The Rise of Asia

Trade and investment in global perspective

Edited by
Prema-chandra Athukorala

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The Rise of Asia

The Rise of Asia examines emerging trends and patterns of foreign trade and investment in Asia with a view to contributing to the policy debate on how development strategies should be adopted in response to challenges to economic globalization.

The existing body of knowledge in this subject area has predominantly been shaped by the experiences of the newly industrialized countries (NICs) in East Asia. This volume is inspired by the conviction that generalization from the NIC experience is hazardous because the ongoing process of economic globalization over the past two decades has dramatically transformed the international context of national development policy-making. Moreover, as 'embracing the market', albeit at varying degrees and rates, has now become an Asia-wide phenomenon, it is vital to look at the issues from a broader relational perspective, paying attention to opportunities for intra-regional division of labour within the wider context of global economic integration.

This book will be of interest to students and scholars with an interest in Asian studies, international economics, political economy and globalization.

Prema-chandra Athukorala is Professor of Economics at the College of Asia and the Pacific, Australian National University, Australia.

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1 Introduction and overview

Prema-chandra Athukorala

Over the past five decades, economies in Asia,[1] particularly those in East Asia, have undergone a transformation that has been more rapid and extensive than in any other region in the world. By 1970, only Japan and the four Asian NIEs (newly industrialized economies) had decisively and successfully adopted outward-looking development strategies. These five countries, led by Japan, graduated quickly out of the earlier specialization in labour-intensive manufactures, opening up new export opportunities for latecomers to market-oriented policy reforms. By 1980, the three Southeast Asian economies – Indonesia, Malaysia and Thailand – had begun to embark on this path, with Malaysia a clear leader. Following the decisive policy shift from 'plan to market' in the late 1970s, China has been emerging as the fastest growing economy in the world and a major hub for international production networks. Until recently, changes were occurring more slowly in South Asia, with the notable exception of far-reaching liberalization reforms in Sri Lanka in the late 1970s. India began to liberalize in the mid-1980s and the reform process accelerated following the macroeconomic crisis in 1991. From about the early 1990s the three economies of Indochina – Vietnam, Laos and Cambodia – began to open up their economies. By the turn of the twentieth century all major countries in the region, besides Myanmar and North Korea, had become more open to foreign trade and investment, albeit from very different starting points and at different rates.

In the early 1980s, when for the first time in history East Asia (Pacific Asia) became the major trading partner of the US, replacing Western Europe, economists began to speculate about the coming of the 'Pacific Century' (Linder 1986). The 1997–98 financial crisis that swept across East Asia had a devastating impact on the economies of a number of high-performing economies in the region, but contrary to the early gloomy predictions, the recovery came relatively quickly. By 2000, all crisis-affected countries had returned to levels of growth higher than in other developing countries, albeit lower than they enjoyed in the lead-up to the crisis (MacIntyre *et al.* 2008). With the Asia-wide embrace of market-oriented policy reforms, and in particular following the wakening of India from economic slumber to join the East Asia high-growth club, the twenty-first century has now come to be labeled the

'Asian Century'. Inevitably, the onset of the global financial crisis in 2008 has dampened the growth of all open economies in Asia, with the severity of the impact varying among them depending on the degree of trade dependence. However, it is unlikely that the process of rapid growth and increasing international integration in the countries of Asia will be derailed; developments in the wake of the crisis will probably further strengthen their position in the global economy by widening the gap in growth rates with the established industrial countries (IMF 2009).

Asia's share of world GDP had risen from 22 per cent in the early 1960s to 35 per cent by 2007, underpinned by an increase in Asia's share in world non-oil trade from 8 per cent to 33 per cent. The region accounted for nearly half of the total increment in world exports over this period. China alone accounted for 13 per cent of total world non-oil exports in 2007. The share of Asia in total FDI flows to developing countries increased from 22 per cent in the early 1980s to nearly 50 per cent in 2007. For the seven years from 2000 to 2007, China was the second largest recipient of foreign investment in the world after the US, accounting for 7 per cent of total world gross inflows.[2]

The rise of Asia naturally widens the scope for all countries in the world for mutually beneficial international trade and investment, contributing to the prosperity of open economies in general. The relative decline in the position of mature industrial nations will be compensated by the enlargement of the aggregate world output. However, these gains will not be automatic; the adjustment process is going to be painful for both the mature industrial economies and latecomers to market-oriented policy reforms. In particular, the sheer size and weight of China and India and their ancient civilizations mean that the adjustment pressure from their rise is very much felt worldwide. There is always the danger that the negative perceptions emanating from adjustment pains may carry over into disruptive economic policies which thwart gains from partnership with enlarged economic power. Misunderstanding of the process and the resultant inappropriate policy responses could harm the open international trade and investment system, and choke off the historic process of poor countries growing out of poverty. The changes for improved outcomes in policy reforms in the future are therefore clearly tied to our ability to cast an informed, fresh look at the issues and new policy challenges. The purpose of this volume is to address these concerns and some closely related general questions.

There is a vast literature on foreign trade and investment in Asian development. Our effort to produce yet another book was inspired by the concern that the existing body of knowledge in this subject area is lopsided: it has predominantly been shaped by the experiences of Japan and the newly industrialized economies countries (NICs) in East Asia in the early stage of their economic transition. Generalization from the experiences of these countries is hazardous because the ongoing process of economic globalization over the past two decades has dramatically transformed the international context of national development policy-making. In particular the standard trade flow analysis which is based on the traditional notion of horizontal specialization (which postulates that countries trade in goods produced from start to finish in a given country) has become increasingly obsolete over the past two decades because of the ongoing process of international production fragmentation – the break-up of the production process into geographically separated stages.[3] Moreover, as 'embracing the market', albeit at varying degrees and rates, has now become an Asia-wide phenomenon, it is vital to look at the issues from a broader relational perspective, paying attention to opportunities for intra-regional division of labour within the wider context of global economic integration.

The 13 chapters that follow are grouped into three parts. Part 1 comprises a chapter by Athukorala and Hill (Chapter 2) which offers a comprehensive analytical account of trade and investment patterns in Asia in order to provide the context for the ensuing chapters. The chapter begins with an overview of the domestic policy environment shaping countries' participation in the global economy. The next section examines patterns of trade since 1970, focusing in turn on trade flows over time in aggregate, by major partners, and by major commodity groups. A key theme running through the analysis is the role of international production fragmentation in determining trade patterns. The following section analyses comparative performance of Asian developing countries in attracting and managing foreign direct investment (FDI) in the global context. Drawing the analyses of trade and FDI patterns together, the chapter finally probes the role of FDI in export performance. A key policy inference from this analysis, which also echoes in some ensuing chapters in the volume, is that in designing policies of outward-oriented development, trade and investment policies must be considered together as co-determinants of the location of production and patterns of trade.

Part 2 contains four chapters dealing with the formation and operations of global production networks. Chapter 3 by Mitsuyo Ando and Fukunari Kimura examines the spatial structure and characteristics of these networks. The analysis focuses on two issues: (a) in what ways the formation of production networks have changed the intra- and inter-regional trade pattern; (b) how multinational enterprises (MNEs) effectively combine intra-firm and arm's length activities in the spatial extension of production/distribution networks. The first issue is addressed through an in-depth analysis of data on the machinery trade carefully disaggregated into parts and components and final goods. The results indicate that explosive expansion of intra-regional trade in parts and components, in particular among developing countries, contributes to the formation of dense production networks. As regards the second issue, an analysis of micro data of Japanese MNEs indicates that long-distance transactions within production networks are mainly intra-firm while transactions within individual-country and regional markets are predominantly arm's length (inter-firm). In the latter case cost advantages arising from agglomeration seem to overwhelm additional transaction costs resulting from going beyond firm boundaries.

In Chapter 4, Witada Anukoonwattaka and Sisira Jayasuriya examine the effects of trade and investment liberalization on the expansion of product fragmentation. They first develop a stylized partial equilibrium model of an MNE that operates in three countries that differ in relative factor endowments and produces both components and final goods in-house while outsourcing some components. The model predicts that intra-firm sourcing in a given country is expected to be relatively more capital-intensive than outsourcing in that country. Further, trade liberalization tends to stimulate intra-firm trade and outsourcing but decreases the variety of intra-firm imports. When the firm is able to freely re-allocate its firm-specific capital, labour-intensive operations will shift to the low wage economy but imports of components from independent suppliers from more capital-rich countries can continue. These predictions are then tested through an empirical investigation of component exports by the Thai subsidiary of Toyota to other subsidiaries in the Toyota subsidiary network located in the ASEAN region and shifts in intra-firm and arm's length trade among Japanese MNEs in Asia. The results are broadly consistent with the model predictions. Furthermore, the prediction that labour-intensive assembly of final goods will shift to the low wage country in the context of a liberal trade regime is consistent with the emergence of China as a global assembly platform.

Chapter 5 by Tomofumi Amano examines competitive strategies of Japanese and US multinationals within global production networks through an in-depth case study of the hard disk drive (HDD) industry in Asia. Following a stage-setting survey of the origin, evolution and the structure of the global HDD industry, the chapter presents the findings of a detailed case study of the HDD industry in East Asia undertaken with emphasis on the factors which contributed to a pattern of specialization in which US MNEs dominated HDD production/assembly while Japanese firms maintained a competitive edge in HDD component production/assembly. It is found that these firms were able to achieve competitive advantages in their respective areas of operation because they made their production location decisions in line with changes in technology and market conditions, and committed themselves to pursuing potential in Asia as the focal point of their global operations; they did not merely establish buffer locations for taking advantage of low wage levels, but also took initiatives to enhance their global competitive advantage by building global production networks centred on Singapore. The host-country governments provided an enabling domestic investment environment and industrial clusters emerged to serve both parties' interests.

In Chapter 6, Michael Landesmann explores the patterns and drivers of outsourcing between advanced economies and 'catching-up economies' within global production networks. The main novelty of the papers lies in the emphasis placed on the movement over time in the position of catching-up economies in the vertically differentiated patterns of network trade. The analysis is based on a comparison of imports patterns of the European Union, USA and Japan, distinguishing among imports from three groups of catching-up economies: OECD catching-up economies (Greece, Portugal, Spain, Turkey and Mexico), the new EU member states (EU members states other than the original 15 member states) and the Dynamic East Asian economies (Hong Kong, South Korea, Singapore, Taiwan, Indonesia, Malaysia, Philippines, Thailand, China and India). The key findings indicate three important stylized facts about outsourcing patterns: (i) rapid growth of outsourcing from high-income to medium- and low-income economies; (ii) importance of geographic proximity in outsourcing decisions; (iii) an emerging pattern of intra-Asian specialization in which China specializes in final assembly while the other Dynamic Asian economies act as prominent suppliers of parts and processed inputs. There is evidence of a successful catching-up process within production networks particularly in industrial sectors which are more demanding from a technological (or 'know-how') point of view.

Part 3 of the book contains four chapters which relate more directly to the role of foreign direct investment in Asian growth and structural change. In Chapter 7 Yasheng Huang undertakes a penetrating analysis of foreign direct investment in China, focusing on the issue of why China has relied so much on FDI in the process of economic transition compared to the other Dynamic Asian economies at a comparable stage of economic growth. Huang's hypothesis is that this is due to institutional distortions in the economy that favour foreign firms (which he dubs the 'ownership bias') rather than normally-postulated determinants of FDI such as growth, domestic market size and labour costs. In testing this hypothesis, he first undertakes a comprehensive survey of the institutional and policy settings pertaining to foreign firms operations in the Chinese economy to identify the nature and extent of ownership bias and then presents the findings of his ongoing research that links the ownership biases with the subjective preferences for partnership with foreign firms on the part of the Chinese private entrepreneurs. The empirical evidence is remarkably consistent with the ownership bias hypothesis; in particular, it is found that credit-constrained private entrepreneurs, all else being equal, exhibit stronger preferences for FDI than those private entrepreneurs who are less constrained. An important policy implication of Huang's findings, which deserves further scrutiny, is that depending on the nature of the policy regime, FDI could well be *ameliorative* (that is, an offset to institutional distortions) rather than *additive* to economic growth in host countries.

Chapter 8 by Kunal Sen assesses the impact of market-oriented policy reforms on foreign trade and inward FDI in India, focusing specifically on productivity and employment growth in the manufacturing sector. After examining trends and patterns of FDI in India in the reform era from a historical perspective, the chapter examines the effects of FDI on market structure, exports, technological development and productivity in Indian industry. The results indicate that, while the reforms relating to trade and foreign direct investment have had a positive effect on economic performance in the industrial sector, the effects of trade and FDI on employment creation have been disappointing, in spite of India's innate comparative advantage in labour-intensive manufacturing activities. Unlike in the Dynamic East Asian economies, in India increasing global integration has not led to a significant re-orientation of domestic manufacturing from the capital-intensive nature of production that had been witnessed in the pre-reform period. The chapter offers three possible explanations of this 'perverse' reform outcome: rigid labour laws, low level of human capital accumulation and the poor quality of infrastructure.

Chapter 9 by Prema-chandra Athukorala and Tran Quang Tien is a case study of the role of foreign direct investment in industrial transition in Vietnam. It begins with an overview of the evolution of the foreign investment regime in Vietnam in the context of market-oriented reforms and then examines trends and patterns of FDI, and the role of foreign-invested enterprises in the process of industrial transition, with emphasis on their role in the process of linking Vietnamese manufacturing to rapidly growing regional and global production networks. A key theme running through the analysis is that both the rate of FDI involvement in the economy and the national developmental gains from FDI depend crucially on the conduciveness of the domestic economic policy environment for market-based decision-making. A comparison of the economic impact of FDI on the Vietnamese economy during the first half of the last decade with that in the 1990s provides strong support for the conventional wisdom that concomitant liberalization of trade *and* investment regimes, accompanied by creating a congenial environment for market-based decisions by the private agents, is vital for reaping developmental gains from FDI. During the 1990s employment expansion in foreign invested enterprises (FIEs) lagged behind their rapid output growth reflecting the capital-intensity bias of industries in protectionist trade and investment regimes. However, with the continuing increase in the relative importance of export-oriented ventures among FIEs, the employment potential of FIEs has begun to improve from the late 1990s. Of particular significance in this connection is the growing importance of assembly activities by FIEs in electronics and other high-tech industries.

Nobuaki Yamashita (Chapter 10) undertakes a comparative analysis of US and Japanese FDI in developing Asia. This chapter differs from the previous studies on this subject in the particular attention paid to differences and similarities of US and Japanese MNEs in their participation in regional production networks. It is found that the degree of participation of US MNEs in the manufacturing sector in Asia has increased continuously over the past three decades whereas that of Japanese firms tended to decline significantly following the 1997–98 Asian crisis. Over the years the operations of US and Japanese MNEs have become similar in many ways, but still there are two notable differences: first, compared to their US counterparts, Japanese MNE affiliates have continued to remain more export oriented; second, within regional production networks Japanese MNE affiliates play a much more significant role in final assembly activities, whereas the activities of US MNEs are concentrated in parts and components assembly/production and headquarter activities, while increasingly relying on contract manufactures and purely local firms for final assembly.

The four chapters in Part 4 deal with selected policy issues relating to the ongoing process of structural change and global economic integration in Asian economies. In Chapter 11, Ian Coxhead and Sisira Jayasuriya probe adjustment pressures and challenges emanating from the rise of the 'two giants' (China and India) for resource-rich Asian developing countries. The expansion of labour-intensive manufactured exports from the giants (from China in particular) exerts competitive pressures on similar exports from other developing countries. At the same time, their growth also stimulates an expansion of demand for imports both of raw materials and of skill-intensive manufactured parts and components. By applying a simple trade theoretic model to selected Southeast Asian countries, the authors analyse these twin pressures and examine how differences in relative factor endowments of resource-rich economies can produce different outcomes. The key inference is that countries that are better endowed with capital and skilled labour and are at a higher rung of industrialization are more likely to be able to escape the 'resource curse'.

Chapter 12 by Prema-chandra Athukorala examines China's emerging trade patterns and their implications for the export performance of the other East Asian countries. Following an overview of trends and patterns of China's export performance since the early 1990s, the empirical analysis probes two key themes central to the current policy debate, namely China's competition in third-country markets and emerging patterns of East Asian exports to China. The analysis places particular emphasis on the supply-side complementarities between China and its East Asian neighbours resulting from China's rapid integration into regional production networks. The findings suggest China's rapid integration into cross-border production networks of vertically integrated global industries as a major assembly centre has created new opportunities for the other East Asian countries to specialize in parts and components production and assembly. This development is an important counterpoint to the popular belief that China's global integration would crowd out other countries' opportunities for international specialization. Moreover, China's rapid world market penetration in labour-intensive manufactured goods has occurred largely at the expense of the high-wage East Asian NIEs, which, in any case, have been rapidly losing comparative advantage in these product lines as an integral part of the export-led industrial transformation. Given the current state of China's factor market conditions the observed trade patterns are unlikely to change dramatically in the short to medium run.

Chris Manning and Alberto Posso (Chapter 13) deal with an important, yet hitherto neglected issue of the East Asian development: why did real wages rise slowly in latecomers to export-led industrialization in Southeast Asia (the ASEAN-3: Indonesia, Malaysia and Thailand) compared with the new industrializing economies during the early periods of rapid economic growth? To address this issue the authors undertake a comparative analysis of dynamic interactions between manufacturing growth and labour market outcomes using the celebrated Lewis model of industrial development in a labour-surplus economy. A simple regression model is employed to examine the determinants of real wages over the first two decades of accelerated growth in the two groups of economies. This suggests that, while both demand and supply factors contributed to differences in real wage growth, labour supply conditions represented by change in agricultural employment were especially significant. There is no evidence to suggest that institutional factors have had a significant impact on the different wage outcomes between the NIEs and the ASEAN-3.

The final chapter by Peter Warr examines the shift in emphasis in the overall structure of trade protection between manufacturing and agriculture in the process of economic growth and structural change through a paired case study of Indonesia and Thailand. The analysis uses as its point of departure the famous World Bank multi-country study by Krueger, Schiff, and Valdés (1988) which documented a consistent and widespread trade policy bias against agriculture in developing countries (including Thailand and Malaysia) during the first three decades of the post-Second World War era. The analysis, which is based on a set of newly-constructed incentives, confirms the Krueger-Schiff-Valdés finding for the period covered by their study but concludes that since then the overall structure of protection has shifted markedly. Overall, trade protection is now roughly neutral between agriculture and manufacturing in both countries. Nevertheless, there remains considerable variation in the treatment of individual commodities. One overall political theme seemingly unites the Indonesian and Thai experiences – the growth of democracy, which makes it much more difficult to sustain the agricultural taxation and industrial protection. Whether the trend away from taxing agriculture will now develop into agricultural subsidization, as occurred in Europe, the United States and Northeast Asia, remains to be seen.

Notes

1 Throughout this volume we define *Asia* to encompass the economies of East and South Asia. East Asia includes Japan, and Developing East Asia (DEA), which covers the newly industrialized economies (NIEs) in North Asia (South Korea, Taiwan and Hong Kong), China and members of the Association of Southeast Asian Nations (ASEAN). South Asia covers India, Pakistan, Bangladesh and Sri Lanka. Developing Asia (DA) refers to South and East Asia except Japan.

2 Figures reported in this paragraph were compiled from UNCTAD, *World Investment database* (FDI data) and World Bank, *World Development Indicators* database.

3 An array of alternative terms have been used to describe this phenomenon, including ‘global production sharing’, ‘vertical specialization’, ‘slicing the value chain’ and ‘outsourcing’.

Part 1

Broad picture

2 Asian trade and investment

Patterns and trends

Prema-chandra Athukorala and Hal Hill

The aim of this chapter is to present an analytical interpretation of trade and investment patterns in Asia, in the context of three general conditioning factors: rapid growth and structural change, host country commercial policy environments, and institutional and technological factors governing global trade and investment. A key theme running through this chapter is the implications of the ongoing process of international production fragmentation[1] – the geographic separation of activities involved in producing a good (or service) across two or more countries – for the debate on regional versus global economic integration of these countries. Among other issues canvassed, we also comment on the debate as to whether the emergence of China as the world's fastest growing industrial economy will crowd out other countries' opportunities for integrating into the regional and global economy through fragmentation-based specialization.

This chapter is organized as follows. The first section briefly surveys the policy environment shaping countries' participation in the global economy. In the second section we examine general patterns of trade since 1970, encompassing trade flows over time in aggregate, by major partners, and by major commodity groups, as well as highlighting the growing importance of international production fragmentation and global production networks in determining trade patterns. In the third section we investigate investment patterns, focusing on rising FDI interdependence, the comparative performance of Asian developing countries in attracting and managing FDI, and the alleged 'crowding out' effects of China's rise to be the largest developing country recipient of FDI. Drawing these two sections together, in the fourth section we examine the trade–investment nexus. The final section summarizes our arguments and draws out some general inferences.

The policy environment

The discussion in this section is based on three broad sets of indicators of openness to international trade and investment. This is the most important, and an obvious prerequisite for participation in the global economy. Trade openness is usually measured either as a 'revealed' or policy variable. The former is typically 'trade orientation' measured as exports or total trade (exports + imports) as a percentage of GDP, while the latter is measured by average tariff rates, the dispersion in these averages, and the extent of non-tariff barriers to trade (NTBs). A more sophisticated measure, rarely available for cross-country purposes, is effective rates of protection. There are also various general indicators of trade openness, either in the form of international rankings or simply binary (0/1) classification. The best known of these is the Sachs–Warner (1995) index.[2]

All these measures have their shortcomings. The caveats associated with the use of trade/GDP ratios are well known: it is a comparison between a net and a gross concept; trade is measured in gross terms (intermediate material inputs + value added) whereas GDP is essentially measured on a value-added basis (that is, net of intermediate material inputs). Thus, the measured change in trade orientation is sensitive to changes in import intensity of export production. As we will see later in this chapter, over the past decade there has been a palpable shift in the export composition away from primary products and towards labour-intensive light manufacturing and, more recently, the ongoing process of international production fragmentation within high-tech industries. The increase in measured trade orientation could partly reflect the fact that these new product lines are relatively more import-intensive compared to the former. Another limitation for cross-country comparisons is that the ratios need to be adjusted for size, in recognition of the fact that small countries by definition will trade more than larger ones.

Tariff rates can be used to compare trade openness across countries when there is little reliance on NTBs. However, the presence of NTBs greatly complicates the analysis. Tariff rates may also vary considerably, depending on whether applied or bound rates are used, or 'effective rates'.[3] Trade policy comparisons also need to allow for partial reforms. Most countries attempt to compensate exporters for duties paid on imported inputs. These typically take the form of duty exemptions or drawbacks, or the establishment of export processing zones. These compensating interventions are rarely incorporated into international comparisons.

The Sachs–Warner classification of open and closed economies has the attraction of a clear analytical foundation, a long time series, and comprehensive country coverage. However, it is a somewhat blunt characterization of liberalization status. Given the complexity of economic policy reform, a binary classification of liberalization status naturally involves a significant element of subjectivity (Rodriguez and Rodrik 2000).

Bearing these caveats in mind, we employ average tariffs, the Sachs–Warner index and the export/GDP ratio, which together enable us to assert with reasonable confidence whether an economy is broadly open. Table 2.1 shows average tariff rates since 1980 for 17 Asian economies. Several key conclusions are evident. First, there is a universal trend towards lower tariffs, with the apparent exceptions of Nepal and Vietnam, which will be discussed shortly. In some countries, the declines have been very large, more than halving since

Table 2.1 Trends in average applied tariff rates[1] in developing and industrial countries, 1980–2004 (%)

Country/Group	*1980–4*	*1985–9*	*1990–4*	*1995–9*	*2000–4*
Japan	—	7.0	6.3	2.8	2.7
Korea		17.5	9.7	9.3	9.1
Taiwan	26.5	16.8	12.5	8.4	5.5
China	49.5	39.3	40.0	18.8	12.8
Indonesia	—	13.7	13.4	6.4	8.5
Malaysia	—	14.9	14.3	6.9	7.6
Singapore	—	0.5	0.4	0.3	0.2
Philippines	29.3	27.8	23.7	13.3	5.9
Thailand	41.2	40.3	37.2	19.6	8.9
Cambodia	—	—	—	—	16.2
Lao PDR					10.3
Myanmar	—	—	—	4.8	4.6
Vietnam	—	—	13.4	13.7	14.4
India	74.3	93.5	57.0	33.7	24.0
Nepal	22.1	21.6	19.1	15.8	14.6
Pakistan		66.7	58.5	41.6	18.8
Sri Lanka	31	27.6	25.5	16.3	9.1
Australia	—	14.2	10.7	6.5	5.2
New Zealand	—	—	8.0	5.4	3.6
Memo Items					
Developing Countries	45.4	42	34.0	19.7	13.2
Low Income	73.3	64	46.7	23.1	15.9
Middle Income	32.9	28.9	27.3	15.0	9.5
High Income	22.9	9.1	0.4	3.6	2.8

Source: Nicita and Olarreaga (2006) and Asia Pacific Economic Cooperation (APEC) Secretariat online data base (for data for Lao PDR).

Notes:
1. Simple averages of MFN rates.
— Data not available.

the 1980s in India, China, the Philippines, Thailand, Taiwan, Japan and Korea. Where these declines have clearly been accompanied by falling NTBs, as for example in the Philippines, the trade liberalizations have been very significant. In comparative terms, average Asian tariff levels are clustered around developing country norms, indicating that other regions have essentially caught up with Asia in this respect.

Second, within Asia, the East Asian economies are generally more open than those of South Asia. In 2004, India and Pakistan had the highest average tariffs, with the Indian figure being three times that of China. Within East Asia, there is no significant north/south divide. Hong Kong and Singapore have of course always had negligible protection. The others mostly range up to 10 per cent. Importantly, though not adequately recorded here, the East Asian economies were much quicker than those of South Asia (with the partial exception of Sri Lanka) to adopt partial reforms that enabled exporters to operate on an effective free-trade footing.

Third, the figures for the late reformers need to be interpreted with caution. For example, the absence of any major change in Vietnam's average conceals the fact that the process of formal tariffication commenced only in the mid 1990s, and that the major trade policy reforms have (appropriately) entailed a shift from NTBs to tariffs (Athukorala 2006c). In the case of Myanmar, the low tariffs mean little when the state interferes extensively in most aspects of commercial life and when there is extensive smuggling.

Table 2.2 depicts the patterns and chronology of liberalization status of Asian countries based on the Sachs–Warner classification. According to this classification Hong Kong, Malaysia, Singapore and Thailand have always remained open throughout the post-war era. Japan, Korea and Taiwan completed the transition from closed to open trade regimes by the 1960s. By the turn of the century (the end point of time coverage of Wacziarg and Welch 2003), only China and Myanmar (and Laos, Cambodia and Vietnam, which are not covered in the classification) remained 'closed'. Among these countries, China and Vietnam have undertaken significant tariff cuts (Table 2.1) and dismantled most NTBs and restrictions on foreign exchange dealings on current account transactions in the ensuing years (Naughton 2007, Athukorala 2006c). Consequently, from about 2005 the 'socialist economic system' characterization remains the only Sachs–Warner closed-economy criterion applicable to these countries. Laos and Cambodia too have undertaken significant trade reforms in recent years, bringing average tariffs and NTB coverage well below 40 per cent. However, residual elements of the back market premium remain.[4]

The standard revealed openness measure, the export/GDP ratio,[5] is reported in Table 2.3. The inter-country differences and the time profile revealed by this measure are broadly consistent with those we have already observed. However, as we have already noted, the usefulness of this measure in its own right as an indicator of trade openness is limited because, by construct, it is driven by structural shifts in production and trade patterns. Of particular relevance in this connection is the ongoing process of international production fragmentation, which involves small value added additions at various stages of the production process of a given final good in various countries, thus resulting in inflated trade values relative to GDP. Even in small countries, at least 60 per cent of GDP is generated by non-tradable sectors. Thus an export share of much more than 30 to 40 per cent can arise only when export production involves adding fairly small amounts of value to imported inputs (Krugman 1995, p. 335).

As with trade policy, all countries in the region have become more open to FDI over time. But the progress has been uneven. It is really only since the mid 1990s that there has been generalized openness, and significant

Table 2.2 Liberalization status/dates and data on trade policy

Country	*Liberalization status/dates during*[1] *1945–2000*	*Data on trade policy (Sachs–Warner criteria)*			*Export marketing boards/Socialist state*
		Average tariff[2] *(1990–99) (%)*	*NTB coverage*[3] *(1990–98) (%)*	*Black-market premium*[4] *(1990–99) (%)*	
Hong Kong	Always open	—	2.1	–0.02	0
Malaysia	Always open	11.7	19.6	1.35	0
Singapore	Always open	0.32	2.1	0.8	0
Thailand	Always open	29.54	17.5	1.8	0
Taiwan	1963	9.85	—	0.95	0
Japan	1964	5.98	—	–0.35	0
Korea, Rp.	1968	11.3	25.0	0.03	0
Indonesia	1970	16.27	31.3	7.1	0
Philippines	1988	19.09	—	4.36	0
Nepal	1991	15.28	—	24.23	0
Sri Lanka	1991[5]	24.34	22.7	7.84	0
Pakistan	1991	54.73	—	9.74	0
India	1994	48.63	93.8	7.45	0
Bangladesh	1996	43.7	—	83.27	0
Myanmmar[6]	Remain closed	5.7	—	2280.77	0
China[7]	Remain closed	31.06	—	35.89	1

Source: Sachs and Warner (1995) and Wacziarg and Welch (2003)

Notes:
1. Based on the application of Sachs–Warner criteria according to which a country is classified as open if it does not satisfy all five criteria for the entire duration of a give time period: (i) Non-tariff barrier coverage of intermediate and capital goods imports of 40 per cent or more; (ii) Average tariff on intermediate and capital goods imports of 40 per cent or more; (iii) A black market exchange rate that is depreciated by 20 per cent or more relative to the official exchange rate; (iv) A socialist economic system (as defined by Kornai 1992); and (v) A state monopoly on major exports.
2. Unweighted average tariff.
3. Core non-tariff barrier frequency on capital goods and intermediates, including quotas, licensing, prohibitions, and administered pricing.
4. [(parallel exchange rate/official exchange rate) – 1]*100.
5. Previous temporary liberalization episodes: 1950–56; 1977–83.
   Sri Lanka embarked on a major economic liberalization in 1977. Of the five Sachs–Warner criteria (Note 1) the only criterion that the Sri Lankan policy regime failed to meet during 1983–89 was the third, but this was only for a single year (1983). (In that year the black market exchange rate premium marginally exceeded 20% because of a temporary run on the currency propelled by the eruption of ethnic violence.) This minor aberration aside, the entire period since 1977 can be treated as an open economy era.
6. Remains closed, based on the black market exchange rate premium.
7. Remains closed in terms of the criteria of socialist economic system and the black market exchange rate premium.

— Exact figure is not available, but it is commonly believed to be well below the Sachs–Warner criteria.

reservations to foreign ownership persist in several countries. In the 1970s, only three economies – the two city states and Malaysia – had unambiguously open FDI regimes. Indonesia appeared to be quite open, owing to its large resource-based FDI. In the 1980s, Southeast Asia remained the most

Table 2.3 Trade orientation of selected Asian economies,[1] 1969/70–2006/07 (%)

	1969/70	*1974/75*	*1979/80*	*1984/85*	*1989/90*	*1994/95*	*1999/00*	*2006/07*
Japan	12	14	13	15	10	9	11	15
Korea, Rep.	15	27	30	33	30	28	40	45
China	3	5	10	11	18	24	21	41
Hong Kong, SAR	92	85	90	108	131	138	138	206
Taiwan	18	23	33	39	42	43	51	70
Indonesia	14	27	33	24	25	27	40	30
Malaysia	40	45	56	54	73	92	121	114
Philippines	21	23	23	24	28	35	53	45
Singapore		80	95	103	134	174	190	240
Thailand	16	20	24	23	35	41	64	73
Cambodia	—	—	—	—	68.4	61.8	85.2	106.3
Lao, PDR	—	—	—	—	47.2	52.5	57.5	58.2
Vietnam	—	—	—	—	30	33	53	75
Bangladesh	7	4	6	4	6	10	14	20
India	4	6	7	5	7	11	13	22
Pakistan	8	13	12	10	15	17	14	15
Sri Lanka	25	27	33	28	29	35	38	30
Developing countries[2]	10	13	15	16	20	23	26	33

Source: World Bank, World Development Indicators Database, Taiwan (Republic of China), *Taiwan Statistical Data Book*, Taipei: Council for Economic Planning and Development, Taipei (data for Taiwan) and ADB Key Economic Indicators database (for Cambodia and Lao PDR).

Notes:
— Data not available.
1. Exports of goods and services relative to GDP (at current prices), two-year averages.
2. Low and middle income countries as per the World Bank country classification.

open region and South Asia the most restrictive (except for Sri Lanka). Thailand and the Philippines became significant recipients. Inflows to China were growing, but still relatively small. India remained essentially off-limits to FDI. The 1990s marked a turning point, when several countries liberalized and global flows increased. Significantly, these liberalizations survived the Asian economic crisis, although in Indonesia political turbulence deterred investors for half a decade. China suddenly became very open, while India began to open up very gradually. The three Indo-China states also became much more open to FDI (Lindblad 1998, Hill 2004, Athukorala 2007).

Hill (2008) provides a comprehensive inventory of shifts in FDI policy regimes in 89 countries over the period from 1970 to 2000, focusing on restrictions relating to three major aspects of MNE affiliates: ownership, profit remittances and liquidation of business. The analysis highlights the general global trends towards the adoption of more liberal policies, particularly since the 1980s, with Asia surpassing other regions, in terms of both the country coverage and the depth of reforms. The data on the time profile of FDI policy reforms in the 16 Asian countries covered in this study are summarized in Table 2.4. It is clearly evident that foreign investment policy regimes of all countries have become increasingly liberal over the past decade and a half.

Openness to trade and investment is a necessary but not sufficient condition for successful global economic integration. Equally important is the conduciveness of the business environment. International competitiveness requires high-quality infrastructure, both hard and soft, especially for successful participation in time-sensitive global production and purchasing networks. Labour markets need to reflect underlying supply and demand conditions, with wage growth and differentials driven by productivity. Prudent macroeconomic management is required to provide a stable and predictable commercial policy environment, and to ensure that exchange rate outcomes do not impair competitiveness. Above all, political stability and policy certainty figure prominently among prerequisites for profitable long-term investment, particularly for MNEs.

In recent years there have been various attempts to build databases on the business environment of a large number of countries based on investor surveys

Table 2.4 Incidence of FDI policy restrictions in selected Asian countries, 1970–2000

	Ownership restrictions[1]	*Profit remittance restrictions*[2]	*Liquidation restrictions*[3]
Bangladesh	1970–1980	1973–1994	1973–2000
China	1970–1986	1970–2000	1970–2000
Hong Kong	None	None	None
India	1971–1991	1970–2000	1970–2000
Indonesia	1974–1986	None	1970–1977
Japan	None	None	None
Korea, Rp	None	None	1970–1981
Malaysia	None	None	None
Nepal	1970–1987	1970–1987	1970–2000
Pakistan	1970–1976	1985–1987	None
Philippines	1970–1991	1970–1986	1970–1986
Singapore	None	None	1970–1978
Sri Lanka	1970–1977	1970–1977	1970–1977
Taiwan	None	None	1970–1987
Thailand	None	None	None
Vietnam[4]	1970–2005	1970–2005	1970–2005

Source: Hill (2008).

Notes:
1. Outright prohibition on the establishment and operation of wholly foreign owned enterprises
2. Restrictions on the right of foreign investors to remit earnings on invested capital, including profits.
3. Restrictions on the liquidation of business and repatriation of foreign owned capital.
4. Based on Athukorala and Tien, Chapter 9 of this volume.

or other subjective assessments covering a large number of countries. Table 2.5 shows the rankings of the Asian countries in one of these, the *Doing Business* database of the World Bank, which has by far the widest country coverage among the alternative databases.[6] The data confirm the superiority of East Asia over South Asia, with the four Asian NIEs together with Malaysia and Thailand ranking the highest; the two city states have the highest ranking. China ranks ahead of India by a wide margin. The differences between Northeast and Southeast Asia are not significant. Nevertheless this ranking exercise is at best indicative and it also presumably reflects the development paradigms of the institution preparing the data. Communist states such as China and Vietnam fare poorly, in spite of the sweeping reforms of the past two decades, and even when they are obviously commercially attractive to foreign investors. Moreover, any ranking exercise of this nature naturally tends to overlook East Asia's early mover advantage, in which MNEs became deeply embedded in the region's economy well before other developing regions.

There is a large literature on macroeconomic management in the major economies in Asia (e.g. Corden 2003, World Bank 1993, Gill and Kharas, 2007). Although this subject is beyond the scope of this chapter, it is important to highlight the principal conclusion: normally macroeconomic policy regimes in performing economies in East and Southeast Asia have been largely consistent with their commitment to an outward-oriented development strategy. None of the countries in the region has experienced prolonged episodes of hyper-inflation and massive exchange rate misalignment unlike countries in Latin America and Africa. Indonesia and Malaysia are notable among resource-rich developing countries in the world for managing resource booms well, rather than becoming victims of the 'resource curse' (Collier 2007).

Trade patterns

Trade data used in this chapter are compiled from the UN *Comtrade* database. The method of data compilation is described in the appendix to this chapter. Our analysis of trade flows commences in 1969/70,[7] when developing country industrial exports first became highly topical, and by which time most but not all developing countries were reporting their trade statistics. We then report trade statistics by decade, with two-year averages to allow for annual fluctuations. The data for total merchandise trade used here are net of oil and gas. Among the countries covered in this study, oil and gas account for a significant share of exports only in Malaysia and Indonesia.[8] However, in both countries there has been a significant shift in commodity composition of exports away from oil and non-oil primary products to manufacturing.

The combined share of Asian countries in world non-oil exports recorded a threefold increase, from 11.1 per cent to 33.2 per cent, between 1969/70 and 2006/7 (Table 2.6).[9] The region accounted for over 40 per cent of the total increment in world exports over this period. East Asia dominated this impressive export growth story. Within East Asia, the share of 'developing

Table 2.5 Indicators of ease of doing business ranking of selected Asian countries, 2009

Economy	*Starting a business*	*Dealing with construction permits*	*Employing workers*	*Registering property*	*Getting credit*	*Protecting investors*	*Paying taxes*	*Trading across borders*	*Enforcing contracts*	*Closing a business*	*Overall rank*
Singapore	10	2	1	16	5	2	5	1	14	2	**1**
Hong Kong, SAR	15	20	20	74	2	3	3	2	1	13	**4**
Japan	64	39	17	51	12	15	112	17	21	1	**12**
Thailand	44	12	56	5	68	11	82	10	25	46	**13**
Malaysia	75	104	48	81	1	4	21	29	59	54	**20**
Korea	126	23	152	67	12	70	43	12	8	12	**23**
Taiwan	119	127	159	26	68	70	100	30	88	11	**61**
Pakistan	77	93	136	97	59	24	124	71	154	53	**77**
China	151	176	111	30	59	88	132	48	18	62	**83**
Vietnam	108	67	90	37	43	170	140	67	42	124	**92**
Sri Lanka	29	161	110	141	68	70	164	66	135	43	**102**
Bangladesh	90	114	132	175	59	18	90	105	178	106	**110**
Nepal	73	129	150	28	109	70	107	157	121	103	**121**
India	121	136	89	105	28	38	169	90	180	140	**122**
Indonesia	171	80	157	107	109	53	116	37	140	139	**129**
Philippines	155	105	126	97	123	126	129	58	114	151	**140**
Lao PDR	92	110	85	159	145	180	113	165	111	181	**165**

Source: World Bank, *Doing Business 2009* (http://www.doingbusiness.org)

Note:
The dataset covers 181 countries. Countries are ranked in ascending order (Best practicing country = 1).

Table 2.6 Asia in world trade (%)

	Total (non-oil) trade (%)			*Manufacturing trade (%)*			*Manufacturing share in total exports (%)*		
	1969/70	*1989/90*	*2006/07*	*1969/70*	*1989/90*	*2006/07*	*1969/70*	*1989/90*	*2006/07*
(a) Exports									
Asia	11.1	24.7	33.2	12.9	27.5	36.6	78.2	89.3	92.1
East Asia	11	23.8	29.9	12	26.7	33.7	72.5	90.3	91.5
Japan	6.3	10.4	6.5	8.9	12.7	7.8	93.4	94.1	94.8
Developing East Asia	4.7	13.4	23.8	3.1	14	26.1	44.3	84.3	86.2
North Asia	2.5	9.6	17.7	2.8	10.7	19.9	72.2	90.6	92.4
China	0.8	2.9	11.8	0.5	3	13.7	45.1	83.6	93.6
Hong Kong	0.9	1.7	0.7	1.3	2	0.7	95.1	96.5	91.3
Korea	0.3	2.2	3.0	0.3	2.6	3.5	75.4	93.6	90.1
Taiwan	0.6	2.7	1.9	0.6	3.1	2.2	71.5	91.9	89.6
ASEAN	2.2	3.9	6.1	0.4	3.3	6.2	11	68.2	71.0
Indonesia	0.3	0.5	0.9	0	0.4	0.7	3.8	55.6	47.1
Malaysia	0.8	1	1.7	0.1	0.7	1.8	7.2	60.4	78.6
Philippines	0.5	0.3	0.7	0.1	0.3	0.7	10.3	62.8	86.8
Singapore	0.2	1.1	1.3	0.1	1.3	1.5	45.9	91.2	74.3
Thailand	0.3	0.8	1.3	0	0.6	1.3	7.7	59.6	78.1
Vietnam	0	0	0.3	0	0	0.3	—	13.5	56.5
South Asia	0.1	0.9	1.6	0.9	0.8	1.3	52.1	71.5	74.4
India	0.9	0.6	1.2	0.7	0.5	1	55.9	71.5	71.1
Sri Lanka	0.1	0.1	0.1	0	0.1	0.1	8.2	62.2	75.7
Bangladesh	0	0.1	0.1	0	0.1	0.1	—	78.4	93
Pakistan	0	0.2	0.1	0.2	0.2	0.1	54.2	71.8	84.3
Memo items									
Developing countries	14.7	20.9	43	5.9	19.3	42.4	26.8	74.2	63.3
Developed countries	85.3	79.1	57	94.1	80.7	57.6	73.3	82.2	77.3
World	100	100	100	100	100	100	66.5	80.6	70.7
US$ bn	205	2386	9620	137	1922	8295			

(b) Imports									
Asia	13.6	21	24.7	10.1	19.3	24.9	49.2	76.2	67.8
East Asia	11.6	19.9	23.3	8.3	18.3	23.6	47.6	74.1	69.2
Japan	6.5	7	4.2	3	5	3.7	30.4	57.7	52.4
Developing East Asia	5.1	12.9	19.2	5.3	13.3	20	69.7	83	73.5
North Asia	2.7	9.5	13.8	2.7	9.6	14.4	72.9	80.9	74.3
China	0	2.3	6.8	0	2.3	6.8	92.3	81	73.9
Hong Kong	1.3	3.1	3.2	1.3	3.4	3.7	69.5	87.5	91.1
Korea	0.9	2.3	2.2	0.8	2.2	2.1	59.9	74.8	59
Taiwan	0.6	1.7	1.6	0.6	1.7	1.7	69.7	80.1	70.5
ASEAN	3.1	5.1	5.3	3.2	5.4	5.6	68.4	84.3	71.6
Indonesia	0.4	0.7	0.4	0.5	0.8	0.4	80.7	83	53.7
Malaysia	0.5	1	1.2	0.5	1	1.2	63.9	85.6	78
Philippines	0.5	0.4	0.5	0.6	0.3	0.5	77.3	76.4	75.3
Singapore	0.9	1.9	1.9	0.9	2.1	2.1	63.7	87.4	74.6
Thailand	0.5	1.1	1	0.7	1.1	1.1	85.9	84.1	68.1
Vietnam	0	0	0.4	0	0	0.35		60.3	68
South Asia	2	1.1	1.4	1.8	1	1.2	59	74.8	49
India	1.2	0.7	1.2	1.6	0.7	1	94.9	77.7	47.1
Sri Lanka	0.2	0.1	0	0.1	0.1	0	52.1	73.5	68.3*
Bangladesh	0	0.1	0	0	0.1	0		65.9	72.1*
Pakistan	0.7	0.2	0.2	0	0.2	0.2		68.1	57.2
Memo items									
Developing countries[1,3]	16.5	21.6	38.2	18.6	21.4	38.2	74.9	80	70.9
Developed countries[2,3]	83.5	78.4	61.8	81.4	78.6	61.8	64.8	80.7	70
World	100	100	100	100	100	100	66.5	80.6	70.3
US$ bn	205	2386	9620	137	1922	8295			

Source: Compiled from UN *Comtrade* database, and Trade Data CD-ROM, Council for Economic Planning and Development, Taipei (for data on Taiwan).

Notes:
1. Excluding Asian developing countries.
2. Excluding Japan.
3. Based on the UN country classification.

East Asia' (East Asia excluding Japan) recorded a fourfold increase (from 4.7 per cent to 23.8 per cent during this period. Notwithstanding the notable export expansion in recent years, South Asia still accounts for a mere 1.4 per cent of total world trade, equivalent to less than 5 per cent of Asia's total trade. Among the nine largest Developing East Asia (DEA) economies only Hong Kong, Indonesia and the Philippines have smaller world trade shares than India, which is by far the dominant South Asian economy.

In the 1970s and 1980s, Japan dominated the region's trade, accounting for nearly 60 per cent of its exports and imports. The picture has changed dramatically over the past two decades: between 1969/70 and 2006/7, the share of developing East Asia (DEA) share in total regional exports and imports increased from 42 per cent to 76 per cent, and 38 per cent to 80 per cent, respectively. The rise of China has been the dominant factor behind this structural shift, but the other countries in the region have also increased their world market shares. Thus, on first inspection, there is no indication of China 'crowding out' its neighbours (see Chapter 12 in this volume for a fuller enquiry into this issue). In the global context, Asia's market share gains have come predominantly at the expense of developed countries. The combined share of other developing countries (that is, all developing countries less Asian developing countries) has increased throughout the period, although of course at a slower rate than DEA.

Rapid export growth in Developing Asia (DA), mainly driven by the DEA group, has been underpinned by a pronounced shift in export structure away from primary commodities and toward manufactures (Tables 2.7 and 2.8). By 2005/7 manufactures accounted for 92.1 per cent of total exports from Asia, up from 78.3 per cent four decades ago. Given the nature of their resource endowments, Japan and the four Asian NIEs relied very heavily on manufacturing for export expansion from the outset. However, beginning in the 1970s, a notable shift towards manufacturing is observable across all countries, at varying speeds and intensity. Between 1969/70 and 2006/7 the share of manufacturing in total exports of developing Asian countries increased from 44.3 per cent to 86.2 per cent. The shares in ASEAN countries and South Asia respectively increased from a mere 11 per cent to 71.0 per cent and 52.1 per cent to 74.4 per cent between these two time points. Among individual countries Indonesia, Vietnam and Pakistan, and small latecomer Indo-China economies have a significantly lower share of manufactures in their exports, reflecting both their comparative advantage and their later adoption of export-oriented industrialization strategies.

Asia's share in total world manufacturing exports increased from 12.9 per cent in 1969/70 to 36.6 per cent in 2006/7. This increase came entirely from the DEA economies, since the share of Japan fell over this period (from 8.9 per cent to 7.8 per cent) and South Asia still accounted for a tiny share, around 1 per cent, at the end of the period (Table 2.6). From about the early 1990s, China's rise has been the key factor behind the rapid increase in the world market share of DA countries, but exports from Taiwan, Korea, and

Table 2.7 Commodity composition of manufacturing exports[4] (%)

	Chemicals (SITC 5)	*Resource based products (SITC 6 – SITC 68)*		*Machinery and transport equipments (SITC 7)*				*Miscellaneous manufacturing (SITC 8)*	
		Total	*Textiles*	*Total*	*ICT products[4] (SITC 75+76+772+776)*	*Electrical goods (SITC 77 – 772 – 776)*	*Road vehicles (SITC 78)*	*Total*	*Apparel (SITC 84)*
Asia									
1992/3	5.8	15.4	5.7	55.6	30.3	5.0	9.3	23.3	7.8
2006/7	7.6	13.4	3.3	58.0	35.1	6.0	7.6	21.1	6.2
East Asia									
1992/3	5.8	14.3	5.1	57.3	31.3	5.2	9.5	22.7	7.0
2006/7	7.4	12.3	2.9	59.8	36.4	6.2	7.7	20.5	5.4
Japan									
1992/3	6.4	10.1	1.7	74.0	29.4	5.1	20.2	9.4	0.2
2006/7	9.0	10.6	1.1	70.7	23.2	5.5	22.7	9.7	0.1
Developing East Asia									
1992/3	5.3	17.0	7.3	46.0	32.6	5.2	2.4	31.6	11.6
2006/7	6.9	12.8	3.4	56.7	40.3	6.4	3.4	23.6	7.0
North Asia									
1992/3	5.5	19.3	9.3	38.3	23.7	5.6	3.0	36.9	13.5
2006/7	6.0	14.1	3.9	53.9	36.3	7.0	3.7	26.1	7.4
Taiwan									
1992/3	6.8	23.7	11.5	50.9	30.5	6.1	4.7	18.6	3.5
2006/7	12.5	17.9	5.4	54.0	33.5	8.6	3.6	15.8	0.8
Korea									
1992/3	8.1	23.6	10.6	53.4	33.9	5.5	7.0	14.9	6.1
2006/7	10.4	13.0	3.1	67.2	39.1	4.8	12.7	9.4	0.9
China									
1992/3	4.2	15.7	7.5	24.8	14.8	5.4	0.9	55.3	20.1
2006/7	3.9	13.6	3.8	50.8	36.1	7.4	1.5	31.7	9.8
Hong Kong									
1992/3	3.1	15.8	9.0	35.7	24.9	5.1	0.4	45.4	23.1
2006/7	4.4	15.3	4.9	45.9	34.7	6.1	0.4	34.4	15.0

(Continued Overleaf)

Table 2.7 Continued

	Chemicals (SITC 5)	*Resource based products (SITC 6 – SITC 68)*		*Machinery and transport equipment (SITC 7)*				*Miscellaneous manufacturing (SITC 8)*	
		Total	*Textiles*	*Total*	*ICT products*[4] *(SITC 75+76+772+776)*	*Electrical goods (SITC 77 – 772 – 776)*	*Road vehicles (SITC 78)*	*Total*	*Apparel (SITC 84)*
ASEAN10									
1992/3	4.8	12.0	2.9	63.5	52.8	4.5	0.8	19.7	7.4
2006/7	9.7	8.8	1.6	65.7	53.1	4.3	2.6	15.8	5.5
Indonesia									
1992/3	5.9	41.8	11.5	13.2	9.2	1.7	0.9	39.1	16.7
2006/7	9.7	23.9	6.1	38.7	24.6	6.4	2.5	27.7	12.6
Malaysia									
1992/3	3.6	9.2	1.8	73.5	63.7	4.5	0.8	13.7	5.8
2006/7	5.9	6.5	0.8	78.0	70.7	3.4	0.6	9.6	2.3
Philippines									
1992/3	1.9	5.6	1.5	58.3	48.3	7.2	1.2	34.3	17.9
2006/7	1.3	3.1	0.6	85.2	74.9	6.4	1.4	10.4	4.9
Singapore									
1992/3	6.9	4.1	0.6	80.9	68.0	4.5	0.7	8.2	1.3
2006/7	20.7	3.7	0.3	67.6	55.6	2.8	0.5	8.0	0.3
Thailand									
1992/3	3.5	15.5	4.3	52.6	39.4	5.6	0.8	28.3	8.9
2006/7	9.3	13.1	2.3	62.1	39.6	5.1	9.0	15.6	4.8
Vietnam									
1992/3	1.3	12.5	6.4	3.9	0.9	0.5	0.9	82.3	42.8
2006/7	2.5	10.3	3.5	18.0	8.6	4.1	1.5	69.2	26.1
Other ASEAN									
1992/3	1.9	12.6	0.4	5.8	1.0	0.3	0.8	79.7	37.3
2006/7	0.3	4.0	1.0	2.0	0.5	0.3	0.6	93.7	85.6
South Asia									
1992/3	6.0	47.8	23.2	6.5	1.5	0.7	1.8	39.8	31.2
2006/7	13.0	40.3	14.3	11.6	1.9	2.0	2.6	35.2	25.5

India									
1992/3	8.5	50.7	16.8	9.2	2.0	0.9	2.7	31.7	21.8
2006/7	16.8	43.2	10.2	14.9	2.4	2.6	3.4	25.1	13.7
Bangladesh									
1992/3	2.8	15.6	8.8	1.2	0.2	0.1	0.1	80.5	77.9
2006/7	1.6	9.2	6.3	1.0	0.2	0.1	0.3	88.2	86.3
Pakistan									
1992/3	0.6	65.4	59.6	0.6	0.1	0.1	0.0	33.4	26.7
2006/7	2.9	59.1	54.7	1.3	0.2	0.1	0.2	36.6	29.2
Nepal									
1992/3	2.2	58.2	55.2	1.1	0.4	0.2	0.1	38.6	36.1
2006/7	15.0	47.9	34.5	2.8	0.3	1.2	0.1	34.3	24.7
Sri Lanka									
1992/93	1.2	19.7	5.4	4.1	1.7	1.1	0.2	75.1	65.4
2006/7	1.5	20.2	2.7	6.9	1.6	2.0	0.9	71.4	66.0
Memo items									
Developed countries[1,3]									
1992/3	14.8	22.2	7.4	54.3	15.7	4.4	14.9	13.6	1.9
2006/7	19.6	17.5	3.5	52.6	13.2	3.9	15.9	12.6	1.3
Developing countries[2,3]									
1992/3	8.2	17.3	2.9	41.9	24.9	5.1	4.1	27.7	11.4
2006/7	9.1	15.2	1.8	52.1	32.1	5.9	5.8	21.3	7.1
World									
1992/3	12.8	18.8	4.2	50.6	18.5	4.6	11.6	17.8	4.8
2006/7	15.1	16.2	2.5	52.4	21.2	4.8	11.6	16.3	3.8

Source: Compiled from UN Comtrade database, and Trade Data CD-ROM, Council for Economic Planning and Development, Taipei (for Taiwanese data)

Notes:
— Data not available
1. Excluding Asian developing countries.
2. Excluding Japan.
3. Based on the UN country classification.
4. ICT: Information and communication technology products.

Table 2.8 World exports shares of selected manufactured products (%)

	ICT products[4] *(75+76+772+776)*	*Electrical goods (77 – 772 – 776)*	*Road vehicles (78)*	*Textiles (SITC 65)*	*Apparel (SITC 84)*
Asia					
1992/3	49.5	33.1	24.1	40.4	49.5
2006/7	58.1	44.0	22.8	45.7	57.6
East Asia					
1992/3	49.5	33.0	23.9	35.0	43.0
2006/7	58.0	43.5	22.5	38.3	48.7
Japan					
1992/3	18.6	13.0	20.4	4.6	0.5
2006/7	8.3	8.8	14.8	3.4	0.2
Developing East Asia					
1992/3	30.8	19.9	3.5	30.3	42.6
2006/7	49.7	34.7	7.7	34.9	48.5
North Asia					
1992/3	15.6	14.7	3.2	26.7	34.3
2006/7	34.1	29.2	6.3	30.8	39.4
Taiwan					
1992/3	4.7	3.8	1.2	7.8	2.1
2006/7	3.6	4.1	0.7	4.8	0.5
Korea					
1992/3	4.7	3.1	1.6	6.5	3.3
2006/7	6.5	3.5	3.8	4.4	0.9
China					
1992/3	4.2	6.2	0.4	9.4	22.2
2006/7	22.8	20.6	1.7	20.2	35.1
Hong Kong					
1992/3	1.9	1.5	0.0	2.9	6.7
2006/7	1.2	0.9	0.0	1.5	3.0
ASEAN 10					
1994/5	15.3	5.3	0.4	3.7	8.3
2006/7	15.6	5.5	1.4	4.1	9.1
Indonesia					
1992/3	0.3	0.2	0.0	1.6	2.1
2006/7	0.8	0.9	0.1	1.6	2.2
Malaysia					
1992/3	5.4	1.5	0.1	0.7	1.9
2006/7	6.0	1.3	0.1	0.6	1.1
Philippines					
1992/3	1.0	0.6	0.0	0.1	1.4
2006/7	2.5	0.9	0.1	0.2	0.9
Singapore					
1992/3	6.5	1.7	0.1	0.2	0.5
2006/7	3.8	0.9	0.1	0.2	0.1
Thailand					
1992/3	2.1	1.2	0.1	1.0	1.8
2006/7	2.4	1.3	1.0	1.2	1.6

Vietnam					
1992/3	0.0	0.0	0.0	0.1	0.5
2006/7	0.1	0.2	0.0	0.4	1.9
Other ASEAN					
1992/3	0.0	0.0	0.0	0.0	0.2
2006/7	0.0	0.0	0.0	0.0	1.3
South Asia					
1992/3	0.1	0.2	0.2	5.5	6.5
2006/7	0.1	0.6	0.3	7.5	8.9
India					
1992/3	0.1	0.1	0.2	2.6	2.9
2006/7	0.1	0.5	0.3	3.9	3.5
Developed countries[1,3]					
1992/3	59.5	66.9	89.4	47.4	28.2
2006/7	35.8	47.5	78.9	40.8	19.6
Developing countries					
1992/3	40.5	33.1	10.6	52.6	71.8
2006/7	64.2	52.5	21.1	59.2	80.4

Source: Compiled from UN Comtrade database, and Trade Data CD-ROM, Council for Economic Planning and Development, Taipei (for Taiwanese data)

Notes:
— Data not available
1. Excluding Asian developing countries.
2. Excluding Japan.
3. Based on the UN country classification.
4. ICT: Information and communication technology products.

the ASEAN countries have also recorded impressive growth. China's share in world manufacturing exports increased from a mere 0.5 per cent in 1969/70 to 3 per cent in 1989/90 and to 13.7 per cent in 2006/7.

Within manufacturing, machinery and transport equipment (SITC 7), and especially information and communication technology (ICT) products and electrical goods have played a pivotal role in this structural shift (Tables 2.7 and 2.8). In 2006/7, this commodity category accounted for 58 per cent of total manufacturing exports from Asia, up from 55.6 per cent a decade ago (Table 2.7). This increase came from DEA countries whose share increased from 46.0 per cent to 56.7 per cent in a context where Japan's share declined from 74 per cent to 70.7 per cent. The share of machinery and transport equipment in the export structures of some of the more industrialized economies of East Asia is particularly high. By contrast, that for Indonesia, Vietnam and all of South Asia is much smaller. Within the machinery and transport equipment category, ICT products have been the most dynamic component of Asian export expansion. The share of Asia in world machinery and transport equipment exports increased from 14.5 per cent in 1994/95 to 42.4 per cent in 2005/7, with DEA accounting for over four-fifths of the increment. By 2006/7, over 58 per cent of total world ICT exports originated from Asia, up from 49.5 per cent in 1994/5 (Table 2.8); China accounted for

22.8 per cent of total world ICT exports, up from 4.2 per cent in 1994/5. In electrical goods, China's world market share increased from 3.1 per cent to 20.6 per cent between these two years.

Asia's share in the other main product categories has also increased over time, though at a slower rate. Of particular interest here is the notable increase in the region's share in miscellaneous manufacturing. This mostly consists of standardized labour-intensive manufactured goods, in particular clothing and footwear. China has accounted for much of this increase but, in contrast to ICT exports, the geographic participation has been broader. A number of low-wage countries in Southeast and South Asia, including Indonesia, Vietnam, India, Sri Lanka, Bangladesh and Cambodia (the latter included under 'Other ASEAN countries'), have all recorded impressive gains in market share.

The data presented in Table 2.9 help us understand changes over time in the export ranking of Asian countries compared to other developing countries. There has been a growing concentration of exports among the top ten countries over time: their share increased from 71.4 per cent in 1969/70 to 84.2 per cent in 2006/7. The rapid expansion of exports from the leading DEA countries has been the dominant cause of this increased concentration. The increase in China's share in total developing country exports, from 8.6 per cent in 1969/70 to 15 per cent in 1989/90 and then to 38.5 per cent in 2005/6, is particularly noteworthy. However, a close look at the table points to the fragility of the now-popular inference (Jomo 2007, Collier 2007), sometimes referred to as the 'new export pessimism', that East Asia's dominant position precludes other countries from success in export expansion.

In particular, there have been notable changes in the relative position of many countries in their overall ranking, and these shifts can be meaningfully related to effective domestic policy reform. Of particular note is India. Its ranking plummeted between 1969/70 and 1989/90 before recording a mild recovery following the policy reforms in the early 1990s. Malaysia and Thailand moved from the second and third deciles respectively to the top ten by 1989/90, and then consolidated their positions in the next one-and-a-half decades, notwithstanding their severe economic crises in 1997–98. Bangladesh and Sri Lanka have moved from the bottom to middle ranks over the past two decades. Moreover, data for the lower deciles of exporters (lower than reported here) reveal the emergence, and in some cases rapid growth, of newcomers. This again runs counter to the arguments of what may be termed the 'neo export pessimism school' that the East Asian early movers, and now China and India, are crowding out opportunities for latecomers. That is, even countries with highly unfavourable initial conditions have been able to achieve export success following reforms. It is worth recalling that Bangladesh had been written of as a 'basket case' in the 1970s and 1980s, that Sri Lanka has experienced a prolonged and vicious insurgency for most of the period under analysis, and that the Indo-China countries were cut off from the global economy for a decade or more and also experienced severe losses of human capital.

