dramatically in just seven years, from 51.8 to 23.7 percent. By 2013, newcomers had completely displaced other sub-sectors that used to make up the top five.

Automotive components, electricity accumulators, other electrical equipment, and electrical and phone wires were in the top five or at least had a 5 percent share. The Herfindahl index decreased, but was still not small. What is interesting is the category of 'other' electronic equipment, which contains everything that elsewhere cannot be grouped under one category. So in recent years there must be new products coming in not captured by the ISIC classification.

Automotive components had clearly become the strongest performer in 2013 (Aswicahyono et al., 2010), due to the dominant presence of Japanese multinationals in the automotive industry. Beside the electronics industry, this is perhaps the only branch in Indonesia where firms are intensively involved in the international production network. To summarise, although still lagging behind other countries in Southeast Asia, looking at the more disaggregated industrial branches shows that at least in manufacturing, some exports have moved in the direction of higher technological content, albeit at a very slow pace.

2.2 The role of productivity

Productivity appears to be the key for firms to venture into export markets (Figure 6.3). We use foreign direct investment (FDI) versus non-FDI as an example.

Generally, labour productivity of FDI is twice as high as its domestic counterpart. There is an academic debate about whether productivity precedes export activity or vice versa. One view suggests that openness is important for firms to improve productivity. Increasing imports and inward FDI brought about by

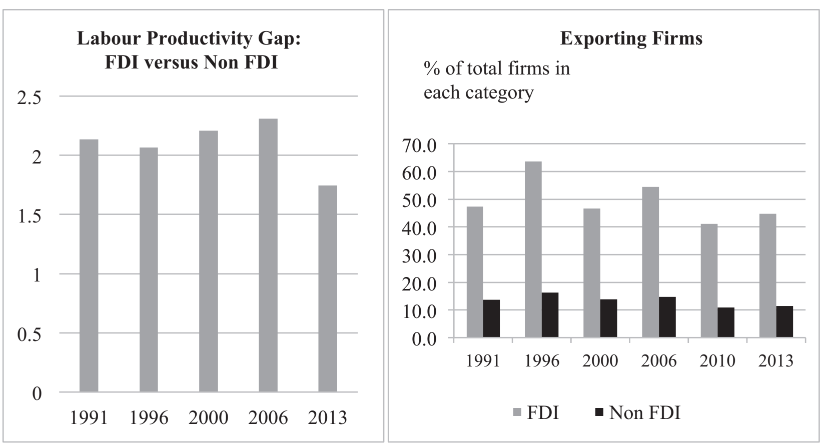

Figure 6.3 Productivity gap: FDI versus non-FDI and export orientation

FDI = foreign direct investment.

Source: Author's calculations based on annual manufacturing surveys, 1991–2013.

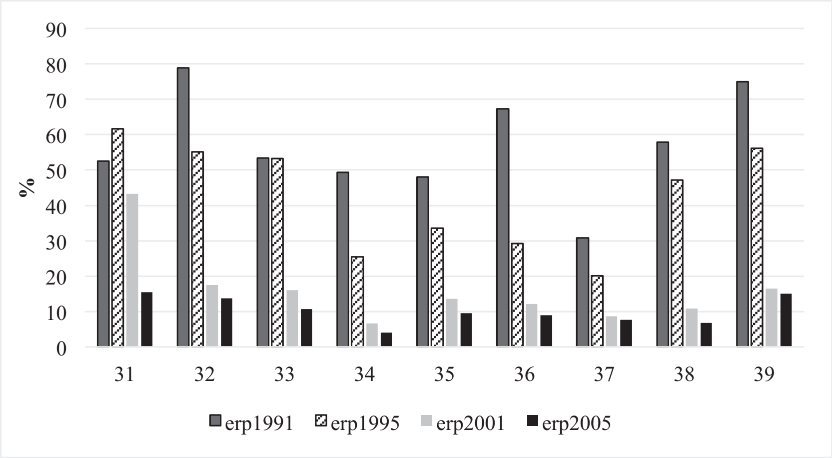

Figure 6.4 Effective rate of protection, 1991–2005
Source: Amiti and Konings (2005; 2007) and Widodo (2008).

lowering trade barriers would intensify competition in the domestic market and erode domestic firms' profitability. This would force domestic firms to produce more efficiently (Bertschek, 1995).

One way of staying competitive is to improve productivity. Openness allows developing countries to progress rapidly up the learning curve without having to undergo the lengthy and expensive process of discovery, by accessing ideas, technologies, and best industrial inputs developed elsewhere and putting them into practice after some modification (Bloom, 2002).

As far as tariffs are concerned, Indonesia's effective rate of protection (ERP) is already low (Figure 6.4). It had also been decreasing across the two-digit ISIC industrial category. The question then is how this translates into higher industry- or economy-wide productivity. An industry or economy will be moving towards higher productivity if as a result of openness the performance of high productivity sectors spills over to low productivity sectors.

Unlike export orientation and productivity, the relationship between openness and productivity is not straightforward. There is no discernible pattern between openness (represented by ERP) and productivity growth (Figure 6.5). There are many intervening variables such R&D, imported inputs, exit and entry, and structural change or labour relocation effects of productivity growth. Regarding the last issue, we need to examine whether the economy/industry has experienced structural change, that is if the share of employment in high-productivity sectors has increased.

To assess this, we need to decompose labour productivity growth into two components – a 'within' component and structural or shift elements (McMillan et al., 2014). This exercise relies on productivity growth analysis. Productivity growth could take place within sub-industries or branches through

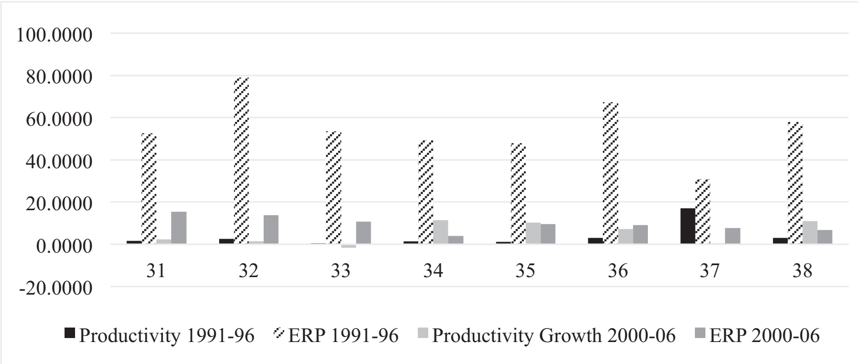

Figure 6.5 Productivity growth and ERP

ERP = effective rate of protection

Source: Manufacturing Surveys, Amiti and Konings (2007) and Widodo (2008).

capital accumulations, technological change, or reduction of misallocation across plants. Also, labour can move across manufacturing branches from low-productivity to high-productivity industries, improving overall labour productivity in manufacturing. In terms of decomposition, this can be written as

$$\Delta Y_t = \sum_{i=n} \theta_{i,t-k} y_{i,t} + \sum_{i=n} y_{it} \Delta \theta_{i,t} \tag{1}$$

Where Y_t and y_t refer to manufacturing-wide and sub-industry labour productivity level, respectively.

The Δ operator points to the change in productivity or employment shares between $t - k$ and t. The first part of Equation (1) is called the within component of productivity growth, which is the weighted sum of productivity growth within individual sub-industries, where the weights are the employment share of each sub-industry at the beginning of the period of analysis.

The second part of Equation (1) represents the productivity effect of labour reallocation across different sub-industries within manufacturing. This part is called the structural change term. This term will be positive if changes in employment shares are positively correlated with productivity levels.[4] Structural change would increase manufacturing-wide productivity growth.

Equation (1) shows that analyses of productivity performance within individual sub-industries can be misleading if large productivity differences across manufacturing branches are present. A high rate of productivity growth within a sub-industry may have an ambiguous impact on overall manufacturing performance if the sub-industry's share of employment declines rather than expands. If the laid-off labour moves to low productivity sectors, then manufacturing-wide growth will diminish or even be negative.[5]

Negative productivity growth in the 1991–1996 period reflects a specialisation in low value added and labour-intensive manufacturing. The period 2000–2006 saw a shakeup in manufacturing following the AFC (Figure 6.6). The structural change was very strong, indicating high mobility between industries. The productivity growth was positive, but still relatively low in compared to the structural change part. In the 2006–2013 period, the structural change was significantly weakened mainly due to the effect of increasing rigidity in the labour market regulatory environment (Aswicahyono et al., 2010). The productivity growth was lower than in the 2000–2006 period. In terms of manufacturing exports, Indonesia is therefore still relatively locked into low productivity products. Still, productivity growth is an important factor behind exports. Productivity growth that is more dynamic in the context of competitiveness is shown in Table 6.6.

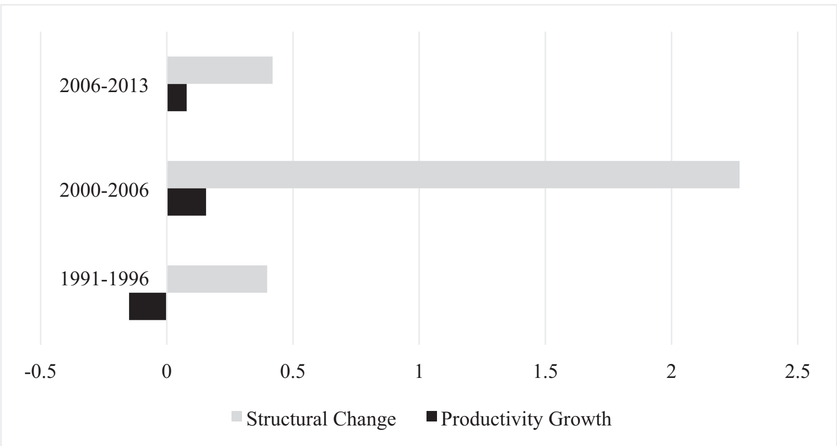

Figure 6.6 Manufacturing export productivity decomposition, 1991–1996
Source: Author's calculations based on annual manufacturing surveys.

Table 6.6 Productivity growth, 1991–2013

Industry	*1991–1996*		*2000–2006*		*2006–2013*	
	Exporter	*All Firms*	*Exporter*	*All Firms*	*Exporter*	*All Firms*
Food	0.0169	0.0062	0.0222	0.0046	0.0085	0.0084
Textiles	0.0250	0.0312	0.0138	–0.0040	0.0167	0.0130
Wood	0.0037	0.0031	–0.0171	–0.0189	0.0041	0.0046
Paper	0.0145	0.0189	0.1140	0.0891	0.0011	0.0025
Chemicals	0.0111	0.1644	0.1030	0.0648	0.0146	0.0085
Non-metals	0.0304	0.0618	0.0731	0.0280	0.0230	0.0205
Basic metal	0.1714	–0.0102	0.0054	0.0298	0.0425	0.0179
Machinery	0.0310	0.1373	0.1108	0.0621	0.0268	0.0181

Source: Author's calculations based on annual manufacturing surveys.

Except for wood, chemicals, and basic metals, exporters generally have higher productivity growth than their non-exporting counterparts. This applies to manufacturing-wide industries, but it may harder to detect if one looks at the micro-data for each individual industrial branch. For this we may have to resort to econometric tests.

2.3 Entry and exit

In terms of their performances, food and textiles show a healthy balance between productivity growth and structural change. Textiles, despite its declining export share throughout the years, is now stable at around 14 percent of manufacturing exports (Table 6.1). The term 'sunset industry' is perhaps a little premature here. One thing that may explain this observation is the entry and exit process of exporting at the industry.

At the aggregate level of the five-digit ISIC classification, an indication of the dynamic of the industry can be derived from how many new five-digit ISIC industries are added in the respective two-digit ISIC industries. Comparing 1996 and 2013, food added three new five-digit industries, which is the same as for machinery. Chemicals had four more five-digit industries by 2013, while textiles had the smallest addition of new industries (Table 6.7).

The preceding exercise is an attempt to capture the dynamic of industries at the aggregate level. A finer observation at the firm level may be needed. An influx of new exporting firms is needed to reinvigorate an industry because they bring new technologies, new skilled manpower, and new ideas. To examine the entry and exit process, at least two points of observations are needed. Due to the problem of firm identifier only two periods can be observed, 1991–1996 and 2000–2008. The results are presented in Table 6.8.

For the period 2000–2008, food and textiles have the highest rates of exit and entry of 51.4 percent and 52.8 percent, respectively, or about 6.4 percent and 6.6 percent per year. The entry rate for food is lower than the exit rate at 33.1 percent, which means fewer firms in the industry are still exporting. This also could mean the reorganisation of the industry through merger, acquisition, or simply through exit and entry. This high turnover may explain a large positive labour relocation effect, though the industry's exports are concentrated in palm oil.

Table 6.7 Dynamic of ISIC5 development, 1996–2013

ISIC 2	*Number Exporting ISIC 5*				
	1996	*2013*	*Survive*	*Exit*	*New*
Food (31)	70	73	70	0	3
Textiles (32)	28	30	28	0	2
Chemicals (35)	49	53	49	0	4
Machinery (38)	79	81	78	1	3

Source: Author's calculations based on annual manufacturing surveys.

Table 6.8 Firm level entry and exit in exporting, 2000–2008

Industry	*% Stay*	*% Exit*	*% Entry*	*% Net Entry*
Food (31)	48.6	51.4	33.1	–18.3
Textiles (32)	47.2	52.8	53.0	0.2
Wood	53.2	46.8	37.3	–9.5
Paper	49.3	50.7	45.1	–5.6
Chemicals	63.8	36.2	27.8	–8.4
Non-metal	57.7	42.3	42.3	0.0
Basic metal	50.0	50.0	25.0	–25.0
Machinery	51.7	48.3	37.3	–11.0
Others	61.2	38.8	30.6	–8.2

Source: Author's calculations based on annual manufacturing surveys.

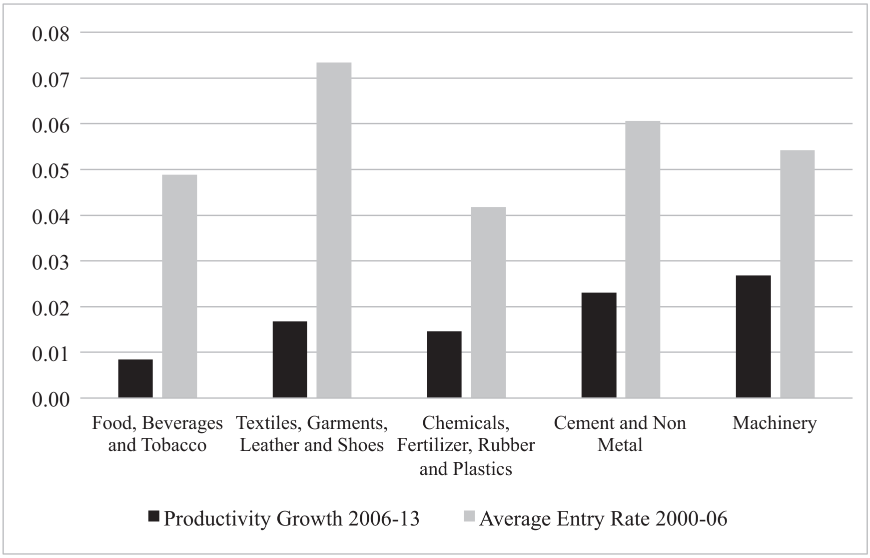

Figure 6.7 Entry rate and productivity growth

Source: Author's calculations based on annual manufacturing surveys.

From 2000 to 2008, the exit and entry rates for textiles were large, but they were almost even (52.8 versus 53.0 percent) and thus the net entry rate is positive but close to zero. This is the only industry with positive net entry. Other industries basically show negative net entry rates, which indicates the difficulties of exporting (Table 6.6).[6] High logistics cost is one explanation, but other factors such as declining foreign demand and fiercer competition from other low-cost countries may also play a part.

In Figure 6.7, the average annual productivity growth in 2006–2013 graphed against lagged entry rates suggests that despite a negative net entry rate, the influx of new firms after some lags had a positive impact on manufacturing in the form productivity growth. This is in line with Aswicahyono et al. (2010), who suggests that most growth in the wake of the AFC came from existing firms rather than new entrants, which was true. Entrants would later impact productivity growth positively, simply because the exit of old firms with lower productivity.[7]

2.4 Research and development (R&D)

The biggest problem in analysing R&D in Indonesian manufacturing is that the information is not always available for every year. The only data sets containing the data for R&D are the 1995, 1996, 1999, 2000, and 2006 surveys. The incidence of R&D is higher for exporters than for the general firm population for all ISIC two-digit industries (Figure 6.8).

Most R&D takes the form of process innovation, mainly experimenting how to fit a combination of domestic and imported inputs into a new set of machinery and equipment to produce high-quality products for export. Process innovation involves a substantially improved or new production process through the introduction of new process equipment or re-engineering of the operational process (Findlay and Pangestu, 2016).[8] As a consequence, there is a positive correlation between carrying out R&D and acquisition of new machinery/equipment (Figure 6.9). One policy implication is that openness in machinery imports is necessary to sustain export activity/productivity in manufacturing.

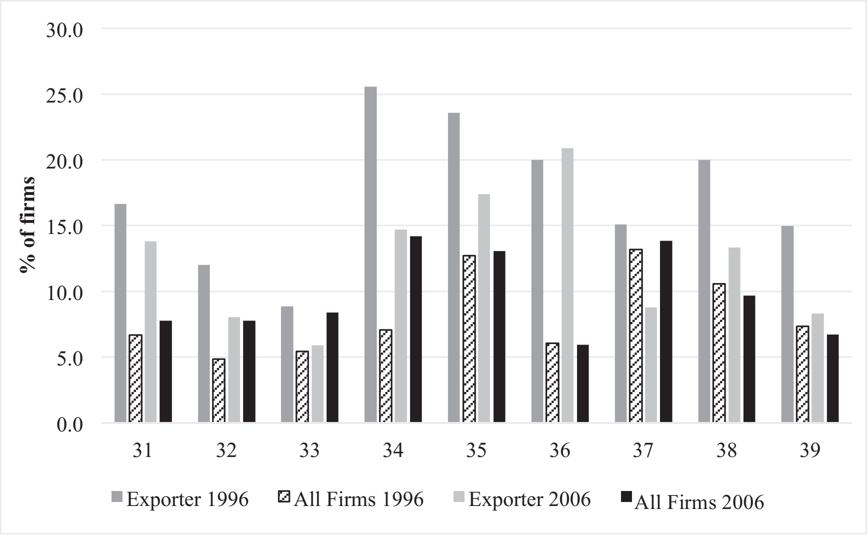

Figure 6.8 Firms carrying out R&D, 1996–2006

Source: Author's calculations based on annual manufacturing surveys.

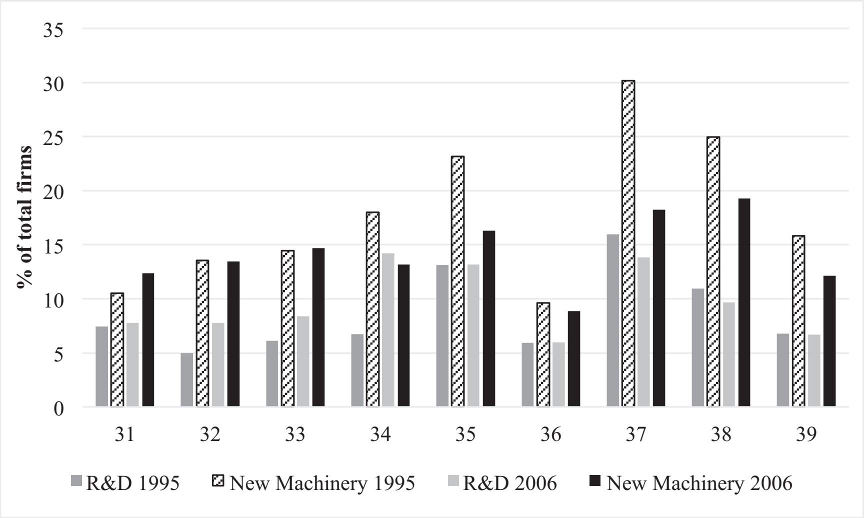

Figure 6.9 Machinery investment and R&D activity, 1995–2006

Source: Author's calculations based on annual manufacturing surveys.

2.5 *Imported inputs*

If a firm is producing under a manufacturing contract for a principal abroad, it almost certainly has to meet strict criteria on inputs procurement. Even if a firm happens to be an independent producer, the availability of high-quality inputs is necessary to sustain the quality of export products to compete in the global market. Except for 2013, the association between import and export orientation is quite strong (Figure 6.10). Imported inputs go up and down with the ratio of exports to output. The use of imported inputs is also tied to the use of new technology embedded in new machinery to stay competitive in export markets. Any policies that restrict these types of imports is bound to be counterproductive.

Certainly, the use of imported inputs exposes firms to the risk of exchange rate volatility. While private hedging is advisable in the short run, in the long run it is perhaps socially optimal for the government to invite both domestic and FDI firms to invest in the production of intermediate inputs in Indonesia. As most intermediate input producers generally are small-medium and medium-sized companies, the trade regime must not discriminate against firms on the basis of size. At present, large firms, both of the non-FDI (facility firms or PMDN= *Penanam Modal Dalam Negeri*) and FDI type get priority in terms of starting a business, other licensing requirements, and custom facilities, to name but a few.

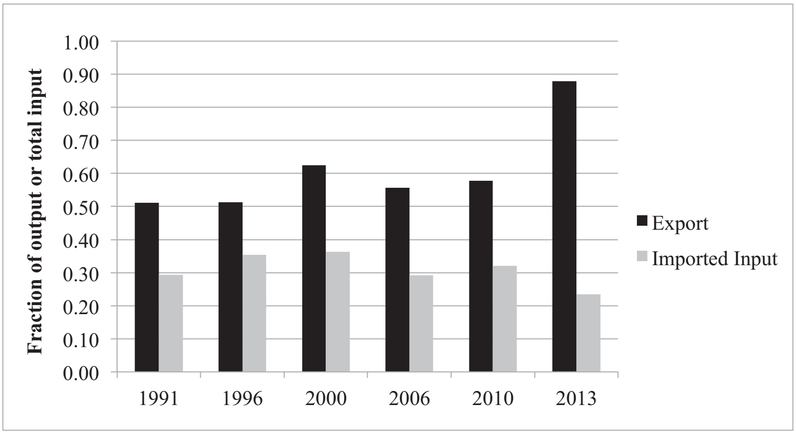

Figure 6.10 Imported output and export orientation, 1991–2013
Source: Author's calculations based on annual manufacturing surveys.

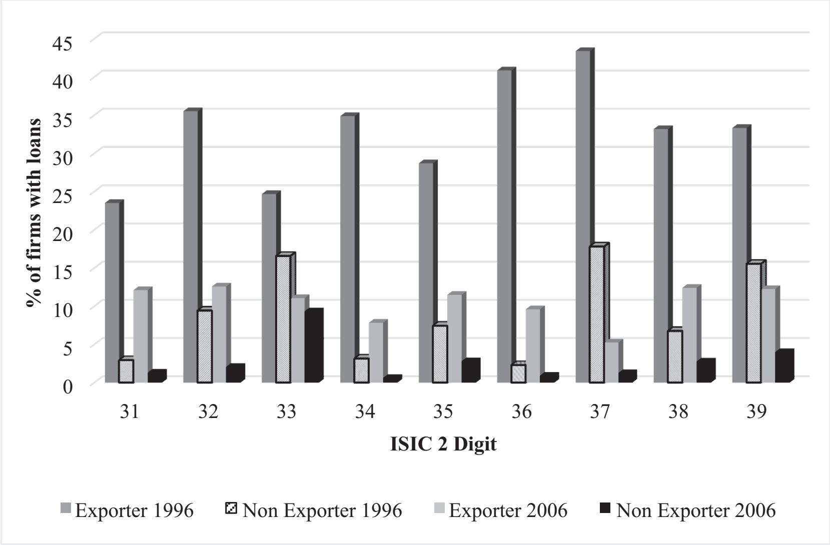

Figure 6.11 External loan and export orientation, 1996–2006
Source: Author's calculations based on annual manufacturing surveys.

2.6 External finance

Firms with external loans are more likely to be exporters (Figure 6.11). The availability of external funding would shift the entire production function outward. So for every level of input usage, output would be higher. In other words, it results in a productivity improvement and greater potential to be an exporter. This is because firms can spend on the investment needed to support higher productivity.

Fazzari et al. (1988) and Hubbard (1998) provide the theoretical and empirical framework underpinning the relationship between cost/access of borrowing and investment. In this setting, a firm is considered to be financially constrained if the cost or availability of external funds prevents it from making the optimum level of investment, so productivity will fall. The actual investment can differ from the optimum one if the available internal funds from cash flows (CF) are less than they should be. In the other case, the level of cash flows is binding below the level of the optimum investment I^*_{it} or $I_{it} = Min(I^*_{it}, CF_{it})$. The role of external funding is to supplement internal funds so as to obtain I^*.

3. Empirical strategy

In setting up the empirical model, we acknowledge that product development is unobservable. What we can trace are some signals of product development. Perhaps the most obvious signal is actually entering the export market as with only 'domestic quality' it would be difficult for firms to penetrate export markets. Improved productivity may also signal product development along with R&D and access to external finance.

3.1 Theoretical framework: export product development

Putting together all the information previously given, a simple model is developed. Assuming that a firm has decided to go to the export market and hence needs to upgrade its product, product upgrading would be feasible if

$$E(\pi_f) - C_f + \pi_d \geq 0 \tag{2}$$

where E is the expectation operator, π_f is the profit from the upgraded product, C_f is the minimum cost of product development or upgrading to penetrate export markets, which is assumed to be a function of imported input (M) and R&D, and π_d is the profit of the old product. The cost of product development includes the expenses for setting up new machinery. Imported inputs of raw materials and semi-finished goods are also necessary to achieve an acceptable minimum quality in export markets, particularly if domestic industries cannot produce the essential inputs required for the production process. Also, experimentations with various mix of domestic and imported inputs without sacrificing quality are necessary to minimise the impact of exchange rate volatility on the production process.

The term $E(\pi_f) - C_f$ is crucial because it determines whether entering the export market and/or product upgrading pays. If the uncertainty is too high and/or the cost of product development is high, then the term would be negative: product upgrading is tantamount to wasting money. If this term is not negative, it is still possible that a firm finances its product upgrading internally from its profits or retained earnings. A firm, therefore, has to bear all risks itself. In this situation, product upgrading may be a rare possibility, which only firms with very high productivity can afford to undertake.

By assuming constant returns to scale, technology for K and L in the production function, if a firm chooses to go to the export market, the production function can be presented as:

$$Y = K^{\alpha} L^{\beta} M^{(1-\alpha-\beta)+(\theta D)} R^{\theta D} \tag{3}$$

Where Y is exported output, K is capital stock, L is labour, M is imported input, R is R&D, and $\theta > 0$. In Equation (3) R&D is a shift factor that allows a firm to follow a different productivity track. In Equation (3) D is a dichotomous variable with the value of one if $E(\pi_f) - C_f > 0$. If a firm decides not to go to the export market because $E(\pi_f) - C_f < 0$, the production function would be:

$$Y = K^{\alpha} L^{\beta} M^{(1-\alpha-\beta)} \tag{4}$$

Obviously, equations (3) and (4) have different curvature, which reflects a different productivity track. The difference between equations (3) and (4) is huge. It would require a significant amount of resources for R&D, investment in machinery, supporting services, training, and currency hedging to venture into international markets. Things would be much better if firms have access to external financing (borrowing or selling shares in the capital market). The essence of external financing is to shift some of the risks associated with an upgrading venture to a third party (lender or capital market). Suppose instead a firm has access to external financing; then Equation (2) becomes

$$E(\pi_f) - C_f + A + \pi_d \geq 0 \tag{5}$$

where A is access to external financing. The presence of A absorbs the cost of product development at least partially, so the expected net profit from exporting is still positive. The higher the A term is, the more likely a firm is to choose exporting or upgrading than the case in Equation (2). Chaney (2005) predicts that because the cost of product development in essence is similar to a long-term investment, firms are not going to waste it.

Once a firm has successfully upgraded, it may continue to export for a long time. Furthermore, after firms have started export upgrading, credit constraints may still matter in affecting the value and growth of their exports particularly if continuing product development is needed to maintain future competitiveness. External financing may not only be critical for the first attempt, but also to support export persistence. For this, empirical testing is needed.

After considering equations (3), (4), and (5), the decision to export and to continuously upgrade the products can be combined as

$$D\tau = 1 \text{ if } [\mathrm{E}(\pi_f) - C_f + \mathrm{A} + \pi_d]_{\tau+i} > 0, i = 0,1,2\ldots T^*$$

$$D\tau = 0 \text{ otherwise} \tag{6}$$

where T^* is the total periods of observation. From Equation (4), the variable representing export persistence (t) after successful upgrading is

$$t = \sum_{\tau=1}^{T^*} D_\tau \leq T^* if \left[E(\pi_f) - C_f + A + \pi_d\right]_{\tau+i} \geq 0, i = 0,1,2,\ldots T^*$$

What is needed to examine this relationship is panel data of firms that shows exporting or no exporting over some periods of time, that is the incidence of exporting behaviour over a period of time. After defining the start of the 'observation' period, the dependent variable is thus the length of time a firm can sustain its export in the international market until it fails, or a time of failure, T, before the end of the observation period at $t = T^*$. Given T, the survivor function, which reflects the probability of surviving longer than t, is

$$S(t) = \mathrm{Prob}(T > t) = 1 - F(t) \tag{7}$$

$F(t)$ is the cumulative distribution function of a random length of time until failure is observed. The density function of t is given by $f(t) = S'(t)$. With these definitions, the hazard function can be written as

$$\begin{aligned} h(t) &= \lim_{dt\to 0} \frac{P(t < T < t + dt \mid T > t}{dt} \\ &= \frac{-S'(t)}{S(t)} \end{aligned} \tag{8}$$

The hazard function captures the probability of failure after it survives until time t.

From Equation (5) various forms of hazard functions can be used depending on the assumption of characteristics of failure. In its simplest form, the hazard function can be represented as

$$h(t \mid X, \beta) = h_0(t) g(X, \beta) \tag{9}$$

where X is a vector capturing factors that affect probability of failure (or survival), which include the type of industries, such as low value added and high value added ones. The parameter β comprises all coefficients to be estimated reflecting the influence of X on failure. The vector of coefficients β can be used to assess the impacts of explanatory variables on the persistence or duration of a firm as an exporter. This procedure will only work properly if for every year a firm identifier is present in the data sets.[9] To account for censoring the proper procedure is to use the maximum likelihood method. In the case of the proportional hazard model, the general function is

$$h(t, X, \beta) = h_0(t, \alpha)g(X, \beta) \tag{10}$$

4. Model estimation

4.1 Duration of export activity or failure to export

Exporting is not an easy business – factors that can negatively affect profits range from slowing demand, a deterioration in the domestic business climate, to an increase in the cost of inputs. For exporters facing an adverse situation in export markets, the responses could include cutting costs, streamlining organisation, cutting exports, or stopping exporting altogether if it cannot find a way to restore profitability.

Under this setting, there are four types of manufacturing firms. First, those that are already exporters when the observation begins and continue to be until the last date of the data set. They are called stayers or survivors. Then there are firms that quit exporting before the final date of the date sets. Next is new entrants or those that start later in the date set and are still exporting when the period data set ends. Finally, there are the non-exporters that are never involved in export activity. Statistically speaking, the last type has no contribution to the likelihood function, so it is left out of the estimation. Equation (10) is estimated as a failure model or the probability to exit from export rather than survival model. In this respect, a negative and statistically significant coefficient should be interpreted as reducing the probability of failure or quit exporting. The results of the estimation of Equation (10) are presented in Tables 6.9 and 6.10. For the period 1992 to 1996 (Table 6.9) there are three observation points: 1991, 1994, and 1996. For the period 2000 to 2012, four annual manufacturing surveys are used: 2000, 2008, 2011, and 2012. Inclusion in the pool of observations depends on the existence of a consistent firm identifier from year to year.[10]

The coefficient of imported output is not significant in either period, which suggests that once a firm starts to export it needs to import inputs to produce high-quality products for the export market. Another interpretation is that openness is at a sufficient level for importing input not to be a binding factor in the long-run decision to remain exporting. Other factors such as FDI, firm size, and access to external loans are more critical to ensuring export persistence.

Being an FDI appears to increase the likelihood as a manufacturing exporter and to continue to do so overtime. In both tables the coefficient of the FDI dummy is negative and strongly significant. Firm size is also an important factor in export persistence. The coefficients of medium and large firms are negative and significant at the 1 percent level. The probability of stopping being an exporter is lower for these categories.

Access to external loans is important for the continuity of exporting. The dummy variable is negative and highly significant for all specifications in both

Table 6.9 Duration of export (failure probability to export)

Independent Variables at Base Year 1991	*Failure Probability to Export 1991–1996*			
	I	*II*	*III*	*IV*
Imported input	0.122	0.084	0.104	0.103
	(1.588)	(1.138)	(1.393)	(1.387)
FDI firm	–0.239***	–0.209***	–0.909***	–0.922***
	(–2.924)	(–2.686)	(–3.349)	(–3.394)
Medium size	–0.479***	–0.476***	–0.481***	–0.481***
	(–8.837)	(–9.303)	(–9.396)	(–9.400)
Large size	–0.616***	–0.642***	–0.641***	–0.642***
	(–9.551)	(–10.26)	(–10.24)	(–10.25)
External finance (access)	–0.156***	–0.116**	–0.107**	–0.109**
	(–2.973)	(–2.302)	(–2.128)	(–2.156)
R&D	–0.012			
	(–0.192)			
ERP	0.007***	0.007***	0.007***	0.006***
	(3.803)	(4.232)	(3.275)	(3.030)
New machinery		–0.119**	–0.139***	–0.139***
		(–2.519)	(–2.913)	(–2.918)
Proportion of white collar			0.585***	0.579***
			(3.781)	(3.744)
FDI productivity spillover			–0.660***	–0.673***
			(–2.604)	(–2.652)
Unit labour cost			–0.379***	–0.379***
			(–2.946)	(–2.943)
Share of generator in district				0.525
				(1.012)
Constant	–1.73***	–1.52***	–0.884***	–0.853**
	(–14.34)	(–13.68)	(–2.612)	(–2.508)
/ln_p	0.650***	0.630***	0.634***	0.635***
	(55.213)	(59.280)	(59.317)	(59.34)
Number of observations	3,270	3,721	3,721	3,721
Log-Likelihood	–3,282.1	–3,770.7	–3,751.9	–3,751.3

FDI = foreign direct investment; ERP = effective rate of protection.

Source: Author's calculations

Notes: t-test are in parentheses. ***, **, and * show coefficient are statistically significant at 1%, 5%, and 10% level, respectively.

Table 6.10 Failure probability to export

Independent Variables at Base Year 2000	*Failure Probability to Export 2000–2012*			
	I	*II*	*III*	*IV*
Imported input	–0.002	0.008	(0.012)	–0.010
	(–0.039)	(0.127)	(0.185)	(–0.148)
FDI firm	–0.153***	–0.127**	0.361	0.317
	(–3.057)	(–2.543)	(0.969)	(0.848)
Medium size	–0.515***	–0.493***	–0.450***	–0.452***
	(–11.99)	(–11.51)	(–10.15)	(–10.19)
Large size	–0.582***	–0.544***	–0.500***	–0.506***
	(–11.50)	(–10.84)	(–9.722)	(–9.841)
External finance (access)	–0.186***	–0.136***	–0.137***	–0.136***
	(–3.718)	(–2.702)	(–2.710)	(–2.691)
R&D	–0.081			
	(–1.433)			
ERP	0.006***	0.007***	0.006***	0.006***
	(4.331)	(4.714)	(3.512)	(3.327)
New machinery		–0.268***	–0.264***	–0.265***
		(–6.253)	(–6.165)	(–6.176)
Proportion of white collar			4.520***	4.646***
			(5.047)	(5.198)
FDI productivity spillover			0.469	0.428
			(1.267)	(1.153)
Unit labour cost			27.023**	26.88**
			(2.296)	(2.225)
Share of generator in district				0.753***
				(2.646)
Constant	–1.19***	–1.17***	–1.71***	–1.68***
	(–27.77)	(–27.35)	(–4.842)	(–4.753)
/ln_p	0.474***	0.478***	0.482***	0.483***
	(52.530)	(52.567)	(52.457)	(52.553)
Number of observations	4,663	4,663	4,663	4,663
Log-Likelihood	–5,274.8	–5,250.4	–5,236.8	–5,231.9

FDI = foreign direct investment; ERP = effective rate of protection.

Source: Author's calculations

Notes: t-test are in parentheses. ***, **, and * show coefficient are statistically significant at 1%, 5%, and 10% level, respectively.

periods. Firms in urban-industrial agglomeration locations tend to carry out on and off exporting as the coefficient of the dummy variable is positive and significant at the 1 percent level. A high effective rate of protection (ERP) has a detrimental effect on export activity as it increases the probability of discontinuing exporting. The coefficient is positive and strongly significant.

R&D is not significant. Because R&D is carried out mostly to suit installation of new machinery to production process, we replace it with a dummy having a value of one for those investing in new machinery. The coefficient is negative for all specifications, indicating that the probability of discontinuing export is lower with new machinery investment.

Access to imported input is also relevant here because new machinery requires high-quality inputs, which may not be readily available from domestic producers. One implication of all this is that openness is important for export development/upgrading, especially to secure machinery, technology, and critical inputs.

4.2 *Exporting activities*

The implication of equations (3) and (4) is that one has to take into account both the exporters and non-exporters, because the decision is always to export or not to export. In this setting, the empirical equation is

$$Y_{it} = \delta_0 + \delta_1 S_{it} + \delta_2 M_{it} + \delta_3 I_{it} + \Delta G_{it} + \Omega F_{it} + u_{it} \tag{11}$$

The Y variable is positive for exporters and zero for non-exporters. S are dummies for firm size capturing K and L together, M is the ratio of imported input to total input, I captures whether or not a firm is carrying out R&D, F are vectors of globalisation capturing FDI versus no FDI and effective rate of protection, and finally G is a vector of geographical location, whether a firm does or does not locate in a urban agglomeration. The estimation results are presented in Table 6.11.[11]

Equation (11) reflects the exporter's annual 'short-term' decision of whether or not to export. This is different from Equation (10), where the decision is about whether to keep exporting over the longer term. Following Sjöholm and Takii (2000), the dependent variable export to output ratio is converted to a discrete one with the value one if the export to output ratio is positive and zero otherwise. A lagged value of the export to output ratio is added as an additional covariate. The significance of a lagged value of the export ratio is the importance of sunk cost in export activity. Once a firm enters the export market, the entry cost can only be absorbed by continuing to export. As the specification contains a lagged endogenous variable, to account for potential endogeneity the instrumental variable (IV) and the generalized method of moments (GMM) is employed in which the instruments are a lagged endogenous variable further in the past and other lagged covariates. The coefficient of lagged exported output is positive and significant in both IV and GMM specifications. It weakens statistically in the GMM specification, but overall it is still significant at the 5 percent level.

Table 6.11 Determinants of export to output ratio

Covariates	*IV*		*GMM*	
	1992–2000	*2000–2013*	*1992–2000*	*2000–2013*
Lag of export (1 year)	0.640***	0.189***	0.621***	0.121**
	(32.177)	(4.360)	(3.965)	(2.135)
Imported input	0.067***	0.073***	0.056***	0.077***
	(4.976)	(3.429)	(3.934)	(4.651)
Capital intensity	–0.016	–0.002	–0.013	–0.004
	(–1.600)	(–0.339)	(–1.460)	(–0.799)
Proportion of white collar	–0.042***	–0.020	–0.043	–0.018
	(–2.766)	(–0.755)	(–1.155)	(–0.781)
Medium size	0.094***	0.128***	0.108***	0.134***
	(8.270)	(8.752)	(6.508)	(12.753)
Large size	0.184***	0.227***	0.197***	0.236***
	(16.115)	(9.688)	(6.095)	(14.903)
Foreign equity	0.108***	0.186***	0.111***	0.204***
	(7.625)	(10.853)	(4.041)	(11.711)
External finance	0.052***	0.063***	0.053***	0.059***
	(7.500)	(4.238)	(6.469)	(9.653)
Unit labour cost	0.006	0.022	0.006	–0.003
	(1.077)	(0.367)	(0.968)	(–0.065)
Own productivity growth	0.003	–0.001	0.001	–0.001
	(1.455)	(–0.652)	(0.637)	(–1.180)
New machinery	0.077***	0.100***	0.067***	0.101***
	(8.243)	(9.334)	(5.973)	(13.171)
ERP	–0.000***	0.000	–0.000***	0.000
	(–6.188)	(1.596)	(–3.359)	(1.428)
District generator ownership	–0.001	–0.002**	0.002	–0.003*
	(–0.209)	(–2.430)	(0.803)	(–1.941)
FDI labour productivity (district)	–0.000	–0.002*	0.001	–0.002
	(–0.182)	(–1.685)	(0.527)	(–0.933)
Services from other firms	0.059***	0.113***	0.061**	0.125**
	(3.047)	(3.166)	(2.321)	(2.269)
FDI productivity growth (ISIC3)	0.010	0.130	0.028	0.171*
	(0.205)	(1.498)	(0.763)	(1.905)
Labour structural change (ISIC3)	0.017***	0.008	0.024***	0.008
	(3.187)	(0.535)	(4.867)	(1.071)
Industry dummies	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Constant	0.060**	0.012	0.055**	0.009
	(2.411)	(0.373)	(2.437)	(0.472)
Number of observations	101,756	214,309	88,817	207,390
Adjusted R2	0.441	0.254	0.439	0.250

FDI = foreign direct investment; ERP = effective rate of protection, IV = Instrumental Variable, GMM = Generalized Method of Moments.