Table 2.9 Manufacturing exports from developing countries: country ranking in ascending order of export value, 1969/70, 1989/90 and 2006/07

	1969/70		*1989/90*		*2006/07*	
	Country	*Share (%)*	*Country*	*Share (%)*	*Country*	*Share (%)*
Top 10	**Hong Kong**	19.6	**Taiwan**	15.5	**China**	38.7
	Taiwan	8.6	**China**	15.0	**South Korea**	10.4
	India	8.6	**South Korea**	13.1	**Taiwan**	8.7
	China	7.5	**Hong Kong**	10.5	Mexico	6.2
	Yugoslavia	5.8	**Singapore**	6.5	**Malaysia**	5.2
	South Africa	5.3	Mexico	5.6	**Singapore**	4.3
	South Korea	5.1	Brazil	4.3	**Thailand**	3.6
	Mexico	4.9	**Malaysia**	3.8	**India**	**2.8**
	Pakistan	3.2	**Thailand**	3.0	Brazil	2.4
	Brazil	2.8	**India**	2.7	Turkey	2.2
	Subtotal	71.4	Subtotal	80.1	Subtotal	84.4
Second 10						
	Argentina	2.0	Yugoslavia	2.5	**Hong Kong**	1.9
	Singapore	2.0	**Indonesia**	1.9	**Philippines**	2.1
	Iran	1.8	Turkey	1.8	**Indonesia**	1.9
	Jamaica	1.2	**Philippines**	1.4	South Africa	1.0
	Malaysia	1.2	South Africa	1.1	**Vietnam**	0.8
	Philippines	1.2	Argentina	0.9	UAE	0.7
	Lebanon	0.8	**Pakistan**	0.8	Saudi Arabia	0.6
	Colombia	0.8	Saudi Arabia	0.8	Argentina	0.5
	Guatemala	0.8	Morocco	0.6	**Pakistan**	0.4
	Egypt	0.7	Tunisia	0.5	**Bangladesh**	0.4
	Subtotal	12.5	Subtotal	12.2	Subtotal	10.3
Third 10	Angola	0.7	Macao	0.5	Costa Rica	0.3
	Guinea	0.7	Liberia	0.4	Colombia	0.3
	Suriname	0.6	Panama	0.4	Morocco	0.3
	New Caledonia	0.6	Dominican Republic	0.4	Tunisia	0.3
	El Salvador	0.6	UAE	0.3	Egypt	0.2
	Panama	0.6	Venezuela	0.3	Chile	0.2
	Thailand	0.5	Colombia	0.3	Venezuela	0.2
	Trinidad & Tobago	0.5	**Bangladesh**	0.3	Croatia	0.2
	Chile	0.5	**Sri Lanka**	0.3	**Sri Lanka**	0.2
	Sierra Leone	0.5	Chile	0.2	Dominican Republic	0.2
	Subtotal	5.9	Subtotal	3.5	Subtotal	2.6
The rest		4.5		1.9		1.3
Total		100		100		100
US$ bn		11		409		2834

Source: Compiled from UN *Comtrade* database.

Notes:
UAE is United Arab Emirates

Network trade

The fast growth of machinery trade in Asia has been driven by the rapid growth of international fragmentation of production in world trade and the increasingly deep integration of East Asian countries into the global production networks (Athukorala 2006b, Kimura 2006, McKendrick *et al.* 2000). International production fragmentation has become one of the defining characteristics of world trade over the past few decades. The electronics MNEs based in the USA started the process in the late 1960s in response to increasing pressures of domestic real-wage increases and rising import competition from low-cost sources. However, unfavourable investment climate in these countries – macroeconomic instability, political tensions, trade union upheavals and uncertainty – led American producers to switch to sub-suppliers located in East Asia (Helleiner 1973, Grunwald and Flamm 1985, Feenstra 1998, Brown and Linden 2005).

Linking Southeast Asia to the global electronics production networks began in 1968 with the arrival of two US companies, National Semiconductors and Texas Instruments, to set up plants in Singapore to assemble semiconductor devices (Athukorala 2008, Goh 1993). By the beginning of the 1970s Singapore had the lion's share of offshore assembly activities of the US and European semiconductor industries. Virtually every international electronics producer was present in Singapore by the mid 1980s, when the hard disk drive (HDD) assemblers entered the country, further boosting its role as a global assembly centre (see Chapter 4 in this volume). During the next five years semiconductor production declined in relative importance, and computer peripherals, especially hard disk drives and computers, became the more important part of the island's electronic industry.

From about the late 1970s, the MNEs with production facilities in Singapore began to relocate some low-end assembly activities in neighbouring countries (particularly in Malaysia, Thailand and the Philippines) in response to the rapid growth of wages and land prices. Many newcomer MNEs to the region also set up production bases in these countries, bypassing Singapore. By the late 1980s, this process had created a new regional division of labour, based on skill differences involved in different stages of the production process and relative wages, and improved communication and transport infrastructure. From about the early 1990s the emergence of China as the 'global factory' of electrical and electrical goods assembly based on parts and components imported from other countries has contributed to rapid expansion of network trade in the region (see Chapter 10 in this volume). More recently, regional production networks have begun to expand to Vietnam. Over the years Singapore's role in regional production networks has gradually shifted from low-skill component assembly and testing to component design and fabrication and providing headquarter services for production units located in neighbouring countries.[10]

The best available indicator of the intensity of fragmentation-based specialization is the share of parts and components in total manufacturing trade.[11] World trade in parts and components increased from about $502 billion (18.9 per cent of total exports) in 1992/3 to over $1,800 billion (22.3 per cent) in 2005/7, accounting for nearly a fourth of the total increment in world manufacturing exports between these two years. There has been a palpable shift in component production away from mature industrial economies toward developing countries (Table 2.10). The share of developing countries in total component trade increased from 27 per cent in 1992/3 to 47 per cent in 2006/7, driven primarily by the growing importance of East Asian countries in global production-sharing. The share of East Asia (including Japan) in total world exports of components increased steadily from 27 per cent in 1992/3 to 39 per cent in 2006/7, despite a notable decline in Japan's share in recent years. The share of DEA (East Asia excluding Japan) increased from 17.8 per cent to 32.3 per cent in the same period. In 2006/7, DEA accounted for over two thirds of the total component trade of developing countries. Developing countries, led by DEA, account for over 70 per cent

Table 2.10 Geographic profile of world trade in parts and components, 1992/3 and 2005/6 (%)

	Exports		*Imports*	
	1992/3	*2006/7*	*1992/3*	*2006/7*
East Asia	30.1	40.6	24.4	38.1
Japan	15.7	10.0	3.3	4.0
Developing East Asia	14.4	30.6	21.1	34.1
Korea	2.3	4.9	2.7	2.7
China	1.1	10.9	2.4	11.5
Hong Kong, SAR	1.7	0.8	3.6	6.1
Taiwan	3.3	3.3	2.8	2.6
ASEAN 10	6.1	10.7	9.6	11.1
Indonesia	0.1	0.5	0.9	0.3
Malaysia	2.1	3.8	2.6	2.8
Philippines	0.6	2.1	0.5	1.4
Singapore	2.5	2.7	4.0	4.9
Thailand	0.8	1.4	1.6	1.4
Vietnam	0.0	0.1	0.0	0.2
Other ASEAN	0.0	0.0	0.1	0.0
South Asia	0.1	0.3	0.6	0.7
India	0.1	0.3	0.4	0.6
NAFTA	24.8	17.6	26.9	20.4
Mexico	2.4	2.7	1.9	3.4
EU15	36.0	27.7	38.3	28.7
Developed countries	76.2	53.9	69.7	51.6
Developing countries	23.8	46.1	30.3	48.4
World	100	100	100	100
	502	1762	502	1762

Source: Compiled from UN *Comtrade* database (importer records).

of the expansion in world parts and components trade during the period from 1995 to 2007. World market shares of ASEAN countries, with the exception of Singapore, have grown faster compared to the regional average. India remains a relatively minor participant in global production networks. In 2005/6 for instance, India accounted for a mere 0.3 per cent of component exports.

Table 2.11 presents comparative statistics on the share of components in total manufacturing exports, imports, and total manufacturing trade (imports + exports), disaggregated by major product categories. It is evident that the share of components in East Asia trade is much higher than that of all other regions in the world. In 2006/7, components accounted for over 35 per cent of total manufacturing trade from DEA, compared to the world average of 22.2 per cent. Within East Asia, ASEAN countries stand out for their heavy dependence on production fragmentation trade, accounting for 44 per cent of total manufacturing exports, a critical part of their export dynamism. The data for all countries and country groups show that parts and components account for a much larger shared of exports and imports of ICT

Table 2.11 Share of parts and components in manufacturing trade, 2006/7 (%)

	Exports			*Imports*		
	Total mfg.	*Machinery (SITC 7)*[1]	*Misc. mfg (SITC 8)*	*Total mfg.*	*Machinery (SITC 7)*[1]	*Misc. mfg (SITC 8)*
Asia	26.3	42.1	4.2	36.1	59.3	8.2
East Asia	26.9	43.3	4.9	35.9	59.3	8.4
Japan	29.4	39.5	14.7	24.6	48.3	5.8
Developing East Asia	26.2	44.6	3.7	37.9	60.9	9.4
Taiwan	32.7	56.2	15.4	34.3	57.6	12.3
Korea	31.4	46.1	4.8	28.3	51.6	9.7
China	18.1	34.2	2.5	37.6	60.2	10.2
Hong Kong	24.6	50.4	4.1	36.8	61.4	5.3
ASEAN 10	38.3	57.3	4.2	43.8	65	13.6
Indonesia	18.6	46.8	1.6	16.9	34.1	11.7
Malaysia	46.8	59.2	7.2	51.1	68.8	20.6
Philippines	65.8	76.5	5.9	64.1	83	29.7
Singapore	41.6	60.7	7.3	52.7	69.5	12.5
Thailand	25.3	39.3	5.9	30	53.8	8.1
Vietnam	8	41.2	0.8	11.5	30.3	7.6
Other ASEAN	0.7	31.2	0.1	11.5	25.4	1.8
South Asia	5.1	42.2	0.7	13.3	26.7	6.4
India	6.5	41.4	1.3	14.4	28.9	6.7
World	22.3	40.7	5.9	22.3	40.7	5.8

Source: Compiled from UN *Comtrade* database, and Trade Data CD-ROM, Council for Economic Planning and Development, Taipei (for data on Taiwan)

Note:
1. Machinery and transport equipment

products and electrical goods sub-categories compared to the other product categories. Also, the import and export shares of parts and components in these two commodity groups are strikingly similar in magnitude, reflecting two-way trade occurring within production networks. These patterns are much more prominent for the East Asian economies compared to the rest of the world.

China's manufacturing trade patterns differ from its East Asian neighbours. In particular, the components share in its total manufacturing imports is much larger compared to the corresponding share in its manufacturing exports. This difference is consistent with our earlier observation that China's rise in world trade has brought about a notable shift in the division of labour within regional production networks, with ASEAN countries playing an increasing role in producing parts and components for the rapidly growing final assembly activities in China.

Direction of trade

We have already drawn attention to the importance of fragmentation-based trade in East Asia's rising economic interdependence. We now examine the implications of this new form of international specialization for the relative importance of intra-regional versus global economic integration, and the way in which latecomers in the region are hooking into the growth process. These two issues are central to the contemporary debate on growth dynamism and the process of intra-regional versus inter-regional economic integration in Asia and elsewhere.

There is a vast literature on what may be termed 'standard trade data analysis', that is, essentially based on the traditional notion of horizontal specialization, in which trade is an exchange of goods that are produced from start to finish in just one country. This literature unequivocally points to a persistent increase in intra-regional trade in East Asia, whether or not Japan is included, from about the early 1980s.[12] This evidence figures prominently in the current regional debate concerning the establishment of regional trading arrangements covering some or all countries in East Asia. In particular, the proponents of expanding the ASEAN Free Trade Area (AFTA) to encompass Japan, China and South Korea (the ASEAN+3 proposal), and more broadly towards an 'Asian Economic Community', and of various proposals for monetary integration in the region, often refer to deepening economic interdependence, as reflected in intra-regional trade among these countries, as evidence of likely success of these initiatives. Another implication of the highly publicized apparent trade integration in the region was the so-called 'decoupling' thesis, which was a popular theme in Asian policy circles in the first decade of the new millennium until the onset of the recent financial crisis.[13] This thesis held that the East Asian region had become a self-contained economic entity with potential for maintaining its own growth dynamism independent of the economic outlook for the traditional developed market economies.

The above discussion on the emerging patterns of intra-regional component trade casts doubts on the validity of these inferences. We have noted two important peculiarities of trade in East Asia compared to global trade patterns. First, component trade has played a much more important role in trade expansion in East Asia compared to the rest of the world. Second, trade in components accounts for a much larger share in intra-regional trade than is the case for the rest of the world. Given these two peculiarities, conventional trade flow analysis is bound to yield a misleading picture as to the relative importance of intra-regional trade, as compared to global trade, for growth in East Asia. This is because growth based on assembly activities depends on the demand for final goods, which in turn depends on extra-regional growth.

To illustrate these arguments intra-regional trade shares estimated separately for total manufacturing trade component trade and final manufacturing trade (that is, total manufacturing trade less component trade) are reported in Table 2.12. The table covers trade in East Asia[14] and three sub-regions therein which relate to contemporary Asian policy debate on regional integration. Data for NAFTA and EU are reported for comparative purposes. Estimates are given for total trade (imports + exports) as well as for exports and imports separately in order to illustrate possible asymmetry in trade patterns resulting from East Asia's increased engagement in fragmentation-based international exchange.

Trade patterns depicted by the unadjusted (standard) trade data affirm the 'received' view that Asia, in particular East Asia, has become increasingly integrated through merchandise trade. In 2006/7 intra-regional trade accounted for 55.1 per cent of total manufacturing trade, up from 53.2 per cent in 1992/3. The level of intra-regional trade in East Asia was higher than that of NAFTA throughout this period and was rapidly approaching the level of EU-15. For developing East Asia (Asia excluding Japan) and ASEAN +3, the ratios are lower than the aggregate regional figure, but they have increased at a much faster rate. The intra-regional trade share of ASEAN has been much lower compared to the other two sub-regions.

However, the picture changes significantly when parts and components are netted out: intra East Asian share in final trade (total trade – parts and components) in 2006/7 was 46.4 per cent, down from 50.3 per cent in 1992/3. The estimates based on unadjusted data and data on final trade are vastly different for East Asia, particularly for DEA and ASEAN. Both the level of trade in the two given years and the change over time in intra-regional trade shares are significantly lower for estimates based on final trade. Interestingly, we do not observe such a difference in estimates for NAFTA and EU.

The intra-regional shares calculated separately for imports and exports clearly illustrate the risk of making inferences about regional trade integration based on total (imports + exports) data. There is a notable asymmetry in the degree of regional trade integration in East Asia. Unlike in EU and NAFTA, in East Asia the increase over time in intra-regional trade ratio (both

Table 2.12 Intra-regional shares of manufacturing trade: total, parts and components, and final trade (%), 1992/3 and 2006/7[1]

	East Asia[2]	*Developing East Asia*[2]	*ASEAN+3*[1]	*ASEAN*	*NAFTA*	*EU15*
4.1: Total Manufacturing[2]						
4.1a: Total						
Exports						
1992/3	47.2	38.2	15.3	20.7	44.4	61.2
2006/7	43.9	33.4	21.9	18.4	48.1	56.9
Imports						
1992/3	58.2	34.9	43.0	15.5	36.3	64.1
2006/7	64.4	46.7	49.3	20.8	32.0	57.9
Trade (exports + imports)						
1992/3	53.2	36.5	27.0	17.8	39.9	62.6
2006/7	55.1	40.0	30.4	20.1	38.4	57.4
Parts and components						
Exports						
1992/3	50.2	42.6	33.7	30.3	43.5	62.3
2006/7	61.1	53.9	35.3	25.4	46.9	55.9
Imports						
1992/3	65.9	35.3	39.6	20.2	39.5	58.0
2006/7	66.9	50.9	47.8	22.9	39.9	55.2
Trade						
1992/3	57.0	38.7	35.4	24.2	41.4	60.1
2006/7	62.9	52.1	40.2	23.1	43.2	55.5
Final goods[3]						
Exports						
1992/3	46.0	36.8	11.4	16.1	44.7	60.9
2006/7	36.9	28.3	17.0	15.9	48.7	57.0
Imports						
1992/3	55.4	34.7	43.4	12.9	35.3	65.6
2006/7	63.0	42.8	50.2	20.6	30.2	58.5
Trade						
1992/3	50.3	35.7	25.4	14.3	39.4	63.2
2006/7	46.4	34.0	29.1	18.0	37.3	57.7

Source: Compiled from UN *Comtrade* database, and Trade Data CD-ROM, Council for Economic Planning and Development, Taipei (for data on Taiwan)

Notes:
1. Intra-regional trade shares have been calculated excluding bilateral flows between China and Hong Kong.
2. SITC 5 to 8 less SITC 68.
3. Total (reported) trade – parts and components.

measured using unadjusted data and data for final trade) has emanated largely from a rapid increase in intra-regional imports; the expansion in intra-regional exports has been consistently slower. The dependence of East Asia (and country sub-groups therein) on extra-regional markets (in particular those in NAFTA and EU) for export-led growth is far greater than is revealed by the standard intra-regional trade ratios commonly used in the debate on regional economic integration. For instance, in 2006/7 only 43.9 per cent of total East Asian manufacturing exports were absorbed within the region, compared to an intra-regional share of 64.4 per cent in total manufacturing imports. For developing East Asia the comparable figures were 33.4 per cent and 46.7 per cent respectively. This asymmetry is clearly seen across all sub-regions within East Asia. The asymmetry between intra-regional shares of imports and exports is therefore much sharper when the parts and components are netted out. This is understandable given the heavy 'component bias' in Asian intra-regional trade and the multiple border-crossing of parts and components within regional production networks. On the export side, the intra-regional share of final goods declined continuously from 46 per cent in 1995 to 37 per cent in 2007, whereas intra-regional import share increased from 56 per cent to 63 per cent between these two time points.

This asymmetry in intra-regional trade in East Asia reflects the unique nature of the involvement of Japan and China in regional production networks. From about the late 1980s Japan's manufacturing trade relations with the rest of East Asia have been predominantly in the form of using the region as an assembly base for meeting demand in the region and, more importantly for exporting to the rest of the world (Athukorala and Yamashita 2008). The emergence of China as a leading assembly centre within regional production networks since the early 1990s has further amplified this trade asymmetry. That is, China is importing parts and components from the other East Asia countries to assemble final products which are predominantly destined for markets in the rest of the world (Athukorala 2009a).

In sum, these data support the hypothesis that, where fragmentation-based trade is expanding rapidly, the standard trade flow analysis can generate misleading inferences regarding the process of economic integration through trade. When data on assembly trade are excluded from trade flows, these estimates suggest that extra-regional trade is much more important than intra-regional trade for continued growth in East Asia, whether or not Japan is included. Thus, the rising importance of product fragmentation seems to have strengthened the case for a global approach to trade and investment policy-making rather than a regional one.

This inference is basically consistent with the behavior of trade flows in East Asia countries following the onset of the global financial crisis (Athukorala and Kohpaiboon 2009). All major East Asian countries (including China, which was expected to cushion the rest of East Asia against a global economic collapse) experienced a precipitous trade contraction from about the last quarter of 2007, revealing the fragility of the decoupling thesis. The remarkably synchronized nature of the trade contraction across countries in the region is generally consistent with close trade ties among the East Asian countries forged within regional production networks. Taiwan, Korea and Japan have suffered the highest rates of contraction in exports to China compared to the other countries in the region, reflecting their greater dependence on that market. China's imports from most countries in the region have contracted at a much faster rate compared to exports, perhaps an indication of restocking of imported parts and components by Chinese firms given the gloomy outlook for exports. China's growth rate was sustained in 2009, after an initial slowdown, not because of any trade decoupling but rather because of the government's massive fiscal stimulus during the year.

Investment patterns

This section begins with an overview of the comparative performance of developing Asian countries as hosts to MNEs. It examines the emerging patterns of source-country and industry composition of FDI flows. It also makes inferences about the prospects for attracting FDI in the context of the contemporary debate on the possible crowding-out effect on other Asian countries of China's emergence as an attractive location for FDI.

Table 2.13 provides data on gross FDI flows to developing Asian countries in a comparative global context. In Table 2.14 the same data are presented as a percentage of gross domestic capital formation (GDCF) of each country/region in order gain some idea of the relative economic significance. The data used here come from the *World Investment Report* (WIR) of the UNCTAD, which is now the most widely accepted data source.

Table 2.13 FDI inflows, 1984–2007

	1984–5[1]	*1989–90*[1]	*1994–5*[1]	*1999–2000*[1]	*2004–5*[1]	*2006*[1]	*2007*[1]
(a) World, US$ billion	56.8	403.9	597.9	2486.7	1676.4	1411.1	1833.3
(b) Share in world inflows							
Developing economies[2] (%)	11.2	16.3	36.7	19.5	35.8	29.3	27.3
Asia	3.9	9.6	24.1	10.3	19.1	15.0	13.5
Japan	0.1	0.1	0.1	0.0	0.2	0.2	0.0
Developing Asia[3]	3.8	9.5	24.1	10.2	18.9	14.8	13.5
East Asia	1.9	4.3	15.1	7.8	13.3	9.3	8.5
China	1.2	1.7	11.9	3.3	7.9	5.2	4.6
Hong Kong SAR	0.4	1.3	2.3	3.5	4.0	3.2	3.3
Taiwan	0.2	0.7	0.5	0.3	0.2	0.5	0.4
South Korea	0.1	0.4	0.3	0.8	1.0	0.3	0.1
Southeast Asia	1.8	5.1	8.1	2.1	4.4	3.6	3.3
Indonesia	0.2	0.4	1.1	–0.3	0.6	0.3	0.4
Malaysia	0.5	1.1	1.7	0.3	0.5	0.4	0.5
Philippines	0.1	0.3	0.5	0.1	0.2	0.2	0.2
Singapore	0.8	2.1	3.4	1.3	2.0	1.8	1.3
Thailand	0.2	1.1	0.6	0.4	0.8	0.6	0.5
Vietnam	—	. . .	0.6	0.1	0.2	0.2	0.4
South Asia	0.1	0.2	0.8	0.3	1.2	1.8	1.7
India	—	0.1	0.5	0.2	0.8	1.4	1.3
Pakistan	—	0.1	0.2	0.0	0.2	0.3	0.3

(*Continued Overleaf*)

Table 2.13 Continued

	1984–5[1]	*1989–90*[1]	*1994–5*[1]	*1999–2000*[1]	*2004–5*[1]	*2006*[1]	*2007*[1]
(c) Share in inflows to developing countries (%)							
Developing Asia[3]	33.9	58.2	65.5	52.5	52.8	50.6	49.6
East Asia	16.6	26.1	41.1	40.1	37.1	31.9	31.4
China	10.6	10.4	32.5	16.7	22.2	17.6	16.7
Hong Kong SAR	3.2	8.1	6.4	17.8	11.3	10.9	12.0
Taiwan	1.7	4.4	1.3	1.6	0.6	1.8	1.6
South Korea	1.1	2.3	0.9	3.9	2.7	1.2	0.5
Southeast Asia	16.3	31.1	22.2	10.8	12.4	12.4	12.1
Brunei Darussalam	. . .	. . .	0.3	0.3	0.1	0.1	0.0
Cambodia	. . .	. . .	0.1	0.1	0.1	0.1	0.2
Indonesia	1.7	2.7	3.0	–1.3	1.7	1.2	1.4
Lao PDR	0.0	0.0	0.1	0.0	0.0	0.0	0.1
Malaysia	4.7	6.5	4.7	1.6	1.4	1.5	1.7
Myanmar	0.0	0.4	0.2	0.1	0.1	0.0	0.1
Philippines	0.8	1.7	1.4	0.7	0.4	0.7	0.6
Singapore	7.4	12.8	9.1	6.8	5.6	6.0	4.8
Thailand	1.8	6.7	1.6	1.9	2.3	2.2	1.9
Vietnam	0.0	0.3	1.7	0.6	0.6	0.6	1.3
South Asia	0.9	1.0	2.2	1.6	3.4	6.2	6.1
Bangladesh	. . .	. . .	. . .	0.2	0.2	0.2	0.1
India	0.4	0.7	1.4	1.2	2.2	4.8	4.6
Pakistan	0.3	0.7	0.6	0.2	0.6	1.0	1.1
Sri Lanka	0.2	0.1	0.1	0.1	0.1	0.1	0.1

Source: Compiled from UNCTAD World Investment database.

Notes:
1. Annual averages
2. Based on the United Nations standards classification
3. Countries in East Asia (other than Japan), Southeast Asia (ASEAN) and South Asia.
. . . Zero or negligible.

Before proceeding to analysis, a cautionary note about the data quality is in order. Not all countries record every component of FDI flows. According to the standard definition, FDI consists of three components. These are: (a) Equity capital, that is, the shares owned by the foreign direct investor (MNE) in its affiliate firms; (b) Retained earnings, that is, the MNE's share (in proportion to its direct equity participation) of earnings not distributed as dividends by affiliates, or earnings not remitted to the parent company (such retained profits that are reinvested by affiliates); and (c) Intra-company loans or intra-company debt transactions (except that for working capital), referred to as short- or long-term borrowing and lending of funds between the parent company and affiliated enterprises. For most countries, the data series on FDI capture only equity capital and inter-company debt; in fact, the majority of countries do not report data on the third component.[15] There is evidence that the retained earnings component in FDI is positively related to the years of operation of firms in a given country, and that US MNEs have a general tendency to rely more on retained earnings for investment expansion

Table 2.14 FDI inflows as % of gross domestic fixed capital formation (GDFCF), 1984–2007

	1984–5[1]	*1994–5*[1]	*1999–2000*[1]	*2004–5*[1]	*2006*	*2007*
World	2.2	4.8	18.3	9.0	12.9	14.8
Developed economies[2]	2.1	3.9	19.1	7.7	12.8	15.6
Developing economies[2]	2.8	8.1	15.8	11.9	12.5	12.6
Developing Asia[3]	2.3	7.9	12.1	9.9	11.0	10.6
East Asia	1.9	9.0	14.8	9.3	8.7	8.6
China	1.8	15.9	10.4	7.7	6.4	5.9
South Korea	0.6	0.6	6.6	3.8	1.9	0.9
Taiwan	2.2	2.3	5.3	2.4	9.6	10.1
South-East Asia	4.5	12.1	20.1	19.0	20.2	19.6
Brunei Darussalam	0.9	21.6	73.3	29.1	28.5	11.3
Cambodia	–	30.0	31.7	23.1	34.3	52.3
Indonesia	1.3	6.1	6.5	7.9	5.6	6.4
Lao PDR	***	38.6	25.9	2.6	17.7	26.1
Malaysia	7.4	15.2	19.2	15.9	18.5	20.6
Myanmar	0.0	23.2	31.9	18.5	7.0	20.4
Philippines	2.0	9.7	11.3	9.0	18.0	14.3
Singapore	14.3	38.6	58.4	65.7	79.9	60.0
Thailand	2.5	2.7	18.1	14.9	15.3	14.6
Viet Nam	0.0	41.5	17.5	11.1	11.6	25.4
South Asia	0.2	1.7	2.4	3.3	6.2	5.7
Bangladesh	***	0.6	4.0	4.1	4.5	3.4
Bhutan	***	***	0.3	1.4	1.2	11.3
India	0.1	1.7	2.7	3.1	6.6	5.8
Maldives	1.3	6.7	7.1	3.3	2.8	2.6
Nepal	0.2	***	0.2	0.1	***	0.4
Pakistan	0.7	4.4	3.4	8.8	16.8	17.4
Sri Lanka	1.9	3.6	4.2	4.7	6.8	6.6

Source: Compiled from UNCTAD World Investment database.

Notes:
1. Annual averages
2. Based on the United Nations standard classification
3. East Asia (excluding Japan) + Southeast Asia + South Asia.

*** Data not available.

compared to MNEs from other countries (Lipsey 2000). This problem of data coverage can lead to considerable underestimation of the actual magnitude of FDI, depending on the history of MNE involvement and the source country profile of FDI. Even for the components for which data are available, the quality varies considerably across countries. For instance, some countries (such as China and Hong Kong) do not make an adequate distinction between portfolio investment and foreign direct investment. For these reasons, a comparison of data among countries, and even over time for a given country, should be made with caution. Moreover, the data coverage tends to vary over time in a given country because of changes made to the data recording system.[16]

Total FDI flows to developing Asia increased sharply from an average annual level of $6.4 billion in 1994/5 to $247 billion in 2007. The share of Asia in total FDI flows to developing countries increased from 33.9 per cent to 49.6 per cent over this period. As a share of total global flows, the increase was from 3.8 per cent to 13.5 per cent (Table 2.13). FDI inflows as a share of GDCF have been significantly higher than the comparable figure for all developing countries throughout the period 1984/5–1994/5, followed by a minor reversal in the pattern during the years of the Asian financial crisis, 1997–99 (Table 2.14). The average FDI/GDCF percentage for developing Asia for the entire period 1984/5–2007 was 9.5 per cent, compared to 6.1 per cent for all developing countries and a global average of 7.2 per cent.

A notable feature within developing Asia is the dramatic increase in inflows to China. During the first four years of reforms, 1979 to 1983, inflows were rather modest, amounting to about $2 billion. FDI inflows began to gather momentum in the latter half of the 1980s, but were interrupted by the Tiananmen Square incident in 1989. Then, from 1991, FDI began to increase dramatically (Huang 2003a, Naughton 2007). Over the past two decades China has been by far the largest developing country recipient of inward FDI. China's share in total FDI inflows to all developing and transition economies increased from 10.4 per cent during 1989/90 to 22.2 per cent during 2004/5, followed by a decline to 16.7 in 2007. For the seven years from 2000 to 2007, China has been the second largest recipient of foreign investment in the world, at about $50 billion per annum and accounting for 7 per cent of total world gross inflows. Only the USA, with about $140 billion per annum, or 13 per cent of total inflows, received more FDI. China's share in inflows to Asian developing countries increased from 11.5 per cent during 1984/5 to 48.3 per cent during 2000 to 2007, and it has accounted for well over half of the total increment in FDI inflows to the region during this period.

Total FDI flows to the ASEAN countries increased sharply from an average annual level of $3 billion in the second half of the 1980s to nearly $30 billion during the six years before the onset of the recent financial crisis. At the time the region accounted for one quarter of total inflows to developing countries and a little over a third of total inflows to developing Asia. Singapore, Malaysia, Thailand and Indonesia were among the eight largest developing country recipients of FDI. Flows to the Philippines continued to remain low by international standards, but they increased from $40 million to over $1 billion by the mid 1990s. The lion's share of ASEAN's FDI inflows was absorbed by Singapore – 50 per cent of the regional total in the 1980s and 40 per cent in the 1990s – while Indonesia, Malaysia and Thailand absorbed most of the remainder. In the first half of 1990s, net capital inflows relative to gross domestic fixed capital formation (GDFCF) stood at over 30 per cent in Singapore, 19 per cent in Malaysia, 10 per cent in the Philippines, and 4 per cent in Thailand.

As they opened up, the transition economies of Cambodia, Laos and especially Vietnam recorded strong FDI inflows from the first half of the 1990s, before faltering during the latter part of the decade. In these countries, FDI accounted for much larger shares of GDFCF,[17] reflecting continuing low levels of domestic private investment until recently as a result of the insecure investment climate for local SMEs.

Did the ASEAN countries maintain their impressive record of attracting FDI during and after the 1997–8 economic crisis? According to the annual WIR data total inflows to the region declined considerably, from about $35 billion per annum prior to 1997 to an annual average of about $24 billion during 1997–9. However, the post-crisis experiences of individual countries varied substantially. Indonesia recorded negative FDI inflows until 2004, contributing significantly to the decline in total flows to the region. When the three atypical boom years, owing to abnormal investor euphoria, prior to the onset of the crisis are excluded, there is no discernible break in the trend of FDI inflows to Singapore, Thailand and the Philippines. Inflows to Korea recorded a notable increase. It could well be that the prolonged period of policy and political uncertainty following the onset of the crisis, and widespread market scepticism about Malaysia's unorthodox reform package introduced in September 1998, may have played a role. The two extreme cases of Indonesia (continuous contraction until 2003) and the Philippines (continuous increase until its own political woes from 2001) clearly suggest the post-crisis decline in FDI inflows to the region was a temporary aberration associated with economic disruption and political turbulence caused by the crisis. Moreover, there is evidence that the decline in FDI after the onset of the crisis was by and large limited to domestic market-oriented investment, while FDI in export-oriented industries continued to increase throughout the period, boosted by the now highly competitive exchange rates (Athukorala 2003).

It is also important to note that the continuation of the crisis-driven decline in FDI inflows to these countries well beyond the period of recovery after the crisis (that is, beyond 2000) was largely a reflection of a large overall decline in global FDI flows during 2000 to 2003 (UNCTAD 2005), and a global downturn in electronics. Total inflows during the four years from 2001 to 2004 were 24 per cent lower than the comparable figure for the preceding three years, 1998 to 2000.[18] Interestingly, FDI inflows to the crisis-affected Asian countries and to developing Asia in general seemed to have been remarkably resilient in the face of this massive global contraction.

The 1990s saw a marked increase in FDI to India, a trend that represents a clear break from the preceding two decades. India's share of FDI in total developing country inflows increased from 0.4 per cent in the 1980s to over 1.5 per cent in the first two years of the new millennium. As a share of GDFCF the increase was from less than 0.3 per cent to over 3 per cent between these time points.[19] Nevertheless, the increase has to be seen in perspective. Total annual FDI inflows to India during 2000 to 2007 were just 10 per cent and 8 per cent respectively of those into China and ASEAN (Table 2.13).

A notable aspect of FDI flows to India is that they have behaved quite independently of the global trends in FDI inflows to developing countries. This pattern clearly suggests that the domestic investment climate – that is, demand-side factors in the investment market – has been the prime mover of investment flows to the country. FDI inflows to Bangladesh, Pakistan and Sri Lanka have registered notable increases over the past two decades, but they still account for a tiny share of total flows to developing countries, and are dwarfed by those into DEA.

The China fear

As observed above, FDI inflows to developing Asia from the mid 1990s have been dominated by the dramatic growth of FDI inflows to China, accompanied by a sharp decline in the share of almost every other country in regional and global inflows. These contrasting patterns, coupled with some anecdotal evidence of foreign firms relocating to China,[20] have led to serious concern, particularly in Southeast Asia, where the growth dynamism for over two decades relied heavily on FDI, that 'competition' from China has begun to erode their prospects for attracting FDI, hence jeopardizing a pivotal element of their outward-oriented growth strategy.[21] Some of the FDI inflows to China could well have been at the expense of other countries, but it would be a mistake to overstate the 'China fear'.

First, there is some controversy over China's actual FDI inflows (Wei 2000, Pomfret 1991, Naughton 2007). Part of the reported FDI from Hong Kong, which has accounted for over 40 per cent of total FDI inflows to China over the past ten years, is 'round tripping' capital. That is, it is investment that originated from the mainland and returned to it in the guise of 'Hong Kong investment' to take advantage of tax, tariff and other benefits accorded to foreign-invested firms. It is variously estimated that these flows constitute about 15 per cent of Hong Kong investment in China. Also, the official Chinese statistics on FDI are believed to contain 'serious fat', arising from the competition among provinces to demonstrate their superior performance in attracting foreign investors. The comparison of FDI flows to China reported by the official sources with those reported by source countries is consistent with this proposition (Table 2.15). Total investment from countries reported in the table excluding China during the years from 2000 to 2005 is almost 90 per cent higher than the amount reported by the investing countries. Even if we make the heroic assumption that all the FDI flows to Hong Kong eventually ended up in China, the difference is still significant, at about 16.2 per cent.

Second, a comparison of FDI inflows to China, a relatively new host of MNEs, with those to countries with a longer history of foreign involvement, needs to be qualified for possible bias arising from the nature of the FDI database, as noted above to do with the treatment of retained earnings. Third, investors from Hong Kong and Taiwan accounted for a large share[22] of total

Table 2.15 FDI flows to China as reported by China and by selected investing countries, 2000–5[1]

	As reported by China (US$ million)	*As reported by investing country (US$ million)*		*Percentage difference between (1) and (2)*	
		China	*China + Hong Kong*	*China*	*China + Hong Kong*
France	3,837	2,605	4,582	47.3	–16.3
Germany	6,628	8,989	11,754	–26.3	–43.6
Italy	1,526	294	322	418.4	374.5
Japan	28,490	18,420	22,686	54.7	25.6
Republic of Korea	22,267	3,570	4,124	523.7	439.9
United Kingdom	5,612	5,212	15,351	7.7	–63.4
United States	25,442	11,160	21,904	128.0	16.2
Total	93,801	50,251	80,723	86.7	16.2

Source: Compiled from CEIC database (China data) and OECD International Direct Investment Statistics (http://titania.sourceoecd.org)

Note:
1. Total for the six-year period. Selection of countries was based on data availability for the entire period.

FDI inflows to China, whereas over 80 per cent of total FDI inflows to all developing countries originate from developed countries. The flows from Hong Kong and Taiwan, and also investment by ethnic Chinese investors from other countries such as Singapore, Malaysia and Thailand, are presumably driven largely by ethnic links, in addition to general commercial considerations (Huang 2003a, Wei 2000, Pomfret 1991). Thus, even if the statistical errors noted above are ignored, it is not realistic to assume that these flows are completely at the expense of other investment locations.

MNEs faced with the decision as to which country to invest in would naturally compare expected returns and risks across various investment locations. China may pose a particular difficulty because of the lack of well-defined property rights and the existence of political risk. Higher risk and lower expected returns may explain why some of the major source countries are not investing as much in China and why overseas Chinese, such as those from Hong Kong and Taiwan, seem to be investing a disproportionately high amount in China. In the absence of enforceable contracts, other informal instruments such as linguistic ties, family connections and geographical proximity, all of which facilitate the quicker acquisition of information, can increase the likelihood of securing a self-enforcing agreement (Fung 1998).

Fourth, data on global investment patterns clearly indicate that the *measured* decline in the share in ASEAN in total developing country inflows was not entirely due to increased inflows to China. In fact, inflows to other developing countries (that is countries other than China and ASEAN) have increased at a much faster rate, from about 30 per cent of total flows to developing countries to over 53 per cent by 2002, compared to a *mild decline* in China's share from 32 per cent to 28 per cent between 1995 and 2002. In fact, these trends have prompted some authors to characterize China as an 'under-achiever' in attracting FDI, particularly from Europe. Much of these 'other developing country' flows were triggered by liberalization reforms in Eastern Europe, the formation of NAFTA (which triggered a massive relocation of production units from North America to Mexico) and regional cooperation initiatives in Latin America.

Finally, the migration of some production processes within vertically integrated high-tech industries such as electronics, motor vehicles and cameras to China does not necessary imply a zero sum game in the competition for FDI. Rather, this process opens up opportunities for additional investment in OEM (original equipment manufacturing) and BTO (back to office) activities in the ASEAN countries for the Chinese market (Athukorala 2008). For instance, recently Intel Corporation, the world's largest computer chip maker, simultaneously invested \$200 million in a second semiconductor chip assembly and testing plant in the central Chinese city of Chengdu, in addition to its \$500 million assembly and testing facility in Shanghai. However, at the same time it invested \$40 million to expand the design and development activities in its plant in Penang, Malaysia, and also announced plans to spend \$100 million a year on further expansion of R&D activities there. More recently Intel signed an agreement with the government of Vietnam to set up a large electronics component assembly plant in that country, as the first step in linking Vietnam to its regional and global operational network (see Chapter 10 of this volume). The Intel story clearly suggests that the highly publicized cases of MNEs migrating from ASEAN to China simply reflect only one side of the ongoing process of restructuring international production within the region. As we have observed in the previous section, there is clear evidence of the expansion of parts and components within the broader product category of machinery and transport equipment (SITC7) from the major ASEAN countries to China. This trade is dominated by MNEs and thus MNE operations in China and other countries in the region are 'complementary' rather than 'competitive'.

Industry profile

During the first two decades of the post-war period, FDI in Taiwan and Korea was predominantly involved in domestic-market oriented production. In both countries from about the mid 1960s there was a major shift in the industry composition of FDI, from the early concentration on import substitution toward export-oriented production. Subsequently, FDI played an important role in the rapid world market penetration of exports from these economies, particularly in automotive, consumer electronics and electrical goods (Koo 1985, Schive 1990, Amsden and Chu 2003).

The colonial pattern of FDI in ASEAN was characterized by a heavy concentration in the primary sector, mining and tropical cash crop production for export. From the 1960s, there was a gradual shift in the sectoral composition of FDI in favour of manufacturing. By the late 1990s, manufacturing accounted for about one third of total FDI in the DEA, with the primary sector (agriculture and mining) and the tertiary sector (construction and various services) accounting for about 28 per cent and 23 per cent respectively (Lindblad 1998, Brooks and Hill 2004).

In Singapore, from the beginning manufacturing FDI was predominantly in 'efficiency seeking' (export-oriented) production, mostly electronics. In other ASEAN countries, there has been a major shift in MNE activities away from 'market seeking' (domestic-market-oriented production) and towards efficiency-seeking production, gradually from the mid 1970s and at an accelerated pace from the 1980s (Huff 1994, Athukorala and Hill 2002). Old-style import-substituting FDI behind tariff barriers is still found, but only in a few industries, such as automobiles and petrochemicals, and even here significant liberalizations have occurred. As in Singapore, efficiency-seeking FDI in Malaysia and the Philippines has largely concentrated in electronics. In recent years there has been major FDI in export-oriented electronics and automotive industries in Thailand; for the latter industry, the country has become the major hub for Southeast Asia. By contrast, in Indonesia efficiency-seeking FDI has continued to remain confined largely to standard labour-intensive consumer goods production.

In Vietnam, during the first decade of liberalization, FDI was heavily concentrated in domestic-market-oriented capital-intensive industries, the chemicals and automotive industries in particular, together with the construction and services sectors. The period from about the late 1990s has seen a major expansion of MNE activity into labour-intensive consumer goods production, in particular clothing, footwear and furniture. More recently there have been some promising signs of MNE entry into component assembly in the electronics and electrical goods industries (see Chapter 10 of this volume for details). In Cambodia, FDI is heavily concentrated in the export-oriented garments industry, as well as tourism. In Laos, hydroelectricity production and extractive industries, mostly gold and copper mining, have been the major attractions to foreign investors, in addition to some investment, mostly by regional investors, in export-oriented garments. FDI into China was heavily concentrated from the beginning in export-oriented industries, more so than in Vietnam and the other transition economies (see Chapter 7 for details).

In the case of India, one-third of the FDI stock at independence in 1947 was in the primary sector (plantations, mining and oil), one-quarter in manufacturing, and the rest in services, mostly trade, construction, transportation and utilities (Athreye and Kapur 2001, Table 3). From the 1960s, inflows tended to concentrate increasingly in manufacturing, while there was also considerable divestment out of other sectors. By the late 1980s, manufacturing accounted for about 85 per cent of the FDI stock in the country. Recent trends, based on approvals data, point to a noticeable increase in FDI in energy, telecommunication, transportation and various other services sectors. Within Indian manufacturing, FDI is heavily concentrated in the capital goods sector, particularly basic metal products, machinery and transport equipment. Although India has an enormous supply of low-wage, low-skill manpower that could be used to attract FDI into garments and other simple assembly activities, the overall investment regime has continued to favour foreign investment in heavy industry, complex activities predominantly focused on the domestic market. The only notable exception has been the phenomenal increase in software exports since the mid 1990s (Saxenian 2002) (see Chapter 8 for details).

It needs to be emphasized that our discussion focuses primarily on FDI in manufacturing. In the 1980s and the first half of the 1990s, this sector was the major recipient of FDI. It was also the best documented and the most responsive to the sweeping trade policy reforms of that era. However, the service sector then began to attract an increasingly large share of FDI, so much so that by 2000 about half the stock of FDI in developing countries was in this sector, more than double the share in 1990 (UNCTAD 2002). Three general factors account for this trend. First, there was a world-wide wave of major service sector liberalizations from the 1980s, initiated by the Thatcher–Reagan reforms, necessitated in some developing countries by the debt crisis of that decade, and spurred on by the collapse of communist regimes at the end of the decade. More generally, in most developing countries, services were typically SOE-dominated, often as monopolies, and they were the last sector to be liberalized. A second explanation is the continually rising share of the sector in output and employment, accompanying the universal decline in agriculture, and a process of 'deindustrialization' that has occurred in several low-income economies, including some large ones such as India and the Philippines. Third, services have become increasingly tradable over this period, owing particularly to the ICT revolution in a range of business services, and expanding global markets for health and education services.

The trade–investment nexus

Drawing together the previous two sections, we now examine the role of MNEs in the expansion of manufacturing exports. The debate on the role of MNEs in this outward-oriented development strategy is far from settled. Although the case for trade liberalization is now widely accepted in development policy circles, the case for liberalizing the FDI regime is still debated. Some academics and policy-makers favour trade liberalization but continue to advocate restrictions or conditions on FDI. This 'revisionist' school of thought concedes that FDI can play an important role in the transmission of technology, market know-how and modern management practices to developing countries. But it argues for a selective approach to the promotion and screening of FDI, and possibly trade policy, in order to foster the development of indigenous entrepreneurial and technological capabilities.[23] At a policy level, this view has been reflected in a 'mismatch' between the liberalization of FDI and trade regimes in some countries.[24]

The empirical underpinning for this revisionist view largely comes from studies conducted in the 1970s, at the formative stage of the export take-off in the East Asian NIEs (Hone 1974, Cohen 1975, Lall and Streeten 1977, Ch.7, and Nayyar 1978). The general inference of these studies was that the export takeoff was predominantly based on local initiatives and ownership and that, at the firm level, transnationality was not an important aid to exporting. It was the innovative and selective use of various 'non-equity' forms of foreign participation, so the argument goes, rather than the direct involvement through FDI, which was the key to NIE success. Some studies even inferred that 'MNEs in Latin American countries, where import-substitution continued to remain the main emphasis of industrialization, played a much more important role in manufacturing for export than in Asia' (Nayyar 1978).

Inferences based on the early years of export-led industrialization in the East Asian NIEs may send inappropriate signals to policy-makers in late-comer exporting countries because of the two major developments in the trade and investment environment discussed in the previous sections. First, an increasing number of firms from some NIEs have become aggressive international investors and, significantly, these 'third world' MNEs seem to possesses specific competitive advantages over 'first world' MNEs in some product areas, particularly where latecomers to export-led industrialization have a comparative advantage in international production. Second, and more importantly, international production fragmentation in high-tech industries, involving the cross-border reallocation of global MNE activities according to the host country's relative factor endowments, has rapidly gained importance over traditional labour-intensive final goods production as the prime mover of the internationalization of production.

MNEs from industrialized countries are the key actors in these worldwide offshore assembly operations. While MNEs from the US dominated the scene at the formative stage of the global spread of assembly activities in the late 1960s, Japanese and Western European MNEs have become increasingly involved since the late 1970s. More recently, MNEs from more advanced developing countries, notably those from the East Asian NIEs, have also joined this internationalization process.

Table 2.16 assembles a data set to examine the contribution of MNEs to manufactured exports from the four East Asian NIEs and seven developing Asian countries (China, Indonesia, Malaysia, the Philippines, Vietnam, India and Sri Lanka). MNE involvement in export expansion is measured in terms of the percentage share accounted for by MNE affiliates in total manufactured exports (MNEXS) (column 3). Export performance is measured in terms of the share of each country in total world manufactured exports (world market share, WMSH) (column 4). The final column contains summary observations

Table 2.16 MNE involvement in manufactured exports and selected export performance indicators in developing Asian countries[1]

Country	*Period*	*MNE share in exports[2] (%)*	*World market Share (%)[3]*	*Nature of export composition of MNE affiliates by the late 1990s[4].*
Hong Kong	1970–74	10.0*	0.52	Mostly 4.3a and 4.3b, with the latter increasing rapidly in recent years.
	1980–84	13.8*	1.10	
	1985–89	16.0	1.19	
Korea, Rp.	1970–74	19.3*	0.93	4.3a and 4.3b, with the latter increasing rapidly in recent years.
	1975–79	25.0*	1.07	
	1980–84	25.8*	1.65	
	1985–89	26.1*	2.30	
Taiwan	1975–79	36.7	1.13	4.3a and 4.3b, with the latter increasing rapidly in recent years.
	1980–84	27.9	1.76	
	1990–94	19.7	2.61	
	2000–04	10.1		
Singapore	1970–74	70.0	0.78	4.3a and 4.3b. 4.3a still dominates, but there has been a continuing shift from 4.3b to 4.3a
	1980–84	74.9	1.35	
	2000–04	89.1	1.52	
China	1985–89	5.3	1.49	Predominantly 4.2 and 4.3b, with some increase in 4.3a recently.
	1990–94	24.3	2.44	
	2000–04	53.16	9.55	
	2005	58.30	13.12	
Indonesia	1990–94	28.5	0.62	Predominantly 4.1, with some increase in 4.3a recently.
	1995–99	38.5	0.67	
	2000–04	45.3*	0.68	
Malaysia	1975–79	65.2	0.40	Predominantly 4.3a, with some (but diminishing) involvement in 4.3b.
	1985–89	75.6	0.59	
	1990–94	78.1	1.11	
	2000–04	86.13	1.89	
	2005	87.80	1.85	
Philippines	1985–89	49.9*	0.16	Predominantly 4.3a, with a small and diminishing share of 4.2.
	1990–94	47.6*	0.21	
	2000–04	85.7*	0.07	
Thailand	1980–84	13.5*	0.33	4.1, 4.2, 4.3a and 4.3b, with the latter two increasing rapidly in recent years.
	1990–94	50.4*	0.91	
	1995–99	62.6*	1.11	
Vietnam	1990–94	12.0	0.05	Predominantly 4.1 (mostly sea food) and 4.2, with rapidly increasing share of (4.3a) from a small base.
	1995–99	39.2	0.12	
	2000–04	48.6	0.20	
	2004–06	56.9	0.28	
India	1970–74	5.0	0.50	Mostly 4.1 and 4.2, with some increase in 4.3a recently.
	1980–84	8.7	0.40	
	1990–94	4.6	0.53	
	2000–04	4.6*	0.82	

Sri Lanka	1980–84	42.8	0.03	Predominantly 4.2, and some 4.1 (mostly ceramics and rubber goods) and 4.3a.
	1990–94	63.5	0.05	
	2000–04	43.2	0.08	
	2005	36.3	0.07	

Source: Athukorala (2007), Chapter 3 (updated using the same data source detailed therein).

Notes:
1. In all cases manufactured exports have been measured using the ISIC-based definition (i.e. all goods belonging to Division 3 of the International Standard Industry Classification) or an approximation to it. Figures reported are five-year averages unless otherwise indicated.
2. Annual averages.
3. Figures marked with asterisk are for a single year or some years falling within the given five year period. For details see the Appendix.
4. Commodity classification:
   4.1: Resource-based manufacturing: local processing of primary products previously exported in raw state
   4.2: Standard (diffused technology) consumer goods: clothing, shoes, sporting goods etc.
   4.3: Assembly activities within vertically integrated production systems
   4.3a: Parts and component assembly and testing in electronic and electrical machinery, scientific instruments and automotive industries
   4.3b: Final goods assembly in industries listed under 4.3a.

on the nature of the product composition of MNE-related exports in terms of the typology developed in the previous section.

It is important to emphasize that these data on the MNE share in exports are pieced together from diverse sources and are therefore not strictly comparable. In particular, there is no uniform treatment of the ownership share used in identifying the 'multinationality' of host country firms across these sources. Estimation errors in individual country figures are also unlikely to be consistent across countries, as data quality obviously varies. Nevertheless, the estimates assembled here are the best available and, taken together, they yield a number of important inferences.

The data indicate that the observation that MNE involvement in export expansion from the NIEs (other than Singapore) is low by international standards generally remains valid. Nevertheless, there is evidence that FDI has played a much more important role qualitatively than that suggested by these figures. Many joint ventures in Korea, particularly those with minority ownership (which constituted almost three-quarters of all investment), were initiated by Korean entrepreneurs who approached potential foreign investors (Koo 1985, p. 213). In the case of Taiwan, Ranis and Schive (1985, p. 134) observe that: 'While FDI never occupied a dominant position in total manufacturing investment, it was qualitatively important in certain specific industries.'

In any case, it is important to note that in both Korea and Taiwan the MNE share in exports did increase significantly from about the mid 1970s to the mid 1980s, as compared to the figures reported by Nayyar (1978) for the late 1960s. Detailed case-studies of the export performance of these countries suggest that this increase reflected the important role played by MNEs, as they shifted from the early reliance on labour intensive, standardized consumer goods sectors to assembly activities in vertically integrated high-tech industries, and subsequently to sophisticated consumer durables (Hobday 1995, Amsden and Chu 2003). The available evidence on the product composition of exports by MNE affiliates in Taiwan and Korea clearly attests to the role played by these firms in the structural transformation of exports from these countries. Given the rapid expansion of traditional labour intensive exports at the initial stage of export-led growth in these countries, any analysis based on MNE shares of *total* exports obviously fails to capture this key point. It is interesting to note that the MNE export shares in Korea and Taiwan have tended to decline from about the mid 1980s. This is most likely due to the combined effects of exports by domestic firms growing more rapidly in recent years, and an increase in domestic sales by MNE affiliates in consumer durable industries in response to the strong increase in domestic demand fuelled by rapid economic growth.

The relatively small role of MNEs in export expansion from Korea and Taiwan compared to Singapore, and more importantly to the second-tier exporting countries in the region, is generally interpreted as resulting significantly from the 'guided' industrial development policies pursued by these countries. These countries, Korea in particular, so the argument goes, followed the Japanese pattern by relying on non-equity arrangements rather than FDI to access technology and other MNE-controlled assets. However, following Goh Keng Swee (1993), the architect of modern Singapore's spectacular economic development, one can argue that this difference, at least to some extent, emanated from the nature of the investment environment at the time – from the late 1960s – when technical advances in the US electronics industry began to create rapid growth of demand for semiconductors, whose production and assembly required the intensive use of low-cost labour. At this time, China's Cultural Revolution was reaching its height, and political stability was a key factor governing the location decisions of assembly operations by electronics MNEs.

This argument receives further support from the fact that not only were Korea and Taiwan largely shunned by the electronics multinationals but so too was Hong Kong, a country that followed almost laissez-faire economic policy throughout. By the time the political risk waned, and export-led growth policies became firmly rooted in these countries, wages had already increased to levels which made them less attractive as labour-intensive assembly locations. The electronics revolution in Singapore, which began in the mid-1960s, absorbed all unemployed labour in that country within a period of five to seven years, and electronics MNEs shifted unskilled and semi-skilled simple assembly activities to neighbouring low-wage countries. In the process, Singapore then assumed a major regional headquarters function for the electronics industry in Southeast Asia (McKendrick *et al.* 2000). In the following 20 years, the MNEs diversified their operations in the region, first from simple assembly to component production operations (mainly hard disc drives), and more recently to consumer electronics, such as TV sets, radios and sound systems.

The inference that MNE participation is crucial for latecomers' export success gains further support from a comparison between China and India. In China, the share of exports from enterprises with foreign equity rose from 0.4 per cent in 1984 to 58.3 per cent in 2005. This was accompanied by a more than tenfold increase in manufactured exports over this period. By contrast, in India, where MNE subsidiaries are still predominantly of the old-fashioned 'tariff-jumping' variety, both the share of MNEs in total manufactured exports and the rate of export growth remain low.[25] Interestingly, since the mid 1980s there has been a mild, yet persistent, decline in the MNE share of India's manufactured exports, and this decline became more pronounced following the 1991 reforms. A detailed analysis of the underlying factors is beyond the scope of this chapter, but the explanation seems to be in the nature of the post-reform trade and foreign investment regimes. From the early 1980s India gradually relaxed restrictions on intermediate and investment goods imports, and the removal of these restrictions was intensified as part of the liberalization reforms initiated in 1991. Consequently the pressure on MNE affiliates, which are predominantly domestic-market oriented, to export in order to become eligible for access to imports (both foreign exchange and quotas), gradually waned and then virtually disappeared after 1991. Owing also to the half-hearted nature of the policy regime relating to FDI, and the still-binding bureaucratic restraints on FDI approval procedures, India has thus far not been successful in attracting export-oriented foreign investors.

Overall, there is a clear difference between the three NIEs – South Korea, Taiwan and Hong Kong – and the other countries in terms of the relationship between the share of exports accounted for by MNE affiliates and the share in total world manufacturing exports. For these three countries, the data do not point to any systematic relationship. By contrast, for all other countries there is a close positive relationship, suggesting that the entry of MNEs has been *export creating*.

The available data do not permit precise disaggregation of exports by MNE affiliates according to the typology developed in the previous section. However, the various country case studies on the nature of the product composition of MNE-related exports (summarized in column 4) do provide empirical support for our arguments concerning changing export patterns and the potential role of MNEs in the expansion of manufactured exports. It is evident that light manufactured goods and assembly activities within vertically integrated high-tech industries have been the main areas of MNE export activities. In Singapore, Malaysia and the Philippines, MNE involvement is predominantly in assembly activities. In the other second-tier exporting countries, the standard labour-intensive products still account for the bulk of exports, but the relative importance of assembly activities seems to have increased over the years in all cases. There is also evidence of a notable shift in assembly processes, from component assembly to final goods assembly in China, Thailand and Malaysia. Interestingly, there is no evidence of a shift in MNE activities from component specialization into final goods assembly in Singapore. It seems that, given the highly favorable investment climate and deep-rooted operational links, coupled with relatively high domestic wages, MNEs use Singapore as the regional centre for high-tech activities in component *production*, while undertaking relatively more labour-intensive assembly of components and final goods in China and neighbouring ASEAN countries, mostly Malaysia together with Thailand and the Philippines. By contrast, the Sri Lankan experience illustrates that the country was not able to reap the benefits of being the first liberalizer in South Asia, owing to the country's political instability. The result has been a prolonged heavy concentration of MNE activities in standard labour-intensive product lines, mostly garments and toys. Foreign firms involved in vertically integrated assembly industries, most notably electronics, have been deterred by country risk (Athukorala and Rajapatirana 2000, Chapter 6).

Concluding remarks

At least seven concluding observations warrant attention. First, at the risk of stating the obvious, Asia exhibits great economic diversity ranging from Japan and the four high-income NIEs to the late reforming, low-income countries in South Asia, and to the three former centrally-planned Mekong economies, which only recently reconnected to the global economy. There are vast differences in commercial policy, economic structure and hence patterns of comparative advantage. Prima facie, this suggests that individual countries have their own niche in attracting FDI across different stages of the production process in vertically integrated global industries. Moreover, these divergent experiences make Asia an important laboratory for examining issues central to the debate on development strategies.

There are notable contrasts in trade and investment patterns between East and South Asia, and particularly between China and India, notwithstanding converging growth rates. India and other South Asian countries have continued to remain under-performers in attracting FDI. India in particular has immense potential to become a major host to MNEs. It has the advantage of a large, educated English-speaking population that is willing to work at relatively low wages. In spite of widespread illiteracy, few countries can match its combination of low-wage, highly skilled workers. The pull of a large established industrial economy like India, despite its current deficiencies and technological gaps, is also much greater than that of its smaller, less industrialized neighbours.

Second, fragmentation-based specialization has become an integral part of the economic landscape of East Asia. The degree of dependence on this new form of international specialization is proportionately larger in East Asia, in particular in ASEAN, than in North America and Europe.

Third, the rise of product fragmentation has strengthened the case for a global, rather than a regional, approach to trade and investment policy-making. It is very doubtful whether regional cooperation initiatives can significantly improve economic growth and welfare, and whether they are in any case feasible for global production networks seamlessly encompassing a dozen or more countries. Given the global orientation of the region's economies, we question whether there would be any significant positive pay-off from current efforts to promote regional cooperation, unless they recognize the principle of 'open regionalism'. With both the current Doha Round and APEC apparently floundering and directionless, this is one of the major multilateral policy challenges of our time.

Fourth, China's emergence as a major trading power and an investment location is not a 'zero sum proposition' from the perspective of the region. China's rapid integration into the regional production networks is an important counterpoint to the popular belief that China's global integration would crowd out other countries' opportunities for international specialization. China's imports of components from countries in ASEAN and other developing East Asian countries have grown rapidly, in line with the equally rapid expansion of manufacturing exports from China to extra-regional markets, mostly North America and Europe. China's pivotal role with regional production networks also seems to have added further dynamism to region-wide MNE operations. The migration of some production processes within vertically integrated high-tech industries to China opens up opportunities for producing original-equipment-manufactured goods and back-to-office service operations in other countries. Even if China continues to remain relatively attractive as an assembly centre, not all stages of production within vertically integrated global industries are going to move there; supply chain managers are reluctant to source all of their inputs from just one nation, preferring instead to diversify the risk of exchange rate instability or supply disruptions. There is also evidence that rapid growth in wages has already begun to erode some of China's cost advantages, encouraging Chinese firms to relocate labour-intensive manufacturing activities in low-wage countries in the region. Moreover, resource-rich countries in the region like Indonesia, Malaysia, Laos and Cambodia are becoming increasingly attractive investment locations for Chinese firms.

Fifth, there is evidence that reforming countries, even those with highly unfavourable initial conditions, have been able to achieve rapid export growth. Important Asian examples in the late twentieth century to which we have drawn attention include Bangladesh, Cambodia and Vietnam. Admittedly, these countries enjoy a geographic advantage over African and Latin American countries. They are surrounded by high-growth, outward-oriented regimes, with both the demonstration effects of policy success and the technology and investment spillovers associated with the search for new low-cost production bases. Nevertheless, it is important not to overstate geography: geography does not guarantee policy success, as the East Asian examples of Burma and even the Philippines demonstrate.

Sixth, a key policy inference from our analysis is that, in designing policies of outward-oriented development, investment and trade policies must be considered together as co-determinants of the location of production and patterns of trade. Of course, enhancing national gains from export-oriented industrialization by encouraging greater participation of local companies is a legitimate objective for any country (as argued by Huang in Chapter 7 in this volume). But under the current competitive conditions governing international production, this objective can be achieved only by providing a favourable setting for domestic entrepreneurial development as part of the overall development strategy, not through direct restrictions on the entry and operation of MNEs.

Finally, we draw out some implications for the analysis and interpretation of trade statistics and data quality. In a context where parts and components trade is expanding rapidly, it is becoming ever more tenuous to employ export growth as a performance indicator, or exports/GDP as a proxy for openness, without careful qualification. This is especially so for comparisons across countries with very different participation in global production networks.[26] A second implication is for factor intensity analysis. Pioneered by Lary (1968) and applied extensively by Drysdale and Garnaut (1997), Krause (1982), and others, it has become a very widespread tool among economists to draw inferences concerning comparative advantage from trade composition analysis. This application was feasible as long as factor intensity rankings were internationally consistent; that is, an industry that was relatively labour-intensive in a poor country was similarly so in a rich country. Rapid expansion of production fragmentation and cross-border production sharing renders this exercise questionable. For instance, in the standard factor proportion classification electronics is recorded as R&D-intensive. However, the components assembly activity that is commonly undertaken in low-income locations can be very labour-intensive. This becomes an especially serious empirical issue when, as in much of East Asia, electronics accounts for over half of merchandise exports.

Appendix

Trade data compilation

The data for all countries other than Taiwan are compiled from the UN *Comtrade* database, based on Revision 3 of the Standard International Trade Classification (SITC, Rev. 3). Data for Taiwan are obtained from the trade database (based on the same classification system) of the Council for Economic Planning and Development, Taipei. The discussion on overall trends and patterns of trade covers the period from 1969 to 2007, the most recent year for which data are available for all reporting countries. Data on the basis of SITC Revision 3 are available only from 1986. The data for the previous years (based on SITC Revision 2) were recast using the commodity concordance available from the UN Statistical Office database.