Source: Authors' calculations

Notes: t-test are in parentheses. ***, **, and * show coefficient are statistically significant at 1%, 5%, and 10% level, respectively.

The coefficient of imported input is positive and significant for all specifications for both periods of estimation. Imported output is very important for a firm's ability to penetrate export markets. External finance has the right positive sign and is significant, which is similar to the results of the durability regression (equation 10). Using medium firms as a base, small firms are less likely to be exporters, unlike medium-sized and large firms, with many of them being exporters. As expected, the coefficient of foreign equity is positive and highly significant at the 1 percent level. Firms with foreign tend to be more export oriented than their domestic counterpart.

Investment in new machinery is an important primary driver for export orientation. Investment in new machinery is often followed by process innovation, where production setup or layout may change to suit new machinery and equipment. This type of innovation, rather than product innovation, constitutes the bulk of innovation in manufacturing.

External access to finance is positive and highly significant, suggesting the importance of outside sources for financing export activity. The ERP is more detrimental to export orientation in 1992–2000, but the negative impact disappears in the subsequent period with tariffs continuing to come down in the post-2000 era as they are replaced by non-tariff measures (NTM). The presence of time and industry dummies is intended to capture the change of NTM over time and across industries.

Capital intensity has a negative coefficient, but is significant only in the GMM specification for the 1992–2000 period. In the meantime, the results for skill intensity proxied by the ratio of white-collar to blue-collar workers are negative and significant. This suggests that manufacturing has not relied on skill intensity for exports. Unit labour cost is not significant in all specifications, that is unit labour cost has not impacted the export to output ratio.

Various productivity measures are used to capture FDI productivity spillover both at the industry and local (district) levels. At the industry level, FDI firms produce positive spillover only in the GMM specification in the 2000–2013 period. There is no apparent local (district) productivity spillover. The lag variable of firm productivity is not significant in all specifications.

Firms tend to agglomerate next to each other. The ability of firms to acquire inputs from the surrounding areas is important for them to thrive. To capture the agglomeration effect, the Herfindahl index is constructed at the district level from service inputs purchased by a firm from other firms. This variable is positive and significant for all specifications for both estimation periods. This suggests that firms tend to agglomerate in close vicinity of each other. This finding along with the insignificance of productivity spillover at the industry level suggests that logistical costs are high.

The availability and reliability of infrastructure is represented by the Herfindahl index on generator ownership. The higher the index the more firms rely on private generators rather than on generators from the state power company.

None of the coefficients in the 1992–2000 period are significant, suggesting that electricity is not a constraint. Subsequently, in the 2000–2013 period, the coefficients are negative in both specifications, which points to a situation where electricity starts to become a constraint for firms.

Structural change in the form of inter-sector labour reallocation is positive and significant only in the first period of estimation, not in later periods. This may reflect the increasing rigidity of the labour market post-2000.

5. Conclusion

The export market is the avenue through which firms can learn to improve their products. To develop its products, a firm can learn from whatever technologies and information are available in the international market. But to learn from the export market, a firm must enter the market first and this is not easy. Product improvement, however, is difficult to observe. What can be observed is a signal from a firm that it actually carries out some sort of activities enabling product development to take place.

Because the product quality itself is often unobservable, exporting activity itself, in contrast to non-exporting, can also be considered as product upgrading, even if there is no change in product line. Being an exporter is a result of a self-selection process in which only more productive firms go into export markets simply because high entry costs do not allow low-productivity firms to do so. A firm with high productivity can afford to do some product upgrading before entering the international market. Once it has made an entry, to enable it to stay a firm must continue its product development.

Productivity is the key to the persistence of exporting. Productivity itself is not a stand-alone variable. It is influenced by access to imported inputs, capital goods, external finance, machinery importation, and infrastructure. For this, maintaining openness is a must. As far as tariffs are concerned, ERP in Indonesia is already low. The remaining hurdles include infrastructure deficiency (measured by the availability and reliability of electricity supply) and logistical costs (measured by a statistically significant short-distance agglomeration, while productivity growth at the industry level is not significant). As a consequence, the involvement of Indonesian manufacturing in the international value chain is low. This is reflected in manufacturing exports, which are narrowly based in food products with palm oil as a prime driver where the requirement for involvement in international distribution networks may not be as high as for machinery and electronics.

There is some hope, however. Although Indonesia still lags behind other countries in Southeast Asia, looking at the more disaggregated level shows that at least in some branches like machinery and electronic, manufacturing exports have moved to the direction of higher technological content albeit at a very slow pace. Also, with some movement and investment in new machinery, textiles and garments are not ready to be called sunset industries yet.

Notes

1 This puts the theory of export and productivity link into the realm of the sales-investment accelerator model, which captures the relationship between cost/access of borrowing and investment (Fazzari et al., 1988; Hubbard, 1998).
2 Prior to 1990 there was no information on export activity in the annual manufacturing survey, so the figures for manufacturing exports in Table 6.1 start in 1991.
3 To obtain exports in real terms, the deflators from the national accounts at two-digit ISIC are used.
4 This can also be tested econometrically.
5 In a later publication, the author plans to include structural change as an additional covariate in the regression of the export production function to capture spillover between from exporters to non-exporters, for example.
6 Unfortunately, we are unable to extend the analysis to 2013 as the firm identifier in the most recent annual 2014 survey is missing or has been censored.
7 Despite initial setbacks brought about by a deteriorating business climate, an uncertain political environment, and conservative lending practices (Narjoko, 2006), new entrants eventually bring a new dynamism to manufacturing.
8 There are three scenarios in which process innovation may take place: setting up a new production line, putting in a new production system, and installing new computer or information technology components to upgrade production facilities (Kraemer et al., 2000).
9 If, for example, there are only two observation points, we need to change the estimation strategy, for example using the multinomial logit, by acknowledging that there are three types of firms. First are the stayers or those that continue to export; second are entrants, that is those that change from non-exporters to become exporters; and third are those that stop exporting or exit.
10 From 2002, the Central Statistical Agency for some survey years uses a different identification number called NKIP, which is not always consistent with PSID.
11 The data set used is the 1991–1996 manufacturing surveys for the pre-AFC period. The post-AFC sample includes the 2000 and 2006 surveys. The most important consideration in the choice of the data sets is the availability of R&D and financial access, which is only available in certain years.

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7 Indonesia's manufacturing export competitiveness

A unit labour cost analysis

Rully Prassetya[1]

1. Introduction

The Joko Widodo administration has placed great emphasis on improving the competitiveness of Indonesia's manufacturing sector, especially the labour-intensive manufacturing sector. The reason is not difficult to discern. Currently, only 30 percent of Indonesia's labour force is in formal employment. Another 20 percent are self-employed, while the remaining 50 percent are in casual employment, unpaid employment, or unemployed. The bulk of the labour force is also still trapped in very low productivity employment (Figure 7.1). To tackle the government's growth, employment, and poverty challenges, the economy has to generate more high-productivity jobs. A competitive manufacturing sector is a key element of achieving this objective.

This is not a new challenge for Indonesia. In the mid-1980s, following the steep decline in oil prices in the early part of the decade, the Indonesian government adopted a comprehensive economic reform programme to boost the competitiveness of its manufacturing sector. The reform programme launched a sustained period of high economic growth, which lasted until the Asian Financial Crisis (AFC) in 1997. The manufacturing sector played a lead role during this period, with labour-intensive manufacturing exports growing rapidly.

The AFC was a major shock to the Indonesian economy, but after a three- to four-year transition period, it recovered and enjoyed a sustained period of strong economic growth that lasted from around 2003 to 2012, with only a brief interruption during the Global Financial Crisis (GFC) (2008–2009). However, while the headline growth numbers were impressive, they masked an underlying deterioration in the competitiveness of the Indonesian economy, as it rode a global commodity super-cycle fuelled by China's demand for raw materials. In particular, Indonesia's manufacturing sector went into retreat, with Indonesia's share of regional manufacturing exports declining steadily over this period. The end of the commodity super-cycle boom in 2011 exposed the underlying weakness in Indonesia's competitiveness as the economy started to slow without its previous tailwinds. There is now widespread recognition that the underlying competitiveness issues will need to be addressed if Indonesia's growth momentum

DOI: 10.4324/9781315161976-7

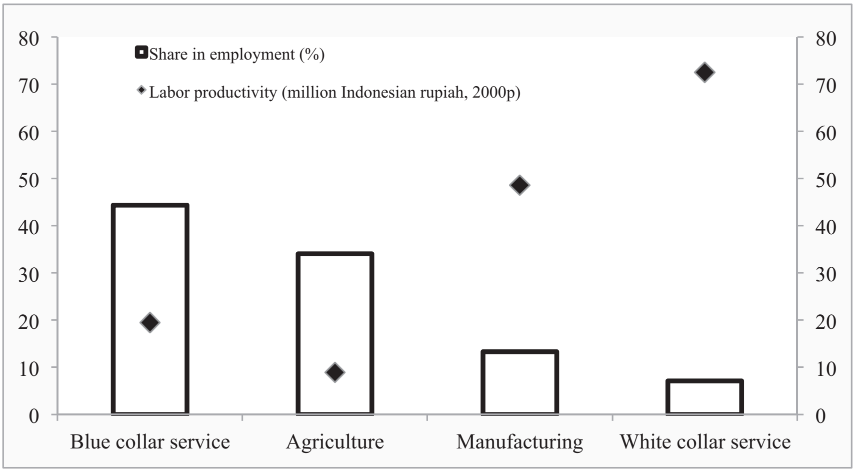

Figure 7.1 Indonesia's labour productivity and employment share by sector in 2014

Source: CEIC; IMF staff's calculations.

Notes: The figures of share in employment are on the left hand-side, while the figure of labour productivity are on the right hand-side. White-collar services includes the financial and transport and communication sectors. The remaining service sectors are categorised as blue-collar services.

is to be restored. It is also vital to ensuring a broad-based improvement in living standards, especially for those most vulnerable in society.

This chapter explores the apparent loss of manufacturing competitiveness over the past two decades, focusing in particular on the upward trend in manufacturing unit labour costs (ULC) during the post AFC commodity boom. The chapter discusses the factors that contributed to this upward trend in unit labour costs, to discern whether the trend reflects the impact of labour market policy, following the adoption of the Labor Law in 2003, other sectoral policies that might have affected productivity trends, or more general macroeconomic conditions, notably the relative high rate of inflation in Indonesia during post-AFC commodity boom. Having concluded that the latter played a major role, the chapter explores the factors driving Indonesia's relatively high inflation rate during this period and concludes that it likely reflected a combination of inflation shocks from food prices and fuel subsidy as well as monetary and exchange rate policy stance by Bank Indonesia that did not sufficiently combat the legacy of high inflation expectation following the AFC and demand-pull inflation as a result of the commodity boom.

However, the chapter concludes that even if Bank Indonesia had pursued a more flexible exchange rate policy, giving it greater independence to run an inflation-targeting regime, there would still have been some real appreciation of the exchange rate during the commodity boom. Therefore, the underlying weakness in Indonesia's economic strategy during the commodity boom was a lack of structural reform to boost the competitiveness of the manufacturing sector to offset such an appreciation. Indeed, competitiveness indicators and productivity growth deteriorated during this period, relative to Indonesia's key partners in the region.

Section 2 discusses the key trends in Indonesia's manufacturing sector, first from the mid-1980s to the late 1990s and then during the commodity boom between 2003 and 2011. Section 3 explores the trend in Indonesia's labour cost competitiveness and the factors that drove up unit labour costs during the commodity boom. Section 4 analyses the role and source of inflation in driving Indonesia's unit labour costs. Section 5 presents a lesson learned on macroeconomic policy during the commodity boom period. Section 6 concludes.

2. Indonesia's manufacturing sector

Indonesia's manufacturing sector performance improved considerably between the mid-1980s and the mid-1990s (Figure 7.2). The rapid growth in manufacturing can be attributed to concerted strategy by the government following the decline in the oil price in early 1980s that comprised both macroeconomic adjustments (devaluation) and comprehensive structural reforms (Aswicahyono et al., 1996). During this period, the share of manufacturing value added in gross domestic product (GDP) doubled from 13 percent to 26 percent, and the share of employment in the industry sector increased steadily from 13 percent to 18 percent. Meanwhile, the share of employment in the agricultural sector fell below 50 percent for the first time in 1994 as the result of a rapid increase in manufacturing and service sector employment. This improvement was driven by a rapid growth in manufacturing exports, which increased in both volume and product diversification during this period. The share of manufactured goods in total export increased from around 3 percent to 51 percent and Indonesia's share of global manufacturing exports increased from 0.1 percent to 0.8 percent. The labour-intensive export manufacturing sector performed particularly well during this period.

The AFC was a major shock to the Indonesian economy. At the height of the crisis in 1998, the economy contracted by 13 percent and manufacturing value added decreased by 11 percent. Although the economy started to recover after 2003, the manufacturing sector continued to decline. The growth of the manufacturing sector following the AFC (4.8 percent) was less than half the rate of the pre-crisis period (10.7 percent).[2]

Manufacturing's share in GDP fell from 28 percent in 2003 to 22 percent in 2011, its share of total exports fell from 52 percent to 34 percent, and Indonesia's share of global manufacturing exports fell back to 0.6 percent. Foreign direct investment (FDI) in the manufacturing sector also continued to decline. Furthermore, as Aswicahyono et al. (2010) find, after the crisis, there is less firm-level mobility in the manufacturing sector, that is most output growth

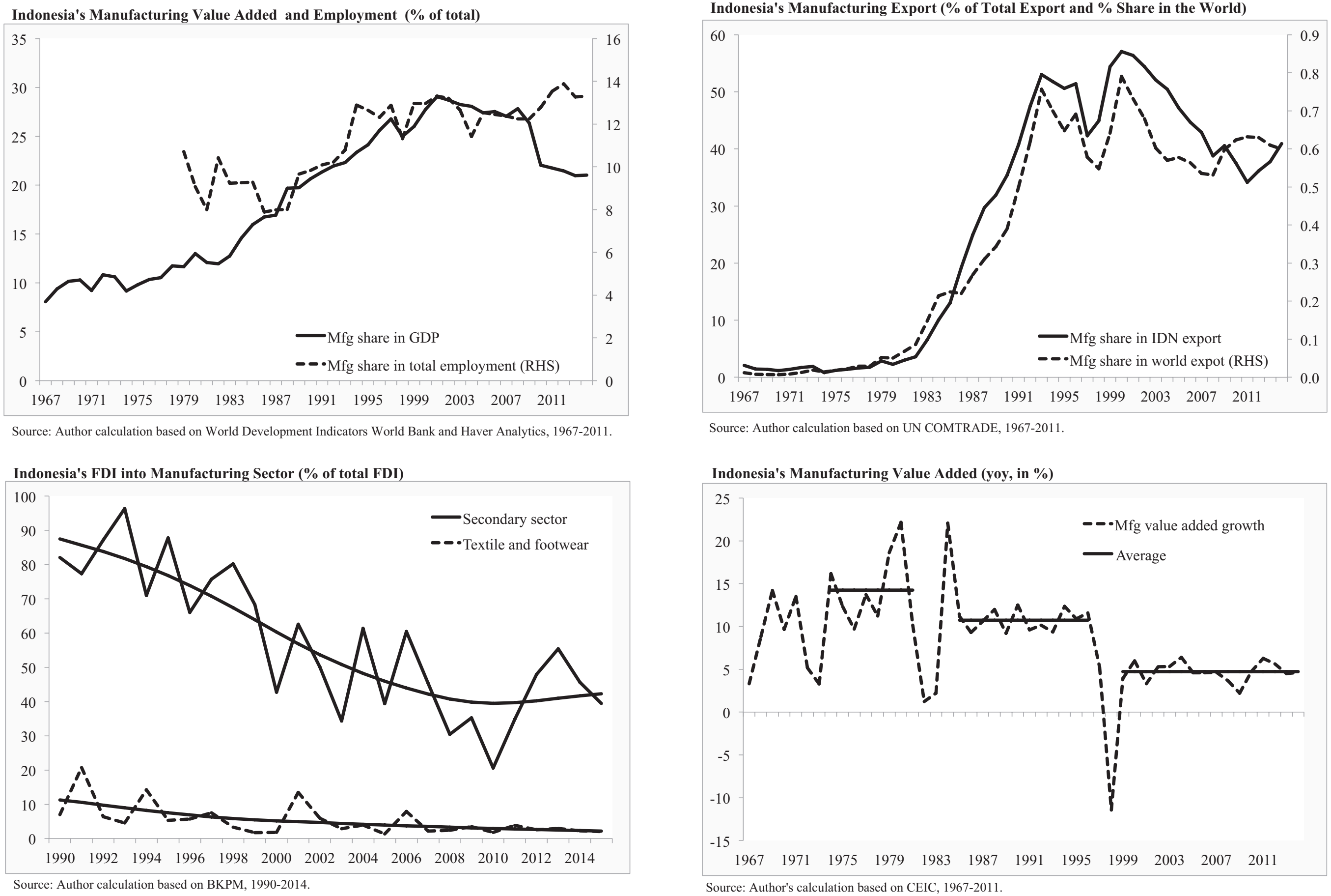

Figure 7.2 Indonesia's manufacturing sector performance

came from existing firms rather than newcomers, thus showing the lower dynamism in the manufacturing sector. Employment growth in the manufacturing sector was also much slower during the post-crisis period (2.7 percent) compared with the pre-crisis period (5.8 percent). The share of manufacturing employment in total employment remained steady at around 12 percent after the crisis due to slow employment growth in both manufacturing and total employment. After 2011, there were some signs of a rebound in manufacturing, notably in FDI, but this primarily reflected optimism about the strength of the domestic market and a demographic dividend, spilling over in some instances into a stronger export performance.[3] With domestic demand weakening more recently, the outlook for manufacturing has also softened, as investors have taken a wait-and-see approach to the new government's reform agenda.

To compare Indonesia's performance with that of other countries in the region, we have scaled its share of global manufacturing exports to its share of global working age population (Figure 7.3).[4] During the 1980s and early 1990s, Indonesia's score on this metric increased steadily, rising from almost zero in the early 1980s to 0.2 in 1993, after which it flattened out for the remainder of the period up until the AFC. This pattern was broadly similar to those of its partners in the Association of Southeast Asian Nations (ASEAN-4),[5] although their per capita manufacturing export performance was much stronger than that of Indonesia. For example, Malaysia's score climbed from 0.8 in the early 1980s to around 4.4 in the mid-1990s. Since the mid-1990s, ASEAN-4's relative share

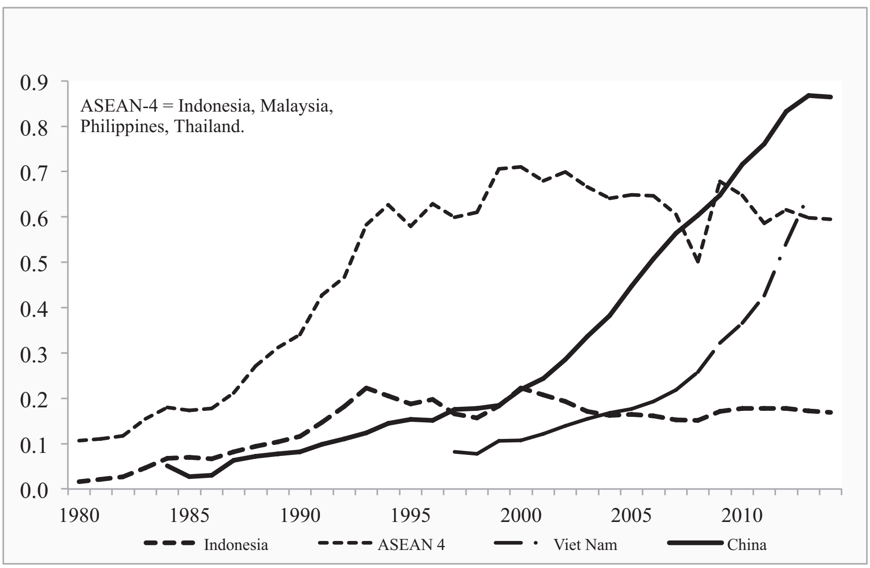

Figure 7.3 ASEAN and China's share in world manufacturing export (scaled to working age population share)

ASEAN = Association of Southeast Asian Nations.

Source: WITS; UN World Population Prospects 2015 Review; IMF staff's calculations.

of global manufacturing exports has stagnated in the face of strong competition first from China and more recently from Viet Nam. With China rebalancing, one of the key issues is whether Indonesia's manufacturing exports, and those of the ASEAN-4, will be able to move into the space being vacated by China and start to gain global market share again.

The decline in Indonesia's manufacturing competitiveness is most apparent in labour-intensive manufacturing (Figure 7.4). Since the mid-1990s, Indonesia's share of labour-intensive manufacturing exports has declined from around 2.3 percent to around 1.5 percent of global exports, while its share of medium-skill and high-skill manufacturing exports barely improved from 0.5 percent. In contrast, China's share of manufacturing export expanded across all manufacturing product categories, with its share in labour-intensive manufacturing goods export increasing threefold, from 10 percent in 1995 to 30 percent in 2014.

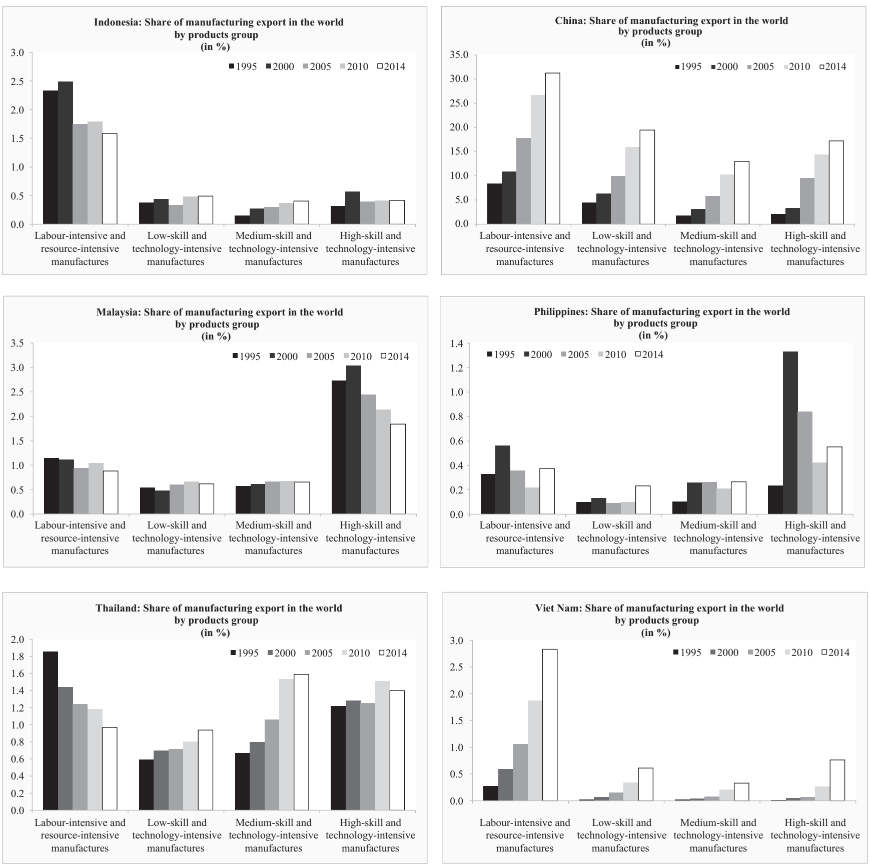

Figure 7.4 China and ASEAN-5 manufacturing export by products group

ASEAN = Association of Southeast Asian Nations.

Source: Author's calculation based on UNCTAD Statistics, 2016.

Among the ASEAN-4, the story has been more varied. Malaysia's share of high-skill export has been declining while the share of other manufacturing groups has stagnated, giving rise to concerns that Malaysia is facing a middle-income trap (Cherif and Hasanov, 2015). In Thailand, the share of labour-intensive exports has declined while medium-skill manufacturing export has increased, which may reflect a shift in the structure of Thailand's manufacturing industries away from labour-intensive manufactures to low-skill and medium-skill manufactures. In the Philippines, the share of labour-intensive and high-skill manufacturing export products has also declined. But in Viet Nam, the share of labour-intensive export quickly expanded, from 0.3 percent in 1995 to 2.8 percent in 2014. By 2014, its export share in the world was double that of Indonesia even though back in 1995 its share was only one-eighth of Indonesia's. Viet Nam's share in other manufacturing sectors has also expanded. By 2014, its low-skill and high-skill manufactures share was higher than Indonesia's.

In summary, Indonesia's manufacturing competitiveness has stagnated across all product groups, especially labour-intensive manufacturing products. Comparison with other countries suggests that Indonesia's competitiveness compares unfavourably in absolute terms, and that it has lost ground against major competitors such as China and Viet Nam since the mid-1990s. Indonesia's lack of competitiveness is also evident if one looks at metrics that gauge participation in global production networks. Indonesia's participation is not as intense as other countries in the region, such as Malaysia and Thailand (Harvard Kennedy School, 2010, 2013). According to the UNCTAD-EORA GVC database, Indonesia's global value chain (GVC) participation rate was 44 percent in 2010, the lowest in the region (Figure 7.5).

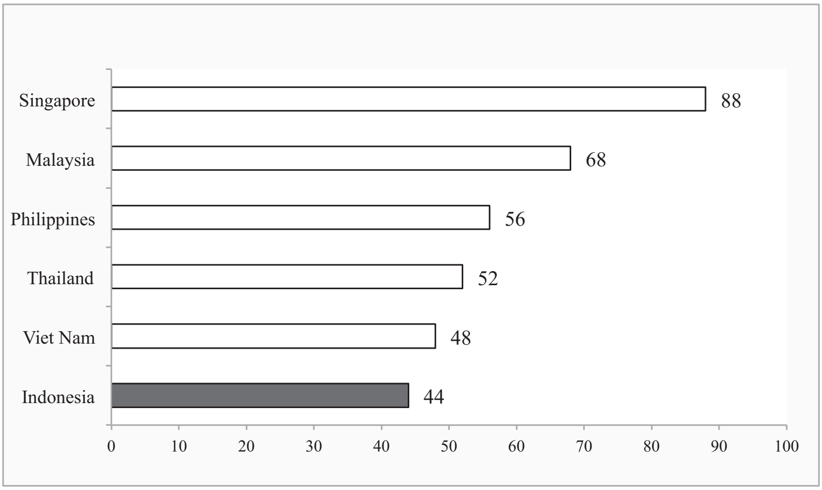

Figure 7.5 UNCTAD global value chain participation rate, 2010 (in percent)

UNCTAD = United Nations Conference on Trade and Development; GVC = global value chain

Source: UNCTAD, 2013.

3. Indonesia's labour cost competitiveness since the mid-1990s

There have been a number of explanations for the apparent decline in the competitiveness of Indonesia's manufacturing sector noted earlier. Some have attributed it to standard Dutch disease effects associated with a boom in the commodity tradable sector (Garnaut, 2015; Papanek, 2014; Coxhead, 2007). In the standard Dutch disease model (Corden and Neary, 1982; Corden, 1984), a boom in the commodity tradable sector adversely affects output in the non-commodity tradable sector (e.g. manufacturing) through the spending effect (i.e. higher non-tradable prices relative to tradable or real appreciation) and the resource movement effect, which comprises direct de-industrialisation (i.e. movement of labour from non-commodity tradable sectors to commodity sector) and indirect de-industrialisation (i.e. movement of labour from non-commodity tradable sectors to the non-tradable sector).

Others have attributed it to the 2003 Labor Law, which caused an intensification of labour market regulations (Manning and Roesad, 2006; World Bank, 2011), especially related to severance and minimum wages that adversely affected labour-intensive manufacturing and other adverse shifts in structural indicators, such as the openness of trade and investment, investment in infrastructure, and education outcomes (Aswicahyono and Hill, 2015). The latter is consistent with broader findings in the literature that FDI and human capital improve the competitiveness of the manufacturing sector and that resource wealth can diminish it (Coxhead and Li, 2008). The emphasis on structural reforms is also consistent with the experience in the mid-1980s, when the government pursued bold structural policies to boost economic growth following the collapse of the oil price.

However, this chapter will focus more narrowly on the trend in ULC in the manufacturing sector to assess the role of labour costs in the decline of manufacturing sector competitiveness. This seems pertinent for a couple of reasons. First, a number of surveys have suggested that labour costs are a concern for investors in the manufacturing sector in Indonesia. A 2015 survey by the Japan Bank for International Cooperation (JBIC) cited rising labour cost as the main concern of Japanese manufacturing companies operating in Indonesia. Furthermore, this concern seems to have been rising over time (Figure 7.6). Second, research suggests that ULC-based real effective exchange rates have greater explanatory power than other real effective exchange rate indices (e.g., CPI-based, PPI-based, and GDP deflator-based) in explaining changes in export market shares of countries (Lafrance et al., 1998; Broeck et al., 2012).

3.1 Trends in manufacturing ULC

This section analyses the trend in Indonesia's manufacturing ULC in US dollar terms since the mid-1990s. The US dollar ULC is used to allow comparison across countries and the mid-1990s are used as the base period because it is

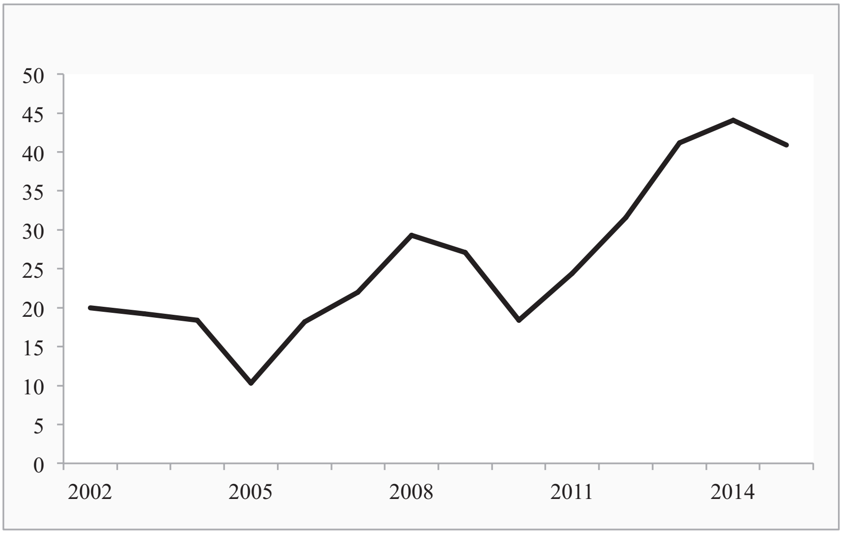

Figure 7.6 Key issues for industry expansion by Japanese manufacturing companies (percentage of respondents citing rising labour cost as an issue)

Source: JBIC, various years.

the peak of Indonesia's manufacturing performance before the AFC crisis. For analytical purposes, the standard definition of the ULC is manipulated to produce the following equation:

$$ULC_{\tau} = \frac{w_{\tau} \cdot \pi_{\tau}}{LP_{\tau}} \because ER_{\tau} \tag{1}$$

Where *ULCτ* is manufacturing ULC in nominal US dollars, *w* is manufacturing real wage, π is inflation, *LP* is labour productivity in the manufacturing sector (calculated as real manufacturing value added divided by manufacturing employment), *ER* is the exchange rate (US dollars/Labour Costs) and τ stands for a period of time. The ULC will increase if the real wage and/or inflation increases, or if the nominal exchange rate appreciates; and it will decrease if labour productivity increases.

The basic trends in Indonesia's ULC are as follows (Figure 7.7). In the mid-1990s, the ULC was relatively stable. It then declined sharply during the AFC, when the Indonesian rupiah collapsed, but this decline had been largely reversed by the end of crisis period in 2003. In the initial part of the commodity boom period, between 2003 and 2009 the ULC was relatively stable, but it then increased sharply after the GFC, rising by over 50 percent between 2009 and 2012, before falling more recently as Indonesia entered the post-commodity boom period.

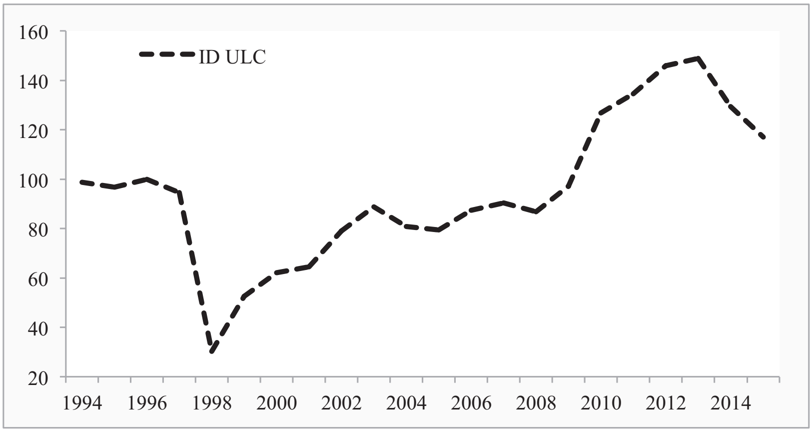

Figure 7.7 The trend of Indonesia's manufacturing ULC, nominal US dollar (1996 = 100)

ID = Indonesia; ULC = unit labour cost

Source: CEIC; Haver Analytics; IMF staff's calculations.

A comparison of Indonesia's ULC with ASEAN-4 trading partners and China reveals the following (Figure 7.8 and Table 7.1):

- First, Indonesia was unable to take advantage of the large depreciation of the Indonesian rupiah during the AFC to secure a lasting boost to competitiveness. Although Indonesia's ULC initially dropped sharply, it quickly rebounded, and by 2002 Indonesia's ULC was back on par with China and the ASEAN-4 average, and by 2003 had surpassed them. Thus, while Indonesia's ULC was still some 10 percent below its pre-AFC peak in 2003, Malaysia's and the Philippines' ULC was some 20 percent below that peak, China was close to 30 percent below it, and Thailand close to 40 percent below it.
- Second, during the commodity boom period (2003–2012), Indonesia's ULC tracked its partners' ULC relatively closely up until the GFC. However, after the GFC the trends start to diverge. Although all the ASEAN-4's ULCs rose quite sharply from 2009 to 2012, Indonesia's increased the most (50 percent). Malaysia's and Thailand's ULC increased by around 30 percent, and the Philippines' only by around 10 percent. China's ULC grew even more sharply during this period; indeed, its ULC had started to rise even before the GFC.[6]

Overall, by the end of the commodity boom in 2012, Indonesia's ULC was some 45 percent above its pre-AFC level. While China's had risen more (over 80 percent), Indonesia's ASEAN-4 partners had managed to limit the increase in their ULCs. Thailand's ULC was broadly unchanged, the Philippines' was up around 10 percent, and Malaysia's was up around 15 percent. Lastly, Indonesia's ULC has fallen quite

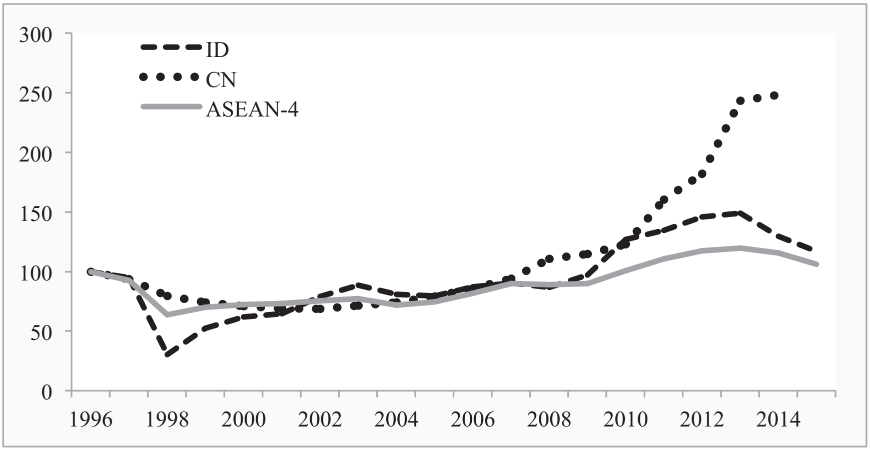

Figure 7.8 Trend of Indonesia's and neighbouring countries' ULC, nominal US dollar (1996 = 100)

ULC = unit labour cost; ID = Indonesia; CN = China

Source: CEIC; Haver Analytics; IMF staff's calculations.

Note: * Data for China refers to Secondary industry (Mining, Manufacturing, Utilities, and Construction); ** ASEAN-4 figure comprises the simple average of Indonesia, Malaysia, Philippines, and Thailand.

Table 7.1 Percentage change in nominal US dollar ULC (in percent)

Country	*1996–2003*	*Commodity Boom Period*				*2012–2015*
		2003–2007	*2007–2009*	*2009–2012*	*2003–2012*	
Indonesia	–11	2	8	50	64	–20
Malaysia	–19	23	–12	30	41	–18
Philippines	–23	26	1	12	42	–19
Thailand	–37	16	6	31	61	22
China	–28	32	22	59	155	36
ULC Index	**1996**	**2003**	**2007**	**2009**	**2012**	**2015**
Indonesia	100	89	90	97	146	117
Malaysia	100	81	99	88	114	94
Philippines	100	77	96	97	108	88
Thailand	100	63	73	78	102	125
China	100	72	94	115	183	248

ULC = unit labour cost.

Source: CEIC; Haver Analytics; IMF staff's calculations.

Note: Data for China are only available until 2014.

sharply since the end of the commodity boom in 2012, narrowing the gap with Malaysia and the Philippines and reversing the gap with Thailand, whose ULC continued to rise during this period. Meanwhile, China's ULC continued to rise sharply, although there are more recent signs that its upward trend is slowing.

3.2 The factors driving the trends in manufacturing ULC

To analyse the ULC trends further, we use Equation (1) to decompose the ULC into its constituent factors (Table 7.2). The exact decomposition formula used to analyse the contribution of component factors to changes in countries' ULC is as follows:

$$\Delta \ln_{ULC_\tau} = \Delta \ln_{w_\tau} + \Delta \ln_{\pi_\tau} - \Delta \ln_{LP_\tau} + \Delta \ln_{ER_\tau} \quad (2)$$

We then analyse the factors' contribution to changes in the ULC in the three main periods: AFC (1996–2003); commodity boom (2003–2012); and post-commodity boom (2012–2015). The key findings are as follows:

- *AFC (1996–2003)*. The main feature among the ASEAN-4 during this period was the impact of the sharp depreciation of ASEAN-4 currencies. The collapse of the Indonesian rupiah had by far the biggest impact (–130) but sharp depreciations of the ringgit, peso, and baht also put downward pressure on their countries ULCs. China is an outlier in this regard, as the renminbi did not depreciate during this period. Indonesia stands out in terms of inflation. Indonesia had much higher inflation during this period (+103), eroding much of the gain from the depreciation. As a result, while Indonesia's real depreciation was off the same magnitude as the rest of the ASEAN-4, it was accompanied by much higher inflation. Two other factors stand out. First, in most countries an increase in real wages pushed up ULCs. Thailand was the exception, as real wages fell during the AFC. In Indonesia, the increase in real wages largely reflected sharp increases in minimum wages between 2000 and 2002 (Suryahadi et al., 2003). Second, while the real wage increases were offset by a pickup in productivity growth in China and Malaysia, in the other countries productivity growth was relatively sluggish. Overall, Indonesia emerged from the AFC period with the smallest decline in its ULC, despite having had by far the largest nominal depreciation of its currency.
- *Commodity boom (2003–2012)*. The most striking feature during this period is that, despite the commodity boom, the Indonesian rupiah depreciated in nominal terms. In contrast, the currencies of all the other countries appreciated. The second feature is that Indonesia's inflation was much higher than that of the other countries during this period. The real appreciations of the exchange rate were broadly similar, but in Indonesia's case it was the result of higher inflation, whereas in the partner countries it occurred via a nominal appreciation of the exchange rate. Third, in contrast to expectations after the passage of the 2003 Labor Law, real wages in Indonesia were broadly

Table 7.2 Decomposition of change in manufacturing ULC nominal US dollar, 1996–2015

Country	*Approx. Percentage Change (ln)*	*Percentage contribution of*			
		Real Wage (+ = increase)	*CPI (+ = increase)*	*Productivity (− = increase in prod.)*	*Exchange Rate (+ = appreciation)*
1996–2003					
Indonesia	−12	23	103	−8	−130
China	−34	30	2	−66	0
Malaysia	−21	27	16	−23	−41
Philippines	−27	17	37	−9	−73
Thailand	−46	−7	19	−8	−49
2003–2012					
Indonesia	50	5	62	−9	−9
China	94	98	28	−60	27
Malaysia	34	24	22	−33	21
Philippines	35	2	43	−35	25
Thailand	47	21	28	−31	29
2003–2007					
Indonesia	2	−14	34	−12	−6
China	28	32	12	−25	8
Malaysia	20	14	10	−14	10
Philippines	23	4	19	−17	16
Thailand	15	−1	14	−16	18
2007–2009					
Indonesia	7	7	14	−1	−13
China	20	19	5	−15	11
Malaysia	−12	−10	6	−6	−2
Philippines	1	−5	12	−3	−3
Thailand	6	5	5	−4	1
2009–2012					
Indonesia	41	12	14	4	10
China	46	47	11	−20	8
Malaysia	26	19	6	−13	13
Philippines	11	2	11	−15	12
Thailand	27	18	10	−11	10
2012–2015					
Indonesia	−22	10	19	−15	−36
China	31	39	5	−15	3
Malaysia	−20	10	7	−14	−24
Philippines	−21	0	8	−22	−7
Thailand	20	16	3	10	−10
1996–2015					
Indonesia	16	39	184	−32	−175
China	91	167	34	−141	30
Malaysia	−7	61	46	−70	−44
Philippines	−13	20	88	−65	−55
Thailand	22	30	51	−29	−30

ULC = unit labour cost; CPI = consumer price inflation.