To analyse the growing importance of regional production networks in determining trade patterns, we rely on detailed (5-digit) data for the period 1992 to 2007. In its original form (SITC, Rev 1), the UN trade data reporting system did not provide for the separation of fragmentation-based trade (parts and components) from final manufactured goods. SITC Revision 2 – introduced by the UN in the late 1970s and implemented by most countries in the early 1980s – adopted a more detailed commodity classification which allowed the separation of parts and components within the machinery and transport sector (SITC 7). There were, however, considerable overlaps between some advanced-stage component production/assembly and assembly of final goods in Revision 2 (Ng and Yeats 2001). Revision 3 was introduced in the mid 1980s with significant improvements; apart from providing a comprehensive coverage of parts and components in SITC 7, it also separately reports parts and components of some products belonging to SITC 8 ('miscellaneous manufactures').

These improvements notwithstanding, SITC Revision 3 does not provide for the construction of data series covering the entire range of fragmentation-based trade. Although data reported under SITC 7 provide a comprehensive coverage, the same cannot be said for SITC 8. In the case of clothing, furniture and leather products for instance, where outsourcing is prevalent and perhaps increasing, related components such as pieces of textiles, parts of furniture, and parts of leather soles are presumably recorded under other SITC categories. Moreover, there is evidence that production fragmentation has been spreading beyond SITC 7 and 8 to other product categories, such as pharmaceutical and chemical products (which fall under SITC 5) and machine tools and various metal products (SITC 6). Assembly activities in software trade have likewise recorded impressive expansion in recent years. These are lumped together with 'special transactions' under SITC 9. As a result, the magnitude of parts and component trade measured on the basis of SITC Revision 3 is downward-biased. However, the magnitude of the bias is unlikely to be substantial because production fragmentation is predominantly concentrated in the machinery and transport equipment category (SITC 7) (Yeats 2001, Krugman 2008).

Although the SITC Rev. 3 was introduced in the mid 1980s, a close examination of country-level data shows that data recording systems in many countries had considerable gaps in the coverage of parts and components trade until the early 1990s. Therefore we use 1992 as the starting year of our data disaggregation. The list of parts and components used in data disaggregation was prepared by carefully linking the parts and accessories identified in the Broad Economic Classification (BEC) Registry of the United Nations Statistical Division (available at http://unstats.un.org/unsd/cr/registry; accessed 1 January 2010) with the 5-digit SITC products.

The data are tabulated using importer records, which are considered to be more appropriate for analysing trade patterns than the corresponding exporter records. It is generally believed that data compiled from importer records are less susceptible to recording errors and reveal the origins and composition of trade more accurately than other records, because there are normally important legal penalties for incorrectly specifying this information on customs declarations. Importer records are also presumably less susceptible to double-counting and erroneous identification of the source/destination country in the presence of entrepot trade, for example, PRC's trade through Hong Kong and Indonesia's trade through Singapore (Ng and Yeats 2003; Feenstra *et al.* 1999).

Notes

1 An array of alternative terms have been used to describe this phenomenon, including 'global production sharing','vertical specialization', 'slicing the value chain' and 'outsourcing'.
2 The index classifies the post-war trade policy history of a given country into two sub-periods (closed economy = 0 and open economy = 1) based on the timing of sustained trade opening. See Table 2.2, Note 1 for the criteria used in identifying the year of demarcation. The original Sachs–Warner classification covered 100 countries (78 developing and 22 developed countries) over the period 1945 to 1994. Wacziarg and Welch (2003) have updated the classification to 2000, while expanding the coverage to 131 countries.
3 That is, total customs revenue as a percentage of the total value of imports.
4 These observations on Laos and Cambodia are based on country economic profiles in various issues of Asian Development Bank, *Asian Development Outlook*. See also Fane (2006) on Lao trade policy.
5 Exports are generally regarded as preferable to total trade (or imports) as the numerator in calculating this ratio because restrictiveness of a given country's policy regime is presumably better captured by export performance.
6 Data are given only for the latest year for which the survey results are available; there has not been a significant change in the ranking of individual Asian countries since the commencement of the survey in 2004.
7 In order to minimize the effect of possible random shocks and measurement errors, two-year averages are used in inter-temporal comparison throughout the chapter.
8 The shares of oil and gas in Indonesian and Malaysian merchandise exports peaked in the late 1970s at almost 60% and about 45% respectively. They have declined consistently since then, and in the past decade have averaged about one-quarter and one-tenth of the respective totals.
9 Hereafter, we will use the terms 'total world exports/trade' and 'total world non-oil exports/trade' interchangeably. Trade and investment magnitudes throughout the paper are measured in current US dollars unless otherwise indicated.
10 For a discussion of the factors underpinning the continued attraction of the East Asia region as the prime location of fragmentation-based international specialization, see Athukorala and Yamashita (2008).
11 Henceforth, for the sake of brevity, we use the term 'components' in place of 'parts and components' and 'machinery' in place of 'machinery and transport equipment'.
12 See for example Kwan 2001; Drysdale and Garnaut 1997; Frankel and Wei 1997; Petri 1994; Lee and Roland-Holst 1998.
13 See Yoshitomi (2007) and Park and Shin (2009) and the works cited therein.
14 There is no notable difference between intra-regional trade patterns of Asia (East Asia + South Asia) and East Asia given that South Asia accounts for a tiny share in total Asian trade.

15 For details on the nature and limitations of the WIR FDI data see UNCTAD 2005, Box 1.1.
16 For instance, the Reserve Bank of India broadened the coverage of its FDI estimation procedure in 2003 (with effect from 2000/1 fiscal year) to include retained earnings. According to the revised data for 2000/1 and 2001/2, the new component accounted for about 40% of the total reported FDI.
17 Namely, about 30% in Vietnam, 20% in Laos and 24% in Cambodia.
18 There has yet to be a comprehensive explanation for this massive contraction in FDI flows, an unprecedented occurrence since 1970, when the WIR FDI series commenced.
19 The recorded increase in inflows in the past three years partly reflects revisions to India's FDI estimation procedures (see note 16 above).
20 Yusuf (2003) reports eight cases (involving 12,000 job losses) of relocation of production plants by electronics MNEs from Penang, Malaysia to China during 1998–2001 (p. 294, table 7.3).
21 See, for instance, Freeman and Bartels (2004) Chapter 1, and the works cited therein.
22 Over a half during 1991–2006, according to the UNCTAD FDI database.
23 See for example Lall 2002, Rodrik 2007, Amsden and Chu 2003 and Huang 2003.
24 A prime example is the treatment of foreign investment in India following the liberalization reforms initiated in 1991 (World Bank 2003, Bajpai and Sachs 2000). The continued liberalization of the FDI regime has also been a thorny issue in the debates on the desirability of further opening in China (Naughton 1996, Lardy 2002).
25 For a fuller discussion of India's failure to attract MNEs as a major cause of her lacklustre export performance, see Srinivasan 1998.
26 See for example some research reported in the *Economist*, 5 January 2008, 'An old Chinese myth', which indicates that, measured on a gross basis, the export/GDP share for China was almost 40% in 2007, whereas on a 'domestic value added' basis it was just under 10%.

Part 2

Production networks

3 The spatial patterns of production and distribution networks in East Asia

Mitsuyo Ando and Fukunari Kimura

It has by now been widely recognized that the formation of international production/distribution networks in East Asia is an extremely important phenomenon (Athukorala and Hill, Chapter 2 of this volume). Rapid development of production networks since the 1990s undermines or at least partially nullifies the applicability of a wide range of old theories and thought. In the context of international trade theory, the pattern of industrial location and international trade in East Asia no longer follows a typical North–South division of labor explained by traditional comparative advantage theories such as the Ricardian and Heckscher–Ohlin models.

The influential "East Asian Miracle" report by the World Bank (1993) was written before the development of production networks, and thus the analysis failed to emphasize the crucial role of foreign direct investment (FDI) in economic development in developing countries. The "export platform" argument now explains only a small portion of international production/distribution networks in East Asia. The flying geese pattern argument cannot be applied anymore to recent international location patterns of manufacturing sectors in the sense that they are dominated by more subtle production-process-wise location patterns, not by industry-by-industry location patterns. The classical industrial policy of the Japanese Ministry of Trade and Industry (MITI) is regarded as completely outdated. East Asia is now presenting a new development strategy aggressively utilizing the mechanics of international production/distribution networks.

The recent policy discussion on East Asian economic integration has also been heavily influenced by the nature and characteristics of international production and distribution networks. *De facto* economic integration no doubt rapidly proceeds in East Asia, but in an uneven manner. Corporate activities extend beyond national borders while substantial differences in development stages across countries remain. International production/distribution networks are actually taking advantage of differences in location advantages. It is a big challenge for both academicians and policy-makers to understand what is taking place in East Asia and to properly design *de jure* economic integration in East Asia.

In an earlier study the authors proposed a conceptual framework of two-dimensional fragmentation (Kimura and Ando 2005). It provided a useful analytical approach to understand the mechanics of international production/distribution networks in East Asia. It explained location patterns of fragmented production blocks across countries with different location advantages, emphasizing the importance of service links that connect remotely located production blocks. Moreover, it effectively described the logic of production/distribution networks extending beyond the boundary of a firm. Arm's length (inter-firm) fragmentation is an essential element in the formation of agglomeration, and such sophisticated networks in turn provide opportunities for indigenous firms to penetrate into production networks developed by multinational enterprises (MNEs).

As an extension to the analysis, this chapter examines some of the unsolved questions on the spatial structure of international production/distribution networks. The first is how the formation of international production/distribution networks, particularly in machinery industries, has changed the spatial pattern of international trade, focusing on intra-regional and inter-regional transactions. Are US and EU markets becoming less important along with the expansion of the East Asian market itself? How big is the "magnification" effect of parts and components trade in the expansion of East Asian intra-regional trade? The chapter looks into these issues to address the first question.

The second question is how firms effectively combine two kinds of fragmentation, i.e., intra-firm and arm's length, in the spatial extension of production/distribution networks. In transactions among Japan, NIEs, ASEAN, and China, is there any systemic spatial pattern of intra-firm or arm's length transactions? Do we observe significant changes over time? Although it is difficult to comprehend these aspects of networks in statistics, analysis using the micro data of Japanese affiliates can provide us some clues.

The outline of the chapter is as follows. The first section reviews the framework of two-dimensional fragmentation and establishes a link with empirical studies conducted in the paper. The second section presents the overall picture of intra-regional and inter-regional trade of East Asian countries by conducting descriptive and econometric analysis using gravity model estimation. The third section concentrates on machinery industries and analyzes the nature of fragmentation in two dimensions—distance and disintegration—by using the micro data of Japanese affiliates abroad. The last section presents concluding remarks.

Conceptual framework of two-dimensional fragmentation

The formation of international production/distribution networks has fundamentally changed the pattern of production location and international trade in East Asia. Although networks can be formulated in various industries, most important, both qualitatively and quantitatively, are those in machinery industries, including general machinery, electric machinery, transport equipment, and precision machinery. Machinery industries involve a large number of multi-layered vertical production/distribution processes, and East Asian firms including Japanese firms have a competitive edge in exploring modulation techniques and constructing vertical value chains. International production/distribution networks in East Asia are distinctive and most developed in the world at this point in time in (i) their significance in each economy in the region, (ii) their extensiveness covering a number of countries in the region, and (iii) their sophistication in subtle combinations of intra-firm and arm's length (inter-firm) transactions (Ando and Kimura 2005).

Literature on the theory of production fragmentation and its empirical applications has grown since a seminal work by Jones and Kierzkowski (1990) and has proved its applicability in analyzing cross-border production sharing at the production process level. International production/distribution networks in East Asia, however, have developed beyond the original idea of fragmentation, and some expansion of the analytical framework is needed in order to incorporate intra-firm and arm's length transactions. Kimura and Ando (2005) propose the concept of two-dimensional fragmentation to analyze the mechanics of production networks in East Asia.

Figure 3.1 illustrates a simple version of the Maquila operation in the US–Mexico nexus. Cross-border production sharing between the US and

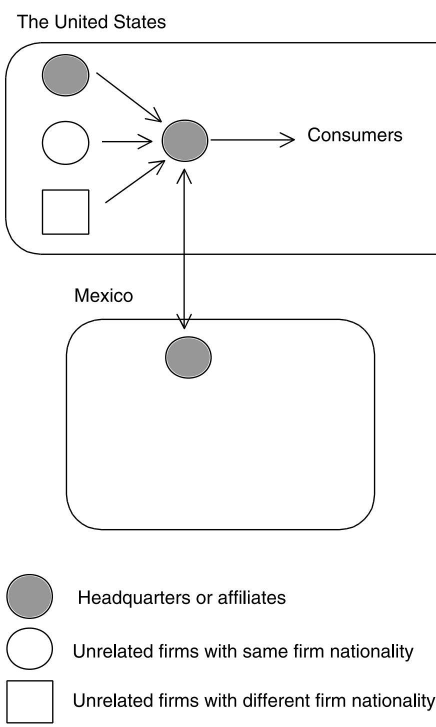


Figure 3.1 Typical Maquila operation by the US MNEs: an illustration.

Mexico is mostly a simple intra-firm fragmentation involving back-and-forth intra-firm transactions between headquarters in the US and an affiliate in Maquila, Mexico. A typical pattern is as follows: parts and components are sent from the US headquarters to a factory in Mexico, the assembly process is conducted there, and the finished products are sent back to the US headquarters. On the other hand, production/distribution networks in East Asia contain a much more complicated combination of intra-firm and arm's - length transactions across a number of countries in the region. Figure 3.2 is drawn with reference to an actual example of a Japanese manufacturer in the electronic machinery industry, extending production/distribution networks all

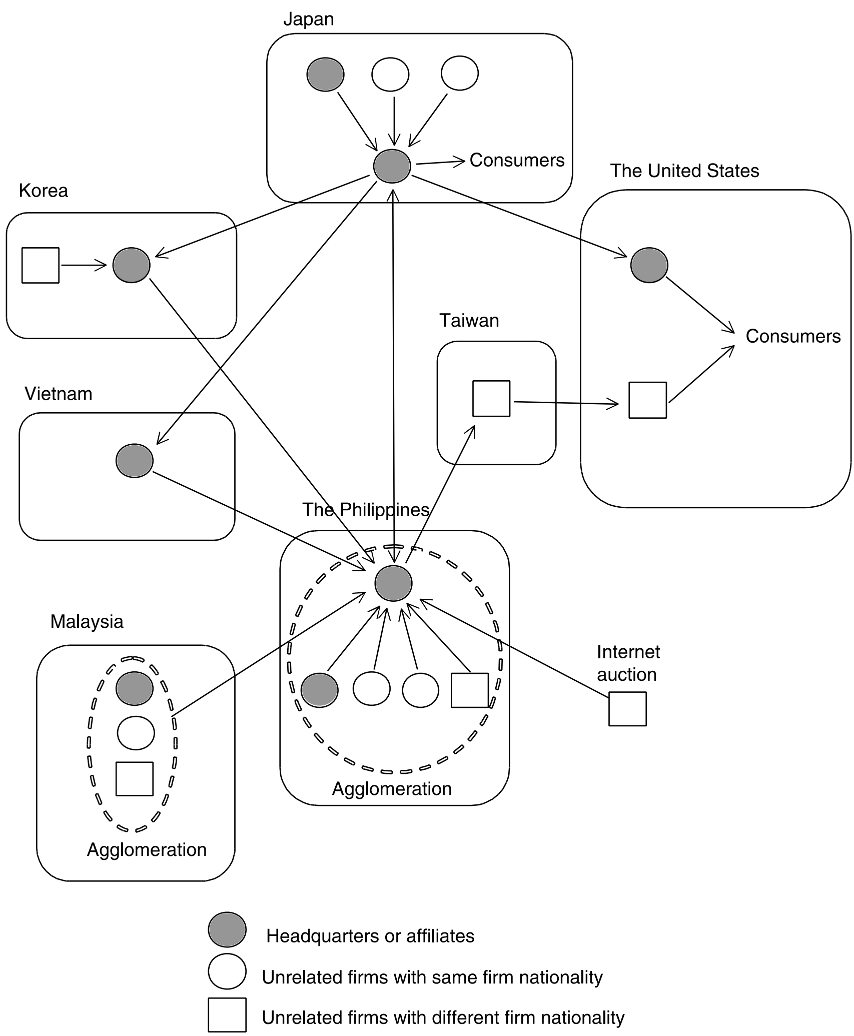


Figure 3.2 Typical East Asian operation by Japanese MNEs: an illustration.

over East Asia and the US The framework of two-dimensional fragmentation tries to capture such a sophisticated structure of international production/ distribution networks.

Figure 3.3 presents fragmentation in a two-dimensional space. The horizontal axis denotes geographical distance. From the original position, a production block can be detached and placed in geographical distance. The dotted line in the middle is a national border, which distinguishes cross-border fragmentation from domestic fragmentation. The vertical axis, on the other hand, represents the organization (integration and disintegration) of corporate activities. A fragmented production may be conducted by either intra-firm establishments or unrelated firms. The dotted line is a boundary of a firm, distinguishing arm's length (inter-firm) fragmentation or outsourcing from intra-firm fragmentation.

When do firms choose fragmentation? First, there must be a substantial cost reduction in the production of fragmented production blocks (see Table 3.1). Geographical distance may provide opportunities to explore different production conditions. In particular, cross-border fragmentation enables firms to enjoy diversified location advantages including workers' wages, economic infrastructure, policy environment, and others. The disintegration axis yields

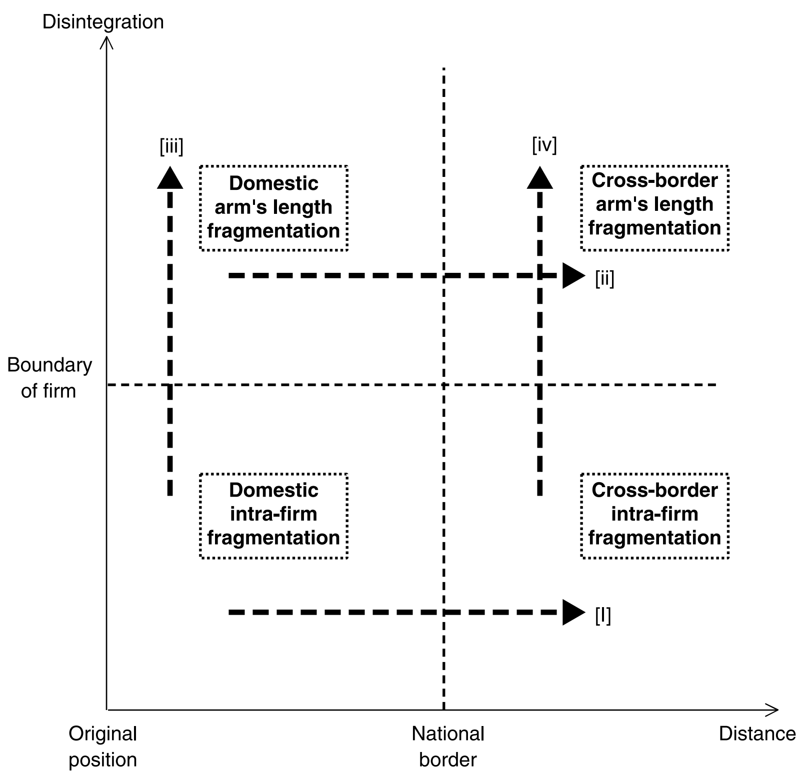


Figure 3.3 Fragmentation in a two-dimensional space.

Table 3.1 Tradeoffs in two-dimensional fragmentation

	Service link cost connecting production block	*Production cost* per se *in production blocks*
Fragmention along the distance axis	Cost due to geographical distance. Elements (examples): transportation, telecommunications, inefficiency in distribution, trade impediments, coordination cost	Cost reduction from location advantages. Elements (examples): wage level, access to resources, infrastructure service inputs such as electricity, water, and industrial estates, technological capability
Fragmentation along the disintegration axis	Transaction cost due to losing controllability. Elements (examples): information gathering cost on potential business partners, monitoring cost, risks on the stability of contracts, immature dispute settlement mechanism, other deficiency in legal system and economic institutions	Cost reduction from (dis)internalization. Elements (examples): availability of various types of potential business partners including foreign and indigenous firms, development of supporting industry, institutional capacity for various types of contracts, degree of incomplete information

chances to utilize business partners' strengths. Instead of doing everything in-house, arm's length fragmentation or outsourcing may make the entire production system more efficient. Second, service link costs to connect fragmented production blocks should not be too high. Fragmentation beyond national borders and/or a boundary of a firm is inevitably accompanied by substantial service link costs, but such costs must be low enough to result in total cost reduction.

Service link costs change as illustrated in Figure 3.4 when fragmentation takes place along the distance or disintegration axis. When fragmentation occurs in the horizontal direction as [i] and [ii] in Figure 3.3, service link costs increase according to the distance from the original position. In particular, once fragmentation crosses a national border, service link costs jump up because of the national border effect. When fragmentation takes place in the vertical direction as [iii] and [iv], service link costs increase as the controllability of a firm over the fragmented production block becomes weaker. Various types of outsourcing along the disintegration axis from subcontracting to internet auction are illustrated in Figure 3.4. An important observation here is that geographical proximity saves service link costs or transaction costs, as [iii] is drawn much lower than [iv].

In East Asia, geographical fragmentation and agglomeration go hand in hand. In contrast to market-oriented agglomeration in Europe, agglomeration in East Asia is often motivated by production-side logic.[1] The forces of fragmentation and agglomeration are countervailing in the first place; they

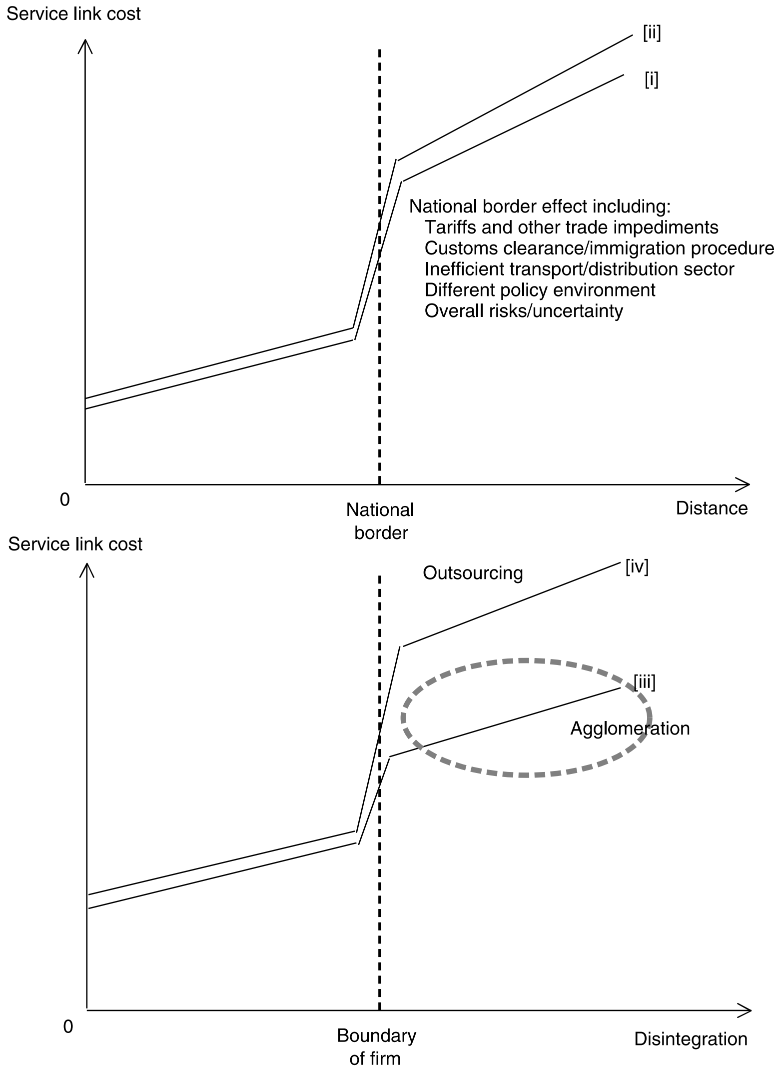


Figure 3.4 Two kinds of service link cost.

are vectors pointing in opposite directions. In particular, when a firm decides whether to make use of intra-firm fragmentation, fragmentation or agglomeration is a binary decision. However, at the industry/aggregate level, fragmentation and agglomeration may go together.

The concentration of fragmented production blocks occurs at least through the following two channels: first, two kinds of service link costs do not have a monotonic pattern, and local minimal points of service link costs tend to attract a large number of production blocks. Particularly in developing countries, each country, each local province, each city, or each industrial estate has a different investment climate. Service link costs are not monotonic at all in both dimensions of distance and disintegration. Moreover, a service link is often accompanied with strong economies of scale. Therefore, when a country successfully reduces two kinds of service link costs with proper policies, fragmented production blocks may rush in, and service link costs will then be pushed down even further.

Second, the concentration of production blocks may also take place due to the close relationship between the service link cost along the disintegration axis and geographical proximity as indicated in Figure 3.4. The service link cost in arm's length fragmentation is extremely sensitive to geographical distance. The closer the distance with business partners, the smaller the service link cost in searching potential business partners, consulting detailed specs of products, managing product quality and delivery timing, solving disputes over contracts, monitoring, and others. The northwest area in Figure 3.4 is a hot spot of this type of agglomeration. Here, the concentration of production blocks would reduce the service link cost, and the low service link cost would further attract production blocks; the arrows of causality would go in both directions. The concentrated production blocks in this mechanism generate interactive industrial structure among production blocks.

The two-dimensional fragmentation framework captures multilayered fragmentation as illustrated in Figure 3.5. By shifting the original position from the headquarters in the home country to an affiliate abroad, for example, the complicated structure of fragmentation with intra-firm and arm's length transactions can be depicted.

The development of intra-East Asian trade

This section examines the first question: how the formation of international production/distribution networks in machinery industries has changed the spatial pattern of intra-regional and inter-regional trade in East Asia. First of all, we demonstrate the significance of machinery trade in East Asia. Figures 3.6 and 3.7 present the shares of machinery goods (i.e. items 84 to 92 in the Harmonized System (HS) of trade classification) and machinery parts and components in total exports to and imports from the world at the beginning of the 1990s and in 2005 for major economies in East Asia and other regions. As both figures vividly show, the share of machinery goods in East Asian countries drastically increased in both absolute and relative terms; while most countries on the left side were developed countries at the beginning of the 1990s, there are East Asian developing countries in 2005 with high shares of both machinery intermediate exports and imports. Moreover, the trade pattern of Japan shifted the weight from machinery final goods to parts and components. These findings suggest drastic changes in trade and production patterns in the region as well as the existence of back-and-forth transactions among a number of countries in the region, as described below.

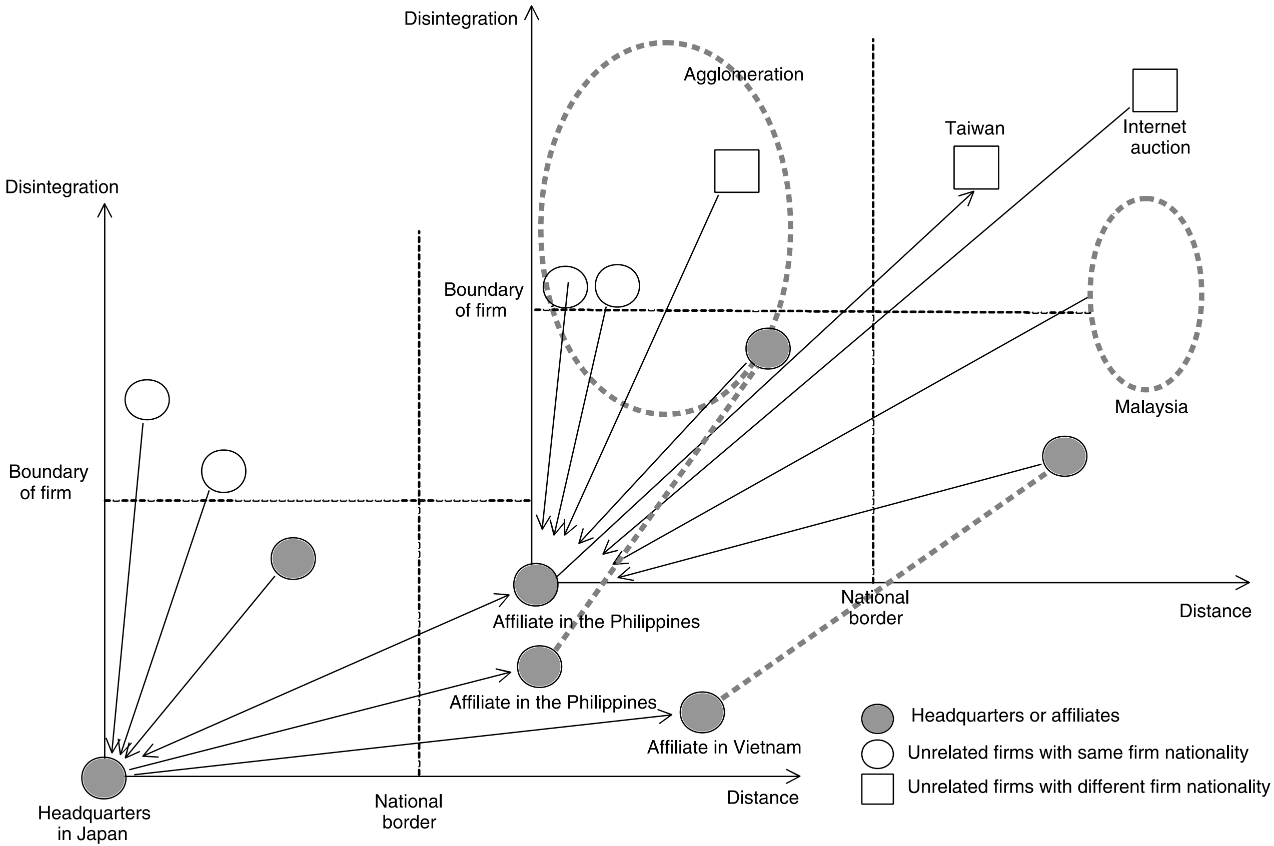


Figure 3.5 Multilayered fragmentation in East Asia: an illustration.

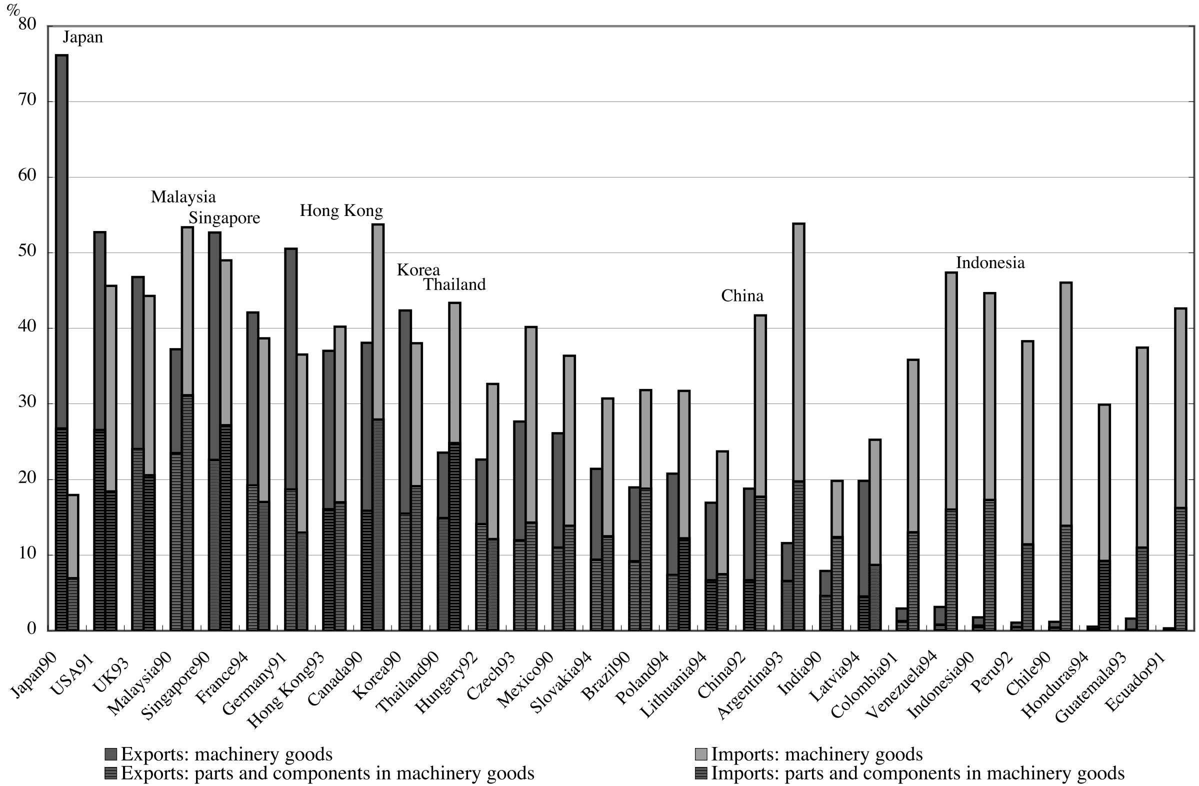


Figure 3.6 Machinery goods and parts and components: shares in total exports and imports 1990–94.

Source: Ando (2006).

Note: Data is of 1990 or close to 1990. For instance, Japan90 and USA91 indicate that data is of 1990 for Japan and 1991 for USA

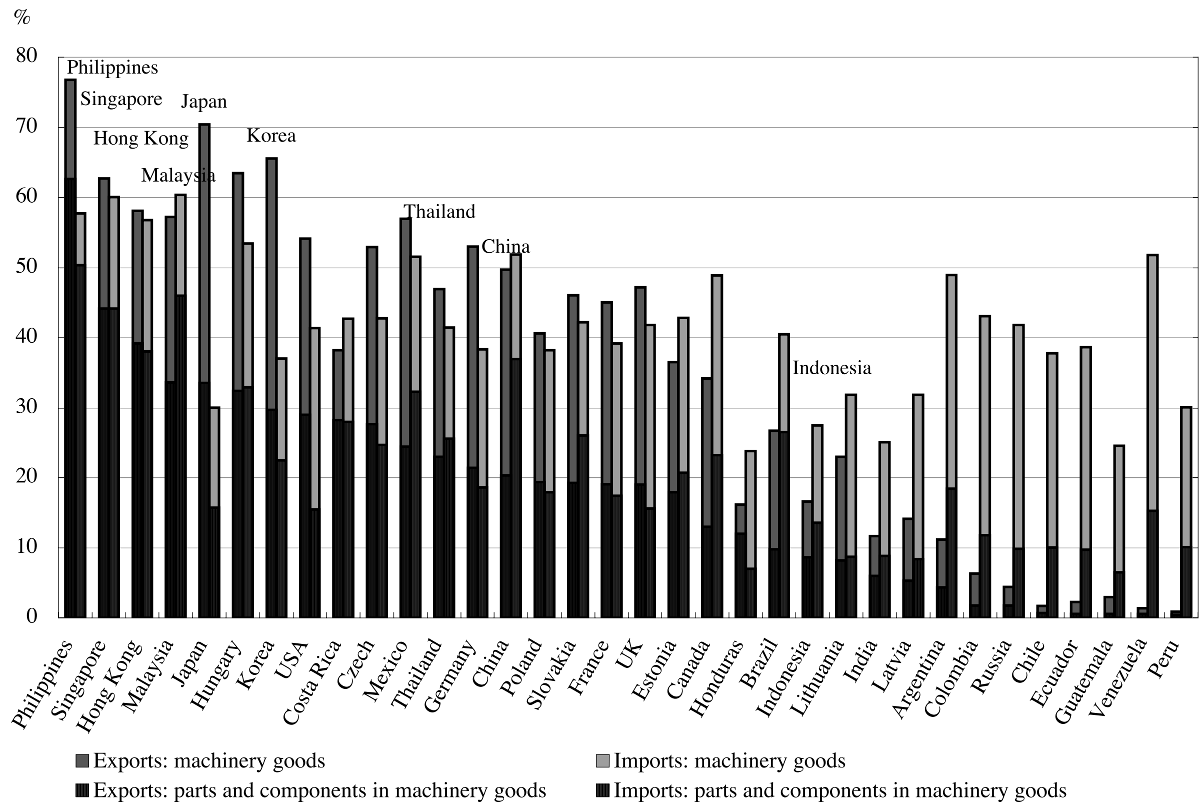


Figure 3.7 Machinery goods and parts and components: shares in total exports and imports in 2005.

Data source: Authors' calculation, based on UN COMTRADE.

In other regions, in contrast, higher shares of parts and components in machinery trade are observable for only some specific countries such as the US, Mexico, Costa Rica, the UK, Germany, Hungary, the Czech Republic, and Slovakia, suggesting the existence of production sharing between the US and Mexico/Costa Rica and between UK/Germany and Central and Eastern European countries without covering an extensive number of countries in the regions. Other countries, particularly those in Latin America except Mexico and Costa Rica, are found on the right side with far lower shares of machinery exports than those of imports, indicating import-substituting-type operations of MNEs.[2]

In the following, we first descriptively examine intra-regional trade patterns and then formally analyze them by using gravity model estimation.

The evolution of intra- and inter-regional trade

To focus on changes in intra- and inter-regional trade patterns, Table 3.2(a) presents current-price exports of all products, machinery goods (total), machinery final goods, and machinery parts and components in East Asia including China, ASEAN4 (i.e., Indonesia, Malaysia, the Philippines, and Thailand), NIEs3 (i.e., Korea, Hong Kong, and Singapore), and Japan in 1990 and 2005, by distinguishing intra-East Asian exports from inter-regional exports. To investigate the relative importance of the US market for East Asian exports in particular, corresponding figures are also displayed in parenthesis. Note that Taiwan, one of the most important players in international production networks of machinery industries, is not unfortunately included in East Asia due to the lack of data available from UN COMTRADE, and thus the value and share of intra-East Asian trade would be underestimated in these tables.

Clearly, the share of intra-East Asian exports in total exports by East Asia as a whole has risen, indicating its increasing relative importance compared to inter-regional exports. The increasing relative importance of intra-regional trade is more vividly observed in machinery trade. In the case of machinery intermediates exports in East Asia, the intra-regional share climbed up to 53 percent in 2005 from 40 percent in 1990. Moreover, the intra-regional share increased from 23 percent to 36 percent even for trade in finished machinery products. These confirm the enhancing relative significance of intra-regional trade patterns to inter-regional trade patterns in machinery industries, particularly in machinery parts and components trade. In other words, the relative importance of markets outside the region for East Asian exports, including the US market, has declined. Considering the expansion in domestic demand accompanying economic growth in East Asian countries, which has not appeared in transactions beyond national borders, the relative importance of the intra-East Asian market would have been enhanced more notably than suggested by the figures above.

Table 3.2 Development of intra-regional exports in East Asia

(a) Intra- and inter-regional exports

	1990		2005	
	Value (million US$)	*%*	*Value (million US$)*	*%*
Machinery goods: parts and components				
Intra-East Asia	54,336	39.6	399,882	52.6
Inter-regional	82,915	60.4	360,823	47.4
(US)	(39,624)	(28.9)	(108,213)	(14.2)
Total	137,251	100.0	760,705	100.0
Machinery goods: final goods				
Intra-East Asia	50,932	23.2	254,738	35.6
Inter-regional	168,597	76.8	460,832	64.4
(US)	(70,183)	(32.0)	(188,911)	(26.4)
Total	219,529	100.0	715,570	100.0
Machinery goods: total				
Intra-East Asia	105,268	29.5	654,620	44.3
Inter-regional	251,512	70.5	821,654	55.7
(US)	(109,807)	(30.8)	(297,124)	(20.1)
Total	356,780	100.0	1,476,274	100.0
All products				
Intra-East Asia	270,465	38.5	1,139,821	44.9
Inter-regional	432,736	61.5	1,401,216	55.1
(US)	(174,978)	(24.9)	(473,093)	(18.6)
Total	703,201	100.0	2,541,037	100.0

(b) Factors of growth in exports (1990–2005)

Intra-East Asian exports	
(i) Growth in intra-East Asian exports	
All products	321%
Machinery goods (total)	522%
– Machinery final goods	400%
– Machinery parts and components	636%
(ii) Contribution to the growth (all products)	
Machinery goods (total)	63%
– Machinery final goods	23%
– Machinery parts and components	40%
Inter-regional exports	
(i) Growth in inter-regional exports	
All products	224%
Machinery goods (total)	227%
– Machinery final goods	173%
– Machinery parts and components	335%
(ii) Contribution to the growth (all products)	
Machinery goods (total)	59%
– Machinery final goods	30%
– Machinery parts and components	29%

Data source: authors' calculation, based on UN COMTRADE

Note: "East Asia" here includes China, ASEAN4, NIES3, and Japan. Due to lack of data available from UN COMTRADE, (i) Taiwan is not included in East Asia, (ii) data for China in 1992 and Hong Kong in 1993 are used in calculating intra-East Asian exports in 1990, (iii) data for the Philippines are not included in calculating intra-East Asian exports in 1990. Growth rates are in nominal terms.

Table 3.2(b)(i) presents the nominal growth rates of intra-East Asian exports and inter-regional exports during the period from 1990 to 2005. During this period, intra-East Asian exports expanded by over four times for all commodities and at much higher paces for machinery goods as a whole, particularly for machinery parts and components. These figures imply how fast intra-East Asian trade, particularly intra-East Asian machinery trade, has grown since the 1990s. Indeed, machinery trade significantly contributed to the growth in intra-East Asian exports from 1990 to 2005 (Table 3.2(b)(ii) and Figure 3.8); 63 percent of the growth in intra-East Asian exports during those 15 years, 321 percent, can be explained by machinery trade, and, more importantly, 40 percent of the growth by machinery parts and components. In other words, a large portion of the explosive growth in intra-East Asian trade was induced by the expansion of machinery trade, mostly that of machinery parts and components. This can be regarded as a sort of "magnification effect" of machinery intermediates trade, which is referred to by Yi (2003). In East Asia, back-and-forth transactions in international production networks exist, and they are reflected in this magnification effect.

In the case of inter-regional trade in East Asia, similarly, machinery trade accounts for close to 60 percent of growth. The main factor contributing to the growth, however, is an expansion of machinery final goods (30 percent

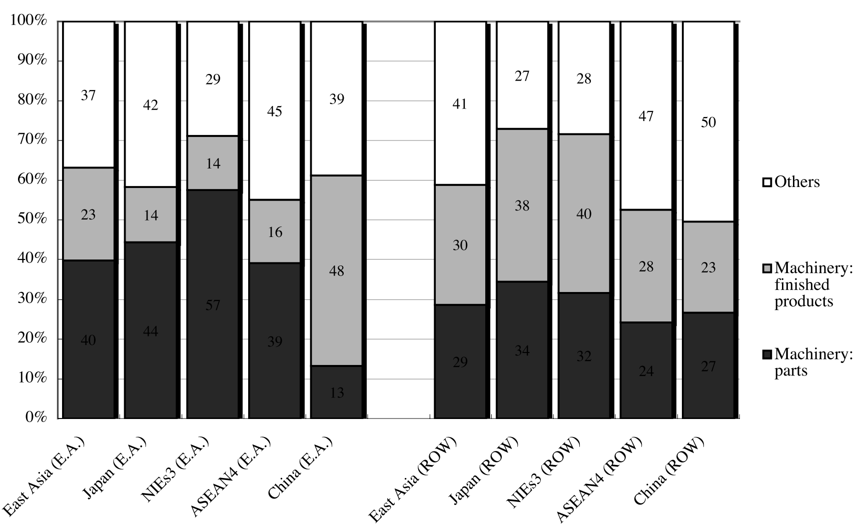


Figure 3.8 Contribution to growth in intra- and inter-regional exports in East Asia, 1990–2005.

Data source: Table 2(b) and Tables A.2(b)–A.5(b).

Note: "E.A." and "ROW" in the figure indicate intra-regional exports and inter-regional exports, respectively.

of the growth) in addition to that of machinery parts and components (29 percent). This implies that machinery final goods produced in international production networks in East Asia are sold predominantly to the United States, Europe, and so on, though the relative importance of these markets are decreasing as discussed above.

Strengthened intra-East Asian trade relationship: gravity estimation

This subsection formally analyzes changes in intra-East Asian trade patterns by conducting simple gravity model estimation for two years, 1990 and 2005, and separately for machinery parts and components, machinery final goods, and all products. The gravity equation for each year is as follows

$$\ln EX_{ij}^{c} = \beta_0 + \beta_1 \ln Dist_{ij} + \beta_2 \ln GDP_i + \beta_3 \ln GDP_j + \beta_4 \ln GDPPCgap_{ij} + \varepsilon_{ij} \quad (1)$$

where EX_{ij}^{c}, $Dist_{ij}$, GDP_i (GDP_j), and $GDPPCgap_{ij}$ represent real export values from country i to country j for commodity c (that is, machinery parts and components, machinery final products, and all products), distance between the capital of country i and of country j, real GDP in country i (j), and real income gap, i.e., absolute value of the difference in real GDP per capita between country i and country j. To compare the results for 1990 with those for 2005, exports, GDP, and income gap used in this paper are constant at the 2000 prices.[3] Exports are obtained from UN COMTRADE (online), GDP, GDP per capita, and the wholesale price index in the US are available from World Bank Indicator (online), and distances measures are obtained from the CEPII (Centre d'Études Prospectives et d'Informations Internationals) website. Table 3.3 presents export shares of China, ASEAN4, NIEs3, and Japan by destination (China, ASEAN4, NIEs3, and Japan) in 1990 and 2005 and real export growth rates in 15 years for each case, based on export data used in the gravity estimation.[4]

The results of gravity estimation provide several interesting insights (Table 3.4).[5] The first is the relationship between geographical proximity and parts and components trade. The coefficients for distance variables in both 1990 and 2005 are all negative as expected, and the absolute values are the highest for machinery intermediates, the next for machinery final goods, and the last for all products. It suggests that geographical proximity or agglomeration is more important for parts and components than for machinery final products or other products. Service link cost in fragmentation certainly includes something beyond usual transport cost, which is likely to include various kinds of coordination cost in production/distribution networks.

The second is the strengthened trade relationships, particularly among developing countries in East Asia. The absolute values of coefficients for distance variables are larger in 2005 than in 1990. This should not be

Table 3.3 By-destination intra-East Asian exports: 1990 and 2005

		Parts and components			*Machinery final goods*			*Total*		
		Share		*Real growth*	*Share*		*Real growth*	*Share*		*Real growth*
Export from	*to*	*1990*	*2005*		*1990*	*2005*		*1990*	*2005*	
China	ASEAN4	5	13	3,038	3	9	3,145	4	11	861
	NIES3	88	64	789	94	69	581	75	60	218
	Japan	7	24	3,817	4	22	5,586	21	29	444
	East Asia	100	100	1,122	100	100	829	100	100	294
ASEAN4	China	0	13	33,332	1	16	16,530	4	15	1,133
	ASEAN4	8	18	1,743	9	19	1,560	8	19	640
	NIES3	69	49	461	68	38	368	39	39	223
	Japan	24	21	589	22	27	906	49	28	83
	East Asia	100	100	688	100	100	730	100	100	224
NIES3	China	32	54	1,457	30	43	566	30	50	622
	ASEAN4	28	20	544	26	23	318	25	22	276
	NIES3	21	17	641	25	18	240	18	15	284
	Japan	19	9	325	19	16	315	27	12	99
	East Asia	100	100	812	100	100	373	100	100	335
Japan	China	5	34	2,230	8	32	482	9	34	868
	ASEAN4	35	26	141	33	21	–6	32	23	78
	NIES3	60	40	121	59	47	20	59	43	81
	East Asia	100	100	229	100	100	48	100	100	150
East Asia	East Asia	100	100	541	100	100	323	100	100	251

Data source: authors' calculation, based on UN COMTRADE.

Note: growth rates are obtained on the real basis.

interpreted as a reflection of enhancing trade impediments. It rather indicates that trade became much more active in 2005 among those with substantially weaker trade relationships such as ASEAN countries in 1990. Indeed, as Table 3.3 clearly shows, exports among ASEAN countries explosively expanded for machinery goods, particularly machinery parts and components. On the other hand, these coefficients (absolute values) in the case of East Asia are still smaller than the case of Europe or the world. Combined with these findings, our results for the distance measures suggest that trade relationships are even more strengthened in East Asia, particularly among developing countries with substantially weaker trade relationships in 1990. This is presumably because service link costs across borders are smaller than in other regions.

The third is the reduced importance of income gap as a determinant of trade. The coefficients for income gap are much smaller in 2005 than in 1995, while they are all positive. Moreover, the coefficient for the income gap in 2005 is not statistically significant anymore for machinery final products, though it is positive, suggesting the expansion of final goods trade among developing countries, rather than between developed and developing countries.[6] These results suggest that the income gap is losing importance as a determinant of trade, although it still works to some extent.

Table 3.4 Gravity model estimation of intra-East Asian exports

Variable	*Dependent variables (exports (log)):* *Machinery parts and components*	*Machinery final goods*	*All products*
(a) Year: 1990	(1)	(2)	(3)
Constant	–5.018	–14.440***	–5.358*
	(–1.02)	(–3.23)	(–1.81)
Distance (log)	–0.724**	–0.623**	–0.429**
	(–2.45)	(–2.32)	(–2.41)
GDPi (log)	0.378***	0.703***	0.424***
	(2.73)	(5.60)	(5.09)
GDPj (log)	–0.155	0.043	0.292***
	(–1.12)	(0.34)	(3.51)
Income gap (log)	1.051***	0.823***	0.500***
(difference in GDP per capita)	(7.99)	(6.89)	(6.31)
Adjusted R2	0.595	0.635	0.634
Number of observations	72	72	72
(b) Year: 2005	(1)′	(2)′	(3)′
Constant	1.974	–6.774	–1.162
	(0.55)	(–1.79)	(–0.44)
Distance (log)	–0.823***	–0.792***	–0.690***
	(–4.21)	(–3.86)	(–4.82)
GDPi (log)	0.351***	0.712***	0.495***
	(3.83)	(7.40)	(7.38)
GDPj (log)	0.329***	0.438***	0.456***
	(3.58)	(4.54)	(6.77)
Income gap (log)	0.341***	0.138	0.171***
(difference in GDP per capita)	(4.13)	(1.59)	(2.82)
Adjusted R2	0.467	0.524	0.620
Number of observations	72	72	72

Data source: authors' calculation.

Notes:
Both dependent and indipendent variables are on the real basis for a time-series-comparison.
Numbers in parentheses are t-statistics.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Intra-firm and arm's length transactions: changing behavior of Japanese firms

The second question is how firms combine two kinds of fragmentation in production/distribution networks. The intensive use of disintegration-type fragmentation or outsourcing arrangements is one of the most salient phenomena in East Asia. Firms in East Asia have indigenous traditions of inter-firm linkages. An old legendary subcontracting system existed among Japanese firms, based on the dualistic structure of large firms in the downstream and small/medium enterprises in the upstream. Taiwan had a tradition of peculiar horizontal subcontracting arrangements among machinery manufacturers. The Hong Kong–Guangdong nexus developed an innovative system of processing deal trade in textile and machinery industries. These traditions certainly worked as prototypes of disintegration-type fragmentation in East Asia. The development of modulation technologies and value chain management know-how was a technological backbone facilitating outsourcing arrangements.

The formal econometric analysis of intra-firm and arm's length transactions is not possible because of a serious deficiency of statistical data. The analysis using the micro data of Japanese affiliates abroad, however, provides some limited information on the characteristics of production/distribution networks.

The analysis in this section is based on the micro data compiled by the Ministry of Economy, Trade, and Industry (METI), Government of Japan: *The 1993F/Y, 1996F/Y, 1999F/Y, and 2002F/Y Survey of Overseas Business Activities of Japanese Companies*. This database presents information on the performance of foreign affiliates of Japanese firms. In particular, the extensive surveys conducted every three years, which are used in this section, include detailed information on overseas business activities such as intra-firm and arm's length transactions.[7]

Table 3.5 presents the number of Japanese affiliates located in East Asia and their performance in terms of total sales/purchases, by-destination sales/by-origin purchases ratios, and intra-firm transaction ratios in 1992, 1995, 1998, and 2001. As Table 3.5 shows, machinery industries (industry 290 to 320) account for over 30 percent and approximately 40 percent of the total number of Japanese affiliates in East Asia and their total sales/purchases in 2001, respectively. In particular, electric machinery (300) and transport equipment (310) sectors compose a large portion of Japanese machinery affiliates in East Asia in terms of their number and their activities. To clarify features of their transactions, Tables 3.6 and 3.7 focus on intra-firm and arm's length transactions by Japanese electric machinery affiliates and Japanese transport equipment affiliates in East Asia, NIEs4, ASEAN4, and China, respectively, which are calculated based on Table 3.5 and corresponding tables to Japanese affiliates located in NIEs4, ASEAN4, and China.[8] In the tables, "local" refers to the country in which the affiliate concerned is

Table 3.5 Sales and purchases by Japanese affiliate in East Asia

Year	Industry	Number of affiliates	%	Total sales (billion JPY)	%	By-destination sales ratio (%)						Intra-firm transaction ratio (%)					
						Japan	Local	Third countries				Japan	Local	Third countries			
									East Asia	North America	Europe				East Asia	North America	Europe
(a) Sales																	
	Manufacturing total	1,463	56.3	7,887	50.7	15.8	66.0	18.2	10.0	3.4	1.8	84.2	6.3	42.9	44.6	62.6	47.7
	Machinery total	715	27.5	5,202	33.4	16.8	66.2	17.0	9.4	4.0	1.8	90.5	7.8	57.7	53.9	76.6	65.0
	290	91	3.5	216	1.4	23.6	53.0	23.4	11.3	2.1	9.8	96.7	3.0	71.2	55.6	54.3	93.9
1992	300	416	16.0	2,872	18.5	27.2	45.7	27.1	17.7	4.9	2.1	90.0	8.0	56.2	53.5	82.6	58.0
	310	171	6.6	1,999	12.8	1.7	92.6	5.7	0.8	3.1	0.4	73.9	7.2	60.2	57.9	71.2	28.3
	320	37	1.4	115	0.7	51.8	36.9	11.3	1.6	4.5	3.3	96.5	32.4	46.6	77.9	51.1	50.8
	Total	2,597	100.0	15,556	100.0	21.8	59.4	18.8	9.3	2.4	1.2	64.1	4.7	28.9	33.1	53.5	44.8
	Manufacturing total	2,966	64.5	12,300	50.0	18.8	58.4	22.8	13.3	3.6	1.8	83.2	15.8	45.4	49.1	57.0	60.7
	Machinery total	1,428	31.0	9,080	36.9	20.8	56.6	22.6	12.8	4.0	1.9	90.6	19.9	55.4	60.2	64.8	71.5
	290	234	5.1	541	2.2	28.5	48.5	23.1	13.9	0.7	5.4	97.6	1.5	68.8	66.5	71.4	98.7
1995	300	755	16.4	5,107	20.8	28.7	38.0	33.2	19.6	5.6	2.2	88.9	9.0	52.6	59.5	56.7	58.4
	310	339	7.4	3,095	12.6	2.2	92.8	5.0	0.8	2.3	0.8	85.1	27.3	65.4	30.3	97.2	94.5
	320	100	2.2	337	1.4	51.2	27.7	21.1	15.9	1.9	2.2	98.9	66.6	74.7	76.6	69.3	75.5
	Total	4,600	100.0	24,579	100.0	17.8	54.7	27.5	13.5	2.5	1.4	67.6	10.4	24.3	31.2	49.1	58.3
	Manufacturing total	3,835	61.7	12,325	53.0	25.4	49.2	25.4	16.9	4.5	2.7	73.1	7.6	45.9	47.2	48.3	40.7
	Machinery total	1,809	29.1	8,485	36.5	44.1	38.6	17.3	15.4	1.1	0.4	80.6	15.6	48.7	47.5	50.8	63.7
	290	315	5.1	689	3.0	40.7	32.4	27.0	14.8	5.5	4.6	90.7	6.9	79.7	76.7	91.5	87.4
1998	300	916	14.7	5,192	22.3	32.9	32.3	34.8	24.9	5.3	3.0	73.6	14.5	51.4	55.4	46.0	37.4
	310	478	7.7	2,140	9.2	11.1	81.0	7.9	2.2	3.5	1.5	82.1	2.8	73.0	52.2	98.5	52.6
	320	100	1.6	464	2.0	45.9	27.2	26.9	23.1	1.5	2.0	70.6	26.8	16.3	15.9	11.3	18.6
	Total	6,213	100.0	23,235	100.0	21.9	49.6	28.4	21.2	3.4	2.6	62.7	5.6	32.3	30.1	47.4	34.1

(*Continued overleaf*)

Table 3.5 Continued

Year	*Industry*	*Number of affiliates*	*%*	*Total sales (billion JPY)*	*%*	*By-destination sales ratio (%)*						*Intra-firm transaction ratio (%)*					
						Japan	*Local*	*Third countries*				*Japan*	*Local*	*Third countries*			
									East Asia	*North America*	*Europe*				*East Asia*	*North America*	*Europe*
2001	Manufacturing total	4,247	62.5	20,382	56.6	25.9	46.1	28.0	18.6	4.9	2.6	77.4	10.9	46.1	44.0	58.1	43.8
	Machinery total	2,121	31.2	14,826	41.2	29.1	40.1	30.9	19.9	5.8	2.9	79.3	13.7	52.6	51.6	62.4	47.6
	290	381	5.6	1,084	3.0	40.0	35.1	24.9	17.0	2.4	1.7	93.9	22.8	81.5	75.0	96.5	94.3
	300	1,041	15.3	8,539	23.7	34.4	31.2	34.4	22.0	7.4	2.8	77.6	15.6	54.3	55.8	55.7	52.4
	310	582	8.6	4,575	12.7	8.1	66.1	25.8	16.4	2.9	4.0	80.7	9.3	33.0	23.3	94.6	29.4
	320	117	1.7	628	1.7	40.4	42.5	17.2	12.7	2.9	1.3	72.2	14.1	79.7	78.0	91.4	74.4
	Total	6,799	100.0	35,984	100.0	25.0	47.5	27.5	18.8	4.2	2.5	67.2	8.2	39.5	34.6	60.0	40.7
(b) Purchases																	
1992	Manufacturing total	1,463	56.3	3,384	43.3	37.9	48.4	13.7	8.1	1.6	0.0	78.2	4.2	42.7	50.2	47.7	–
	Machinery total	715	27.5	2,466	31.5	46.2	43.4	10.3	8.3	1.3	0.0	84.4	2.0	62.6	58.8	80.8	–
	290	91	3.5	138	1.8	47.8	49.0	3.3	0.7	1.1	0.3	93.9	4.5	49.7	84.8	80.3	23.9
	300	416	16.0	1,469	18.8	46.7	36.6	16.7	15.2	1.1	0.1	84.6	1.9	62.5	59.8	86.6	98.1
	310	171	6.6	790	10.1	43.8	52.9	3.2	1.0	1.7	0.4	81.7	0.6	76.7	34.6	76.2	86.2
	320	37	1.4	68	0.9	60.2	34.2	5.6	0.3	0.1	0.0	85.6	17.5	4.9	100.0	0.0	–
	Total	2,597	100.0	7,817	100.0	34.7	38.5	26.8	11.6	1.6	0.0	82.8	5.1	21.2	33.6	36.3	–
1995	Manufacturing total	2,966	64.5	6,914	47.5	40.3	40.3	19.4	14.4	1.4	0.7	76.5	15.1	40.8	44.9	32.6	50.7
	Machinery total	1,428	31.0	5,479	37.6	29.3	43.3	27.5	18.6	4.7	2.7	76.2	9.3	53.6	54.3	59.1	46.3
	290	234	5.1	380	2.6	44.0	42.9	13.2	12.6	1.1	1.0	82.9	1.6	25.7	35.4	25.1	13.2
	300	755	16.4	2,834	19.5	38.9	33.8	27.3	24.8	1.3	0.2	86.0	14.1	46.5	45.9	33.1	48.2
	310	339	7.4	2,008	13.8	51.6	45.6	2.8	1.0	0.8	0.7	73.6	16.1	68.8	39.9	97.2	85.2
	320	100	2.2	257	1.8	44.3	34.9	20.8	20.6	0.1	0.1	85.9	42.4	73.7	74.5	0.0	0.3
	Total	4,600	100.0	14,559	100.0	31.5	36.1	32.4	14.9	1.3	1.4	69.1	14.2	23.2	36.2	44.7	27.5

	Manufacturing total	3,835	61.7	7,502	49.3	35.1	43.3	21.6	18.6	1.5	0.6	58.7	7.1	44.9	47.0	44.7	31.6
	Machinery total	1,809	29.1	5,764	37.9	36.8	41.3	21.8	20.3	1.0	0.4	61.9	6.7	49.3	50.0	51.6	21.8
	290	315	5.1	401	2.6	32.2	57.7	10.1	8.8	0.8	0.4	79.1	3.4	76.1	85.1	21.2	0.0
1998	300	916	14.7	3,711	24.4	37.0	35.8	27.2	26.3	0.4	0.2	64.0	6.5	49.7	50.8	24.0	7.4
	310	478	7.7	1,381	9.1	37.2	53.4	9.4	6.1	2.5	0.7	43.8	5.2	48.4	36.2	89.5	17.0
	320	100	1.6	272	1.8	41.2	40.2	18.6	14.5	2.6	1.5	72.9	20.5	22.6	22.3	0.0	65.3
	Total	6,213	100.0	15,223	100.0	33.4	41.1	25.5	20.7	1.5	1.3	59.3	9.9	35.6	39.4	41.8	15.4
	Manufacturing total	4,247	62.5	13,781	51.5	35.8	43.3	21.0	18.6	1.0	0.6	66.0	9.5	42.0	42.6	43.1	19.2
	Machinery total	2,121	31.2	10,417	38.9	38.0	40.3	21.7	20.2	0.7	0.3	69.9	10.1	46.4	45.4	64.7	41.3
	290	381	5.6	786	2.9	36.2	59.0	4.8	4.3	0.3	0.1	67.1	9.8	48.3	48.7	40.9	56.5
2001	300	1,041	15.3	6,249	23.3	35.3	35.2	29.4	28.0	0.5	0.3	74.4	8.6	44.7	44.4	33.3	39.0
	310	582	8.6	2,945	11.0	46.5	47.3	6.2	3.9	1.6	0.4	59.6	13.7	71.4	65.4	98.2	46.2
	320	117	1.7	437	1.6	42.5	49.9	7.7	7.4	0.0	0.2	68.5	11.4	52.1	52.4	79.0	26.3
	Total	6,799	100.0	26,784	100.0	33.9	42.5	23.6	19.3	1.8	1.2	62.6	12.9	39.6	42.5	38.2	10.4

Data source: authors' calculation, based on METI database.