Source: CEIC; Haver Analytics; IMF staff's calculations.

Note: The positive and negative sign reflects the direction of the ULC change. As such, negative sign in productivity reflects increase in productivity because it lowers the ULC; while negative sign in ER reflects depreciation because it lowers the ULC.

unchanged over the commodity boom period, in contrast to China, where real wages increased sharply, and Malaysia and Thailand, where real wages also increased. Only in the Philippines did real wages also remain flat during this period. However, because productivity growth was so much lower in Indonesia during this period, the relatively low growth in real wages did not translate into a material gain in competitiveness.

- *Post-commodity boom (2012–2015)*. After the end of the commodity boom, the ULC in most of the ASEAN-4 declined, with the notable exception of Thailand. In Indonesia and Malaysia this was driven mainly by a significant nominal depreciation of the exchange rate, although in Indonesia there was also a pickup in productivity growth, whereas in the Philippines it was driven more by continued productivity growth and low real wage growth. In Thailand, the increase in ULC was driven largely by a reversal in productivity growth, which fell sharply during this period. The real wage in Thailand also increased during this period, due to an increase in the minimum wage and civil servants' salaries (Chen and Ong, 2015). In China the ULC surged, mainly reflecting very high real wage growth.

In summary, between the mid-1990s and the end of the commodity boom in 2012, Indonesia had the largest increase in ULC among the ASEAN-4. This was despite having by far the largest nominal depreciation of its exchange rate over this period. This can be attributed to two factors: (1) Indonesia consistently had much higher inflation than its ASEAN-4 peers, which was most evident during the AFC, but was also a feature during the commodity boom period; and (2) Indonesia tended to have much lower productivity growth than its ASEAN-4 peers, especially during the commodity boom period. The low productivity growth is broadly consistent with Indonesia's long-term trend (Van der Eng, 2009). A further observation is that real wage growth does not appear to have been a major factor affecting Indonesia's competitiveness relative to its ASEAN-4 peers, despite the passage of the Labor Law in 2003 and some large hikes in minimum wages, especially after the GFC. Since the end of the commodity boom, Indonesia's ULC has fallen on the back of a depreciation of the Indonesian rupiah and there have been some signs of a rebound in productivity growth. The trend of China's ULC is relevant, because competition from 'Factory' China was a major factor in the slowdown in industrialisation of ASEAN after the mid-1990s. The data suggests that while China's industrial ULC remained competitive until the GFC, it subsequently increased sharply driven by a rapid growth in real wages. This increase in ULC in China has opened up new windows of opportunity for ASEAN.

4. The role of inflation in Indonesia's labour cost competitiveness

While low productivity growth appears to have been a significant contributory factor to the adverse trend in ULC in Indonesia, and deserves further study, we will focus here on the contribution of inflation.

Palomba, in his study on Indonesia's high inflation in the region (Figure 7.9), posits that a number of factors explain inflation across countries (Palomba,

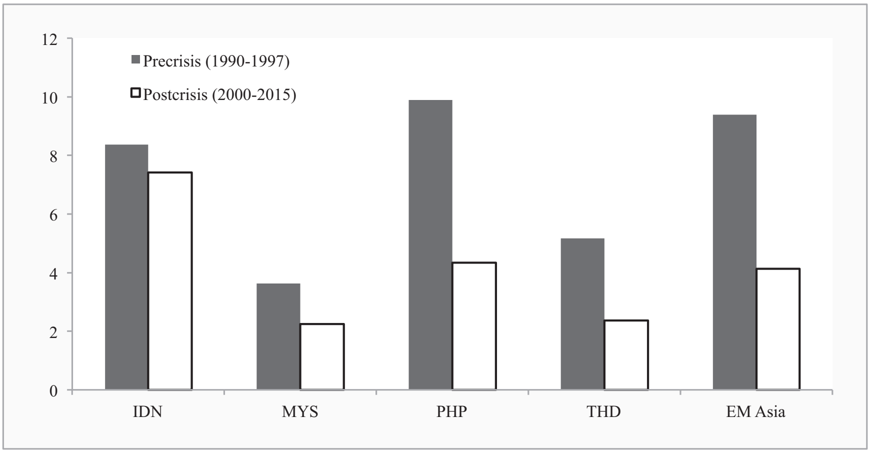

Figure 7.9 Inflation rates of Indonesia and regional countries (period average, in percent)
EM = emerging market; IDN = Indonesia; MYS = Malaysia; PHP = Philippines; THD = Thailand
Source: IMF WEO database.

2012): (1) inflation inertia (i.e. the past inflation); (2) country-specific shocks (e.g. output gap, monetary policy, and exchange rate fluctuation); (3) structural features of the economy (e.g. degree of central bank independence and economic openness); and (4) political stability and institutional development (e.g. frequent government changes and weak institutions leading to difficulties in pursuing consistent and sound policies to maintain low inflation). Based on inflation data from 1991–2010 (including the AFC years), he finds inflation inertia and political risks explain, on average, around 75 percent of the inflation differential between Indonesia and selected Asian countries. Monetary policy and exchange rate depreciation are also a contributing factor, accounting for about 25 percent.

But Palomba does not explain the reason for the high inflation inertia in Indonesia, nor does he explore the direct impact of political risk and instability on inflation. In Indonesia's case, these are likely to be linked given the legacy of the AFC. This chapter explores two factors that might explain the relatively high rates of inflation (and inflation inertia) in Indonesia: (1) a high frequency of food and fuel price shocks, and (2) a monetary policy stance during the commodity boom that failed to adequately combat a legacy of high inflation expectations following the AFC and demand-pull inflation as the impact of the boom fed through the economy. The following sections discuss these two factors in more detail.

4.1 Inflation shocks

High inflation periods in Indonesia (Figure 7.10) have been closely linked with inflation shocks stemming either from large adjustments in fuel prices (2005,

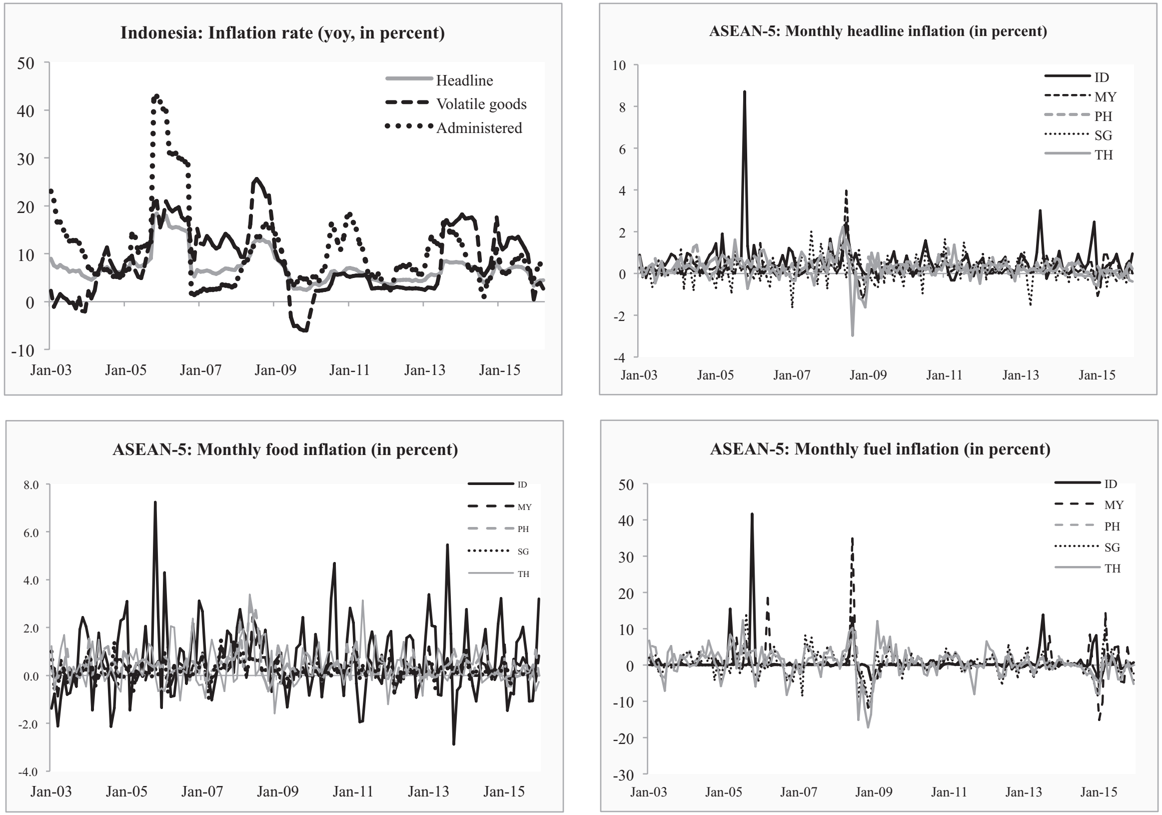

Figure 7.10 Component of Indonesia's inflation and inflation component in ASEAN-5 countries, 2003–2015

yoy = year-on-year; ASEAN = Association of Southeast Asian Nations; mom = month-on-month; ID = Indonesia; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand.

Source: CEIC.

Table 7.3 Probability of high monthly food and fuel inflation in ASEAN-5 countries, 2003–2015 (in percent)

Country	*Headline*		*Food*		*Fuel*	
	Mean	*Prob. > 1%*	*Mean*	*Prob. > 2%*	*Mean*	*Prob. > 10%*
Indonesia	0.6	12.2	0.7	17.9	0.8	2.6
Malaysia	0.2	1.9	0.3	0.0	0.3	1.9
Philippines	0.3	5.1	0.4	2.6	0.6	0.0
Singapore	0.2	7.7	0.2	0.0	0.4	1.3
Thailand	0.2	5.1	0.4	3.8	0.4	1.9

ASEAN = Association of Southeast Asian Nations; Prob. = probability.

Source: CEIC; IMF staff's calculations.

2008, 2013, and 2014) or shocks stemming from 'volatile goods' prices, which are mainly food prices (2008 and 2014). Indonesia has been more exposed to such shocks than other countries in the region (Figure 7.10 and Table 7.3). Between 2003 and 2015, the probability of having monthly food price inflation in excess of 2 percent was almost 18 percent in Indonesia, compared to almost zero in Malaysia and Singapore, and lower than 4 percent in the Philippines and Thailand. And over the same period, the probability of having monthly fuel inflation higher than 10 percent was 2.6 percent in Indonesia, compared with close to zero percent in the Philippines and 1.9 percent in Malaysia and Thailand. Consequently, the probability of having monthly headline inflation higher than 1 percent during this period was 12 percent in Indonesia. This compares with less than 2 percent in Malaysia and around 5 percent in the Philippines and Thailand.

The high volatility of food prices in Indonesia is most likely caused by infrastructure or supply chain deficiencies, as well as price-distorting trade policies. The long supply chain between farmers and consumers creates higher distribution cost, higher vulnerability to distribution channel shocks, and higher vulnerability to price manipulation (e.g. cartel practices by the distributors). In terms of trade policies, the import barrier on rice, for instance, has caused the domestic rice price to be highly vulnerable to domestic weather and deficiencies in logistics. In fact, between 2009 and 2012, Indonesia's rice price doubled despite stable rice price in Thailand and Viet Nam. As a result, Indonesia's rice price has been twice as high as that of Thailand and Viet Nam since 2012.

Fuel inflation in Indonesia has been determined almost entirely by the fuel subsidy programme. This resulted in a tendency, until recently, for fluctuations in international oil prices to be passed on only infrequently, in contrast to Singapore, Thailand, and Philippines, where domestic fuel price movements are more in accordance with movements in international oil prices. In other words, the transmission of fluctuations in world oil market prices were delayed. And when they were eventually passed on, it created very large inflationary shocks that were exacerbated by a disproportionate increase in the food prices and public transport fares. On the contrary, occasional falls in the price of gasoline are not usually followed by falls in food prices and public transport fares.

The high exposure to fuel and food prices shocks means inflation expectations in Indonesia are upwardly biased, complicating the conduct of monetary policy under an inflation-targeting framework.[7] Under an inflation-targeting framework, central banks influence inflation through transparent and credible adjustments in their policy rate, while monetary aggregates and exchange rates are by and large free to adjust. A well-functioning arbitrage ensures the change in policy rate is transmitted along the yield curve, influences the money market rate, deposit rate, and banks' lending rate, and ultimately the level of economic activity and inflation rate (IMF, 2013). In a country where the significant source of the inflation dynamic is on the supply side, it is difficult to implement a pure inflation-targeting framework. Under an inflation-targeting framework, monetary policy should not respond to temporary price shocks such as those reflected in volatile goods and administered prices inflation.[8] However, high price volatility in these two groups of goods will have a significant impact on inflation expectations and feed into core inflation. Indeed, this is the case for most developing countries (Walsh, 2016). Therefore, for monetary policy to become effective, traditional monetary tools need to be supplemented by policies that directly address the supply side shocks to inflation.

In addressing this supply side shock, in recent years Bank Indonesia and the government have adopted various measures. Bank Indonesia has improved its coordination with the central and local government through an inflation task force (TPID or *Tim Pengendali Inflasi Daerah*) to manage food price inflation. The fuel subsidy system, which distorts the transmission of world oil price fluctuations to domestic consumers, was overhauled in late 2014. The subsidy on premium petrol (Ron 88) was removed, while the diesel subsidy was fixed at Rp1,000 per litre. There have also been efforts to ease import restrictions on certain food commodities. Nonetheless, challenges remain. The effectiveness of a fixed fuel subsidy system, or the government's commitment to this policy, remains to be tested in a high oil price environment. Efforts to balance concerns regarding food security or self-sufficiency with price stability for consumers still need to be further improved.[9]

4.2 Monetary and exchange rate policy

Any analysis of inflation has to examine the conduct of monetary (and exchange rate) policy. To set the scene for such an analysis, one needs to first examine the conditions under which Bank Indonesia had to operate its monetary policy during the commodity boom period of 2003–2012. A cursory examination of the basic facts suggests that it was not an easy environment. Apart from the high frequency of exogenous inflation shocks, discussed earlier, Bank Indonesia faced two additional challenges. First, there was the legacy of the AFC itself. This period of macroeconomic and political instability not only destabilised inflation expectations but undermined confidence in Indonesian rupiah assets more broadly, making macroeconomic and financial conditions highly sensitive to shifts in sentiment. Second, the commodity boom, as it gained momentum, injected significant amounts of US dollar liquidity into the economy, directly through the positive shifts in the terms of trade and increasingly indirectly as the commodity boom attracted significant capital inflows. Initially, this economic boost was welcome for an economy recovering from the trauma of the AFC. However, this surge of dollar liquidity increasingly posed a challenge, as policymakers struggled with the age-old trilemma/dilemma.

That said, it is still reasonable to ask how monetary policy met this challenge. Fane (2000) and McLeod (2003) argue that the very high inflation during the main AFC crisis period (1997–1998) was largely because Bank Indonesia lost control over its lender-of-last resort facility, resulting in an explosive expansion of the monetary base (M0). However, Fane (2005) argues that inflation continued to rise after the AFC because of the rapid growth in base money. McLeod (1997) argues that even before the AFC, excessive growth in base money was the cause of high inflation in Indonesia. A number of papers have examined Bank Indonesia's monetary policy during the commodity boom period.[10] The main conclusion from these analyses is that during the commodity boom, Bank Indonesia intervened in the foreign exchange market to ease the Indonesian rupiah's appreciation pressure. The incomplete sterilisation contributed to high inflation through an excessive expansion of base money. Let us examine this hypothesis more closely.

The growth rate of base money can be approximated by the change in net foreign asset (NFA) and net domestic asset (NDA) of central bank's balance sheet. An increase in NFA during appreciation pressure roughly implies foreign exchange intervention, whereas a decline in NDA implies sterilisation (Fane, 2005). During the commodity boom period, Indonesia's exchange rate was relatively stable or appreciated the least compared to other commodity exporting countries (Figure 7.11). The foreign exchange intervention to limit further appreciation resulted in the build-up of foreign exchange reserve, which increased threefold, from 40 billion US dollars in 2005 to 120 billion US dollars in 2011. As sterilisation was increasingly costly (IMF, 2010; Thee and Negara, 2010), the incomplete sterilisation resulted in expansion of the monetary base, especially the currency in circulation, its main component. The high growth in currency in circulation then contributed to high inflation during the period.[11]

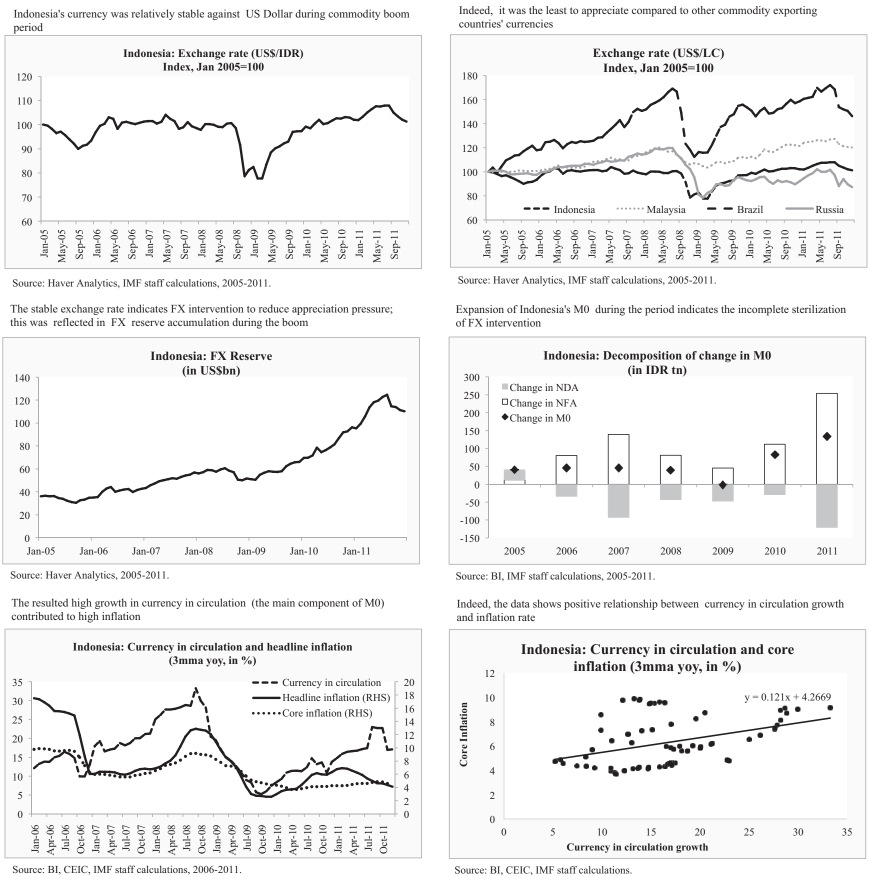

Figure 7.11 Indonesia's exchange rate policy during the commodity boom, 2003–2011

Comparison with Malaysia and Thailand shows the growth rate of base money was higher in Indonesia (Table 7.4). Decomposition of NFA and NDA growth shows NFA growth was higher in Malaysia and Thailand during the commodity boom period (especially 2003–2007 and 2009–2012). And the corresponding bigger decline in NDA implies both countries sterilised their foreign exchange intervention more than Indonesia did. The result was smaller base money growth and thus lower inflation. The reason for more complete sterilisation in Malaysia and Thailand may be due to the lower cost of sterilisation in those countries. In short, the high inflation during the boom period, which contributed to a high ULC increase, was partly endogenous to Bank Indonesia's exchange rate

Table 7.4 Growth rate of base money, GDP, and velocity of money (in percent)

Average Yearly Growth	*1996–2003*	*2003–2007*	*2007–2009*	*2009–2012*	*2012–2015*
Indonesia					
Base money (M0)	24	25	6	24	12
NFA cont. to growth (%)	*76*	*10*	*20*	*35*	*18*
NDA cont. to growth (%)	*–53*	*15*	*–14*	*–11*	*–6*
CPI	18	9	8	5	7
Real GDP	2	6	5	6	5
Nominal GDP	22	18	19	16	10
Velocity of M0	0	–5	12	–6	–2
Malaysia					
Base money (M0)	–2	8	–2	23	10
NFA cont. to growth (%)	*23*	*95*	*1*	*50*	*–8*
NDA cont. to growth (%)	*–24*	*–87*	*–3*	*–28*	*18*
CPI	2	3	3	2	2
Real GDP	4	6	2	6	5
Nominal GDP	8	12	4	10	6
Velocity of M0	14	4	7	–9	–3
Thailand					
Base money (M0)	6	8	8	11	6
NFA cont. to growth (%)	*15*	*34*	*94*	*36*	*3*
NDA cont. to growth (%)	*–8*	*–26*	*–86*	*–25*	*2*
CPI	3	4	2	3	1
Real GDP	2	5	0	5	2
Nominal GDP	5	9	3	9	3
Velocity of M0	–2	2	–5	–2	–2

GDP = gross domestic product; CPI = consumer price inflation.

Source: Bank Indonesia; CEIC; IMF staff's calculations.

Note: Velocity of M0 is defined as the nominal GDP divided by M0.

policy, which is to limit currency appreciation or maintain a relatively stable nominal exchange rate.

In addition to the exchange rate policy, it is also argued that Bank Indonesia's implementation of the inflation-targeting framework it introduced in 2005 was not consistently and sufficiently rigorous, and that policy rate actions were not always sufficiently timely to counteract inflationary pressures (Kenward, 2013). For instance, from late 2007 to early 2008, Bank Indonesia's policy was too loose for too long, it has been argued, for example between May 2006 and December 2007, when Bank Indonesia cut its benchmark interest rate by a cumulative 450 basis points to try and stimulate growth (Figure 7.12). By April 2008, however, inflation had reached 9 percent – way above Bank Indonesia's upper target (6 percent). Only when inflation increased further due to the rising

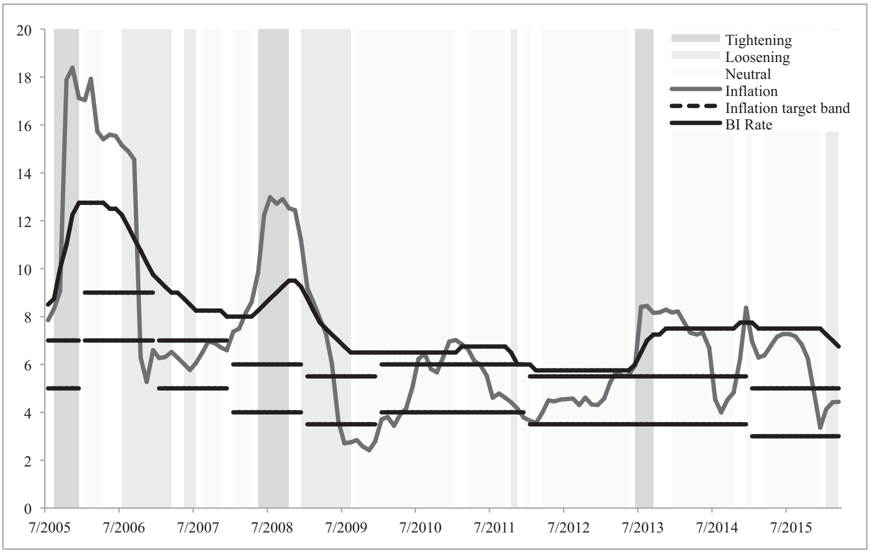

Figure 7.12 Bank Indonesia rate and headline inflation (yoy, in percent)

Source: Bank Indonesia and CEIC, 2005–2015.

oil price did Bank Indonesia start to tighten again. It has also been argued that Bank Indonesia's decision to adjust its inflation target upward in 2005–2006 had weakened the credibility of Bank Indonesia's commitment to the new inflation-targeting framework. Nonetheless, there are many instances Bank Indonesia's easing of monetary policy was clearly appropriate, for example during the GFC. Moreover, since mid-2013, after the 'Tapering Tantrum' shock, there has been a significant shift in Bank Indonesia's monetary policy framework. In particular, the decision to move to a more flexible exchange rate regime and underpin that shift with a monetary policy framework more tightly focused on stability and bringing inflation down appears to be bearing fruit, with inflation in Indonesia converging since late 2015 on the levels of its partners in the region.

Bank Indonesia's monetary instrument, the Bank Indonesia rate, appears to be less effective due to its long transmission channel and non-transactional rate. Thailand, for instance, which was also hit by the AFC, had implemented inflation targeting much earlier, in 2000, by using 14-day repurchase agreement (repo) contract rate as the instrument. This instrument appears to be more effective in terms of ensuring core inflation remains within the target band (Fane, 2005). Bank Indonesia finally started using a seven-day repo contract rate in August 2016 in a move to improve the transmission mechanism. Nonetheless, apart from the room for improvement discussed earlier, overall Indonesia's inflation trend has declined, especially since early 2009. The conduct of Bank Indonesia's inflation targeting framework has generally been in line with international best practice, and the public's focus on inflation has also intensified due to the inflation-targeting framework. Overall, Bank Indonesia has made progress in reducing inflation in Indonesia, and its challenge will be to aim for a lower inflation target (Kenward, 2013), thus showing greater commitment to a lower inflation environment. Also, as Bank Indonesia operates in an environment of high and persistent food inflation, monetary policy that is more responsive to developments in headline inflation will be welfare superior compared to monetary policy that puts greater weight on developments in core inflation (Cashin and Roitman, 2016). Finally, as the commodity boom ended in 2011 and the associated large capital inflows have declined, the appreciation pressure of the exchange rate has largely subsided. And as the conduct of exchange rate policy by Bank Indonesia has improved since mid-2013, more stable and lower inflation is expected in the future.

In summary, the inflation shocks due to food prices and fuel subsidy, coupled with Bank Indonesia's monetary and exchange rate policy stance in a high inflation risk environment during the commodity boom, have contributed to high inflation in Indonesia which subsequently translated into high growth in unit labour cost. Various measures taken by Bank Indonesia and the government to reduce the inflation shocks, improvement in the conduct of monetary and exchange rate policy, as well as reduced appreciation pressure in the post-commodity boom period, may lead to lower inflation and ULC growth. Nonetheless, to further improve labour cost competitiveness, it is important for the government to specifically target reducing the high living cost pressures faced by low-income workers. This, for instance, could be done through the following initiatives (Papanek et al., 2014). First, provide low-cost housing for workers and their families; second, provide free health and education services for workers and their families; third, provide transportation vouchers for workers; and fourth, provide subsidised food in workers' canteens in industrial areas.

5. Macroeconomic policy during a commodity boom

The previous sections have described that Indonesia's manufacturing export competitiveness has declined since the early 2000s. This can be attributed in part to the higher growth of Indonesia's ULC compared to other countries in the region. Analysis on the ULC's components shows the increase was mainly driven by high inflation and relatively low labour productivity growth. As this chapter focuses on the former, it has described the causes for high inflation in Indonesia particularly during the commodity boom. Overall, it can be attributed to inflation shocks coming from food prices and fuel subsidy and the monetary and exchange rate policy stance of Bank Indonesia in the high inflation risk environment of the commodity boom period. As another commodity boom could occur in future, it is worthwhile to take stock of the lessons learnt.

5.1 Taming inflation is necessary

This is even more important for a country that is emerging from a period of instability, as Indonesia did. Indonesia's experience showed two things. First, a multi-faceted approach is needed, that is monetary policy should be combined with efforts to dampen the frequency and severity of inflation shocks. Indonesia's experience shows that a persistent food inflation shock and a one-time fuel subsidy removal shock can result in an excessive inflationary response. The severity and persistence of this shock ultimately translates into higher inflation expectations. Monetary policy, therefore, should give greater weight to headline inflation developments, rather than mainly focus on core inflation, as is common practice in inflation-targeting countries. Attempting to reduce the inflation shocks, Bank Indonesia and the government have implemented various reforms, for instance mobilising greater coordination and focus on monitoring the food supply chain, overhauling the fuel subsidy system, and easing some price-distorting trade policies.

Second, managing inflation during a commodity boom is much easier if a country has a flexible exchange rate regime, but it still requires a clear focus to establish the credibility of the inflation-targeting regime. In responding to the appreciation pressure during the boom period, Bank Indonesia intervened to limit appreciation of the exchange rate. This resulted in higher inflation through rapid base money expansion. Even if one concludes that a real appreciation during a commodity boom period is inevitable, it would be preferable for the real appreciation to occur through nominal appreciation rather than through high inflation, for the following reasons: (1) keeping the exchange rate within a certain range during a period of high capital inflow will stimulate further speculative inflow; (2) sterilising intervention in the foreign exchange market is difficult and costly; and (3) the high inflation resulting from unsterilised foreign exchange intervention is costly and has significant side effects. Overall, the consistent implementation of an inflation-targeting framework, particularly with the legacy of high inflation expectation from the AFC and demand-pull inflation from the commodity boom, would result in a better inflation performance. Reflecting on its experience, particularly during the peak of the commodity boom and the high capital inflow period (2009–2012), Bank Indonesia has considerably improved its monetary and exchange rate policy since mid-2013. The exchange rate policy has become more flexible; taking its share in absorbing external shocks. This can clearly be seen, for instance during the recent 'Renminbi Tantrum' in August 2015, when the exchange rate was allowed to depreciate by about 10 percent.

5.2 Taming inflation is not sufficient

On this front, there are three main lessons. First, the ULC analysis clearly points to a productivity issue that needs to be tackled. Real appreciation during a commodity boom may be inevitable, but the increase in ULC could be moderated if labour productivity increases to compensate, at least partially, the real appreciation. It means that from 2003 to 2012, Indonesia's productivity growth should have been five times higher than the actual one. Second, the broader literature suggests that labour cost competitiveness is only one in an array of factors that determines the competitiveness of the investment climate in an emerging market economy. Other factors, for instances, human capital, legal execution, infrastructure, and trade policy, are found to be equally important. Even on the labour issue itself, not only *the level* of the labour cost is important for competitiveness, but the certainty of rule regarding *the change* in labour cost (e.g. minimum wage increase) is also a determining factor. The unexpected double-digit increase in minimum wage from 2012 to 2014, for instance, has deteriorated Indonesia's manufacturing investment climate. To this end, the rule-based minimum wage increase formula introduced by the government in October 2015 is a step in the right direction. Third, even if Indonesia had been more successful in taming inflation during the commodity boom period, there would still have been Dutch disease effects from a real appreciation of the exchange rate and a shift of resources out of the commodity tradable sector into the commodity and non-tradable sector. This emphasises that managing a commodity boom requires broad-based structural reforms and investments to try and mitigate the loss of competitiveness that the non-commodity sector will suffer from Dutch disease effects.

5.3 Combating the Dutch disease is challenging

Despite the best intentions and policy initiatives to pursue structural reforms during a commodity boom, cross-country experiences show that combating the Dutch disease is a challenging task. Canada, for instance, a country with a track record of implementing various policies to develop its manufacturing sector since the 1950s, was also negatively affected by a commodity boom in the 2000s. In the late 1990s, over half of Canada's exports consisted of sophisticated value added products. But since the early 2000s, the resource industry has been more dominant (led by the expansion of the petroleum sector), squeezing the manufacturing sector in both absolute and relative terms (Stanford, 2012). During the boom period, Canada's currency appreciated by 60 percent against the US dollar. The pace of capital accumulation and the employment level in manufacturing output fell, while those in commodity and non-tradable sectors increased (IMF, 2015). By 2011, unprocessed and semi-processed resource exports accounted for two-thirds of Canada's exports. Now that the commodity boom has ended, leaving Indonesia with lagging manufacturing sector competitiveness, the premium on undertaking structural reform is very high. Whether this momentum can deliver structural reforms will be a crucial question in Indonesia's economic history.[12]

6. Concluding remarks

This chapter has attempted to explain the decline of Indonesia's manufacturing export competitiveness after the AFC from a ULC perspective. Further research on this topic is needed, especially an analysis of the trend of Indonesia's manufacturing labour productivity during the commodity boom; comparing Indonesia's macroeconomic policy response with other commodity exporting countries; and cross-country case studies on structural reform experiences during the boom period.

Notes

1 The author is grateful for the feedback from Benedict Bingham. The views expressed in this chapter are solely those of the author, and do not represent the views of the International Monetary Fund (IMF).
2 Pre-crisis period is defined as 1985–1996; post-crisis period as 2003–2015.
3 Amid the boom in Japanese foreign direct investment in Indonesia since 2010, Japanese automotive manufacturers invested in a strategic vehicle model and began exporting in 2014. Among the reasons are Indonesia's large population, emerging middle class, and economies of scale as production and export base (Sato and Damayanti, 2015).
4 A country has a 'score' of 1 if its export market share equals its share of the world's working age population.
5 Indonesia, Malaysia, Philippines, and Thailand.
6 China's ULC may be biased upward slightly relative to the ASEAN-4. Due to data limitations, China's ULC was computed for secondary industry, which includes mining, utilities, and construction. The property and construction boom in China since the mid-2000s may have pushed construction wages upwards, raising the overall secondary industry ULC.
7 Bank Indonesia formally adopted an inflation-targeting framework in 2005.
8 Volatile goods and administered prices refer to goods and services whose prices are volatile in the short term (e.g. the price of raw food), or whose prices are set or administered by the government (e.g. gasoline and electricity prices).
9 For instance, in August 2015, there was sudden ban of maize grain imports by the Ministry of Agriculture, which cited low maize prices at local farmers as the reason. The result was stranded maize imports at the seaport and higher cost of livestock feed. The import ban continues. Between November 2015 and January 2016, the price of maize grain increased by 100 percent. As a result, the prices of livestock meat at the consumer level increased.
10 See, for instance, Lindblad and Thee (2007), Ashcroft and Cavanough (2008), Patunru and von Luebke (2010), Baird and Wihardja (2010), Thee and Negara (2010), World Bank (2010), and Suryadarma and Sumarto (2011).
11 Loose monetary policy in favour of stable or weaker exchange rate has long been practiced in Indonesia. In the pre-AFC period, the pre-announced monetary growth inflation targets were often missed since the exchange rate goal dominated the conduct of monetary policy (Ramakrishnan and Vamvakidis, 2002).
12 M. Sadli, one of Indonesia's chief modern economic architects, famously stated (Sadli's law), that bad times produce good policies and good times often reverse them. This may not hold anymore. As Patunru and Rahardja (2015) argue, trade policy has become increasingly protectionist since the end of the commodity boom.

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8 Labour market and firm competitiveness in Indonesia

Issues and challenges

Muhamad Purnagunawan, Devanto Shasta Pratomo, and Daniel Suryadarma

1. Introduction

Indonesia's large population and low dependency ratio result in an abundant supply of labour. The World Development Indicators show that Indonesia's labour force in 2014 was around 124 million people, the fourth biggest in the world. Such an abundance of labour makes it a key determinant of Indonesia's competitiveness. The period 2015–2030 has been described as Indonesia's period of demographic bonus or demographic dividend, as the share of dependents decreases relative to economically active persons. In this period, the productive utilisation of the workforce is expected to contribute to a rise in output.

Labour productivity rose significantly in all sectors from 2001 to 2015, with manufacturing having contributed higher productivity than agriculture and services (Figure 8.1). However, the share of employment in manufacturing has grown very slowly since the early 2000s. This slow growth of manufacturing is mainly caused by the diminished competitiveness of industry affected both by domestic obstacles to job creation and the appreciation of the real exchange rate. In contrast, services have continued to grow far more rapidly than other sectors at an annual average growth rate of 7.1 percent. By 2015, services already accounted for just under half of total employment (Figure 8.2). Agriculture had lost its dominant position as the main source of jobs in 2007, but agriculture output growth has remained stable, supporting some improvement in productivity.

Several studies have noted that education and also increasing the levels of skills in the workplace is a major instrument for increasing productivity and competitiveness (Allen, 2016). Hence, the government has allocated 20 percent of the public budget to expenditure on education. However, some problems remain. Besides the relatively low quality of education (Suryadarma, 2011; Di Gropello, 2013), only a minority of business firms allow workers to continually acquire new skills by attending workplace training. This is largely due to the fact that a significant proportion of employees are employed on short-term contracts, which means there is lower investment in training and human capital development. Access to certified training courses is also limited in Indonesia and only few less educated people have access to them, with the result that as many as half of all workers might be under-qualified for their positions (Allen, 2016).

DOI: 10.4324/9781315161976-8

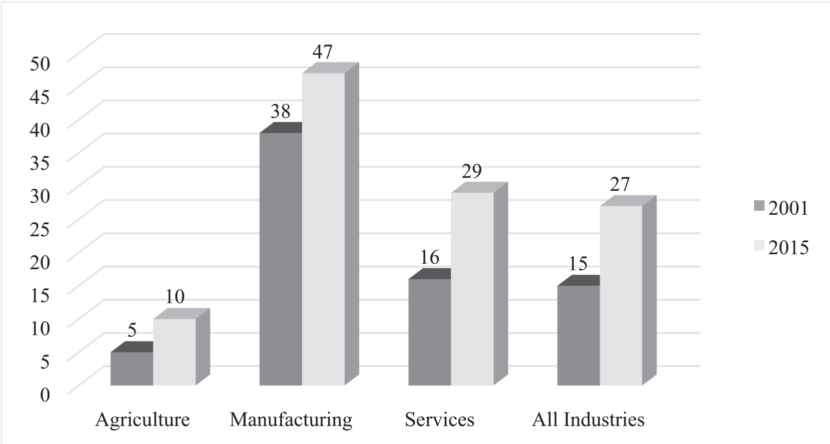

Figure 8.1 Labour productivity in major sectors, 2001 and 2015 (constant 2000 prices) in million Indonesian rupiah

Source: Authors' calculations based on Indonesian Labor Force Survey (Sakernas).

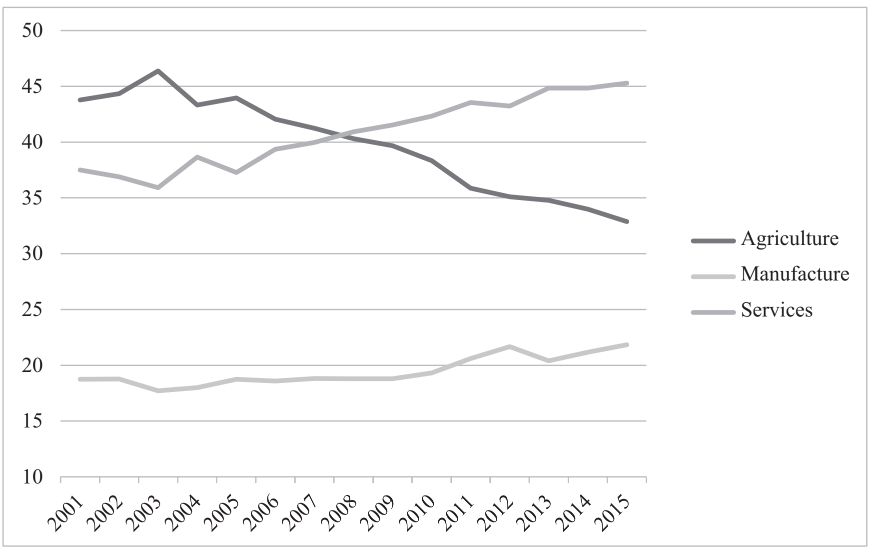

Figure 8.2 Share of employment by sector (in percent), 2001–2015

Source: Authors' calculations based on Indonesian Labor Force Survey (Sakernas).

In this chapter, we examine aspects related to Indonesia's labour market that influence whether Indonesia's abundant labour force hinders or helps the country's competitiveness. We use a simple guiding framework, the concept of unit labour cost (ULC), which is widely known as a measure of international competitiveness

(Manning and Purnagunawan, 2013a). ULC is positively correlated with labour cost, meaning that, other things being equal, higher labour cost means higher ULC, and ultimately lower competitiveness. On the other hand, it is negatively correlated with labour productivity. Holding labour cost constant, an increase in labour productivity will lower ULC, thus increasing competitiveness.

In this chapter, we provide a broad-brush discussion of various issues that affect labour cost and labour productivity in Indonesia. The issues we cover are those we consider to be the most deserving of the attention of policymakers, but the list is by no means exhaustive. Specifically, we discuss (1) the skills gap in the labour market and policies that can be implemented to address it, and (2) minimum wages and severance pay policies. We also provide an update of labour market conditions in Indonesia.

2. Labour market conditions: unemployment and informality

2.1 Unemployment rate

The unemployment rate in Indonesia fell from over 10 percent in 2005 to around 5–6 percent in 2015. Although this is a success, it remains high compared with Indonesia's neighbouring countries. Indonesia's rate is comparable with that of the Philippines (7 percent), but it is still much higher than that of Malaysia (3 percent), Thailand (0.8 percent), or Viet Nam (2 percent) (World Bank data from 2014[1]).

Unemployment, especially youth unemployment, remains a big issue (Figure 8.3). The main explanation for the high rate of youth unemployment is the long transition from full-time education to the labour market, reflecting the difficulties

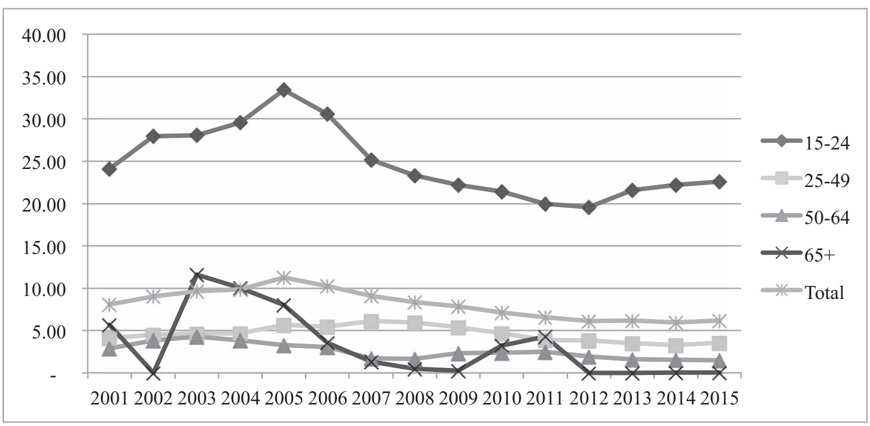

Figure 8.3 Unemployment rate by age groups (in percent), 2001–2015

Source: Authors' calculations based on Indonesian Labor Force Survey (Sakernas).

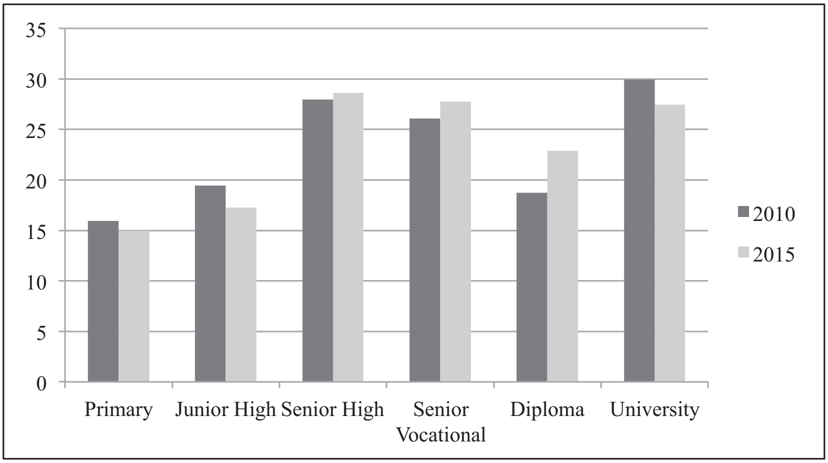

Figure 8.4 Youth unemployment rate by education (in percent), 2010 and 2015
Source: Authors' calculations based on Indonesian Labor Force Survey (Sakernas).

of finding a preferred job in the labour market. Allen (2016) notes that one-third of unemployed youths remain unemployed 12 months later. As shown in Figure 8.4, the high youth unemployment rate is dominated by those with senior secondary education, both academic and vocational, and tertiary education, suggesting that the educated are the only segment that can afford to be unemployed for a relatively long period as they wait for or seek a better-paid job in the formal sector. This implies that while youth unemployment is relatively high, it is not as critical an issue as in other countries where the youth are unemployed because they cannot find even low-paid jobs. However, the fact that there are many unemployed youth and, at the same time, significant shortages for specific skills in the labour market (Di Gropello et al., 2011) indicate that there is a serious mismatch between the skills produced in formal education and the skills that employers need – an issue we come back to in the next section. In general, the situation confirms the need for accelerating labour market entry for youth, which can be achieved by providing education and training that matches industry's needs.

Another important characteristic of the unemployed in Indonesia is the fact that they remain dominated by females living in urban areas. But interestingly, the female unemployment rate declined faster than the male rate; the gender gap in the unemployment rate had narrowed to just 0.3 percentage points in 2015 (Figure 8.5).

Another dimension of the limited utilisation to the workforce is underemployment. Unlike part-time work, which has been a feature of the family-based agriculture sector and is common among family workers, underemployment is defined as those people working less than 35 hours but still seeking more work.

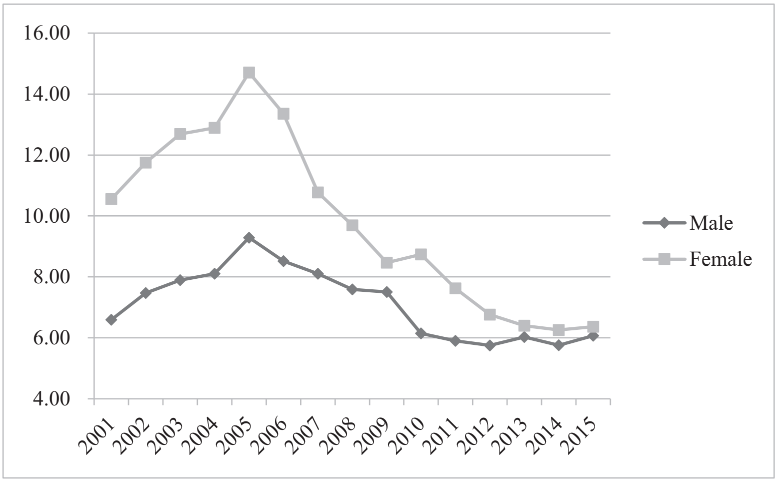

Figure 8.5 Unemployment rates by gender (in percent), 2001–2015

Source: Authors' calculations based on Indonesian Labor Force Survey (Sakernas).

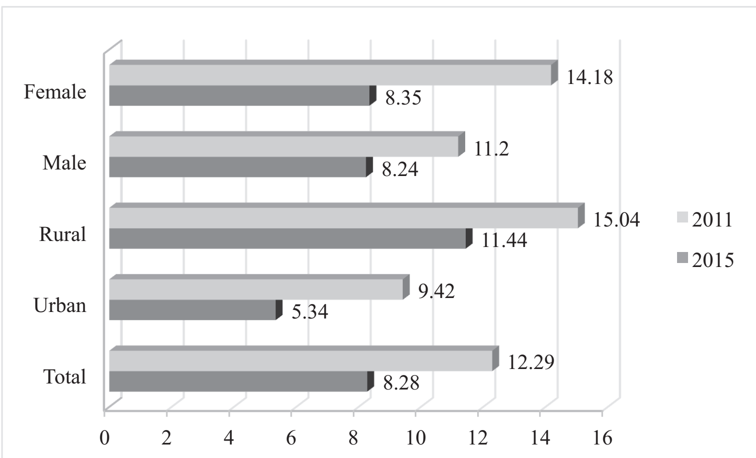

Figure 8.6 Rates of underemployment by gender and location (in percent), 2011 and 2015

Source: Authors' calculations based on Indonesian Labor Force Survey (Sakernas).

The rate of underemployment in 2015 was around 8 percent, which is not much above the unemployment rate. Underemployment is more evident among female, less educated, and rural workers, particularly due to the dominant role of the agriculture sector. While still a problem, underemployment decreased across gender and urban-rural areas from just over 12 percent in 2011 to around 8 percent in 2015 (Figure 8.6).

2.2 Formal and informal segmentation of the labour market

The Indonesian labour market is heavily segmented, with the informal sector dominant both in terms of economic activity and providing employment. The informal sector is characterised by insecure work arrangements, little protection for workers, and low wages. Thus, the existence of the informal sector in Indonesia is a reflection of the limited job opportunities available in the formal sector, which again could be related to a skills mismatch. A significant decline in the share of informal employment, from 63 percent in 2001 to 52 percent in 2015, suggests that most new jobs have been created in the formal economy (Figure 8.7). One factor that has influenced the increase in formal sector employment has been strong labour demand driven by the expansion of wage employment in the manufacturing and services sectors, supported by the improved education of the labour force.

Table 8.1 shows the trend in informality rates (employment in the informal economy) based on several demographic and sectoral characteristics between 2001 and 2015. In 2001, 58 percent of male workers were in the informal sector and, after a slight increase in 2006, the proportion continued to decline. As of 2015, close to half of male workers were in the formal sector. For female workers, although the proportion of informal workers also declined, from 68 percent in 2001 to 56 percent in 2015, the informality rate remained much higher than among male workers. This is possibly related to the fact that a large proportion of female workers are unpaid family workers.

Informality rates both in urban and rural areas declined between 2001 and 2015, although the decline was much stronger in rural areas. Having said that,

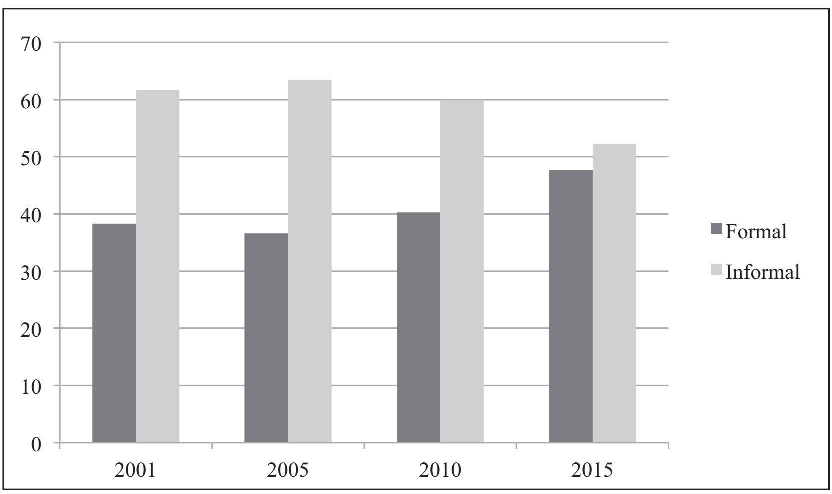

Figure 8.7 Informal and formal employment rates (in percent), 2001–2015

Source: Authors' calculations based on Indonesian Labor Force Survey (Sakernas).

Table 8.1 Informality rates by demographics and sector, 2001–2015

	2001	*2006*	*2011*	*2013*	*2014*	*2015*	*Proportional change 2001–2015 (%)*
Gender							
Male	58.2	61.8	53.2	51.2	51.3	50.1	–13.9
Female	67.7	65.7	58.3	58.3	57.9	56	–17.3
Urban/Rural							
Urban	39	42	37.4	35.1	36.1	36	–7.7
Rural	76.6	77.3	71.6	71.3	70.5	69.6	–9.1
Age Group							
15–24	56.8	58.7	48.6	44.9	43.7	42.1	–25.9
25–49	59	60.2	52	50.2	50	48.6	–17.6
50–64	72	73	66.4	66.3	66.3	64.3	–10.7
65+	83.6	84.1	80	81.5	81	78.5	–6.1
Sector							
Agriculture	90.7	92	89.7	88.6	88.2	87.1	–4.0
Manufacturing	28.8	36.8	33.3	29.8	32.6	34.3	19.1
Services	44.3	44.8	37.1	37.8	37.8	35.6	–19.6
Education Attainment							
Less than primary	81.6	84.8	79.6	79.2	79.8	78.4	–3.9
Primary	71.8	77	70.2	69.7	70.2	69.8	–2.8
Junior secondary	57.6	63.5	54	55.2	55.5	56.3	–2.3
Senior secondary	30.8	34.9	32.7	31.9	32.6	32.8	6.5
Tertiary	9.7	9.5	7.7	8.9	9	9.3	–4.1
Total	**61.7**	**63.1**	**55.2**	**53.8**	**53.8**	**52.3**	**–15.2**

Source: Authors' calculations based on Indonesian Labor Force Survey (Sakernas).

the informality rate in rural areas remained around twice as high as in urban areas. In 2015, only around 4 out of 10 jobs in urban areas were informal jobs, whereas the rate was close to 7 out of 10 in rural areas.

Moving on to the informality rate by age group, it remained lowest in the 15–24 age group in 2015, as was also the case in 2001. Moreover, the proportional decline in the informality rate was also highest in the 15–24 age group. It appears, therefore, that younger workers have benefited most from the increase in formal jobs in Indonesia.

An examination of informality rates by sector reveals that even the agriculture sector has become more formalised. Informality increased in manufacturing, however, which indicates an increasing rate of self-employment and casualisation in the sector. This is likely due to firms' strategies, especially in manufacturing, to use subcontracting and employ temporary and short-term workers to avoid severance pay and contributions for workers' benefits.

According to the 2016 National Labour Force Survey, only 20 percent of regular employees were employed as permanent workers, while the remaining workers were on fixed-term contracts (30 percent) or had no contract (agreement) or only an informal contract with their employers (50 percent) (Allen and Kyloh, 2016). The 50 percent of workers who are neither permanent nor fixed-term contract workers would include most of the temporary and short-term workers who tend to be informal as they are very unlikely to receive standard forms of working benefit including health insurance, provident funds, pensions, or other benefits.

When we look at informality by workers' education attainment, we find that informality has declined for workers at all levels of education, except senior secondary graduates. Although informality rates are still the highest for workers with lower education levels, the increase among senior secondary graduates could indicate the pressure in the formal Labor market was increasing even further.

3. Worker skills, labour productivity, and firm competitiveness

The first component of firm competitiveness we examine is labour productivity. One particularly important worker trait that leads to productivity is skills. Highly skilled workers contribute to firm competitiveness not only through producing more, but also because they produce higher-quality outputs (Black and Lynch, 1996; Haltiwanger et al., 1999; Vandenberg and Trinh, 2016). Highly skilled workers can absorb and apply imported technologies or discover innovations that can increase the firm's competitiveness even further, which is particularly important in Indonesia's low value added manufacturing sector (Di Gropello, 2013). In this sense, a highly skilled workforce at all levels, from the production floor to the boardroom, is ultimately more valuable than capital or technology, even in capital or technology-intensive firms. And firms with aspirations to supply the global market need highly skilled workers even more (Di Gropello, 2013; Onkelinx et al., 2016).

There are many types of skills, ranging from academic and life skills to technical skills (Di Gropello, 2013). These skills are produced in multiple ways, such as formal education, non-formal education, on-the-job training, and work experience. Workers continue to acquire skills throughout their careers. But the main producer of skills remains the formal education system. A weak formal education system that does not equip individuals with basic skills, such as mathematics, literacy, and the ability to think is a major, if not the main, obstacle to labour productivity, eventually resulting in low firm competitiveness. According to Vandenberg and Trinh (2016), studies that estimate a correlation between workers' education attainment and firm productivity implicitly assume that the education system does in fact impart knowledge and develop intellectual capacity.

In a survey of 473 medium and large firms across five provinces in Indonesia, Di Gropello et al. (2011) find that firms consider basic academic skills to be the most important, and at the same time most lacking, for production workers. Manufacturing and exporting sectors reported greater difficulty in finding appropriate staff, while the services sector is not in a much better situation. Similarly, the 2015 World Bank Enterprise Survey quantifies the difficulty for employers to find suitable employees. Overall, more than 10 percent of Indonesian firms report that they face difficulties finding adequately educated employees. The rate is much higher in the services sector at 12 percent, but as Figure 8.8 shows, there was a significant increase between 2009 and 2015 among manufacturing firms. In comparison with neighbouring countries, Indonesia's condition is similar to that of the Philippines (10.1 percent), but is worse than that of Viet Nam (8.1 percent) and Thailand (2.1 percent). This stands in stark contrast to the relatively high unemployment rates among the educated population, again indicating a significant skills mismatch. By 2025, ILO (2014) projects that 63 percent of high-skills jobs in Indonesia can be filled by underqualified workers, the highest rate in the Association of Southeast Asian Nations (ASEAN).

Di Gropello (2013) concludes that: 'Inspite of a significant increase in education attainment, preliminary evidence, including global competitiveness rankings and education quality indicators, suggests that this increase has not translated into higher productivity and competitiveness.' Similarly, a recent Organisation for Economic Co-operation and Development (OECD) survey of

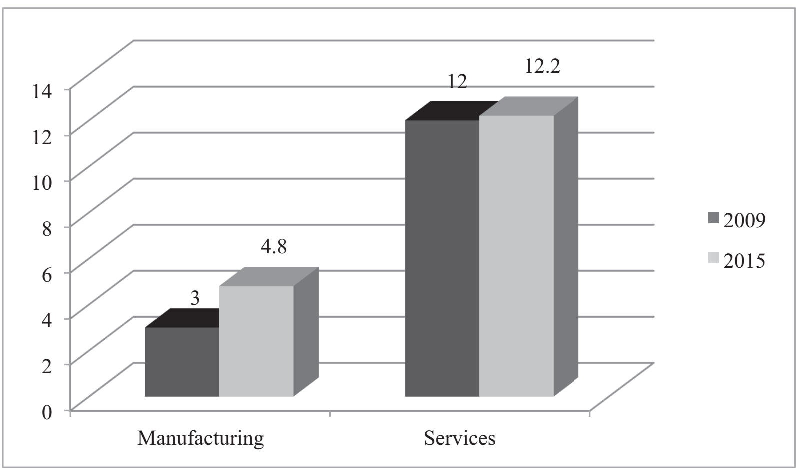

Figure 8.8 Firms identifying an inadequately educated workforce as a major constraint by sector (in percent), 2009 and 2015

Source: Authors' calculations based on World Bank Enterprise Survey.

adult skills (OECD, 2016) finds that adults in Jakarta show low average levels of proficiency in literacy and numeracy compared with adults in other participating countries. Even more problematic is the fact that the variability in the skills is also relatively large. The immediate consequence of this large variability is the high cost borne by employers in finding workers with appropriate skills.

These studies appear to show that Indonesia's formal education system is not yet capable of producing workers with even basic skills, such as literacy and numeracy. Numerous studies have come to a similar conclusion (Suryadarma, 2011; Di Gropello, 2013; OECD, 2016). The most recent evidence directly linking the low quality of Indonesia's education system and firm productivity is Vandenberg and Trinh (2016), who find that Indonesia is the only ASEAN country out of the five they study where the correlation between the educational attainment of the workforce and enterprise productivity is small and statistically insignificant.

What can policymakers do to ensure that firms can equip themselves with skilled workers? We would like to propose three policies: (1) improve the quality of education; (2) create a skills development system that would allow workers to continually acquire new skills, both general and firm-specific skills, through non-formal or on-the-job training; and (3) better support the movement of labour across the ASEAN region. Unfortunately, two of these policy recommendations are long-term policies that will not achieve many results in the short term.

To attempt to improve the quality of education, it is important to know how far behind its neighbours Indonesia is. Suryadarma (2011) finds that the performance of eighth-grade Indonesian students in international science and mathematics assessments lags far behind the performance of students in countries with similar socioeconomic levels. Compared with neighbours like Malaysia, Singapore, and Thailand, the performance of Indonesian students is 0.4 to 1.9 standard deviations lower.

The extent of the challenges faced by Indonesia's education sector has been well documented, both in popular writings (e.g. Pisani, 2015) and academic publications. As a quick summary, Suryadarma and Jones (2013) note that the challenges facing primary and secondary education include poorly trained teachers, high teacher absenteeism rates, an emphasis on rote learning, insufficient textbooks, poor-quality buildings, and lack of school facilities, including running water. In addition, governance is also a major challenge, as there is much evidence of corruption in schools.

The second issue to consider is whether it is possible to close such a gap in the short to medium term. Beatty and Pritchett (2012) use three international student assessment tests and find that progress in student learning between cohorts of students is generally slow, not only in developing countries but also in OECD countries. Looking specifically at their simulations for Indonesia, the good news is that Indonesia, Malaysia, and Thailand are in the same situation. The bad news is that these three countries are not likely to ever achieve the OECD average, let alone catch up with Singapore. The most optimistic simulation, using the OECD's Programme for International Student Assessment (PISA), shows that if reading and mathematics skills in Indonesia continue to progress at the rate they did between 2000 and 2009, the country will reach the 2009 OECD average reading skills in 2037, and the 2009 average mathematics skills in 2078.

In contrast to the problems that result in a generally low quality of education, Indonesia also has a small group of extremely high-achieving students who are largely ignored. These are the students that win international accolades – individuals who, if properly nurtured, could go on to produce technological innovations and become the country's future leaders. A country should attempt to produce more of these high achievers, while at the same time strive to improve the quality of education for everyone. At this point, very little is done to ensure that these children can make the most of their potential. In fact, very little is known about these high achievers beyond crude approximations.

We follow Pritchett and Viarengo (2008) to estimate the number of high achievers that Indonesia produces every year. Results from the 2007 Trends in International Mathematics and Science Study (Mullis et al., 2008) show that 0.4 percent of grade-8 students in Indonesia achieve the higher mathematics proficiency band. Considering that in the same year there were about 3.7 million grade-8 students in the country, the results imply that Indonesia produces fewer than 15,000 mathematics high achievers every cohort. This is in stark contrast to India, South Korea, and the US – which have between 127,000 and 272,000 high achievers per cohort (Pritchett and Viarengo, 2008), and even slightly lower than Thailand, which manages to produce more high achievers despite a much lower cohort size.

Policymakers and practitioners are acutely aware of the enormous challenge faced by Indonesia's education sector. The central government has implemented a number of policy innovations, including certifying teachers, providing a direct transfer to schools (the School Operational Fund programme), and testing and conducting remedial training for in-service teachers. While many of these policies have yet to show promising results (see e.g. De Ree et al., 2015), the government – at both central and local level – must continue to experiment with various innovations that may significantly improve education quality more expeditiously than in the aforementioned simulations by Beatty and Pritchett (2012).

The second policy recommendation is to create a skills development system for those who are no longer in the formal education system. At the moment there is a plethora of non-formal training and education institutions, but there is a lack of a unifying framework or a coherent system. The system needs multiple pathways, providing opportunities for complementing skills, updating skills in time, and providing skills for out-of-school individuals (Di Gropello, 2013). It also needs to allow individuals to acquire skills that are in demand. While the government needs to take a lead in developing, maintaining, and funding such a system, the rapid change in the kinds of technical skills demanded by firms implies that such a system would only be sustainable and flourish when there is a close collaboration with and co-funding from the private sector. Such a partnership is the only way to ensure that the system can address the mismatch between workers' skills and the skills demanded by firms. As a first step, Di Gropello (2013) recommends that the government revisit the national qualification framework, ensuring a streamlined and strengthened framework on standardisation, accreditation, and certification. Such an activity will need to start with a review of the effectiveness and efficiency of the current non-formal training institutions.

The large proportion of temporary and short-term workers employed by Indonesian firms, which lead to low investment in training and human capital, eventually negatively affects efficiency and productivity. Workers with fixed and informal contracts are not expected to remain in the same enterprise for long periods, which means that certified workplace training is likely to be attended only by employees on permanent contracts (Allen and Kyloh, 2016). Based on the 2016 National Labour Force Survey, 40 percent of permanent employees are likely to benefit from training, compared with 30 percent for fixed-term contract workers.

The third policy recommendation is to give the private sector greater freedom to tap into needed skills from overseas. A free movement of labour is an important part of the ASEAN Economic Community, but it currently only covers skilled workers and professionals (Chia, 2011). Huelser and Heal (2014) argue that well-managed labour migration can provide benefits to the workers themselves, the sending countries, and the host countries. However, labour migration is a highly contentious issue. Sending countries are worried about brain drain (Chia, 2011), and host countries are concerned that the migrants will take away jobs from locals (Huelser and Heal, 2014). Indonesia has some of the most stringent immigration requirements, aimed at restricting inward labour mobility (Chia, 2011).

In contrast to extensive research that simulates the net economic benefit of the ASEAN Economic Community (e.g. Plummer and Chia, 2009), there is not much research specifically on the labour movement aspect. Using a computable general equilibrium model, however, ILO (2014) finds that AEC will only have a small impact on skilled migration as the current Mutual Recognition Agreements only cover eight occupational categories, which together only account for a small share of total employment in ASEAN. Thus, there needs to be more research to address the question of whether Indonesia will win or lose as a result of free labour mobility under the ASEAN Economic Community.

To conclude this section, we return to our conceptual framework on firm competitiveness. Considering the evidence, we believe that attempting to improve competitiveness through increasing labour productivity will only start to bear fruit in the medium to long term. The benefit in the medium to long term is the inherent characteristic of attempting to improve the quality of the labour force. Therefore, in the next section we consider the second aspect of competitiveness: the cost of labour and the role of labour policies in Indonesia.

4. Labour policies in Indonesia

Given Indonesia's labour abundance, relatively low skills, and productivity, one way to improve competitiveness is by ensuring that labour costs are lowered. It is important to note that lowering labour costs does not necessarily mean keeping labour wages low. Policies that will increase certainty regarding wages and severance pay also contribute to firms' ability to plan their cost structure accordingly. In this section, we discuss two main labour market policies in Indonesia: the minimum wage and severance pay.

4.1 Minimum wage policy

The minimum wage is an important instrument used by the government to regulate the labour market. The objective of minimum wage is to protect vulnerable workers by ensuring that there is a wage floor that meets the basic living standards. In addition to serving as the wage floor for low-paid workers, minimum wage policy is also used to increase the welfare and standard of living for all workers – when the floor rises, all workers earning above minimum wage are also expected to receive a pay raise. In this section, we describe the evolution of Indonesia's minimum wage policy, and how it may have affected firm competitiveness.

The minimum wage policy in Indonesia was first introduced at the beginning of the 1970s, but it was not effective in the earlier periods (Rama, 2001; Suryahadi et al., 2003). In the original design, the minimum wage was constructed from a *Kebutuhan Fisik Minimum* (KFM, Minimum Physical Needs), consisting of a minimum consumption package that includes food, housing, clothing, and other selected items an unmarried worker would need to purchase in a month (Sukatrilaksana, 2002). The components that made up KFM were then expanded in 1996, and the result was labelled the *Kebutuhan Hidup Minimum* (KHM, Minimum Living Needs). Starting in 2006, *Kebutuhan Hidup Layak* (KHL, Decent Living Needs) was adopted, which is another set of more expanded consumption packages also taking into account productivity and economic growth.

In Indonesia, minimum wages are generally set at the provincial level, except for the provinces of Java and Bali, where the districts set minimum wages (although the levels are usually anchored to the provincial minimum wage). In some cases, sectoral minimum wages are applied in specific sectors and even occupations, as workers in various industries may bargain for different levels of minimum wages.

Although government regulations stipulated that minimum wages are set according to the KHL, in most cases the KHL is only the starting point of tripartite negotiations between labour unions, employers, and provincial/district government representatives (all three of whom are members of the wage council in respective districts/provinces). Suryahadi et al. (2003) and Widarti (2006) argue that this practice usually causes regional government to be more willing

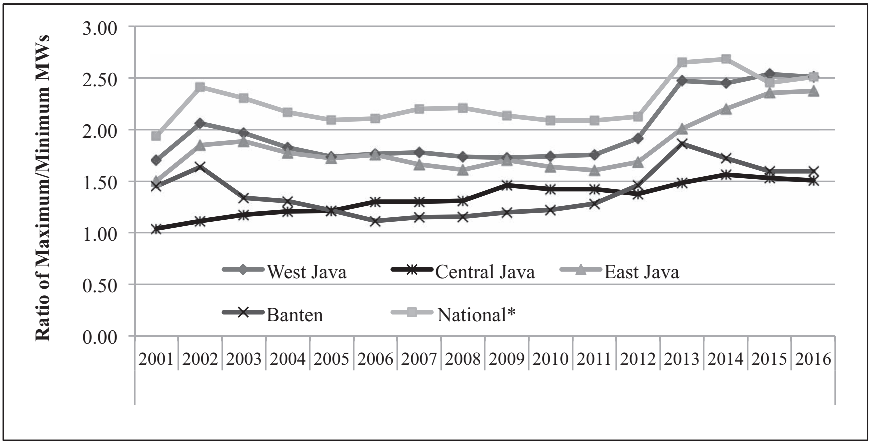

Figure 8.9 Ratio between highest and lowest district's minimum wage in each province, 2001–2016

Source: Authors' calculations based on Indonesian Labor Force Survey (Sakernas).

Note: * National data using Province Minimum Wages.

to support a populist approach by setting the minimum wage level based on workers' demands, without considering other economic factors. This would be especially true around local election periods. Therefore, although in theory the determination of a realistic minimum wage should also take into account maintaining companies' productivity and sustainable economic conditions (Hendrani, 2002), it has almost never been the case in Indonesia.

The minimum wage setting processes just described have led to significant increases in minimum wage and increased minimum wage disparities between districts or provinces. Figure 8.9 shows, for example, that the ratio between the highest district-level minimum wage and the lowest within the same province, West Java, in 2015 was 2.5 times the lowest minimum wage. One immediate effect of the increasing disparity of minimum wages is firm relocations (Manning and Purnagunawan, 2011) and also labour (Purnagunawan, 2011) across districts in the same province or across provinces.

We now turn to the issue of compliance with minimum wages. The compliance rate in Indonesia, as in most developing countries, is relatively low. As shown in Figure 8.10, between 2002 and 2015, nominal minimum wages increased 4.5 times. Over the same period, the proportion of regular workers earning below the minimum wage increased by 32 percentage points from 28 percent to 60 percent, or 114 percent proportionally. Most casual workers always earn below the minimum wage. This condition at the very least indicates that the minimum wage regulation is not strictly enforced, and fails in its main function of serving as the wage floor. But the condition also implies that minimum wages

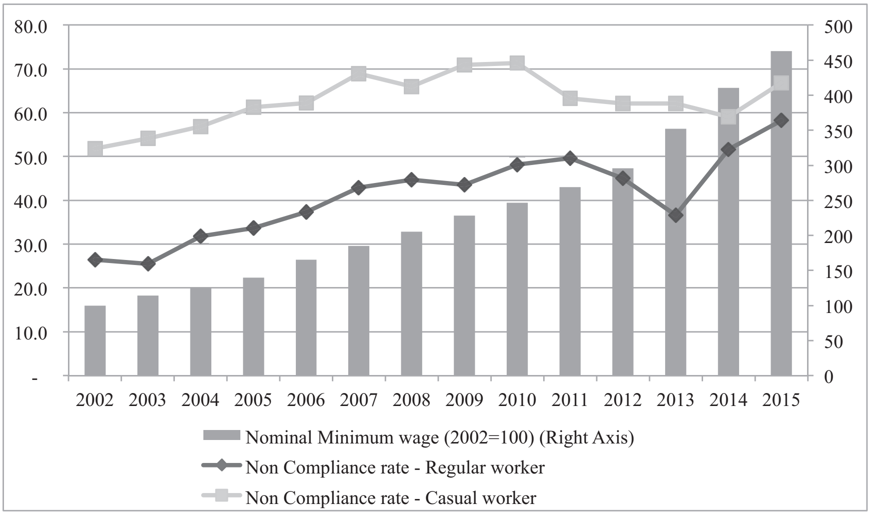

Figure 8.10 The non-compliance rate of the minimum wage, 2002–2015
Source: Authors' calculations based on Indonesian Labor Force Survey (Sakernas).

increase much faster than the firm's ability to pay or, in other words, than the increases in labour productivity. However, the low enforcement of the minimum wages in some cases is tolerated by the government and even by workers to protect jobs.

Returning to our conceptual framework of firm competitiveness being influenced by the cost of labour, the impact of minimum wages on firm competitiveness in Indonesia has been widely studied. Rising minimum wages in recent years has pushed up production costs, mainly in the formal manufacturing sector. Most studies show that rising minimum wages have had a negative effect on overall formal employment, leading to job losses (Suryahadi et al., 2003; Comola and De Mello, 2011; Del Carpio et al., 2012). The negative effects are largely concentrated in labour-intensive firms with unskilled workers, decreasing the demand for unskilled workers (Del Carpio et al., 2012), while, in contrast, white-collar workers and high-skilled workers clearly benefited from an increase in the minimum wage. Suryahadi et al. (2003) argue that an increase in minimum wage without an increase in workers' productivity levels, therefore, is hurting rather than protecting vulnerable workers (i.e. females, youths, and less-skilled workers), leading to unemployment or an increase in informal sector employment, which is not covered by the minimum wage.

To address the issue, towards the end of 2015 the central government passed a new regulation on wages. This regulation, coming 12 years after the 2003 Labor Law, had been a long time coming. One of the main features of the new regulation is the formula to set the minimum wages. The minimum wage in each region (province or district) is now automatically adjusted annually based on the national economic growth rates (in real terms) and the national inflation rate (calculated as growth in the cost of living, the consumer price index). For regions where the minimum wage is still below the local KHL, additional adjustment will be added so that in certain years the minimum wages can be at least the same as KHL. The KHL itself will be reviewed every five years by the national wage council using data collected by Statistics Indonesia. This new formula effectively removes the need for annual tripartite negotiations and depoliticises minimum wage setting.

There are some advantages of using national level figures, rather than provincial or district level figures, in the minimum wage setting formula. First, the national figures are more moderate and stable than the province/district figures, which can fluctuates significantly from high growth and inflation to a contraction and deflation in the next period. Second, national level data are easier to compute and update, and are more current. The regional economic growth data are updated less frequently and have longer lags. Consumer price index data is only collected in limited cities and the consumer price indexes for the province level are not publicly reported.

The new minimum wage formula indeed also has some limitations. First, applying the same increase nationwide will widen the disparities between regions that already have high minimum wages with those that have lower minimum wages. Second, the rate of firms complying with the set minimum wages is relatively low.

While the new formula will not solve the regional disparity and non-compliance problem entirely, it is expected that the much-needed certainty it brings will allow firms to better plan their future activities. Firms are less likely to be caught off guard due to sudden increases in minimum wages, and in some sense certainty matters more than the actual level of costs. The formula also allows regions where the minimum wages are below KHL to adjust and catch up while limiting the pace of minimum wage increase for other regions. The certainty and simplicity of the formula is also expected to give greater confidence to foreign investors.

As could be expected, labour unions oppose the new formula, although the opposition was smaller than had been anticipated. This might be due to the relatively generous minimum wage increase for an economy in the midst of global uncertainty (Manning, 2015). The formula essentially means minimum wages are pegged to nominal economic growth. Nevertheless, the unions still feel that their bargaining position has weakened as they are no longer involved in setting minimum wages. This has resulted in appeals to the Constitutional Court to annul the regulations, and it remains to be seen whether the regulation remains in place.

To sum up, even though the formula might not be the perfect answer for the longer term, it has depoliticised the minimum wage setting process, made minimum wages a true safety net (Manning, 2015), and provided greater certainty, both for employers and workers. Therefore, the new regulation is a step in the right direction to improve firm competitiveness in Indonesia.

4.2 Severance pay policy

Another government policy that significantly influences labour costs, and ultimately firm competitiveness, is employment protection legislation (EPL). Addison and Teixeira (2003) argue that any policy that restricts employers in utilising labour could be described as employment protection. Usually, these include dismissal protection, regulation of fixed-term and contract workers, and working hours. While the main purpose of these restrictions is to improve job security, they will undoubtedly increase employment costs, as they limit the flexibility of firms in allocating and utilising workers and directly increase the cost of hiring and firing workers.

In Indonesia, employment protection policy became significantly more rigid during 1996–2003, especially in terms of the severance payment rate. The implementation of several ministerial decrees that culminated in the 2003 Labor Law resulted in a more than doubling of severance pay compared with 1996, and a tripling of severance pay compared with 1986. The significant increase in severance pay and the relative restrictiveness of regular contracts and outsourcing have effectively turned Indonesia into one of the countries with the most rigid EPL in the world (LP3E-UNPAD, 2004).

Unfortunately, the high severance pay that was originally designed to provide protection and security for those who lose their job was not fully enforced and applied. World Bank (2010) reports that only 7 percent of the terminated employees receive their full entitlement or more, whereas 27 percent receive less than their full entitlement. The majority, 66 percent, does not receive any severance pay at all. One reason for this is that the chance a company is caught and punished is very low, making the cost of full compliance possibly much higher than the expected penalty for not complying. So, rather than effectively protecting workers, Indonesia's rigid EPL in fact hurts workers more.

Nevertheless, although the compliance rate was still low, significant changes in severance pay and minimum wages during 2000–2003 are often regarded as key reasons for the rise in joblessness in the manufacturing sector from 1999–2008 (World Bank, 2010; Aswicahyono et al., 2011). Firms, especially in labour-intensive industries, were reluctant to hire workers as it would be costly and difficult to fire surplus workers in future.

LP3E-UNPAD (2004) finds that many firms attempted to sidestep the regulation and maintain their competitiveness by changing their composition of permanent workers and contract workers. Some firms even changed the majority of their permanent workers' status to contract workers, while others chose to employ more outsourced and contract workers, offering early retirement for their permanent workers. This results in increased casualisation in the labour market (Manning and Purnagunawan, 2013b), a phenomenon that partly explains high unemployment rates among the highly educated graduates, as discussed earlier.

While using outsourcing and fixed-term contract workers has become quite common in many developed and developing countries over the past two decades,[2] labour unions' rejection of this practice has been quite strong in Indonesia. Employers, on the other hand, have argued that using these practices allows workers to remain employed and make firms more competitive. As is usually the case in contemporary Indonesia, this argument was taken to the Constitutional Court.

In 2012, the court determined that outsourcing labour, specifically the hiring of workers on short-term contracts without benefits, is unconstitutional. The court acknowledged that outsourcing or fixed-term contracting as a strategy to avoid paying benefits and other fixed cost is unjust, such contracts are still allowed for irregular and seasonal activities, but not for regular activities (Manning and Purnagunawan, 2013b). Nevertheless, as argued by Manning and Purnagunawan (2013b), that decision can still be a win-win solution for employers and employees. The potential gains for the employees include (1) similar treatment between permanent and contract workers and (2) clearer regulations on outsourcing and fixed-term contracting. For employers, the regulation can potentially improve worker morale, resulting in higher productivity and less industrial conflict.

Comparing the friendliness of labour regulations in Indonesia with neighbouring countries, the 2015 World Bank Enterprise Survey shows that close to 10 percent of firms in Indonesia identifying that labour regulations as a major constraint (Figure 8.11). The rate is only slightly different from Malaysia and Thailand, but is much higher than in Viet Nam or the Philippines.

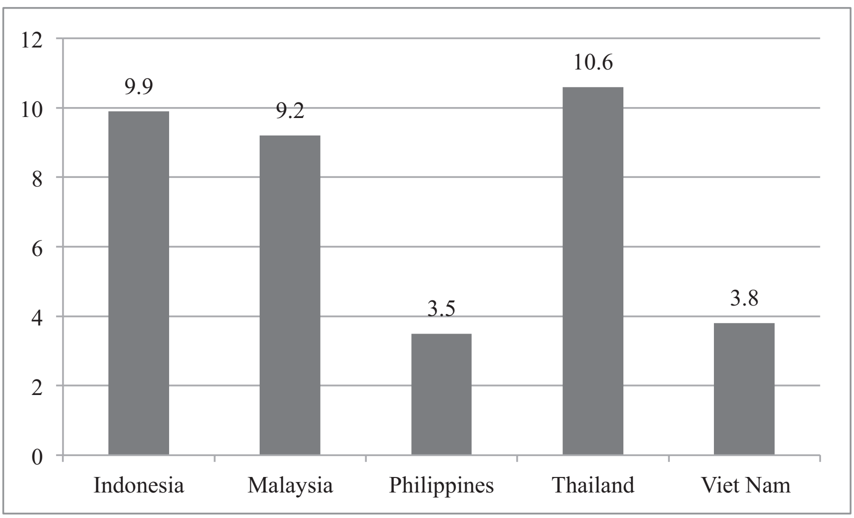

Figure 8.11 Firms identifying labour regulations as a major constraint (in percent)
Source: Authors' calculations based on World Bank Enterprise Survey, 2015.

5. Conclusion

In this chapter, we examine Indonesia's labour market conditions, and also focus on two components that determine the country's competitiveness: labour productivity and labour cost. On the former, we find that the low quality of Indonesia's formal education system and the lack of a continuous skills development system have contributed to stagnant productivity. Various studies predict that this problem will become more acute in the future (Di Gropello, 2013; ILO, 2014). The issue of low education quality and the very low number of high achievers must be addressed without delay, as formal education continues to be the main source of skills production and successful education reform will only improve labour productivity after students have graduated and entered the labour market. Given the long lag between a policy innovation or any other interventions and the outcomes to be achieved, the sooner these challenges are addressed, the better.

The long lag in improving labour productivity also implies that in the short to medium term, the country needs to rely on reducing labour costs as a way to improve competitiveness. Indonesia's rigid labour policies appear to have contributed to the country's low competitiveness in the labour market by keeping labour costs high. Minimum wages have continued to increase without much corresponding increase in labour productivity. The severance pay policy with subsequent decisions by the Constitutional Court to prohibit outsourcing and fixed-term contracting except under certain conditions have further increased labour costs in a climate where outsourcing and fixed-term contracting are increasingly used in other countries. The recent policy reforms on minimum wages have introduced much-needed certainty, but it remains to be seen whether the policy will be successful. Without further reform in this area, costs will continue to increase and firms may be forced to choose between increasingly using capital and technology rather than labour in their production, or to relocate to another country. Either outcome would be undesirable in a country with the fourth largest labour force in the world.

Notes

1 http://data.worldbank.org/indicator/SL.UEM.TOTL.NE.ZS (accessed 26 November 2016).
2 See especially OECD (2004, 2010); ILO (2011a, 2011b).

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9 Assessing the impact of local content requirements on Indonesia's manufacturing

Siwage Dharma Negara[1]

1. Introduction

Like many other developing countries, Indonesia aspires to upgrading its industrial competitiveness and increasing the value added of its manufacturing sector. Traditionally, Indonesia's manufacturing sector has had a high dependence on imported inputs, such as capital, intermediate inputs, and raw materials, which has been considered undesirable by many political leaders.[2] There is a commonly held belief among policymakers that Indonesia should promote a localisation strategy to reduce its high dependence on imported inputs. Also, there is a common view among policymakers that Indonesia should be able to produce everything from upstream to downstream and achieve 100 percent local content.[3]

This nationalistic view is not unique to Indonesia and, in fact, many developing and even some developed countries embrace a similar perspective.[4] Australia, Canada, and several European countries have used various local content requirements (LCR) to develop their automotive industries (Veloso, 2006). A typical LCR policy requires a firm to use a given proportion of locally made inputs (e.g. parts and components in the automotive industry) in its final goods production. Failure to meet the LCR will result in a penalty in the form of high tariffs on all of the firm's imports of intermediate inputs. In many cases, LCR serve as either a precondition for receiving government support or an eligibility requirement for inclusion in national projects.