Note: machinery industries are general machinery (290), electric machinery (300), transport equipment (310), and precision machinery (320).

Table 3.6 Intra-firm and arm's length transactions by Japanese electric machinery affiliates in East Asia

	Japanese affiliates in East Asia				*Japanese affiliates in NIEs4*				*Japanese affiliates in ASEAN4*				*Japanese affiliates in China*			
	1992	*1995*	*1998*	*2001*	*1992*	*1995*	*1998*	*2001*	*1992*	*1995*	*1998*	*2001*	*1992*	*1995*	*1998*	*2001*
(a) Sales																
Value (billions JPY)	2,872	5,107	5,192	8,539	1,706	2,793	2,161	3,542	1,083	1,984	2,235	3,595	70	311	750	1,298
Share (%)																
(i) Japan	**27.2**	**28.7**	**32.9**	**34.4**	**24.7**	**22.6**	**28.1**	**30.3**	**27.7**	**36.2**	**41.9**	**40.0**	**81.2**	**29.7**	**22.5**	**32.2**
-intra-firm	24.5	25.6	24.2	26.7	23.3	19.9	19.9	18.0	23.1	32.1	31.8	35.7	80.7	28.3	15.8	26.5
-arm'slength	2.7	3.2	8.7	7.7	1.4	2.7	8.2	12.3	4.6	4.1	10.1	4.4	0.4	1.4	6.7	5.8
(ii) Local	**45.7**	**38.0**	**32.3**	**31.2**	**52.2**	**45.4**	**44.2**	**41.4**	**38.4**	**29.3**	**17.2**	**18.5**	**13.4**	**34.1**	**40.8**	**37.2**
-intra-firm	3.7	3.4	4.7	4.9	5.0	3.2	5.6	4.1	2.3	3.8	3.7	5.6	0.0	2.5	4.5	5.7
-arm'slength	42.0	34.6	27.6	26.3	47.2	42.2	38.7	37.4	36.2	25.5	13.4	12.9	13.4	31.6	36.3	31.6
(iii) Other East Asia	**17.7**	**19.6**	**24.9**	**22.0**	**16.3**	**17.4**	**18.8**	**16.4**	**20.6**	**20.3**	**28.4**	**26.8**	**5.1**	**30.8**	**31.7**	**22.0**
-intra-firm	9.5	11.6	13.8	12.3	5.2	9.2	6.4	7.5	15.1	11.7	15.8	14.2	5.1	27.9	27.2	17.0
-arm'slength	8.2	7.9	11.1	9.7	11.0	8.1	12.3	8.9	5.4	8.6	12.6	12.6	0.0	2.9	4.5	5.0
(i+ii+iii) East Asia (total)	**90.6**	**86.3**	**90.1**	**87.6**	**93.1**	**85.3**	**91.1**	**88.1**	**86.7**	**85.9**	**87.4**	**85.3**	**99.8**	**94.6**	**95.0**	**91.4**
-intra-firm	37.6	40.6	42.7	43.9	33.5	32.3	31.9	29.6	40.5	47.6	51.3	55.4	85.9	58.6	47.5	49.1
-arm'slength	53.0	45.7	47.4	43.8	59.6	53.0	59.2	58.6	46.2	38.2	36.1	29.9	13.8	35.9	47.5	42.3

(b) Purchases																
Value	1,469	2,834	3,711	6,249	757	1,455	1,700	2,653	654	1,157	1,452	2,602	47	209	532	919
Share																
(i) Japan	**46.7**	**38.9**	**37.0**	**35.3**	**48.7**	**37.8**	**42.5**	**40.8**	**42.1**	**37.1**	**33.7**	**28.3**	**83.6**	**53.3**	**33.3**	**38.3**
-intra-firm	39.5	33.5	23.7	26.3	43.2	33.6	27.8	33.1	32.8	30.7	21.7	19.4	78.4	45.1	19.4	24.9
-arm's length	7.2	5.4	13.3	9.0	5.5	4.2	14.7	7.7	9.4	6.4	12.0	8.9	5.2	8.2	13.9	13.4
(ii) Local	**36.6**	**33.8**	**35.8**	**35.2**	**34.3**	**38.4**	**36.4**	**31.3**	**39.7**	**31.2**	**36.0**	**38.7**	**16.1**	**18.7**	**33.7**	**37.3**
-intra-firm	0.7	4.8	2.3	3.0	0.3	7.5	2.6	3.6	0.7	1.8	2.1	2.1	6.3	1.8	2.6	4.1
-arm'slength	35.9	29.0	33.5	32.2	33.9	30.8	33.8	27.7	39.0	29.4	33.9	36.6	9.9	16.9	31.1	33.2
(iii) Other East Asia	**15.2**	**24.8**	**26.3**	**28.0**	**15.9**	**20.4**	**20.7**	**26.3**	**15.9**	**30.1**	**29.1**	**31.2**	**0.1**	**27.0**	**32.1**	**23.8**
-intra-firm	9.1	11.4	13.4	12.4	15.0	12.0	11.1	12.8	3.5	7.9	10.1	10.5	0.1	22.4	27.1	16.1
-arm'slength	6.1	13.4	12.9	15.6	1.0	8.4	9.6	13.5	12.5	22.2	19.0	20.7	0.0	4.6	5.0	7.8
(i+ii+iii) East Asia (total)	**98.5**	**97.5**	**99.1**	**98.5**	**98.9**	**96.6**	**99.5**	**98.4**	**97.8**	**98.4**	**98.8**	**98.2**	**99.8**	**99.0**	**99.1**	**99.5**
-intra-firm	49.3	49.6	39.4	41.7	58.6	53.1	41.5	49.5	36.9	40.4	33.9	32.0	84.8	69.3	49.1	45.0
-arm'slength	49.2	47.9	59.8	56.8	40.4	43.5	58.1	48.9	60.9	58.0	64.8	66.2	15.0	29.7	50.0	54.4

Data source: authors' calculation, based on METI database.

Table 3.7 Intra-firm and arm's length transactions by Japanese transport equipment affiliates in East Asia

	Japanese affiliates in East Asia				*Japanese affiliates in NIEs4*				*Japanese affiliates in ASEAN4*				*Japanese affiliates in China*			
	1992	*1995*	*1998*	*2001*	*1992*	*1995*	*1998*	*2001*	*1992*	*1995*	*1998*	*2001*	*1992*	*1995*	*1998*	*2001*
(a) Sales																
Value (billions JPY)	1,999	3,095	2,140	4,575	811	758	557	829	974	1,920	843	2,379	35	145	281	696
Share (%)																
(i) Japan	**1.7**	**2.2**	**11.1**	**8.1**	**2.3**	**1.9**	**3.1**	**3.1**	**1.8**	**2.5**	**25.3**	**9.4**	**1.5**	**5.5**	**7.9**	**14.0**
-intra-firm	1.3	1.9	9.1	6.5	1.1	1.6	1.4	2.7	1.7	2.1	21.0	7.1	1.2	5.2	7.0	12.2
-arm's length	0.5	0.3	2.0	1.6	1.2	0.2	1.7	0.4	0.1	0.5	4.3	2.3	0.2	0.3	0.9	1.8
(ii) Local	**92.6**	**92.8**	**81.0**	**66.1**	**92.2**	**92.8**	**91.0**	**84.1**	**92.3**	**91.9**	**59.9**	**54.4**	**92.4**	**87.9**	**88.4**	**82.4**
-intra-firm	6.7	25.3	2.3	6.1	0.6	22.7	5.3	6.3	11.8	34.3	3.2	8.7	0.0	0.3	0.4	0.8
-arm's length	85.9	67.4	78.8	59.9	91.6	70.1	85.7	77.8	80.5	57.6	56.6	45.7	92.4	87.5	88.0	81.6
(iii) Other East Asia	**0.8**	**0.8**	**2.2**	**16.4**	**1.6**	**0.7**	**2.9**	**7.0**	**0.5**	**0.9**	**3.6**	**21.8**	**0.0**	**1.9**	**1.4**	**1.4**
-intra-firm	0.5	0.3	1.1	3.8	0.8	0.3	0.9	3.7	0.4	0.3	2.7	5.6	0.0	0.2	0.1	0.2
-arm's length	0.3	0.6	1.1	12.6	0.8	0.4	2.1	3.3	0.1	0.7	0.9	16.2	0.0	1.7	1.3	1.2
(i+ii+iii) East Asia (total)	**95.1**	**95.8**	**94.3**	**90.6**	**96.1**	**95.4**	**97.0**	**94.2**	**94.6**	**95.3**	**88.7**	**85.7**	**93.9**	**95.2**	**97.7**	**97.9**
-intra-firm	8.4	27.5	12.5	16.5	2.5	24.6	7.5	12.7	13.8	36.6	27.0	21.5	1.2	5.7	7.5	13.2
-arm's length	86.7	68.3	81.8	74.1	93.6	70.7	89.5	81.5	80.8	58.7	61.8	64.2	92.6	89.5	90.2	84.6

(b) Purchases																
Value	790	2,008	1,381	2,945	215	389	419	479	512	1,380	520	1,658	6	91	171	394
Share																
(i) Japan	**43.8**	**51.6**	**37.2**	**46.5**	**38.3**	**34.6**	**31.7**	**22.6**	**45.0**	**61.1**	**41.0**	**54.8**	**39.3**	**52.9**	**43.0**	**38.4**
-intra-firm	35.8	38.0	16.3	27.7	16.9	19.0	13.0	18.2	43.5	50.3	25.5	32.5	38.2	45.0	9.8	19.7
-arm's length	8.0	13.6	20.9	18.8	21.4	15.6	18.7	4.4	1.6	10.8	15.5	22.4	1.0	7.9	33.2	18.6
(ii) Local	**52.9**	**45.6**	**53.4**	**47.3**	**59.9**	**64.3**	**60.8**	**62.2**	**51.4**	**35.7**	**46.0**	**39.6**	**40.5**	**43.3**	**52.3**	**57.9**
-intra-firm	0.3	7.3	2.8	6.5	0.0	0.4	5.6	0.5	0.5	9.5	4.9	10.2	0.0	24.1	0.1	0.5
-arm's length	52.6	38.3	50.6	40.8	59.9	64.0	55.2	61.6	51.0	26.1	41.1	29.4	40.5	19.2	52.2	57.3
(iii) Other East Asia	**1.0**	**1.0**	**6.1**	**3.9**	**0.4**	**0.2**	**6.1**	**12.2**	**1.1**	**1.1**	**8.0**	**3.0**	**9.9**	**1.0**	**1.8**	**1.1**
-intra-firm	0.4	0.4	2.2	2.6	0.3	0.1	1.1	9.1	0.3	0.6	4.2	2.0	9.9	0.7	1.7	0.7
-arm's length	0.7	0.6	3.9	1.4	0.1	0.2	5.0	3.1	0.9	0.5	3.8	1.0	0.0	0.2	0.1	0.4
(i+ii+iii) East Asia (total)	**97.8**	**98.3**	**96.7**	**97.7**	**98.6**	**99.2**	**98.7**	**97.0**	**97.6**	**97.9**	**95.0**	**97.5**	**89.6**	**97.2**	**97.1**	**97.3**
-intra-firm	36.5	45.7	21.3	36.8	17.2	19.5	19.7	27.9	44.2	60.4	34.6	44.7	48.1	69.9	11.5	20.9
-arm's length	61.3	52.6	75.4	61.0	81.4	79.7	79.0	69.1	53.4	37.4	60.4	52.8	41.5	27.3	85.6	76.4

Data source: authors' calculation, based on METI database.

located, "third countries" are countries other than Japan and "local," and "East Asia" indicates countries in East Asia other than Japan and "local."

The nature of fragmentation and its changes over time can be observed particularly in the largest sector, electric machinery (300), and patterns of by-destination sales and by-origin purchases vividly present the development of international production/distribution networks. The most salient phenomenon is the large and increasing share of sales/purchases with other East Asian countries, suggesting the extensiveness of networks and their development: shares of other East Asian countries increased from 18 percent (9 percent) in 1992 to 22 percent (20 percent) for sales and 15 percent (8 percent) in 1992 to 28 percent (20 percent) in the electric machinery sector (machinery sectors as a whole). In addition, increasing shares of Japan in sales and decreasing shares of Japan in purchases indicate the expansion of back-and-forth cross-border production sharing as well as the development of local vendors. The declining trend of local sales ratios suggests a shift in weight from import-substituting-type industries to export-oriented, network-forming industries.

Ratios of intra-firm/arm's length transactions conform to our two-dimensional fragmentation framework. Intra-firm transaction ratios for transactions with Japan, other East Asian countries, and local concerns become smaller in this order (Table 3.5).[9] In other words, intra-firm transactions are large in transactions with Japan while arm's length transactions are important in local transactions, and transactions with other East Asian countries are categorized in the middle. This observation proves a close link between geographical proximity and disintegration-type fragmentation, indicating the formation of agglomeration of fragmented production blocks, as discussed in Section 2.

The above-mentioned characteristics seem to be reflected most closely in the case of Japanese affiliates in ASEAN4. That is, intra-firm transactions are large in transactions with Japan, while arm's length transactions are important in local transactions, and transactions with other East Asian countries are categorized in the middle, reflecting a close link between geographical proximity (agglomeration) and arm's length fragmentation (Table 3.6). In the case of Japanese affiliates in China, we must note that operations by Japanese firms in China seriously started only recently (see values of sales and purchases in Tables 3.6 and 3.7).[10] Rapid increases in local purchases ratios from 16 percent in 1992 to 37 percent in 2001, eventually reaching up to the level of ASEAN4, with the rapid expansion of arm's length transactions in the local market, suggest the formation of local vertical links in agglomeration in China.

On the other hand, the declining trend in purchases from Japan, mostly intra-firm purchases, is clearly observed: shares of purchases from Japan (intra-firm purchases from Japan) in total purchases by Japanese electric machinery affiliates in China are 84 percent (78 percent) in 1992 and 38 percent (25 percent) in 2001. In China, purchases from Japan, particularly intra-firm purchases from Japan, seem to be significantly replaced by local arm's length purchases according to the above-mentioned development of agglomeration in the local market, and intra-firm purchases from other East Asian countries, probably mainly ASEAN countries. Although arm's length transaction ratios are large for transactions with other East Asian countries by Japanese electric machinery affiliates in ASEAN4, intra-firm transaction ratios are large by those in China. Such a difference in intra-firm transaction ratios with other East Asian countries may indicate proximity among ASEAN countries and remoteness of China from ASEAN4. Low intra-firm sales ratios in selling to the local market perhaps reflect regulations in the local distribution sector.

In contrast to the electric machinery sector, the transport equipment sector (310) has been heavily affected by import-substitution policies. Extremely high ratios of local sales in total sales in the 1990s reflect trade protection and import-substitution-type operations in most of the East Asian countries. The ratios, however, have been in a declining trend even in this sector, particularly in ASEAN4, reflecting trade liberalization and the removal of local contents requirements, which encourages exports of parts and components as well as built-up cars.

Conclusion

In this chapter we have applied an analytical framework of two-dimensional fragmentation to empirically examine the spatial structure and characteristics of international production/distribution networks in East Asia.

The analysis of international trade data, particularly trade in machineries and machinery parts and components, verifies the importance of international production/distribution networks in East Asian economies, and the enhancing relative importance of intra-East Asian markets to other markets outside of the region including the US market for East Asian exports. Although production/distribution networks in East Asia have architecture open to other regions and are utilized by firms with various firm nationalities, dense networking is in particular developed within the region. The recent enhancement of transactions among developing countries including ASEAN and China is noteworthy; both markets of intermediate and finished products start being integrated with massive FDI and trade liberalization/facilitation. Together with the rapid expansion of its own market, East Asia seems to be gaining self-contained economic structure while keeping its open setting intact.

The investigation of data relating to the performance of affiliates of Japanese firms in East Asia suggests the spatial microstructure of vertical production chains effectively combining intra-firm and arm's length transactions. The development of arm's length transactions and the formation of agglomeration come into a mutually enhancing causal link. Forces of agglomeration provide opportunities for local firms to penetrate into production/distribution networks that were initially constructed by MNEs, which induces drastic changes in the perception of industrial promotion policy.

The formation of international production/distribution networks at the level of sophistication observed in East Asia is an unprecedented phenomenon. It presents a new form of trade and FDI among countries at different development stages and at the same time suggests the possibility of new development strategies for developing countries. Recognizing the importance of its policy implication, we must continue to analyze the phenomenon more deeply and extensively.

Notes

1 For previous literature on agglomeration see Fujita, Krugman, and Venables (1999) and Baldwin et al. (2003).
2 For a comparision of production networks in Asia and US-Mexico see Ando et al 2006. Ando and Kimura (2007) provide a comparison of production networks in East Asia and Europe.
3 The wholesale manufacturing price index of the US is used to obtain export values at the 2000 prices.
4 Since export data at the HS classification in 1990 are not available for China, Hong Kong, and the Philippines, corresponding import data are used.
5 We also conducted the gravity model estimation using weighted distances instead of simple distances. The results are basically the same.
6 Growth rates of final machinery products from Japan to other East Asian countries are relatively small and even negative for exports to ASEAN countries.
7 In this data set, foreign affiliates include both "affiliates abroad" with no less than 10 percent ownership by Japanese parent firms and "affiliates of affiliates abroad" with no less than 50 percent ownership by "affiliates abroad," except those in finance, insurance, or real estate. Note that the the survey is not mandatory and hence the response ratio is about 60 percent.
8 The corresponding tables on Japanese affiliates in NIES4, ASEAN4, and China are omitted from the chapter and are available upon request from the authors.
9 See Ando et al. 2006 for more detailed discussion on similarities of operations of Japanese and the US firms in East Asia.
10 The number of affiliates of Japanese MNE affiliates operating in China increased from 30 to 281 and their sales increased from JPY 47 billion to JPY 919 billion between 1992 and 2002.

4 Production fragmentation and outsourcing

The impact of trade and investment liberalization

Witada Anukoonwattaka and Sisira Jayasuriya

Increasingly firms purchase many intermediate inputs (components) both from other firms and from subsidiaries located in other countries. Such outsourcing across firm and national borders has shown rapid growth in Asia in recent years; in East Asia intermediate-product trade increased by 30 per cent between 2000 and 2003, and 40 per cent of ASEAN-4 exports depend on intra-regional vertical specialization (Athukorala and Yamashita 2006). This is not confined to manufacturing; with falling transport and communication costs, numerous services have become tradeable allowing similar product fragmentation in services. Outsourcing of services by US firms expanded at an annual rate of 6.3 per cent between 1992 and 2000 (Amiti and Wei 2006).[1]

This is associated with the rapid expansion of international production networks – largely built around multinational enterprises (MNEs) and FDI – in the context of ongoing trade and investment liberalization, but a significant proportion of such intermediates are sourced from 'independent' firms.[2] Hence trade in components involves both 'intra-firm' trade and 'arm's length' trade.[3]

Decisions on sourcing options determine the 'boundary of the firm' and related patterns of production and trade. Wide differences in the firm boundary are observed among different firms, within different industries and countries and over time. Bernard, Jensen and Schott (2005), for example, found that MNEs increase their share of intra-firm trade with low-income countries and increase their share of arm's length trade with upper income countries over time. Operations of Japanese MNEs in East Asia (EA) reveal a complex (and changing) pattern of intra-firm and arm's length trade (Ando and Kimura 2007; Athukorala and Yamashita 2006; Guiheux and Lecler 2000 and Legewie 1999). For example, as seen in Table 4.1, while Japanese affiliates of MNEs in the transport equipment sector increased arm's length purchases from 41.5 to 76.4 per cent of their total intermediate goods purchases during the period from 1992 to 2001 in China, they sharply reduced arm's length purchases in the more advanced countries of NIE4 (Hong Kong, Singapore,

Table 4.1 Purchases of Japanese affiliates in East Asian transport equipment sector (shares in total purchases: %)

	NIE4		*ASEAN4*		*China*	
	Intra-firm	*Arm's length*	*Intra-firm*	*Arm's length*	*Intra-firm*	*Arm's length*
1992	17.2	81.4	44.2	53.4	48.1	41.5
2001	27.9	69.1	44.7	52.8	20.9	76.4

Source: Ando and Kimura (2007), Table 7, p. 37.

South Korea, and Taiwan). Their sourcing pattern in ASEAN4 countries (Indonesia, Malaysia, Philippines and Thailand) was almost unchanged during this same period.

While much international literature has focused on the production and employment implications of outsourcing for capital-rich developed countries of the growth of China and India – large low-wage economies – there have also been concerns about the likely impact on 'intermediate' economies such as Malaysia and Thailand. Available models (as reviewed below) that typically consider a two-country world with limited intermediate goods are inadequate to address how firms behave when there are such intermediate countries.

In this chapter we present a stylized three-country model to highlight some key determinants of MNE behaviour, examine the validity of the model in the light of available empirical evidence on Japanese MNE operations in Asia and draw some conclusions about likely future trends in the context of ongoing trade and investment liberalization. We show that model predictions are broadly consistent with industry trends and patterns of Japanese MNE behaviour in the transport equipment industry in Asia. In a case study, we draw on the model to examine the relative factor intensity of components produced in-house and outsourced by the Thailand subsidiary of Toyota.

The model

In this section we present a formal partial equilibrium model of an MNE where the firm boundary is endogenously determined, drawing on the above continuum of components framework and extending it to a three-country setting. The model allows both intra-firm and inter-firm trade in final goods and multiple components. We model operations of an MNE in three countries that differ in factor endowments in ways harmonized with the analysis of fragmentation across two or more specialization cones by Jones (2000) and Deardorff (2001b). We conceptualize these countries as (loosely) representing capital-rich developed countries (e.g. Japan and Singapore), intermediate (e.g. Malaysia and Thailand), and labour-rich developing countries (e.g. China and Vietnam), respectively.

External factor prices are assumed exogenous, so there is no movement towards international factor price equalization (FPE). For simplicity, scale economies and game-theoretic complexities are not considered.[4] We do not focus explicitly on other issues such as imperfect information, contractual incompleteness and hold-up problems. Limited firm-specific capital generates a trade-off between in-sourcing and outsourcing in a multi-component and three-country framework. Initially each 'subsidiary' has a fixed amount of firm-specific ('headquarters') capital and high initial trade costs preclude international trade, so the final good is produced in-house in all three locations.

We analyse trade and production in this initial equilibrium and then examine the impact of progressive trade liberalization, first in component trade and then in both components and final good. The model implies systematic relationships between country characteristics and characteristics of the production stages, and between characteristics of production stages and the organizational forms of trade. Comparative static results are presented on how tariff reductions affect arm's length and intra-firm trade. Finally, we consider production specialization patterns, investment, and trade after investment liberalization (defined as a situation where the MNE's firm-specific capital is perfectly internationally mobile allowing reallocation among subsidiaries).

The MNE operates in three countries (North, Middle and South) producing a final good from a bundle of multiple components that differ from each other in their factor intensity. The endowments and prices of capital and labour in each country are sufficiently different, i.e. $(r / w)_{North} < (r / w)_{Middle} < (r / w)_{South}$. We assume that the MNE has headquarters in the North and has directly invested in the Middle and the South by setting up subsidiaries.

In each country, the MNE faces downward-sloping demands for the final good. Assuming a quasi-linear utility function, the final good demand function in country j takes a simple form: $P_j = A_j - B_jQ_j$. On the supply side, the final good in country j may be produced domestically (D_j) or imported from subsidiaries abroad ($M^{j'}_j$): $Q_j = D_j + \sum_{j' \neq j} M_{j'}$, where j is the domestic country and j' denotes its trading-partner countries $j' \in$ [*North*, *Middle*, *South*]. The final-good production of country j is for domestic sales (D_j) and also for possible export ($X^{j'}_j$) {:} $Y_j = D_j + \sum_{j' \neq j} X^{j'}_j$.[5]

Final-good production requires a continuum of intermediate inputs (parts or components), labour, and firm-specific (headquarters) capital in fixed proportions.[6] Components are indexed from 0 to 1. To simplify notation, the unit requirements of firm-specific capital and components are set equal to unity. The production function of the final good takes the following form:

$$Y = \min\left\{H_Y, \frac{L_Y}{a_L}, Z_0, \ldots, Z_1\right\}$$

where Y denotes the quantity of final good. The amounts of firm-specific capital, labour, and component i used in final-good production are denoted by H_Y, L_Y and Z_i, respectively, and a_L is the unit labour requirement for final-good production. The fixed-coefficient production functions yield the amounts of factors used in final-good production in a country as follows: $H_Y = Y$, $L_Y = a_L Y$ and $Z_i = Y$.

All MNE subsidiaries can produce components internally, engage in intra-firm trade with the other subsidiaries of the parent company and engage in arm's length trade with domestic or foreign independent suppliers. The MNE uses firm-specific capital and labour for in-house production. With a fixed-coefficient technology, it requires b_i of headquarters capital and b_L of labour to produce one unit of component i. The capital-to-labour ratio for component i is, therefore, b_i / b_L. To simplify notation, we assume $b_L = 1$, hence b_i becomes a normalized capital-to-labour ratio of component i. We arrange the continuum of components such that the capital intensity of components is increasing with component index, i.e. $(\partial b_i / \partial i) > 0$. Derived demands for headquarters capital and labour for in-house component i are, respectively, $H_i = b_i Y$, and $L_i = Y$. Outside (independent) suppliers produce components with the same technology but using non firm specific capital available in the capital market at an exogenously set rental rate and labour.

We assume that final good production – assembly – is highly labour intensive. Combining multiple components into a final good is subject to *ad valorem* transaction costs, $T_{F(i)} \geq 1$, that vary across sources and types of components.[7] As in Grossman and Rossi-Hansberg (2006 and 2008a), we assume that production of capital-intensive components is subject to higher within-firm 'transaction costs' than labour-intensive components, as they involve more sophisticated and complex tasks, i.e. $(\partial T_{F(i)} / \partial b_i) > 0$. In country j, the dual unit-cost of domestically outsourcing component i in competitive markets is

$$c_{z(i)s_j} = T_{F(i)}(b_i r_j + w_j) \tag{1}$$

Importing components from country j' is subject to *ad valorem* tariff, $T \geq 1$. Then, the dual unit-cost of using arm's length imports of component i from country j' is

$$c_{m(i)s_{j'}} = T T_{F(i)}(b_i r_{j'} + w_{j'}) \tag{2}$$

Equilibrium conditions

We solve the MNE's profit maximization problem in each country to derive final-good supply and demand for intermediate inputs.[8] In country j, the firm maximizes profits with respect to final and intermediate goods production and trade, i.e.

Q_j, D_j, $X^{j'}_j$, $M^{j'}_j$, $z_{isj'}$, $m_{is}{}^{j'}_{j}$, $x_{iv}{}^{j'}_{j}$, z_{iv_i}, $x_{iv}{}^{j'}_{j}$, and $m_{iv}{}^{j'}_{j}$:

$$\prod_j = P(Q_j)\, D_j + \sum_{j' \neq j} P(Q_{j'})\, X^{j'}_j + \sum_{j'} p_{iv_j}\, x_{ivj}^{j'} - TP(Q_{j'})\left[\sum_{j' \neq j} M^{j'}_j\right] -$$

$$w_j a_L \left[D_j + \sum_{j' \neq j} X^{j'}_j\right] - \int_{i=0}^{1} T_{Fi}(b_i r_j + w_j) z_{is_j}\, di - \sum_{j' \neq j} T \int_{i=0}^{1} T_{Fi}(b_i r_{j'} + w_{j'}) m_{isj}^{j'}\, di -$$

$$\sum_{j' \neq j} \int_{i=0}^{1} w_j T_{Fi}\left(z_{iv_j} + \sum_{j' \neq j} x_{ivj}^{j'}\right) di - T \sum_{j' \neq j} \int_{i=0}^{1} p_{ivj'} m_{ivj}^{j'} di$$

s.t. final-good sufficiency condition: $Q_j \leq D_j + \sum_{j' \neq j} M^{j'}_j$

component-sufficiency condition: $D_j + \sum_{j' \neq j} X^{j'}_j \leq z_{iv_j} + z_{is_j} + \sum_{j' \neq j} m_{iv_{j'}} + \sum_{j' \neq j} m_{is_{j'}}$,

fixed supply of firm-specific capital: $\left[D + \sum_{j' \neq j} X^{j'}_j\right] + \int_{i=0}^{1} b_i \left(z_{iv_j} + \sum_{j' \neq j} x_{ivj}^{j'}\right) di \leq \overline{\mathrm{H}}_j$.

These optimization constraints are bounded at strict equality at the equilibrium, and their Lagrange multipliers are strictly positive. The above Lagrange multipliers measure shadow costs of final good, components, and firm-specific capital, respectively, in country j. Exports of country j to country j' are imports of country j' from country j, i.e. $X^{j'}_j = M^{j}_{j'}$ for final-good trade, and $x_{ivj}^{j'} = m_{iv}{}^{j}_{j'}$ for intra-firm component trade.

Dual unit-cost functions

Firm-specific capital has no market price but a shadow price in each country j, denoted by λ_j. The marginal (shadow) cost of using domestically in-sourced component i is

$$c_{z(i)v_j} = b_i \lambda_j + T_{F(i)} w_j. \tag{3}$$

The marginal (shadow) cost of intra-firm import of component i from country j' is

$$c_{m(i)v_{j'}} = Tc_{z(i)v_{j'}} = T(b_i \lambda_{j'} + T_{F(i)} w_{j'}). \tag{4}$$

The marginal cost of final-good production (c_j) is the aggregation of unit-shadow cost of capital, labour cost, and intermediate inputs:

$$c_j = \lambda_j + w_j a_L + \int_{i=0}^{1} p_{ji} di. \tag{5}$$

Intermediate goods

Deriving the Kuhn-Tucker conditions and applying equilibrium cost functions of components yield the equilibrium conditions of component sourcing. The value of the Lagrange multiplier of the component-sufficiency condition p_{ji} comes from the minimal cost of component i available to the firm in country j.

$$p_{ji} = \min \{c_{z(i)v_j}, c_{z(i)s_j}, c_{m(i)v_j}, c_{m(i)s_j}\} \tag{6}$$

These yield corner solutions for optimal component sourcing, given the assumption of perfect substitution between sourcing options. The derived demand for intermediate goods in country j would be met by the minimal-cost options among components sourced from domestic production (z_{iv_j}), domestic outsourcing (z_{is_j}), intra-firm imports ($m_{ivj}^{j'}$) and arm's length imports ($m_{isj}^{j'}$).

Final good

These also yield corner solutions for the final-good production and imports, because they are perfect substitutes. Each subsidiary meets its domestic final-good demand by domestic production or imports (from country g) depending on whether the cost of domestic production is lower or higher than imports subject to tariffs. Marginality conditions give optimal amounts of domestic production or imports of country j.

The Kuhn-Tucker conditions and equilibrium cost functions of final good yield equilibrium conditions of component sourcing:

$$D_j = \frac{1}{2B_j}[A_j - c_j] \text{ and } M_j^{j'} = 0 \text{ when } \forall j' \quad c_j \leq Tc_{j'} \tag{7}$$

$$M_j^{j'=g} = \frac{1}{2B_j}[A_j - Tc_{j'=g}] \text{ and } D_j = 0 \text{ when } \forall j' \quad Tc_{j'=g} \leq \min [c_j, Tc_{j'}] \tag{8}$$

The closed economy

In a 'closed economy', trade barriers are prohibitively high ($T \rightarrow \infty$) for importing components and the final good. Each subsidiary produces the final good for its domestic market: $X_j^{j'} = 0$, $M_j^{j'} = 0$, $Q_j = D_j$, $x_{ivj}^{j'} = 0$, $m_{ivj}^{j'} = 0$, and $m_{isj}^{j'} = 0$.

However, trade in components (i.e. outsourcing) is possible between firms within the same country and we focus on this particular equilibrium.[9] Such outsourcing occurs if firm-specific capital is inadequate to produce the optimal amount of the final good and all components within the firm. Then, the firm's capital constraint is bound at strict equality and the shadow cost of headquarter capital (λ_j) is higher than zero. The equilibrium value of λ_j is determined by the equalization of component costs between the two sourcing options, and the equilibrium unit cost of components determines patterns of component sharing as described below:

Cost equalization gives the equilibrium shadow price (cost) of firm-specific capital in country j:

$$\lambda_j = T_{F(n_j)} r_j \tag{9}$$

Therefore, the equilibrium unit-cost of in-house component i is:

$$c_{z(i)v_j} = b_i T_{F(n_j)} r_j + T_{F(i)} w_j \tag{10}$$

r_j and w_j are given exogenously, and the specialization pattern of production is determined by relative costs of components between in-house components, $c_{z(n_j)v_j}$, and domestically outsourced components, $c_{z(n_j)s_j}$ which is defined as in Equation 4.1. Figure 4.1 illustrates the minimal-cost locus of in-house production and domestic outsourcing. Outsourcing cost must lie above in-sourcing cost at higher ratios of capital intensity ($i > n_j$), because transaction cost ($T_{F(i)}$) is increasing with i. Hence, in that range, in-house production has a cost advantage over domestic outsourcing. It follows that the components $i > n_j$ would be produced inside the firm (boundary) in country j, and the components $i < n_j$ would be outsourced to domestic suppliers.

$$i > n_j,\ z_{iv_j} = D_j,\ z_{is_j} = 0, \text{ and } p_{ji} = c_{z(i)v_j}. \tag{11.1}$$

$$i < n_j,\ z_{is_j} = D_j,\ z_{iv_j} = 0, \text{ and } p_{ji} = c_{z(i)s_j} \tag{11.2}$$

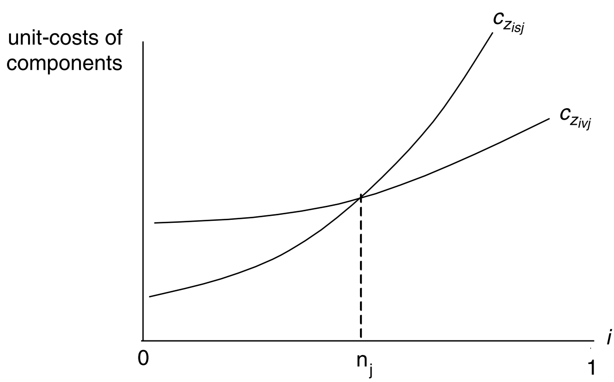


Figure 4.1 In-house production and domestic outsourcing.

The marginal component $i = n_j$ is determined by the full-employment of headquarters capital in equation (4) that becomes

$$D_j + \int_{i=n_j}^{1} b_i z_{iv_j}\, di = \overline{H}_j \tag{11.3}$$

The distinction between in-sourcing and outsourcing components is summarized in the following statement:

Statement 1: *The MNE may outsource some components because the firm has a limited firm-specific asset that is an input for activities inside the firm boundary. The MNE preserves the firm-specific capital for its core activity (final-good production) and relatively capital-intensive components, which are subject to higher transactions costs if they are outsourced.*

The trading economy: trade in components

When component tariffs are low enough, intra-firm and arms' length trade in components may occur. There are six possible component sources in each country (three arm's length choices and three intra-firm choices). We look at an equilibrium where the MNE, with limited firm-specific capital, both produces and outsources components in every country.

To show production specialization, we first illustrate the roles of factor price differences on specialization of outside suppliers in different countries by initially assuming that the MNE does not produce components. For fixed wage and rental rates, each country has an outsourcing-cost advantage in different components if factor-price differences are sufficiently large. Figure 4.2 illustrates the minimal-cost of outsourcing defined as in Equations 4.1 and 4.2. Note that we specify the equations of the trading economy for the MNE's home country ($j = North$). a_{1_j} and a_{2_j} denote the marginal components where the costs are equalized. The cost locus of outsourcing from the North will lie below that of the other two countries in the range of relatively capital-intensive components. The range within which there is a cost advantage to outsourcing from the South will be in the relatively labour-intensive components and that of the Middle will be in between.

Now consider the option of in-sourcing in this framework. The minimal costs of in-house production and intra-firm imports ($c_{z_{iv}\ j}$ and $c_{m_{iv_j^{j'}}}$) are illustrated as dashed lines. The relative cost advantages of intra-firm and arm's length sourcing determine the firm boundary along the component spectrum. At $i = n_j$, $c_{m_{is_j^{j'}}} = c_{m_{iv_j^{j'}}}$. Then, the shadow cost of headquarters capital reaches the same equilibrium value as in the autarky, Equation 4.9:

$$\lambda_j = T_{F(n_j)} r_j \tag{9}$$

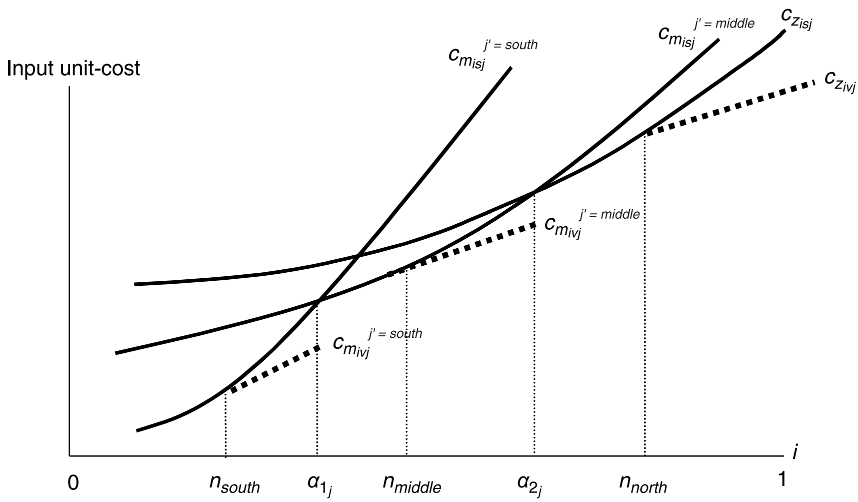


Figure 4.2 Minimal costs locus of outsourcing.

The MNE and its subsidiaries produce components in that range where in-sourcing has a cost advantage over outsourcing in the host countries. In-sourced components will be relatively capital-intensive components in the range where the host countries have cost advantages. The marginal components ($i = n_j$, where j = *North, Middle, South*) are those where in-sourcing and outsourcing costs are equalized.

The insights from the above discussion can be described as follows:

Statement 2: *The relative cost advantages of each country follow factor-price differences. The North can potentially export highly capital-intensive components, while the South is likely to produce relatively labour-intensive products. The factor-intensity range of components produced in the Middle is likely to be intermediate. In each country, the MNE will produce in-house (in-source) the relatively capital-intensive components and outsource the more labour-intensive components.*

The trading economy: trade in the final good

Country j imports final-good ($M_j^{j'} > 0$) if factor price differences are sufficiently large and trade costs are low. The equilibrium conditions in the final-good market (Equations 4.7 and 4.8) imply that each subsidiary will source final-goods from the cheapest cost location (country). The cost of the final good produced in country j is

$$c_j = T_{F(n_j)} r_j + a_L w_j + \int_{i=0}^{1} p_{ji}\, di. \tag{12}$$

The term $\int_{i=0}^{1} p_{ji} di$ is the minimal costs of components for the final-good assembler in country *j*. Note that final-good cross-border trade costs are affected by both direct and indirect tariffs. Direct tariff means the tariff applied to the FOB value of a finished good ($Tc_{j'}$); indirect tariffs are embedded in the cost of imported components of a final-good assembler ($c_{m(i)v_{j'} = south}$ and $c_{m(i)s_{j'} = south}$). If cross-border trade costs are low, for relatively small differences in component costs, wage differences will play the key role in determining the cost advantages of final-good production (assumed to be highly labour-intensive, i.e. a_L is large). Hence, for $j = South$, it is likely that $c_j \leq Tc_{j'}$, while for $j \neq South$, $Tc_{j' = south} \leq \min [c_j, Tc_{j' \neq south}]$.

Patterns of final-good production and trade evolve as trade costs decline with 'trade liberalization'. If prohibitive trade costs preclude trade in the final good, each subsidiary produces the optimal final-good output for each country $D_j = \frac{1}{2B_j}[A_j - c_j]$. In contrast, if cross-border trade costs are lowered, there can be trade in the final good. If final-good assembly is highly labour-intensive, final-good production tends to be located in the labour-rich country which becomes the final-good export-platform. If the size of the MNE capital stock in the South is adequate, North and Middle will cease to produce the final good altogether and import $M_j^{j'} = [A_j - Tc_{j'}]$ where $j' = South$, from their South subsidiary.

This can be summarized as follows.

Statement 3: *The South is likely to be an export-platform for the final good if cross-border trade costs ('tariffs') are low ($T \rightarrow 1$) and final-good assembly is highly labour-intensive.*

Trade liberalization

When there are multiple components, trade growth in components can be broken down into three parts: more units of each good are traded, the unit prices of traded goods are rising, and the number of traded varieties is rising. As external capital and labour prices are given, the effects of changing trade costs of component trade can be understood as differentiating between a widening (extensive margin) and a deepening (intensive margin).

Trade costs and intensive margins

Changes in trade costs affect the amount of final-good production, and the derived demand for components. For example, trade cost reductions increase the volume of final goods production and intra-firm trade, because the marginal cost of final-good production declines. The MNE then allocates more firm-specific capital to final-good production. Moreover, increased demand for the final-good increases demand for components and more units of each component may be produced in-house and/or outsourced.

Trade costs and extensive margins

The extensive margins of the production network in country j are the number of components between n_j and $a_{k\,j}$, where $a_{k\,j} \in [a_{1j}, a_{2j}, 1]$. Let us look at the signs of partial derivatives of these variables with respect to cross-border trade costs ('tariffs').

From the equilibrium conditions (Equation 12) and the implicit function theorem, the impact of changes in tariffs on extensive margins of intra-firm sourcing is:

$$\frac{\partial n_j}{\partial T} < 0, j \in [North, Middle, South].$$

The tariff fall increases n_j, reducing in-sourcing and intra-firm trade. It raises the firm supply of final good because of falling marginal costs and has to reduce the numbers of components produced to allocate more capital to increasing units of each product. Then, more components have to be outsourced in order to release firm-specific capital for increasing the volume of final-good production and each in-house component. Note that in this model the firm boundary is influenced by 'market size'. In response to growth in market demand, the MNE reduces the numbers of in-house components in order to increase final good output. The effects of lowering tariffs on component trade can be summarized as follows.

Statement 4: *The effect of a tariff falls between deepening (intensive margin) and widening (extensive margin) of in-house production and intra-firm trade. Falling tariffs increase final-good production and demand for all components. As the firm expands final-good production, it allocates more firm-capital to final-good production and the more capital-intensive components and reduces the variety of components produced inside the firm, cutting down production of the more labour-intensive components.*

Investment liberalization

So far, we assumed that the country allocations of firm-specific capital are fixed and cannot be re-allocated among them. This leads to cross-country differences in the shadow costs of firm-specific capital in each subsidiary (λ_j). The shadow value of headquarters capital is the highest in the labour-rich South, and lowest in the capital-rich North. We can consider a longer-run situation where the MNE has flexibility to change its asset allocation among the subsidiaries/locations. Consider a situation where, from the viewpoint of the MNE, all countries have identical investment environments and its capital stock can be moved costlessly between countries. Then the MNE will allocate headquarters capital among subsidiaries to equate returns across locations (i.e. to equate shadow costs of headquarter capital).

Let λ_{j_0} and λ_{j_1} be the shadow costs of headquarter capital in country *j* before and after capital movement respectively. Before investment liberalization, the shadow cost of capital is highest in the South, lowest in the North, and intermediate in the Middle: $\lambda_{N_0} < \lambda_{M_0} < \lambda_{S_0}$. When firm-specific capital is mobile, shadow prices of firm-specific capital will converge. Let them be equalized at λ_1, where $\lambda_{N_1} = \lambda_{M_1} = \lambda_{S_1} = \lambda_1$. This MNE-wide equilibrium shadow cost of capital will be higher than in the North and lower than in the South ($\lambda_{N_0} < \lambda_1 < \lambda_{S_0}$). However, whether it is higher or lower than the initial internal capital cost in the Middle (i.e. λ_1 is greater or smaller than λ_{M_0}) depends on parameter values.[10]

Statement 5: *Because wages are lower in the South, MNE capital will be moved to the South (and possibly to the Middle) to take advantage of the lower wages until the shadow cost of capital is the same in all three countries. In other words, production in the North and the Middle will shrink and may even cease. But so long as MNE capital is limited, there may be continuing outsourcing of some components in all locations depending on trade costs.*

When the shadow cost of internal capital in the North rises, it will exceed the external-capital cost adjusted by transaction cost ($\lambda_{N_1} > \lambda_{N_0} = T_{F(n_{north})} r_{north}$). This means that in-house production in the North is costlier than outsourcing in the North. Therefore, MNE component production ceases in the North and internal capital moves to the South and expands component production there. As capital flows into the South, its shadow cost falls. If it is still higher than the cost in the Middle, capital will move also from the Middle until equality is established. In the South, the lower cost of internal capital reduces incentives to outsource to outside suppliers. The MNE will not only produce all its (labour-intensive) final goods in the South but may cease to outsource components in the South if the internal capital stock is sufficiently large.

Will there be any outsourcing in the Middle? Here the patterns of production depend on the range of λ_1 relative to initial shadow cost there ($\lambda_{M_0} = T_{F(n_{middle})} r_{middle}$). There are three possibilities depending (in particular) on the total size of the capital stock of the firm relative to the final-goods market and the final MNE-wide equilibrium shadow cost can be higher, be the same or be lower than the initial shadow cost of capital in the Middle.

For brevity, we will only discuss here the case where the equilibrium shadow cost of internal capital is higher than the initial levels in both North and Middle: $\lambda_{N_0} < \lambda_{M_0} < \lambda_1 < \lambda_{S_0}$. (It is obvious that there will be no change if (coincidentally) the initial shadow cost of capital in the Middle happens to be the same as the final MNE-wide equilibrium shadow cost.) There is no incentive to produce any components inside the firm in the Middle as it is cheaper to outsource. Hence no production of either components or final goods will occur in the Middle. Outsourcing and arm's length exports of the North and the Middle increase along extensive margins. In the South, in contrast, the inflow of capital increases in-sourcing, which expands along the extensive margin. At the same time, the range of components in which the Middle has cost advantages over the South decreases along the extensive margin (i.e. a_1 increases from the initial equilibrium). This means that in-house production in the Middle will cease, but the South subsidiary may import intermediate-capital-intensive components from independent suppliers in the Middle generating arm's length exports to the South. Similarly, it can be shown that if the final MNE-wide equilibrium shadow cost is lower than the initial shadow cost of capital in the Middle, then there is no incentive to outsource in the Middle. It is cheaper to produce components in the South.

Patterns of production, trade and outsourcing: trade and investment liberalization

The above results of the impact of trade and investment liberalization on patterns of production fragmentation and trade can be summarized as follows:[11]

1 With high trade costs, the MNE produces final goods and components for each country separately. With limited and fixed stocks of firm-specific capital, the firm outsources the less capital-intensive components within the country while producing capital-intensive components inside the firm.
2 As cross-border trade costs in components fall (partial trade liberalization with liberalization in components trade but not in the final good) intra-firm and arm's length trade in components is stimulated. This reduces the cost of final-good production, raises the optimal final-good output, allocation of more firm-specific capital to final-good production, and increases outsourcing of components to both domestic and foreign suppliers. Within the range of components supplied by each country, there is a pattern of in-sourcing and outsourcing such that in-house production in each country is more capital-intensive than outsourcing.
3 With trade liberalization in both components and the final good, the labour-rich South becomes a final-good export-platform. The North and the Middle become export-platforms for the more capital intensive and intermediate components respectively. Intra-firm trade expands along the intensive margin but shrinks along the extensive margin (i.e. a reduction in the variety of components but larger volumes of a fewer number of component varieties). International production fragmentation and inter-firm trade in components expands.
4 Allowing the firm's internal capital to be mobile across subsidiaries leads to firm-capital inflows into the lowest wage country. In the North, and in the Middle, production falls and – if the firm's capital stock is relatively small – may even cease. Outsourcing increases in the North while in the

> South, in-house production increases while outsourcing falls. The impact on outsourcing in the Middle depends on factors such as the size of the firm-capital stock relative to the final-good market; if the firm's capital stock is relatively small, it may outsource some components in the Middle. But if the firm's capital stock is relatively large, probably the more realistic case for large MNEs, outsourcing from the Middle can decline with most components produced in the South. Overall, while the MNE will increasingly tend to shift its production to the low-wage country, component trade sourced through arm's length suppliers in the richer countries can continue.

If these developments take place on a large scale, general equilibrium repercussions of the associated factor flows and their impact on factor prices can no longer be ignored as these predicted paths of production and trade patterns will become increasingly modified by narrowing factor price differentials.

Empirical evidence

In this section we look at the extent to which the evidence from Japanese MNE operations in Asia provides support for the model predictions. We consider first the prediction about the relative factor intensity of components produced in-house and outsourced and then at the broader industry trends.

Factor intensity of components: evidence from Toyota Thailand

The model predicts that the firm will tend to produce more capital-intensive components in-house. Unfortunately accessible data sets do not enable us to directly compute and compare the factor intensity of components. However, we had access to a rich data set that provides considerable detail on components exported from Thailand to Toyota subsidiaries in ASEAN to investigate this issue.[12]

The data set covers component exports from Thailand to the rest of ASEAN4 under the ASEAN Industrial Cooperation (AICO) program which gave preferential tariff rates (0–5 per cent) to approved car assemblers for their intra-ASEAN4 imports of selected car-components during the period from 1999 to 2003.[13] The program granted tariff preferences to approved components, used in specific car models. To receive AICO import approval, car assemblers (component end-users) were required to declare each import items by producer prices, by car models to which the components would be applied, and by component producers. Car assemblers had to submit import proposals providing information on proposed imports to national authorities for their approval. These records of the AICO program provided us with firm-level data on traded car components of ASEAN countries.

Toyota was one of the most active participants in the AICO program, accounting for about 50 per cent of Thailand's AICO trade value. The data set detailing Thailand's exports to Toyota subsidiaries in ASEAN includes 1,923 observations covering 900 types of components used in three different models of Toyota passenger cars. These components were produced in Thailand by 97 component suppliers, some of which were Toyota affiliates and some were not. The components were exported from Thailand to Toyota subsidiaries in Malaysia, Indonesia and the Philippines. Reflecting the trade restrictions within ASEAN on fully assembled motor cars – the 'final good' – there was no trade in finished cars during this period.

In the model we categorized intermediate inputs by organization of production into two types: intra-firm (vertical integration) and outsourcing. In this data set, Toyota ASEAN's imports were classified into three categories: intra-firm imports from vertically integrated firms (Toyota-owned firms), imports from *Keiretsu* firms (partially owned by Toyota), and imports from independent firms (non-Toyota firms). The three types of firms differed in terms of the degree of vertical integration, with Toyota Thailand having the highest degree of vertical integration with the other ASEAN subsidiaries, *Keiretsu* firms being somewhat more weakly vertically integrated, and independent firms being not vertically integrated at all.

In the model we explored the pattern of component production and trade according to component characteristics that can be directly linked with capital intensity. In the absence of direct data on factor intensities of components, guided by information and advice from industry sources we assumed that the product value and technological sophistication of finished cars and components would be a reasonable proxy for 'capital intensity' of the components. Components meant for different car models are categorized into high-end, middle-end, and low-end, on the basis of the price of finished cars. We hypothesize that the car model and the component price are indicators of the product value and technological sophistication (quality) of the components. (Transaction costs are also likely to be positively correlated with 'quality' factors.) We have information on MFN tariffs of each component in the data set.

We use ordered-Probit estimation to investigate how these component characteristics determine the vertical-integration probability of Thailand's component exports to Toyota in the rest of ASEAN4. The key findings are shown in Table 4.2. First, an increase in the quality index tends to increase the likelihood of vertical integration, while it decreases the probability of independent outsourcing. Second, it is found that value of components increases the probability of sourcing inside the firm boundary, while it decreases the likelihood of outsourcing to foreign suppliers. These results are broadly consistent with the sorting patterns predicted by the model when we interpret components with high value or meant for high-end models as highly firm-specific capital-intensive components. Quality is likely to be correlated with transaction costs in our model, increasing the probability of in-sourcing. Finally, results indicate that high tariffs tend to discourage outsourcing and

Table 4.2 Predicted probabilities of component imports from independent, *keiretsu*, and vertically integrated firms

	Pr(v = 0|x) *Arm's length*	*Pr(v = 1|x)* *Keiretsu*	*Pr(v = 2|x)* *Vertical integration*
Car model[/1] (mean=0.98)			
High-end : 1	0.516	0.333	0.152
Low-end : 0	0.556	0.315	0.129
Difference	*–0.040*	*0.028*	*0.023*
P_i (US$)[/2] (mean–6.9)			
: 75th percentile = 6	0.522	0.330	0.148
: 25th percentile = 1	0.577	0.305	0.118
Difference	*–0.045*	*0.025*	*0.030*
MFN Tariff[/3]			
: Mean=0.19	0.516	0.333	0.152
: 0	0.569	0.309	0.122
Difference	*–0.053*	*0.024*	*0.030*
Obs.	1923	1923	1923

Notes:

1 The predicted probabilities are evaluated at the specified numerical value of the car-model variable, given the other variables are at their mean (P_i = 6.9 and Tariff Preference = 0.19).

2 The predicted probabilities are evaluated at the specified component price, given Model = 1 and the mean of Tariff Preference = 0.19.

3 The predicted probabilities are evaluated at the specified tariff, given Model = 1 and the component price is at the mean.

increase the probability of intra-firm sourcing. An implication is that trade liberalization is likely to increase the probability of outsourcing – again consistent with the model predictions.

Trade volumes: intra-firm trade and arm's length trade

In this section, we examine the trends and patterns of transactions (sales and purchasing) by Japanese MNE affiliates in the transport equipment industry in East Asia between 1992 and 2001 to assess their consistency with the model predictions drawing on data given in Ando and Kimura (2007). This was a period of significant trade and investment liberalization in the transportation equipment sector in East Asia which had been strongly affected by earlier protectionist policies.

Recall that according to model predictions trade liberalization leads MNE affiliates to reduce reliance on domestic markets, to increase production for exports and to import more from overseas affiliates and independent suppliers. At a regional level, we can plausibly rank Japan, NIEs, ASEAN4 and China in order of relative capital endowments. As is evident from the data presented (earlier) in Table 4.1, Japanese affiliates in most East Asian countries gradually reduced the shares of the domestic market in total sales and exports. The clearest case is that of ASEAN4 which experienced substantial automobile tariff reductions during this period. The importance of the domestic market in both sales and purchases was reduced; the sales share fell from 92 per cent to 54 per cent while share of purchases fell from 51 per cent to 40 per cent. The trend in the more developed East Asian countries was similar.

However, the opposite trend is observed in the case of China. China has some unique features. It started to attract Japanese motor vehicle manufacturers in the early 1990s, only on a limited scale because of regulatory restrictions and political factors. Given the limited industrial base and few potential independent component suppliers, Japanese MNEs had to depend largely on in-house sourcing for components, supplemented by purchases from some *kiretsu* firms. However, over this period, China developed a very large and rapidly growing market and an extensive supplier base.

In Table 4.3, we break down purchases of Japanese affiliates in the East Asian transport equipment sector from Ando and Kimura (2007), into intra-firm and arm's length, and separate purchases by origin into imports from Japan (home country), local (domestic) purchases, and imports from other countries in East Asia. It is clear from Table 4.3 that Japanese MNEs implemented different strategies in the different regions.

Substantial increases (decreases) in the shares of arm's length (intra-firm) imports and purchases were observed in China during this period. In the context of our theoretical model, we may identify the key factor as the dramatic expansion of the Chinese domestic market, which raised demand for final goods and components. MNEs had to focus their firm-specific resources to meet the higher demand for final goods and outsourced more components – importing the more capital/skill-intensive components from relatively advanced East Asian countries and also purchasing other components from component supply firms in China. The latter would have also been facilitated by the much larger number of component supply firms in China towards the end of this period.

The Japanese automobile MNEs seem to take different approach in ASEAN4. Table 4.4 reveals that they had reduced intra-firm imports from Japan and increased intra-firm activities within ASEAN4 during the period from 1992 to 2001. The shares of intra-firm imports from Japan in total

Table 4.3 Purchases of Japanese affiliates in East Asia: Chinese transport equipment sector (%)

	Import from Japan		*Local purchases*		*Imports from other EA*	
	Intra-firm	*Arm's length*	*Intra-firm*	*Arm's length*	*Intra-firm*	*Arm's length*
1992	38.2	1.0	0.0	40.5	9.9	0.0
2001	19.7	18.6	0.5	57.3	0.7	0.4

Source: Ando and Kimura (2007), Table 7, p. 37.

Table 4.4 Purchases of Japanese affiliates in East Asia: ASEAN4 transport equipment sector

	Import from Japan		*Local purchases*		*Imports from other EA*	
	Intra-firm	*Arm's length*	*Intra-firm*	*Arm's length*	*Intra-firm*	*Arm's length*
1992	43.5	1.6	0.5	51	0.3	0.9
2001	32.5	22.4	10.2	29.4	2.0	1.0

Source: Ando and Kimura (2007), Table 7, p. 37.

purchases dropped from 43.5 to 32.5 per cent, while intra-firm purchases increased from 0.5 to 10.5 per cent. In addition, arm's length transactions within ASEAN4 host countries tended to be replaced by arm's length imports from Japan. These trends can be interpreted as being linked to greater trade and investment liberalization between Japan and ASEAN4. We expect to see FDI (firm-specific capital) from Japan into ASEAN4 where returns to capital would be higher. This would cause intra-firm transactions within ASEAN4 to expand, and local arm's length transactions to shrink along extensive margins. In contrast, moving firm capital overseas lowers intra-firm activities in Japan while expanding arm's length purchases from Japan, so that imports from Japan by ASEAN4 increasingly come from independent suppliers (i.e. arm's length purchases).

The adjustments of Japanese affiliates in NIE4 (Hong Kong, South Korea, Singapore and Taiwan) are shown in Table 4.5. As in-house production will be more capital-intensive than outside production, we expect that arm's length imports from Japan, while relatively capital-intensive with respect to production in the other regions, will be less capital-intensive than intra-firm imports from Japan. The data shows that arm's length imports from Japan have decreased while imports from 'other EA' (ASEAN4 and China), particularly intra-firm imports (which are likely to be closer in terms of capital intensity to arm's length imports from Japan) have increased. This is consistent with model predictions of a shift of component production and purchases from outside suppliers (arm's length trade) in Japan to subsidiaries and independent suppliers (intra-firm and arm's length trade) from ASEAN

Table 4.5 Purchases of Japanese affiliates in East Asia: NIE4 transport equipment sector (%)

	Import from Japan		*Local purchases*		*Imports from other EA*	
	Intra-firm	*Arm's length*	*Intra-firm*	*Arm's length*	*Intra-firm*	*Arm's length*
1992	16.9	21.4	0.0	59.9	0.3	0.1
2001	18.2	4.4	0.5	61.6	9.1	3.1

Source: Ando and Kimura (2007), Table 7, p. 37.

and China. Overall, these trends in Japanese MNE operations appear to be quite consistent with model predictions.

Concluding remarks

In this chapter we present a formal partial equilibrium model of an MNE with firm-specific capital which operates in three countries with factor price differences, having the option of in-house production or outsourcing (with transactions costs) of a range of components. The model suggests that intra-firm sourcing in a given country is expected to be relatively more capital-intensive than outsourcing in that country. Further, trade liberalization tends to stimulate intra-firm trade and outsourcing but decrease the variety of intra-firm imports. When the firm is able to freely reallocate its firm-specific capital, labour-intensive operations will shift to the low-wage economy but imports of components from independent suppliers from more capital-rich countries can continue.

Patterns of component trade of Toyota subsidiaries in Thailand with their counterparts in the other ASEAN countries under the AICO trade preferential scheme from 1999 to 2003 provide strong supportive evidence for the predictions of the model. The prediction that labour-intensive assembly of final goods will shift to the low-wage country is consistent with the emergence of China as a global assembly platform. More interestingly, empirical evidence provided in Ando and Kimura (2007) on Japanese MNE affiliates' changes in intra-firm arm's length trade within Asian regional groupings is consistent with predictions about the direction of change in sourcing and trade patterns in response to ongoing trade and investment liberalization.

The formal model is subject to several important limitations, apart from its partial equilibrium nature, and can be extended by incorporating scale (or scope) economies, possible strategic behaviour in contracting, or hold-up problems that may constrain outsourcing. A particularly important limitation is the assumption that countries differ only in their wage-capital factor costs. In practice, overall production and trade costs are critically affected by the existence of efficient infrastructure, legal systems and institutions and a myriad other factors. These factors will constrain the tendency we see in the formal model for MNEs to locate all in-house production operations in the lowest-wage economy. Most importantly, the general equilibrium effects of these developments will change relative factor prices and modify the incentives for some of the predicted shifts in production and trade patterns. Despite these limitations, the model illustrates incentives generated for vertical and horizontal specialization in MNEs in response to trade and investment liberalization in a multi-country setting and generates predictions that are broadly consistent with observed MNE behaviour in Asia.

Notes

1 The two terms 'offshoring' and 'outsourcing' are often used interchangeably. However, following convention in industrial organization literature we use the term 'outsourcing' for subcontracting a segment of a production process to an outside party, and 'offshoring' for moving such operations to a foreign country.
2 The expansion of production networks and its links to FDI and MNEs in Asian manufacturing trade have been extensively documented in recent years (eg. Athukorala and Yamashita 2006 and Kimura and Ando 2005).
3 Purchasing from subsidiaries of the same firm is referred to as intra-firm trade while purchasing from other firms – outsourcing – is referred to as 'arm's length trade' and (when imported) as international outsourcing.
4 Our model is broadly similar to that of Feenstra and Hanson (2005); but in their model producing a final good involves only two tasks (input procurement and assembly) where assembly has to be conducted in a single location ('China').
5 This is standard in much of the literature; see Markusen, 1984; Helpman and Krugman, 1985; and Markusen, 2002. D_j and $X_j^{j'}$ represent respectively market-serving and export-platform (vertical) activities of final-good production in country *j*.
6 'Firm-specific capital' is a composite of managerial skills, firm-specific knowledge, technologies, and both physical and financial capital.
7 We consider two types of 'transaction costs': Inter-firm transactions costs – all costs associated with outsourcing across firm boundaries as defined by Grossman and Helpman (2005: 136), and intra-firm transaction costs – costs a firm bears in combining inputs within its own branch network.
8 The MNE's total profit $\left(\sum_j \Pi_j\right)$ is maximized when its profit in each country is maximized. Given competitive component markets, solving the MNE's profit maximization problem in each country is equivalent to solving its total profit maximization problem.
9 There are two other possible equilibria: (1) Large stock of firm-specific capital – all components produced inside the firm. In this equilibrium endowment constraint is bound with inequality and the shadow cost of headquarter capital is zero ($\lambda_j = 0$); (2) Very limited stock of firm-specific capital – produce final good only and outsource all components. Endowment constraint is then bound with equality and the shadow cost of headquarter capital is higher than outside capital adjusted by transaction cost ($\lambda_j > T_{F(n_j)} r_j$).
10 For example, the shadow cost of pooled capital will tend to be high if the final-good markets are large relative to the firm's total capital endowment ($\frac{A_j}{\bar{H}}$ is much greater than unity).
11 Detailed results are available from the authors.
12 We use the *Toyota Data Book* (2002) as a guideline.
13 Since 2003, the AICO program has been phasing out because all transport-equipment trade between Indonesia, the Philippines and Thailand can receive 0–5% preferential tariffs rates automatically under the ASEAN Free Trade Area (AFTA).

5 Competitive strategy of Japanese and US multinationals in global production networks and clusters

The case of the hard disk drive industry

Tomofumi Amano

For firms engaged in international production, the timing of foreign investment, the selection of countries, and the maintenance and expansion of their local operations are all important strategic matters. This chapter examines the impact of industrial policies of the investment recipient countries on the location strategies of multinational firms through a comparative case study of competitive strategies of Japanese and US multinational enterprises in the hard disk drive (HDD) industry in East Asia. The analysis is built around two key issues: what are the unique aspects of the investment-attracting policies implemented by investment-receiving (host) countries? How do multinational enterprises (MNEs) respond to these policies in the process of internationalization of their operations?

There is a large empirical literature on the determinants of internationalization decisions of MNEs based on econometric analysis of country or industry level cross-section or pooled data. These studies shed some light on the general factors of multinational firms' location decisions, but they are of limited value in understanding the strategic interactions of firms' location strategies and countries' industrial policies. This is because this aggregate econometric approach, by its very nature, fails to capture evolutionary aspects of MNE behavior. Here the term "evolutionary aspect" implies many important factors impacting on the internationalization decision including competition, technological innovations, and changes in countries' investment environments and firms' global strategies. The actual location decision is the outcome of the interactions of these strategic and managerial factors. It is rather difficult to analyze these factors based on a general economic framework because they are highly contextual and interdependent. There is also a high level of information asymmetry among the players. In this context, case study is the only practical approach to understand the essence of the international location decision of MNEs.

This chapter examines how major Japanese and US firms in the HDD industry have relocated production activities in Asian countries and formed production networks in the region. Over the past 20 years, the industry has experienced discontinuous changes in technologies and market conditions. In this highly competitive market setting, relocating production in Asian countries has been a surviving condition for these MNEs. They have tried to expand their mass production to this region, create huge industrial clusters, shift some R&D activities to the area, localize many functions and integrate their global networks. There is anecdotal evidence that there are differences between Japanese and US MNEs in this internationalization process. Probing these differences is vital for understanding the current status of their competitive advantages.

The chapter is organized as follows. The first section develops an analytical framework for understanding the competitive strategy of multinational enterprises and the role of cluster formation in the process of internationalization of production. The second section presents a succinct survey of the origin, evolution and the structure of the global HDD industry in order to place the East Asian case study in context. In the third section a case study of the HDD industry in East Asia is undertaken with emphasis on the factors which contributed to a pattern of specialization in which US MNEs dominate HDD production/assembly while Japanese firms maintain a competitive edge in HDD component production/assembly. It also examines the role played by host country policies in making East Asia the center of the global HDD industry. The final section summarizes the key findings and offers some policy inferences.

Competitive strategy of global firms and industrial clusters

Three analytical points are relevant for understanding the competitive strategy of global firms: (1) global location strategy and allocation into industrial clusters; (2) integration of global production networks; and (3) building the stickiness of direct investment within recipient countries. In this section these are discussed in order to provide the setting for the ensuing case study.

Global location strategy and allocation into industrial clusters

Porter (1986, p. 35) defines a global strategy as "a strategy to achieve a global competitive advantage through concentrated allocation or coordination of distributed activities, or both". He states that "in order to understand the competitive advantage of a global strategy or the cause of globalization of a firm, one must know the conditions for achieving cost reduction or differentiation through globally concentrating the activities or coordinating the distributed activities" (*ibid.*, p. 36).

The idea of industrial cluster is central to the expansion of operational foundations at overseas locations by seizing the local opportunities for achieving competitiveness, for it influences a firm's location decisions and even their whole structure of international resource allocation. In industrial clusters, many firms and institutions are located together, creating multi-dimensional networks and supporting each other. In these well-developed locations the markets of diverse human resources and intermediate goods and services are also formed. These conditions provide entrant firms with many strategic competencies to compete globally. These benefits are generally called *agglomeration economies*.

A key goal of a global strategy is to establish the firm's own base within the competitive industrial clusters, to take part in creating and enjoying such agglomeration economies. Spreading the value chains to these areas is only the first step of enjoying those economies. A more essential part is how deeply firms can get involved in the local industrial cluster, and how well they can find and develop the potential resources. If they succeed, the advantages gained in the clusters become highly firm-specific and relation-specific, unlike the initial advantages like low-wage labor and land for manufacturing, and become their core advantages.

Integration of global production networks

As business opportunities spread worldwide and a firm's scope of operations broadens, its management becomes more complicated. One of the conditions for a multinational firm to smoothly carry out its global operations is, therefore, to know how to integrate its decentralized and complicated management of international production networks under a common vision and strategy. This is the second purpose of a global strategy according to Porter (1986).

In order for a firm to effectively integrate its operations beyond national borders, leadership and coordinating ability from the firm's headquarters are necessary. It is the duty of the headquarters, or the top management, to instill its business philosophy and business strategy in overseas growth markets and to make the firm's resources complement each other. It is important that the top management and the management team at the headquarters should launch concrete initiatives to put the visions and strategies into practice within the local operation bases. Furthermore, the firm needs to identify the ways of sharing the responsibilities and communication between the headquarters and the local bases to implement its visions and strategies in an organized manner. To begin with, the headquarters need to take the initiative in overall matters. However, as the subsidiaries become localized, their responsibilities increase and the communication becomes two-way and multi-tiered. An effective communication system encompassing all global operational units is required so that the firm can fully enjoy the merits of integration.

Industrial clusters and the stickiness of foreign investment

The country on the receiving end of investment (host country) is interested in attracting MNEs to set up production units and ensuring continued expansion of their operations within its national boundaries. In this case, the point of concern is the issue of *mobility of investment*, namely the possibility that a firm that has been lured under initial conditions such as low wages and land conditions, could move to another country due to factors such as wage increase, local economic slump or newly emerging competitive investment locations as more and more countries embark on outward-oriented development strategies. Given the cross-border mobility of FDI, the host country needs to take the lead in developing competitive advantages that do not rely only on wage level or initial land conditions. Here again a key strategy is to facilitate forming and developing competitive *industrial clusters*.

With agglomeration economies based on both *practical and knowledge-based infrastructure* in certain industrial areas, MNEs do not quickly withdraw their operations even when they face economic recession or adverse circumstances. There are a variety of ways of upgrading industrial clusters. For example, development of expressway systems and port improvements are indispensable for achieving low transportation costs and shorter transportation times. It is also necessary to simplify customs procedure. In regards to forming pools of intellectual human resources and promoting innovations, it is important to develop human resources through collaboration between industry, academia, and government. Another possible measure would be to implement special taxation that meets the industrial needs.

The regional development of an industrial cluster involves both *planned factors* and *emergent factors*. Establishment of development zones, development of public infrastructure, and revision of the tax system are planned factors. These are important, but sometimes are easily copied by others. More important factors are emergent ones such as industry-specific networks and a pool of qualified human resources, which are accumulated through the industrial development of the recipient country. Both planned and emergent factors are critical to provide located firms with incentives to secure their investments, which significantly contributes to the consolidation of investments (*stickiness of direct investment*) for the economic growth of the recipient country.

Structural changes in the HDD industry

The above-mentioned three concepts provide the analytical framework for our study of the HDD industry case. Within this analytical framework, this section focuses on the structural changes in the industry since the 1980s, with particular emphasis on the competition between Japanese and US firms in expanding their operations in Asia.

For a long time, the HDD industry was dominated by IBM. The firm has a long history in the data storage business, starting with tapes, moving on to floppy disks in 1970, and establishing the standard for the "Winchester" HDD in 1973, which provided the launch pad for the HDD industry. Later on, when US computer firms begun to outsource HDD production to external firms, US and Japanese firms with a high level of technology entered and formed the industry. Dramatic changes occurred in the industrial structure from the second half of the 1970s through the 1980s. As the composition of computer production changed from mainframes to minicomputers, office computers, workstations and personal computers, the demand structure shifted from large general-purpose machines to small computers, and there was a transition from centralized processing using mainframes to distributed processing using small computers. Consequently, HDD interfaces evolved to enable the use of HDDs as modules.

In the mainframe era of the 1970s, a computer and an HDD were connected via IBM-IF, and the physical address of the HDD was controlled by the host computer. Later, with the rise of minicomputers, office computers, and workstations, the interface between the computer and the HDD evolved into the Storage Module Drive (SMD) and subsequently into the Shugart Associates System Interface (SASI) in the second half of the 1970s.[1] With the introduction of the SASI, the host computer came to control the HDD not through physical addressing, but through logical block addressing.

The personal computer (PC) industry began to take off at the end of the 1970s, providing further impetus for the expansion of the HDD industry. Apple Computer, the pioneer of the PC market, had not revealed its Basic Input/Output System (BIOS) for its Apple-1. However, after IBM revealed the BIOS source code for its IBM-PC XT, the design of controllers and HDDs became more open. In the middle of the 1980s, the Small Computer System Interface (SCSI) was introduced as the interface connecting the computer to the HDD in the PC field. After that, in the PC field, standardization of external interfaces made headway with the introduction of Intelligent Drive Electronics (IDE), achieving the complete modularization of the HDD by moving the hard disk controller that had been mounted on the PC motherboard to within the drive. The IDE specification was later officially certified by the American National Standards Institute (ANSI), and is being standardized as the AT Attachment (ATA).

As the external interfaces became standardized, drive firms no longer had to adjust their HDD specifications according to the computer in the design phase. They could now produce the internal design of their HDDs independently, placing greater emphasis on the possibilities for technological innovations and cost reductions. These changes were so dramatic that they completely changed the competition rules of the industry, and served as the background to the subsequent entry of many firms into this industry and their fierce competition in development and cost.

During this course, the size of HDDs became more compact. HDDs were first miniaturized from the 14-inch drive for mainframes to the 8-inch and 6-inch drives targeting minicomputers and office computers. By the first half of the 1980s, the 5.25-inch drive for desktop PCs became popular. Shortly after, the small HDD for PCs was further miniaturized from 5.25 inches to 3.5 inches, and the 3.5-inch drive achieved full-fledged diffusion. In this process, the emerging firms using the 5.25-inch drive took bold growth strategies in entering the competition arena of the 3.5-inch drive. The shift from 5.25-inch drives to 3.5-inch drives was in fact an important turning point in HDD industry which marked a massive shift in trade volume (McKendrick et al. 2000).

The expansion of the 3.5-inch drive market brought about a notable change in the ownership structure of the HDD industry. The number of firms peaked in 1985 with 105 players in the industry. This was the time when the 3.5-inch drive market was launched in the United States. A large number of firms attempted to enter this market segment at the time, seeking potential business opportunities. After the peak, however, many firms withdrew from the HDD industry, and the number of firms remaining in the industry rapidly declined. Only 15 firms remained in the industry in 2000, which means 90 firms, or about 86 per cent in proportion to the number of firms in the industry in 1985, withdrew from the industry over a time span of 15 years. This fact indicates the unusually fierce competition in the small HDD market segment.[2]

The shift towards Asia

US HDD firms' strategic shift to Asia

Table 5.1 shows the HDD firms' timing of investment in Asia. The race for foreign investment in the region was started by US venture firms. The industrial leader, Seagate, was also the first firm to invest in Asia. Seagate was a venture firm founded in 1979 by an IBM engineer, Alan Shugart. Since Shugart himself was the person who promoted the standardization of the interface of the 3.5-inch HDD, he thought it was only a matter of time until the HDD would become adaptable to a wide variety of applications. Therefore, he established a production base in Singapore in 1983 and in Thailand in the following years, driving forward the mass production of the HDD, already with a full understanding of how modularization would affect the industry.

Seagate frequently conducted mergers and acquisitions (M&As) in its growth process. It acquired Grenex (a thin-film media firm) in 1985 and Aeon (an aluminum substrate firm) in 1986. Furthermore, it purchased HDD software firms in the 1990s and acquired Conner Peripherals, which had originally been hived off from Seagate, in 1996. By procuring funds from the stock market and acquiring external resources through M&As, Seagate came to possess the largest HDD production capacity in the industry. Much of the

Table 5.1 Timing of HDD firms' investment in East Asia

Year	*Company*	*Place of investment*
1983	Seagate Technology	Singapore
	Ampex	Hong Kong
	Computer Memories	Singapore
	Tandon	Singapore
	Tandon	India
1984	Seagate Technology	Thailand
	IBM	Japan
	Maxtor	Singapore
	Miniscribe	Singapore
	Quantum and OEM to MKEI*[2]	Japan
1985	Microscience International	Singapore
1986	Micropolis	Singapore
	Tandon	South Korea
1987	Connor Peripherals	Singapore
	Control Data	Singapore
	Cybernex	Singapore
	Microscience International	Taiwan
	Priam	Taiwan
	Seagate Technology	Thailand
1988	Unisys	Singapore
	Western Digital	Singapore
1989	IBM(SAHA Union)	Thailand
	Seagate Technology	Malaysia
	Kalok	Philippines
	SyQuest	Singapore
	NEC	Philippines
1990	Connor Peripherals	Malaysia
	Microscience International	China
1991	Fujitsu*[1]	Thailand
	PrairieTek	Singapore
	Xebec	Philippines
1992	Integral Peripherals	Singapore
	Ministor	Singapore
1993	Connor Peripherals	China
1994	DEC	Malaysia
	Hewlett-Packard	Malaysia
	Quantum	Malaysia
	Western Digital	Malaysia
	MKEI and Quantum OEM	Singapore
1995	IBM	Singapore
	Hitachi	Philippines
	Toshiba	Philippines
	Fujitsu	Philippines
1996	IBM	Thailand
	Seagate Technology	Thailand
	Fujitsu	Vietnam
1998	MKEI and Quantum OEM	Indonesia
2002	Western Digital	Thailand
	Hitachi*[3]	Thailand

Source: Based on McKendrick, Doner and Haggard (2000), p. 99 and data from interviews by the author.

Notes:
1. Fujitsu launched Fujitsu (Thailand) Co. Ltd. (FTC) in 1988, but shifted its HDD production to FTC in 1991.
2. MKEI: Matsushita-Kotobuki Electronics Industries.
3. Hitachi acquired IBM's HDD division.

production capacity it established through this process is located in Southeast Asia. Seagate's expansion into Asia began in Singapore in 1983, later spreading to Thailand and Malaysia. While Seagate had 12,000 workers in Singapore and 16,700 workers in Thailand and Malaysia compared with 11,000 workers in the United States in 1990, the number of workers in Asia increased to 15,000 in Singapore and 57,000 in Thailand and Malaysia against 9,000 workers in the United States in 1999. By 2008 the firm employed over 4,000 workers in China.

The next firms to invest in East Asia were Tandon and Maxtor. Tandon advanced into countries such as Singapore, India, and South Korea in the first half of the 1980s. However, this expansion ended in failure, and the firm was acquired by Western Digital in 1988. Conversely, Western Digital managed to invest in Singapore through the acquisition of Tandon. Firms including Maxtor, Conner Peripherals, and Miniscribe also invested in Asia in the mid-1980s.

At that time, many of these firms chose Singapore as their preferred location. From the end of the 1980s, the locations for investment by US firms spread from Singapore to Thailand and Malaysia. Seagate invested in Thailand in 1987, in Malaysia in 1989, and once again in Thailand in 1996. Western Digital expanded into Malaysia in 1994, and Quantum also invested in Malaysia in the same year.

IBM's case is interesting. The firm had engaged in development and manufacturing of all types of HDD, from drives for servers to 2.5-inch or smaller drives for mobile computers. It had also conducted in-house development of key components, including magnetic heads and media. IBM America outsourced the development and manufacturing of 3.5-inch and 2.5-inch HDDs for PCs to IBM Japan in 1984. IBM Japan initially developed and manufactured HDDs in Fujisawa, Japan. However, due to the competitors' shift to Southeast Asia and the impact of yen appreciation, they started to outsource the manufacturing of HDDs to Saha-Union Public Firm in Thailand in 1989. Moreover, IBM America shifted its operations related to HDDs for servers from San Jose in the United States to Singapore in 1995, and established a wholly owned manufacturing base in the Prachinburi Province, Thailand, in 1996.

Quantum also expanded its operations by using contract manufacturing. The firm was founded in 1980 and had expanded its business mainly through the 5.25-inch HDD. Quantum listed its stock in 1982, and came to command a 25 percent share in the HDD market. However, in order to further expand its production capacity, it entered into a partnership with Matsushita-Kotobuki Electronics Industries in 1984, regarding contract production of the 3.5-inch HDD. Matsushita-Kotobuki first manufactured the HDD at its base in Ipponmatsu, Ehime Prefecture, Japan but in order to evade the impact of yen appreciation, launched overseas production of HDD in Singapore in 1994.

Among the Southeast Asian countries, Singapore has particularly substantial preferential investment promotion measures for foreign firms, including tax incentives. For example, in Thailand, the Board of Investment (BOI) gives approvals for inward investment by foreign firms, and by dividing the land area into three zones from Zone 1 to Zone 3, provides a tax allowance of 40 to 50 percent for firms investing in Zone 2 and Zone 3, which are a long distance from Bangkok. Malaysia provides a tax allowance for re-investment, and a tax allowance of a little over 10 percent for collaboration with universities and public research institutions. The Thai government usually takes about three to six months to approve an investment project.

Compared to neighboring countries such as Thailand and Malaysia, the support policy of Singapore had distinctive characteristics. First of all, its taxation system was highly preferable for foreign firms conducting sophisticated operations, including an R&D allowance, an equipment purchase allowance, an allowance for collaboration with universities or public research institutions, a depreciation allowance, a human resources development allowance, and an allowance for technical assistance to small and medium-sized enterprises (SMEs). At the same time, the time required for gaining approval for an investment project was three months in 80 percent of all cases, which was extremely short compared to other countries. This point was very important for making large-scale investment with a short payback period in the IT industry, which has short lifecycles. The Singaporean government was thoroughly aware of the needs of the US IT industry.

A more important point was that Singapore provided, in addition to the above-mentioned general incentives applicable to all industries, industry-specific incentives specializing in the HDD industry. Singapore provided substantial preferred measures in association with a wide range of activities in the HDD industry, including (1) development of engineers and operators, (2) diffusion and development of technology, and (3) development of local vendors.

The organization that played the central role was the Magnetic Technology Centre (MTC; renamed as the Data Storage Institute [DSI] in 1996). The MTC was established within the National University of Singapore at the government's initiative in 1984. Since then, it has promoted basic research related to data storage and joint projects between industry and academia, and has produced a large number of engineers for the HDD-related industry. It also provided support measures for SMEs, provided them with basic knowledge and techniques for quality control and production management, and engaged in operator training.[3]

US HDD firms sought assistance from the Singaporean government and the government made active efforts to support Singapore's HDD industry. As a result, many firms related to the HDD industry established "advanced mass production bases" equipped with a technology development capacity and a mass production capacity in Singapore. Under a favorable environment, Seagate developed engineers, supervisors, and operators in Singapore, appointed them as core personnel, and spread a low-cost operation framework throughout Southeast Asia. When launching production bases in Malaysia and Thailand, the operational experience in Singapore and the human resources it had developed there played a key role. The concentrated human resources development at the core base and prompt transfer of knowledge to the neighboring mass production bases enabled Seagate to conduct what can be called a *vertical launch* of HDD mass production.

Furthermore, the firm developed local suppliers and encouraged global suppliers to establish their bases close to Seagate's bases. It provided technical guidance to local suppliers to raise their technical level. Seagate also appointed local workers as personnel in charge of procurement and repeatedly applied unique ideas in product design in order to be able to manufacture HDDs using local components. For global suppliers, it increased the incentive for establishing their bases nearby through increasing the production ratio in Southeast Asia and securing production volume. Since component cost accounts for a large share of the HDD production cost, such local supplier networks are likely to have contributed greatly to increasing the firm's cost competitiveness.

These efforts of Seagate have been copied by other US HDD firms, and have sparked successive waves of investment. Underlying the rapid increase in the overseas production ratio in the second half of the 1980s were such efforts by this pioneering firm, with subsequent firms immediately following its example.

Hesitant Japanese HDD firms

The overseas production ratio (the share of overseas production in total production) of US firms increased from 4 per cent in 1983 to 67 percent by 1990. In contrast, the overseas production ratio of Japanese HDD firms was only 2 percent in 1990. They only began to make a full-fledged expansion into Asia from the mid-1990s, achieving an overseas production ratio of 54 percent by 1995. The main reason for the foreign investment was to deal with the second yen appreciation in the mid-1990s.

The US HDD firms' investment in Asia can be understood as part of the competition to acquire production resources on a global scale amidst the rapid expansion of the 3.5-inch HDD market. However, Japanese HDD firms were not necessarily quick to respond to this trend. The reason was closely related to their conventional business circumstances. The HDD sections of Japanese general electric firms were usually established within the in-house computer division as a section providing storage devices. From the end of the 1970s to the first half of the 1980s, they supplied storage devices to US office computer firms as OEM suppliers, and expanded their operations. Since the HDDs for office computers had close technical relevance to computers, Japanese electrical appliance firms provided technical support and engaged in joint development with US computer firms, and gained tremendous trust from leading client firms including IBM. The HDD business earned the biggest profits for them at the time, and some firms gained nearly 70 percent of their overall profits from the HDD business.

One example is Fujitsu. The firm jointly developed an 8-inch HDD with Memorex Products in 1979, and independently developed a 48 MB HDD in 1981. It also succeeded in developing a 10.5-inch drive and supplied the product to the United States. Until the mid-1980s, the OEM business of HDDs for US office computer firms was one of the core businesses of the firm. Although the HDD business required cutting-edge technology, the unit prices for products were extremely high. Fujitsu exerted efforts to develop HDD-related technology in-house and in affiliated firms, and won orders from US clients.

However, such success produced the opposite result in the world of small HDDs. In the second half of the 1980s, when US HDD firms achieved rapid growth, Japanese HDD firms faced a very severe situation. The market for medium and large-size HDDs was eroded by that for small HDDs, and shipment values for the HDD operations of Japanese firms which had relied on medium and large-size HDDs dropped sharply. Moreover, yen appreciation spurred a decline in profits. In order to break through this situation, Japanese firms finally began to review their operational structure in the early 1990s, but the process did not progress smoothly.

Fujitsu launched Fujitsu Thailand (FTC) in 1988 and attempted to shift its 3.5-inch HDD operation to FTC in 1991. However, the operation did not succeed, and Fujitsu withdrew from global production. It invested in Thailand once again in 1994, but full-fledged mass production only started in the second half of the 1990s, nearly ten years later than that of US firms.

NEC Corporation was more passive. The firm had produced HDDs mainly for its PC98 series computers and computers for its internal systems divisions, as well as for the captive market in which products were sold through its distributors and exclusive dealers. NEC expanded into the Philippines in 1989, but all products were sold to Japan and the components were supplied from Japan; only the labor-intensive processes were outsourced to the local Japanese subcontracting firms, and the finished products were imported into Japan. The firm lacked the attitude to commit itself to establishing a mass production framework in Asia. As a result, costs became high and the firm had no choice but to withdraw from the in-house manufacturing of HDDs in 1998, and from the entire HDD production business in 2001.

Toshiba and Hitachi, at first, intentionally avoided full-scale entry into the 3.5-inch HDD market and specialized in the 2.5-inch HDD for laptop PCs. The two firms both invested in the Philippines in 1995 and gradually increased their overseas production ratios. However, the market for the 2.5-inch and smaller HDDs for mobile computers is smaller in absolute scale compared to that for the 3.5-inch HDD, and had little growth potential. Since they could not allocate a substantial amount of management resources to their HDD operations, they purposely avoided entering into full-fledged competition with US firms.

The main investment location of Japanese firms was the Philippines, which was far from Singapore and Thailand. By looking at their mode of investment, it is doubtful whether they promoted foreign investment with a view to forming local industrial clusters and strategically expanding the scale of operations as the US firms did. They seem to have regarded the shift of production to overseas bases as a temporary measure to deal with the relative personnel costs that soared in Japan due to yen appreciation. Such differences between Japanese and US firms manifested as differences in their competitive advantages in the HDD market in the 1990s when the 3.5-inch drive became the standard.

Rapid growth of Japanese component firms

In contrast to the struggling Japanese HDD firms, Japanese HDD component firms gradually gained strength in the 1990s. These firms paid attention to the growth of US firms from an early stage and established business connections with them. Since US firms started increasing their production in Asia, the Japanese component firms have attempted to establish their production bases near the US firms' bases.

Japanese HDD component firms started investing overseas relatively earlier than Japanese HDD firms. They promoted overseas production in pace with the expansion of US HDD firms rather than that of the Japanese HDD firms. The first Japanese firm to begin investment in Southeast Asia was the top spindle motor firm, Nidec. It was a venture firm, founded by Shigenobu Nagamori, which was hived off from TEAC Corporation in 1973. At the time, Japanese general electronics firms tended to produce motors in-house or at their affiliated firms, so it was difficult to expand the motor business within Japan. Therefore, the firm conducted active sales and marketing activities in the United States, at a time when US HDD firms were switching from the in-house production of the spindle motors to procuring the motors from outside. Thus, Nidec was able to start a deal with Seagate in 1983. HDD firms including Seagate concentrated their development resources on the development of the disk drives and magnetic heads in order to catch up with the rapid market expansion of the 3.5-inch HDD. Nidec acquired orders for motors from most HDD firms, weaving its way through this niche.

US HDD firms had been major clients of Nidec from the beginning. So it had seen the need to establish its production framework in Southeast Asia by the mid-1980s. Nidec established a branch office in Singapore in 1984 to gather information while engaging in sales and marketing activities, and achieved investment in Thailand in 1990. The direct cause for the investment was a request from Seagate, which had already started manufacturing in Thailand, and from IBM-affiliated Saha Union.

Later, while US HDD firms expanded their mass production at their overseas bases, Nidec established and expanded its plants in Thailand. Nidec mentioned the following points as the reasons for choosing Thailand:

(1) clients are concentrated in the area; (2) supply chains are developed, and about 70 percent of the components can be procured within Thailand; (3) there is access to the BOI's tax exemption measures and the preferential treatment for the HDD industry; and (4) people in Thailand are diligent and friendly. Currently, Nidec controls the Ayutthaya, Bangkadi, Rojana, and NHMT (acquired from Seagate) plants in Thailand, with about 9,000 workers. The firm has a separate production line for each client. Nidec deals with most of the HDD firms, including GSM, Maxtor, Western Digital, Hitachi Global Storage Technologies, and Fujitsu. After Nidec expanded into Thailand, Fujitsu, IBM (Prachinburi), and Western Digital also expanded into Thailand and nearby Malaysia, so it became even more advantageous to establish operation bases in this area.

While Nidec conducted one of the most daring foreign investment campaigns of Japanese HDD-related component firms, firms producing other types of components also shifted their operations overseas one after the other in the mid-1990s. In the area of hard disk (HD) media processing, US-based Komag (1993 and 1996: Malaysia), Mitsubishi Chemical (1996: Singapore), Fuji Electric (1996: Malaysia) and Hoya (1995: Singapore) established their plants close to HDD firms' bases. Their overseas expansion was also influenced by the local production activities of US HDD firms that were their major clients. Therefore, their investment locations came to be concentrated in Singapore and Malaysia.[4]

Changing competitive pressure and establishment of production bases within industrial clusters

In the HDD industry, the significance of establishing production bases within industrial clusters in Asia gradually increased through the 1990s. This is closely related to the changes in competitive pressure within the industry. From the 1980s to the 1990s, the competitive pressure in the industry changed and HDD firms' establishment of production bases in Southeast Asia came to take on a different meaning in terms of competition.

In the first half of the 1980s, when US HDD firms began to consider the establishment of bases in the Southeast Asian region, particularly Singapore, the only roles of Southeast Asia were to accept matured products and manufacture low added value at a low cost by providing low-cost labor and investment incentives.

However, the situation began to change in the second half of the 1980s. US firms at the time launched new products in the United States, commencing mass production in Singapore when the processes became stable, and shifting the production to Thailand or Malaysia when the products matured. Meanwhile, the product life cycles became shorter in the market, generating the need to shorten the time required for placing a new product on the market (time to market). Singapore played the key role in shortening the time to market.

After the mid-1990s, firms faced the need to expeditiously place new stable-quality products at low prices from the start, in order to survive. Therefore, while conducting a pilot run in the home country, the firms came to directly launch mass production in Southeast Asia. Today, they even conduct pilot runs in Southeast Asia.

Firms no longer simply sought low-cost labor from the investment locations. They were now required to shorten the development period in the United States, and to solve the quality problems involved in the process, from the pilot run to the launch at their local bases in Southeast Asia, so as to smoothly introduce the products to the market. In order to withstand such competitive pressure, the firms needed to promote localization in Southeast Asia and effectively exploit the various agglomeration benefits of industrial clusters.

The firms that responded actively to this issue were the US HDD firms and the Japanese component firms. US HDD firms made concentrated investments in Southeast Asia from an early stage and actively involved themselves in the formation of local industrial clusters. They invited key component suppliers to these locations in order to enjoy stronger cluster effects. As their local production increased in scale, it became more beneficial for component firms to move into these locations, so Japanese component firms advanced into these areas in succession.

Nidec in the earlier example was also quick at shifting its operations to Southeast Asia. Currently, the firm not only conducts the daily operations related to mass production, but also conducts product launches and pilot runs at its production bases in Thailand. They say they will transfer more of their back-end product development operations to Thailand in the future. It can be said that the firm has steadily reinforced its ties with industrial clusters under the increasing competitive pressure.

On the other hand, many Japanese HDD firms that were late in expanding overseas invested in the Philippines, far from the major industrial cluster areas. This can either be construed as having prioritized low wages over industrial cluster effects or having intentionally avoided the industrial cluster areas where US firms had a firm foothold.

Significance of establishing bases in industrial clusters

What, then, is the significance of establishing production bases in such mass production clusters in regard to the HDD industry? First of all, there are two significant points in regards to operations.

The first point is the ability to deal with daily production fluctuations and quality problems. Since most HDDs are currently destined for the PC OEM market, there are considerable production fluctuations on a daily basis. Information regarding market trends is relayed through the chain of production to the component firms by way of information systems. Thus, HDD firms and component firms must change their production volumes every day. Such daily adjustments of production volumes and response to quality troubles naturally need to be conducted locally.

The second, more important point is the ability to improve yield upon launching a new model. Even if the key HDD components were of good quality when shipped from the component firms, this does not guarantee high-quality final products. The quality of a finished product can only be confirmed after combining the components in the HDD firm's final assembly process. In particular, when launching a new model, how quickly the firm can correct the *compatibility problems* among the components and improve yield quickly affects the profits of the HDD firms and the component firms.

A case of a media firm, Hoya's subsidiary in Singapore, is highlighted below to illustrate this point.[5] When an HDD firm commences initial development, Hoya always get its development team to participate in the client firm's development to acquire information on the product's specifications and process attributes. Then the firm conducts the initial process development in the client firm's home base, gradually shifting the operations to Singapore. The homeland staff and local staff carry out the pilot run at the overseas location in cooperation with each other. During the same period, the client firm also shifts its pilot run and process development operations to Southeast Asia and works on launching the production. The two firms actively exchange information during this process.

The reason for conducting the pilot run at the overseas location is that, even if the trial products created in the product and process development phases comply perfectly with the intended design, when they are moved to the mass production phase, the percentage of good-quality products can be low due to the peculiarities of the actual facilities and the process characteristics. Also, even if a component firm delivers good-quality components that meet the specifications, *defects* could occur when they are assembled into a product in the HDD firm's final stage of production, due to a bad combination or incompatibility of components. In particular, problems frequently occur with respect to the interface between the head and the media.

The parameter adjustment in the media firm's production process is important in solving this yield problem. Therefore, the media firm in this case example has a separate production line for each client, conducts lot control, carries out 100 percent inspection in the pilot run phase, and informs the HDD firm of the results. If the HDD firm requests correction of a product's attributes, the firm makes adjustments by changing the parameters in the production process. Due to the need for frequent adjustments in the mass production phase and early achievement of economies of scale, it is highly beneficial for component manufacturers to locate their operations close to the HDD firms' bases.

Access to skilled human resources and technology spillovers

In the case of mass-production-type products such as the HDD, a firm often faces the need to establish a new plant or suddenly expand its production capacity. In such a case, it would be too late to start developing human resources that have the know-how to launch such operations. The key to determining the production location would be the ability to promptly hire people who already have the necessary skills at that location. This point is evident in IBM's case.

Since its contract production to Saha-Union in Thailand in 1991, IBM has expanded its production in Southeast Asia. It established a wholly owned production subsidiary in Prachinburi in 1997. As of 2003, Saha-Union produced over 12 million units of product and the Prachinburi Plant produced over 28 million units. About 7,000 employees are working in the two locations combined.

When IBM established its Prachinburi Plant, it conducted personnel exchanges with Saha-Union, which had a long production experience. The firm had the staff hired at the Prachinburi Plant receive training in Saha-Union, and had engineers from Saha-Union dispatched to the Prachinburi Plant. In this case as well, the yield upon the initial production launch was very low at about 50 percent, and the firm was required to promptly solve the quality problems and smoothly inaugurate the production. Thus, the above-mentioned personnel exchanges were indispensable for launching production in the new plant.

Later, in the second half of the 1990s, IBM expanded the Prachinburi Plant and hired people at the mid-career level. It is notable that two-thirds of the engineers hired at this time were people who had been working for nearby competitors, such as Seagate or Fujitsu, and the remaining one-third were people who had moved from semiconductor-related firms. Sometimes, such people coming from other firms brought their subordinates with them.

A similar situation occurred in Singapore. IBM established a production base for HDDs for servers in Singapore in 1994. The person who supervised the launch of this production base was an engineer who had over 20 years of experience with IBM's competitors, including Seagate. He took his subordinates with him when he joined IBM. A person who was assisting him stated as follows:

> When he started business in 1994, many senior staff members gathered under him. All of us had worked with him for ten years or more. I had the experience of working with him for another firm for ten years. We had accumulated work experience, sometimes in the same firm, and sometimes in different firms. However, when he was going to establish IBM Singapore, we all came back to him. So we already knew each other and had experiences at the time of establishment. This is why we could launch the business so quickly.[6]

This statement expresses the essence of the white-collar labor market in Southeast Asia very well. US HDD firms and Japanese component firms that expanded their operations to Asia in a decisive manner launched production quickly by actively hiring people who had accumulated experience with other firms.

In recent years, many firms have also acquired such human resources through M&A. Western Digital acquired Fujitsu's plant in 2002 to expand production of the 3.5-inch HDD. The main reason for the acquisition was to acquire a large number of experienced human resources along with the manufacturing equipment.

In an industrial cluster, information moves around through movement of labor, close business relationships between firms, and frequently held seminars. Best practices concerning production or distribution operations often come to be shared within an industrial cluster through various routes. By establishing a production base in a cluster and taking root there, a firm is able to increase its sensitivity to such information and effectively incorporate it into the firm's operations.

The slow speed of the mass production launch of Japanese electric appliance firms is considered to be attributable in part to limited access to experienced human resources at the locale. Therefore, they had to dispatch many engineers from Japan. Consequently, they took a long time to develop a local framework for solving problems independently and are likely to have failed to reduce the overhead costs in proportion to the increase in the production scale.

Concluding remarks

The history of the HDD industry in the 1980s and 1990s indicates how Japanese and US firms competed fiercely based on accelerated innovations in line with the modularization of HDDs and a trend toward global competition. US HDD firms and Japanese component firms managed to achieve high business growth through investing in full-fledged industrial clusters in ASEAN, centred on Singapore. Their expansion into East Asia was based on a long-term strategy and gradually encompassed the entire region.

Japanese HDD firms expanded into Asia in a passive manner in response to yen appreciation and competitive pressures from US firms, not as part of a consistent strategy. Their investment in Asia in the initial stage was not so different from their conventional outsourcing strategy aimed at reducing processing costs within Japan. However, from the end of 1990, Japanese firms also began to expand the scale of operation through M&A and made efforts to form full-fledged industrial clusters in the Philippines and China, following their US counterparts.

In the HDD industry, the expected functions of industrial clusters became more advanced with the increase in competitive pressures, so firms have exerted efforts to enhance the functions of industrial clusters and develop human resources. The countries on the receiving end of investment also developed industrial policies for sophisticating the industrial clusters. The efforts of the Singaporean government are notable in this respect. Since the mid-1980s, Singapore has rolled out investment-attracting policies that reflected the intentions of the investors, targeting specific industries including HDDs. The shorter time for approving investment projects and specific tax incentives for capital investment and R&D sufficiently met the needs of the HDD industry that involve short payout periods and required intensive development of production technology at the locale. The initiatives targeting the HDD industry, including development of engineers and operators, technical/management support for local vendors, and support for R&D and commercialization of magnetic recording technology at the National University of Singapore, helped US firms and some Japanese component firms to localize part of their technology development and operational management function. Additionally, the engineers and supervisors who gained experience at the local bases became indispensable human resources when the firms expanded their business into other ASEAN countries or China.

US firms and some Japanese component firms were able to achieve competitive advantages because they quickly selected their business in line with technology and market changes, and committed themselves to pursuing potential in Asia in order to achieve an advantage in that business area. They did not merely establish buffer locations for taking advantage of low wage levels, but also took initiatives to enhance their global competitive advantage by building global production networks in Asia centered on Singapore. The host-country governments provided an enabling domestic investment environment and industrial clusters emerged to serve both parties' interests.

Notes

1 The SASI is the standard interface between the computer and the HDD, which was developed by a leading HDD firm, Shugart Technology, the predecessor of the present Seagate Technology.
2 The data reported in this paragraph are from International Disk Drive Equipment and Materials Association (IDEM), *Trend FOCUS*, and an interview survey of firms conducted by the author.
3 According to an interview with the Data Storage Institute (DSI) (February 2004).
4 Based on *Market Survey on HDD* for the relevant years, Japan Economic Center and *Electronic Firms' Investment in East Asia*, Electronic Economic Research Center, 1995.
5 Based on an interview conducted with the management in February 2004.
6 Based on an interview with IBM Singapore (December 1998).

6 Patterns of trade and outsourcing in an era of catching-up

An Asia–Europe comparison

Michael A. Landesmann

This chapter discusses features of the new era of 'South–North integration' in the global economy over the past two decades. By a new era of 'South–North integration' is meant that a significant part of the global dynamic in trade and investment patterns is currently shaped by economic integration between countries with significant differences in income levels. This era follows the early post-war period when economists were busy explaining why the dominant trade flows were happening between advanced economies which showed rather small differences in income levels (i.e. 'North–North integration'). This empirical observation gave rise to the development of 'new trade theory' in which the gains from trade were explained by gains from product differentiation ('variety'), product-specific economies of scale and 'pro-competitive effects' of integration (Ethier, 1982, Helpman, 1981, and Helpman and Krugman, 1985). The older branches of trade theory, Ricardian theory and H-O-S (Heckscher-Ohlin-Samuelson) theory were not that useful in explaining the dominant pattern of North–North integration as advanced economies did not differ much in technological levels or in relative factor endowments.

Developments from about 1980 onwards indicate that the main drivers of international trade and investment flows have changed: while in level terms, trade and investment flows amongst advanced economies still account for the largest shares of global trade and investment, the main (and significant) shifts in trade flows now occur between advanced economies and groups of successfully catching-up economies (i.e. those which start with a lower level of per capita income). In this sense we can speak of a new era of 'South–North integration' in the global economy.[1] In this chapter we shall show that the dominant characteristic of recent processes of trade integration and international production specialization are indeed shaped by the appearance of significant (in terms of economic weight) successful catching-up economies (we shall refer to them as SUCCESS economies in the following) in global trade and production patterns.

The first section of this chapter surveys overall trends in South–North integration, focusing in turn on patterns of trade specialization and their dynamics, patterns of outsourcing between Northern and catching-up Southern economies, and movements in the positions of catching-up economies in the vertically differentiated pattern of trade. In the next section we present and discuss a theoretical approach which can support the empirical findings observed in the previous section regarding dynamics of trade specialization and catching-up. The final section makes some conluding remarks.

Aggregate trends in 'South–North integration'

Figure 6.1 depicts some features of 'South–North integration'. The shares in total goods imports of a range of 'Southern economies' are shown in three 'Northern' markets: the EU-15 (excluding intra-advanced EU trade),[2] the USA and Japan. Amongst the 'Southern' economies are a group of OECD catching-up economies (the Southern EU cohesion countries: Greece, Portugal, Spain, Turkey and Mexico), the new EU member states (EU-10) and the large 'Dynamic Asia' group (comprising Hong Kong, South Korea, Singapore, Taiwan, Indonesia, Malaysia, Philippines, Thailand, China and India). What we can see from this figure is a sharp increase in goods imports from the three groups of Southern 'successful catching-up economies' (SUCCESS economies) over the period 1990 to 2006. We observe the much stronger presence of 'Dynamic Asia' in the US and Japanese markets than in the EU-15 and the rather strong declines of import shares

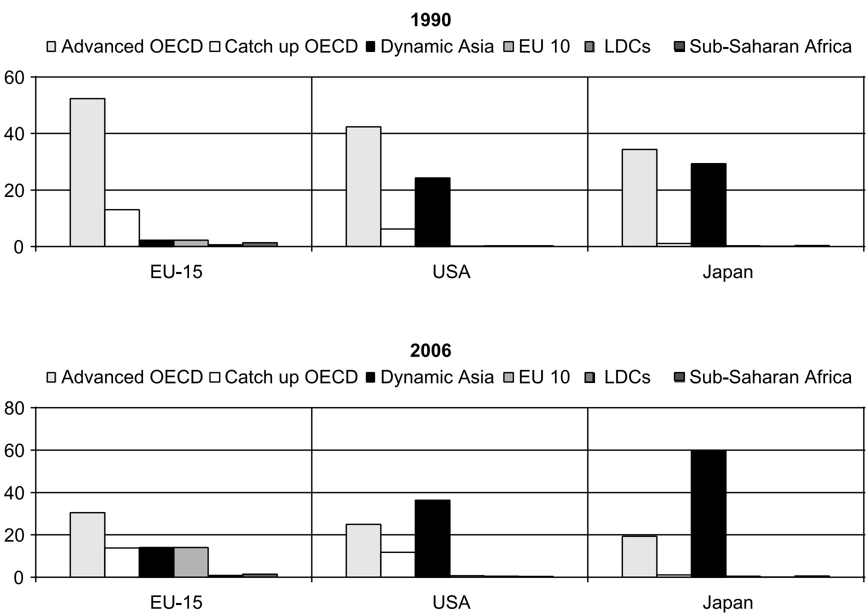


Figure 6.1 Shares in total goods imports in EU-15, US and Japan, excluding intra-advanced EU-trade (%).

Source: UN *Comtrade*; author's own calculations. For definition of country groups see text.

of other advanced OECD economies. The figure also points to another feature of 'South–North integration', namely, there are no significant goods trade flows from large groups of other 'Southern economies', such as the group defined as 'least developed economies' (LDC) or Sub-Saharan Africa to the advanced Northern markets.

Figure 6.2 shows the strong growth in goods exports by 'Dynamic Asia' which – if one excludes intra-EU 15 trade flows[3] – now represents the group with the largest goods exports worldwide. From the European point of view we can see that the inclusion of the new EU member states' export flows holds the EU-27 share in global trade flows rather stable since the early 1990s (it would have declined otherwise). One further point should be made at this stage: strong and significant 'South–North' integration is at this stage still limited to goods trade. This can be seen from the trade flow network diagrams Figures 6.3a and 6.3b depicting the trade flows between global regions in goods and services respectively (on the horizontal axis are the supplying regions and on the vertical axis the receiving regions). We can clearly see that in services trade flows the 'North' remains at this stage the only significant supplier of traded services (in spite of the well-known service exports from India) and by far the most important market for tradable service imports. Looking at the EU 15 in more detail (see Figure 6.4) and distinguishing the three broad service trade flows, transport services, travel and other services (comprising the important group of business and financial services) we see

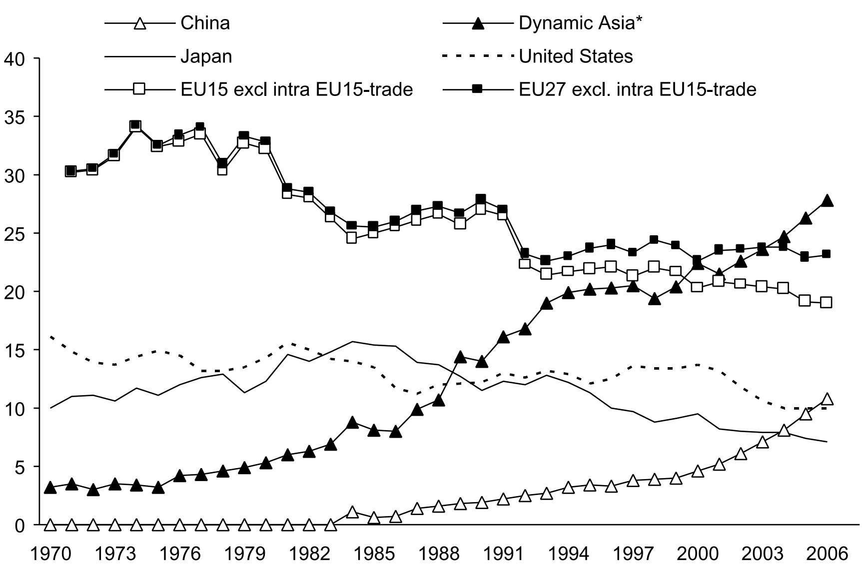


Figure 6.2 Shares in global goods exports, 1970–2006, excluding intra-EU15 trade.

Source: UN *Comtrade*; author's own calculations.

* Dynamic Asia includes Tigers 1 (Hong Kong, South Korea, Singapore, and Taiwan), Tigers 2 (Indonesia, Malaysia, Philippines, and Thailand), China and India.

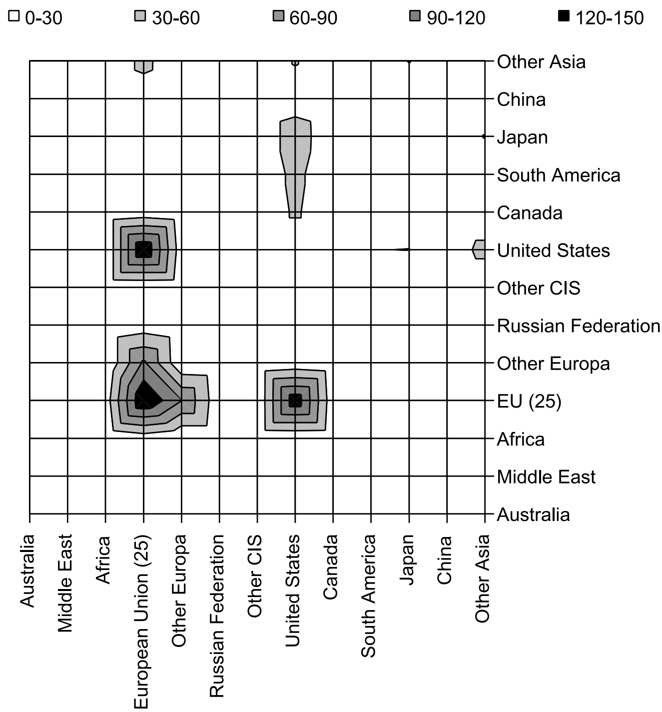


Figure 6.3a Network of global service trade 2005, USD bn.

Source: Eurostat, author's own calculations.

that – especially in the most dynamic area of 'other services' – the advanced OECD economies remain by far the dominant suppliers and markets.

In the following we move back to a more detailed analysis of goods trade and to a classification of countries into groups which we shall use in the rest of the chapter. The countries are grouped along two dimensions: whether they are high-, medium- or low-income countries (we shall use as the first letter of the country group description the capital letters H, M, and L to indicate these groups of countries) and, in a second dimension, we shall indicate within each of these groups of countries whether they are high- or low-growth economies (shown by the second letter of the country group description; e.g. MH refers to the group of medium-income and high-growth countries. See Appendix (Table 6.A.1) for details of the country classifications used in this respect.)

Over the period 1990 to 2005, the group of middle- and low-income countries together have increased their import share in 'Northern markets' by the following amounts: in the EU-12[4] from 16.2 per cent in 1990 to 32.1 per cent in 2005, in the US from 38.8 per cent in 1990 to 56.3 per cent in 2005 and in Japan from 40.4 per cent in 1990 to 54.0 per cent in 2005. There are also some

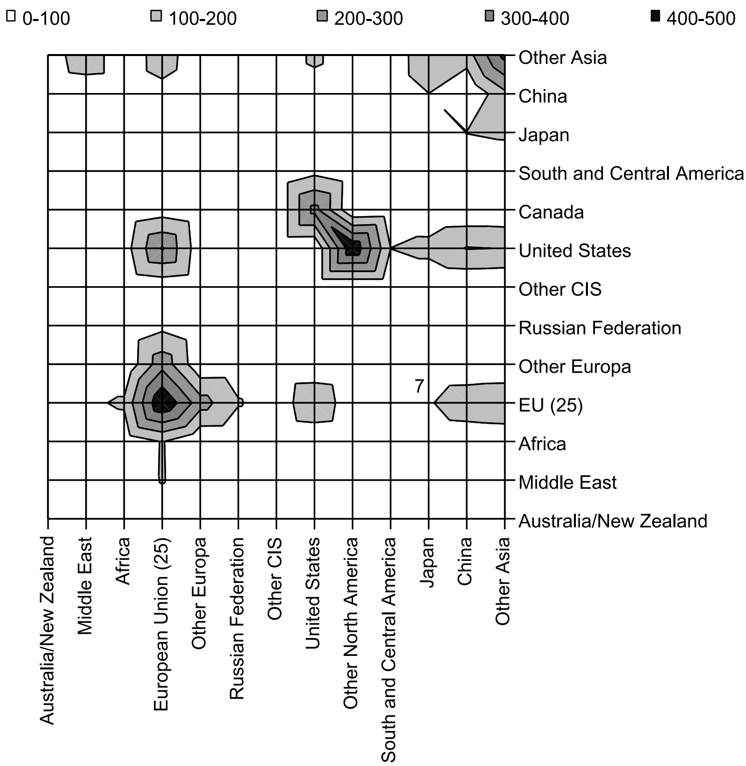


Figure 6.3b Network of global goods trade 2005, USD bn.

Source: WTO, author's own calculations.

interesting differences in the import penetration of the different groups of middle and lower income countries in 'Northern' markets (see Figure 6.5): In the EU-North it is particularly the middle income, high growth (MH) economies and China (and to some extent also the LH economies) which are most prominent in expanding their market shares. The MH countries comprise most of the Southern cohesion and all of the new EU member countries. In the USA, on the other hand, there is some shift from the MH countries (which comprise the first Tiger group of South-East Asian economies) to the LH (comprising the second group of East Asian Tiger economies), China and the ML group (which comprises Mexico where the outsourcing phenomenon in the wake of the NAFTA agreement became very prominent). Lastly, for Japan we see a similar phenomenon as for the USA in relation to the various groups of Asian economies: a shift from the first tier South-East Asian economies included in the MH group and towards the LH group and China. No significant improvement in the trade position emerges for the low-income, low growth (LL) economies in any of the Northern markets. This confirms the picture that the dynamics in international market penetration is

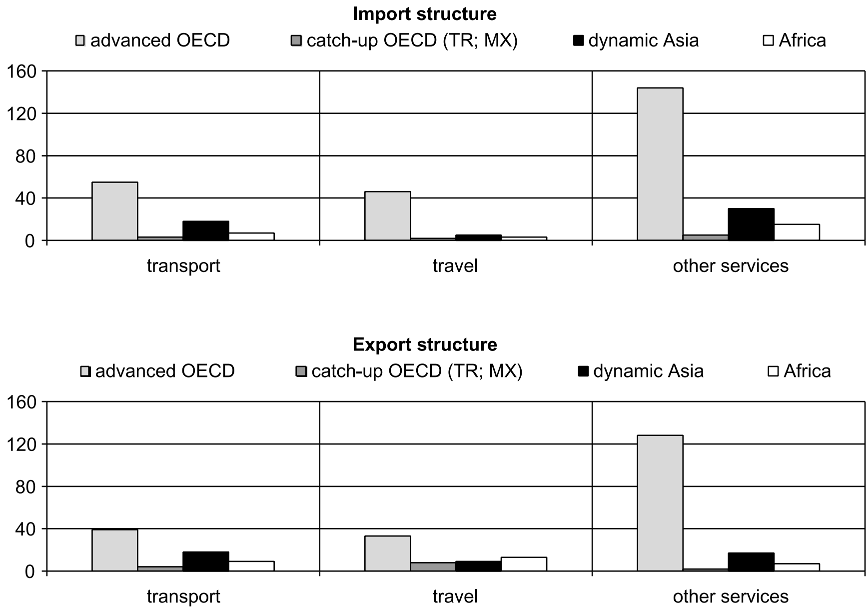


Figure 6.4 EU-15 services trade 2006, excluding intra-advanced EU-trade, EUR bn.

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

driven by the groups of SUCCESS economies without any significant impact of other 'Southern' economies. We now move to a discussion of the evolving patterns of trade specialization between the 'success' economies and the advanced 'Northern' markets.

The dynamics of South–North trade specialization

The main point we want to explore in this section is whether we observe a rather static pattern of trade specialization with low- and medium-income countries specializing in lower-tech industries or in industries with a low skill-content[5] and vice versa for advanced economies. Or, alternatively, whether we witness rather fast changes in patterns of specialization for which an alternative explanatory framework to the H-O-S (or the static Ricardian) framework is required to understand current developments.

In the following we continue to use the country groupings introduced in the previous section, but complement these by a further decomposition using industry classifications. Two different industry classifications will be used (see Appendices 6.A.2 and 6.A.3). One industry classification groups industries by 'skill content', i.e. whether production requires a higher or lower share of skilled workers (in this particular context defined as employees with a completed tertiary degree); the other industry classification groups industries into

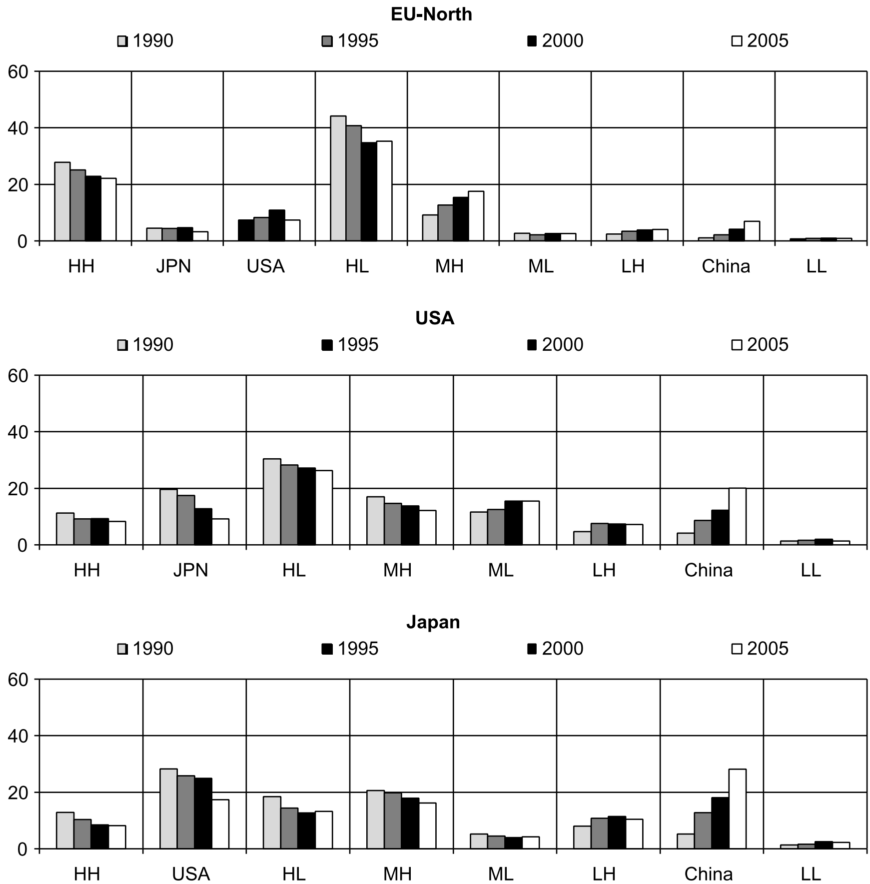


Figure 6.5 Shares in goods imports in EU-North, US and Japanese markets, 1990–2005 (%).

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb. See Appendix 6.1 for description of country groups.

whether they have a higher or lower 'technology content' (proxied here by R&D expenditure in relation to sales). Admittedly, the classifications have been made using aggregate data for EU-27 or OECD and might not reflect the relative 'skill' or 'technology content' in any particular country; consequently refinement of this analysis would definitely be very useful.[6]

Figures 6.6a and 6.6b present the import share developments for the 'skill content' classification.[7] The first thing to point out (see Figure 6.6a) is that the decline of import shares by high income (H) economies in 'Northern' markets is happening across all skill categories of industries and, in fact, is proceeding more rapidly in the medium- and high-skill groups of industries than in the low-skill intensive branches. Symmetrically, the increase in import

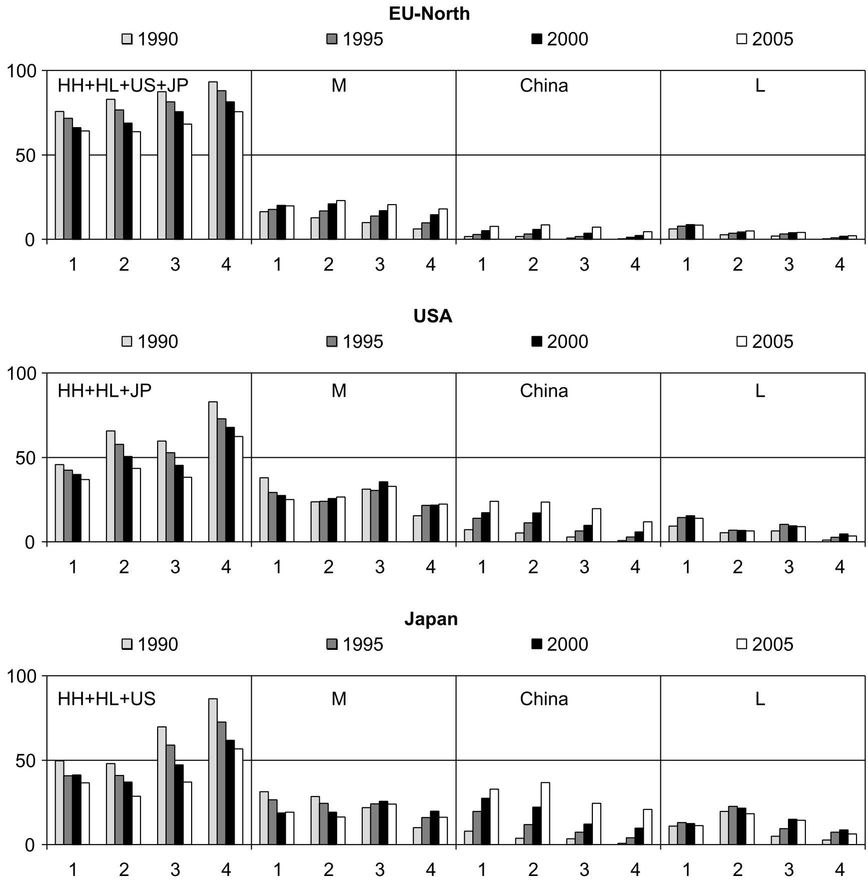


Figure 6.6a Import shares by skill categories, 1990–2005.

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

Note 1: low, 2: medium-low, 3: medium-high, 4: high.

shares by the groups of medium- and low-income (M and L) groups of countries is proceeding more rapidly in the medium- and high-skill intensive industrial sectors than in the low-skill intensive sectors, although the relative specialization of high-income countries in higher-skill intensive sectors is still maintained; but gaps have been much reduced. If we look at the detailed import share positions of the medium- and low-income economies (Figure 6.6b) we see a somewhat differentiated picture: in the EU-North the MH group is the group with the strongest market share position amongst the medium- and low-income economies and the strongest increases in import positions are indeed in the medium- and higher-skill intensive industries with increases in low-skill intensive segments being more moderate. In the US

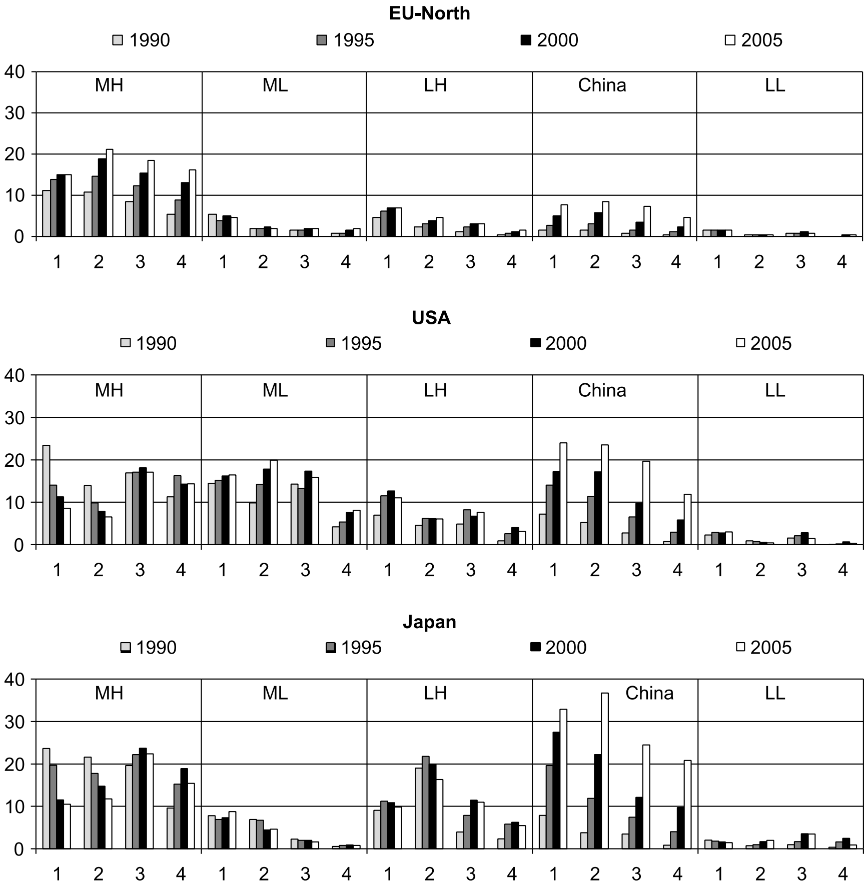


Figure 6.6b Import shares by skill categories, 1990–2005, middle- and low-income countries.