The proliferation of the use of LCR is likely to distort world trade and investment flows. In Indonesia, LCR have been implemented pervasively in some 'strategic' sectors.[5] Common rationales for LCR are to protect local industries from fierce competition with imported products, to create jobs for the indigenous workforce, and to boost exports. In addition, there is a view that LCR support broader economic development as they force foreign companies to invest in Indonesia. This in turn promotes innovation and technological capacity of local firms through so-called backward and forward linkages.

Despite some 'perceived' benefits of LCR, in Indonesia in particular, there is a lack of thorough analysis on the economic impact of such a policy on industrial performance. In fact, policymakers often have little knowledge about the real costs and benefits of LCR policy. In view of this, there is a need to study the link between LCR policy and industrial performance.

DOI: 10.4324/9781315161976-9

The purpose of this chapter is to investigate the impacts of LCR on Indonesia's manufacturing sector. We specifically focus on the impact of LCR on sectors like the electronics, and the machinery and transport industries (HS 84, 85, and 87). These industries are part of the global supply chain, in which technology spillovers and regional networks are important. According to data from Statistics Indonesia (BPS), the three classified goods are among Indonesia's top 10 exports. Together they account for around 13 percent of the country's total exports. While they contribute to export revenue, these industries have always been targeted by LCR policy.

The chapter is organised as follows: Section 2 reviews the literature on local content requirements. Section 3 illustrates some LCR policies in Indonesia. Section 4 discusses some stylised facts of import dependence in the machinery and transport industries. Section 5 examines the impact of LCR through the use of imported inputs on firms' productivity, value added, output, exports, and employment. Section 6 concludes and draws some policy recommendations for designing future trade, industrial, and investment policies.

2. Literature review

Grossman (1981) pioneers a theoretical analysis of the effects of local content protection on resource reallocation in relation to market structure and the domestic intermediate goods industry.[6] He develops a model in which a domestic final goods sector in a competitive market relies on an intermediate sector, either domestically or abroad. Due to inferior technological capability, the domestic cost of intermediate goods is higher than the international price. In this situation, the market equilibrium is set such that local producers of the consumer good will choose to import intermediate goods. To protect weaker local firm in the intermediate sector, the government uses a LCR policy. This policy in turn results in two opposite effects (see Figures 9.1a and 9.1b). First, it increases

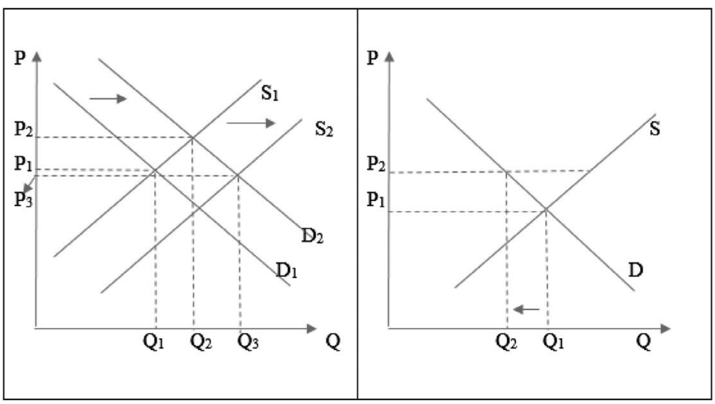

Figure 9.1 (a) Local component market and (b) Final good market
Source: Author's construction.

demand for the domestic components sector (from Q_1 to Q_2). Because supply cannot respond fast enough to this artificial demand, the price of local components will increase (from P_1 to P_2). LCR policy is expected to provide local firms with incentives to produce and innovate in response to this increased demand, thus increasing the supply of local components (from Q_2 to Q_3). This effect is seen by the proponents of LCR as important for promoting domestic innovation and job creation.

Second, due to higher prices of local components, producers have to increase the price of the final good (from P_1 to P_2). And as a result, the quantity sold will go down (from Q1 to Q2), as will domestic welfare. This second effect is used by the opponents of LCRs to point out the economic costs – inefficient resource allocation, higher retail prices for final goods, and a negative impact on trade. Moreover, there is no certainty whether LCRs will eventually lower manufacturing costs through greater competition and innovation. Grossman postulated that the net effect will depend on substitution possibilities in production, supply conditions in the domestic intermediate goods industry, and the market structure for intermediate goods.

Grossman's seminal work generates a variant of theoretical models on LCR, which are fitted under various settings of market competition. For instance, Davidson et al. (1985) develop a duopolistic model to assess the impact of LCR on welfare, output, and employment. Their model suggests that LCR policy reduces economic welfare in both the source and host countries. The source country's welfare falls because monopoly rents are shifted from the source country's firm to the host country's firm, while the host country's welfare also falls due to the reduction of consumer surplus that outweighs the gain from an increase in monopoly rent (Davidson et al., 1985). Furthermore, Krishna and Itoh (1988) show that local content protection has qualitatively different effects in oligopolistic markets. The effects vary according to different kinds of protection schemes and the characteristics of the market on the demand and supply side. Their model shows that content protection policy alters the nature of interactions between firms (Krishna and Itoh, 1988). They also demonstrate that under certain conditions, content protection, even when set at free trade levels, lowers the profits of domestic input suppliers.

Some studies use a general equilibrium framework to analyse the welfare implications of LCR policy. For instance, Richardson (1993) develops a two-stage general equilibrium production model with foreign capital flows to explore the welfare effect of content protection. The model suggests that the second-best welfare consequences of content protection depend on its effects on imported inputs. It shows that a content requirement will encourage foreign firms to increase their own domestic production of the component input and so will induce capital flows.

Lopez-de-Silanes et al. (1996) look at the impact of local content policy on the North American automotive industry using an applied general-equilibrium model under an oligopolistic structure. Their model assumes foreign multinationals rely much more on imported intermediate inputs than do domestic firms.

In such a situation, the model shows that local content policy is anti-competitive. It reduces overall final output of the industry and shifts rents to domestic firms.

Similarly, Belderbos and Sleuwaegen (1997) study the impact of LCR under an oligopoly structure. Their study reveals that the European Community's LCR imposed on Japanese firms have substantial anti-competitive output reducing effects. Moreover, LCR are generally ineffective in increasing domestic welfare and may have undesirable income distribution effects.

Lahiri and Ono (1998) propose a model to link local content protection with firms' strategies. In their model, identical foreign firms move to a host country and export their products in the final form to another country (consuming country). These foreign firms compete with a domestic firm in a consuming country in an oligopolistic market. Their model shows that when there is free entry and exit of foreign firms, the consuming country may ask for less strong content protection. On the contrary, when the number of foreign firms is exogenously given, the consuming country will ask for stronger local content protection. This is because a more severe local content policy will only have a limited effect on the total production of the foreign firms.

Qiu and Tao (2001) develop a model with heterogeneous firms to explore why foreign multinationals in the same industry adopt different international strategies, either through exports or foreign direct investment (FDI) to enter the same market. They show that firms face different levels of FDI location advantage and thus may adopt different international strategies depending on their production cost or degree of vertical integration. Their key findings are that LCR policy affects firms' modes of entry to a new market, with FDI more likely to be used when LCR are lower. Facing the same LCR, a less efficient firm is more likely to use FDI compared with a more efficient firm.

Veloso (2006) builds a theoretical model to look at the conditions under which LCR can affect overall welfare in an economy. Using the automotive sector as his case study, he shows that LCR can be welfare enhancing because of their extra social benefits. These benefits will diminish and the total welfare of the local economy will decline after reaching a certain point. He argues that certain conditions make LCRs effective: first, if the gap in manufacturing conditions for components forced into local production is small; second, if forced localisation is associated with a unique learning process (Veloso, 2006). He also reminds that the policy has a limit, in that too much local content is likely to severely hurt the economy. In case of small production volumes, it is not possible for such regulation to have a positive effect.

Furthermore, Veloso (2006) argues that there are a number of cases in which local content regulations benefited local industry. These benefits are linked to reasonable content policies, which induce favourable economies of scale and maintain healthy competition for individual component suppliers (Veloso, 2006).

Kwon and Chun (2009) analyse the link between LCR policies and firms' choice of technology transfer using a duopoly model of multinationals in a two-stage production setting. Their model assumes that local suppliers in the less developed country (LDC) have inferior technology and hence multinationals prefer importing intermediate inputs from their home country for the manufacture of final goods in the LDC. The LCR policy of the LDC forces multinationals to purchase a fixed proportion of its intermediate inputs. They show that the magnitude of an LCR policy cannot affect the multinationals' decision regarding technology transfer under technology diffusion. In addition, an increase in the LCR may limit technology diffusion because it could induce multinationals to establish their own intermediate input suppliers and become vertically integrated multinationals.

All in all, the literature presents rather mixed results on the impact of LCR on economic outcomes. Some studies argue that LCR may result in unexpected and undesirable outcomes (Davidson et al., 1985; Krishna and Itoh, 1988; Belderbos and Sleuwaegen, 1997; Lahiri and Ono, 1998; Kwon and Chun, 2009). But others have shown that LCR policies can increase the welfare of a country in certain situations (Hollander, 1987; Richardson, 1993). Some studies, such as Qiu and Tao (2001) and Veloso (2006), find both positive and negative aspects of LCR, and they claim it is possible to design an optimal LCR policy.

3. LCR policy in Indonesia

Local content policy in Indonesia can be traced back as far back as the early years of independence when the government implemented the 'Benteng programme' (1950). This programme was meant to promote indigenous local entrepreneurs, thus reducing the economic dominance of the Dutch and ethnic Chinese businesses (Thee, 2012). Then during the New Order period, the government introduced a so-called deletion program (1974–1993), which required manufacturing assembly to progressively use locally made parts and components. However, this programme had not been successful in developing viable supporting industries for the car assembly industry, particularly at the second and third tier levels. Thee (2012) attributes the failure to several factors, including low technological capabilities of local suppliers, lack of economies of scale due to Indonesia's relatively small and fragmented domestic market, and the large amount of investment needed to set up local suppliers.

The deletion programme was implemented under a protectionist and import-substituting trade regime. The programme was terminated in 1993 because of pressure from the General Agreement on Tariffs and Trade (GATT) to abandon non-tariff trade protection. After that, Indonesia replaced the 'deletion programme' with the 'incentive programme', in which the government provides fiscal incentives in the form of lower or even zero import duty depending on the level of usage of locally produced parts and components.

In 1996, the government decided to accelerate the incentive programme by launching a national car programme, under which the automotive industry to receive lower import duty must have local content of at least 20 percent in the first year, 40 percent in the second year, and 60 percent in the third year (Aswicahyono et al., 2000). This programme did not last very long, as the Indonesian economy was hit hard by the 1997–1998 Asian Financial Crisis.

After the crisis, Indonesia undertook major economic reforms, including trade liberalisation that lowered various barriers to trade. Local content policy was not given priority, but neither was it fully abandoned, an indication of Indonesia's ambivalence towards globalisation (Aswicahyono and Hill, 2015).

In the last few years, there has been rising concern over increased economic nationalism and protectionism in Indonesia (Patunru and Rahardja, 2015). The government started to revisit its localisation strategy with the aim of increasing domestic investment for local supporting industries, particularly the parts and components industry. In November 2009, the Ministry of Finance announced regulation 176/PMK.011/2009, which provides a duty exemption for a period of up to four years on machines, goods, and materials, under the condition that at least 30 percent of the total value of machines used were purchased locally.[7] This regulation can be considered as a discriminating local content policy because it provides companies with an incentive to buy local goods and the tariff elimination is used as a reward for that.

The regulation stated, however, that the exemptions do not hold for the motor vehicle industry. It was later amended by regulations 76/PMK.011/2012 and 188/PMK.010/2015, which extend the tariff exemption to the motor vehicle and construction industries. Specifically, regulation 76/PMK.011/2012 eliminates import tariffs on machinery, goods, and materials used in the motorised vehicles assembling and components industries. To benefit from duty exemption, at least 30 percent of the total value of machines used must have been locally purchased.

In September 2014, the Ministry of Industry issued regulation 80/M-IND/PER/9/2014, introducing local content requirements on motor vehicles.[8] The regulation stipulates that the motor vehicle industry (motor vehicles with at least four wheels, motor vehicles for private use, and motorcycles with two or three wheels) is required to support the local motor vehicle components industry in their production process. Activities such as welding, painting, assembling of motorised vehicles, and quality control are encouraged to be conducted within the country. Moreover, the companies must report the progress of their support programme every six months to the Directorate General of the Ministry.[9]

Local content requirements also affect other sectors such as electricity, oil, and gas,[10] franchise business, including food, beverage, and the modern retail sector (World Bank, 2016). In April 2015, the Indonesian government legislated a LCR policy that affects the telecommunication industry. The new regulation requires around 30–40 percent of local content for 4G/LTE equipment by 2017. As it stands, foreign companies that want to sell their 4G/LTE products in Indonesia must build their factory in the country or find a local manufacturer as their business partner. The policy is expected to increase the innovation capacity of local industry.

4. Stylised facts

The composition of Indonesia's main imports has remained unchanged since 1997. As Figure 9.2 illustrates, imports of intermediates inputs (including raw materials) and capital goods account for the largest share of total imports in

Indonesia. On average, these two components combined accounted for around 70 percent of total imports from 1997 to 2014. Imports of fuel and lubricants have fluctuated due to price variations.

According to a recent World Bank study, about a quarter of medium-sized and large manufacturing firms in Indonesia used imported inputs in their production process. Those firms accounted for 51 percent of employment created, produced about 66 percent of total output, added two-thirds of total value created, and contributed about two-thirds of total manufacturing exports (Rahardja and Varela, 2015).

As can be seen in Figure 9.2, imports of capital goods, raw materials, and intermediate input rose from 2004 to 2012, which coincided with an increase in exports (except for a short-lived drop in 2009 due to the Global Financial Crisis). In particular, capital goods imports increased from an annual average 21.4 percent of total imports from 2001 to 2007 to 29.3 percent from 2008 to 2012. The increase in capital goods' share of total imports from 2005 to 2011 was mainly driven by imports of mechanical and electrical machinery, particularly general electronic devices and parts, information and communication technology (ICT)-related products and parts, heavy machinery, and generators (World Bank, 2012).

Increasing capital goods imports have been driven by the rise of inward FDI in the telecommunications, machinery, electronics, and mining sectors in Indonesia since 2008. As a result, demand for capital goods imports, especially machinery and equipment, has increased significantly.

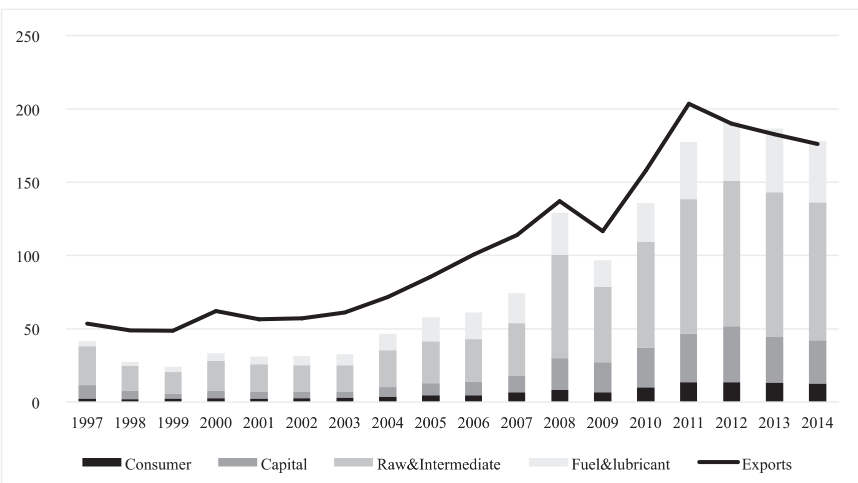

Figure 9.2 Indonesia's imports by type of goods (billion US dollars), 1997–2004

Source: Author's calculations based on Statistics Indonesia.

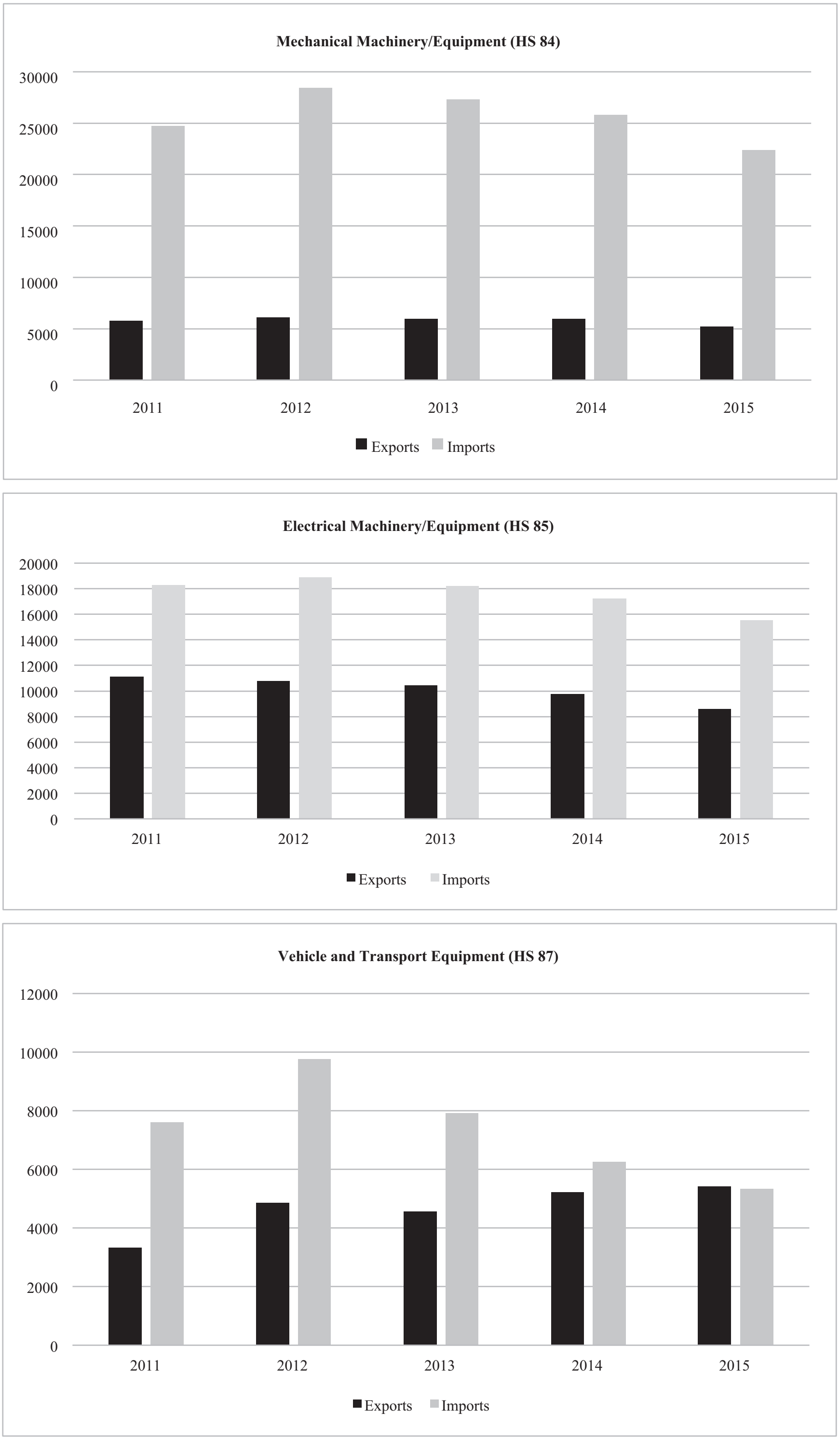

Figure 9.3 Exports and imports of electrical, machinery, and transportation goods (million US dollars), 2011–2015

Source: Author's calculations based on Statistics Indonesia.

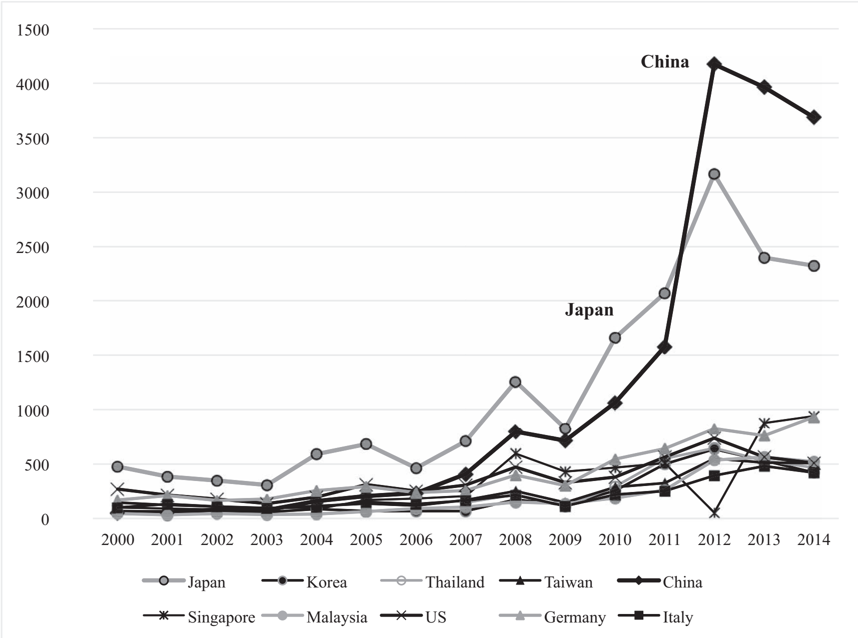

Figure 9.4 Key sources of machinery imports in Indonesia (million US dollars), 2000–2014

Source: Author's calculations based on Ministry of Trade.

The rise in machinery imports has resulted in a significant trade deficit in the mechanical machinery and equipment (HS 84) and electrical machinery and equipment (HS 85) sectors (see Figure 9.3). Imports of machinery for industrial purposes mainly come from China and Japan (Figure 9.4). Capital goods imports from China accounted for 7.2 percent of total imports in 2011, an increase of 4.6 percentage points from 2005.

On the contrary, the trade deficit in vehicle and transport equipment (HS 87) has been declining in the last five years. It should not be concluded from looking at the trends that intervention through localisation programs has been more 'effective' in the vehicle and transport industry. It can be argued that the vehicle and transport industry's success has been due to a combination of a large domestic market base and fewer major international manufacturers compared to that of the machinery industry.

Figure 9.5 shows that Indonesia's export growth is strongly and positively correlated with the growth of its intermediate goods imports (with correlation coefficient = 0.82). Similarly, Indonesia's gross domestic product (GDP) growth is also positively correlated with the growth of its intermediate goods imports (with correlation coefficient = 0.64) (Figure 9.6).

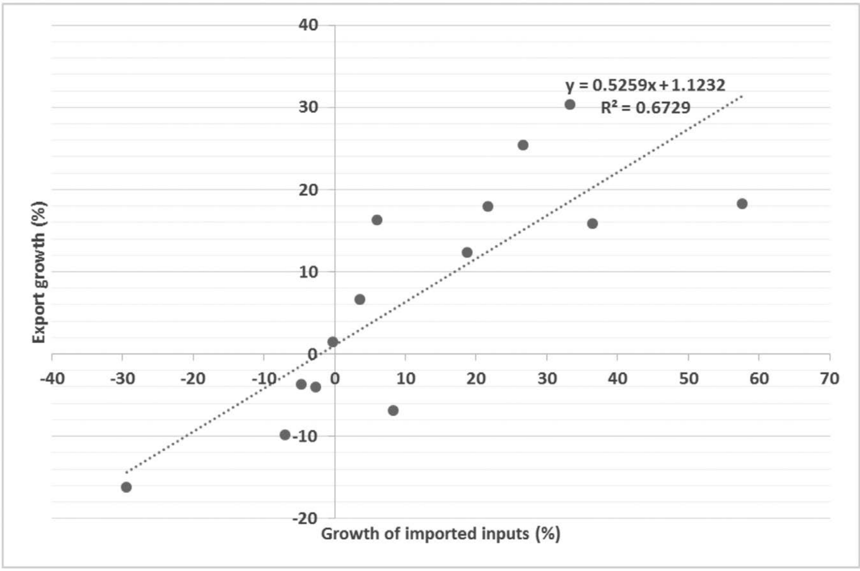

Figure 9.5 Indonesia's exports are strongly correlated with its imports
Source: Author's calculations based on Statistics Indonesia, trade data.

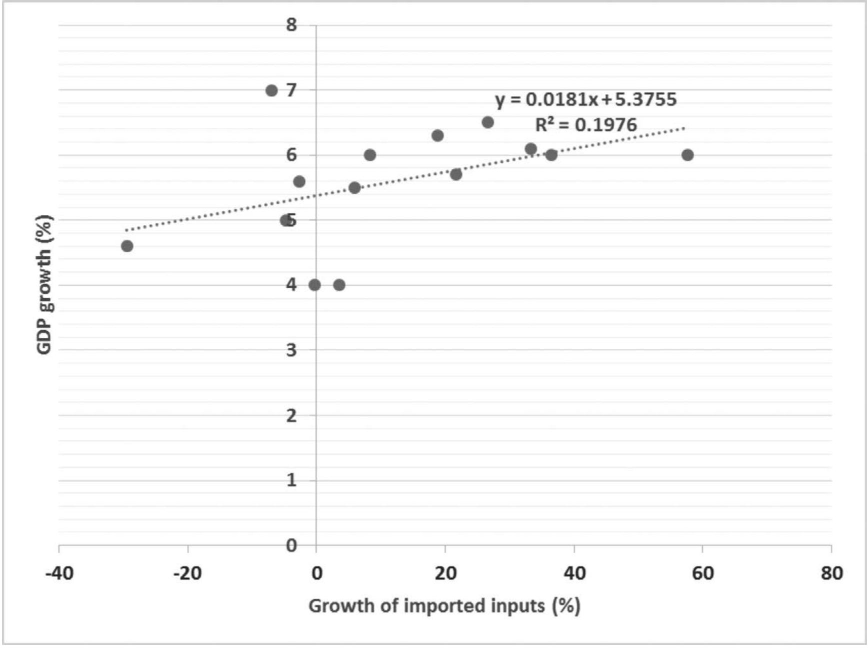

Figure 9.6 Indonesia's GDP growth is associated with its imports growth
GDP = gross domestic product.
Source: Author's calculations based on Statistics Indonesia, trade data.

In the next section, we look beyond simple correlation on how the use of imported inputs is associated with firms' productivity, output, exports, and employment.

5. Model, data, and estimation results

5.1 Model

Consider a firm with a Cobb-Douglas production function,

$$Y_{it} = A_{it} K_{it}^{\alpha} L_{it}^{\beta} M_{it}^{\gamma} D_{it}^{\delta} \tag{1}$$

where output in firm *i* at time *t*, Y_{it}, is a function of capital, K_{it}, labour, L_{it}, domestic intermediate inputs and raw materials, D_{it}, and imported intermediate inputs and raw materials, M_{it}. This Cobb-Douglas technology assumes that the mix of inputs of production used by industries does not change over time. Taking the natural logs of Equation (1), and denoting them by small letters, we get

$$y_{it} = \beta_0 + \beta_1 k_{it} + \beta_2 l_{it} + \beta_3 m_{it} + \beta_4 d_{it} \tag{2}$$

We then estimate Equation (2) and obtain its residuals, which later can be used as a proxy for firm-level total factor productivity.

5.2 Data

We use data from the Manufacturing Survey of Large and Medium-Sized Firms (*Survei Industri*, SI), covering the period from 1990 to 2013. The SI data is based on the annual census of manufacturing firms in Indonesia with 20 or more employees. The data covers firm-level information such as production value, export value, import value, employment, capital, foreign ownership, and value added, among others. The data on value added is calculated from firm's output minus its intermediate inputs.

Our main interest is to see the impact of LCR policy on firms' industrial performance, that is productivity measured by total factor productivity, output, value added, exports, and employment. Unfortunately, there is no ideal proxy for LCR policy. Nevertheless, we know that such policy is meant to control or reduce firms' imports of foreign inputs. The SI data has information on total firm's expenditure on both domestic intermediate inputs and imported intermediate inputs.[11] Given this data, we can use the share of a firm's imports of intermediate inputs to its total inputs as an indicator of whether there have been changes in the firm's dependence on imported inputs due to the LCR policy. If the policy is effective, we should find a declining trend in the share of imported inputs without adversely affecting firms' level of productivity, value added, outputs, exports, and employment over time.

Table 9.1 Summary statistics of Indonesia's medium and large manufacturing industries

Variable	*Description*	*Observations*	*Mean*	*Standard Deviation*
VA/L	Log (Value added per worker)	526,140	9.34	1.68
Y/L	Log (Output per worker)	489,007	10.36	1.71
K/L	Log (Capital per worker)	333,903	9.12	1.77
va	Log (Value added)	526,140	13.53	2.28
y	Log (Output)	489,007	14.57	2.32
x	Log (Export)	47,900	15.01	2.30
k	Log (Capital)	333,903	13.29	2.27
l	Log (Number of worker)	526,150	4.20	1.19
d	Log (Domestic intermediate inputs)	494,535	13.50	2.47
m	Log (Imported intermediate inputs)	103,443	13.92	3.01
FM	FM = 1 if import share > 0	526,150	0.20	0.40
FF	FF = 1 if foreign share > 0	526,150	0.08	0.26
FX	FX = 1 if exporting > 0	526,150	0.48	0.50
TM	TM = 1 if industry = machinery and transport	526,150	0.02	0.12
dtfp	TFP growth	33,879	0.10	0.66
dv	Value added growth	458,074	0.15	0.95
dy	Output growth	420,801	0.13	0.86
dx	Export growth	20,280	0.17	0.89
dn	Employment growth	458,088	0.001	0.35
impsh	Share of imported inputs to total inputs	463,657	0.06	0.19

Source: Author's calculations using Statistics Indonesia Manufacturing Survey data.

The SI data must first be cleaned due to a number of missing variables in some observations and some unrealistic numbers. After cleaning the data, the final dataset is an unbalanced panel of around 20,000 firms per year with a total of 526,150 observations. Summary statistics for the full sample (including all manufacturing industries) are provided in Table 9.1. Table 9.2 presents summary statistics of the transport and machinery industry only.

5.3 Estimation strategy

Because imported inputs are key for a firm's production, in general we expect a positive and significant effect of imported inputs on a firm's productivity, value added, output, exports, and employment level. Moreover, we hypothesise that if LCR policy works effectively, the share of imported inputs in production of goods should decrease over time. We use the fixed effect method to remove any time-invariant unobserved heterogeneity. The fixed effect method assumes

Table 9.2 Summary statistics of transport and machinery industry

Variable	*Description*	*Observations*	*Mean*	*Standard Deviation*
VA/L	Log (Value added per worker)	7,780	10.58	1.84
Y/L	Log (Output per worker)	7,228	11.34	1.79
K/L	Log (Capital per worker)	4,393	10.14	1.80
va	Log (Value added)	7,780	15.17	2.46
y	Log (Output)	7,228	15.95	2.45
x	Log (Export)	374	16.18	2.22
k	Log (Capital)	4,393	14.72	2.35
l	Log (Number of worker)	7,780	4.59	1.20
d	Log (Domestic intermediate inputs)	7,133	14.45	2.40
m	Log (Imported intermediate inputs)	2,954	15.41	2.72
FM	FM = 1 if import share > 0	7,780	0.38	0.49
FF	FF = 1 if foreign share > 0	7,780	0.22	0.41
FX	FX = 1 if exporting > 0	7,780	0.55	0.50
dtfp	TFP growth	745	0.13	0.83
dv	Value added growth	6,954	0.16	1.03
dy	Output growth	6,354	0.14	0.93
dx	Export growth	105	0.17	0.85
dn	Employment growth	6,954	0.01	0.40
impsh	Share of imported inputs to total inputs	6,820	0.16	0.29

Source: Author's calculations using Statistics Indonesia Manufacturing Survey data.

that only time-varying sources of bias must be controlled for. We will explain these control variables further.

Basically, we estimate a reduced-form function as follows:

$$\text{Outcome}_{it} = f(\text{import\_share}_{it}, t,\ t * \text{import\_share}_{it}, X_{it},\ \mu_i,\ \varepsilon_{it}) \qquad (3)$$

Five endogenous variables are used to proxy firms' industrial performances, that is firm-level total factor productivity (tfp_{it}), value added per worker (va_{it}), output per worker (y_{it}), exports (x_{it}), and employment (n_{it}). On the right-hand side, our key independent variable is firm's share of imported inputs to its total inputs (import_share_{it}). Time-trend (t) is a variable that is equal to the time index in a given year (time trend variable equals 1 for 1990, 2 for 1991, etc.). It allows us to control for the exogenous increase in the dependent variable, which is not explained by other variables. The time trend can be used as a proxy for technical progress. Moreover, we interact the import share variable with time trend (t) to capture the change in firms' use of imported inputs over time. Other control variables, X_{it}, include a foreign participation dummy (FF_{it}), a firm exporting dummy (FX_{it}), and a firm importing dummy (FM_{it}).

5.4 Estimation results

5.4.1 All manufacturing industries

Table 9.3 presents the estimation results of an unbalanced panel with a time trend and firm-fixed effects for the reduced-form Equation (3).[12] We include an Asian Financial Crisis (AFC) dummy to control for a possible structural break in the economy after the crisis.[13] Robust standard errors are calculated to correct for heteroscedacticity at the firm level.

As can be seen from Table 9.3, the contribution of imported intermediate inputs to firms' productivity, value added, output, and exports remains positive and significant despite the existence of LCR policy. It is, however, negative and significant in the employment equation. This result may support the opinion that an increase in the use of imported inputs will have a negative impact on the employment level. However, if we look at the size of the coefficient, this effect is much smaller than the gains from an increase in firms' productivity, value added, output, and exports.

Table 9.3 Basic results (full sample, manufacturing)

Dependent variable	*ln* TFP_{it}	*ln* VA_{it}	*ln* Y_{it}	*ln* X_{it}	*ln* L_{it}
Share of imported inputs (m_{it})	1.066***	0.411***	0.78***	0.782***	–0.121***
	(0.075)	(0.033)	(0.034)	(0.103)	(0.022)
Time trend (t)	0.082***	0.142***	0.129***	0.129***	–0.004***
	(0.002)	(0.001)	(0.001)	(0.003)	(0.0004)
$t \times m_{it}$	0.027***	–0.006**	–0.022***	0.018**	0.019***
	(0.006)	(0.003)	(0.003)	(0.009)	(0.002)
Foreign dummy (FF_{it})	0.202***	0.149***	0.191***	0.269***	0.145***
	(0.038)	(0.02)	(0.02)	(0.051)	(0.015)
Exporting dummy (FX_{it})	0.03***	0.067***	0.062***		0.026***
	(0.011)	(0.004)	(0.004)		(0.002)
Importing dummy (FM_{it})		0.031***	0.035***	0.121***	0.085***
		(0.011)	(0.012)	(0.035)	(0.008)
AFC dummy	0.062***	–0.117***	–0.046***	0.048**	0.017***
	(0.013)	(0.005)	(0.004)	(0.023)	(0.002)
Firm fixed effects	yes	yes	yes	yes	yes
Observations	51,846	463,653	430,335	38,378	463,657
R-squared	0.93	0.80	0.82	0.89	0.90

Source: Author's calculations.

Notes: Robust standard errors are in parentheses. Based on them ***, **, and * mean coefficients statistically significant at 1%, 5%, and 10% level, respectively. The Hausman test is conducted to choose between the fixed effects and random effects model.

Table 9.3 also shows mixed results with respect to the interaction coefficients between the time trend and the imported input share variables. The coefficients are positive and significant for firms' levels of productivity, exports, and employment but they are negative for firms' value added and output. Nevertheless, given that the magnitude of the negative coefficient is relatively small compared to the coefficient estimates for m_{it}, overall the impact of imported inputs on firms' value added and output remains positive.

It is important to note, however, that imports data from the SI census only report the value of intermediate imports that were directly imported by the surveyed firm and imported inputs purchased from local distributors. While some of the local intermediate inputs used by the same firm may consist of imported materials as well, this is not captured in the data. Therefore, the contribution of imported inputs is likely to be underestimated in our data.

We find a positive and significant effect of foreign participation on firms' levels of productivity, value added, output, exports, and employment.[14] Similarly, the exporting and importing dummy variables are both positively and significantly associated with firms' levels of productivity, value added, output, exports, and employment.[15]

The estimated coefficient for AFC dummy merits further explanation. As expected, the coefficients are negative and significant for firms' value added and output. However, the AFC dummy is positive and significant for firms' productivity, exports, and employment levels. Amiti and Konings (2007) argue that the large currency depreciations and high level of inflation that Indonesia experienced during the AFC could affect measured productivity (and exports) without any changes to efficiency.

There is a possibility of the existence of structural break in the data that can lead to significant change in the coefficient estimates (thus the relationship between variables being examined). In fact the plots of the mean values of some of the key variables indicate noticeable shift in firms' output, export and import share of intermediate inputs after the AFC. Considering the possibility of

Table 9.4a Estimation results comparing pre- and post-AFC

Dependent variable	*ln* TFP_{it}		*ln* VA_{it}		*ln* Y_{it}	
	1990–1996	*2001–2013*	*1990–1996*	*2001–2013*	*1990–1996*	*2001–2013*
Share of imported inputs (m_{it})	0.502*** (0.088)	1.484*** (0.124)	0.135** (0.061)	0.481*** (0.052)	0.593*** (0.053)	0.835*** (0.056)
Time trend (t)	0.083*** (0.004)	0.05*** (0.003)	0.113*** (0.002)	0.13*** (0.001)	0.098*** (0.002)	0.115*** (0.001)

(*Continued*)

Table 9.4a (Continued)

Dependent variable	*ln* TFP_{it}		*ln* VA_{it}		*ln* Y_{it}	
	1990–1996	*2001–2013*	*1990–1996*	*2001–2013*	*1990–1996*	*2001–2013*
$t \times m_{it}$	0.075***	0.013	0.037***	–0.01***	–0.006	–0.019***
	(0.015)	(0.008)	(0.012)	(0.003)	(0.01)	(0.004)
Foreign dummy (FF_{it})	0.239***	0.068*	0.189***	0.054**	0.263***	0.108***
	(0.065)	(0.04)	(0.046)	(0.024)	(0.041)	(0.025)
Exporting dummy (FX_{it})	0.075***	–0.017	0.111***	0.019***	0.088***	0.011**
	(0.018)	(0.011)	(0.015)	(0.004)	(0.012)	(0.004)
Importing dummy (FM_{it})			0.13	–0.002	0.032**	0.009
			(0.019)	(0.017)	(0.016)	(0.018)
Firm fixed effects	yes	yes	yes	yes	yes	yes
Observations	18,654	23,576	109,406	266,282	102,866	245,798
R-squared	0.97	0.93	0.81	0.74	0.88	0.77

Source: Author's calculations.

Notes: Robust standard errors are in parentheses. Based on them ***, **, and * mean coefficients statistically significant at 1%, 5%, and 10% level, respectively.

Table 9.4b Estimation results comparing pre- and post-AFC

Dependent variable	*ln* X_{it}		*ln* L_{it}	
	1990–1996	*2001–2013*	*1990–1996*	*2001–2013*
Share of imported inputs (m_{it})	0.463***	0.597**	–0.116***	–0.051
	(0.136)	(0.277)	(0.029)	(0.033)
Time trend (t)	0.145***	0.077***	0.026***	–0.006***
	(0.007)	(0.007)	(0.001)	(0.001)
$t \times m_{it}$	0.12***	0.013	0.073***	0.008
	(0.028)	(0.021)	(0.006)	(0.002)
Foreign dummy (FF_{it})	0.216***	0.11	0.179***	0.078***
	(0.082)	(0.091)	(0.028)	(0.016)
Exporting dummy (FX_{it})			0.112***	0.02***
			(0.009)	(0.002)
Importing dummy (FX_{it})	0.097**	0.053	0.087**	0.055***
	(0.046)	(0.091)	(0.011)	(0.01)
Firm fixed effects	yes	yes	yes	yes
Observations	17,486	10,819	109,408	266,284
R-squared	0.93	0.95	0.95	0.91

Source: Author's calculations.

Notes: Robust standard errors are in parentheses. Based on them ***, **, and * mean coefficients statistically significant at 1%, 5%, and 10% level, respectively.

structural break after the AFC, we divide the sample into two groups, pre-AFC (1990–1996) and post-AFC (2001–2013)[16], and re-estimate Equation (3) using the fixed effect method. The additional benefit of splitting the sample is that it functions as a robustness check for the model itself. We can check how the key regression coefficient estimates behave when the subset of the full sample is used. However, one of consequences of splitting the sample is that we lose significant degrees of freedom. Regressions with a dummy of AFC could circumvent this problem.

Comparing the estimation results of pre- and post-Asian Financial Crisis (AFC), three things stand out. First, the coefficients show that contribution of imported intermediate inputs to a firm's level of productivity, value added, output, and exports has increased significantly after the crisis. The magnitudes of the coefficient differ significantly between the pre- and post-AFC. What particularly stands out is that the increase in the coefficients of import share for productivity, value added and output were more than double in the post-AFC period. This may indicate increased integration of firms into the global value chain. It could also be argued that measures to control or reduce the use of imported inputs are ineffective given firms' far-reaching dependence on imported inputs.

Second, the impact of imported inputs on a firm's level of employment has changed from negative and significant to not significant post-AFC. Interestingly, the importing dummy is consistently positive and significant between the two periods, indicating the positive effect of importing inputs on a firm's employment level. This result may refute the opinion that an increase in the use of imported inputs will have a negative impact on the employment level. What happens is that the use of imported inputs improves a firm's productivity and output, so the firm can expand its operation and create more jobs.