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

Note 1: low, 2: medium-low, 3: medium-high, 4: high.

and Japanese markets the MH group of countries (including the first-tier South-East Asian economies) experience a decline in import shares in the low-skill intensive industries and either stagnant or rising shares in the higher skill-segments. As to China, we can move to Figure 6.7 which shows the import shares in all Northern markets using both classifications. The general picture which emerges with respect to China is that there are strong market share increases across the board and in absolute terms we see a 'U-shaped' pattern: a strong market share position in both low-tech segments and in medium-high and high-tech segments (with a particularly strong position in office machinery and computing equipment).[8] Looking at the movements

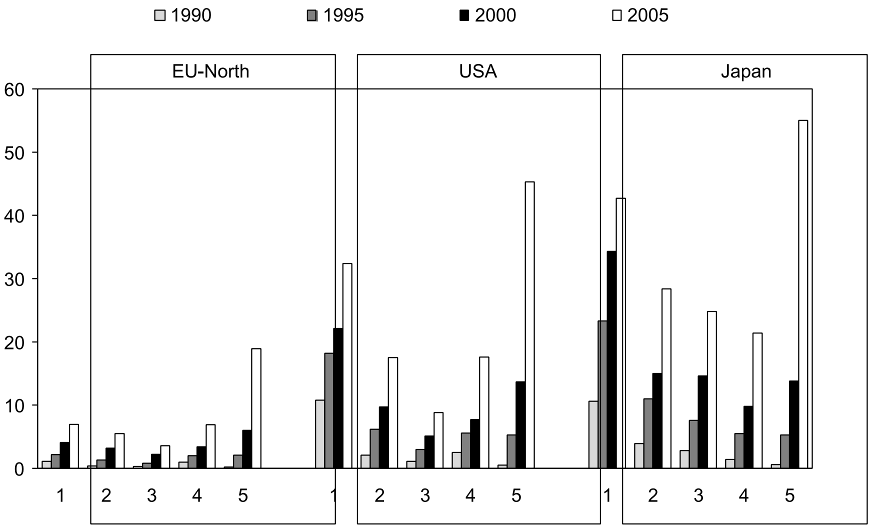


Figure 6.7a Shares of China in imports of EU-North, USA and Japan, by technology classes (%).

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

Note Technology classes: 1: low, 2: medium-low, 3: medium-high, 4: high, 5: office machinery and computers.

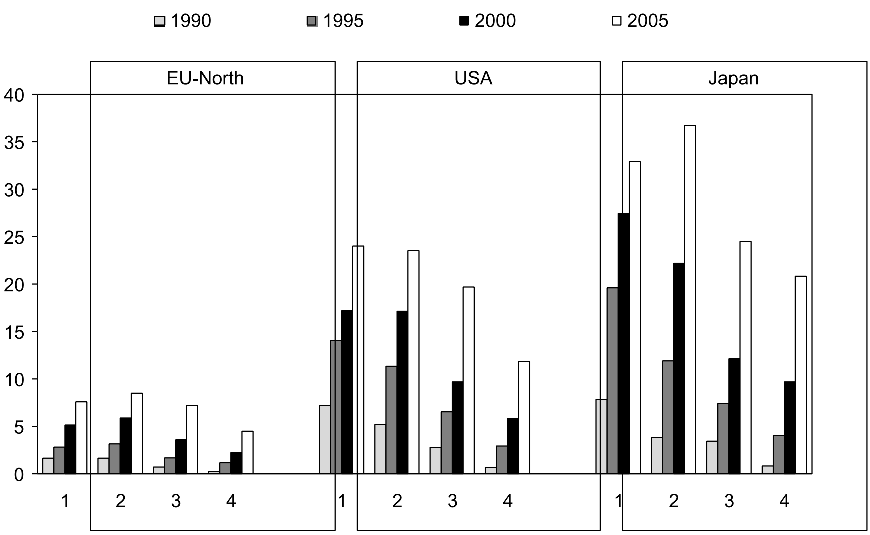


Figure 6.7b Shares of China in imports of EU-North, USA and Japan, by skill categories (%).

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

Note 1: low, 2: medium-low, 3: medium-high, 4: high.

in import shares over time, we can observe again that the increases are particularly high in the medium- and higher-tech (or medium- and higher-skill) segments of industries. The same is true (using both classifications) and even more strongly pronounced for the changing market share positions of MH countries in EU Northern markets (see Figure 6.8).

In sum, for the important groups of SUCCESS countries (MH, China, and in some respects also LH) we can detect a strong pattern of upgrading both in terms of relative skill- and technology-intensity. This theme will be further explored in the next two sections in relation to 'outsourcing' and the position of SUCCESS economies in 'vertical intra-industry trade' respectively.

Outsourcing patterns and catching-up

The recent literature on the phenomenon of 'fragmentation' in international trade deals with the splitting up of production processes into various 'production stages' or 'tasks' which can be performed in different international locations (see Arndt and Kierzkowski, 2001; Grossman and Rossi-Hansberg, 2008a; Baldwin, 2006). The reason why such fragmentation becomes feasible or economically attractive could be technological innovations leading to falling transport or communications costs, organizational innovations, falling trade barriers and improvements in legal enforcements. All of this encourages and facilitates the organization of production of different tasks (elements of the value added chain) in different geographic locations.

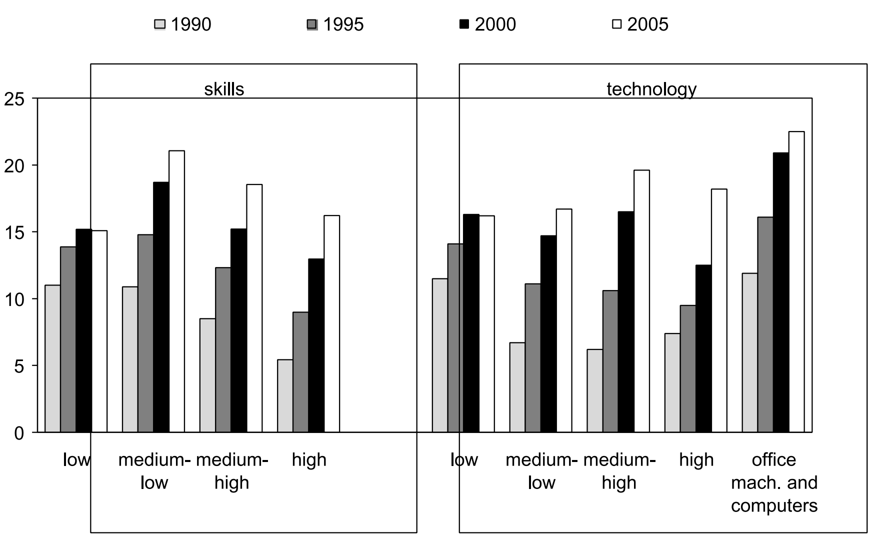


Figure 6.8 Shares of middle-income–high-growth (MH) countries in imports of EU-North, by skill and technology categories (%).

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

The basic feature of international fragmentation is that it makes a more complete pattern of specialization possible than would be the case if production processes remained vertically integrated. It provides greater scope for productivity effects from the finer utilization of specialization advantages all along the value chain with its impact upon absolute factor returns. Furthermore, one might make the argument that ‘moving up the value chain’ for catching-up economies would be easier if it happens along a supply chain which is vertically integrated and thus allows more learning spillovers between contractor and contractee, as compared to the difficulty of gaining such learning advantages from increased inter-industry specialization processes (Landesmann and Stehrer, 2009).

The focus here is to look at trade flows of intermediate inputs (parts and components) into the European Union (the EU-27) and the USA with emphasis on changes in the composition of suppliers (i.e. whether these came from high- or low- and medium-income countries); at the same time we analyse these trade flows in terms of skill content. If the skill content in the imports of intermediate inputs from low- and medium-income countries was low, this would indicate that we are witnessing a classical pattern of outsourcing: the less skill-intensive stages of production get outsourced to low-/medium-income countries, while the more skill-intensive stages remain in higher-income countries.

What we shall show in the following is that there is indeed evidence for the classical pattern of vertical differentiation in that the skill content of imports of intermediate inputs from high-income countries is higher than the skill content from low-/medium-income countries, but that over time this gap has declined significantly, i.e. medium-income countries are also increasingly exporting intermediate inputs with a higher skill content to high-income economies. Furthermore, there is a significant shift of imports of intermediate inputs as a whole from high-income to medium-income economies and this shift is stronger than in the case of final goods.

Figures 6.9a and 6.9b show that there was indeed a shift in the shares of intermediate imports (processed inputs and parts) supplied by medium-/low-income (ML) countries to EU-27 and the US markets and, furthermore, that this shift in shares was stronger in the case of intermediates (particularly parts) than in the case of final goods. We can also see that the skill content of all types of goods, but particularly that of intermediate inputs (see the shading within each bar which shows the skill content) supplied by medium- and low-income countries to Northern markets is increasing rapidly.

Figures 6.10a and 6.10b show the breakdown of imports of processed inputs, parts and final goods by different supplier groups. As to developments in EU Northern markets (Figure 6.10a) we can see that there are two groups of catching-up economies which account for most of the growth of import shares of the low-/medium-income group: the group of MH countries and China which is – so far – a LH, i.e. low-income, high-growth economy. What is interesting to see is that China increased its share in EU-27 imports

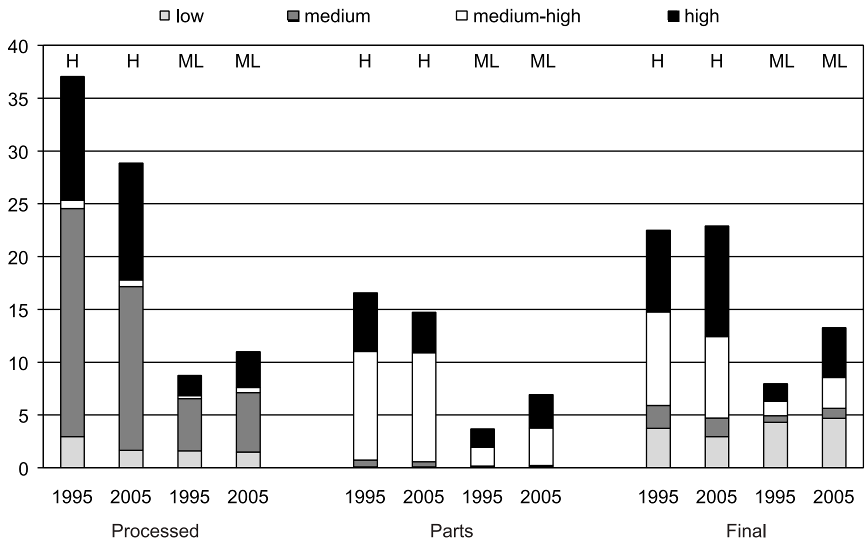


Figure 6.9a Outsourcing: shares in EU-27 imports by high- (H) and medium-/ low- (ML) income countries and by import categories, 1995 and 2005 (in % of total).

Note H: high income countries, ML: medium/low income countries; and by low, medium, medium-high and high skill content; see Appendix 6.2 for classification.

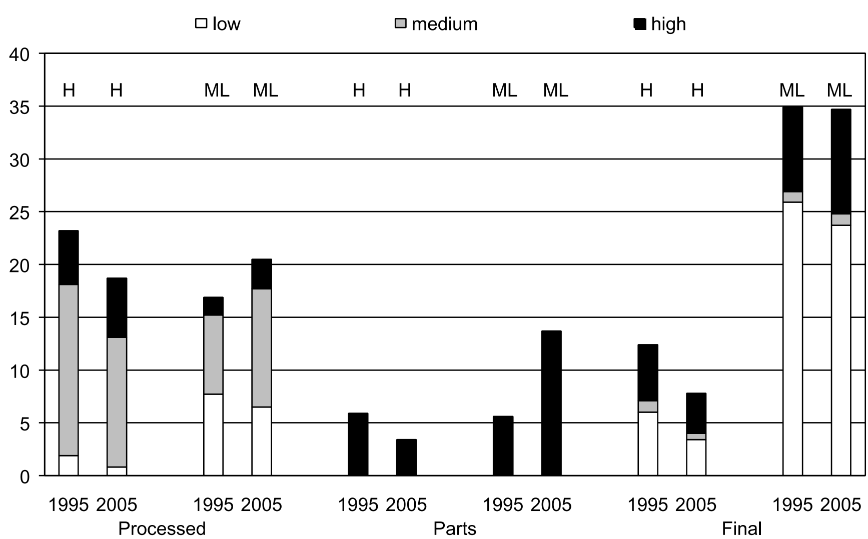


Figure 6.9b Outsourcing: shares in USA imports by high- (H) and medium-/ low- (ML) income countries and by import categories, 1995 and 2005 (in % of total).

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

Note H: high income countries, ML: medium/low income countries; and by low-, medium, high-skill content; see Appendix 6.2 for classification.

mostly in final goods, while the MH countries increased their share both in intermediates (processed inputs and parts) as well as in final goods. As a lot of these countries are located in Europe, we can deduce that in outsourcing, geographic distance matters.

The situation in the USA (Figure 6.10b) is somewhat different in that there is an interesting difference between China and the other middle-income and low-income economies. We can see an increasingly dominant position of China in finished goods supply, while the LH countries (which include the second-tier East Asian economies) have a very strong position in parts production. The MH and ML economies also feature strongly in the supply of processed inputs. This can be seen as evidence for the characteristics of intra-Asian production networks pointed out by other authors (see e.g. Athukorala 2005b, Athukorala and Yamashita, 2006) where countries other than China specialize more in parts and processed inputs supplies while the final stages in goods production have increasingly shifted to China. This picture is also supported by looking at the positions of China and MH economies in Japanese imports (see Figures 6.11a and 6.11b) where we see a strong shift towards China in finished goods while MH economies seem to maintain their import share position in parts production.

Vertical intra-industry specialization and catching-up

In this section we present some evidence on patterns of intra-industry trade flows which account for significant differences in the quality positions of different international suppliers.[9] We shall for this purpose use relative export prices as indicators of relative product quality (for earlier work, see Landesmann and Stehrer, 2002, Landesmann and Woerz, 2006). Calculation of export unit value ratios was done in the following way (see Appendix (Table 6.A.4) for details): we use the Comext trade statistics at the most detailed (8-digit) level which contains information on price and quantity (usually weight) for about 12,000 products. We then calculate export prices for each exporter to the EU-15 market at this detailed product level and compare the export price with the average price of the respective product in total EU-15 imports. This gives us detailed export (or unit value) ratios for each exporter to the EU-15 market and we then construct an aggregate index by simply weighting the individual products by their shares in the export basket in the particular country's exports to the EU-15 market. Furthermore we also report unit value ratios for groupings of industries and in this case we use as weights the shares of the products in the particular industries' exports to the EU-15 market.

Figure 6.12a depicts the results of these detailed export price comparisons at the level of total goods exports. The unit value ratios for two periods are shown: an average over the period 1995–7 and an average over the period 2002–4. The calculations refer to the (weighted) average relative prices of different suppliers in EU-15 markets: the suppliers identified are the EU-15

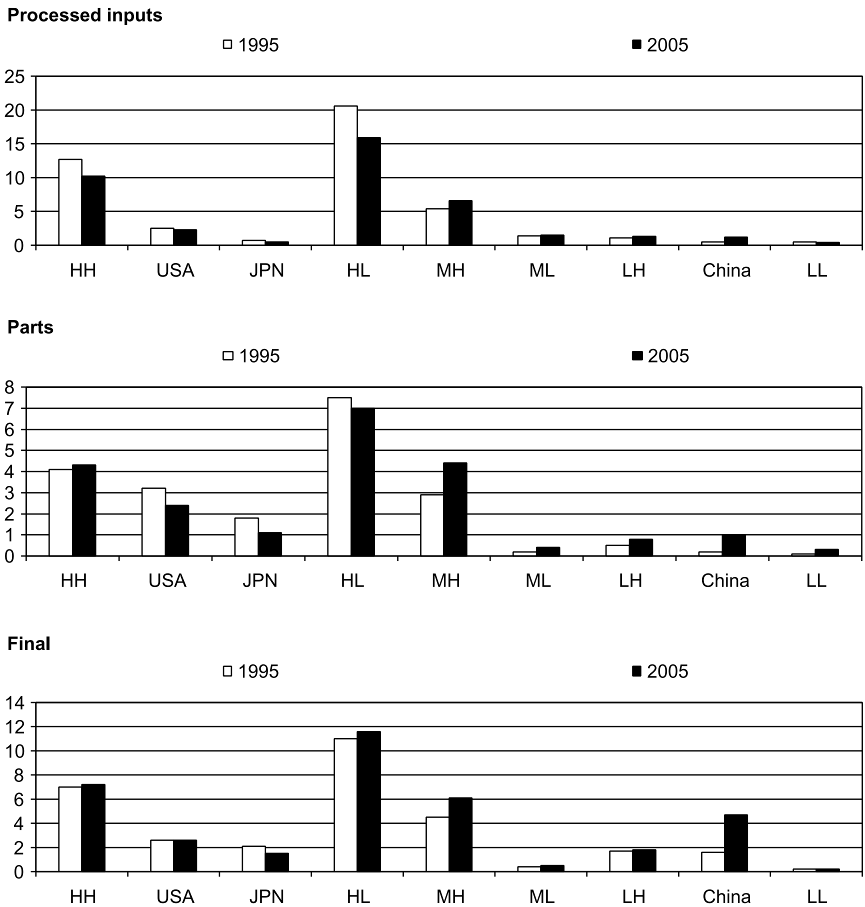


Figure 6.10a Outsourcing: imports of EU-North by source regions and by import categories (shares in % of total imports), 1995 and 2005.

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

themselves, the (first round) new member countries (NMS), the second round accession and candidate countries (ACCs) Bulgaria, Romania, Croatia and Turkey, then the first and second group of 'Asian Tigers' and, finally, China. Looking at the results and the first period (1995–7), we see that all the groups of 'catching-up economies' sold their export products on the EU-15 markets at substantial price discounts compared to the average EU-15 imports; this can be interpreted as a significant 'quality gap'. The prospective new members and ACCs showed a particularly high quality/price discount and only China showed an even higher price discount. In the more recent period (2002–4) the quality gap (price discount) for the European catching-up economies has shrunk quite dramatically, from over 20 per cent to less than 10 per cent while

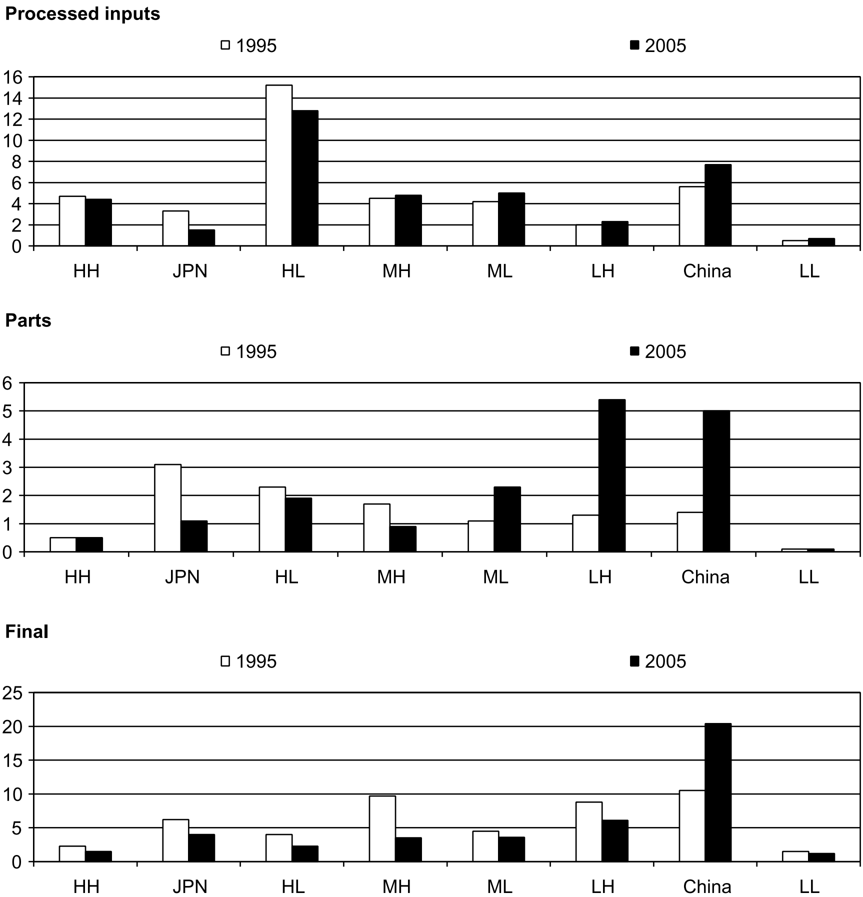


Figure 6.10b Outsourcing: imports of USA by source regions and by import categories (shares in % of total imports), 1995 and 2005.

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

for China it remained at close to 30 per cent. We can also see in Figure 6.12a a very dramatic increase in relative export prices of the Asian Tigers 1 and, a bit less so, of the Asian Tigers 2 as well as of India.

One should add two remarks to these calculations: first, while the calculations of export price ratios were done at the most detailed product level, the aggregation (using trade weights) across products means that differences in the composition of exports also matter in these comparisons. For example, if a country exports mostly in the low-tech areas (as does India), the aggregate unit value ratios obtained for India will reflect the fact that its main competitors are those countries which also principally export similar products. In contrast, if a country exports mostly higher-tech products (as do the Asian

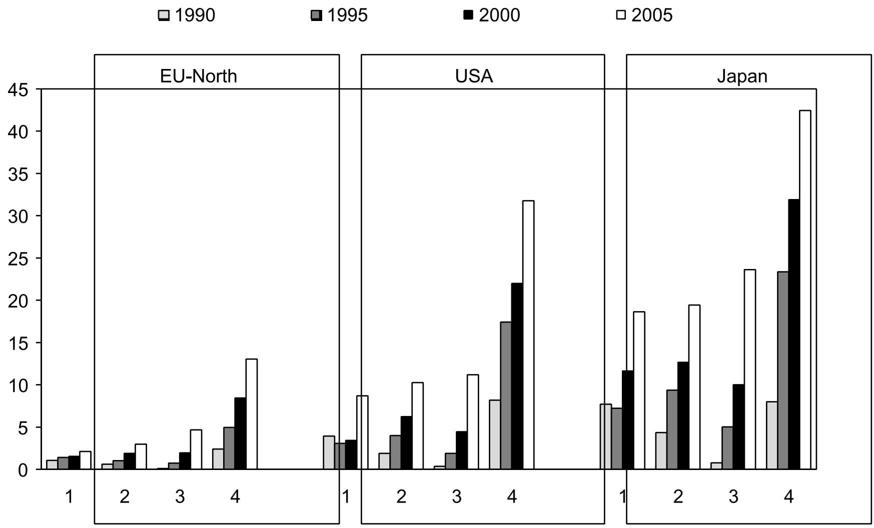


Figure 6.11a Shares of China in imports of EU-North, USA and Japan, by outsourcing categories (%).

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

Note 1: primary, 2: processed, 3: parts, 4: finished goods.

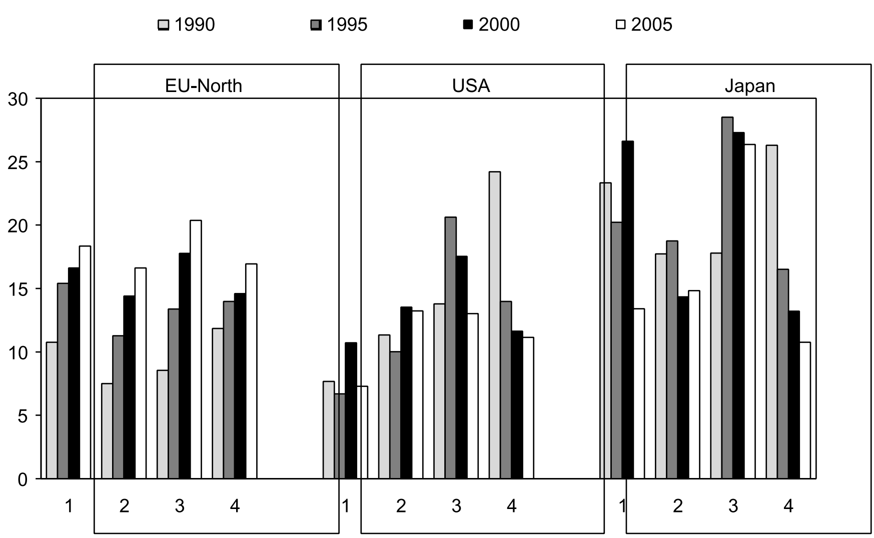


Figure 6.11b Shares of middle-income–high-growth (MH) countries in imports of EU-North, USA and Japan, by outsourcing categories (%).

Source: Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

Note 1: primary, 2: processed, 3: parts, 4: finished goods.

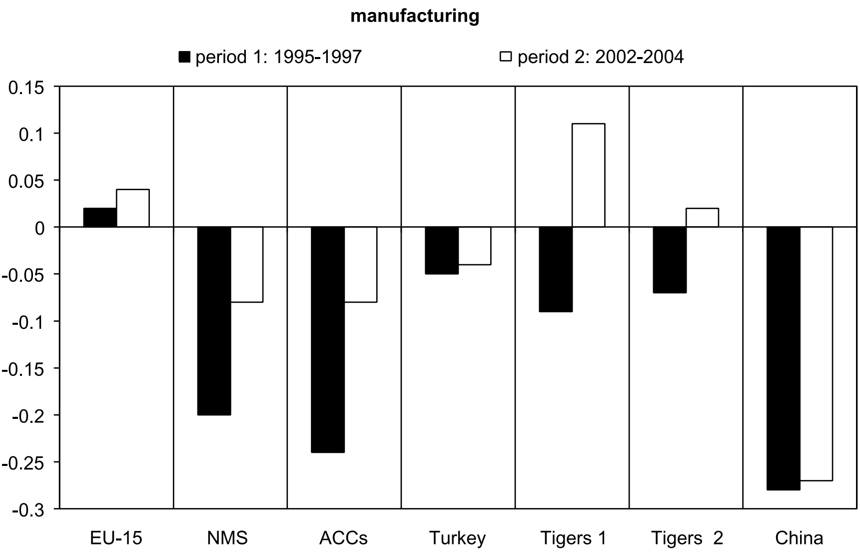


Figure 6.12a Unit value ratios in EU-15 markets (calculated from detailed export price data).

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

Tigers 1) the aggregate unit value ratios will reveal their relative export price performance compared to other high-tech producers in these fields. This compositional effect should not be forgotten when interpreting these figures. Second, a relatively low (or high) unit value ratio indicates – accounting for the commodity composition of the country's exports – that a country sells its products at relatively low (or high) export prices (compared to the mix of producers who sell in these product areas). It does not by itself reveal whether a country's sales are high or low or whether sales performance has improved or deteriorated (due to a high or low price). We deal with this issue explicitly below by combining the information on unit value ratios with information on sales performance.

Figure 6.12b shows a further breakdown of the unit value performance for two groups of industries: the 'low-tech' group (comprising industries such as textiles, leather, footwear, wood products, etc.) and the 'medium-/high-tech' group (comprising industries such as motor vehicles, electrical and mechanical machinery, chemicals, etc.). These groupings are indicated as groups 1 and 3 respectively in Figure 6.12b (see Appendix (Table 6.A.3) for a classification of industries into these groups). What we observe in these figures with respect to the NMS and the candidate countries is that in the earlier period 1995–7 the largest price-quality gaps were in the 'medium-/high-tech' group, while the price gaps were smaller in the 'low-tech' group of industries. For the NMS and also for the Asian Tigers 2 the largest reductions in price-quality gaps

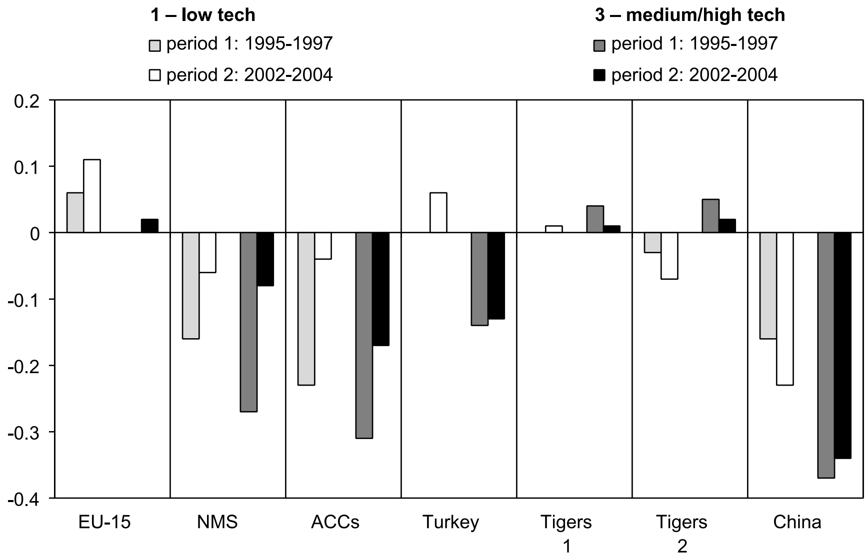


Figure 6.12b Relative export prices by industrial groupings (groupings 1 – low-tech, 3 – medium/high-tech).

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

(from the earlier to the more recent period 2002–4) took place in the more sophisticated 'medium-/high-tech' group. This reveals an important feature of the more advanced European catching-up producers and the Asian Tiger economies in that they managed to close 'quality gaps' most strongly in the more sophisticated groups of engineering industries where (quality) competition with higher-quality producers is more fierce than in 'lower-tech' industries.

The next exercise consists in jointly looking at relative product quality developments (as measured by the unit value ratios discussed above) and changes in market shares. Figures 6.13a–c present diagrams with two coordinates: on the horizontal axis we show the change in market share by a country or country grouping (more precisely: share in total EU-15 imports) and on the vertical axis we show the development of a country's unit value ratios (or: relative export prices). Each time we look at the changes from 1995–7 to 2002–4. As already discussed above, the unit value ratio can be interpreted as an indicator of a country's quality of export products compared to those of the aggregate of other exporters in that market (and industry type) and a change in that ratio refers to a change in relative export prices. In principle, the intersection of the two axes defines four fields (see particularly Figure 6.13a). In one field relative export prices rise and market shares fall (producers in this field 'price themselves out of the market'). In another field relative export prices rise but market shares rise as well: this can

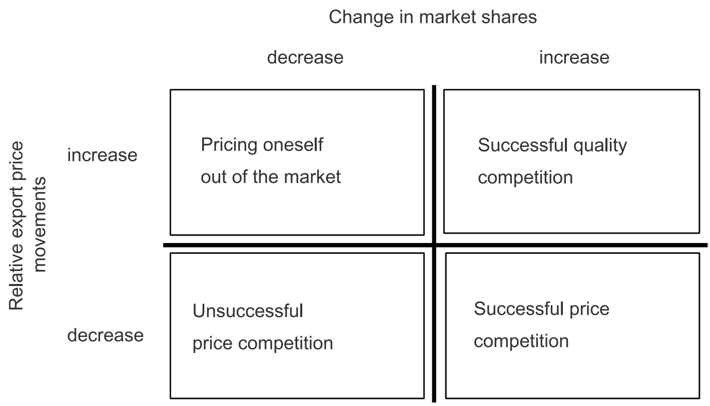


Figure 6.13a Price versus quality competition in export markets.

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

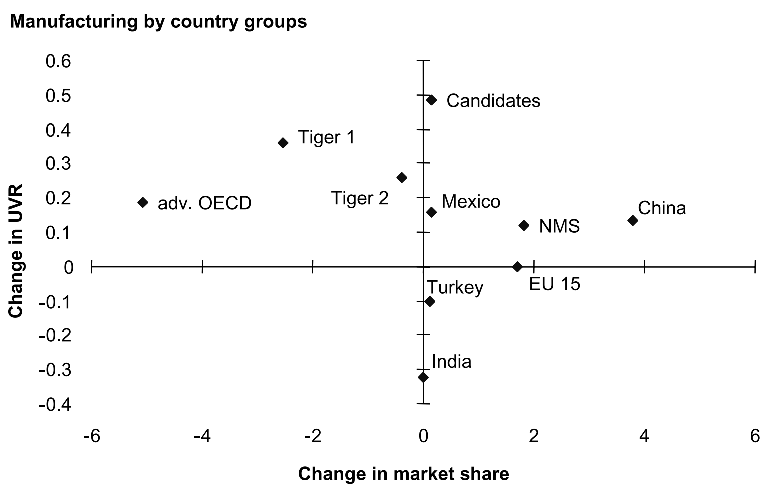
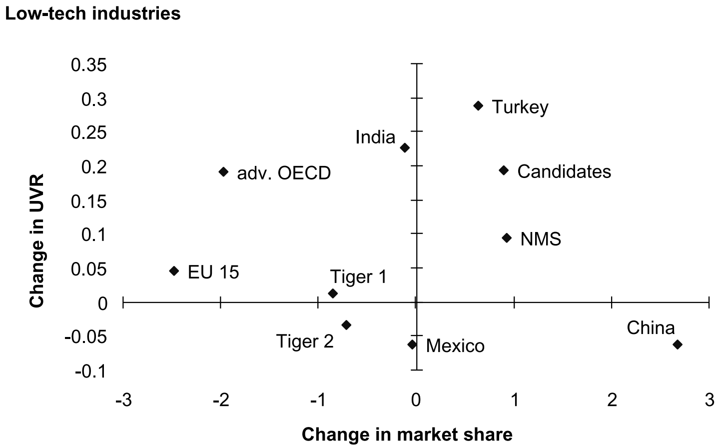


Figure 6.13b Price and quality competition in EU-15 markets 1995/98–2002/04.

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

clearly be interpreted as relative product quality having improved, and this is honoured to such a degree by consumers in that market that market shares (in value terms) even improve ('successful quality competition'). In the two other fields relative export prices fall, but in one quadrant market shares increase, which would be a sign of 'successful price competition', while in the other quadrant market shares fall together with relative export prices ('unsuccessful price competition').



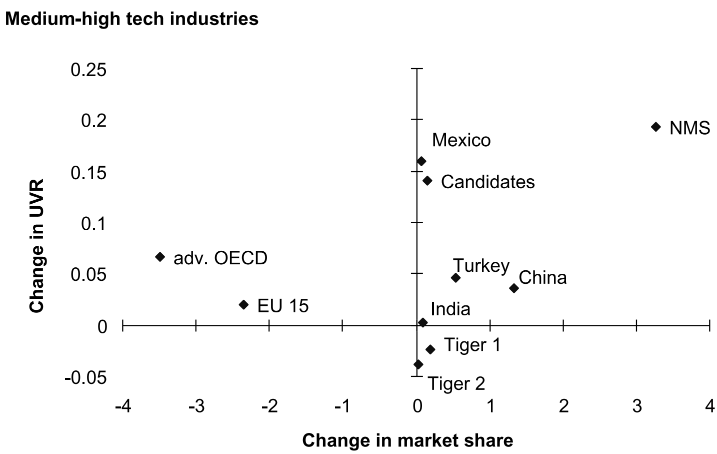


Figure 6.13c Price and quality competition in EU-15 markets 1995/98–2002/04 by country groups.

Source: Based on data compiled from Comext database: http://fd.comext.eurostat.cec.eu.int/xtweb.

Figures 6.13b and 6.13c show the developments in market shares (in percentage points of total EU-15 imports) and in relative export unit values both for manufacturing as a whole as well as for two of the industry groups introduced earlier, the 'low-tech' and the 'medium/high-tech'. The groups identified are the EU-15, other advanced OECD economies, the new member states (NMS), the candidate countries, the two groups of Asian Tigers, Turkey, China and India. As for total manufacturing (Figure 6.13b), the NMS and China stick out as being in the quadrant where both market shares and relative export prices improve – a clear sign of successful quality upgrading honoured by the demand side. On the other hand, during the period from 1995 to 2004 both other advanced OECD countries and the two Asian Tiger economies lost market shares while improving their unit-value ratios, a case of 'unsuccessful high price competition'. In Figure 6.13c we can see that the two Asian Tiger groups of economies have maintained or increased their market shares in medium-/high-tech industries, but lost such market shares in lower tech branches. The situation of China and NMS has become more differentiated: while we see that the NMS are involved in 'successful quality competition' in both sets of industries (their location in the medium-/high-tech industries is particularly remarkable), China seems to have pursued a strategy of 'successful price competition' in the low-tech areas and of 'successful quality competition' in the medium-/high-tech areas. Other catching-up economies, such as Turkey and the candidate countries, can also be found in the quadrant of 'successful quality competition'.

Explanatory theoretical framework

In this section we review two different theoretical contributions which can provide an explanatory framework for the dynamics of international trade specialization of catching-up economies for which we have tried to submit evidence in the above sections of this paper. One such framework is represented by the analysis contained in a number of papers by Feenstra and Hanson (1996 and 1999). The other refers to contributions by the author of this chapter together with Robert Stehrer (Landesmann and Stehrer, 2001, 2004, 2007).

The specifically interesting feature of the Feenstra and Hanson model is that the distributional consequences of 'outsourcing' are different from that of trade specialization in the H-O-S model. In the Feenstra-Hanson model the outsourced tasks or production stages are at the lower end of the range of products or stages in which the 'outsourcing country' had a comparative advantage. For example, if it has a comparative advantage in skill-intensive products it would outsource the products or stages which are the least skill-intensive from the range of products (or tasks) in which it formerly had a comparative advantage. As transport or trade costs fall, the stages in which it has the least comparative advantage will shift locations and get produced in the country or countries which are competitive in low-skill-intensive products.

Looking at labour market implications, one can investigate what happens to the relative wage rates of the skilled vs unskilled workers in the two locations: In the 'outsourcing country' (OC) the average composition of skilled vs unskilled work will shift towards higher skill-intensity; hence, there would be a rise in the 'skill premium'. On the other hand, the other economy which is the 'recipient of the outsourcing' (RO) becomes the location of a stage of production which was the least skill-intensive from the point-of-view of the OC country but would be the most skill-intensive production stage in the RO country. The reason is that if it were not at the most skill-intensive end, it would be amongst the products/stages which would already have shifted to the RO country. Hence also in the RO country the average skill-intensity will increase and this would mean a rising skill premium in that country as well. Hence – contrary to the H-O-S model – there could be a rise in the relative wage rates of skilled to unskilled workers in both types of economies.

If we think of a whole range of economies and allow for endogenous wage rate changes, then the RO country would also change its comparative advantage vis-à-vis other economies and hence could itself lose production stages to these economies. The Feenstra-Hanson model like the H-O-S model determines wage rates endogenously by imposing a full employment condition (of both types of labour). If we do not impose the full employment condition, then there has to be another mechanism of determining the wage rates. However, given any exogenous structure of wage rates (plus transport and trade costs) we would still be able to determine the comparative advantage positions of different economies and hence the production locations of different products/tasks. Given the levels of demand for the different products, the employment demand for different types of labour (skilled and unskilled) can then be determined.

The Landesmann-Stehrer model is basically a dynamic Ricardian model with the dynamics of relative cost developments being at the heart of an explanation of changing patterns of international specialization between NEs and CUEs. It links comparative cost dynamics of productivity catching-up on the one hand and wage–price dynamics on the other hand. The idea is rather simple: just like in the new growth theoretical literature which studies the problem of convergence in income (or productivity levels) between countries of different initial levels of income (or productivity), there is an underlying hypothesis which goes back to Alexander Gerschenkron's famous notion of 'the advantage of backwardness' (Gerschenkron, 1952, 1962). The advantage of less developed economies consists of the fact that they can benefit from technology (knowledge) transfer and hence this would be the motor behind a successful catching-up process. To be successful in benefiting from such an 'advantage of backwardness', however, they have to possess or develop the mechanisms which allow such a successful technology transfer. Moses Abramovitz speaks here of 'absorption capabilities' (Abramovitz, 1986). This mechanism of technology transfer can operate at the level of the economy as a whole and can be rather widely interpreted not only as technology transfer in the narrow sense but also as the (selective and often modified) transfer of institutional and behavioural schemes and policies. In the Landesmann and Stehrer model, the Gerschenkron hypothesis is applied at the industrial rather than the economy-wide level. In this form it means that productivity growth in CUEs could be particularly high in industries which start from a high initial technology (or knowledge and productivity) gap compared to the more advanced economies. The behavioural hypothesis here is that if technology and knowledge gaps are high in particular areas of industrial activity, then the scope for learning (and hence for productivity growth) is also high. This boils down to an empirically testable hypothesis whether productivity growth is strong in those industries where initial productivity gaps are big. It so happens that industries with high initial knowledge (and productivity) gaps are often those which would count as more ‘high-tech’ and also more ‘skill’ and ‘R&D’ intensive.

Hence, once the Gerschenkron hypothesis has been empirically tested and supported in the cases of CUEs (see Figure 6.14 for a test of the implied productivity and wage dynamics for MH and LH economies in different groups of industries), for earlier econometric estimates we obtain the first ingredient of a model with changing comparative cost dynamic (see Landesmann and Stehrer, 2001). That is, the (relative) productivity (and hence catching-up) dynamic is higher in industries with more technology or skill content than in industries with lower technology and skill content. If this is a persistent pattern, then CUEs would lose the comparative disadvantage they originally had in industries in which the initial productivity gaps were very large (i.e. medium- or higher-tech industries). To fully state the argument, however, another component of the model is important: if higher productivity gains would simply be absorbed by higher relative labour costs, then the uneven

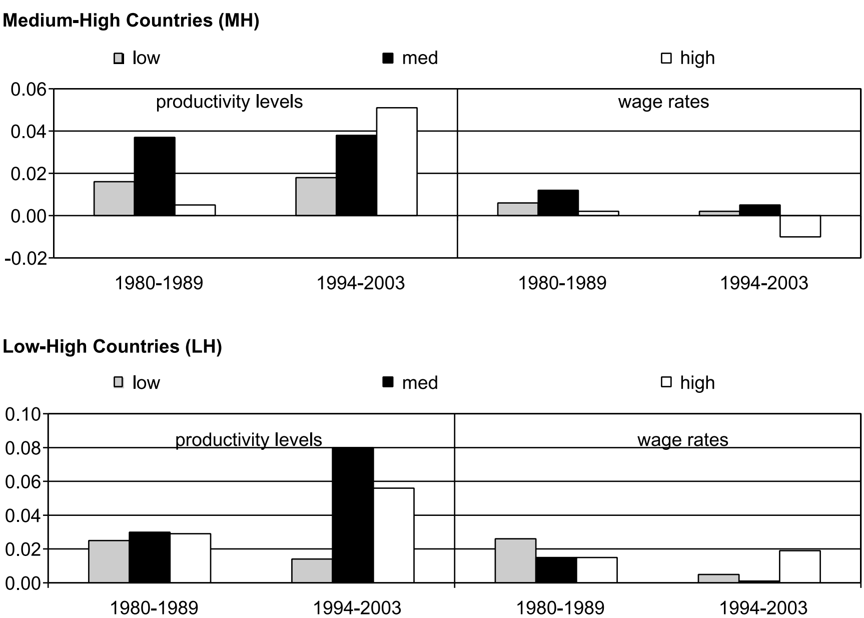


Figure 6.14 Econometric estimate of convergence parameters of productivity levels, wage rates by industry groups (low-, medium-, high-skill).

Source: UNIDO industrial statistics.

Note: The different industry groups refer to industries distinguished by skill-intensity (Appendix 6.2).

productivity dynamic would not translate into a changing comparative cost dynamic. Hence another important ingredient is added to the model: wage and price–cost dynamic. In this respect we refer to two empirical findings which characterize dynamic catching-up processes: one is that wage growth is less uneven across industrial branches than is productivity growth (labour economists speak here of a 'wage drift' in the sense that wage claims made in one industry have an impact on wage claims in other industries as wage bargaining has an economy-wide dimension; see again Figure 6.14 for estimates in this regard) and this means that relative labour unit costs fall more strongly in those industries in which there is relatively fast productivity catching-up. This supports the dynamic of changing comparative cost positions discussed above. The other phenomenon which is often registered in catching-up economies is that profitability in those industries which undergo fast productivity catching-up is also higher than in the other industries. The high profitability in the fast catching-up industries results from a particular price–cost dynamic and makes investments into such industries attractive. Hence we often observe in successfully catching-up economies that international investments flow into those industries which benefit from the changing character of the dynamics of comparative advantage (i.e. they flow more into medium- and high-tech industries than into low-tech industries; for an analysis of catching-up processes in Central and Eastern Europe in this respect see Landesmann and Stehrer (2002). And since international investment is often the conduit of international technology transfer, it speeds up the above pattern of changing comparative advantage.

The industries which undergo the fastest catching-up process (i.e. the more medium- and higher-tech industries) are also the more skill-intensive ones and hence labour demand turns in successfully catching-up economies in the direction of a higher skill composition. Depending upon the evolution of skill supplies, there is hence also an argument of observing a rising skill premium in the catching-up economies, in line with the Feenstra-Hanson model. Empirical analysis strongly confirms this model prediction in that labour demand has shifted in the CUEs strongly in the direction of a higher demand for skilled workers (EU Skills Study, 2007). Finally, we should state that the disaggregated Gerschenkron catching-up hypothesis can also be extended to deal with the differentiated product-quality upgrading processes.

Conclusions

This chapter has explored the ongoing process of 'South–North integration', which we consider to be the dominant feature of current changes in global trade and investment patterns. We have observed four important stylized facts about outsourcing patterns in the EU and US economies: (i) there is evidence of increased outsourcing from high-income to medium- and low-income economies; (ii) geographic proximity matters in outsourcing, as evidenced by the much stronger position of Dynamic Asian economies in the US and Japanese markets than in the EU-15 market in which the European catching-up economies play a prominent role; (iii) there is evidence of intra-Asian specialization in that Asian economies other than China seem to remain prominent suppliers in parts and processed inputs and China in final goods supplies; and (iv) there is evidence in successful catching-up economies of a substantial increase in the quality upgrading within production networks which show substantial improvement in the skill content of parts and components purchased from medium- and low-income countries. Such ‘quality catching-up’ proceeds at a faster pace in industrial sectors which are more demanding from a technological (or ‘know-how’) point of view. These empirical regularities are consistent with the analytical priors relating to the implications of fast upgrading processes of catching-up economies for international patterns of specialization.

Appendix

Table 6.A.1 Classification of regional groupings

Country	*Code*	*Group*	*Country*	*Code*	*Group*
Australia	AUS	1HH	Lithuania	LTU	5MH
Austria	AUT	1HH	Poland	POL	5MH
Finland	FIN	1HH	Portugal	PRT	5MH
Great Britain	GBR	1HH	Romania	ROM	5MH
Italy	ITA	1HH	Singapore	SGP	5MH
Netherlands	NLD	1HH	Slovakia	SVK	5MH
Norway	NOR	1HH	Slovenia	SVN	5MH
Japan	JPN	2JPN	Spain	ESP	5MH
USA	USA	3USA	Taiwan	TWN	5MH
Bel./Lux.	BELU	4HL	Argentina	ARG	6ML
Belgium	BEL	4HL	Brazil	BRA	6ML
Canada	CAN	4HL	Colombia	COL	6ML
Denmark	DNK	4HL	Costa Rica	CRI	6ML
France	FRA	4HL	Greece	GRC	6ML
Germany	DEU	4HL	Israel	ISR	6ML
Germany, West	BRD	4HL	Mexico	MEX	6ML
Iceland	ISL	4HL	New Zealand	NZL	6ML
Luxembourg	LUX	4HL	South Africa	ZAF	6ML
Sweden	SWE	4HL	Uruguay	URY	6ML
Switzerland	CHE	4HL	Venezuela	VEN	6ML
Bulgaria	BGR	5MH	Bangladesh	BGD	7LH
Chile	CHL	5MH	India	IND	7LH
Croatia	HVR	5MH	Indonesia	IDN	7LH
Czech Republic	CZE	5MH	Malaysia	MYS	7LH
Estonia	EST	5MH	Mozambique	MOZ	7LH
Hong Kong	HKG	5MH	Pakistan	PAK	7LH
Hungary	HUN	5MH	Sri Lanka	LKA	7LH
Ireland	IRL	5MH	Thailand	THA	7LH
Korea	KOR	5MH	Tunisia	TUN	7LH
Latvia	LVA	5MH	Turkey	TUR	7LH

China	CHN	8China	Jordan	JOR	9LL
Algeria	DZA	9LL	Kenya	KEN	9LL
Côte d'Ivoire	CIV	9LL	Morocco	MAR	9LL
Cameroon	CMR	9LL	Nigeria	NGA	9LL
Egypt	EGY	9LL	Peru	PER	9LL
Ethiopia	ETH	9LL	Philippines	PHL	9LL
Ghana	GHA	9LL	Ukraine	UKR	9LL

Note: The classification is based on income levels (using GDP per capita at PPP for the year 1990). In the 6 country groupings HH, HL, MH, ML, LH and LL, the first letter stands for the income group and the second letter for the growth group.

Table 6.A.2 Classification of industries by skill types

NACE code	*Skill type*	*1999 High skill share*	*2005 High skill share*	
19	low	4.8	7.8	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
18	low	6.3	7.7	Manufacture of wearing apparel; dressing and dyeing of fur
17	low	6.9	8.1	Manufacture of textiles
20	low	7.5	8.4	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
37	low	8.1	10.0	Recycling
36	low	9.6	10.8	Manufacture of furniture; manufacturing n.e.c.
28	medium	10.1	11.7	Manufacture of fabricated metal products, except machinery and equipment
26	medium	10.3	11.8	Manufacture of other non-metallic mineral products
15	medium	11.1	12.2	Manufacture of food products and beverages
25	medium	11.4	13.4	Manufacture of rubber and plastic products
21	medium	12.6	15.0	Manufacture of pulp, paper and paper products
27	medium	13.0	13.4	Manufacture of basic metals
16	medium	15.4	24.9	Manufacture of tobacco products
34	high	16.0	19.5	Manufacture of motor vehicles, trailers and semi-trailers
29	high	18.2	20.6	Manufacture of machinery and equipment n.e.c.

(*Continued overleaf*)

Table 6.A.2 Continued

NACE code	*Skill type*	*1999 High skill share*	*2005 High skill share*	
31	high	20.8	19.8	Manufacture of electrical machinery and apparatus n.e.c.
22	high	21.7	26.7	Publishing, printing and reproduction of recorded media
35	high	24.9	24.9	Manufacture of other transport equipment
33	high	26.1	27.7	Manufacture of medical, precision and optical instruments, watches and clocks
24	high	27.8	33.4	Manufacture of chemicals and chemical products
32	high	27.8	29.8	Manufacture of radio, television and communication equipment and apparatus
23	high	30.5	32.2	Manufacture of coke, refined petroleum products and nuclear fuel
30	high	37.2	41.2	Manufacture of office machinery and computers

Notes: Industry 16 (Manufacture of tobacco products) shows a large increase in the share of high-skilled workers in a number of countries which might be explained by higher investments in R&D in marketing due to increasing regulations. Despite the large high-skill share in 2005, we decided to keep this industry in the medium group as the number in employment is rather low and thus the figures are somewhat unreliable. The initial position is more important for the analysis than the position in the last year and also to guarantee a broadly balanced distribution across industry types. For some of the analysis conducted in the section on outsourcing a more detailed decomposition of industries is employed which differentiates the group of high-skill intensive industries into a 'high-medium' group (comprising industries 29, 31, 34 and 35) and the rest which we call 'high-high'.

Table 6.A.3 Industry classification by technology content

NACE code	*Industry description*	*Technology group*	*Technology intensity*
15	Food products and beverages	1	low-tech
16	Tobacco products	1	low-tech
17	Textiles	1	low-tech
18	Wearing apparel; dressing and dyeing of fur	1	low-tech
19	Leather and footwear	1	low-tech
20	Wood and wood products	1	low-tech
21	Pulp, paper and paper products	1	low-tech
22	Publishing, printing and reproduction of recorded media	1	low-tech

23	Coke, refined petroleum products and nuclear fuel	2	medium-/low-tech
24	Chemicals and chemical products	3	medium-/high-tech
25	Rubber and plastic products	2	medium-/low-tech
26	Other non-metallic mineral products	2	medium-/low-tech
27	Basic metals	2	medium-/low-tech
28	Metal products	2	medium-/low-tech
29	Machinery and equipment n.e.c.	3	medium-/high-tech
30	Office machinery and computers	4	high-tech
31	Electrical machinery and apparatus n.e.c.	3	medium-/high-tech
32	Radio, television and communication equipment and apparatus	4	high-tech
33	Medical, precision and optical instruments, watches and clocks	4	high-tech
34	Motor vehicles	3	medium-/high-tech
35	Other transport equipment	3	medium-/high-tech
36	Furniture, manufacturing n.e.c.	1	low-tech
37	Recycling	1	low-tech

Note: The classification here has been obtained from information regarding R&D intensities of OECD industries using the STAN database. For details see Landesmann and Woerz (2006).

Table 6.A.4 Unit value ratios

In the calculation of relative unit values of traded products we use the COMEXT trade database at the most detailed 8-digit level. Denoting the value of exports to the EU of commodity i by country c in year t by v^c_{it} and the quantity (measured in tons) by x^c_{it}, the export unit value is defined as

$$u^c_{it} = v^c_{it} / x^c \qquad (1)$$

The unit values of country c's exports to the EU are then compared to the unit values of total EU imports (from the world, including intra-EU trade) by calculating the logs of the unit value ratios

$$r^c_{it} = \ln (u^c_{it} / u^{EU}_{it}) \qquad (2)$$

where u^{EU}_{it} denotes the unit value of total EU imports for a particular commodity i in year t. Taking the logarithm of (u^c_{it} / u^{EU}_{it}) ensures a symmetric aggregation across products for ratios larger and smaller than 1 (see below). In logs, the ratio is thus larger (smaller) than zero if the export unit value of country c is larger (smaller) than the unit value of total EU imports.

Unit value ratios at the 8-digit level were aggregated to the 3-digit level and further to to industry groupings by calculating weighted averages of across the products belonging to a particular industry j (or an industry group). The weight used is the share of its export value in the industry's exports of country c.

(*Continued overleaf*)

Table 6.A.4 Continued

Denoting the set of commodities i belonging to an aggregate j (industry or industry grouping) by $i \in I(j)$ the weights are calculated as,

$$w^c_{it} = v^c_{it} / \sum_{i \in I(j)} v^c_{it} \tag{3}$$

The unit value ratio for a particular aggregate j is then

$$r^c_{jt} = \sum_{i \in I(j)} r^c_{it} w^c_{it} \tag{4}$$

As the COMEXT trade data may contain errors at the detailed product level, we have – in our procedure of calculating unit value ratios – deleted very extreme levels of relative unit values. The criterion we used to classify an observation as an outlier was derived from the levels of the so-called ‘adjacent values’ in the distribution of the unit value ratios in the following way: The lower (upper) adjacent values are defined as the 25th (75th) percentile of the data minus (plus) 1.5 times the interquartile range (i.e. the range from the 25th to the 75th percentile). The lowest adjacent value in the data was found for Bulgaria in 1995 with about 2.5 ($\approx$ -ln 12) and the highest adjacent value for Slovenia in 1999 with about 1.75 ($\approx$ ln 5.75). In the calculations we dropped observations where $r^c_{jt} > \ln | 20 |$, i.e. at a value larger than the highest and lowest adjacent values in the sample. This means that observations where the ratio (u^c_{it} / u^{EU}_{it}) was higher than 20 or lower than 1/20 have been classified as outliers and removed from the sample. Using this criterion we think that extreme outlier values have been removed without biasing the data.

Notes

1 The catching-up economies in the South are the main driving force of this new era of global economic integration; hence the term ‘South–North integration’.
2 Excluding intra-advanced EU trade means that we exclude trade amongst the EU-15 minus Greece, Portugal and Spain.
3 We do not, however, exclude intra-Asian trade flows, which makes the analysis slightly inconsistent.
4 This refers to EU-North; that is, EU-15 minus Greece, Portugal and Spain (see note 2 above).
5 The distinction of industry groupings by ‘technology content’ and ‘skill content’ will be explained below.
6 In a detailed investigation of these industry classifications across country types (for selected H, M and L economies) we found the classifications to be reasonably robust. Nonetheless, country-specific differences are pertinent for a more detailed analysis of vertical forms of intra-industry trade, of ‘fragmentation’ phenomena and of outsourcing. Research in this direction requires non-OECD information on skills and technology content by country and this is difficult to obtain.
7 Figures based on technology-content classification are not reported for want of space. Their patterns are strikingly similar to those based on skill-content classification.
8 In the ‘technology content’ classification, office machinery and computing equipment has been separately identified as there are good arguments to believe that the degree of vertical differentiation and vertical intra-industry specialization within that industry is particularly strong. We shall return to this issue later in this paper where some information on vertical intra-industry positions will be presented.

9 The literature distinguishes between the two forms of product differentiation in international trade, i.e. horizontal and vertical intra-industry trade; for empirical studies see Aturupane *et al.*, 1999, Fontagne *et al.*, 2006, Hummels *et al.*, 2001, Yi, 2003; Schott 2001 and 2004.

Part 3

Foreign direct investment

7 Ownership biases and foreign direct investment in China

Yasheng Huang

The key theme of the seminal research began by Stephen Hymer (1976) is that foreign direct investment (FDI) is a conduit for transferring management know-how, technology, and much-needed market access to a host country, rather than a conduit for transferring financial resources.[1] The purpose of this chapter is to revisit this strand of the FDI literature in the context of China and ask why FDI happens and why it happens on such a large scale in China. A central hypothesis of this paper is that China's FDI inflows are largely, although not exclusively, a function of China's institutional landscape. That institutional landscape is best described as manifesting a political pecking order of firms in which the firms at the top of the pecking order are the least efficient, such as state-owned enterprises (SOEs), and the firms at the bottom of the pecking order are the most efficient, such as entrepreneurial, private-sector firms.[2]

In this institutional setting, FDI plays a critically important role in providing finance and ameliorating property rights insecurity to the most dynamic sector of the Chinese economy, private firms. FDI also contributes to the growth of the Chinese economy through its privatization of SOEs. This is the central idea behind the hypothesis that connects FDI inflows with ownership biases in the Chinese economy. We should explicitly separate the incidence of FDI from the effects of FDI in our discussion. The effects of FDI are efficiency-improving but the efficiency of FDI rests on its curative functions of existing distortions in the Chinese system. Here is the fundamental difference between the traditional conception of FDI and the ownership-bias view of FDI. The traditional view of FDI is that it is additive to economic growth through capital formation, technology and knowledge, providing market access, etc. The ownership-bias view of FDI is that FDI is remedial of fundamental distortions of an economy and its incidence is a function of distortions and inefficiencies rather than low domestic labor costs and market growth. Also this line of research is distinct from the research that seeks to ascertain the "spillover" and/or "crowding out" effect of FDI (Aitkin and Harrison 1999; De Backer and Sleuwaegen 2003).

This chapter is organized as follows. The first section presents some stylized facts about FDI in China. The second section presents some direct evidence of the ownership biases in the Chinese economy. The third section summarizes some of the research that connects ownership biases with FDI. The fourth section concludes with broad implications of this line of research.

FDI in China: some stylized facts

It is well known that China is one of the top destinations of FDI in the world. Annual inflow of FDI to China increased from about US$1.3 billion in the mid 1980s to over US$80billion by 2007 (Figure 7.1). During the period from 2000 to 2007 China accounted for 8 percent of total world FDI inflows and 20 percent of total FDI inflows to developing countries. It follows naturally that the large FDI inflows would have led to a substantial role of foreign-invested enterprises (FIEs) in the Chinese economy. FIEs have established an absolute dominance in China's high-tech export sectors, such as electronics and electrical goods, and overall FIEs now account for over 60 percent of China's total exports (see Chapter 2 in this volume).

Many attribute China's huge export success to FIEs and draw parallels between China's export performance on the one hand and the export performance of the East Asian tigers – such as Japan, Korea and Taiwan – a generation ago, on the other. But there are some substantial differences between China and the first-generation Asian tigers during the comparable periods of their economic development. As of the mid-1970s, FIEs in Taiwan accounted for only 20 percent of Taiwan's manufactured exports (Ranis

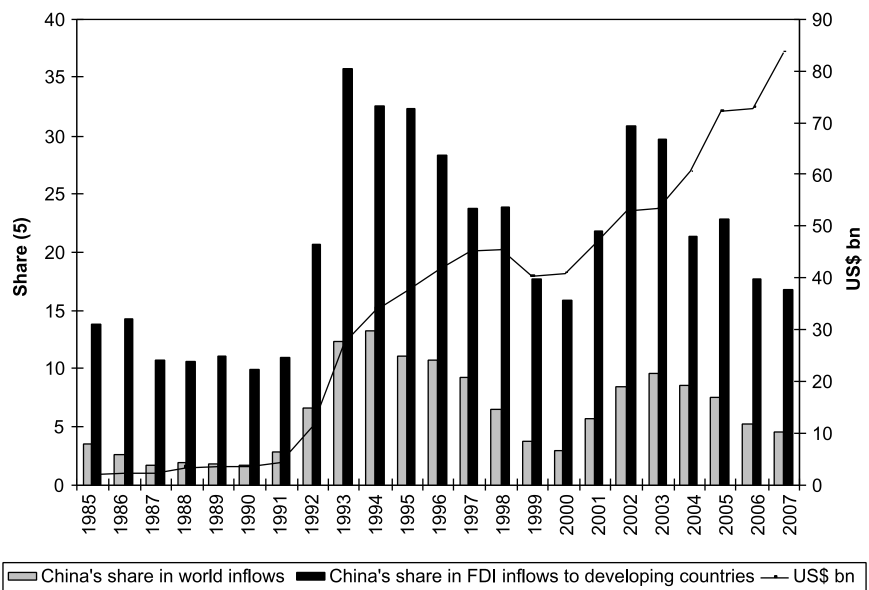


Figure 7.1 FDI in China, 1985–2007.

Source: Based on data compiled from UNCTAD, World Investment database.

and Schive 1985). In Korea, between 1974 and 1978, foreign firms accounted for 24.9 percent of manufactured exports (Naya and Ramstetter 1988). In contrast, FIEs account for more than 60 percent of China's manufactured exports.