Third, foreign and exporting dummy variables show an overall positive and significant effect on a firm's productivity, value added, output, and exports. This effect seems consistent between pre- and post-AFC.

5.4.2 Transport and machinery industry

It can be argued that the transport and machinery industries have very different characteristics compared with the overall manufacturing industry, as they are relatively more technology intensive. To see how the result may differ, we pick out and estimate the transport and machinery industry only. Table 9.5 exhibits the estimation result for this particular industry. Similar to our basic result presented in Table 9.3, the contribution of imported inputs to firms' productivity, value added, output, and exports remain positive and significant. Comparing the magnitude of the coefficient estimates with the results in Table 9.3, one can see that the coefficients are larger in the transport and machinery industry, indicating a bigger impact of imported inputs in this industry. However, we do not find any significant change in the trend of imported inputs used except for firms' value added and output per worker after the crisis. The continuously

Table 9.5 Estimation results for transport and machinery industry (full sample)

Dependent variable	*ln* TFP_{it}	*ln* VA_{it}	*ln* Y_{it}	*ln* X_{it}	*ln* L_{it}
Share of imported inputs (m_{it})	2.414*** (0.452)	0.534** (0.225)	0.99*** (0.214)	1.42* (0.727)	–0.121 (0.183)
Time trend (t)	0.132*** (0.015)	0.161*** (0.006)	0.144*** (0.006)	0.193*** (0.034)	0.001 (0.004)
$t \times m_{it}$	–0.042 (0.026)	–0.002 (0.017)	–0.016 (0.017)	–0.043 (0.05)	0.005 (0.012)
Foreign dummy (FF_{it})	0.483 (0.319)	0.063 (0.137)	0.047 (0.146)	0.242 (0.326)	0.315*** (0.079)
Exporting dummy (FX_{it})	0.044 (0.087)	0.169*** (0.041)	0.183*** (0.038)		0.023 (0.019)
Importing dummy (FM_{it})		–0.067 (0.091)	–0.07 (0.102)	–0.447 (0.375)	0.167*** (0.055)
AFC dummy	–0.285*** (0.092)	–0.366*** (0.057)	–0.242*** (0.046)	0.071 (0.254)	–0.062** (0.024)
Firm fixed effects	yes	yes	yes	yes	yes
Observations	1,265	6,820	6,306	276	6,820
R-squared	0.92	0.80	0.82	0.92	0.87

Source: Author's calculations.

Notes: Robust standard errors are in parentheses. Based on them ***, **, and * mean coefficients statistically significant at 1%, 5%, and 10% level, respectively. The Hausman test is conducted to choose between the fixed effects and random effects model. The test rejects the null hypothesis, therefore the fixed effects model is selected for equations (3)–(7).

important role of imported inputs in firms' performance may indicate that LCR policy again is not very effective, especially if the objective is to reduce the use of imported inputs in this sector.

Interestingly, different from our estimation results in Table 9.5, now the foreign participation is not significant for firms' productivity, output, value added, and export. In fact, the foreign participation has a negative and significant effect on exports. This may indicate that most foreign firms in the transport and machinery industry target the domestic market as opposed to the export market.

All in all, there are mixed effects of imported inputs in the transport and machinery industry. Imported inputs have a positive and significant effect on firms' productivity and on firms' output before the AFC. However, it has no significant effect on firms' value added, exports, and output in the period after the AFC. Similarly, the interaction between time trend and share of imported inputs shows a mixed picture. It is positive and significant for firms' value added and output after the AFC.

5.4.3 Electronic and electrical goods industry

Next we would like to see if a similar picture emerges in the electronic and electrical goods industry. Compared with the transport and machinery industry, arguably, the electronics and electrical goods industry has experienced less LCR. Table 9.6 exhibits the estimation result for the electronics and electrical goods industry. Like the transport and machinery industry, we find that imported inputs contribute positively to firms' productivity, value added, output, and exports in this industry as well. Comparing the magnitude of the coefficient estimates with the results in Table 9.5 (for transport and machinery industry), one can see that the impact of imported inputs on firms' value added, output, and exports is slightly higher in the electronics and electrical goods industry. And unlike in the transport and machinery industry, we find a positive and significant association between imported inputs and firms' productivity in this industry. Confirming our previous finding, the significant share of imported inputs indicates that LCR policy may not be effective in reducing the use of imported inputs in this sector.

The foreign investment has positive and significant impacts on firms' output, value added, and employment in the period pre-AFC. However, it has negative

Table 9.6 Estimation results for electronic and electrical goods industry (full sample)

Dependent variable	*ln* TFP_{it}	*ln* VA_{it}	*ln* Y_{it}	*ln* X_{it}	*ln* L_{it}
Share of imported inputs (m_{it})	1.265*** (0.381)	0.853*** (0.182)	1.47*** (0.208)	1.831*** (0.49)	0.153 (0.11)
Time trend (t)	0.048*** (0.016)	0.16*** (0.007)	0.13*** (0.01)	0.19*** (0.032)	0.011* (0.006)
$t \times m_{it}$	0.051* (0.03)	−0.018 (0.014)	−0.03* (0.017)	−0.038 (0.068)	−0.006 (0.01)
Foreign dummy (FF_{it})	0.745** (0.319)	0.421** (0.169)	0.577*** (0.209)	0.384 (0.496)	0.324*** (0.105)
Exporting dummy (FX_{it})	0.046 (0.097)	0.071 (0.058)	0.021 (0.064)		0.037 (0.027)
Importing dummy (FM_{it})		−0.225** (0.114)	−0.259* (0.143)	−1.291*** (0.368)	0.086 (0.072)
AFC dummy	−0.051 (0.123)	−0.0.38 (0.065)	0.119* (0.065)	0.268 (0.249)	−0.033 (0.038)
Firm fixed effects	yes	yes	yes	yes	yes
Observations	1,344	5,374	4,714	566	5,374
R-squared	0.89	0.74	0.72	0.88	0.88

Source: Author's calculations.

Notes: Robust standard errors are in parentheses. Based on them ***, **, and * mean coefficients statistically significant at 1%, 5%, and 10% level, respectively.

and significant impacts on firms' productivity (pre-AFC); negative and significant impact on firms' export (post-AFC); and positive and significant impact on firms' employment (post-AFC). Arguably, the negative and significant effect of the foreign dummy on exports is likely to be due to most of the foreign firms targeting the domestic market in this sector.

In general, the picture of the electronic and electrical goods industry confirms that imported inputs have a positive and significant effect on firms' productivity, value added, and employment.

5.5 *Endogeneity*

In this section we address the issue of the potential endogeneity in our model. Amiti and Konings (2007) argue that in the case of Indonesia it is unclear whether there is in fact a serious endogeneity issue in a firm fixed-effects model. Nevertheless, it is possible that firms in low-productivity industries used more domestic inputs and thus less imported inputs, which would lead to reverse causality. We try to address this problem by estimating the impact of the growth of imported inputs on the growth of firms' productivity, output, value added, exports, and employment. Table 9.7 presents the estimation results for the

Table 9.7 Alternative econometric specification (transport and machinery)

Dependent variable	Δ TFP$_{it}$	Δ VA$_{it}$	Δ Y$_{it}$	Δ X$_{it}$	Δ L$_{it}$
Growth of share of imported inputs (Δm_{it})	0.007*** (0.001)	–0.00003 (0.0004)	0.002*** (0.0002)	–0.166 (0.129)	–0.00006 (0.0001)
Time trend (t)	–0.041*** (0.01)	0.001 (0.008)	–0.021*** (0.008)	–0.157*** (0.018)	–0.003 (0.006)
$t \times \Delta m_{it}$	0.107*** (0.019)	0.023** (0.011)	0.04*** (0.01)	0.223 (0.017)	–0.015** (0.007)
Foreign dummy (FF_{it})	0.124 (0.174)	–0.269 (0.212)	–0.219 (0.207)		0.094 (0.129)
Exporting dummy (FX_{it})	–0.123 (0.092)	–0.175** (0.069)	–0.047 (0.054)		–0.008 (0.025)
AFC dummy	–0.573*** (0.143)	–0.229 (0.189)	–0.143 (0.128)		–0.402*** (0.046)
Firm fixed effects	yes	yes	yes	yes	yes
Observations	745	1,721	1,661	53	1,721
R-squared	0.34	0.17	0.21	0.95	0.21

Source: Author's calculations.

Notes: Standard errors are in parentheses. Based on them ***, **, and * mean coefficients statistically significant at 1%, 5%, and 10% level, respectively.

Table 9.8 Alternative econometric specification (electronic and electrical goods)

Dependent variable	*Δ ln TFPit*	*Δ ln VAit*	*Δ ln Yit*	*Δ ln Xit*	*Δ ln Lit*
Growth of share of imported inputs (Δm_{it})	0.0001*** (0.00002)	–3.18e-07*** (8.01e-09)	–0.0001** (0.00004)	0.119*** (0.028)	1.29e-07*** (6.09e-09)
Time trend (t)	–0.03*** (0.011)	0.003 (0.011)	–0.003 (0.011)	–0.089** (0.037)	–0.021*** (0.006)
$t \times \Delta m_{it}$	0.087*** (0.023)	0.008 (0.011)	0.042*** (0.012)	0.034 (0.081)	0.003 (0.009)
Foreign dummy (FF_{it})	–0.109 (0.082)	–0.01 (0.139)	0.211* (0.125)	0.544 (0.343)	0.109 (0.164)
Exporting dummy (FX_{it})	–0.195 (0.139)	–0.308*** (0.082)	–0.355*** (0.083)		0.104*** (0.027)
AFC dummy	–0.017 (0.167)	0.234 (0.151)	0.431*** (0.101)	0.26 (0.172)	–0.079* (0.043)
Firm fixed effects	yes	yes	yes	yes	yes
Observations	734	2,082	2,003	218	2,082
R-squared	0.30	0.23	0.22	0.57	0.26

Source: Author's calculations.

Notes: Standard errors are in parentheses. Based on them ***, **, and * mean coefficients statistically significant at 1%, 5%, and 10% level, respectively.

transport and machinery industry. Table 9.8 presents the estimation results for the electronics and electrical goods industry.

The results show that there is a positive and significant impact of imported inputs growth on firms' productivity growth in both industries. The growth of imported inputs has a positive and significant impact on output growth in the transport and machinery industry. However, it is negative and significant in the electronic industry. In addition, the growth of imported inputs has a positive and significant impact on export growth in the electronics and electrical goods industry, but it is not significant in the transport and machinery industry. The interaction variable is positive and significant, suggesting a positive association between firms' productivity and output growth and the upward trend of imported inputs growth in the two industries.

The estimates in Table 9.7 and Table 9.8 corroborate our previous findings that imported intermediate inputs have positive and significant impacts on firms' productivity, output, and exports.

6. Conclusions

This chapter examines the impact of local content requirements (LCR) in the manufacturing sector in Indonesia. During the last two decades, Indonesia has been using LCR policy to promote local supporting industries and to reduce the dependence on imported inputs (including raw materials). However, there is lack of empirical evidence that the LCR policy has either strengthened the capacity of local supporting industries or effectively reduced firms' dependence on imported inputs over time.

For the case of Indonesia, our estimation results show that the contribution of imported intermediate inputs remains positive and significant to firms' productivity, output, value added, exports, and employment, even though the LCR policy has been implemented for most of the period of observation. This finding indicates that the LCR policy so far has been ineffective in reducing firms' dependence on imported inputs. One possible reason is weak law enforcement in Indonesia. Furthermore, our results also indicate that the possibility to use imported inputs is very important for firms' competitiveness. With better access to imported inputs, local firms have access to foreign knowledge and technology, enabling them to produce higher-quality and more competitive products. Increased use of imported inputs in recent years may also indicate that Indonesia's manufacturing sector has been continuously integrating into the global production network. This could be a fruitful area for future research.

Given the preceding findings, we argue that any unreasonably restrictive measures to limit the use of imported inputs may adversely affect firms' industrial performance. Adopting a more restrictive LCR policy will increase the cost of inputs for local firms. Given a strong positive association between the use of imported inputs and firms' exports and output, such policy will harm the industry and adversely affect its competitiveness for exports. Moreover, evidence suggests that increased access to imported inputs, facilitated by the trade liberalisation process, was a significant productivity-enhancing factor for Indonesian firms. A study conducted by Amiti and Konings (2007), using the manufacturing census data from 1990–2001, finds that a 10-percentage point fall in input tariffs led to a firm-level productivity gain of 12 percent via learning, quality, and variety effects. This gain is at least twice as high as the gains from reducing output tariffs that may arise via tougher competition effects. Likewise, World Bank (2012) shows that firms that are more integrated with the global economy (exporting a larger part of their output and using more imported inputs) tend to be on average 16–17 percent more productive than non-integrated firms.

In addition, it is important to note that a country's imports of particular goods may embody some amount of the labour and capital services that originated in the importing country. Likewise, some of the value added of a country's exports may be of foreign origin. The SI data cannot fully capture the import content of local inputs or the local content of foreign inputs. More research is certainly needed to fully understand the net effect of LCR on Indonesia. Future research may look at how to better measure foreign and domestic value added in the production of goods. In particular, it would be useful to confirm the findings of this chapter using data that allow for identification of foreign and domestic value added. Moreover, it would be interesting to learn more about the characteristics of firms that determine the extent of localisation of its parts and components.

Finally, localisation policy is a strategic business decision. The way it is implemented needs to consider many factors, including the nature of the industry and how it operates in a global context. LCR policy needs to consider substitution possibilities in production, supply conditions in the domestic intermediate goods industry, and the market structure for the intermediate good. It must be carefully targeted, continuously monitored, and should not be implemented for too long and be too restrictive.

Notes

1 Special thanks to Sagap Alik Tipo for providing the data, Imam Setiawan for excellent research assistance, and Cassey Lee for providing helpful comments and suggestions in the earlier draft.
2 See Yose Rizal Damuri, 'Indonesia's Import Phobia', *East Asia Forum*, 10 August 2012, available at www.eastasiaforum.org/2012/08/10/indonesia-s-import-phobia/ (accessed 3 August 2016).
3 www.kemenperin.go.id/artikel/7950/Indonesia-Harus-Kuasai-Proses-Produksi-Hulu-Hilir.
4 See OECD (1989) for an assessment of local content requirements in the OECD countries.
5 For the official definition, see Law No. 3/2014 on Industry. Also, the 2015–2019 strategic plan of the Ministry of Industry states the 10 priority industries, including industries on transportation means, capital goods, intermediate goods, parts and components.
6 In the literature, the terms 'local content protection' and 'local content requirement' mean the same thing. This paper uses the two terms interchangeably.
7 The term 'purchased locally' is rather confusing. An interview with a manager from a shipbuilding company revealed that the company procured machinery from a local distributor. The machine was imported by the distributor, but since the company bought the machine from the local distributor it can claim the machine as local content.
8 See Global Trade Alert, 'Indonesia: LCR in Automotive Industry', www.globaltradealert.org/measure/indonesia-lcr-automotive-industry.
9 This regulation came into force on 24 March 2015.
10 See GBG Indonesia. 'Going Local: Understanding Indonesia's Local Content Requirements', 5 May 2014, www.gbgindonesia.com/en/main/business_updates/2014/upd_going_local_understanding_indonesia_s_local_content_requirements.php.
11 In our sample, only 20 percent of the firms use imported inputs. It is important to note, however, that a country's import of particular goods may embody some amount of the labour and capital services, which originally are from the importing country. Likewise, some of the value added of a country's exports may be of foreign origin. Reimer (2011) calculates that 21.5 percent of imported labour

services are domestic labour, 17.7 percent of imported capital services are domestic capital, 12.3 percent of exported labour services are foreign labour, and 23.3 percent of exported capital services are foreign capital.

12 We experimented with year dummies and the results are not much different from the estimation using time trends. And since we assume that the effect of LCR policy is not specific to any given year, we drop the year dummies.

13 A crisis dummy equal to one for the years 1997 and 1998. We attempted to include a Global Financial Crisis dummy in 2008 and 2009, but the result was not significant, so it was dropped.

14 This finding is similar to the findings in the literature in which firms which are foreign-owned, export-oriented, and particularly both, have higher productivity, value added, output and employment (see for instance Blomström and Sjöholm, 1999; Tybout, 2000; Takii, 2004; Aswicahyono, 2009; World Bank, 2012).

15 The importing dummy is omitted in the total-factor productivity equation, while the exporting dummy is dropped in the export equation due to collinearity.

16 Amiti and Konings (2007) also compare the pre-AFC case (1991–96) with the full sample (1991-2001). Their estimates with subset of the full sample are used as a 'robustness test' for the key results.

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10 Foreign direct investment and value added in Indonesia[1]

Fredrik Sjöholm

1. Introduction

The Indonesian foreign direct investment (FDI) regime has typically been rather restrictive and liberalised only in times of economic difficulties (Patunru and Rahardja, 2015). It is possible, even likely, that the restrictions on FDI have been costly in terms of forgone economic growth and development. FDI can benefit the host country in different ways, all of which work through an impact on value added.

More specifically, there are three main mechanisms through which such an impact on value added may arise. The first is through the capital, technology, management, and other resources the foreign firms brings with them, and which will contribute to production and value added. Moreover, foreign firms tend to contribute more than domestic firms to value added because of the special characteristics of multinational enterprises (MNEs). As an example, most new commercial technologies are developed by MNEs. Affiliates of these MNEs bring with them new technology with a positive effect on value added in the host country. Moreover, MNEs have superior international networks and dominate international trade.[2] It follows that FDI will increase the host country's exports and thereby value added and economic growth. Finally, foreign firms will have access to high-quality inputs, which again is likely to increase value added.

The second mechanism is through the types of goods and services that are being produced in the host country. FDI might contribute to a structural change by expanding high value added industries such as manufacturing and high-end service sectors. Such growth will result in use of idle resources or move capital and labour from low value added sectors to high value added ones.

The third and final way FDI impacts value added is through its effect on domestic firms. This effect could be either positive, for instance through support of local linkage industries, or negative, for instance because of crowding out effects that force domestic firms to operate at a lower scale.

This chapter discusses FDI in Indonesia and how it impacts value added. We will also examine how it affects other aspects that are related to value added, such as tax revenues, wages, and employment. We start by showing the development of FDI in Indonesia over time and compare it to the development in neighbouring countries. We continue with a more detailed look at the industry

DOI: 10.4324/9781315161976-10

distribution of FDI, followed by a comparison of foreign and domestic firms in Indonesia. We then discuss how FDI contributes to a structural shift of the economy towards high value added activities and also discuss how FDI impacts domestic firms. Our analysis shows that FDI increases value added in Indonesia, and we continue by looking at which actors in the economy benefit from this higher value added. Our chapter ends with some concluding remarks and a discussion of the policy implications.

2. FDI in Indonesia

FDI inflows played a minor role in Indonesia until the liberalisations of the early 1990s, as seen in Figure 10.1. The reforms, including relaxed ownership rules and changes in the trade policy, contributed to strong growth in FDI. Annual inflows grew by more than 800 percent between 1989 and 1996 when it amounted to more than 6 billion US dollars. The 1997 Asian Financial Crisis (AFC), and the large political and economic turmoil that followed, resulted in the collapse of FDI inflows. In fact, FDI inflows were registered as negative every year except one between 1998 and 2003.[3] Inflows of FDI started to increase again in 2004, and the increase was dramatic. More precisely, FDI inflows in 2005 were higher than at the previous peak in 1996, and they further increased, by another 170 percent, from 2005 to 2014. Moreover, the strong growth continued in 2015, for which data from UNCTAD is not available: FDI increased by almost 20 percent from 2014 to 2015, according to the Investment Coordinating Board of the Republic of Indonesia (BKPM).[4]

The growth of FDI in Indonesia coincides with global growth in FDI. Global FDI flows have for instance been growing more rapidly than international trade (Jungnickel, 2002; Antràs and Yeaple, 2014). However, growth in FDI to Indonesia seems even higher than the global trend. For instance, in 2014 FDI to Indonesia was higher than to any other Southeast Asian country, with the exception of Singapore.[5] Moreover, Indonesia has been among the top 20 receivers of FDI in recent years (UNCTAD, 2013). It seems likely that high inflows of FDI will continue, at least as judged from investors' view on Indonesia (UNCTAD, 2013). More specifically, in 2012 Indonesia was ranked as the fourth most popular prospective host country for FDI.

However, the growth of FDI in Indonesia might to some extent be a catching-up effect following historically low inflows of FDI. Figure 10.2 tries to answer this question by relating the stock of inward FDI to national gross domestic product (GDP) in a number of Southeast Asian countries. Singapore is not included because figures on FDI to Singapore are notoriously unreliable.[6]

FDI as a share of GDP in Indonesia increased from 7 percent in 1990 to 15 percent in 2000 and almost 30 percent in 2014. Despite this growth, the relative amount of FDI in Indonesia is low compared with FDI in other countries in the region. More precisely, it is substantially lower than in Cambodia, Thailand, Viet Nam, and Malaysia; it is at about the same level as in Lao PDR; and it is only higher than in Myanmar and the Philippines.

Figures 10.1 and 10.2 are based on balance-of-payments data, which measures financial flows rather than real economic activity. Such data is problematic for various reasons (Lipsey and Sjöholm, 2011a). Most importantly, the financial flows are often not originating from the countries to which they are attributed and they often do not end up in the countries that are their supposed destinations. An alternative approach is to look at the share of actual production or employment accounted for by MNEs. Such figures are available in work by Ramstetter (2009) for the manufacturing sector in Indonesia, Malaysia, Thailand, Viet Nam, and Singapore. The foreign share of output is around 40 percent in four out of five countries, including Indonesia, and around 80 percent in Singapore. The shares have increased from previous years in Indonesia and Viet Nam, have been relatively stable in Malaysia, and have declined in Thailand. Moreover, the foreign share of employment is around 25 percent in Indonesia and Thailand, almost 40 percent in Malaysia and Viet Nam, and more than 50 percent in Singapore.

To sum up the discussion on FDI, inflows to Indonesia have increased rapidly over the last decades. Part of this increase is presumably caused be a general worldwide increase in FDI and by a catching-up from previously low inflows caused by restrictive policies. Despite the increased inflows, FDI seems to be slightly less important in Indonesia than in many of its neighbouring countries.

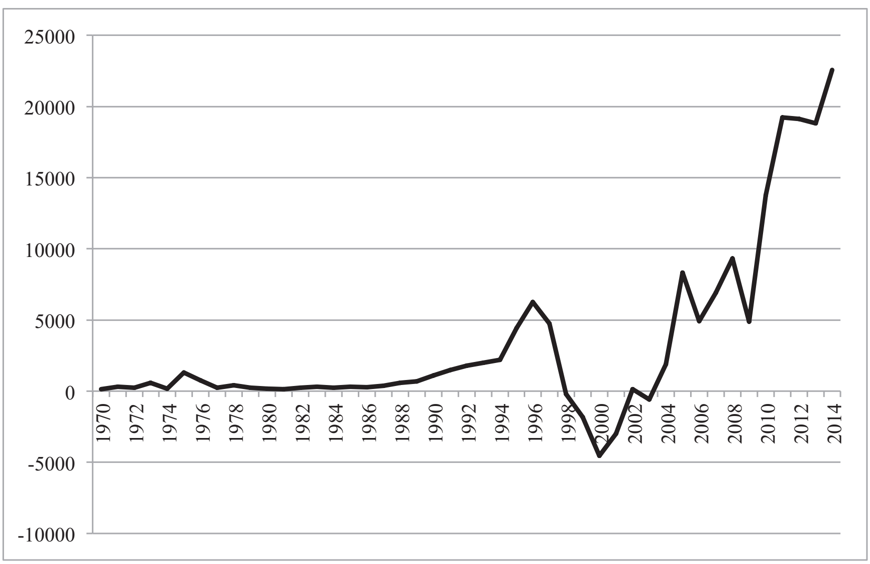

Figure 10.1 FDI inflows to Indonesia (million US dollars, current prices), 1970–2014

Source: Author's calculations based on data from UNCTAD, 2016. http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx.

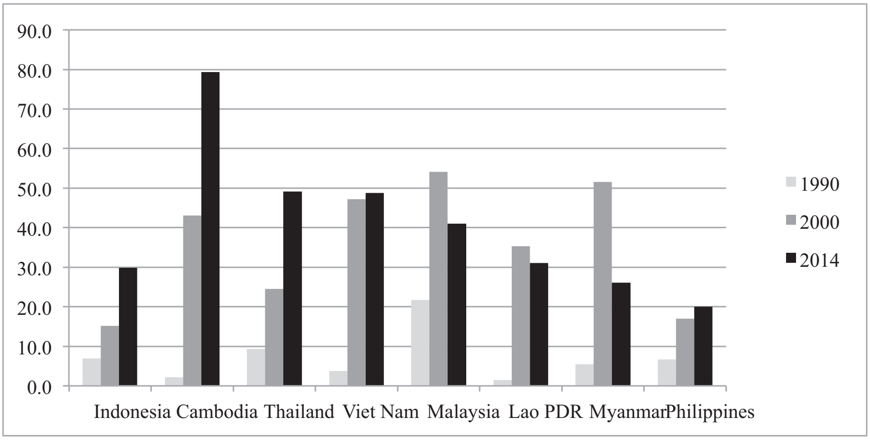

Figure 10.2 The stock of FDI as a share of GDP in selected Southeast Asian countries (in percent), 1990–2014

Source: Author's calculations based on data from UNCTAD, 2016. http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx.

Table 10.1 FDI in Indonesia by sectors, 2015

Sector	*Share of total FDI (%)*
Mining	13.7
Transportation, Warehouse, and Telecommunication	11.2
Metal, Machinery, and Electronic	10.6
Electricity, Gas, and Water Supply	10.4
Real Estates	8.3
Others	45.8

Source: Author's calculations based on the Investment Coordinating Board of the Republic of Indonesia, 2016. www.indonesia-ottawa.org/wp-content/uploads/2010/12/FDI-TW_IV_2015_Final.pdf.

2.1 The distribution of FDI in Indonesian manufacturing

Table 10.1 shows the distribution of FDI in Indonesia by sectors. Investments target a broad range of sectors: mining, services (e.g. transport, real estate), and manufacturing (machinery). In this chapter, we focus on FDI in manufacturing, where available data allows for a more detailed analysis. Table 10.2 presents some descriptive statistics on the industry distribution of Indonesian manufacturing and on the share of foreign value added in different industries. The

Table 10.2 Industry distribution of Indonesian manufacturing and the foreign share of manufacturing value added (in percent), 1990–2012

Industry	*Share*	*Foreign*	*Share*	*Foreign*	*Share*	*Foreign*	*Share*	*Foreign*	*Share*	*Foreign*
	1990		*1995*		*2000*		*2005*		*2012*	
Total	100	20.1	100	26.5	100	36.3	100	33.5	100	39.9
Food products and beverages	16.2	12.5	10.6	20.4	12.1	25.2	15.6	27.7	21.4	30.4
Tobacco products	16.3	3.2	14.9	4.2	10.8	6.4	12.3	22.6	8.7	8.6
Textiles	9.8	22.6	11.0	17.0	10.2	27.7	7.9	22.4	4.7	22.9
Wearing apparel	2.5	12.2	3.9	35.8	4.2	38.6	3.2	37.5	3.8	49.9
Leather products	1.8	38.7	2.6	46.1	2.8	51.6	2.2	57.8	2.4	56.7
Wood products	9.8	10.3	7.6	13.3	5.6	6.8	4.1	9.6	1.8	15.4
Paper products	3.4	45.4	3.2	40.9	3.9	20.1	6.9	19.5	5.2	28.7
Printing	1.5	0.4	1.7	1.7	2.8	0.6	1.3	12.2	0.6	1.5
Oil products	0.1	55.1	0.1	37.7	0.2	74.7	0.2	68.8	0.2	23.2
Chemicals	8.2	50.6	7.3	48.0	9.1	57.7	9.8	25.5	10.5	41.0
Rubber and plastics products	4.4	16.3	3.9	22.9	4.3	31.7	6.3	30.7	5.5	33.9
Non-metallic mineral products	4.3	21.0	3.9	26.8	3.7	39.3	5.6	37.4	3.9	28.1
Basic metals	10.1	18.2	9.0	43.2	3.7	37.0	3.2	26.6	3.5	28.0
Fabricated metal products	1.9	22.0	2.6	53.7	3.2	66.5	2.3	35.6	3.7	43.7
Machinery and equipment	0.5	24.3	0.9	57.1	0.6	48.1	1.4	59.3	2.2	63.4
Office, accounting and computing machinery	0.0	0.0	0.0	0.0	0.0	48.5	0.2	98.6	0.0	90.4
Electrical machinery	1.3	24.4	3.1	22.9	3.4	72.7	2.2	58.1	3.5	54.6
Radio, television and communication	1.2	42.9	2.2	72.7	6.8	87.9	2.8	71.6	2.3	89.6
Medical, precision and optical instruments	0.1	16.7	0.3	54.2	0.5	44.8	0.1	41.3	0.2	56.6
Motor vehicles	2.7	37.8	2.0	54.8	3.1	86.3	6.8	60.7	9.3	75.1
Other transport equipment	2.8	60.9	7.4	13.6	6.8	23.0	3.6	79.4	5.1	71.8
Furniture	1.0	13.6	1.7	33.6	2.2	27.8	2.0	32.8	1.4	27.8

Source: Author's calculations based on data from Statistics Indonesia's Industrial Survey (an annual survey on large and medium-sized enterprises in the manufacturing sector), 1990–2012.

Note: Share is the industry's share of total manufacturing. Foreign is the foreign share of value added in the industry. Firms are defined as foreign if they have at least 10 percent foreign ownership.

calculations are based on the Indonesian annual census of large and medium-sized plants, covering all plants with more than 20 employees. Manufacturing value added increased dramatically between 1990 and 2012 – by about 5,000 percent in nominal terms. The growth varied substantially between industries, which resulted in large structural changes, as can be seen in Table 10.2. For instance, food products and tobacco products each accounted for around 16 percent of manufacturing value added in 1990. The relative share of food products increased to about 21 percent in 2012, whereas the share for tobacco declined to about 9 percent. Chemicals was the second largest industry in 2012, and its share has been rather stable since 1990. Basic metals and textiles were two of the largest industries in 1990, but have since declined rapidly in relative importance. The opposite development can be seen for motor vehicles, which in 2012 accounted for more than 9 percent of manufacturing value added. Adding the other transport equipment industry gives a combined share of almost 15 percent. This development has come about despite concerns that Indonesia is being left behind in the automotive industry because of restrictions on FDI, protectionism, and lack of skills (Soejachmoen, 2016).

The foreign share of value added has increased since the start of the liberalisations of the early 1990s, rising from around 20 percent in 1990 to slightly above one-third in the first half of the 2000s and to 40 percent in 2012, the last year for which we have data.

There is a large variation between industries in the foreign share of value added, and also within industries over time. The foreign share is particularly large in the different machinery sectors and in the two transport sectors. Printing, tobacco products, and wood products are predominantly domestic industries. The foreign share of the largest industry, food products, is lower than the average.

Industries with relatively low growth rates, such as basic metals and textiles, tend to have relatively low foreign shares; industries with high growth rates, such as transport industries, tend to have high foreign shares.[7] Hence, from this simple description, there seems to be a positive correlation between FDI and growth in value added.

3. Value added in foreign and domestic firms

Figure 10.3 shows average value added in domestic and foreign firms in 2012. Value added is considerably higher in foreign than in domestic firms – 6.6 times as high, on average. The difference is particularly high in the transport industries, which is largely explained by foreign and domestic firms being concentrated in different sub-sectors within these industries. But the difference is seen in all industries except in printing. Hence, foreign firms have higher value added than domestic firms both in typical high value added industries, such as paper, basic metals, and electrical machinery, and in low value added industries such as wood products and furniture.

There are several reasons for the high value added in foreign firms. Most importantly, they tend to be relatively large in size, and large firms will have

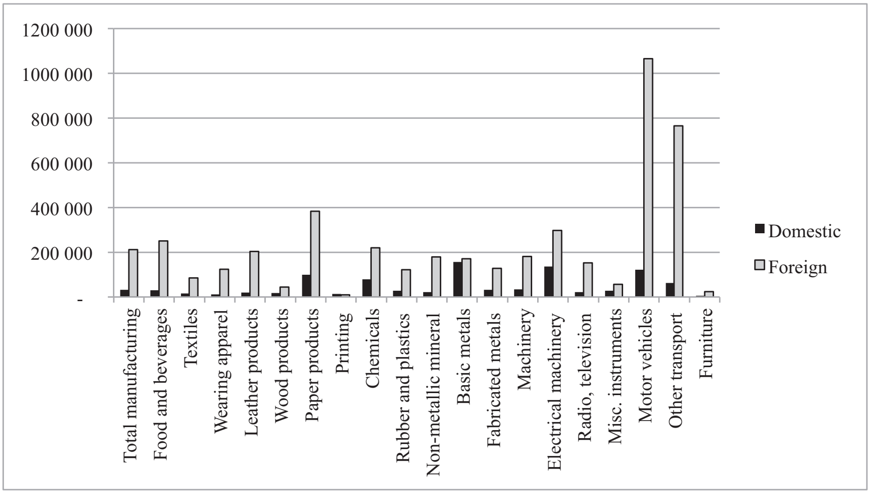

Figure 10.3 Average value added in domestic and foreign firms in Indonesia (million of Indonesian rupiahs), 2012

Source: Author's calculations based on data from the Statistics Indonesia Industrial Survey.

Note: Industries with less than 10 foreign firms have been excluded.

higher output and higher value added than small firms. As can be seen in Table 10.3, the average foreign firm employs 610 employees compared with 170 employees for the average domestic firm. Hence, foreign firms are on average 3.6 times larger than domestic firms. Foreign firms are larger than domestic firms in all industries, but the difference is relatively small in chemicals and in basic metals. Foreign firms are particularly large, in absolute terms and in relation to domestic firms, in wearing apparels and in leather products.

Controlling for differences in size slightly reduces the previously shown difference in value added between foreign and domestic firms, but the difference remains large, as can be seen from the included figures on labour productivity or, in other words, on value added per employee. The average labour productivity is almost 6 times higher in foreign compared with domestic firms. This is an important difference with large welfare implications because wages and living standards are closely related to productivity. Labour productivity is higher in domestic than in foreign firms in wearing apparels and in printing. It is higher in foreign firms than in the rest of the industries, and the difference is particularly large in chemicals. Including chemicals might in some sense exaggerate the difference between domestic and foreign firms, which can be seen from the substantially lower median difference – productivity is 2.5 times higher in foreign than in domestic firms in the median industries (textiles and rubber products).

Table 10.3 Characteristics of domestic and foreign-owned firms in Indonesia, 2012

	Size dom.	*Size for.*	*VA per empl. (ratio)*	*Export domestic (%)*	*Export foreign (%)*	*Import domestic (%)*	*Import foreign (%)*
Total	170	610	5.9	10.6	35.1	5.2	30.9
Food products and beverages	143	480	5.5	8.8	36.1	2.3	9.5
Textiles	185	696	2.5	6.8	35.7	5.6	28.6
Wearing apparel	181	1394	0.9	9.5	53.5	4.8	32.6
Leather products	184	2060	1.2	8.5	38.6	5.9	33.0
Wood products	181	575	1.7	31.8	56.3	1.5	14.9
Paper products	262	519	3.6	5.0	27.6	6.1	32.8
Printing	102	210	0.7	1.1	8.2	1.8	27.7
Chemicals	211	214	10.1	7.9	20.4	20.4	45.0
Rubber and plastics products	193	432	2.5	9.8	34.9	7.5	28.5
Non-metallic mineral products	106	432	4.3	3.8	15.1	2.9	23.4
Basic metals	235	237	1.6	15.4	21.0	12.0	51.2
Fabricated metal products	159	278	4.2	3.5	20.7	10.4	35.2
Machinery and equipment	142	343	1.8	5.5	18.4	13.3	39.2
Electrical machinery	264	612	1.5	7.8	29.1	17.4	42.8
Radio, television and communication equipment	186	647	3.7	9.7	32.6	23.4	42.1
Medical, precision and optical instruments	223	406	1.5	10.3	49.7	14.8	69.5
Motor vehicles	222	728	2.5	2.5	24.2	12.6	43.1
Other transport equipment	212	617	2.6	5.5	19.9	12.0	47.5
Furniture	120	452	1.4	32.1	68.5	3.9	19.7

VA = value added.

Source: Author's calculations based on data from the Statistics Indonesia Industrial Survey.

Note: Industries with less than 10 foreign firms have been excluded. Size is measured as the number of employees; value added per employee is measured as the ratio between foreign and domestic firms. Export is the share of output being exports; import is the share of intermediate goods being imported.

The Indonesian market is not small, but still of modest size compared with the large economies in Asia, North America, and Europe. The limited size imposes a constraint on the scale of operation for those firms that only produce for the local market. Export enables firms to expand production, and one explanation to the large foreign firms is that their networks of affiliates and their good knowledge of foreign markets make them well-equipped for exporting. They also produce to a large extent for the international market and are not constrained by local demand. This can be seen clearly in Table 10.3. Around 35 percent of foreign firms' output is exported, compared with around 11 percent for local firms. It is a large difference, and foreign firms have relatively high export shares in all industries. Moreover, more than half of foreign firms' output is exported in wearing apparels, wood products, and furniture. The highest export share in domestic firms is also seen in wood products and furniture, with slightly more than 30 percent.

The last two columns of Table 10.3 focus on another important difference between foreign and domestic firms: the former import a large share of the intermediate products that are used in production. One explanation is that foreign firms are typically more integrated in international production networks. Such networks are of particular importance in Southeast Asia and explain a large part of the region's increased export of manufacturing products (Athukorala and Kohpaiboon, 2015). The importance of intermediate imports is an often overlooked determinant of productivity and value added, and an aspect that is affected by globalisation. Foreign technology might be embodied in imported inputs. Amiti and Konings (2007) examine the productivity effects of greater availability of imported intermediate goods in Indonesia between 1991 and 2001. Their results suggest that the productivity effects are large: a 10 percent decrease in tariff rate on intermediate goods increases productivity by around 12 percent for firms that import their intermediates.

Getting back to the figures in Table 10.3, it can be seen that foreign firms import roughly 31 percent of their intermediate goods, a much higher figure than the 5 percent for domestic firms. The import share is substantially higher in foreign firms in each of the industries included in our study. In some industries, foreign firms have very high import shares, which suggests that backward linkages with the local economy in these industries are limited. There are also industries where high import coincides with low value added (Figure 10.3). One prime example is the medical and optical instrument industry, where foreign firms import two-thirds of their intermediate goods and export about half of their production, and where the resulting value added is relatively low, as can be seen in Figure 10.3. It is likely that the foreign operations in this, and possibly in some other industries, can be characterised by relatively simple assembling type activities, where imported inputs are put together and exported.

One of the more important reasons for high value added in foreign firms presumably is their access to relatively sophisticated technology.[8] Such access is one major reason why foreign firms can compete in foreign markets despite a disadvantage in knowledge of local preferences, institutions, and markets. The general level of technology in Indonesia is relatively low (Hill and Thee, 1998; Okamoto and Sjöholm, 2003). Very few firms are engaged in innovative activities. Public support has historically been biased in favour of unsustainable 'white elephant' type projects, and Basri (2001) finds that industries that received support have done worse than industries without support.

Focusing on the role of FDI, it seems that technology capability is higher in MNEs than in local firms, but it is a firm characteristic that is quite difficult to measure. One possible approach is to construct and compare measures of total factor productivity (TFP).[9] At a general level, Aswicahyono and Hill (2002) find increased globalisation through international trade to increase TFP in Indonesian manufacturing. In a more explicit comparison between local and foreign firms, Takii (2004) finds that foreign firms in 1995 had relatively high levels of TFP. Moreover, wholly foreign-owned firms had higher TFP than joint ventures between foreign and local owners, and foreign firms that had been in Indonesia for some time had higher TFP than new foreign firms. Moreover, Okamoto and Sjöholm (2005) find in a study of TFP growth between 1990 and 1995 that the foreign firms' contribution to manufacturing TFP growth is higher than the foreign share of manufacturing. Finally, Arnold and Javorcik (2009) find in a panel of Indonesian firms between 1983 and 1996 that foreign acquisitions of local firms had a positive effect on TFP.

Hence, there is evidence that TFP and growth in TFP is higher in foreign than in local firms. To the extent that TFP captures technology capability, it suggests that one reason for high value added in foreign firms is their relatively sophisticated technology.

4. FDI and structural change

FDI will benefit Indonesia even if there were no difference in value added between foreign and domestic firms. The reason is that FDI contributes to a structural change of the economy with an expansion of relatively high value added activities. In other words, it will engage resources that had previously been poorly used, for instance the unemployed or underemployed, or used in activities with relatively low value added and productivity, such as in some parts of the agriculture and service sectors.

Indonesia is in need of job creation in the formal sector, and industrial expansion will be hugely beneficial to the country. Many Indonesians seek to make a living in low productivity agriculture or in the informal services sector. Around 60 percent of the Indonesian labour force is defined as having vulnerable employment, including self-employment, casual employment, or unpaid employment (Statistics Indonesia, 2014). In other words, Indonesia is still plagued by a labour surplus situation, as was described by Lewis (1954). Employment in manufacturing has increased but so has the labour force. More specifically, employment in firms with more than 20 employees increased from around 1,750,000 in 1990 to around 4,700,000 in 2012.[10] Manufacturing still only accounts for around 13 percent of total employment, because of the mentioned population growth and the resulting growth of the labour force. Manufacturing is also relatively small as a share of GDP: manufacturing peaked as a share of GDP in 2004 with around 28 percent, and has since declined to around 25.5 percent (ILO, 2015). The low share of manufacturing is unfortunate, considering that the productivity in manufacturing is twice the level in the services sector and four times the level in agriculture (ILO, 2015).

There are good reasons to believe that foreign MNEs can contribute to a structural change by expanding the Indonesian manufacturing sector as well as the higher-end services sector. As previously mentioned, the foreign share seems to be relatively high in industries with high growth rates (Table 10.2). Moreover, foreign firms are on average employing substantially more workers than domestic firms, as can be seen from the relative size in Table 10.3.

Moreover, it is not difficult to find examples in Southeast Asia and elsewhere of the entry of a few foreign firms having led to strong growth of the industry, with both new foreign and domestic firms entering the same industry or linkage industries. The textile industry is one example, and motor vehicles and car parts another. There is, to the best of our knowledge, no formal empirical study on how FDI impacts structural changes in Indonesia, or in any other country. However, Lipsey et al. (2013) examine employment growth in Indonesian manufacturing, which is related to structural change because manufacturing is one of the high value added industries that should attract more resources and grow in importance if Indonesia is to grow and develop. If growth is relatively high in foreign firms within manufacturing, it means that they are contributing to a structural change towards a high value added sector.

More specifically, Lipsey et al. (2013) find employment growth to be higher in foreign than in domestic firms during 1975–2005. Employment in firms that were foreign-owned throughout the period grew on average about 5.5 percentage points faster than domestically owned firms. Firms that were acquired by foreigners grew about 11 percentage points faster than their pre-acquisition level. Most of the employment effects of foreign takeovers occurred in the year of takeover. There was relatively little effect on growth rates in the following years, but the absolute additions to employment in the years after takeover were larger than they would have been under continued local ownership because the base was much larger.

Hence, foreign firms create a relatively large amount of employment. Moreover, there are reasons to expect that the effect can be of substantial importance. Again, and as can be seen in Table 10.3, foreign firms are considerably larger than domestic firms. A combination of large size and high growth means that the number of jobs created in foreign firms is large.

5. The effect of FDI on local firms

The previous discussion shows that foreign firms have high value added. Hence, the positive effects from FDI seem obvious. However, any cost-benefit analysis of FDI needs to consider the effect on domestic firms. For instance, a situation where FDI only results in a replacement of value added in domestic firms with value added in foreign firms will not contribute to the country's development. In other words, our conclusions and policy recommendations might be seriously biased if we only study the MNEs without taking into account that their presence will have both positive and negative effects, sometimes referred to as externalities or spillovers, on the rest of the economy.

One difficulty in estimating externalities is that they might take very different forms. For instance, it could be through pecuniary linkages, such as the purchases of inputs from local producers, and from technology linkages, such as an increased degree of technology diffusion in the local economy. Moreover, the externalities might take place both within the same industry as the MNEs and between different industries.

Fortunately, there are a large number of studies on spillovers from FDI in Indonesia. More specifically, Lipsey and Sjöholm (2011b) survey the literature and find 10 such studies. Eight of the studies have been published in international journals and have hence been scrutinised by referees. All of the studies relate the performance in domestic firms to the presence of FDI, typically measured as the share of FDI in the industry, the province, or the industry-province. They differ in the variable of interest: most examine productivity effects, but there are two papers that also examine wage spillovers. Moreover, the studies also differ in the econometric approaches and in the definitions of various variables. The main constraint, which they share with the whole literature on spillovers from FDI, is that they tend to show correlations rather than causal relationships.

All of the papers on spillovers from FDI in Indonesia find positive effects. Considering that they differ substantially in their methodologies and approaches, it seems to be evidence in favour of positive effects of FDI on local firms. In light of our focus on value added, it is of particular interest to note that six different papers examine the effect of FDI on growth in value added or value added per employee in domestic firms. Again, all find positive spillovers: the presence of foreign MNEs tends to have a positive effect on value added in local firms. If we add this result to the relative high value added in foreign MNEs, as shown and discussed earlier, we reach the conclusion that inflows of FDI increase overall value added in Indonesia.

Whereas the statistical evidence is in favour of positive spillovers, it is less clear exactly how FDI affects value added in local firms. One can only speculate about the mechanisms but it is likely that value added could be positively affected through technology spillovers from FDI. Case studies of other countries tend to find such linkages between foreign firms and local suppliers (Moran, 2005). Technology spillovers can arise both within the same industry as the foreign firms, often through imitation effects, and in other industries, often when the foreign firms provide support to local suppliers. It is also likely that the entry of foreign firms increases competition, which, in turn, forces local firms to improve to survive and keep market shares.[11]

6. Benefits of high value added

Value added is created from inputs of labour, capital, and various inputs. It constitutes rewards for labour (wages) and for capital owners (profits). Hence, a high value added will create extra resources for the country and enable higher living standards. Value added created in foreign firms, however, might have a slightly different effect on the host country than valued added in domestic firms. The difference can be expected both when it comes to how profits are benefiting the host country (Indonesia) and in compensation to workers.

6.1 MNEs pay low corporate taxes

A relatively high efficiency in MNEs means that profits tend to be higher in MNEs than in local firms. Profits are important for the host country as a means of generating resources to be used in various activities. For instance, it will constitute a tax base for the government and generate public revenues that can be spent on important areas such as infrastructure, education, and health. Moreover, profit is a way to generate capital for new investments within the firm. Such investments in new machinery, technology, and product development form the basis of economic growth.

The importance of the first aspect, public revenues through corporate taxes, has declined worldwide over the last decades (Gropp and Kostial, 2001). The reason is globalisation and the competition for FDI: governments are trying to attract MNEs by offering low taxes. There are good reasons for countries wanting to attract FDI to use low taxes. Many studies show that taxes are one important aspect that MNEs consider when they make their investment decisions, and increases in corporate taxes lead to less inflows of FDI (Djankov et al., 2010). More specifically, a 1 percent increase in corporate tax seems to decrease FDI inflows by between zero and 5 percent (OECD, 2008). Moreover, it seems that FDI is becoming increasingly sensitive to taxation.

The decline in corporate taxes seen globally[12] is also taking place in Indonesia: corporate taxes have in the last two decades declined from a peak of 39 percent in 2002, to 30 percent in 2003, 28 percent in 2009, and 25 percent since 2010.[13] Moreover, there are plans to lower corporate taxes even further, to 18 percent, in 2016.[14] And there are also plans to introduce special taxes for new firms in 'pioneer' industries, such as energy, telecommunications, maritime transport, and agriculture processing. Firms in these industries would get tax cuts ranging between 10 and 100 percent for up to 15 years.[15]

The 'race to the bottom' in corporate taxes around the world is not without problems. An aggressive use of taxes to attract FDI might distort global trade and investment flows, which could have positive effects on the countries lowering their corporate tax rates, but negative global welfare effects. Moreover, governments will continue to need resources for public spending. If corporate taxes generate less income, taxes on other income bases will have to be increased.

It is then possible that taxes will change to less mobile production factors such as labour and small local firms.

For the world as a whole, it would presumably be preferable if countries did not compete for FDI by continuously lowering corporate taxes. However, given that countries do behave this way, Indonesia has to figure out if the forgone tax revenues are lower than the extra benefits made available through more FDI.

Hence, the competition for FDI tends to drive down corporate taxes for all firms, domestic as well as foreign owned. But MNEs also seem to pay lower taxes than domestic firms for any given level of profits and any given tax rate. The reason is that MNEs are well-placed to use transfer pricing to avoid taxes. Transfer pricing refers to the practice of not using market- based prices on corporations' internal export and import of goods and services. By having affiliations in many different countries, MNEs can choose to show a large part of the profits in tax havens and thereby avoid or minimise taxes.

Empirical studies confirm the importance of transfer pricing as a way for MNEs to pay lower taxes. For instance, Davies et al. (2014) find that French MNEs systematically use transfer pricing to declare profits in tax havens. The total sum of forgone tax revenues for the French government amounts to around 1 percent of total corporate taxes. Accordingly, around 20 percent of all US corporate profits are declared in tax havens, a tenfold increase since the 1980s (Zucman, 2014). Moreover, Egger et al. (2010) find that subsidiaries of multinational corporations in Europe pay on average 32–57 percent less tax than similar domestically owned firms.

Hence, the Indonesian government's tax revenues from foreign MNEs can be expected to be lower than tax revenues from indigenous firms with more limited abilities to move profits to foreign tax havens. It would, however, be premature to take this as an indication that a country would be better off without the foreign MNEs. First, foreign and domestic firms are not perfect substitutes: a foreign MNE that withdraws from Indonesia will not be automatically replaced by an indigenous firm. Second, foreign firms are larger and more efficient with higher profits. Hence, it is possible that the actual amount of absolute taxes paid by foreign firms can be substantial even if the share of profits paid in corporate taxes is lower than in domestic firms. Finally, MNEs as well as domestic firms will contribute to tax revenues not only through corporate taxes but also through taxes on wages and property, for instance.

6.2 Investments in foreign and domestic firms

The second positive effect of profits, mentioned earlier, is that they can be reinvested in Indonesia. Also, this aspect might differ between domestic and foreign firms, and the contribution of the latter group might be comparably smaller for a given amount of profits. More specifically, profits in foreign firms might leave the country and not be reinvested to the same extent as profits in domestic firms. In other words, owners of a firm with all of its activities in Indonesia will tend to invest a relatively large part of the profits within Indonesia.

Foreign owners of a MNE located in Indonesia will choose to invest where the return for the corporation as a whole is the largest. This could be in Indonesia but also in the home country of the MNE or in any other country where it has, or plans to have, affiliates. The amount invested in Indonesia and the amount invested in other countries will ultimately be decided by the relative business climate. International surveys suggest that around one-third of profits in MNEs are reinvested in the host economy and about two-thirds are repatriated (UNCTAD, 2013).

Investments as a share of value added can be seen as a rough proxy-variable for the share of profits being invested in Indonesia. Such figures are available for domestic and foreign firms in the year 2000 and are shown in Table 10.4. The figures confirm the previous hypothesis: investment ratios tend to be lower in foreign than in domestic firms. More specifically, investments amount to around 26 percent of value added in domestic firms compared with less than

Table 10.4 Investment as a share of value added in domestic and foreign firms (in percent), 2000

	Domestic	*Foreign*
Total	25.9	10.6
Food products and beverages	20.5	12.5
Textiles	58.0	8.4
Wearing apparel	13.9	2.4
Leather products	24.6	6.8
Wood products	29.5	22.5
Paper products	15.3	12.3
Printing	26.7	2.3
Chemicals	38.2	23.3
Rubber and plastics products	20.1	16.6
Non-metallic mineral products	25.0	13.3
Basic metals	27.7	7.3
Fabricated metal products	17.0	4.7
Machinery and equipment	14.5	6.0
Electrical machinery	23.2	2.3
Radio. television and communication equipment	17.4	1.8
Medical. precision and optical instruments	18.6	6.7
Motor vehicles	73.5	5.3
Other transport equipment	16.8	20.8
Furniture	8.9	1.8

Source: Author's calculations based on data from the Statistics Indonesia Industrial Survey.

Note: Industries with less than 10 foreign firms have been excluded.

11 percent in foreign firms. Hence, the investment ratio is about 2.5 times higher in domestic than in foreign firms. It is a robust relationship judging from the industry figures: domestic firms have a higher investment ratio than foreign firms in every included industry. As previously discussed, the figures show that domestic firms invest more for a given level of profits, measured as value added. We cannot conclude that investment would increase if foreign firms were replaced by domestic ones, because the former firms tend to be larger and have higher value added.

6.3 Workers gain from FDI

MNEs are sometimes accused of using their strong bargaining power, achieved by the threat of moving to cheaper production sites, to put pressure on wages and working conditions (UNCTAD, 2013). However, there is not much empirical evidence to show MNEs to be more footloose than local firms. For instance, Bernard and Sjöholm (2003) find that foreign plants in Indonesia are less likely to close down than domestically owned plants.

Moreover, there are several reasons why foreign-owned firms might choose to pay higher wages than domestically owned firms. For instance, lack of knowledge of the local labour market might force foreign firms to pay a wage premium to attract good workers; it might be a way to restrict labour turnover and thereby leakage of knowledge and technologies (Fosfuri et al., 2001); it could be because of rent-sharing arrangements between foreign firms and their employees (Budd et al., 2005), or a result of higher labour demand volatility in foreign-owned firms (Fabri et al., 2003). Other studies show that globalisation, which FDI is part of, can lead to different wages for identical workers in the presence of efficiency wages (Davis and Harrigan, 2011), fair wages (Egger and Kreickemeier, 2009), and hiring and firing rigidities (Helpman et al., 2010).

A number of empirical studies in different countries show that workers employed in MNEs have higher wages than employees in local firms, which is also the case in Indonesia, as shown in Table 10.5. The figures show the difference in wages, as a ratio between wages in foreign and domestic firms, without taking in to account differences in worker or firm characteristics. Wages in foreign firms were about 50 percent higher for blue-collar workers and 60 percent higher for white-collar workers in 2012. Domestic firms pay higher wages than foreign firms for blue-collar workers in textiles and wearing apparels. Foreign firms pay higher wages in all other industries and for both categories of workers.

Lipsey and Sjöholm (2004) carry out a more rigorous analysis of wages in Indonesian manufacturing in 1996. They find that the average wage in foreign firms was about 50 percent higher than in private domestic firms. Hence, the difference is similar to the one in 2012 shown in Table 10.5. Lipsey and Sjöholm also find that foreign firms provide more of other types of labour compensation. Wage bonuses, gifts, social security, insurances, and pensions are typically higher

Table 10.5 Wages for blue- and white-collar workers in foreign and domestic firms (ratio foreign to domestic), 2012

	Blue-Collar Workers	*White-Collar Workers*
Total	1.5	1.6
Food products and beverages	1.4	1.3
Textiles	0.8	1.4
Wearing apparel	0.9	2.0
Leather products	1.0	1.3
Wood products	1.3	1.1
Paper products	1.4	1.4
Printing	1.1	4.1
Chemicals	1.5	2.2
Rubber and plastics products	1.7	2.1
Non-metallic mineral products	1.8	1.4
Basic metals	1.3	1.3
Fabricated metal products	1.2	1.3
Machinery and equipment	1.3	1.4
Electrical machinery	1.2	1.1
Radio, television and communication equipment	1.1	1.3
Medical, precision and optical instruments	1.9	1.8
Motor vehicles	1.8	1.6
Other transport equipment	1.1	1.3
Furniture	1.2	1.4

Source: Author's calculation based on data from the Statistics Indonesia Industrial Survey.

Note: Industries with less than 10 foreign firms have been excluded.

in foreign firms, and if all such forms of labour compensation are accounted for, compensation for employees is about 60 percent higher in foreign than in domestically owned firms.

The Indonesian firm data in 1996 includes information on the level of education of employees. This information can be used to see how much of the preceding wage difference is caused by differences in worker characteristics (education) and how much is caused by ownership. Lipsey and Sjöholm (2004) find that among blue-collar employees, more than 6 percent of those in private domestic firms had less than a primary education and around 30 percent had only primary education, while in foreign-owned firms, only 2 percent had less than a primary education and 17 percent only primary schooling. At the other end of the distribution, about a third of the employees in domestic firms had stopped after completion of high school and only a little over 1 percent had a tertiary education, while more than half the employees of foreign-owned firms had completed high school and 3 percent had a completed tertiary education.

When wages are examined econometrically and when controlling for the aforementioned differences in education, the wage premium in foreign firms declines to a little over one-quarter for blue-collar and one-half for white-collar employees. Hence, the result suggests that foreign MNEs pay substantially higher wages for identical workers, or at least for workers with identical levels of education.

One potential problem is that foreign firms might acquire high-wage domestic firms. In other words, the correlation between foreign ownership and high wages might not necessarily be a causal relationship. Lipsey and Sjöholm (2006) address this concern in a study that continues to examine wages in foreign and domestically owned Indonesian establishments but using a panel between 1975 and 1999. Their study separates firms into those taken over by foreigners from domestic owners, those taken over by domestic owners from foreigners, and those that did not change ownership. They examine wage levels in establishments before they are taken over to learn whether foreign firms select high-wage firms to acquire, and they examine wage changes after takeover.

While establishments acquired by foreigners had previously paid somewhat above-average blue-collar (but not white-collar) wages, the differences were far too small to account for the wage differences between foreign-owned and domestically owned firms in general. Moreover, after foreign takeovers, both white-collar and blue-collar wages in these firms rose strongly, especially the white-collar wages. Parts of the increase in wages were due to changes in firm characteristics, such as size and input use, but even after controlling for these, the foreign firm margins were in the range of about 30–40 percent.

To sum up, it seems well-established that workers in foreign MNEs benefit from a wage premium. The exact magnitude of this premium is more uncertain, but results from previous studies suggest that it is of not only statistical but also economic significance.

7. Concluding remarks and policy recommendations

This chapter shows that FDI is important for Indonesia. Foreign MNEs contribute to industrial expansion and thereby to economic growth and increased living standards. Or in other words, FDI has contributed to Indonesian value added. One core channel for the positive effect is that foreign firms generate higher value added than domestic firms. We have also shown that FDI seems to increase value added in domestic firms located in the same industry or province. High value added in foreign firms together with positive externalities on domestic firms add up to a positive overall effect on the Indonesian economy.

FDI will also contribute to a structural change in the economy, which improves value added and living standards by moving resources from sectors with low value added to sectors with high value added. There are indications of such effect in Indonesia: employment growth is comparably high in foreign-owned firms in the Indonesian manufacturing sector. High employment growth in combination with the relatively large size of foreign firms means that they contribute with large employment in a high value added sector.

Increased value added will benefit the whole country through different channels. More specifically, value added will contribute to profits and to higher wages. Profits, in turn, are important to finance further investments and also constitute a tax base for the government.

The policy conclusion from our analysis is straightforward: Indonesia will benefit from increased inflows of FDI and should therefore implement policies that encourage such inflows. It is more difficult to identify the exact policies that encourage FDI. A good starting point is to ensure a level playing field for foreign and domestic firms. Economic nationalism has strong roots in Indonesia, which has frequently resulted in policies favouring domestic firms. There is a tendency to raise hurdles for foreign firms when the indigenous know-how and capital is available. Such restrictive policies are regularly launched, also by recent governments (Patunru and Rahardja, 2015).

For instance, one recent complaint has been the frequent changes of the negative list: a list of the sectors where foreign firms are not allowed, or where they need to form partnerships with Indonesian co-owners. Some of the other hurdles for foreign firms in Indonesia refer to the overly long processes to get permits and the difficulties of using foreign personnel in Indonesian affiliates.

Once the playing field has been levelled, focus can be put on improving the overall business climate as a way to encourage foreign firms to locate in Indonesia rather than elsewhere. One positive aspect of such efforts is that it will also benefit domestic firms. There is certainly room for improvements in the business climate, as indicated by the yearly rankings by the World Bank.[16]

A promising approach is to start by thinking about what typically are considered the basics for attracting FDI: economic and political stability, labour force skills, and infrastructure. Indonesia is doing relatively well when it comes to stability, but substantially worse when it comes to labour force and infrastructure. Note that labour force development is not only about improving education but does also include policies to supply skills that are demanded by foreign MNEs. One suggestion would be to invite foreign MNEs to discuss how to collaborate to secure the necessary skills through, for instance, vocational training and internships. Good education brings the additional advantage of improving the absorptive capacity in the economy and thereby the technology diffusion from MNEs to the local firms. It is, finally, also an important determinant when MNEs decide on upgrading the production lines and production processes.

The government should presumably avoid selective policies aiming at targeting what is sometimes describes as 'high-quality' FDI. Such policies put large requirements on the administrative capacity and on the integrity of the bureaucracy. Moreover, targeting is in many countries combined with various subsidies, tax incentives, and protection from outside competition. There is a tendency that such support becomes permanent and leads to inefficiencies.

It is therefore preferable if government policies instead focus on creating a competitive environment with low trade barriers and strong domestic competition. The reason is that the institutional setting affects the type and behaviour of FDI and thereby its contribution to growth and development. For instance, we have previously discussed that foreign firms are large partly as a result of their high degree of international integration. Hence, a more outward trade regime might spur employment growth in foreign firms, a result that got support in Lipsey et al. (2013). Accordingly, high competition will force foreign firms to bring up-to-date technologies to Indonesia and thereby foster high growth (Sjöholm, 1999).

To sum up, Indonesia is fortunate in having a relatively large domestic market, to be located in a dynamic region, and to have rich endowments of natural resources. The potential for large inflows of FDI is good. Relatively modest changes of economic policies have therefore the potential to generate substantial improvements in incomes and living standards.

Notes

1 Part of the work builds upon research supported by the Torsten Söderberg Foundation.
2 As an illustration, MNEs account for around 10 percent of world output but 30 percent of world trade (UNCTAD, 2007).
3 Negative FDI flows are caused by disinvestments of existing foreign firms.
4 www.tradingeconomics.com/indonesia/foreign-direct-investment.
5 See data from UNCTAD for more information on FDI flows to Southeast Asia. http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx.
6 Singapore is a regional hub for trade and investment and a relatively large share of FDI that is recorded as going to Singapore is in reality reinvested in other countries. As a result, there is a weak link between recorded FDI flows to Singapore and actual economic activities in foreign-owned firms in Singapore.
7 High (low) growth rates can be seen from increased (decreased) industry shares of total manufacturing value added in Table 10.2.
8 Moreover, capital intensities will have an impact on value added. Indonesian capital stocks are measured with a lot of noise and are therefore not shown.
9 The approach is not without limitations: TFP builds on a set of restrictive assumptions such as competitive factor markets, and they also require access to good measures on capital and output.
10 The calculation is based on data from the census on large and medium-sized plants in Indonesian manufacturing, used in many of the tables and figures in this chapter.
11 See Co (2001), Chung (2001), Fu and Wu (2012), and Sjöholm and Lundin (2013) for studies on FDI and competition.
12 For the global development of corporate taxes, see http://taxfoundation.org/article/corporate-income-tax-rates-around-world-2015.
13 See www.tradingeconomics.com/indonesia/corporate-tax-rate.
14 www.straitstimes.com/business/indonesia-plans-to-cut-corporate-tax-rate-next-year.
15 See www.cnbc.com/2015/09/03/.
16 See www.doingbusiness.org/rankings.

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11 Innovation in manufacturing and service sector

Determinants and challenges*

Günther Schulze and Ute Schulze

1. Introduction

Innovation is one of the main drivers of economic growth (Aghion and Howitt, 1992, 1998) and thus central to the welfare of nations. It is the result of a complex process of 'creative destruction' (Schumpeter, 1934), in which firms competing with each other seek to gain a competitive edge over their competitors through innovations (Porter, 1980, 1990) and a subsequent process of imitation, adaptation, and diffusion of knowledge. Innovation is a multidimensional process, which depends on the institutional setup at the national, regional, and industry levels (Freeman, 1995; Nelson, 1993; Breschi and Malerba, 1997; Edquist, 1997) and on informal institutions, notably social capital (Putnam, 1993). While being linked to firm-specific competition, innovations create knowledge spillovers that other firms benefit from (Romer, 1990). These external effects may create agglomeration benefits in innovating regions (Morgan, 1997), thus leading to clustering of innovations within and across countries, thereby making firm location an important determinant of innovation behaviour (Acs and Audretsch, 1990; Audretsch and Feldman, 1996; Jaffe et al., 1993; Audretsch and Stephan, 1996, and others). Of course, innovation at the firm level crucially depends on firm characteristics, as firms need to have the capacity and the incentive to engage in innovation activities.

As innovation may create a reinforcing process, and as it is essential for the economic success of a country, it is important to study the determinants of innovation. What makes firms fit to innovate, and what are the main obstacles to innovation? We empirically study these issues for Indonesia using the World Bank Enterprise Survey for Indonesia 2015 (WBES).[1] In the context of developing countries, the focus is on innovation diffusion and adoption, as the creation of entirely new products and processes is concentrated in advanced economies (Fagerberg and Srholec, 2008; Zanello et al., 2015). We therefore focus on innovations that introduce products, production processes, management processes, and the like that are new to the firm, but not necessarily to the market in which they operate.

While there has been an extensive literature on innovation in advanced countries for a long time (Hong et al., 2012), the literature on developing countries emerged only recently (Fagerberg and Verspagen, 2009; Fagerberg

DOI: 10.4324/9781315161976-11

et al., 2010; Martin, 2012; Zanello et al., 2015). Zanello et al. (2015) survey studies that analyse the diffusion of innovation in low-income countries in the manufacturing and service sector from 1985 to 2013, covering a wide range of methodological approaches, they find 88 studies (including unpublished papers), five of which analyse Indonesian firms.[2]

Van Dijk and Szirmai (2006) analyse the rapid catch-up process of Indonesian paper manufacturers from 1923 to 2000. They show that the technology diffusion was limited to a small number of firms with the capabilities and the financial resources to adopt the new technologies. The enterprises were helped by Indonesian industrial policy supporting the catch-up process through subsidies. Blomström and Sjöholm (1999) show that joint ventures of foreign and domestic firms create technology spillovers to local partners (and that the ownership division does not play a role). Todo and Miyamoto (2006) use plant-level panel data to show that foreign-owned firms investing in research and development (R&D) locally create knowledge spillovers, whereas foreign firms that do not engage in R&D have no such effect. Blalock and Veloso (2007) analyse a panel data set for manufacturing firms for the period 1988–1996 and provide evidence that firms selling to import-intensive sectors experience higher productivity growth, thereby underscoring the importance of imports as a vehicle for technology transfer. Suyanto et al. (2009) show that foreign direct investment (FDI) in the pharmaceutical and chemical sectors creates positive spillover effects and that these effects rise with increased competition. Firms with R&D expenditures profit more from these spillovers than firms not engaged in R&D. Blalock and Gertler (2008) find that foreign firms operating in Indonesia produce technology diffusion to their local suppliers in the upstream market, thereby creating stronger competition and substantial productivity gains that benefit them but also downstream buyers in other sectors. Ing et al. (2016) show for Indonesian manufacturing firms that increased quality competition with Chinese firms leads to higher total factor productivity.

Our chapter adds to this emerging literature. Yet, given the nature of our data, our approach is somewhat different. First, we use *direct* measures of innovation rather than indirect ones, such as R&D expenditures, patents, or changes in productivity, which have conventionally been used as proxies. Our outcome variables are the existence of innovations (of various types) and not predominantly measures for investment in innovations (R&D expenditures) or potential consequences of these innovations (and possibly other factors), such as patent registrations, productivity gains, or increased sales, in particular because the effects may be highly conditional on a number of local and industry factors, which may be in part unobservable. We seek to understand what the pattern of innovations across firms is, what the determinants of innovations are, and what constitutes the major obstacles that prevent firms from innovating.[3]

This chapter proceeds as follows. Section 2 describes our database, the World Bank Enterprise Survey for Indonesia 2015. Section 3 looks at the innovation behaviour of Indonesian firms. We first describe the evidence on innovation behaviour of firms for various types of innovations with a particular focus on differences by firm size. We then provide a cluster analysis of the innovating firms and show their heterogeneity with regard to their innovation behaviour. Finally, we empirically analyse the determinants of innovation by Indonesian firms. Section 4 analyses the obstacles to innovation: we investigate whether innovating firms state systematically different levels for the different types of obstacles to innovation than non-innovators and whether there are differences across innovation clusters. Section 5 summarises and draws some policy conclusions.

2. Data

To analyse the questions at hand, we use the WBES, fielded between April and November 2015. The WBES follows a common methodology (World Bank, 2009); for Indonesia, 1,320 firms were sampled using stratified random sampling to allow for unbiased estimates for the non-agricultural formal economy. This includes manufacturing and service sectors but excludes the sectors of financial intermediation, real estate, renting activities, and the public and utilities sectors. Stratification was done according to industry, establishment size, and region. Industry stratification was designed for seven manufacturing sectors (food and beverage, garments, textiles, chemicals, rubber and plastics, non-metal mineral products, and other manufacturing) and two service sectors (retail and other services). Size groups to be stratified were defined as small (5–19 employees), medium (20–99 employees), and large enterprises (100 or more employees). The sample was regionally stratified across nine regions: Jawa Barat, Jawa Timur, Jawa Tengah, DKI Jakarta, Banten, Sulawesi Selatan, Sumatera Utara, Bali, and Lampung (World Bank, 2015).[4]

Due to the use of stratified random sampling, observations need to be weighted by the inverse of their probability of being selected. The WBES 2015 offers three different eligibility criteria of varying strictness, which influences the sample weights. We chose the medium eligibility criteria and thus the corresponding sample weights (cf. World Bank, 2009).

The WBES can be accessed at www.enterprisesurveys.org; descriptive statistics are given in Appendix Table 11.A.1. Unless otherwise indicated, all descriptive evidence and regression results use sampling weights and are thus representative of the entire population of firms in the formal manufacturing and service sector. We drop all firms with fewer than five full-time workers in order to focus on small and medium enterprises; the WBES does not allow for inferences of microenterprises.[5] In total, 21 firms were dropped. The data set contains 463 small, 451 medium, and 385 large enterprises, where group size was categorised according to the number of full-time workers at the end of the last fiscal year.

3. Innovation of small and medium enterprises

3.1 Descriptive evidence

The WBES is particularly suited to analyse the innovation behaviour of firms, as it contains a set of questions on various types of innovation. For instance, respondents – managers, owners, and directors of the firms – were asked about product innovations in the following way: 'During the last three years, has this establishment introduced new or significantly improved products or services?' Other types of innovations were asked about in the same way – all questions referred to the existence of a given category of innovation in the last three years.[6] Questions are not mutually exclusive – respondents could state that firms had innovations in multiple categories. We adopt a broad concept of innovation; in particular innovations did not need to be new to the market, they could also be new to the firm only. This seems a sensible choice, as developing and threshold countries' innovation strategies focus on adopting existing technologies (Bell and Pavitt, 1993). Table 11.1 displays the innovation behaviour of firms by firm size and innovation type, after correcting for stratified sampling. We also include the existence of formal R&D expenditure, formal training, and the purchase or licensing of any patent as this captures a different dimension of innovation behaviour.

Table 11.1 shows a clear pattern in the innovation behaviour: large firms are much more likely to innovate than small or medium firms. For instance, 1 in 6 large firms had a product innovation in the past three years, while only 1 in

Table 11.1 Innovation by firm size and innovation type

Innovation Type	*Enterprise Size*			
	Small	*Medium*	*Large*	*Total*
Product innovation	0.049	0.099	0.167	0.061
Process innovation	0.075	0.057	0.199	0.076
Logistics or distribution innovation	0.051	0.044	0.192	0.054
Process supporting innovation (maintenance, accounting computing, purchasing operations, etc.)	0.038	0.042	0.204	0.045
Organisational/management innovation	0.020	0.013	0.123	0.022
Marketing innovation	0.080	0.113	0.170	0.089
Ongoing product innovation	0.091	0.099	0.163	0.095
Formal R&D expenditure incurred	0.012	0.043	0.099	0.020
Formal training provided	0.036	0.107	0.359	0.060
Purchased or licensed any patents	0.020	0.024	0.209	0.027

Source: World Bank Enterprise Survey 2015 for Indonesia, authors' calculations using sample weights to account for stratification. Data refer to the existence of an innovation in the past three years, 2012–2015.

10 medium-sized firms and only 1 in 20 small firms did a product innovation in the same period. The divide between large enterprises and small and medium enterprises is very apparent for all other types of innovation activities as well; yet, the difference between small and medium enterprises is not very pronounced for many innovation types. As for process innovations, for instance, small firms have an even higher incidence than medium-sized firms (7.5 percent versus 5.7 percent).

The differences are very pronounced with regard to the occurrence of formal training, formal R&D expenditures, and the question of whether the firm had purchased or licensed any patented or non-patented inventions or other types of knowledge. For example, only 4 percent of the small enterprises provided formal training, compared to 11 percent of the medium enterprises and more than a third of the large enterprises. While these differences are substantial, it is important to keep in mind that differences refer only to the existence of the type of innovative activity, not to the extent. A higher incidence of formal training in large firms does not necessarily imply that a larger share of workers in large firms received formal training than in small and medium enterprises, as the former have more workers per firm than the latter. Only 2 percent of the firms incurred formal research and development expenditures. For small firms the figure was a mere 1 percent; 4 percent of the medium and 10 percent of the large enterprises had formal R&D expenditures.

We also investigated the distribution of any kind of innovation activity by firm size, where innovation activities are those listed in Table 11.1 plus abandoned product innovation activities. This is displayed in Table 11.2.

Almost 80 percent of all firms had no innovative activity at all in the past three years, still more than half of the large firms with 100 or more full-time employees did not innovate at all during that time. This suggests deficient innovation dynamics across all firm sizes; in particular for medium and large firms, there should be considerable room for improvement.

Table 11.2 Distribution of any innovation activity across firms

Any Innovation	*Enterprise Size*			
	Small	*Medium*	*Large*	*Total*
No	0.813	0.715	0.518	0.786
Yes	0.187	0.285	0.482	0.214

Source: World Enterprise Survey Indonesia 2015, authors' calculations using sample weights to account for stratification in sampling.

Notes: 'Any innovation' refers to the presence of any of the following activities in the past three years: innovations of products/services, processes, marketing, organisation or management; process-supporting operations; ongoing or abandoned product innovations; formal training; formal R&D expenditures; purchasing or licensing of patented or non-patented inventions; or other types of knowledge.

3.2 Cluster analysis

Only one-fifth of all firms had any innovation activity in the last three years, and the innovation behaviour within this group shows considerable variation: some firms had innovation activities in only one sector, whereas other firms innovated in multiple dimensions. In order to analyse a pattern for this heterogeneous group of innovating firms, we carried out a cluster analysis.

Cluster analyses group observations according to a similarity measure or a distance measure into multiple clusters. We opt for a partitioning cluster analysis and apply the centroid-based (k-means) cluster analysis with 10,000 iterations. As in our case, the relevant characteristics are exclusively binary variables indicating whether a certain innovation activity had been undertaken, we use the Jaccard similarity measure. In our preferred specification, we allow for three clusters of innovating firms, which we characterised as ‘innovation beginners’, ‘advanced innovators’, and ‘innovation leaders’.

Relative frequencies of the three clusters are given in Table 11.3. In our sample of 1,299 firms with five or more full time employees, there are 389 firms with innovation activity in the past three years. Two hundred firms belonged to the cluster *innovation beginners*, 88 were *advanced innovators*, and 101 were *innovation leaders*. As our sample is stratified, some types of firms are oversampled while others are undersampled (compared to random sampling). We use sample weights to correct for this. The share of innovation beginners in our sample is 51 percent of all innovating firms, but 71 percent in the population of all firms with at least one innovation (or innovation attempt). Thus, column 4 in Table 11.3 provides the relevant shares for the three clusters.

The three clusters exhibit very different innovation behaviour, as Table 11.4 shows. *Innovation beginners* have no product innovation, and one in five firms have process innovations, which are much lower shares than in the other clusters for these important two types of innovation. The probability of having other types of innovations (conditional on having at least one innovation) is in the range of the cluster *advanced innovators*. All *advanced innovators* have a product

Table 11.3 Relative frequencies of three innovation clusters

	Frequency sample	*Share sample*	*Share population*
Innovation beginners	200	0.514	0.707
Advanced innovators	88	0.226	0.211
Innovation leaders	101	0.260	0.082
Total	389	1	1

Source: World Enterprise Survey for Indonesia, 2015. ‘Share sample’ refers to the unweighted share of sampled firms belonging to the respective cluster in all innovating firms in the sample. ‘Share population’ uses sample weights to correct for stratified sampling and thus refers to the share of innovating firms in a cluster in the entire population of innovating firms.

Table 11.4 Innovation behaviour of the clusters

	Product innovation	*Process innovation*	*Logistics/ distribution innovation*	*Process supporting innovation*	*Organisational/ management innovation*	*Marketing innovation*	*R&D expenditures*
Innovation beginners	0	0.190	0.150	0.195	0.095	0.330	0.120
Advanced innovators	1	0.364	0.159	0.114	0.034	0.330	0.045
Innovation leaders	0.693	0.921	0.921	0.970	0.653	0.812	0.416
Total	0.406	0.419	0.35 2	0.378	0.226	0.455	0.180

Source: World Enterprise Survey for Indonesia, 2015. Shares refer to the percentage of firms in a given cluster with innovation of the respective type given that they innovate at all.

innovation, more than a third have process innovations as well, and a third have marketing innovations. The other innovations are much less prevalent; conditional probabilities are similar to the *innovation beginners. Innovation leaders* have high innovation shares for all innovation types (which implies that the firms have multiple innovations): around 70 percent had product innovations; over 90 percent process innovations; almost all had process supporting innovations; two-thirds had management and organisational innovations; and over 80 percent undertook marketing innovations in the past three years. Forty-two percent had formal R&D expenditures, which is almost four times as many as the *innovation beginners* and more than nine times as many as the *advanced innovators.*

To demonstrate the different innovation 'intensity' between clusters, we calculated the number of innovation activities by cluster. For comparison, we add the distribution over the entire population (including non-innovating firms). Table 11.5 shows the results.

Innovation beginners have mostly innovations of one or two types, almost all have three or fewer types of innovation. Nine out of 10 *advanced innovators* have between two and five different types of innovations, while 90 percent of all *innovation leaders* have at least six different types of innovation; more than half of the firms in that group have nine or more (out of eleven) types of innovations. This is in stark contrast to the entire population of firms, of which almost 80 percent do not innovate and another 14 percent have one or two types of innovation activities.

Table 11.5 Innovation 'intensity', by cluster

Count	*Innovation beginners*	*Advanced innovators*	*Innovation leaders*	*Total population*
0	0	0	0	.786
1	0.467	0.051	0	.073
2	0.364	0.226	0	.065
3	0.125	0.185	0.001	.027
4	0.032	0.294	0.005	.018
5	0.001	0.186	0.085	.01
6	0.011	0.055	0.128	.007
7	0	0.002	0.184	.003
8	0	0	0.053	.001
9	0	0	0.081	.001
10	0	0	0.432	.008
11	0	0	0.031	.001
Sum	*1*	*1*	*1*	*1*

Source: World Enterprise Survey for Indonesia, 2015. Shares refer to the percentage of firms in a given cluster or the total population with a given number of innovation activity types. Innovation types are given in Table 11.1 plus abandoned innovations.

Our cluster analysis shows that there is not only a large divide between innovating and non-innovating firms, but also a significant heterogeneity within the group of innovating firms. Next we turn to the question of what determines the difference in innovating behaviour in order to better understand the pattern observed.

3.3 Determinants of innovations

We run logistic regressions on the binary variable, which indicates whether a firm has innovated at all, that is the variable becomes 1 if the firm has done any of the innovations listed in Table 11.1. Because only one-fifth of all firms fall into that category (Table 11.2), this distinction makes sense, even though it disregards the heterogeneous composition within the group of innovating firms.[7]

Our choice of explanatory variables is guided by the literature and the available data. Explanatory variables are grouped into firm characteristics, firm behaviour, and overall competitive environment (Hong et al., 2012). Firm characteristics comprise firm size, age, leaders' characteristics, ownership structure, and industry. Firm size is not only a necessary scaling factor for explaining our dichotomous endogenous variable, as large firms are more likely to have any innovating activity at all. Pavitt et al. (1987) find a U-shaped relationship between innovation extent and size of the firm (see also Tether, 1998). We measure the firm size by the number of full time employees and create dummies for medium enterprises (20–99 employees) and large enterprises (100 and more employees), with small enterprises (5–19 employees) being the omitted category. We opt for the number of employees as measure of size, as it is a more reliable variable than sales. Firm age may influence the likelihood of innovation – younger firms may be more dynamic and less bureaucratic and thus innovate more (Hurley and Hult, 1998); alternatively, older firms may have acquired a larger capability to innovate over time (Sorensen and Stuart, 2000). We capture age with two dummy variables for young firms (start of operation was less than 5 years than when the survey was conducted in 2015) and medium-aged firms (between 5 and 9 years old) with firms that are 10 or more years old serving as reference category. Ownership structure is included, as family owners have been shown to be more risk-averse and thus less inclined to innovate in other contexts (Huergo, 2006; Munari et al., 2010). Respective dummy variables are for sole proprietorships, partnerships, and limited partnerships, with shareholder companies as reference category. Firms that are (partially) foreign-owned may have better access to new technology, possibly within the hierarchy of connected firms, and thus may be more likely to innovate (Falk, 2008; Leiponen, 2006; Sadowski and Sadowski-Rasters, 2006). In contrast, state-owned enterprises may face lower incentives to innovate as soft budget constraints may shield them from competitive pressures. We include two dummies indicating whether the state or a foreign investor held any share in the business. We use dummies indicating the experience and the gender of the top manager. We also include a full set of industry dummies in our regressions, as different industries may have very different levels of technology and therefore may be pressured to innovate to different extents (Kafouros et al., 2008).

A competitive environment may be an important incentive to innovate. It is in part the consequence of firm behaviour: firms engaging in export have to face international competition and thus may be more likely to innovate (Leiponen and Byma, 2009; Falk, 2008). We therefore include a dummy that is 1 if the firm is engaged in export activities, either directly or through an intermediary firm (and zero otherwise). As technology import can also be facilitated through imports of intermediate inputs (Goldberg et al., 2010; Seker, 2012; Shepherd, 2016), we include a dummy variable 'import' that is 1 if the firm uses any positive share of foreign origin (and zero otherwise).[8] Overall competitive environment also refers to the structure of the market in which the firm operates and to the location of the firm. We therefore created a dummy indicating whether the firm had 10 or more competitors to capture the market structure. Firm location may play a large role for innovative behaviour due to innovation spillovers and related forms of regional externalities (Audretsch, 2003); in particular, agglomerations may create regional economies of scale (Sedgley and Elmslie, 2004). Moreover, market access, infrastructure (including information infrastructure), and local governance may affect the profitability of innovation activities. As we have no geolocation of the firms, we include dummies for the nine regions in which they were sampled[9] and, in one specification, the size of the town they are located in. This is motivated by evidence from Ghana, where it was found that innovating firms were more likely to be located in large towns (Robson et al., 2009). Larger cities may have better location factors such as infrastructure quality, market size, extent of knowledge spillovers, and so forth.