This overall FDI dependency is also evident in traditional labor-intensive industries in which foreign technology is presumably not a key prerequisite for export success (Huang 2003b). For instance, in the 1990s FIEs accounted for 60.5 percent of garment and footwear exports in China, but only 5.7 percent in Taiwan in the 1970s. FIEs similarly dominated exports in leather and furniture in China to a far greater extent than they did in Taiwan. A very interesting peculiar Chinese pattern is that FIEs' export dominance is not because these firms are more export-oriented than Taiwanese FIEs *at the firm level*. In fact they are less export-oriented. On average, FIEs in China in 1995 exported 38.6 percent of their output, but FIEs in Taiwan in 1976 exported a much higher share, at 46 percent (Ranis and Schive 1985). Thus, FIEs in China, compared to their counterparts in Taiwan, exported a much larger share of output simply because of their sheer dominance in Chinese export production, not because of greater export orientation at the firm level. This distinction is critical. The export dominance of FIEs in China is the result of their substantial overall role in the Chinese economy rather than export efficiency at the firm level.

That said, it is important to note that China's FDI dependency resembles that of Southeast Asia rather than that of East Asia. Singapore, Malaysia, Thailand and Vietnam are also heavily reliant on FDI in their export production. In those economies, the export production of FIEs also accounted for around 50 to 70 percent of the total export production (Athukorala and Hill, Chapter 2 of this volume). But this comparison raises more questions rather than reaching more conclusions. One question, which is not explored here, is whether the Southeast Asian countries also have a functionally-similar ownership bias to that of China. For example, it is well known that the Singaporean government has historically favored MNCs at the expense of local, small and medium entrepreneurs. The New Economic Program of Malaysia was strongly biased against local ethnic Chinese businesses (Lim and Fong 1991). Thus, the mere fact that China exhibits a similar level of FDI dependency as some of the Southeast Asian countries is by no means to justify the inference that China's FDI patterns are economically "normal." It does raise the question whether Southeast Asia is also endowed with some of the similar distortions that have motivated this line of research on China.

The pervasive presence of FIEs

A universal pattern observed in the location of FIEs is the tendency to geographically cluster (locating close to each other) within countries. However, in China, the geographic distribution of FDI is extremely dispersed. FDI researchers postulate that FDI is highly concentrated in the coastal provinces to the neglect of China's hinterland provinces. Edward Graham and Erika

Wada, in a study on FDI in China, make the following observation: "[V]ast areas of China, including ones where much state-owned industry is located, have not been touched by FDI" (Graham and Wada 2001, p. 5). In recent years, the Chinese government has made FDI promotion a prominent component of its development strategy for the central and western provinces.

The data that are often cited to support the geographic concentration hypothesis are that Eastern China accounted for 84.5 percent of cumulative FDI between 1985 and 1991 and 87.3 percent between 1992 and 1998 (Gipouloux 2000). In interpreting these data, it is important to keep in mind that during the 1990s China attracted an enormous amount of FDI and thus a small portion of FDI going to the interior provinces is still a significant number. According to statistics provided in Gipouloux's study, the interior regions of China accounted for about 13 percent of cumulative FDI inflows between 1992 and 1998. During this period cumulative FDI flows into China as a whole amounted to $242.3 billion. This means that the interior regions of China received $31.5 billion in FDI.

The true puzzle is not why the poor, land-locked provinces do not receive much FDI, but why they attract any FDI at all. These areas of China are not expected to be competitive on the FDI front. Linguistic and cultural ties with the overseas Chinese economies are not strong and, to the extent that FDI is a "neighborhood affair," these regions of China are far away from all the major FDI suppliers. They are also quite small in terms of economic size and in terms of internal market potentials. But the fact is that even in some of the most remote provinces in China FDI accounts for a surprisingly high proportion of fixed asset investments.

The theory suggests that FDI is usually concentrated in industries characterized by oligopolistic dynamics. This is supported by strong empirical evidence. For example, a comprehensive survey on FDI issues finds that over 80 percent of foreign subsidiaries in Mexico and Brazil were in industries with four-firm concentration ratios exceeding 50 percent. Similar concentration patterns of foreign firms were found in Peru, Chile, Colombia, and Malaysia (Moran 1998). FDI in Central European countries exhibited a similar pattern. Foreign firms were found in only a few industries, such as autos, consumer products, and telecommunications. And the investing firms were familiar ones, such as ABB, Coca-Cola, and Procter & Gamble (Kogut 1996).

Chinese FDI patterns again differ notably. In order to avoid attributing a particular pattern of industry distribution of FDI to investor characteristics – such as those associated with Western MNCs vis-à-vis those associated with Asian MNCs – Huang (2003b) presented Hong Kong investments in four Asian economies, China, Taiwan, Malaysia, and Indonesia, to control for a supply perspective focusing on differences among investors. Except for in China, Hong Kong investments exhibit a similar degree of high industry concentration. In Indonesia, the top three manufacturing industries with the most Hong Kong investments accounted for 79.1 percent of total Hong Kong investments; in Malaysia, it was 75.3 percent; and in Taiwan, it was 86.4 percent. (While these data are from the 1970s, data from the 1990s show a similar pattern of sector concentration of Hong Kong FDI.) In China, the top three industries, electronics, plastic products, and textiles, only accounted for 46.7 percent of total Hong Kong FDI as of 1993. Among the 28 manufacturing industries, none received more than 10 percent of total FDI. The highest share was 9.6 percent in the electronics and telecommunications industry. The textile industry followed, at 8.9 percent.

Labor-intensive FDI

In a widely-used textbook on FDI, Richard Caves writes (2007, p. 31), "MNEs [multinational enterprises] are logically incompatible with the purely competitive organization of an industry." The reason is, as Caves observes, that "purely competitive industry has ample new local entrants to compete down the windfall profits in the foreign market."

One of the most interesting aspects of Chinese FDI inflows is how far the country has deviated from this theoretical postulation. FDI has been very large in China's labor-intensive industries. According to one estimate, about 50 percent of China's FDI inflows in the late 1990s went into labor-intensive manufacturing industries (Tseng and Zebregs 2002). While one can argue that the export dominance of FIEs is due to their control of access to Western markets, it should be noted that in a number of labor-intensive industries, the FIE shares of industry sales seem to be substantial as well. In 1995, FIEs accounted for 30.7 percent of sales in furniture manufacturing, 50.8 percent in garments, and 54.1 percent in leather and related products.

One of the reasons why FDI is so substantial in labor-intensive industries is the presence of many foreign small-to-medium-sized enterprises (SMEs) among foreign investors in China. The active role of foreign SMEs in China is revealed in a number of ways. One is the small size of the FDI projects. The other is that FDI projects tend to be small across the board; that is, the small size, at least in the mid-1990s, is not a function of the investors' ethnicity. Huang (2003b) has collected data that show that the individual size of FDI projects from Taiwan was substantially smaller than similar projects by Taiwanese firms in other economies.

Declining contractual alliances

One of the biggest puzzles in China's export production is why outsourcing declined at the same time as equity production arrangements gained dominance. While FIEs have played an instrumental role in China's successful export drive, it should be noted that they both have created exports and may have replaced exports previously produced by Chinese-owned firms. In the late 1980s, contractual alliances accounted for most of Chinese export production; by 1996, exports by processing and assembly operations fell to 16 percent of Chinese exports, while FIEs' share of exports increased to

33.8 percent (China General Administration of Customs 1996). In more recent years, contractual alliances have all but disappeared. This was mainly due to a massive conversion of contractual alliances between domestic and foreign firms into FIEs during the mid-1990s.

Efficiency does not explain this massive conversion. To the extent that there is any difference at an operating level, the difference actually favors export-processing and assembly operations over FIEs. Based on research on Guangdong province and data from the early 1990s, Sung et al. (1995) find no evidence of significant differences in technology and labor intensity between FIEs and export-processing operations. FIEs, in the opinion of the authors of this study, were "no better than processing operations in the transfer of management skills." In fact, processing operations might command an edge in efficiency because they operate in an extremely competitive environment and are more export-oriented (Sung et al. 1995).

Precisely because the operating differences between FIEs and contractual alliances are not substantial, it is all the more important to explore why equity capital inflows have risen while contractual capital inflows have experienced a dramatic decline. It is an analytical matter as well because most of the FDI studies begin with the question, "Why does a firm not rely on a contractual exchange when doing business abroad?"

A related development is the rising foreign equity controls of Chinese firms. Corporate control is a complicated concept but the simplest measure is the investor's share of the equity ownership. The higher the share, the more control the investor is said to have since equity ownership is usually an indicator of how decision-making power is apportioned among investors, through, for example, the number of board seats one can appoint. Since many FIEs in China are joint ventures (JVs), decision-making is shared among Chinese and foreign investors. The allocation of decision-making power is determined on the basis of their respective shares of equity ownership.

Foreign firms have established majority controls over FIEs in most industries. Data from the late 1990s suggest that at the two-digit industry level, in the majority of industries foreign equity controls exceeded 50 percent. Foreign equity control is only absent or small in those industries explicitly declared to be off-limits to FDI, such as the tobacco industry. A new development since 2004 is that many first-generation entrepreneurs surrendered controlling stakes to foreign strategic investors. A case in point is the selling in 2006 of the majority of its shares to Best Buy by one of the largest electronic retail chains in China. In an economy growing at a double-digit rate every year, Chinese entrepreneurs seem to have a strong desire to cash out, rather than building up their businesses for the long term.

Another characteristic is that foreign majority equity controls seem unrelated to some of the well-known features of these industries. Foreign majority controls span both labor-intensive industries, such as garments, footwear, and leather products, and capital-intensive industries, such as chemicals, machinery, and instrument manufacturing. This across-the-board foreign equity control contrasts with the Taiwanese pattern. In Taiwan foreign firms have dominant equity positions in certain industries, such as garments and footwear (71.8 percent), lumber and bamboo products (75.7 percent), and leather and fur products (79.6 percent). But in quite a number of industries, they are mere minority investors (such as nonmetallic minerals, chemicals, and the machinery industry) (Ranis and Schive 1985).

Ownership biases in China

This section of the chapter presents evidence that the Chinese system favors FIEs over indigenous private-sector firms. As a highly illustrative example, the constitutional protection of FIEs far exceeded that accorded to domestic private firms for many years. The Chinese state made a legislative commitment in 1979 not to nationalize or expropriate the assets of foreign investors without "due cause and compensation." This commitment was reinforced in 1982, as detailed in the next section.

A dualist legal system

China's legal system is explicitly dualist. Certain laws and regulations apply to foreign business activities and other laws and regulations apply only to domestic businesses. The dualist nature of the legal system even pertains to such basic issues as company incorporation, corporate governance, and contract and tax issues. The dualist nature of China's economic legislation is deeply rooted in the design and the approach of China's reform. As a design matter, China's reform has been primarily motivated to save, rather than dismantle, socialism. The separate legal regime designed for FIEs is simultaneously used to complement socialism as well as to insulate socialism from the full effects of FDI. China's reform approach matters as well. China has permitted and, over time, encouraged the emergence of non-state firms by crafting new rules and policies while maintaining old rules and policies on the incumbents.

On balance, the legal treatment of FIEs has been far superior to that accorded to domestic private firms, although inferior to that of SOEs. The most remarkable example concerns the constitutional treatment of FIEs and domestic private firms. China's Constitution, adopted in 1982, only six years after the Cultural Revolution, clarified and offered protection to the legal status of foreign enterprises operating in the country (Article 18).[3] Foreign enterprises were permitted "to invest in China and to enter into various forms of economic cooperation with Chinese enterprises and other Chinese economic organizations. . . ." Article 18 also swore to protect their "lawful rights and interests." While Article 12 prohibited "appropriation or damaging of state or collective property," no such commitment was made about the property rights of private enterprises. It was not until March 1999 that the Chinese Constitution acknowledged the private sector to be an integral part of the

Chinese economy. Only in 2007 did the Chinese state make a similar commitment to domestic private enterprises.

Tax treatments

Until the tax unification of 2006, FIEs were taxed at 15 percent corporate profit rate whereas domestic firms' rates ranged from 25 to 33 percent. It is not clear that the effective tax rates differ as much as the statutory tax rates because SOEs – and in recent years some large domestic private firms – received government subsidies. But it is safe to assume that tax treatments were different and tax burdens differed. In 2006, the Chinese government unified the corporate profit tax rates between FIEs and domestic firms but it is misleading to assume that tax treatments have been equalized as a result. The reason is that the tax base still differs. FIEs are allowed to have full deductibility on their wage bills whereas domestic firms are only allowed this to the extent of wage rates stipulated by the government. The government typically stipulates below-the-market wage rates in order to limit the tax deductibility of domestic firms. As SOEs are subject to soft budget constraints, this tax treatment again falls heavily on indigenous private-sector firms.

Another form of tax bias is that the government is more likely to initiate audits of domestic firms than FIEs. Due to the limitations of the data, we can only show this pattern descriptively. Huang (2003b) shows that in 1992, in a nationwide auditing campaign, twice as many domestic firms were audited by the General Auditing Agency than FIEs in terms of the percentage share of all their respective firm populations.

A further difference in tax treatment has to do with the levying of "tax and surcharges," which are defined in the Chinese statistical manual as the "tax on city maintenance and construction, consumption tax, resource tax and extra charges for education." These are essentially surcharges collected by government agencies outside the Ministry of Finance.

The combined incidence of consumption and resource taxes and extra fees was the lowest for FIEs compared to SOEs, collective firms and private firms: FIEs paid a mere 0.67 percent of their sales in the form of these surcharges whereas SOEs, collective firms and private firms paid 0.86 percent, 1.07 percent and 1.03 percent, respectively. Our finding here confirms a political pecking order of firms documented in Huang (2003), in which private firms in China got the worst tax and legislative treatment.

Perceptions of the business environment

However, one can argue that domestic private firms are more optimistic and therefore a higher level of tax and legislative burdens do not affect their business operations whereas the more risk-averse foreign firms need policy inducements to make investments in China. If the risk aversion differs in the way postulated above, domestic firms and FIEs may view their business environment similarly despite the well-documented statutory differences.

We will consider some perception data. The World Bank Business Environment Survey (WBES) conducted in 2000 by the World Bank (Batra et al. 2003) found that China's domestic private firms perceived business and labor regulations and taxes as having a relatively more constraining effect on their operations compared to FIEs (Table 7.1). FIEs were less satisfied with China's legal system than domestic firms, although domestic firms appear to have less confidence than foreign firms in China's judicial system. In terms of both access to financing and corruption FIEs rated the Chinese business environment much more favorably compared to domestic private firms.

Ownership biases and FDI

In the last six years since the publication of Huang (2003b), large-scale datasets have become available that enabled researchers to investigate the connections between ownership biases and FDI inflows empirically and systematically. The claim that FDI is a source of capital provision to domestic private firms – rather than a source of technology – has received substantial empirical support.

Huang and Wen (2007) present evidence that legal and financial constraints

Table 7.1 Average response scores given by foreign and domestic private firms on business environment in China, 2000

	Foreign firms	*Domestic private firms*
Business regulations: 1=no obstacle; 4=major obstacle	1.79	1.90
Labor regulations: 1=no obstacle; 4=major obstacle	1.62	1.70
General constraint-taxes and regulations: 1=no obstacle; 4=major obstacle	1.86	2.17
Confidence in judicial system today: 1=fully agree; 6=fully disagree	2.59	2.77
Quality of courts: 1=very good; 6=very bad	3.15	2.97
Changes in laws and regulations: 1=completely predictable; 6=completely unpredictable	3.37	3.15
Helpfulness of central government today: 1=very helpful; 5=very unhelpful	3.0	3.02
Helpfulness of local government today: 1=very helpful; 5=very unhelpful	2.76	2.62
General constraint—financing: 1=no obstacle; 4=major obstacle	2.93	3.48
General constraint—corruption: 1=no obstacle; 4=major obstacle	1.93	2.13

Source: Batra, Kaufmann, and Stone (2003) imposed on the domestic private-sector firms reduced the bargaining power of the owners of those firms when they negotiated with foreign investors over the equity control of their alliances. The data used are from the 1995 industry census. Based on provincial-level data, Havrylchyk and Poncet (2007) show that incoming foreign investments functioned as a "remedy" for the inherent weaknesses in Chinese financial and investment allocations. Their paper has an additional set of controls as compared with Huang and Wen (2007) but the findings are quite similar in that they show financial biases and inefficiencies of SOEs are actually correlated with more FDI inflows at the provincial level.

One paper (Huang et al. 2008) first constructs a comprehensive index of financing constraints, known as the Whited-Wu estimate, and explores the systematic variations between the Whited-Wu estimates and the likelihood of a private firm changing its legal status to that of an FIE. One unique aspect of this paper is the long-time series of the dataset, from 1998 to 2005, that enabled the researchers to impose a before-and-after treatment of the data. The paper finds that credit-constrained private-sector firms made more concessions on the equity structure as compared with those firms with access to finance. Credit constraints only have this effect on private-sector firms. SOEs are unaffected by credit constraints.

In the following paragraphs, I will present a detailed illustration of a study that connects ownership biases with FDI. The empirical findings are reproduced from the paper by Huang (2007). This paper compares two provinces, Jiangsu and Zhejiang. The reason for this comparison is that the pair comes closest to a natural experiment. The two are similar to each other in many aspects but differ in one critical detail important to the ownership bias view of FDI; ownership biases are far more substantial in Jiangsu than in Zhejiang. Consistent with our hypothesis, Jiangsu is far more dependent on FDI than Zhejiang in its economic development. In the following section we supplement this aggregate description with firm-level survey data.

An FDI tale of two provinces

Both Jiangsu and Zhejiang are China's export powerhouses and they are open to foreign trade to a similar degree. There are, however, two significant differences between the two regions. One is that the increase in Jiangsu's foreign trade/GDP ratio was driven by both exports and imports. In the case of Zhejiang, export growth was the main driver. The other difference is that export growth over the past decade was faster in Zhejiang (28 percent) compared with Jiangsu (9.3 percent), contradicting the conventional wisdom that export success requires FDI. In fact, one can argue that an FDI-induced export success is associated with smaller domestic value added. FIEs in Jiangsu are mainly engaged in import-intensive export processing operations whereas export-oriented firms in Zhejiang primarily source from local firms. Jiangsu, like the rest of China, also has a more dispersed distribution of FDI across different industries as compared with Zhejiang, as measured by the industry shares of fixed assets by FIEs or by the industry shares of equity of FIEs. These contrasts are shown in Table 7.2.

Ownership biases in Jiangsu and Zhejiang

The two provinces had similar private sector levels in the early 1980s. In 1980, the size of the domestic private sector – the non-state sector minus the collective firms, such as Township and Village Enterprises (TVEs) and FIEs – in the two provinces was virtually identical. In Jiangsu, domestic private firms accounted for 0.53 percent of total industrial output value, compared with Zhejiang's 0.57 percent. In the 1980s and 1990s, the domestic private sector grew much faster in Zhejiang. In 1995, domestic private firms generated 38.7 percent of Zhejiang's industrial output value, compared with 10.5 percent in Jiangsu. After 1995, the two provinces began to converge somewhat. By 2001 domestic private firms generated 69.3 percent of gross industrial output value in Zhejiang, compared with 44.7 percent in Jiangsu.[4]

This difference in private sector development was mainly due to the

Table 7.2 Various measures of FDI developments (%)

	Jiangsu	*Zhejiang*
FDI/fixed asset investment ratios		
–1985–89 annual average		
1) Of all firms	0.63	0.65
2) Of non-state sector firms[a]	1.27	1.25
3) Of domestic private firms[b]	2.16	2.19
–1990–95 annual average		
1) Of all firms	13.6	5.7
2) Of non-state sector firms[a]	21.4	10.5
3) Of domestic private firms[b]	93.9	31.8
Roles of FIEs		
–Industrial FIE shares of sales of all industrial firms		
1995	18.9	17.0
2001	28.3	18.6
–Industrial FIE shares of profits of all industrial firms		
1995	31.0	21.7
2001	37.8	19.8
–Gross profit margins of industrial FIEs[c]		
1995	4.4	3.9
2001	5.0	6.3
–Average foreign equity stake in 27 manufacturing industries, 1995	19.1	14.6

Notes:

a Non-state sector firms refer to collective firms, FIEs, and domestic private firms;

b The denominator does not include fixed asset investments made by FIEs;

c Gross profit margins refer to profits divided by sales revenue.

contrasting economic models of the two provinces. Jiangsu is known for its statist developmental model known as the Sunan model; Zhejiang is known for its laissez-faire model of development known as the Wenzhou model. In the Sunan model the government played a heavy sponsorship and operating role in enterprise management and supported collectively-owned TVEs rather than, or even to the detriment of, genuinely private firms. The model was widespread in much of southern Jiangsu, but three cities, Wuxi, Suzhou, and Changzhou, are considered to be the progenitors of this model. The other is the Wenzhou model, which is characterized by a heavy reliance on private initiatives, a non-interventionist government style in the management of firms, and a supportive credit policy stance toward private firms. Wenzhou, a city in southern Zhejiang province, is the best-known example of this model (hence the name of the model).

Government control of firms was far tighter in Jiangsu. By contrast, Wenzhou favored a far more laissez-faire policy stance and did not exercise this kind of micro-management. Until the mid-1990s, Jiangsu actively suppressed the development of private firms. The tight labor regulations reduced the availability of quality human capital to the private sector and the strict registration procedures prevented private entrepreneurs from falsely registering their firms as collective firms. This is a popular mechanism to evade the prohibitions on private firms and to acquire some rudimentary property rights security associated with the closer relationship with the state. Jiangsu wanted to conserve raw materials and energy and to protect TVEs as much as possible from competition for human and financial resources. Private enterprises "are tolerated, but their development has been constrained by limits on loans, restricted access to inputs, and environmental and other regulations" (Svejnar and Woo 1990, p. 80). As a result of this bias, the dominance of the more government-controlled TVEs was overwhelming in Wuxi.

The centerpiece of the Wenzhou model was an active informal credit market servicing the private enterprises, much of which was not sanctioned by the central government. Despite the dynamism of the private sector, "the state banking system was neither willing nor jurisdictionally able to meet the credit needs of the new generation of individual entrepreneurs" (Tsai 2002, pp. 122–23). In the 1980s, the thriving informal financing mechanisms included rotating credit associations (*hui*), money houses, and credit cooperatives. The Wenzhou government, rather than curtailing the informal credit facilities, tried to incorporate them into the formal financial sector. Its reasoning is particularly indicative of the economic liberalism of Wenzhou – informal finance should be made official to enhance regulatory supervision and to better meet the rising credit demand from the private sector (Tsai 2002, pp. 157–58).

There are differences in the formal financial sector as well. Banks in Zhejiang lent more to the private sector than banks in Jiangsu, although in both provinces the bulk of lending has always gone to the state sector. In Jiangsu province, the private sector received a smaller share of credit resources compared with the private sector in Zhejiang. During the period from 1990 to 1995, loans directly allocated to the private sector on average amounted to 4.3 percent of total loans in Jiangsu; the same figure for Zhejiang was 8 percent.[5] What is impressive about Zhejiang is that the direct credit allocation to the private sector was already substantial in the 1980s. On average, between 1985 and 1989, 6.9 percent of the loans went to the private sector, as compared with 1.7 percent in Jiangsu.

Ownership biases and FDI: an empirical analysis

The data used in the econometric analysis of this section came from a large-scale private-sector survey conducted in 2002. This was a nationwide survey, covering all the provinces in China, and the data enable a detailed comparison to be made between Jiangsu and Zhejiang.[6] Critically for our purposes, the survey includes questions about intentions or plans to form joint ventures with foreign firms. The responses to these questions will be the basis for the dependent variable in this paper.

The firms that have already formed joint ventures can be said to have the strongest FDI preferences and those firms that are forming or contemplating forming joint ventures have the next strongest FDI preferences. The firms that have not planned or have not thought about setting up joint ventures have the weakest FDI preferences. Thus, our first dependent variable, FDIPREF1, takes the value of 1 for firms that have not contemplated forming joint ventures, 2 for firms that are not planning to form joint ventures, 3 for firms that are planning to form joint ventures within three to five years, 4 for firms that are in the process of negotiating joint ventures, and 5 for firms that have already formed joint ventures. The second is a dummy variable (FDIPREF2), which takes the value of 1 if a firm has chosen 1), 2), or 3) in its answer to this question and takes on a value of 0 if it has chosen 4) or 5). In the 2002 survey, out of 706 valid observations, half of the firms have formed or are in the process of forming joint ventures with foreign firms.

The set of independent variables consists of a number of firm-level variables that either directly measure ownership biases or can be construed as measures of ownership biases. Our ownership bias variable is formulated on the basis of responses to Question 20a3 that asks the respondents to choose one principal reason for difficulties in obtaining bank loans. The choices are: 1) ownership discrimination, 2) collateral and guarantee conditions being too difficult, 3) financial disclosure requirements being too stringent, 4) strict credit rating requirements, 5) high interest rates, 6) maturity terms being too short, 7) insufficient credit amount, and 8) other reasons.

The variable – BANK_BIAS – is coded 1 if firms blamed difficulties in obtaining bank loans on an ownership bias and 0 otherwise. This is our primary ownership bias measure (BANK_BIAS). In the two-province sub-sample, 64 out of 614 firms with valid observations viewed bank discrimination as rooted in ownership considerations rather than in more technical considerations (such as collateral requirements).

Because much of the FDI literature focuses on why foreign firms invest abroad, rather than why domestic firms seek foreign capital, there is not much theoretical guidance about what are the relevant firm-level independent variables. Technology features prominently in FDI discussions so we conjecture here that a more technologically-intensive domestic firm may desire to form an alliance with a foreign firm as a way to access technology. The survey asks respondents whether or not they hold patents and we created a technology variable coded as 1 for firms with patents and 0 for firms without patents. There are also alternative measures of firm size in all the regressions. One measure is the employment size; the other measure is the sales value of the firms.

The model includes three dummy variables to control for region-level and industry-level attributes. There are three regional dummy variables, each representing development zones, urban/rural location, and the province. Industry dummies are based on a classification of firms into fifteen sectors: 1) agriculture and fishery, 2) mining, 3) manufacturing, 4) electricity and gas, 5) construction, 6) geology, 7) transport, 8) commerce, 9) finance, 10) real estate, 11) social services, 12) health and sports, 13) science and technology, 14) education and training, and 15) others. The majority of the firms are in the manufacturing sector (397 out of 733 firms in the two provinces). However, manufacturing firms were not further disaggregated by industry because this makes it difficult to control for a number of potentially relevant industry characteristics. Fortunately, due to the entry restrictions imposed on private firms in the 1990s, it is safe to assume that most private firms might have operated in relatively labor-intensive industries. Therefore, after the variables measuring patent holdings and firm size, the hope is that industry characteristics among the manufacturing private firms are not substantially different. Our default strategy is to include a manufacturing industry dummy, although we also experimented with regressions that include all fifteen industry dummies (minus the benchmarked one).

Summary indicators of the key variables are reported in Tables 7.3 and 7.4. The ordered probit regression results are reported in Table 7.5. The dependent variable, FDIPREF1, ranges from 1 (= having not thought about forming a JV) to 5 (= already having formed a JV). The five specifications in the table vary with the sample selection and types of other controls included in the regressions. Specifications 1, 2, 4, and 5 are based on the Jiangsu/Zhejiang sub-sample from the 2002 survey. Specification 3 is based on the entire national sample. Specifications 1, 2, and 4 include the 16 regional dummies (with Wuxi being the omitted category). Specification 5 includes only a Zhejiang dummy (= 1 and Jiangsu = 0). Specification 3 uses the whole national sample with 30 provincial dummies (Zhejiang is the omitted province). Specifications 1, 2, 3, and 5 include one dummy for the manufacturing industry, whereas specification 4 includes 14 industry dummies (out

Table 7.3 Descriptive statistics of major variables[a]

Variable	*Definition*	*Mean*	*Std dev.*	*Min.*	*Max.*	*Obs*
2002 private sector survey						
FDIPREF1	5 discrete values from 1 (=have not thought about forming a JV) to 5 (=already formed a JV)	2.40	1.4	1	5	706
FDIPREF2	1 if the firm has formed a JV, is forming, or is in the process. 0 if not in the process or no such a plan.			0	1 (353)	706
Bank bias (BANK_BIAS)	1 if credit discrimination viewed as ownership-related and 0 for bank discrimination on technical grounds.			0	1 (64)	614
Employment	Employment in persons in 2001.	159	293	1	3000	726
Sales	Values of sales in 2001 (in 10,000 yuan)	2770	7172	2	77000	697
Patent dummy	1 for firms with patent holdings and 0 otherwise.			0	1 (106)	694

Note:
a Observations with missing values are excluded.

of a total of 15 industries). All the regressions include a period dummy denoting those firms created since 1991, a size variable (log employment), a technological variable (a dummy for those firms holding patents), and two locational variables (whether located in a development zone or in the countryside, with the omitted category being the city variable).

The results suggest that larger firms, as measured by employment, have stronger FDI preferences, as do technologically sophisticated firms. These findings are consistent with well-established findings in the FDI literature. The estimated coefficients of the locational variables are consistent with what one might have expected. Firms located in development zones – which are set up specifically to attract FDI – have stronger FDI preferences than firms located outside development zones. Firms located in rural areas, which may not enjoy the same level of contacts with foreign firms as firms located in cities, have weaker FDI preferences.

The variable of interest is the ownership bias measure, BANK_BIAS. In all five specifications, the coefficient of this variable is consistently positive and consistently statistically significant. In alternative model specifications for the

Table 7.4 FDI preferences and ownership bias: ordered probit estimates (2002 survey)

Dependent variable:	*FDIPREF1 (=1 if having not thought about forming JV; 2=no plan to form JV; =3 if planning to form JV in 3–5 years; =4 if already in the process of forming JV, and =5 if already formed JV)*				
Specification:	1	2	3	4	5
Explanation:	Baseline	Excluding firms with JVs already	National sample	Industry dummy variables	Zhejiang dummy
Ownership bias:					
Bank bias (BANK_BIAS)	0.398*** (0.155)	0.424*** (0.17)	0.099* (0.05)	0.438*** (0.158)	0.365** (0.151)
Firm attributes:					
Log employment	0.227*** (0.04)	0.143*** (0.04)	0.024*** (0.018)	0.219*** (0.14)	0.245*** (0.039)
Patent dummy	0.296** (0.138)	0.329** (0.15)	0.48*** (0.059)	0.284** (0.14)	0.255** (0.133)
Location:					
Development zone	0.231 (0.197)	0.405** (0.22)	0.161* (0.09)	0.151 (0.20)	0.38** (0.19)
Countryside	–0.304*** (0.117)	–0.347*** (0.126)	–0.189*** (0.05)	–0.369*** (0.119)	–0.22** (0.11)
Other controls:					
Provincial dummies			Yes		Zhejiang=1 Jiangus=0
Regional dummies	Yes	Yes	Yes	Yes	
Manufacturing dummy	Yes	Yes	Yes	Yes	
Industry dummies				Yes	Yes
Period dummy (since 1991)	Yes	Yes	Yes	Yes	Yes
Observations	572	511	2625	572	572

Note: Standard errors are in brackets. *: 0.10, **: 0.5 and ***: 0.01.

two-province sub-sample, the coefficient of this variables ranges from 0.36 to 0.44, while attaining statistical significance at the 5 percent level or better. This means, all else being equal, those domestic private firms that viewed bank discrimination as rooted in ownership considerations were more likely to form JVs with foreign firms than those firms that viewed bank discrimination as rooted in technical considerations (such as high collateral requirements). This finding holds for both the two-province sub-sample as well as for the national sample as a whole (specification 3) and it is robust to a variety of province, city, and industry controls.

Before we conclude that an ownership bias seems to correlate positively with FDI preferences, let us consider a number of complications. One is the possibility that BANK_BIAS is endogenous of foreign ownership rather than the other way around, as postulated by the ownership-bias hypothesis. Economists and social scientists in general often assume that governments

Table 7.5 FDI preferences and ownership bias: alternative independent and dependent variables (2002 survey)

Dependent variable:	*Ordered probit: FDIPREF1 (=1 if having not thought about forming JV; 2=no plan to form JV; =3 if planning to form JV in 3–5 years; =4 if already in the process of forming JV, and =5 if already formed JV)*				*Probit: FDIPREF2 (=1 if planning to form JV in 3–5 years or already in the process of forming JV or already formed JV; =0 if no plan to form JV or having not thought about forming JV)*	
Specification:	1	2	3	4	5	6
Explanation:	Size measured by sales	Technology measured by technicians/employment ratio	Without firm-level controls	Additional firm-level controls	Binary dependent variable	Excluding firms with JVs already
Ownership bias:						
Bank bias (BANKBIAS)	0.394*** (0.16)	0.366** (0.173)	0.36** (0.152)	0.422*** (0.168)	0.504*** (0.19)	0.527*** (0.19)
Firm attributes:						
Log sales	0.128*** (0.032)					
Log employment		0.21*** (0.045)		0.205*** (0.048)	0.182*** (0.048)	0.133*** (0.052)
Patent dummy	0.392*** (0.139)			0.339** (0.144)	0.469** (0.172)	0.458** (0.18)
Technicians/employment ratio		0.262 (0.416)				
New investments in 2001				0.000 (0.000)		
The amount of capital needed to expand production				0.000 (0.000)		
Location:						
Development zone	0.283 (0.19)	0.197 (0.20)	0.217 (0.189)	0.164 (0.27)	0.547** (0.27)	0.654** (0.28)
Countryside	–0.26** (0.119)	–0.308** (0.126)	–0.315*** (0.11)	–0.277** (0.129)	–0.32** (0.14)	–0.299** (0.15)
Other controls:						
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes
Manufacturing dummy	Yes	Yes	Yes	Yes	Yes	Yes
Period dummy (since 1991)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	551	493	594	489	571	510

Note: Standard errors are in brackets. *: 0.10, **: 0.5 and ***: 0.01.

discriminate against foreign firms and protect domestic firms. This is known as the "national preference" view of the world.[7] Following the national preference view, for example, one may argue that Chinese banks discriminate against those private firms with partially foreign-owned assets in favor of those private firms without such assets.

On *ex ante* grounds, this scenario is unlikely. As early as 1986, the State Council decreed that banks would treat FIEs as favorably as SOEs; a level of treatment domestic private firms did not receive until probably 2002 or 2003. Nevertheless, this endogeneity concern can be addressed empirically. Specification 2 excludes those private firms that have already formed JVs with foreign firms. The dependent variable then denotes pure FDI preferences, ranking firms in the process or planning to form JVs vis-à-vis firms with no intention of forming JVs. BANK_BIAS remains positive and statistically significant. In fact, one can go a step further, by dropping those firms in the process of forming JVs as well. The remaining firms are those with plans to form JVs within three to five years, those without such plans, and those that have not considered this option at all. This procedure produces a BANK_BIAS coefficient of 0.415 at a 5 percent significance level. (This result is not reported in the table.)

The second concern is that there may be an interaction effect between BANK_BIAS and the firm-level attributes. For example, it is reasonable to conjecture that only firms that enjoy ownership security can grow to be large and can have the resources to invest in R&D. Thus the reported BANK_BIAS results may simply reflect this effect. To investigate this possibility, specifications 1, 2, and 3 were re-estimated with alternative measures of firm controls or omit the firm-level attributes altogether (Table 7.5).

Under specification 1, the size of a firm is measured by the sales value, rather than the size of employment. Under specification 2, the technological sophistication of a firm is measured by the ratio of technicians to total employment. Specification 3 omits all the firm-level controls. BANK_BIAS remains positive and statistically significant throughout. Specifications 5 and 6 provide additional checks on our findings. The dependent variable is now a binary measure, with those firms planning to form, in the process of forming, or having already formed JVs being coded 1 or 0 otherwise (FDIPREF2). Specification 6 omits those firms that have already formed JVs in order to denote more sharply the idea of "preference." BANK_BIAS is positive and is statistically significant at 1 percent in both specifications.

Specification 4 adds two additional firm-level controls – the amount of fixed asset investments made in 2001 and the estimated capital requirements to further expand production.[8] BANK_BIAS remains positive and statistically significant at 1 percent. This procedure can address another potential concern. Because our ownership bias measure here is a measure of bank policies, there is a question about how to interpret BANK_BIAS. For example, one can argue that BANK_BIAS reflects the difficulties in obtaining bank loans and thus the FDI preferences can correlate with a desire to obtain capital from foreign firms. Although this interpretation does not invalidate the general argument that a policy bias against private firms increases FDI preferences, it points to financial, as opposed to property rights, motivations.

To address this concern, it is important to emphasize that those domestic private firms on the 1/0 values of BANK_BIAS do not necessarily differ in terms of the degree of credit constraints. The question is about how to interpret difficulties in obtaining credit, not whether or not there are credit constraints. Both types of firms believe that obtaining bank loans is difficult, but those private firms that seem to have stronger FDI preferences interpret the difficulties in ownership terms. This is a cleaner test of the effect of the ownership bias on FDI preferences as it allows us to separate the purely financial motivations of obtaining capital from foreign firms via FDI and the legal motivations of obtaining a *foreign status* from foreign firms via FDI. As shown in specification 4, the coefficient of BANK_BIAS is not sensitive to the inclusion of variables that denote some explicit measures of financial motivations – such as estimated capital requirements for production expansion.

One last concern relates to that of an omitted variable. The 2002 survey did not ask respondents whether or not they export. This may bias our finding in the following way. It is often postulated that exporting firms desire FDI because FDI can provide overseas marketing channels. But this positive correlation between exports and FDI can affect the ownership bias. A number of economists have postulated that the Chinese government discriminates against private firms because it does not have the administrative and technical capabilities to monitor private firms (in comparison with the SOEs) (Bai et al. 1999). Exporting private firms are most difficult to monitor because they can keep their revenues abroad. Bank discrimination arises via this mechanism. This concern can only be addressed in the future with better data.

Conclusion

The main idea behind the ownership-bias hypothesis is that institutional distortions in the Chinese economy may have driven up FDI inflows into China. There are a number of specific mechanisms. One is that these distortions reduce the bargaining power of the biased firms and this dynamic may have reduced the valuation of the private-sector firms seeking to establish joint ventures, thus increasing foreign control. The other mechanism operates on the demand side – biased firms may have an incentive to seek FDI as FDI is a source of financing and of some legal security.

The claim here is that these dynamics are broadly and descriptively consistent with a number of prominent characteristics of China’s FDI inflows, such as the high volume of FDI inflows, pervasive presence of FIEs, and the presence of FDI in labor-intensive industries. This line of research linking ownership biases with FDI inflows entails substantial policy implications.

One implication of our findings is that FDI is an offset to institutional distortions and as such FDI is ameliorative rather than additive to economic growth. This view of FDI contradicts a common view that FDI is a boost to growth up to and beyond the natural rate of growth. If FDI is a remedy, rather than a reward as shown by Havrylchyk and Poncet (2007), then FDI merely restores the growth to the natural rate of growth.

The comparative case study of Jiangsu and Zhejiang suggests that less FDI is actually associated with faster growth. By the criterion of FDI, Jiangsu province has been a huge success story. In absolute terms, Jiangsu ranks as the second largest provincial recipient of FDI (after Guangdong province). In 2002, Jiangsu received \$10.2 billion in FDI, which accounted for nearly one-fifth of the total FDI inflows into China. In contrast, the FDI inflows into Zhejiang amounted to only \$3.1 billion in the same year. The less-than-stellar FDI inflows into Zhejiang prompted several research organizations, including the World Bank, to give a low score to cities in Zhejiang in terms of international integration. However, Zhejiang has consistently outperformed Jiangsu with respect to economic growth. In 1980, Jiangsu already had the second largest GDP in the country (after Sichuan) and it produced almost twice as much as Zhejiang did. In per capita income terms, Jiangsu occupied exactly the same position in 1980 as it did in 2003 – number three in the country (excluding Beijing, Shanghai, and Tianjin, which do not have an agricultural sector). In contrast, Zhejiang ranked seventh in the country in 1980 but it ranked first by 2003 (again excluding Beijing, Shanghai, and Tianjin). In 1978, Zhejiang was substantially poorer than Jiangsu; today it is richer.

The findings from this chapter suggest, at the very least, that there are many complex issues related to FDI research. While far more research is warranted to look deeply into the questions of FDI in China, available evidence suggests that at least there is room for debate on both the drivers and the effects of FDI inflows.

Notes

1 The general social science research on FDI is substantial. For a summary of the literature, see Caves (2007).
2 This hypothesis, proposed in Huang (2003b), has recently been verified by a paper using a database of over 1.5 million industrial firms in China. See Huang, Ma et al. (2008).
3 For an extensive analysis, see Gelatt (1983).
4 Since the late 1990s, there has been some convergence of the two models – in the direction of the Zhejiang model. It is beyond the scope of this chapter to delve into this issue. But one hypothesis is that by the late 1990s private sector development became a more acceptable policy goal of the government. And Jiangsu simply followed the national trend. Thus it is not so much that Jiangsu began to converge with Zhejiang but that the rest of China began to converge with Zhejiang in the late 1990s. For a detailed study of privatization activities, see Garnaut et al. (2005).
5 The source of the data is China State Statistical Bureau (1996).

6 The survey was conducted by the Department of the United Front and the All-China Federation of Industry and Commerce, the organization that represents the private sector. The detailed description of the 2002 survey is contained in the dataset available from the University Service Centre of the Chinese University in Hong Kong.

7 In FDI research, there is a long and venerable view that host governments discriminate against foreign firms in order to protect domestic firms. The term "national preference" belongs to Caves (2007).

8 We also include additional firm-level controls such as company debt, whether or not the firm was privatized from an SOE, and a measure of insider controls. The insider controls dummy was based on responses to Question 17d: "For the sake of the stable development of your firm, I or my relatives must manage the firm": those who agree with this statement are coded 1 and 0 otherwise.

8 Trade, foreign direct investment and industrial transformation in India

Kunal Sen

In the middle of the 1970s, the foreign trade and investment policy regime in India was one of the most restrictive in the world (Bhagwati 1993, Bhagwati and Desai 1970). The objectives of the policy regime with respect to the manufacturing sector were to channelize investments in 'socially desirable directions', consistent with the Five Year Plans of the Government of India, and to build up a self-reliant and diversified industrial base (Bhagwati and Srinivasan 1975). It is widely recognized that the policy regime was a key contributing factor to the industrial stagnation observed in the Indian economy, especially from 1966 to 1980, though the policies towards self-reliance led a diversified industrial base (Ahluwalia 1991, Mookherjee 1995). A process of gradual reform was initiated in the late 1970s and quickened in pace in the 1980s, culminating in 1991 in a radical set of reforms that dismantled much of the import licensing system and removed most restrictions on foreign direct investment (FDI).

In this chapter, we assess the impact of the reforms on foreign trade and inward FDI in India, focusing specifically on the manufacturing sector. We also examine the implications of the trade reforms for productivity and employment growth in Indian manufacturing. We then examine characteristics of inward FDI in post-reform India, and discuss the possible effects of FDI on market structure, exports, technological development and productivity in Indian industry.[1] We find that while the reforms relating to trade and foreign direct investment have had a positive effect on economic performance in the industrial sector, the effects of trade and FDI on employment creation have been disappointing, in spite of India's innate comparative advantage in labour-intensive manufacturing activities.

The rest of the chapter is in six sections. In the next section, we briefly describe the changes in the policy regime with respect to trade and FDI in India. In the third section, we describe the evolution of the Indian manufacturing sector, examining the trends and patterns in employment, wages, and output. Section 4 provides the salient features of trade flows and FDI inflows to India. In Section 5, we analyse the effects of the trade reforms on productivity and employment in the Indian manufacturing sector. In Section 6, we discuss the possible effects of FDI on industrial development in

India, as we have found in the literature and in our own estimates. Section 7 concludes with a discussion of the underlying causes of the puzzling outcome of Indian reforms – the phenomenon of 'jobless growth' in Indian industry.

Trade and foreign direct investment policy regime

Trade policy: an overview

The import and exchange rate regime that Indian policy-makers followed after independence was aimed at comprehensive, direct control over foreign exchange utilization, with an overwhelming reliance on quotas rather than tariffs (Bhagwati and Srinivasan 1975). Import licences allocated reflected two major criteria: (1) the principle of 'essentiality'; and (2) the principle of 'indigenous non-availability'. Thus, imports, in terms of both magnitude and composition, were to be permitted only if the firm in question certified to the government that they were 'essential' (as inputs or equipment for production). At the same time, the government had to clear the imports from the viewpoint of indigenous availability: if it could be shown that there was domestic production of the imports demanded, then the imports were not permitted (regardless of cost and quality considerations). Nearly all imports were subject to discretionary import licensing or were 'canalized' by government monopoly trading organizations. The only exceptions were commodities listed in the Open General License (OGL) category. Capital goods were divided into a restricted category and the OGL category. While import licences were required for restricted capital goods, those in the OGL category could be imported without a licence subject to several conditions. Intermediate goods were also classified into banned, restricted and limited permissible categories plus an OGL category. As these names suggest, the first three lists were in order of import licensing stringency. OGL imports of intermediate goods were also governed by the 'actual user' condition. The import of consumer goods was, however, banned (except those which were considered 'essential' and could only be imported by the designated government canalizing agencies).

Beginning with the export-import policy of 1977–78, there was a slow but sustained relaxation of import controls. Several capital goods that were not allowed to be imported without an import licence were steadily shifted to the OGL category. The number of capital goods on the OGL list increased from 79 in 1976 to 1,170 in April 1988. During the 1980s the import licensing of capital goods in the restricted list was administered with less stringency (Agarwal *et al.* 1995). In the case of intermediate goods too, there was a steady shift of items from the restricted and limited permissible categories to the OGL category. However, in practice a capital or an intermediate good was placed in the OGL list only if it was not being domestically produced. Thus, import liberalization during this period may have led to some degree of competition to established producers of intermediate and capital goods in India (though in several instances, the goods that were allowed to be imported were imperfect substitutes of domestically produced goods).

The pace of the trade reforms – in particular, the shift from quantitative import controls to a protective system based on tariffs – initiated in the mid-seventies was considerably quickened by the new government of Rajiv Gandhi that came into power in November 1985. Restrictions on the import of capital goods were further eased to encourage technological modernization. Also, beginning in the mid-eighties, there was a renewed emphasis by the new administration on export promotion. The number and value of incentives offered to exporters were increased and their administration streamlined. The allotment of REP licences – tradable import entitlements awarded to exporters on a product-specific basis – became increasingly generous (Agarwal *et al.* 1995). Finally, the duty exemption scheme for imported inputs was extended to cover all imported inputs for both direct and indirect exporters.

In 1991, as a part of the comprehensive economic reform programme initiated that year, there was a significant liberalization of the trade regime with respect to capital goods. Import licensing was virtually abolished with respect to the imports of most machinery and equipment and manufactured intermediate goods (Ahluwalia 1999). There was also a significant cut in tariff rates, with the peak tariff rate reduced from 300 per cent to 150 per cent and the peak duty on capital goods cut to 80 per cent.[2] Import-weighted custom duty rates fell from an average of 97 per cent in 1990–91 to 29 per cent in 1995–96. There was, however, little change in trade policy with respect to consumer goods which remained in the 'negative' (banned) list.

The radical reforms of the trade regime in 1991 coincided with an equally significant set of reforms in industrial policy. Prior to 1991, there was a system of industrial licensing of private industry in place which governed almost all aspects of firm behaviour in the industrial sector, controlling not only entry into an industry and expansion of capacity, but also technology, output mix, capacity location and import content. In 1991, previous piecemeal efforts towards liberalization of controls were consolidated in a comprehensive wave of domestic deregulation. Industrial licensing was abolished altogether, except for a list of environmentally sensitive industries. Along with this was the removal of restrictions on large business groups to merge or expand, and the opening up of several industries to the private sector, which had been previously reserved for the public sector (Ganesh-Kumar, Sen and Vaidya 2003).

Trends in measures of trade restrictiveness

Figure 8.1 depicts estimates of effective rates of protection (ERP) in Indian manufacturing during the period from 1980 to 1999 for the three major sectors – capital goods, intermediate goods and consumer goods. The most protected sector in the beginning of the 1980s was the intermediate goods

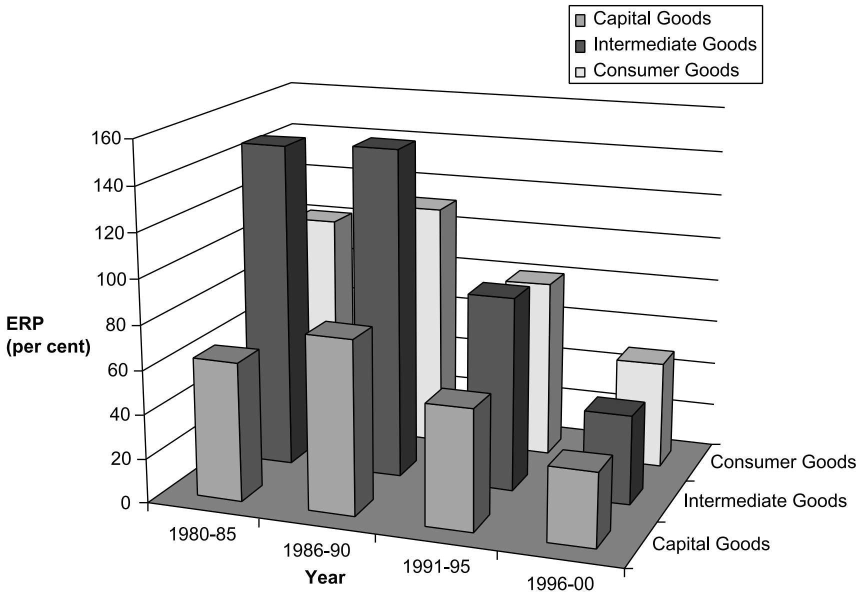


Figure 8.1 Effective rates of protection (ERP) by sector, India.

Source: Das (2003)

sector, where the average ERP was 147 per cent. The ERPs for the capital goods and consumer goods sectors for the same period were 63 and 102 per cent respectively. There was little change in ERPs in the 1980s, as the gradual relaxation of import licensing over this decade coincided in most instances with an increase in tariffs. However, since the 1991 trade reforms, there has been a clear decrease in ERPs across all three sectors. In fact, by the end of the 1990s, the average ERP for the intermediate goods sector at 40 per cent was actually less than the average ERP for the consumer goods sector at 48 per cent. However, the least protected sector in the late 1990s was the capital goods sector with an average ERP at 33 per cent.

These ERP estimates, which cover only the protective effect of tariffs, potentially understate the degree of protection in Indian industry given the extensive use of non-tariff barriers in Indian trade policy. A more accurate measure of the restrictiveness of trade policy in this case is the import coverage ratio (ICR), which is the share of imports subject to non-tariff barriers. We find that the use of ICRs as a measure of the restrictiveness of trade policy suggests that all the three sectors were equally protected by the use of non-tariff barriers to trade (NTBs) in the early 1980s, and that NTBs covered almost all manufacturing goods. The average ICR by sector was at 95 per cent or more in 1980–5 (Figure 8.2). However, by the late 1990s, the most spectacular decline in NTBs was in the capital goods sector, where the ICR fell to

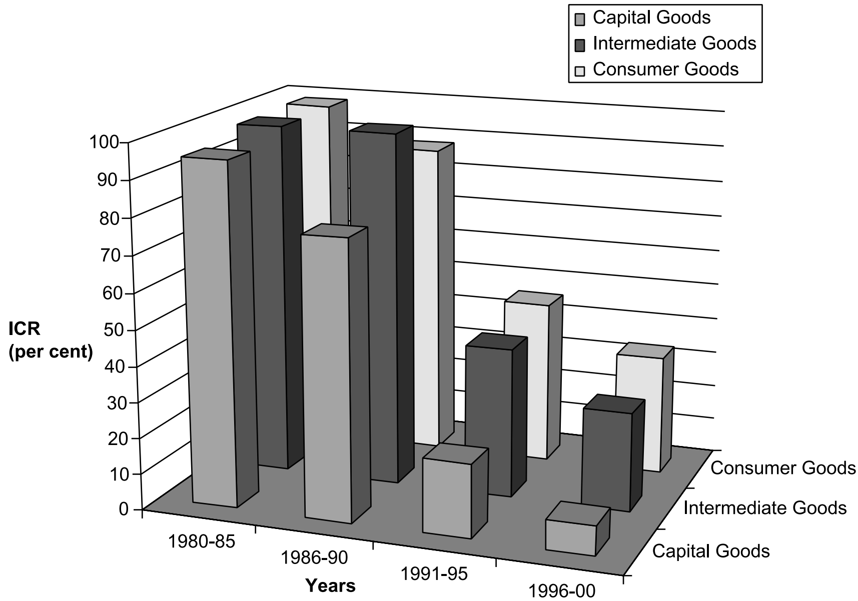


Figure 8.2 Import coverage ratios (ICR) by sector, India.

Source: Das (2003)

8 per cent. The ICRs in the case of intermediate goods and consumer goods sectors were 28 and 33 per cent in 1996–99 respectively.

The policy regime with respect to FDI

The Indian policy regime with respect to foreign direct investment was fairly liberal till the mid 1960s. In the late 1960s, the industrial policy regime became increasingly restrictive with the enactment of the Monopolies and Restrictive Trade Practices (MRTP) Act in 1969. The MRTP Act stipulated that all firms with a capital base of over 20 million rupees were to be classified as MRTP firms and were permitted to enter only selected industries and even then only on a case-by-case basis. In addition to industrial licensing, all investment proposals by these firms required separate approvals from the Department of Company Affairs. Amidst increasing concerns about the foreign exchange costs of repatriated profits, the government introduced a new clause in the Foreign Exchange Regulation Act (FERA) in 1973 that required firms to dilute their foreign equity holdings to 40 per cent if they wanted to be treated as Indian companies (Athreye and Kapur 2001). The FERA provided the regulatory framework for commercial and manufacturing activities of branches of foreign companies in India and Indian joint-stock companies with a foreign equity holding of over 40 per cent. The Act specified a list of industries where such firms would be allowed to operate and all new investments and substantial expansions required separate approval from the Department of Company Affairs. In addition to restrictions on foreign investment, there were new restrictions on technology imports, with technology acquisition allowed mostly through licensing rather than through financial collaboration (*ibid.*).

In line with the incremental reforms that occurred with respect to the trade regime in the 1980s, there was an attempt to liberalize the regulatory regime with respect to FDI in the same period. In order to boost manufacturing exports, firms which produced primarily for the export markets were granted exemptions from the standard FERA restrictions on foreign equity ownership. Along with a more liberal regime with respect to capital goods imports, restrictions on technology transfers and royalty payments were somewhat relaxed in an attempt to modernize the manufacturing sector, which was seen to have become stagnant and technologically obsolescent by the early 1980s.

More radical reforms had to wait till 1991, when the Indian government significantly liberalized the policy regime with respect to FDI, which was allowed in sectors (such as infrastructure and services) where previously it had been excluded. The limit on foreign equity participation was raised to 51 per cent in most of these sectors, and FDI proposals were automatically approved in many of these sectors. For most manufacturing industries, 100 per cent fully foreign owned firms were allowed (Kumar 2005). The restriction on FDI that it had to provide specific benefits in terms of technology transfer and exports was also removed.

Growth and transformation in Indian industry

In this section, we describe the evolution of the Indian manufacturing sector from the mid 1970s onwards to the late 1990s.[3] We begin with an overview of India's economic growth and the contribution of the manufacturing sector to it. We then examine the behaviour of employment, wages and output in the Indian manufacturing sector.

The contribution of manufacturing to India's economic growth

In the 1980s and 1990s, the Indian economy grew at a rate of 5.8 per cent per annum, considerably higher than the rate of economic growth that was witnessed in the previous decades.[4] Much of the higher economic growth of the 1980s was primarily due to the manufacturing sector, which was the fastest growing sector in the 1980s (Sen 2008a). The high growth of the manufacturing sector was predominantly due to the registered manufacturing sector. In contrast, unregistered manufacturing's share in total output remained more or less constant during the 1980s and 1990s. Beginning in the mid-1980s, trade, hotels and restaurants along with financial services also became an important source of growth, and in the late 1990s, the infrastructural sector also grew rapidly.

Employment and wages

The behaviour of overall manufacturing employment is shown in Figure 8.3. After a period of increase in the second half of the 1970s, there was stagnation in employment levels in the first half of the 1980s. From the second half of the 1980s, there has been a steady increase in employment, with the level of employment in 1999 standing at 9.1 million (as compared to 5.8 million in 1975). Employment growth has been particularly strong in 1991–95, at an annual average rate of growth of 4.2 per cent (Table 8.1). However, the pattern of employment in Indian manufacturing has been such that more workers are employed in the capital intensive industries over time (Sen 2008a).

Aggregate real wages have increased steadily since the early 1980s, with a 66 per cent increase in the period from 1975 to 1999 (Figure 8.4). However, the strongest growth in real wages occurred in the second half of the 1970s and the first half of the 1980s, when the annual rates of growth of real wages were 3.5 and 3.7 per cent respectively (Table 8.1).

After a period of stagnation in the 1970s, labour productivity has increased at a rapid rate since the early 1980s (Figure 8.5). Labour productivity growth was the strongest in the period 1986–95, increasing at an annual rate of 7 per cent in this period (Table 8.1). The rapid increase in labour productivity which has outpaced real wage growth has meant that unit labour cost has fallen steadily since the early 1980s, significantly improving the international competitiveness of Indian manufacturing (Figure 8.6). Consequently, India's manufacturing exports as a share of world manufacturing exports

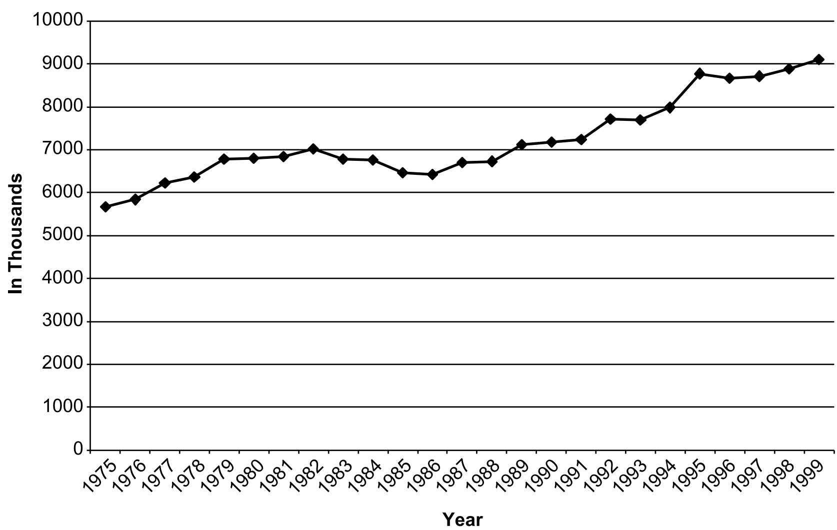


Figure 8.3 Overall manufacturing employment in India.

Source: author's calculations, data from United Nations Industrial Development Organization (UNIDO).

Table 8.1 Overall trends – Indian manufacturing[a]

Average growth rate	*1976–1980*	*1981–1985*	*1986–1990*	*1991–1995*	*1996–1999*
Real value added	1.6	7.4	9.3	11.1	5.3
Employment	3.7	–1.0	2.2	4.2	0.9
Labour Productivity	–2.1	6.4	7.1	6.9	4.4
Factories[b]	N/A	–0.8	2.0	3.6	0.4
Real wages	3.5	3.7	2.0	1.7	–0.3

Source: author's calculations, data from United Nations Industrial Development Organization (UNIDO).

Notes:
a) Average annual growth rates in per cent;
b) only for 1996–1997.

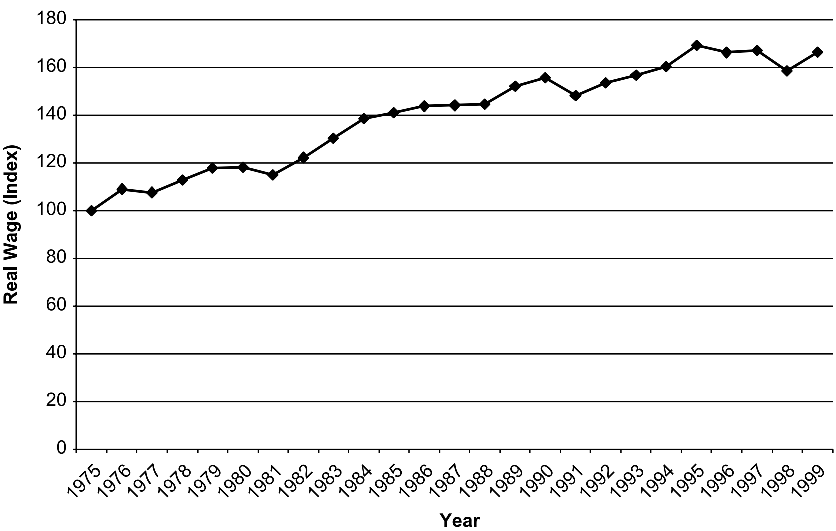


Figure 8.4 Aggregate real wages in India.

Source: author's calculations, UNIDO data.

recorded a steady increase since the mid 1980s (Ganesh-Kumar, Sen and Vaidya 2003).

To summarize, it is clear that after a period of stagnation in the 1970s, there has been strong growth in labour productivity since the early 1980s. Following a period of industrial adjustment in the first half of the 1980s, there has been growth in employment, especially in the first half of the 1990s. Real wages have also increased in this period, though lagging behind labour productivity growth.

One unusual feature of India's industrial transformation has been a gradual

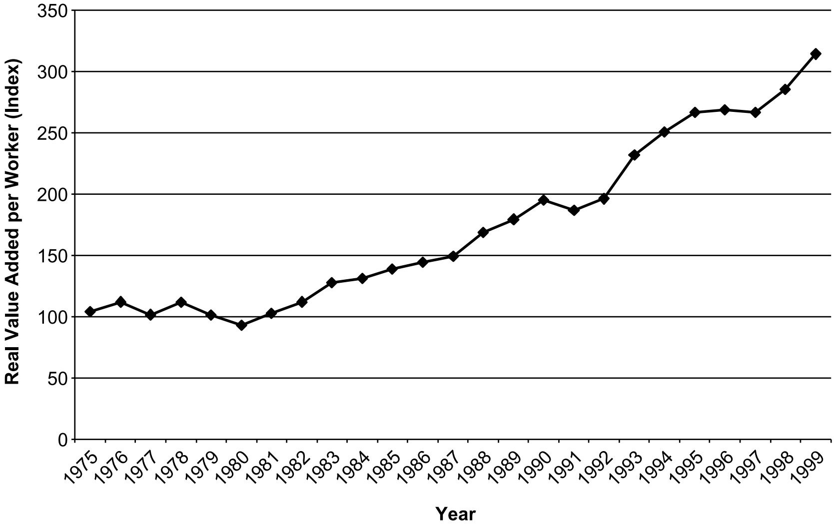


Figure 8.5 Aggregate labour productivity in India.

Source: author's calculations, UNIDO data.