Results are reported in Table 11.6, which displays the average marginal effects (and corrects for the stratification of the sample as before). There is a clear effect of *firm size* on innovation activity. Medium-sized firms have a 12 percent higher probability to innovate than small firms; large enterprises have a 26–30 percent higher probability (depending on the specification used). This result of the multivariate analysis corroborates the impression of the simple distribution of innovation by firm size in Table 11.2. Firms that engage in *export*, either directly or through a third firm, have a 16–23 percent higher probability to innovate. This clearly supports the notion that export-oriented firms are more exposed to new technologies, face stronger competition for product quality, and are thus more likely to innovate.[10] Innovation is more likely in markets in which competition is non-atomistic. Firms operating in markets with 10 or more competitors are a quarter less likely to innovate than firms in more concentrated markets. This makes sense, as firms in polypolistic markets may not reap the benefits of the innovation to the same extent as they are serving only a small part of the markets and will not be able to expand production by as much.

A number of possibly important factors did not turn out to be significant. The experience of the manager in the respective sector and the age of the firm play no significant roles; foreign ownership surprisingly did not increase the

Table 11.6 Determinants of innovation

Variables	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
Medium enterprise dummy	0.126*	0.123*	0.125**	0.118*	0.118*	0.0307	0.0332	0.0391	0.125*
	(0.0681)	(0.0646)	(0.0639)	(0.0669)	(0.0669)	(0.0555)	(0.0560)	(0.0553)	(0.0645)
Large enterprise dummy	0.384***	0.280***	0.297***	0.291***	0.289***	0.0485	0.0414	0.0629	0.256***
	(0.111)	(0.0977)	(0.102)	(0.0990)	(0.0997)	(0.0969)	(0.0925)	(0.0888)	(0.0912)
Age1: below 5 years		–0.112	–0.0819	–0.151	–0.151	–0.0721	–0.0464	–0.0921	–0.151
		(0.137)	(0.135)	(0.155)	(0.155)	(0.131)	(0.129)	(0.142)	(0.137)
Age2: between 5 and 9 years		0.0798	0.0908	0.0582	0.0582	0.0331	0.0392	0.0290	0.0440
		(0.0622)	(0.0604)	(0.0709)	(0.0709)	(0.0667)	(0.0660)	(0.0633)	(0.0745)
Export activity		0.217***	0.233***	0.209***	0.209***	0.161**	0.164**	0.141*	0.172**
		(0.0692)	(0.0673)	(0.0734)	(0.0734)	(0.0774)	(0.0768)	(0.0762)	(0.0741)
Imported inputs			–0.0399	–0.0458	–0.0458	–0.0338	–0.0141	–0.0226	–0.0365
			(0.0827)	(0.0769)	(0.0769)	(0.0703)	(0.0691)	(0.0636)	(0.0700)
Foreign ownership (also partial)		0.125	0.133	0.128	0.128	–0.0608	–0.0581	–0.0483	0.117
		(0.120)	(0.115)	(0.128)	(0.128)	(0.103)	(0.103)	(0.0833)	(0.0963)
Competition: no. of competitors 10 or more			–0.235***	–0.234***	–0.234***	–0.247***	–0.242***	–0.224***	–0.225***
			(0.0829)	(0.0802)	(0.0802)	(0.0787)	(0.0758)	(0.0675)	(0.0762)
Experienced top manager 5 to 9 years				–0.0491	–0.0489	–0.0740	–0.0785	–0.126	–0.103
				(0.103)	(0.103)	(0.0985)	(0.0943)	(0.0843)	(0.0942)
Experienced top manager 10–14 years				–0.124	–0.124	–0.142	–0.128	–0.124	–0.0824
				(0.114)	(0.114)	(0.102)	(0.0970)	(0.0970)	(0.109)
Experienced top manager 15–19 years				–0.112	–0.112	–0.140	–0.125	–0.159	–0.132
				(0.122)	(0.122)	(0.118)	(0.115)	(0.0982)	(0.103)
Experienced top manager above 20 years				–0.0702	–0.0700	–0.0582	–0.0520	–0.133	–0.137
				(0.124)	(0.125)	(0.118)	(0.115)	(0.102)	(0.108)

(*Continued*)

Table 11.6 (Continued)

Variables	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
Female top manager				0.0159	0.0159	–0.0155	–0.0113	0.00798	0.0340
				(0.0691)	(0.0691)	(0.0620)	(0.0608)	(0.0590)	(0.0657)
State-owned enterprise					0.0535	–0.00261	–0.0176	–0.0174	0.0294
					(0.152)	(0.166)	(0.168)	(0.168)	(0.157)
Legal status of the firm: sole proprietorship						–0.814***	–0.816***	–0.817***	
						(0.0498)	(0.0508)	(0.0488)	
Legal status of the firm: partnership						–0.452***	–0.444***	–0.501***	
						(0.106)	(0.105)	(0.0813)	
Legal status of the firm: limited partnership						–0.720***	–0.714***	–0.753***	
						(0.0828)	(0.0840)	(0.0771)	
Size of locality = 250,000 to 1 million							0.0129		
							(0.0696)		
Size of Locality = 50,000 to 250,000							0.132		
							(0.184)		
Size of locality = Less than 50,000							0.145		
							(0.212)		
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Region dummies	no	no	no	no	no	no	no	yes	yes
Observations	1,281	1,281	1,281	1,281	1,281	1,278	1,278	1,281	

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Authors' estimations based on World Enterprise Survey for Indonesia 2015.

likelihood of innovation; and the gender of the top manager did not have a significant effect. Equally surprisingly, import of inputs from abroad does not have any effect on the likelihood of innovation. Firms (partially) owned by the state display no different behaviour from privately owned firms. Likewise, the location in small, medium, or large cities did not affect the likelihood to innovate. The legal status matters: the few shareholder companies outperform all other firms; partnerships innovate more than limited partnerships and sole proprietorships. Yet, the legal form is correlated with firm size – shareholder firms tend to be large, sole proprietorships small – so that the firm size variables lose significance when we include the legal status of the firm.

We find significant industry effects (not reported in Table 11.6). Compared to the reference sector 'food production', firms in the garments sector, the hotel and restaurant sector, and in particular the electronics sector are significantly more likely to innovate. Firms in recycling and fabricated metal are less likely to do so. There is also a strong regional divide in innovation activity: compared to West Java, firms in North Sumatra are 28 percent less likely to innovate (Table 11.6 Column (8)). Firms are 27 percent less likely to innovate if located in DKI Jakarta, 33 percent less likely in East Java, 36 percent less likely in Bali, and 35 percent less likely in Lampung. There is no statistically significant difference in the probability to innovate between West Java and Central Java, Banten, and South Sulawesi.

Our results show that exports to foreign markets, firm size, market form, industry, and geographical location play a very important role in determining innovation activity.

4. Obstacles to growth and enhanced productivity

In the previous section, we analysed which firm and location characteristics make innovation more likely. Now we turn our attention to potential obstacles that may prevent firms in Indonesia from innovating (more).

External or internal barriers can prevent or slow down innovation creation, adoption, and diffusion (Keller, 2004; Zanello et al., 2015). External factors refer to a political and economic environment that is unfavourable for innovation, such as inadequate infrastructure, poor governance quality (excessive red tape, corruption, inefficient court system), excessive taxation, political instability and crime, restrictive policies for trade and foreign investment, and a suboptimal competitive environment. Internal factors refer to the firms' capacity to develop or adopt innovations, which requires skilled personnel, access to adequate finance, and entrepreneurial skills, among other things.

High quality of institutions (rule of law, adequate regulatory stance, property rights protection, efficient legal system, democracy, etc.) has been found to foster innovation (Amendolagine et al., 2013; Nguyen and Jaramillo, 2014; Srholec, 2011). Allard et al. (2012) show that innovation is higher in developed and politically stable economies and that a pro-business policy stance enhances innovation levels; De Waldemar (2012) finds for India that corruption reduces innovation rates. Trade openness has been found to strongly influence technology adoption and innovation in general (Almeida and Fernandes, 2008; Coe et al., 1997; Eaton and Kortum, 2002; Tybout, 2000; Wang and Wong, 2012). Another potential determinant of innovation levels is the extent of cooperation between the public and the private sectors, especially between universities and the business sectors, and the quality of public research institutions (Kruss et al., 2012; Srholec, 2011). This is a non-exhaustive list of external factors, as for instance cultural factors are missing, and all other factors that are conducive to FDI such as a good infrastructure (Kinda, 2010), given that FDI may have substantial spillover effects on the level of local innovations (e.g. Amendolagine et al., 2013; Blalock and Gertler, 2008; Suyanto et al., 2009).

Internal obstacles to innovation are financial constraints (Kimura, 2011; Kugler, 2006; Gebreeyesus and Mohnen, 2013) and inadequate access to land and a qualified workforce. Especially inadequate education levels of managers and staff have been shown to be a major obstacle in a number of different settings (inter alia, Wang and Wong, 2012; Robson et al., 2009; Ilori et al., 2000). Similar evidence exists for lacking managerial skills that may be a major obstacle to innovation (Bruhn et al., 2010).

The WBES asks for a number of potential obstacles. Respondents are not directly asked for obstacles to innovation, but whether a certain factor constitutes an obstacle to the operation of the business in general. For instance, one query reads as follows:

> Using the response options on the card; To what degree is Access to Finance an obstacle to the current operations of this establishment?

Respondents were given the choices (1) ‘no obstacle’, (2) ‘minor obstacle’, (3) ‘moderate obstacle’, (4) ‘major obstacle’, and (5) ‘very severe obstacle’. We merged categories 2 and 3 into ‘moderate obstacle’ and categories 4 and 5 into ‘severe obstacle’.[11]

Because we cannot directly observe obstacles to innovation, we focus on systematic differences in the assessment of obstacles between innovating and non-innovating firms. We distinguish responses of non-innovators and the three clusters of innovating firms. Response rates are in the figures in the following section (see Figures 11.1–11.8). We group potential obstacles in the following categories:

1 Infrastructure (electricity, transport)
2 Factor availability (land access, access to finance, labour regulations, availability of skilled workforce)
3 Regulatory quality (corruption, trade restrictions, business licensing, tax administration and tax rate, courts)
4 Competition
5 Stability and security (political instability and crime).

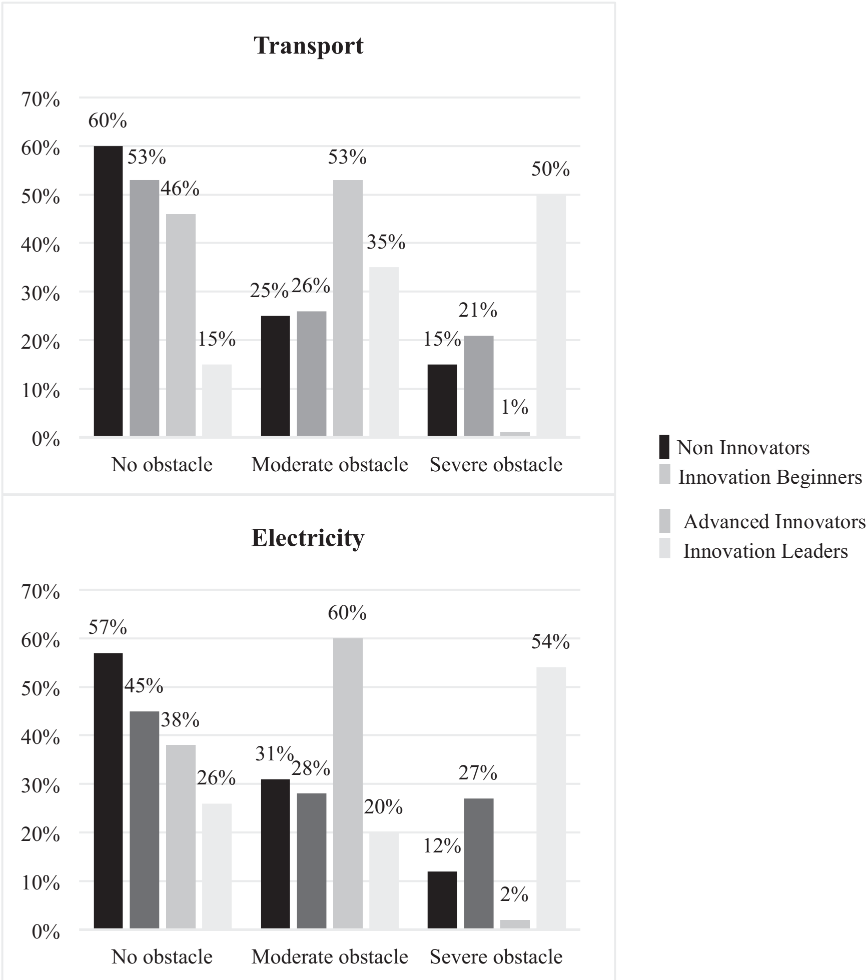

Figure 11.1 Inadequate infrastructure as obstacle

Source: Authors' calculations based on Enterprise Survey, 2016.

4.1 Infrastructure

Most of the firms do not find infrastructure to be a major or even a moderate obstacle to the operation of their business. Aggregate figures for the response 'no obstacle' are 53 percent for electricity and 58 percent for transport. Yet, there is a distinct pattern hidden behind these aggregate figures with respect to the innovation intensity of the responding firms (Figure 11.1). While non-innovating firms and *innovation beginners* find infrastructure not to be a significant obstacle to their operations, most of the *advanced innovators* regard it

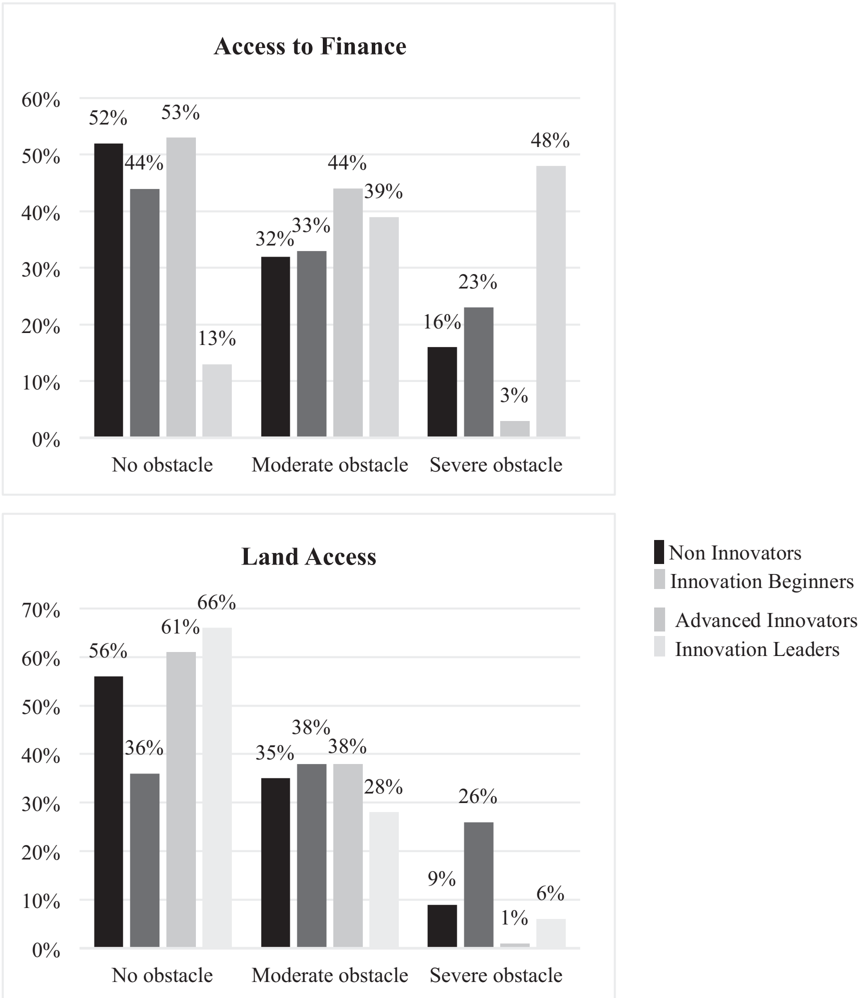

Figure 11.2 Access to finance and land as obstacle

Source: Authors' calculations based on Enterprise Survey, 2016.

a moderate obstacle, and most of the *innovation leaders* consider it to be a severe obstacle. This points towards a rising importance of infrastructure as innovation intensity increases.

4.2 Factor availability

Financial constraints seem to be no problem for around half of the firm population and a moderate problem for most of the remaining firms. Yet, almost half

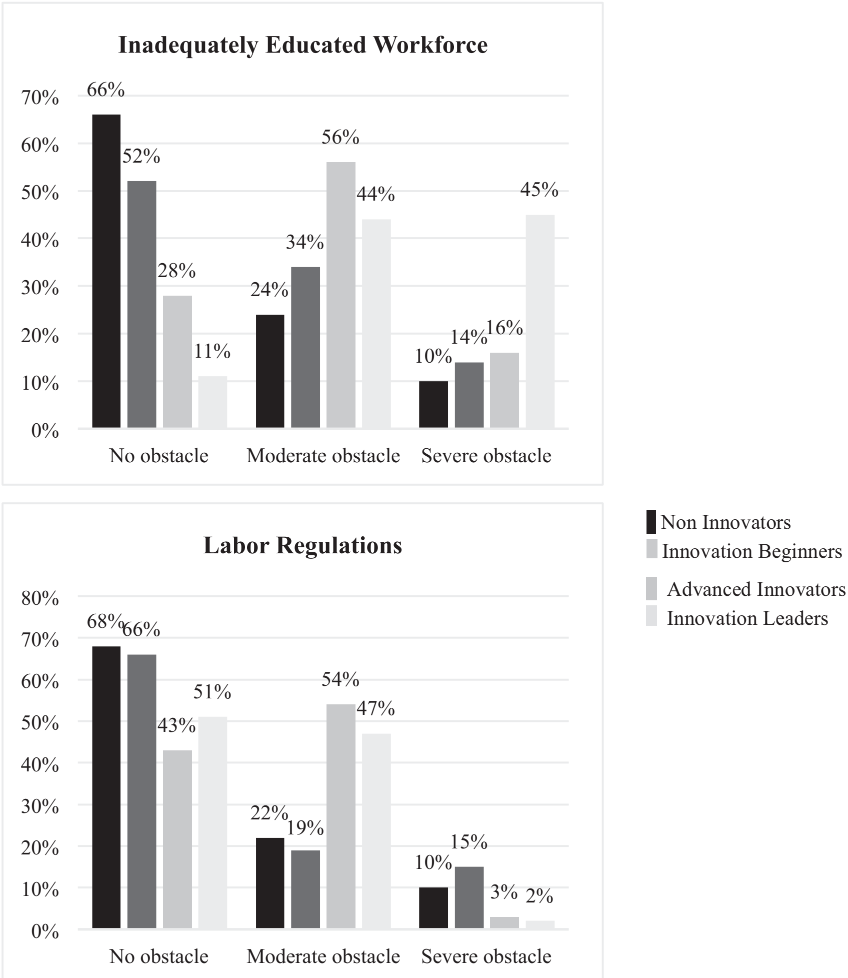

Figure 11.3 Labour market conditions as obstacle

Source: Authors' calculations based on Enterprise Survey, 2016.

of the highly innovating firms (*innovation leaders*) consider access to finance a severe problem, another 39 percent a moderate problem (Figure 11.2). This underlines that there are heterogeneous needs for financial resources of highly innovating firms and those that innovate little or do not innovate at. This makes much sense because innovating firms have to finance their investment in innovation and therefore may have to rely more on external funding.

Access to land seems to be not a major problem and a minor problem for around a third of the firms. Only *innovation beginners* seem to be severely affected by insufficient access to land.

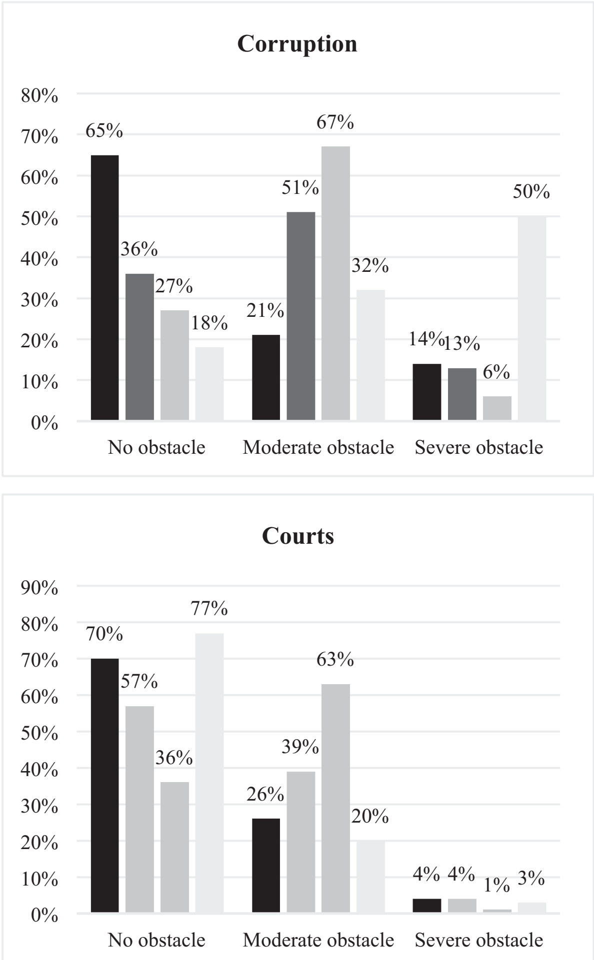

Figure 11.4 Corruption and the legal system as obstacle
Source: Authors' calculations based on Enterprise Survey, 2016.

The pattern for inadequately educated workforce as potential obstacle is similar to the one for access to finance (Figure 11.3). It is not a big problem for non-innovating firms; as for the *innovation beginners*, a third assesses it to be a moderate problem and a mere 14 percent a severe one, yet more than half of the *advanced innovators* view it as a moderate and 16 percent as a severe problem. In contrast, 44 percent of all *innovation leaders* consider inadequately educated workforce to be a moderate problem, and roughly the same proportion a severe problem. Thus, *innovation leaders* are severely constrained by the non-availability of skilled personnel.

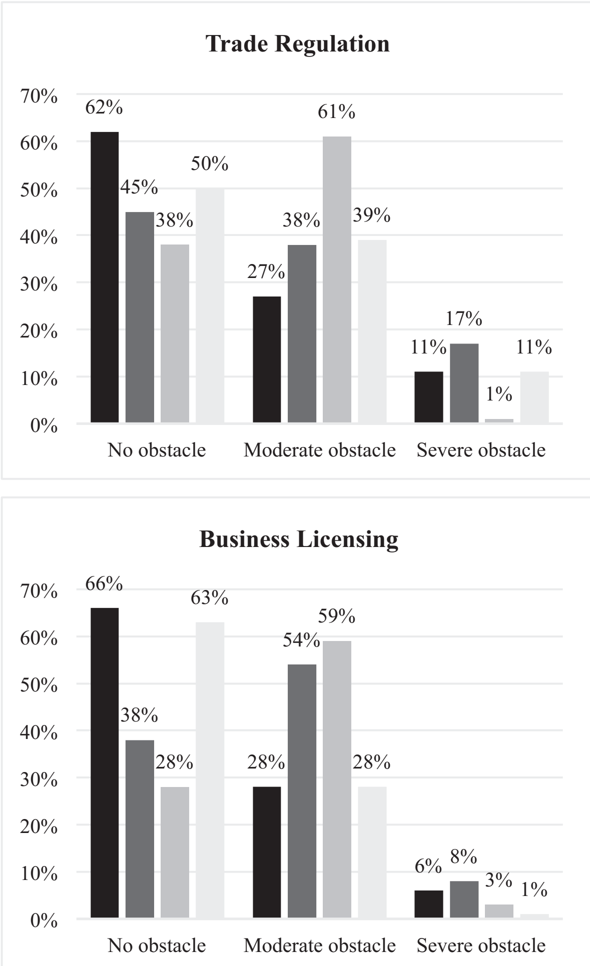

Figure 11.5 Regulation as obstacle

Source: Authors' calculations based on Enterprise Survey, 2016.

Labour regulations are a moderate problem for around half of the highly innovating firms and much less so for the non- or little innovating firms. It is hardly ever a severe problem.

4.3 Regulatory quality

Corruption is not much of a problem for non-innovating firms: two thirds of all non-innovating firms do not consider corruption as an obstacle; 86 percent of all firms view it as a moderate problem at most (Figure 11.4). This is in stark

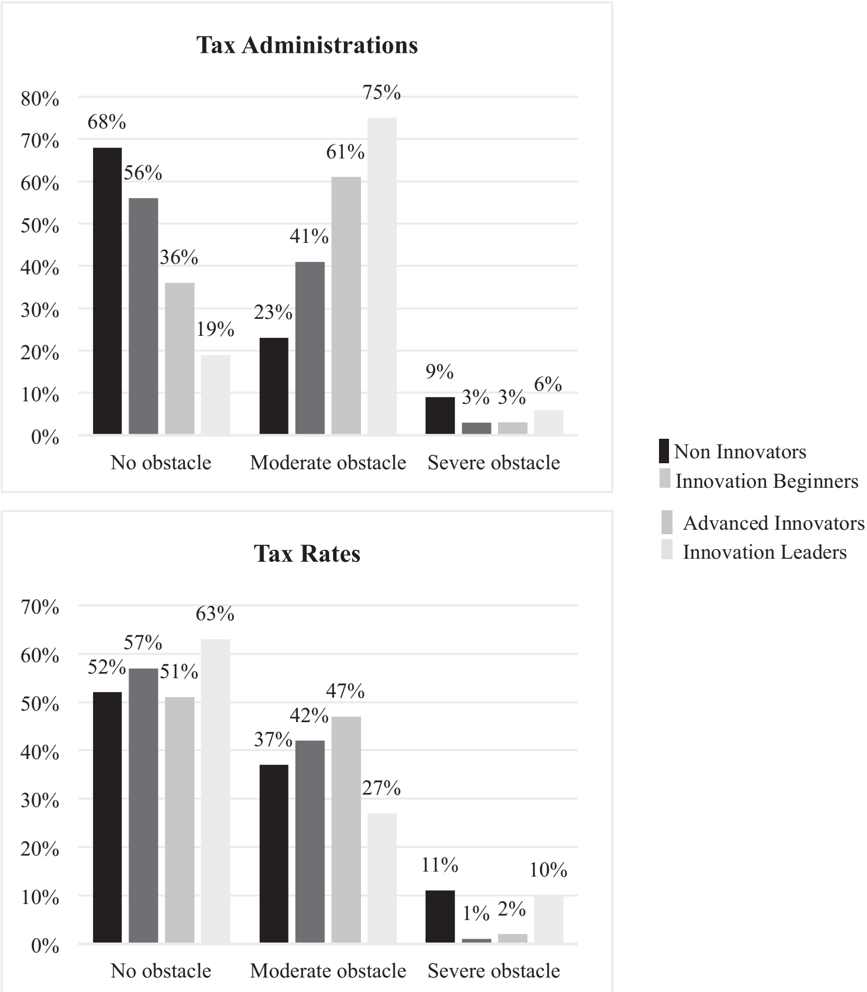

Figure 11.6 Taxation as obstacle

Source: Authors' calculations based on Enterprise Survey, 2016.

contrast to innovating firms, which consider corruption a problem that increases with the extent of their innovation activities. Half of all *innovation leaders* regard corruption as a severe obstacle, another third as a moderate one.

The legal system does not seem to be a major problem overall, for non-innovating firms and *innovation leaders* alike. Only *advanced innovators* consider it a moderate problem in large numbers.

Restrictive trade regulation and business licensing are considered a moderate problem, particularly for *innovation beginners* and *advanced innovators*; it is

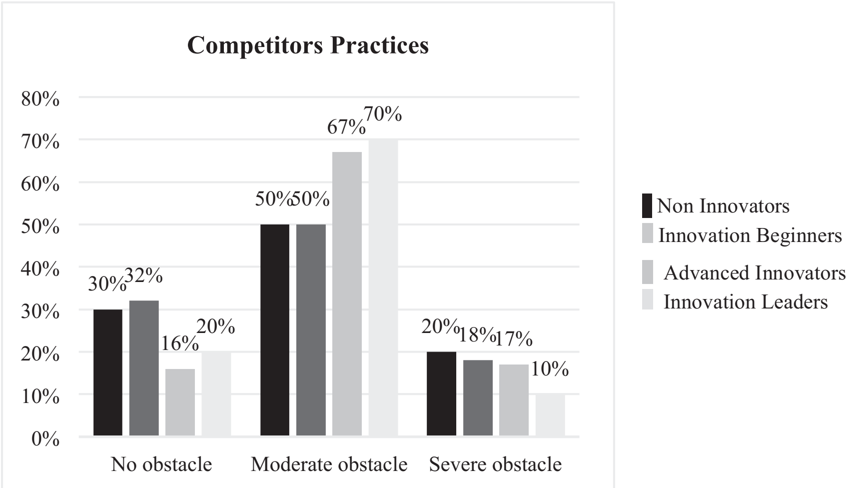

Figure 11.7 Competition as obstacle

Source: Authors' calculations based on Enterprise Survey, 2016.

much less a (moderate) problem for non-innovating firms and, in the case of business licensing, also for *innovation leaders* (Figure 11.5).

Tax administration is a moderate obstacle for innovating firms with the response rate rising with rising innovation levels (Figure 11.6). The pattern is similar to corruption, even if inefficient tax administration is considered as a less severe problem. Again, only a third of non-innovating firms regard tax administration a problem at all.

Tax rates are not a problem for half or more of the firms across all categories. For the other half, it is mostly a moderate problem.

4.4 Competition

Competition is mostly a moderate problem for all groups; for *advanced innovators* and *innovation leaders* it is a somewhat more pronounced problem (Figure 11.7). Causality could run both ways – innovation could be the consequence of higher competitive pressure, and innovation activity could provide firms an access to more competitive markets.

4.5 Stability and security

Political instability is much less an issue for non-innovators than for innovating firms (Figure 11.8). Two thirds of all non-innovating firms do not consider it a problem at all, and another 20 percent regard it as a moderate obstacle. This is quite different for *advanced innovators* and *innovation leaders*, almost three

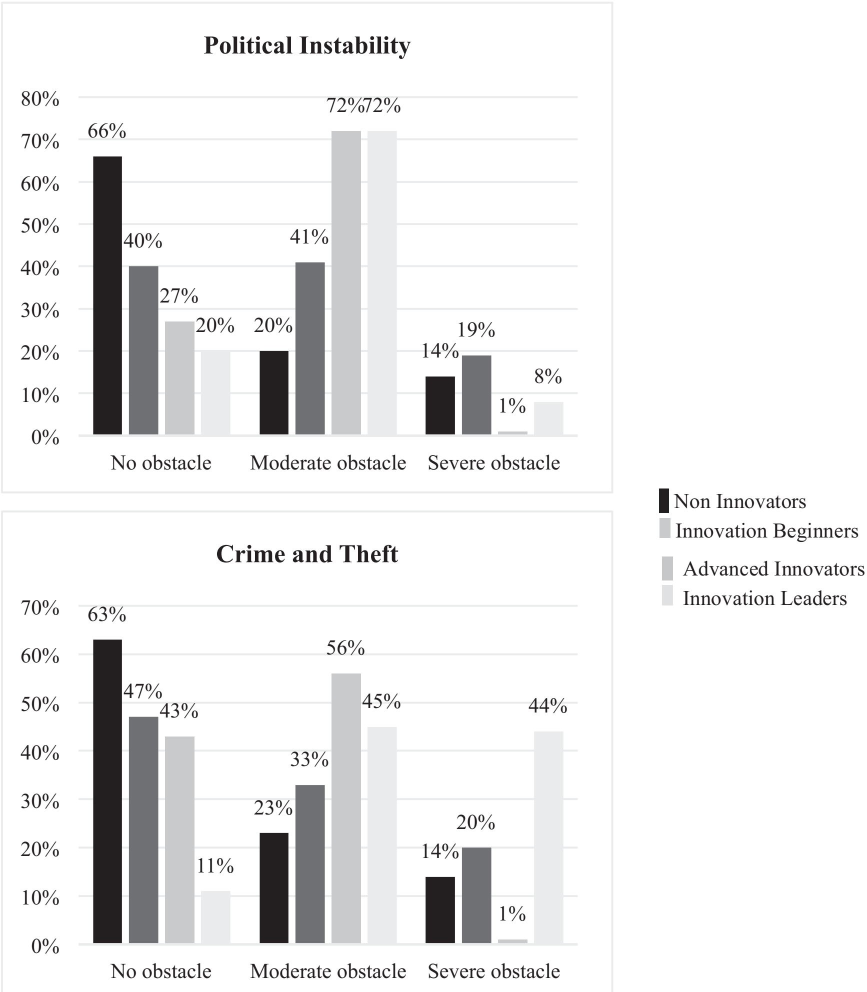

Figure 11.8 Instability and lacking security as obstacle
Source: Authors' calculations based on Enterprise Survey, 2016.

quarters of whom consider political instability an obstacle, even if it is only a moderate one.

Crime, theft, and disorder are again much less of a problem for non-innovators and they are increasingly a problem the more the firms innovate. Especially, 44 percent of all respondents in the cluster *innovation leaders* considered crime and theft a severe obstacle, and another 45 percent considered it a moderate obstacle. In other words, as many as 9 out of 10 firms in the cluster *innovation leaders* considered crime, theft, and disorder an obstacle to their operations.

Taking all potential obstacles together, a clear pattern emerges. Non-innovating firms are much less concerned about potential obstacles than innovating firms. They constitute around 80 percent of the firm population in Indonesia. This implies that average responses on obstacles are misleading if the goal is to remove obstacles for innovating firms in order to enhance innovation activities and, as a consequence, to improve productivity. Innovating firms are much more concerned about a number of obstacles, notably inadequate access to finance, inadequately educated workforce, corruption, crime, and political instability, and, to a lesser extent about inefficient tax administration, labour regulations, and trade regulations. The most innovating firms, the cluster of *innovation leaders*, are affected most and often substantially more than the next innovative cluster. Other potential problems are much less of a problem for highly innovating firms such as access to land, tax rates, and business licensing. These are obstacles that concern predictable cost components. Because innovating firms tend to be the more profitable ones, these costs are easier to shoulder for them.

5. Conclusion

In this chapter, we have analysed innovation behaviour of Indonesian manufacturing and service sector firms. We have shown that only one in five firms has had innovation activity at all in the past three years and that the highly innovating clusters, the *advanced innovators* and *innovation leaders*, are even much more highly concentrated. Only around 6 percent of all firms belong to these clusters of substantially innovating firms.

Determinants of innovation activity are firm size – medium and especially large firms are much more likely to innovate – export activity, and presence in an oligopolistic market. Moreover, industry affiliation and geographic location have very significant and substantial effects on the likelihood to innovate. Surprisingly, foreign ownership, the import of inputs, and the age of the firm do not play a significant role.

For most obstacles, *innovation leaders* and, to a lesser extent, *advanced innovators* are much more affected than non-innovating or little innovating enterprises. This applies to a number of obstacles, which refer to administration or regulatory issues such as tax administration, corruption, and trade regulation, as well as, even more pronounced, to the availability of infrastructure, skilled labour, and external finance. As these constraints are endogenous to the scale and success of operations, they are felt as more restraining for businesses investing in innovation than for other businesses. Other obstacles that are more predictable cost items, such as access to land or tax rates, are less of a burden for innovating firms than for non-innovating firms, as the former tend to be more profitable than the latter.

A policy that caters to the needs of the most innovative firms, striving to foster technological and organisational change and thereby overall productivity, should therefore address their needs more specifically and not respond to the average level of complaint, but rather to the firms that advance change. Because most of the obstacles refer to general problems, such as lacking education, crime, corruption, and inadequate infrastructure, other firms will also benefit from improvements in these areas, even though initially to a lesser extent. However, it may allow them to move up the innovation ladder eventually. Adequate policy responses include fostering education including vocational training, reducing red tape and curbing corruption, making tax administration more efficient and more predictable, removing restrictions on trade and FDI (and supporting export activity through credit facilities), and increasing infrastructure investments. A more liberal trade and investment policy does not only reduce poverty and increase employment (Kis-Katos and Sparrow, 2015), but it also improves innovation and productivity (Hamilton-Hart and Schulze, 2016). The Presidential Decree No. 44/2016 on the Negative Investment List that opens 35 new sectors to FDI is certainly a step in the right direction,[12] albeit a very limited one (Hamilton-Hart and Schulze, 2016). More generally, measures that enhance the ease of doing business, such as those announced by the Indonesian president for the twelfth economic stimulus policy package[13] will foster not only firms in general, but are also likely to increase innovation.

These measures could be complemented by programmes specifically targeted at highly innovative firms. One priority measure could be specific credit facilities to finance innovations, as highly innovative firms are particularly restrained by inadequate access to finance. Other measures could aim at increasing cooperation between universities and other knowledge centres and the innovating firms. This could be done, for instance, through the establishment of national science and technology parks as planned by the Indonesian government,[14] but also through other measures that stimulate the cooperation between better-governed and better-financed universities and the business sector.

Notes

* We are grateful to Gerrit Gonschorek for very helpful comments.

1 Enterprise Surveys (www.enterprisesurveys.org), The World Bank.

2 They missed Blomström and Sjöholm (1999).

3 Our chapter also adds to the sizeable literature on Indonesian manufacturing firms (see for example Aswicahyono and Hill, this volume, and the literature cited). Aswicahyono and Hill provide the historic and macroeconomic context, in which our analysis is embedded.

4 Cf. www.enterprisesurveys.org/methodology.

5 McCulloch et al. (2013) analyse microenterprises in Indonesia.

6 Questionnaires and data are available at www.enterprisesurveys.org.

7 We also ran logistic regressions on the endogenous variable that is one if firms belong to the clusters ‘advanced innovators’ and ‘innovation leaders’ and zero otherwise in order to focus on the determinants of substantially innovating firms as opposed to firms innovating at all. Results were relatively similar.

8 The WBES 2015 contains a question asking whether any input has been directly imported (rather than whether it is of foreign origin). Unfortunately, this variable has a large number of missing values. We used it alternatively (treating the missing values as zeros). This did not lead to significantly different results. Estimates for the other variables were not significantly affected by the inclusion of either import variable.

9 The sampled regions are Jawa Barat, Jawa Timur, Jawa Tengah, DKI Jakarta, Banten, Sulawesi Selatan, Sumatera Utara, Bali, and Lampung.

10 This is a very interesting and meaningful correlation, but does not establish causality in a strict sense. Causality could run both ways: Firms may innovate because they are exposed to foreign competition and have better access to the latest technology; yet they may have decided to export in part because they were more innovative already before they started to export.

11 Respondents were also given the option to answer 'don't know' and 'does not apply'. These options were rarely chosen, response frequencies are mostly below one percent. We treat these as missing values.

12 www.indonesia-investments.com/news/todays-headlines/opening-foreign-investment-in-indonesia-e-commerce-industry/item6860.

13 www.thejakartapost.com/news/2016/04/28/jokowi-publishes-10-points-on-ease-of-doing-business.html.

14 www.thejakartapost.com/news/2015/05/26/the-need-a-progressive-policy-boost-innovation.html.

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Appendix

Table 11.A.1 Descriptive statistics

	Linearized			
	Mean	*Std. Err.*	*[95% Conf. Interval]*	
Product innovation	0.063	0.016	0.031	0.094
Process innovation	0.077	0.017	0.043	0.111
Logistics or distribution innovation	0.055	0.018	0.020	0.089
Process supporting innovation (maintenance, accounting computing, purchasing operations, etc.)	0.046	0.015	0.017	0.074
Organisational/management innovation	0.023	0.011	0.001	0.044
Marketing innovation	0.090	0.018	0.054	0.126
Formal R&D expenditure incurred	0.019	0.009	0.001	0.037
Formal training	0.060	0.015	0.029	0.090
Purchased or licensed any patents	0.027	0.011	0.006	0.049
Abandoned innovation	0.028	0.012	0.004	0.052
Ongoing innovation	0.097	0.020	0.057	0.137
Small enterprise dummy	0.791	0.021	0.750	0.832
Medium enterprise dummy	0.175	0.020	0.135	0.215
Large enterprise dummy	0.034	0.007	0.021	0.047
Foreign ownership (also partial)	0.039	0.013	0.013	0.065
Export activity	0.112	0.022	0.070	0.155
Female is top manager	0.201	0.031	0.140	0.262
Years of experience of top manager (in that sector)	2.957	0.097	2.766	3.147
State-owned enterprise (dummy)	0.001	0.000	0.000	0.002
Age of firm	18.990	0.828	17.366	20.615
Legal status of the firm: sole proprietorship	0.767	0.028	0.713	0.822

(*Continued*)

Table 11.A.1 (Continued)

	Linearized			
	Mean	*Std. Err.*	*[95% Conf. Interval]*	
Legal status of the firm: partnership	0.127	0.020	0.088	0.166
Legal status of the firm: limited partnership	0.098	0.021	0.057	0.138
Legal status of the firm: shareholder company	0.008	0.008	–0.008	0.023
Size of locality > 1 million population	0.881	0.020	0.771	0.851
Size of locality = 250,000 to 1 million	0.134	0.017	0.100	0.168
Size of locality = 50,000 to 250,000	0.034	0.012	0.011	0.057
Size of locality = fewer than 50,000	0.021	0.006	0.010	0.032

Source: World Bank Enterprise Survey, 2015.

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