Figure 8.6 Aggregate unit labour costs in India.

Source: author's calculations, UNIDO data.

contraction of both employment and production in labour-intensive industries, particularly in the textile, clothing and footwear industries (Sen 2008a). This is a disquieting feature of structural change from an employment point of view. At the same time, the strong growth in labour productivity is one of the positive features of manufacturing performance in the same period.

Trends and patterns in trade and FDI inflows in India

The Indian economy has become increasingly open over the 1980s and 1990s. As is well known, India has been a major exporter of information technology services in recent years. This is reflected in the larger increase in the ratio of exports plus imports of both goods and services to GDP as compared to the ratio of exports plus imports of only goods to GDP (Figure 8.7). However, both indicators have shown a steady increase since the late 1980s, and the ratio of exports plus imports of goods to GDP stood at around 25 per cent in 2003.

Manufactures have accounted for an increasing share of total exports and imports over time (Figure 8.8). This is particularly evident on the export side, with manufactures now accounting for around 75 per cent of total merchandise exports. In 1975, manufacturing exports were 3.0 billion US dollars. In 1999, manufacturing exports had reached 23.5 billion US dollars. Much of the increase occurred from the mid 1980 onwards. Manufacturing imports also have shown a steady increase – however, the increase in the case of manufacturing imports occurs from the mid 1970s as compared

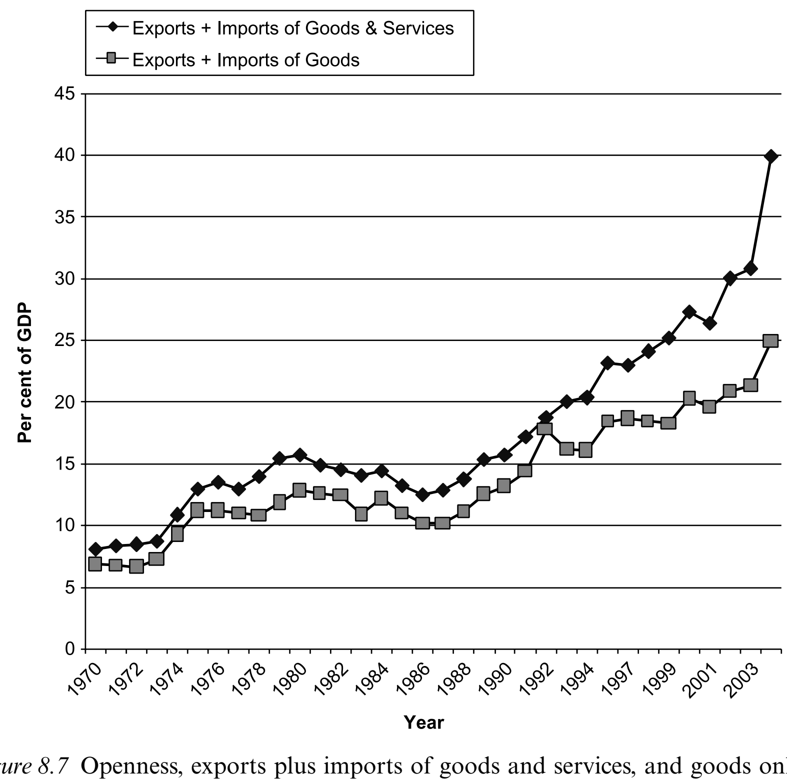


Figure 8.7 Openness, exports plus imports of goods and services, and goods only as ratios of GDP, India.

Source: *World Development Indicators*, World Bank.

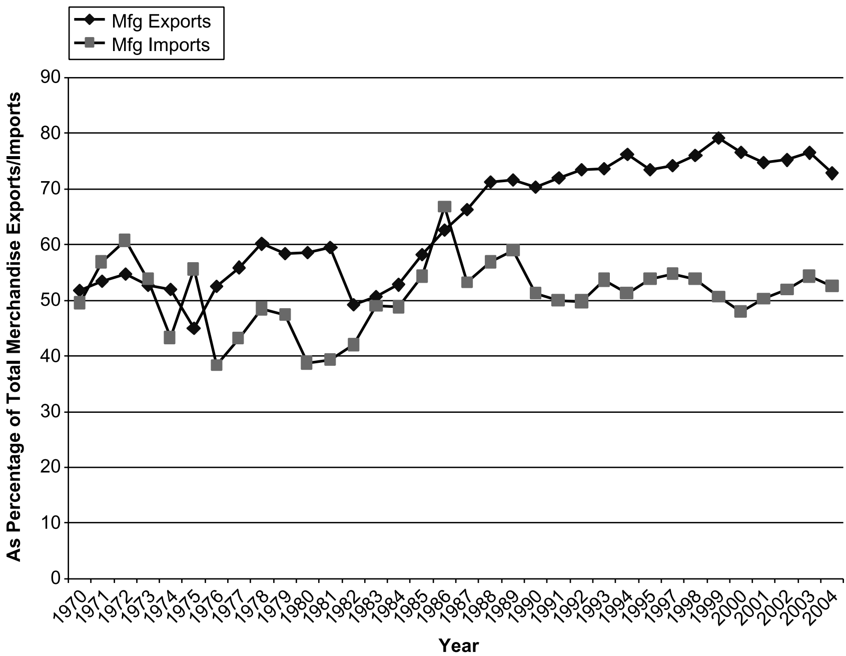


Figure 8.8 Manufacturing exports and imports as shares of total merchandise exports and imports in India.

Source: *World Development Indicators*, World Bank.

to manufacturing exports, which show an increase only in the 1980s. Corresponding to the strong performance of manufacturing exports in the 1990s, the manufacturing trade balance shows an increase in the 1990s, after persistent deficits in the 1980s (Figure 8.9).

To examine changes in the composition of manufacturing exports and imports, we classify exports and imports by factor content, distinguishing between natural resource intensive, labour intensive, technology intensive and human capital intensive industries.[5] The natural resource intensive industries are further subdivided into agricultural and mineral-based industries. Unskilled labour-intensive industries are those with the lowest value added per worker. The remaining industries are divided into technology intensive and human capital intensive, with the industries with a high ratio of R&D to value added being classified as technology intensive.

We find that unskilled labour-intensive products are the most important in India's manufacturing exports, comprising 45 per cent of total manufacturing exports in 1996–9 (Figure 8.10). However, while the share of unskilled labour intensive commodities in total manufacturing exports has increased over the period from 1975 to 1999, the increase (37 per cent per annum) has not been as dramatic as in countries in the high-performing East Asian

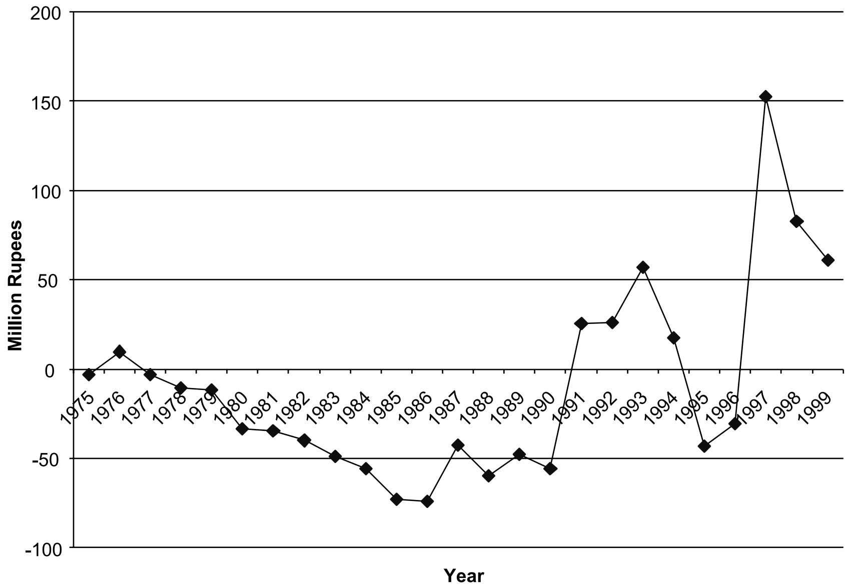


Figure 8.9 India's manufacturing trade balance.

Source: author's calculations based on UN Comtrade database.

economies (Athukorala and Hill, Chapter 2 of this volume). The share of human capital-intensive and technology-intensive products also has increased, from 14 per cent during 1975–95 to 24 per cent in 1996–99. On the other hand, the share of agricultural intensive exports has fallen dramatically from 31 per cent in 1975–80 to 12 per cent in 1996–99.

With respect to imports, technology-intensive goods remain the dominant set of commodities in India's manufacturing imports, followed by human capital intensive goods (Figure 8.11). There has been a slight increase in the share of human capital intensive goods in India's manufacturing imports, with no significant change in the share of technology-intensive imports in spite of the trade liberalization of the 1980s and 1990s, which had a bias towards liberalization of capital and intermediate goods imports.

Trends and patterns in FDI inflows

There has been a significant increase in FDI inflows to India over the period from 1990 to 2006. In 1990–2000, the average inflow of FDI to India was US$1.7 billion (Table 8.2). This had increased to US$16.9 billion in 2006. Inward FDI inflow to India as a percentage of gross fixed capital formation (GFCF) increased from an average of 1.9 per cent in 1990–2000 to 8.7 per cent in 2006. Since year-on-year FDI flows are notoriously volatile, it

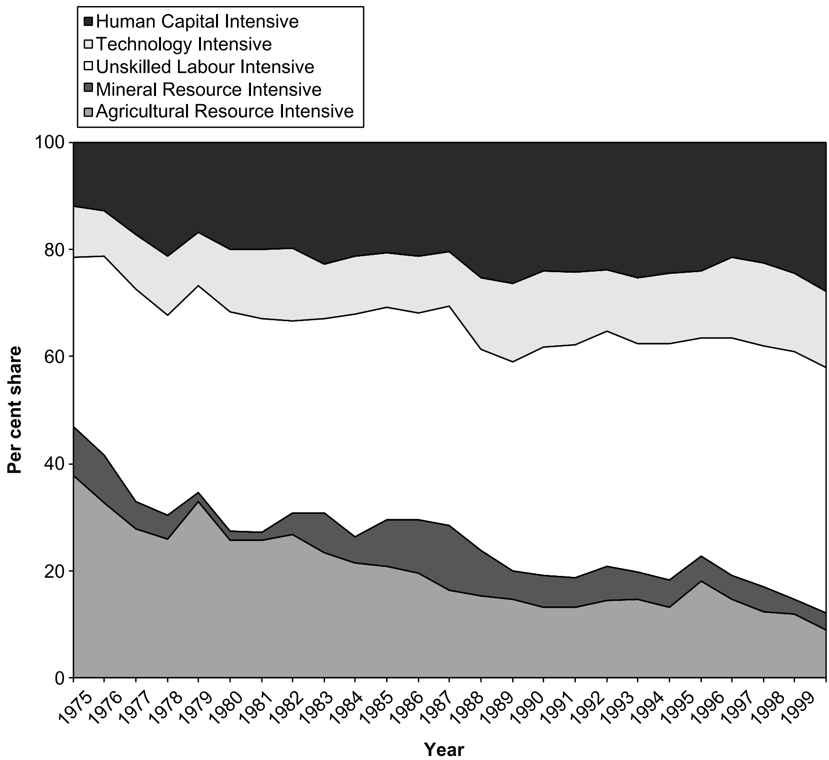


Figure 8.10 Factor content of India's manufacturing exports.

Source: author's calculations based on UN Comtrade database.

is more appropriate to look at the behaviour of inward FDI stock to discern long-term trends. The stock of inward FDI stock in India shows a strong increase from US$452 million in 1980 to US$50,680 million in 2006. As a ratio of GDP, the FDI stock increased from 0.5 per cent to 5.7 per cent in the same period. However, FDI inflows to India were about one-fourth times the corresponding amount (US$69,468 million) for China in 2006. Inward FDI stock as a percentage of GDP in China's case was 11.1 per cent in 2006, close to double to that for India.[6]

A large part of the increase in FDI has been due to mergers and acquisitions of foreign companies of existing Indian firms rather than green-field investment. During the period from 2000 to 2008, mergers and acquisitions accounted for over 60 per cent of total FDI outflows (Athukorala 2009b, Figure 3). Examining the sectoral distribution of FDI stock, around 85 per cent was in the manufacturing sector in 1980 and 1990 (Table 8.3). However, by 1997, this proportion had declined to 48 per cent, with an increase in FDI stock in services and infrastructure (labelled 'Others' in Table 8.3), which together comprised around 50 per cent of total FDI stock.

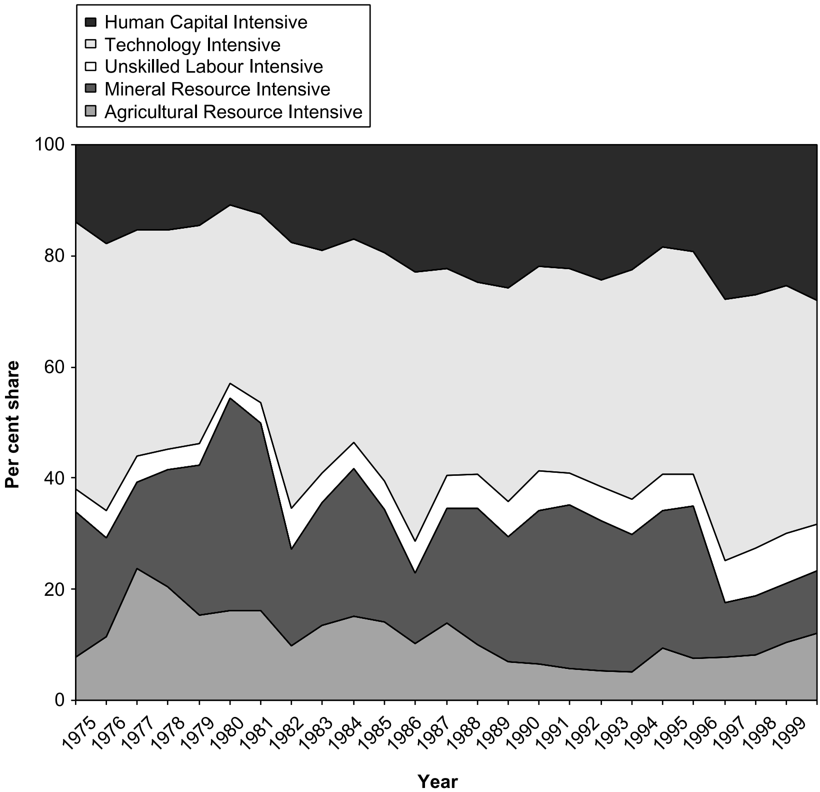


Figure 8.11 Factor content of India's manufacturing imports.

Source: author's calculations based on UN Comtrade database.

In the manufacturing sector, most of the FDI inflow went to transport equipment, machinery and machine tools, electrical goods and machinery and chemicals and allied products. Around 20 per cent of manufacturing FDI stock was in food and beverages and textile products. Thus, most FDI inflows to the manufacturing sector were to the capital-intensive sectors, with a small amount going to labour-intensive sectors.

The impact of trade policy reform on productivity and employment

In this section, we examine the impact of trade policy changes on total factor productivity (TFP) in Indian industry, along with an assessment of the contribution of international trade to manufacturing employment growth in the period under consideration.

Table 8.2 Foreign direct investment (FDI), inward, flows and stocks, selected years

	1990–2000 (annual average)	*2003*	*2004*	*2005*	*2006*
FDI flows – Inward, US$ million[a,b]					
India	**1705 (1.9)**	**4323 (n.a)**	**5771 (3.2)**	**6676 (3.6)**	**16881 (8.7)**
China	30104 (11.3)	53505 (n.a)	60630 (8.0)	72406 (8.8)	69468 (8.0)
South Asia	2560 (2.2)	5479 (n.a)	7601 (2.2)	9866 (4.4)	22274 (9.3)
Asia and Oceania	76700 (8.1)	115300 (n.a)	170722 (10.3)	209127 (11.3)	259773 (12.9)
Developing countries	130722 (9.3)	178699 (n.a)	283030 (12.9)	314316 (12.6)	379070 (13.8)
	1980	*1990*	*2000*	*2005*	*2006*
FDI stocks – Inward, US$ million[a,c]					
India	**452 (n.a)**	**1657 (0.5)**	**17517 (3.8)**	**44019 (5.5)**	**50680 (5.7)**
China	1074 (n.a)	20691 (5.4)	193348 (17.9)	272094 (13.7)	292559 (11.1)
South Asia	2081 (n.a)	4984 (1.2)	28406 (4.7)	60807 (6.0)	72862 (6.5)
Asia and Oceania	65461 (n.a)	200566 (9.2)	1073401 (26.5)	1533932 (23.5)	1932153 (24.9)
Developing countries	140356 (n.a)	364683 (9.6)	1707639 (25.6)	2621615 (26.3)	3155856 (26.7)

Source: *World Investment Report 2007*, UNCTAD.

Notes:
a) n.a: not available;
b) figures in brackets are percentages of Gross Fixed Capital Formation;
c) figures in brackets are percentages of Gross Domestic Product.

Productivity

Table 8.4 gives data on TFP growth by the major industrial groups. Overall there has been a mild slowdown in TFP growth in the 1990s compared to the 1980s. A similar pattern has been observed by other authors, Balakrishnan *et al.* (2002).[7] From 1985 to 1990 TFP growth was the highest in the capital and intermediate goods sectors, whereas during the period from 1973 to 1978 it was the highest in the consumer goods sector.

Table 8.3 Sectoral distribution of India's inward FDI stock (percentage share)

Sector	*1980*	*1990*	*1997*
Plantations	4.1	9.5	1.2
Mining	0.8	0.3	0.1
Petroleum	3.9	0.1	0.9
Manufacturing	87.0	84.5	48.0
Food and beverages	4.2	6.0	6.7
Textile products	3.4	3.4	2.9
Transportation equipment	5.5	10.4	6.7
Machinery and machine tools	7.6	13.1	5.3
Metal and metal products	12.7	5.2	2.1
Electrical goods and machinery	10.5	10.9	8.3
Chemical and allied products	32.3	28.4	8.9
Others	10.7	7.5	7.4
Services	3.4	3.3	15.0
Others	0.7	1.9	34.8
TOTAL (million rupees)	9332	27050	365100

Source: Kumar (2005), from *Reserve Bank of India Bulletins*, various issues.

Table 8.4 Total factor productivity growth in Indian manufacturing

	Consumer goods	*Intermediate goods*	*Capital goods*	*Average*
1973–1977	6.8	5.0	6.7	6.1
1978–1984	3.9	4.9	6.0	4.7
1985–1990	5.6	7.0	7.5	6.5
1991–1997	5.1	5.7	5.7	5.2

Source: author's calculations.

Note: Weighted average, weights are share of each industry in Gross Value Added; Price–Cost Margins = (Gross Value Added – Wages)/Gross Value Added.

The effects of trade policy on TFP growth are examined by estimating an augmented production function of the form:

$$Y_{it} = a_1 L_{it} + a_2 K_{it} - a_3 TP_{it} + e_{it} \tag{1}$$

Where Y is real value added[8] for industry I at time t, L and K are the labour and capital inputs for industry I at time t, TP is the measure of trade policy for industry I at time t, and e_{it} is the error term. The two measures of trade policy discussed earlier – effective rates of protection (ERP) and import coverage ratios (ICR) – are used for TP. We use annual data for a panel of 60 industries at the ISIC 4-digit level over the period from 1973/94 to 1997/98. Y, L and K are measured in natural logarithms and TFP growth in per cent. The model is estimated using the fixed effects (within) estimator that allows us to control for intrinsic differences across industries with respect to technological progress. The results are presented in Table 8.5.

Equation (1) is estimated first by including the import coverage ratio as the measure of trade policy. Col. (2) includes the effective rate of protection. The assumption of constant returns to scale is not rejected in any of the augmented models, though the point estimates suggest increasing returns to scale. Most of the coefficients have signs and significance that are in accord with the theoretical priors. The estimate in Col. (1) suggests that an increase in quantitative restrictions as captured by an increase in the ICR has a strong negative effect of total factor productivity (TFP). The coefficient on ERP is positive, when we would expect a negative relationship between ERP and TFP. However, the coefficient is not significant at conventional levels of significance. In Cols (3) and (4), we impose the statistically acceptable restriction of constant returns to scale on the parameters of K and L and estimate equation (1) where a direct measure of TFP growth using the Tornquist index formula is used as the dependent variable, with ICR and ERP included in turn. We do this to control for the endogeneity of K and L arising out of their possible correlation with demand shocks included in the error term. We find that in both estimates, there is no difference to our qualitative results with the coefficients on the variables of interest retaining their correct signs and statistical significance. The results indicate that trade reforms have led to a significant increase in total factor productivity in India.

Table 8.5 Impact of trade policy on total factor productivity – regression estimates[a,b,c]

Variable	*Col. (1)*	*Col. (2)*	*Col. (3)*	*Col. (4)*
Intercept	1.17*** (5.8)	1.07*** (5.3)	1603.3.*** (36.1)	1505.1*** (27.3)
Ln K	0.59*** (35.3)	0.60*** (38.2)	—	—
Ln L	0.57*** (21.7)	0.56*** (22.2)	—	—
ICR	–0.001*** (3.59)	—	–10.6*** (17.3)	—
ERP	—	0.0003 (1.64)	—	–6.32*** (12.6)
R^2	0.92	0.92	0.01	0.01
Number of observations	1094	1094	1092	1075
Number of industries	60	60	60	60

Notes:
a) Dependent variable is Logarithm of Real Value Added
b) L = Labour; K = capital; ICR = Import Coverage Ratio; and ERP = Effective Rate of Protection
c) ***, ** and * denote significance at the 1, 5 and 10 per cent levels.

Employment

To assess the impact of trade on manufacturing employment, we compute the employment coefficients of manufacturing exports and import-competing production (Figure 8.12). It is evident that the employment coefficients of exports and imports have consistently fallen over the period. Moreover, the difference between the employment coefficient of exports and that of imports has narrowed over time. The findings suggest that a unit increase in manufacturing exports matched by an identical increase in manufacturing imports will lead a smaller positive effect on employment in 1996–99 as compared to 1975–80. However, it is possible that the increase in the manufacturing trade balance in the 1990s may have led to an overall increase in employment in the manufacturing sector.

The net effect of international trade on manufacturing employment can be established by using a growth accounting methodology which divides employment changes over a period of time into that attributable to changes in domestic demand, exports, import penetration and productivity (Jenkins and Sen 2006). Table 8.6 presents the results of this methodology as applied to Indian manufacturing data. Employment has increased in the period 1985–99, following a decline in 1980–85. Much of this increase in employment has been driven by increases in domestic demand. Increases in labour productivity all through the 1980s and 1990s have led to labour shedding for the entire 1980s and 1990s. The contribution of exports to employment growth has been

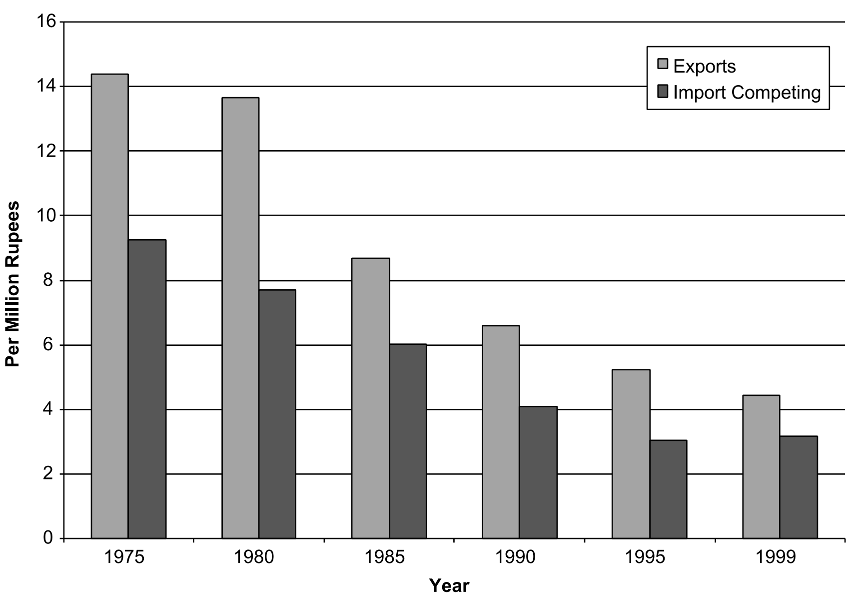


Figure 8.12 Employment coefficients, exports and import-competing production.

Source: author's calculations based on UN Comtrade database.

Table 8.6 Decomposition of manufacturing employment changes

	Total employment effect	*Domestic demand*	*Productivity growth*	*Export growth*	*Import penetration*	*Net employment growth from trade*
Absolute numbers (in thousands)						
1975–1980	1122	1444	–263	5	–63	–59
1980–1985	–333	1898	–2227	76	–80	–4
1985–1990	639	1981	–1883	388	152	541
1990–1995	848	2034	–1687	655	–154	501
1995–1999	870	1935	–1154	15	75	90
Percentage contribution						
1975–1980		128.69	–23.47	0.43	–5.64	–5.22
1980–1985		–569.45	668.22	–22.83	24.06	1.23
1985–1990		310.08	–294.73	60.80	23.85	84.65
1990–1995		239.77	–198.87	77.23	–18.14	59.10
1995–1999		222.35	–132.65	1.69	8.60	10.30

Source: author's calculations; *International Economic Database*, Australian National University, and UNIDO.

Note: We exclude other manufacturing industries from our sample of industries (ISIC Code 390).

greater in the period 1985–95 than in the preceding and ensuing periods. Import penetration has led to few jobs being lost for much of the period under consideration. The upshot is that international trade has played a minor role in employment changes in Indian manufacturing, especially in the late 1990s.

The effects of FDI on Indian industry

For many developing countries which have been latecomers to industrialization, FDI has played a crucial role in industrial development by bringing in technology, market know-how and modern management practices to domestic firms (Athukorala and Hill, Chapter 2 of this volume). We have already noted that after a severely restrictive policy regime with respect to FDI, Indian policy-makers have eased these restrictions in a significant way, starting in 1991. The ensuing years have seen large inflows of FDI to the Indian economy and an increase in the contribution of FDI to capital formation and output, especially since 2000.

In this section, we summarize the available evidence on the effects of FDI on market structure, export orientation, productivity and technology spillovers in Indian industry during this period. We also conduct a new statistical analysis of our own using a recently compiled dataset of firms operating in India to examine whether there are differences between foreign firms and domestic firms with respect to export orientation, technological prowess and productivity. The dataset we use is a survey of around 2,000 firms in India conducted by the Confederation of Indian Industry (CII) and the World Bank in 2002 as part of the World Bank's Investment Climate Survey. The advantage of the dataset in comparison with others that are available in the public domain (e.g. the Reserve Bank of India's surveys of the finances of medium and large public limited companies and the PROWESS dataset of the Centre for Monitoring the Indian Economy) is that it contains data on employment, which allows calculations of labour and total factor productivity. However, a limitation of the dataset is that it does not allow us to assess the changes in the characteristics of foreign firms relative to domestic firms over time because, except for output and input variables, most observations are for a single year (2002). In the survey a firm was identified as a 'foreign firm' if foreign ownership constitutes 25 per cent or more of total equity capital.

Market share

What have been the long-run trends in the relative importance of foreign firms in Indian industry? Athreye and Kapur (2001) find a decline in the market share of foreign firms in the 1990s as compared to the 1980s. They estimate that foreign firms accounted for 26 per cent of total sales in manufacturing in 1990–91, down from 31 per cent in 1980–81. However, more recent estimates of the share of foreign firms in total value added and total sales over the 1990s find that there has been an increase in the former from 9.5 per cent in 1990 to 12.6 per cent in 2001 and in the latter from 11.3 per cent in 1990 to 13.8 per cent in 2001 (Kumar 2005). Clearly, the liberalization of the FDI regime has led to a higher market share of foreign firms in Indian industry over the 1990s.

In the absence of reliable statistical evidence it is difficult to establish whether the increasing presence of foreign firms in Indian industry has led to increased competition in domestic markets and lower prices for consumers. India's large domestic market has been the attraction for many new foreign entrants. Examples of sectors where there have been significant new entries are beverages, automobiles, refrigerators and washing machines. In these sectors, there have been examples of both price and non-price competition; at the same time, there are also examples of possible increases in market structure concentration in other sectors, as for example, when Coca-Cola acquired the dominant domestic aerated drink producer, Parle Industries (maker of the leading domestic brand – Thums Up), and when Hindustan Lever, the Indian subsidiary of Unilever, acquired its largest domestic rival and the second largest firm in the industry, TOMCO, along with the largest cosmetics firm, Lakme (Nagaraj 2003). Athreye and Kapur (2001) also find a positive correlation between industrial concentration (as measured by the Herfindahl index) and the presence of foreign firms across industrial sectors in India using firm-level data for 1994. Clearly, more recent studies are needed to evaluate the effects of FDI on market structure and on price and non-price competition in India since the 1991 reforms.

Industrial location

From the CII dataset, we find that there are significant differences between foreign and domestic firms as to the industrial location (Table 8.7). Foreign firms are mostly in drugs and pharmaceuticals, consumer electrical goods, auto components and food processing. Only 8.6 per cent of foreign firms are in garments, textiles and leather products. In contrast, 31 per cent of domestic firms are in these three industries. These data reinforce the point made earlier that FDI inflows to Indian manufacturing have mostly been to capital-intensive sectors.

Export orientation

Earlier studies of export performance of foreign firms relative to domestic firms in India in the pre-reform period have found no statistically different performance in export performance (Kumar and Siddharthan 1994). More recent studies that look at the post-reform period find that Indian affiliates of multinational corporations perform better than their domestic counterparts in export orientation (Agarwal 2001, Kumar and Pradhan 2003).

We examined whether foreign firms are more likely to be exporters than domestic firms. We found that this is the case with the foreign firm dummy significant at the one per cent level when we regress the exporter status dummy on the latter variable along with industry (Table 8.8) dummies, which control for differences in exporting propensities across industries. We obtain a similar result when the export status dummy is replaced by the export to sales ratio.

Productivity

It is generally believed that foreign firms are more productive than domestic firms, as they have advantages in recruiting more able managers and skilled

Table 8.7 Distribution of foreign and domestic firms by industry in India (per cent)

Industry	*Foreign firms*	*Domestic firms*
Garments	2.9	14.8
Textiles	5.7	12.5
Drugs and pharmaceuticals	31.4	9.9
Electronics	2.9	8.5
Electrical white goods	11.4	7.1
Machine tools	2.9	3.5
Auto components	17.1	13.4
Leather products	0.0	3.7
Sugar	5.7	0.7
Food processing	11.4	9.5
Chemicals	8.6	10.6

Source: author's calculations, from *Confederation of Indian Industry Firm Level Survey 2002*.

Table 8.8 Characteristics of foreign and domestic firms in India[a]

Characteristic (1)	*Coefficient on foreign dummy (2)*
Firm size – sales	1332.44 (4447.82)
Firm size – employment	430.65 (68.13)***
Firm growth	–0.95 (17.07)
Labour productivity	1.37 (0.23)***
Total factor productivity	98.18 (9.99)***
Capital–labour ratio	8.68 (1.18)***
Exporter – if yes, dummy=1	0.46 (0.07)***
Exports as per cent of sales	39.62 (7.21)***
R and D expenditure / sales	0.0005 (0.016)
Investment / capital stock	–0.02 (0.38)

Source: author's calculations, from *Confederation of Indian Industry Firm Level Survey 2002*.

Note:
The regressions of variables in Col (1) on a 'foreign firm' dummy variable and on industry dummies. The standard errors are given in parentheses: *** denotes significance at the 1 per cent level.

workers, given the salaries and wages they pay. Affiliates of multinational corporations also have access to better technology from abroad obtained from their parent company. In the Indian case, this certainly seems to be true – the coefficients on the foreign firm variable are positive and statistically significant when we run regressions of labour productivity and total factor productivity on this variable along with the industry controls. Foreign firms are significantly more capital intensive than domestic firms, as evidenced by the positive and significant coefficient on the foreign firm dummy, in regressions with the capital to labour ratio as the LHS variable. However, we find that we do not obtain similar findings for other indicators of firm performance, such as firm growth (defined as the percentage change in sales) and the investment to capital ratio (Table 8.8). It is also not clear whether the higher productivity observed in foreign firms is due to their larger size and, therefore, their ability to reap economies of scale. A regression of firm size as captured by total sales does not yield a positive and significant coefficient on the foreign firm dummy once we control for industry differences, though it does when we use capture firm size by total employment instead (Table 8.8).

Technology spillovers and R&D intensity

An important reason for attracting FDI to the manufacturing sector is that the presence of foreign firms can have significant positive knowledge spillovers to domestic firms, and by doing so, increase average productivity in the industrial sector. In the Indian case, using firm-level panel data from 1975 to 1988, Kathuria (2001) finds that there are positive spillovers to domestic firms by the presence of foreign firms, but that the nature and type of spillovers depended on the industries to which domestic firms belonged, with firms in more technology-intensive sectors more likely to benefit. Using more recent data – from 1989 to 1996 – Kathuria (2002) finds that 'scientific' domestic firms benefited from the presence of FDI, irrespective of which industry the domestic firm was located in, but that 'non-scientific' domestic firms did not.

In the CII sample of firms, we do not find R&D intensity to be higher for foreign firms, controlling for industry differences (Table 8.8). Kumar (2005) also finds that, while the gap between R&D intensity of foreign and domestic firms is positive in the early 1990s, this gap has reduced over time. In summary, the evidence seems to be that there are no substantial knowledge spillovers from foreign to domestic firms in the post-reform period, in part because foreign firms have not invested in R&D more highly than domestic firms in this period.

Conclusions

In this chapter we have examined the impact of international trade and foreign direct investment on India's industrial transformation, particularly since the initiation of economic reforms in the 1980s and early 1990s. The empirical analysis shows that trade reforms in India have had a strong positive impact on total factor productivity, and this was an important factor behind the strong growth of the manufacturing sector witnessed since the 1980s. However, the evidence suggests that the Indian manufacturing sector's increasing global integration has not led to a significant re-orientation of production from the capital-intensive nature of production that had been witnessed in the pre-reform period. Manufacturing employment growth has been relatively small in the 1980s and 1990s.

There has been a strong growth in inward FDI since the early 1990s. However, India's inward FDI flows and stocks are still below China's when scaled by gross investment and GDP respectively. The flow of FDI in the recent period seems more to infrastructure than to manufacturing, and within manufacturing, to the capital-intensive sectors. There is evidence that foreign firms in India in the reform period are more productive and exhibit greater export orientation than domestic firms, but they do not show stronger growth, higher investment rates or R&D intensity compared to domestic firms. It is also not clear whether the increasing presence of foreign firms, along with the easing of restrictions on technology acquisition, has led to widespread knowledge spillovers to domestic firms in the post-reform period.

The overall finding of the chapter is that the economic reforms may have had a net positive effect on Indian manufacturing performance, enabling the manufacturing sector to break out of the stagnation witnessed in the pre-reform period. However, there is no evidence to suggest that trade and FDI flows as yet have led to a significant change in the pattern of industrial growth towards labour-intensive production in which India has a comparative advantage. Thus, from the viewpoint of equity, India's post-reform manufacturing performance has been disappointing. The slow growth of the labour-intensive manufacturing sector is a surprising outcome, in the context of India's innate comparative advantage in labour-intensive activities, and in comparison with other Asian economies with similar factor endowments (Wood and Calandrino 2000, Sen 2008b).

Three possible factors may explain such a 'perverse' outcome. Firstly, labour laws with respect to firing are among the most restrictive in the world (Pages and Roy 2008). It is widely recognized that such restrictive labour laws discourage the growth of large enterprises in the labour-intensive manufacturing industries (such as garments, leather goods and jewellery) and the use of labour by manufacturing firms in general in favour of capital (Panagariya 2008). A second factor is the low rates of human capital accumulation, especially at the primary schooling level, along with the poor quality of education that most schoolchildren in India receive (*ibid.*). Even in the labour-intensive manufacturing industries, a certain level of cognitive skills is essential and India's performance in primary school enrolment and the quality of schooling has been far below those of its major competitor, China, in world markets for labour-intensive goods. A third possible reason is the poor quality of infrastructure, especially roads and electricity, in India. The under-provision of the quantity and quality of schooling and infrastructure can be related to significant state failure in the provision of public goods, especially at the sub-national level (Pritchett 2008). Clearly, reforms of labour laws and more effective state provision of public goods such as schooling and infrastructure are essential for the growth of the labour-intensive manufacturing sector in India in the future.

Notes

1 Outward FDI is becoming increasingly important in India, with outflows rising from an annual average of US$ 121 million in the 1990s to US$ 13649 in 2008 (see Athukorala 2009b and the works cited therein). For reasons of space and also because we are interested in examining the effects of FDI on domestic industrial transformation, we confine ourselves in this chapter to inward FDI.

2 As Joshi and Little (1997) argue, the concentration of emphasizing an early reduction in tariffs on capital goods in the reform process was probably intended to avoid discouraging investment because of the expectation of a later reduction in tariffs.

3 For a meaningful assessment of the impact of trade policy on productivity, it is necessary to use industry data at the ISIC 4-digit level (corresponding to the NIC 3-digit code of the Central Statistical Organisation's *Annual Survey of Industries* (ASI)). However, unfortunately it is difficult to match the data from ASI for the years after 1999 with those for the preceding years at the 3-digit level because of a major change in classification system introduced with effect from that year. For this reason, the time coverage of our analysis ends in 1999.

4 The rate of GDP growth for the period 1955–79 was 3.6 per cent per annum.

5 We apply Krause's (1982) classification of ISIC manufacturing industries according to their dominant factor input.

6 It should be noted that there are two problems in comparing data on FDI inflows to China and India. First, it is well recognized that a large share of FDI inflow in China represents 'round-tripping' – recycling of domestic saving via Hong Kong to take advantage of tax, tariffs and other benefits offered to non-resident Chinese, which are estimated to be in the range of 40–50 per cent of total FDI (Nagaraj 2003). In the case of India, presumably a substantial (yet unknown) share of FDI inflows takes the form of round-tripping investment via Mauritius. Second, in compiling FDI data, the Reserve Bank of India began to fully comply with the the IMF Balance of Payments Manual definition only from 2003: FDI data for the previous years cover only fresh inflows of equity (Athukorala and Hill, Chapter 2 of this volume). The cumulative bias in comparison resulting from these problems can go either way.

7 To our knowledge only one study, Milner *et al.* (2007), has found an increase in TFP in the 1990s as compared to the 1980s, but sufficient information is not given therein to verify the source of this discrepancy.

8 The double-deflation method is used to calculate real value added. This is the standard practice in most estimates of total factor productivity in India (Balakrishnan and Pushpangadan 1994).

9 Foreign direct investment in industrial transition

The experience of Vietnam

Prema-chandra Athukorala and Tran Quang Tien

Opening of the economy to foreign direct investment has been an important element of Vietnam's 'renovation' (*doi moi*) reforms initiated in 1986. With a slow and hesitant start in the late 1980s, the foreign investment regime was considerably liberalized in the first half of the 1990s as part of a broader liberalization reform package designed to reshape the former closed command economy into a market-based economy. The reform process lost momentum between 1996 and 1998 partly due to economic uncertainty created by the East Asian crisis, but partly (perhaps even more so) due to domestic policy ambivalence and complacency resulting from the success of the initial reforms. There has, however, been a renewed emphasis on completing the unfinished reform agenda since the late 1990s. Notable recent reforms include permitting previously-established foreign invested enterprises (FIEs) to reconstitute as fully-owned subsidiaries, streamlining/simplification of investment approval and monitoring processes under a unified investment law applicable to both foreign and local investors, removal of local-content and export-performance requirements and restrictions on technology transfer, and the announcement of an action plan to reconstitute all state-owned enterprises (SOEs) as private limited liability companies or joint-stock companies with opportunities for FIEs to participate in the process.

The purpose of this chapter is to survey the evolution of the foreign investment regime in Vietnam in the broader context of market-oriented reforms and examine the role of foreign direct investment (FDI) in the process of industrial transition. A key theme running through the analysis is that both the rate of FDI involvement in the economy and the national developmental gains from FDI depend crucially on the conduciveness of overall domestic economic policy environment to market-based decision-making; liberalization of foreign investment regime *per se* is not sufficient to reap national gains from opening the door to foreign investors (Bhagwati 1996, 2006). Particular emphasis will be placed on the role of FDI in linking Vietnamese manufacturing to the rapidly evolving regional and global production networks. Based on the recent literature on the role of institutions in economic development, we also emphasize the importance of legal and institutional reforms as prerequisites for creating an enabling environment for harnessing foreign (and domestic) investment for national development, particularly in transition economies (Lankes and Venables 1996, McMillan and Woodruff 2002).

In addition to informing the policy debate on liberalization reforms in Vietnam, this chapter intends to contribute to the fledgling literature on the role of FDI in economic transition from 'the plan to market'. Attracting FDI has been a key focus of market-oriented policy reforms in *transitional economies*, countries which have embarked on a process of systemic transformation from central planning to market orientation. It is generally believed that FDI can play a 'special' role in economic transition in these countries as a catalyst for revitalizing the private sector, which remained dormant under the command economy era. Yet there is a dearth of systematic comparative analysis of FDI flows to these countries and their developmental impact. The limited literature so far has predominantly focused on the experiences of China and a few major economies in Eastern Europe.[1]

The study is based on a data set pieced together from a number of sources. The investment monitoring organization in Vietnam, the Ministry of Planning and Investment (MPI) does collect information annually on the operation of approved projects, but there is no system in place to systematically process and publish the data. The General Statistical Organization (GSO) of Vietnam has been conducting an annual census of manufacturing based on a well-designed questionnaire since 2000. Some of the basis data tabulations from this survey are available from GSO publications, but the large bulk of the valuable information gathered from the census still remains underutilized. This study brings together whatever relevant data is available from MPI and GSO publications and some fresh data tabulations from unpublished data obtained from these two organizations.

The chapter begins with an overview of FDI policy and the investment environment in Vietnam. The following section examines trends and patterns of FDI against the backdrop of domestic policy shifts, and regional and global trends. The next section examines the development impact of FDI, with emphasis on the implications of the incomplete reform agenda and policy inconsistencies that cropped up in the reform process in determining the actual outcome in contrast to initial expectations. The key findings and policy recommendations are presented in the concluding section.

Investment climate

The term 'investment climate' encompasses both the foreign investment regime (rules governing foreign investment and specific incentives for investors) and the general investment environment. The latter encompasses various considerations impinging on investment decisions such as political stability, macroeconomic environment and attitudes of host countries towards foreign enterprise participation. In this section we survey the evolution of FDI regimes under market-oriented reforms followed by a comparative assessment of the current state of the overall investment climate.

FDI policy

The first law on FDI was passed by the Vietnamese National Assembly on 29 December 1987. The law specified three modes of foreign investor participation, namely: (i) business cooperation contracts (BCC); (ii) joint venture; and (iii) fully foreign-owned ventures. Foreign participation in the fields of oil exploration and communications was strictly limited to BCC. In some sectors such as transportation, port construction, airport terminals, forestry plantation, tourism, cultural activities and production of explosives, joint ventures with domestic state-owned enterprises (SOEs) were specified as the mode of foreign entry. Fully foreign-owned ventures were to be allowed only under special considerations governing policy priorities of domestic industrial development. The duration of foreign ownership of approved projects was limited to a maximum of 20 years, unless under exceptional circumstance. The government provided a constitutional guarantee against nationalization of foreign affiliates and revoking ownership rights of enterprises. The incentives offered to foreign investors included exemption from corporate tax for a period of two years, commencing from the first profit-making year, followed by a preferential corporate tax rate between 15 per cent and 25 per cent in priority sectors (as against the standard rate of 32 per cent). Overseas remittance of payments for the provision of technology services, repayment of principal and interests on loans, and repatriation of after-tax profit were freely allowed.

In 1991 legislation was passed to permit setting up export processing zones (EPZs) which offered special incentives to firms involved in the production of goods for export and the provision of services for the production of export goods. In 1992, the duration of foreign participation was extended from 20 years to 50 years, and 70 years in special cases. A new law enacted in 1996 permitted private enterprises to enter into joint ventures with foreign investors and procedures for the approval of investment projects were streamlined. The tax holiday for investment in priority sectors was extended up to 8 years, with a beyond-tax holiday tax of 10 per cent. A three-tier withholding tax of 5 per cent, 7 per cent and 10 per cent, based on the 'priority status' of investment, was introduced in place of the original flat rate of 10 per cent.

These significant revisions to the foreign investment law, however, coincided with a growing resentment against FDI within Communist Party circles. This resentment, which was fuelled by the massive influx of FDI following the initial phase of reforms, resulted in a number of restrictive policy measures which raised serious concerns in the international investment community about Vietnam's attempts to project its image as a new investment centre. These included a proposal to establish liaison offices of the Communist Party in all foreign ventures, doubling of commercial and residential rents for foreign enterprises and expatriate staff, imposition of a maximum time limit of three years on work permits issued to foreigners employed in FDI projects, restrictions on foreign capital participation in labour-intensive industries, and imposition of domestic content requirements and export performance requirements on FIEs in a number of key industries. The foreign investment approval procedure also turned out to be more selective with greater emphasis placed on promoting investment in key high-tech industries such as metallurgy, basic chemicals, machinery, pharmaceuticals, fertilizer, electronics and motor vehicles. Notwithstanding the new (1996) legislation permitting domestic private enterprises to enter into joint ventures with foreign firms, joint ventures with SOEs continued to remain the prime mode of FDI entry in investment approval (Truong and Gates 1996).

Policy reforms following the economic downturn from 1997 to 1999 placed renewed emphasis on FDI promotion. Under an amendment to the FDI law on 9 June 2000, foreign-invested enterprises (FIEs) and parties to Business Corporation Contracts (BCC) were given freedom to convert joint ventures into fully-owned subsidiaries of parent companies, and to merge and consolidate enterprises. The approval procedure of new investment proposals was streamlined, with automatic registration of export-oriented FIEs. FIEs were allowed to open accounts with overseas banks and to mortgage assets attached to land and land-use rights as security for borrowing from credit institutions permitted to operate in Vietnam. Local authorities, notably the Ho Chi Minh City council, were given greater autonomy to improve the investment climate and ease administrative hurdles for foreign-invested projects. In April 2003, 100 per cent foreign-owned companies were allowed to become shareholding companies (that is, they were permitted to establish joint ventures). The withholding tax on profit remittance was abolished with effect from April 2004.

A new unified Investment Law was promulgated in December 2005 to replace the Law on Foreign Investment and the Law on Domestic Investment Promotion (Magennis 2006). Key features of this landmark legislation (which became operational in July 2006) included treating foreign and domestic investors equally with regard to institutional and legal procedures for approval and monitoring and the incentives offered, providing investors with complete freedom in the choice of the particular mode of business entry (that is, joint venture or full ownership), abolishing local context and export performance requirements, and introducing a decentralized, three-tier system of investment approval. Under the new investment approval procedures, projects under one million US dollars require only business registration (that is, no requirement for investment approval), projects between one and twenty million dollars are approved at the provincial level, and only projects beyond this investment level require the approval of the central government (MPI).

As part of the new law steps have been taken to reduce the amount of paperwork involved in FDI approval and monitoring. No formal approval is now required if the project involves less that 300 billion dong (about 20 million US dollars), provided the project is not in a 'conditional' sector.[2] Economic and technical assessments of larger projects (beyond this limit) are to be completed within 15 days from the date of receiving the complete investment application. The new law also contains a more flexible dispute resolution procedure under which a foreign investor has freedom to choose between a domestic and an international arbitration body in the event of an investment dispute. In compliance with the requirement for WTO accession, the new law removed domestic inputs (local content requirement, export performance requirement and conditions relating to technology transfers).

Liberalization of the foreign investment regime has gone hand in hand with significant trade liberalization. After one-and-a-half decades of reforms, tariffs are now the major instruments used in regulating import trade in Vietnam. The average import duty rate has come down from over 50 per cent in the early 1990s to about 14 per cent by 2005 (Athukorala 2006b).

Reform of the state-owned enterprises (SOEs) in line with economy-wide liberalization reforms was initiated in 1992, although the implementation has been slow. But under the WTO accession commitments, the Vietnamese government has agreed to privatize or equitize all SOEs, except for selected business groups and enterprises supplying public goods. FIEs already operating in the country are to be treated as domestic investors in participating in the privatization process.

The earlier reforms in Vietnam largely bypassed the domestic private sector. The new Enterprise Law which came into force in 2000 was a major step towards redressing this gap in the reform process. It assures security for private enterprises and owners with a full government guarantee against nationalization or expropriation of assets and has introduced a greatly simplified procedure for setting up new enterprises.

Investor perception

After one-and-a-half decades of policy reforms, how do international investors rate Vietnam among other countries as an alternative host? Investment Climate Studies (ICSs) recently undertaken by the World Bank provide vital information needed for probing these and related issues. Based on systematic questionnaire-based surveys of representative samples of firms in individual countries, these studies provide a far superior information base compared to other widely-used comparative investment climate assessments (such as the *World Competitiveness Report* of the World Economic Forum, the Canadian Fraser Institute Index, the Economic Freedom Index of the Heritage Foundation and World Bank *Doingbusiness* database), which are predominately based on various secondary sources and anecdotal evidence gathered through short field visits.

Information from the ICS of Vietnam is summarized in Table 9.1, with regional and global comparison based on similar studies. Interestingly, the percentage of firms in Vietnam which rated legal system, bureaucratic

Table 9.1 Constraints on growth of business: Vietnam in a regional and global context[1]

Constraint[2]	*Vietnam*	*East Asia*[3]	*Developing world*[4]
Corruption	12.8	27.9	36.8
Crime and theft	4.0	20.0	25.7
Regulatory and policy uncertainty	14.7	31.5	40.2
Legal system/regulatory uncertainty	5.5	26.2	21.6
Anti-competitive behaviour	12.3	23.7	29.7
Customs and trade regulation	12.5	20.2	21.6
Tax administration	8.7	23.9	32.4
Macroeconomic instability	16.8	35.7	40.2
Tax rate	13.8	30.6	40.5
Business licensing and permits	1.4	14.6	15.9
Access to/cost of finance	29.4	23.5	33.1
Infrastructure	14.6	24.7	15.7
Electricity	15.7	27.0	24.4
Transportation	21.6	19.3	12.4
Telecommunication	6.5	13.2	10.3
Labour skills and education	22.3	26.2	20.4
Labour relations	10.9	19.2	17.3
Access to land	26.4	15.0	14.5

Source: World Bank 2005, Table 4.

Notes:
1. Data generated by the World Bank *Investment Climate Survey* conducted in each country. Figures indicate the percentage of firms which consider that the constraint is either major or severe.
2. Constraints are ranked by the descending order of the figures for Cambodia.
3. Based on data for Cambodia, Lao PDR, Vietnam, China, Indonesia, Malaysia, the Philippines and Thailand.
4. Covers 57 developing countries and transition economies.

procedures and corruption as a major constraint to business growth is significantly lower than in the rest of East Asia or the rest of the developing world. Perhaps the ability to conduct business-to-business transactions on a trust basis, or using rudimentary but reliable enforcement mechanisms, may explain the low importance attached to these institutional constraints (McMillan and Woodruff (1999 and 2002). The considerable simplification of the procedures introduced by the Enterprise Law in 2000 and reinforced through mechanisms like one-stop shops or investment approval could also have contributed to a relaxation of the constraining effects of bureaucracy and red tape. The rather low emphasis placed on corruption is more unexpected, but is consistent with a number of recent firm-level surveys conducted by the World Bank and various other organizations. They all yield a consistent picture: corruption directly affecting businesses is quite prevalent, but petty (small bribes), amounting to less than one per cent of total sales (World Bank 2005, 45–46). The major constraints identified by the Vietnamese respondent firms, in descending order of significance, were difficulty of gaining access to finance and land, insufficient skills and education of the workforce, and poor transportation infrastructure.

Trends and patterns of FDI

Foreign investors' response to economic opening in Vietnam was swift and notable. Annual gross FDI inflows to Vietnam surged from almost zero in the late 1980s to an annual average of US$780 million in 1990–95 and to US$2,587 million in 1997. From 1997 there was a precipitous fall in investment inflows, bottoming at US$1,200 in 2002. Since then, there has been a notable recovery, reaching US$2,500 million in 2007 (Athukorala and Hill, Chapter 2 of this volume).

The surge of FDI in the aftermaths of the policy shift from 'plan to market' has been a common pattern observed across almost all other transition economies (Huang 2003a, Lankes and Venables 1996, Lankes and Stern 1997). Significant initial reforms and the general media-propelled euphoria about the opening of a 'new investment frontier' naturally heightened investor interest in becoming the first in exploiting new investment opportunities. Moreover, in the immediate aftermath of economic opening, there were many quick-return as well as low-risk long-term investment opportunities up for grabs in infrastructure development and provision of utilities (power, telecommunication, etc.) and resource extraction (oil exploration, for example). Massive injection of funds by international developmental agencies such as the Asian Development Bank (ADB) into infrastructure and energy projects provided an added impetus for investment in related areas. Once these initial stimuli dissipated, the sustainability of the investment surge depended very much on the ability of the governments to deliver the promised reforms and the 'natural' attractiveness of the country as an investment location.

The onset of the East Asian financial crisis in mid-1997 was an additional factor in the cessation of the early post-reform surge in FDI in Vietnam. Investors from East Asian countries – in particular Malaysia, South Korea and Singapore – played a key role in the investment surge on the back of the economic boom in their economies in the lead-up to the crisis. These substantial intra-Southeast Asian FDI flows were severely disrupted by the onset of the Asian financial crisis. In addition to this direct effect, the financial crisis also presumably had a damaging impact (at least in the short to medium term) on investor bullishness about East Asia as a favoured investment location in general.

However, one should not overstate the role of these two factors in the cessation of the post-reform FDI boom in Vietnam. A close look at investment approval data in Vietnam suggests that investor interest in that country began to decline from about mid-1996, following the failure of the sixth Communist Party Congress to deliver anticipated further reforms and the onset of a political backlash against foreign firms on the basis of their perceived adverse socio-economic implications (World Bank 2005, Kokko 1997).

There was also a notable increase in the failure rate of licensed FDI projects (that is, the percentage of withdrawn projects out of total licensed projects) in the second half of 1990s compared with the early post reform years (Kokko *et al.* 2003).

Notwithstanding the recent surge, in an overall international comparison Vietnam has continued to remain a small player in the global investment scene. During the period from 2000 to 2007 FDI flows to Vietnam amounted to a mere 0.6 per cent of total FDI flows to developing countries and 3.8 per cent of flows to China (Athukorala and Hill, Chapter 2 of this volume).

Ownership structure

A well-known feature of FDI in Vietnam highlighted in the early studies was the dominance of joint ventures with SOEs as the entry mode. From 1988 to 1994, joint ventures accounted for over 70 per cent of total approved projects and 75 per cent of total registered capital. The bulk of these joint ventures (over 90 per cent) had state-owned enterprises as the local partners (Kokko 1997). Since then, there has been a significant increase in the share of fully-foreign-owned firms among total approved investment (both in terms of the number of projects and value of committed capital) at the expense of the relative position of joint ventures. By 2001 fully-foreign-owned firms accounted for over 80 per cent of total approved FIEs and 65 per cent of total registered investment of these firms. The main underlying factor in this shift in the ownership structure appears to be the more flexible ownership criterion adopted by the Vietnamese authorities in approving export-oriented FDI. As we will see below, the relative importance of export-oriented firms and fully-foreign-owned firms among total FIEs seems to have increased hand in hand.

Source country composition

The geographic origin of FDI in Vietnam is characterized by a clear East Asian regional bias. Between 1998 and 2004, investors from ASEAN, North-east Asia and China together accounted for over two-thirds of approved FDI.[3] This is in sharp contrast to the other Southeast Asian countries (Indonesia, Malaysia, Philippines, Singapore and Thailand) where the bulk of FDI is originated in OECD countries. Over the years, the relative position of ASEAN countries has declined as a result of the growing importance of investors from the other East Asian countries and OECD countries. At the individual country level, the relative position of Singapore, which was the largest host country until late 1999, declined from 20 per cent during 1988–99 to 12.0 per cent during 2000–07 and that of South Korea and Taiwan has increased from 9 per cent to 16 per cent, and 12 per cent to 24 per cent respectively. Investment from China also has increased rapidly, but from a low base, reaching 6 per cent of total investment during 2005.

During the early years of market-oriented reforms in Vietnam, analysts often referred to the US economic embargo as a major constraint on the country's ability to rely on FDI in the process of economic transition. However, interestingly the lifting of the embargo in 1994 and the signing of the Vietnam–USA Free Trade Agreement in 2001 did not immediately bring about a significant change in the source country composition of FDI in Vietnam. The share of US investors in total approved investment in realized projects amounted to a mere 1.5 per cent between 2000 and 2005.

US FDI in countries in the Asia Pacific region is heavily concentrated in assembly activities in vertically integrated high-tech industries, mostly in electronics (Lipsey 1998). Investors in these product lines place a much greater weight on the stability and transparency of the domestic investment climate compared to investors involved in the standard export-oriented labour-intensive production (like clothing or footwear) or domestic-market oriented industries. Reflecting this cautious approach to site selection, the first investment project by a US electronics multinational enterprise (MNE) in Vietnam materialized only in 2006, by which time Vietnam's commitment to market-oriented reforms and promoting FDI had become firmly rooted.

On 28 February 2006, the US-based Intel Corporation, the world's largest semiconductor producer, announced that it will invest US$300 million (subsequently revised to US$1 billion) to build a semiconductor testing and assembly plant in Ho Chi Minh City as part of its worldwide expansion of production capacity. When completed this will be the seventh assembly site of Intel's global network and is projected to eventually employ about 1,200 workers. There is evidence from other countries in the region such as Singapore, Thailand and the Philippines that there is something of a herd mentality in the site selection process of electronic multinational firms, particularly if the first entrant is a major player in the industry. It seems that this process has already begun to play out in Vietnam. For instance, the Taiwanese-based Hon Hai Precision Industry Co., the world's biggest electronics contract manufacturer, announced in August 2007 its plan to set up a $5 billion plant in Vietnam (*The Wall Street Journal*, 30 August 2007, p. 1). The other major players in the electronics industry which have already appeared in investment approval records of the Ministry of Planning and Investment include Foxconn, Compal and Nidec. The Saigon Hi-Tech Park has begun to emerge as an investment hub bringing together foreign investors with domestic companies in setting up assembly and testing plants linked to regional production networks (*The Wall Street Journal*, 7 October 2007, p. 1). Until the entry of Intel, the electronics industry in Vietnam was dominated by small- and medium-scale foreign investors from Taiwan and Korea, the only large global player being Hitachi from Japan.[4]

Industry composition

In the immediate reform years, offshore petroleum and gas extraction and the construction and services sectors were the major areas of attraction to foreign investors, with the manufacturing sector accounting for less than a fifth of registered investment in total approved projects (Table 9.2). The relative importance of manufacturing has, however, increased over the years. By 2007, manufacturing accounted for 45 per cent of cumulative approved investment in realized projects. During the early years, much of the FDI investment in manufacturing was in production for the domestic market. During 1988–90, less than 20 per cent of total approved projects had export–output ratios of over 50 per cent. From the late 1990s there has been a notable compositional shift in manufacturing FDI from domestic-market-oriented to export-oriented production. By 2000, over 70 per cent of approved FIEs in manufacturing had export–output ratios of over 50 per cent, with the majority clustering within the 80 to 100 per cent range. Until around late 1990, most of the export-oriented FDI projects were in garment, footwear, and furniture and other wood product industries. Over the past five years foreign investors have begun to enter into assembly activities in the electrical and electronics industries.

Economic impact

Foreign-invested enterprises (FIEs) have made a notable contribution to the process of economic transition in Vietnam. Their share of GDP increased consistently from 6.3 per cent in 1995 (the earliest year for which this

Table 9.2 Vietnam: sectoral distribution of cumulative approved investment[1], 1991–2007 (%)

	1991	*1995*	*2000*	*2005*	*Sep-07*
Primary production	50.64	27.93	16.36	25.74	24.95
Crude oil	45.21	24.10	10.51	19.80	18.83
Agriculture and forestry	5.43	3.82	5.85	5.93	6.12
Manufacturing industry	15.66	33.66	49.01	41.93	43.18
Foodstuffs	3.41	18.17	23.85	6.77	7.12
Seafood	1.77	10.21	14.90	0.56	0.54
Textiles, clothing and footwear	2.18	0.52	0.74	11.23	11.84
Other	8.30	4.77	9.53	23.38	23.68
Construction	—	3.26	4.69	16.74	16.11
Service	20.99	26.44	18.86	15.59	15.68
Transportation and telecoms	10.12	7.10	4.67	2.65	2.38
Hotel and tourism	7.60	12.18	9.69	8.37	8.10
Finance and banking	2.77	4.93	2.48	2.30	2.46
Total	100	100	100	100	100
US$ million	361	6,269	14,954	27,986	30,960

Source: Compiled from data provided by the Ministry of Planning and Investment, Hanoi.

Notes:
1. Figures for a given year show the cumulative approved investment since 1988. The data cover realized projects only.

—Data not available.

information is available) to 15.2 by 2005, accounting for over a quarter of the total increment in real GDP between these two years.[5] The contribution of FIEs to the expansion of manufacturing has naturally been much greater compared to the rest of the economy; during the period from 2000 to 2005, they accounted for 35 per cent of the increment in real capital stock, over 40 per cent of real value added and nearly a third of employment in manufacturing (Table 9.3). In this section we examine the role of FIEs in the Vietnamese economy, focusing on three important aspects of manufacturing performance: export performance, labour absorption and factor productivity growth.

Table 9.3 Ownership structure of Vietnamese manufacturing by key performance indicators, 2000–2005

Indicator/ownership category	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2000–05*[2]
(1) Gross output[1] (%)	100.0	100	100	100	100	100	100
Domestic private firms	23.8	27.6	25.9	27.1	29.3	27.3	24.3
SOEs	51.7	35.8	35.8	33.3	29.6	32.0	40.8
FIEs	26.5	36.5	38.3	39.6	41.2	40.7	34.9
JV – with domestic private firms	14.1	15.3	15.6	15.3	14.3	13.0	14.0
JV – with SOEs	1.6	1.1	1.3	1.5	1.7	1.8	1.1
Fully owned	10.6	20.1	21.4	22.8	25.2	25.9	19.9
(2) Value added[1] (%)	100	100	100	100	100	100	100
Domestic private firms	18.9	34.6	19.9	22.6	26.4	23.4	36.0
SOEs	41.1	37.7	46.6	40.8	38.2	40.4	33.9
FIEs	40.0	27.8	33.5	36.6	35.4	36.1	30.1
JV – with domestic private firms	11.2	12.5	15.9	16.4	14.5	13.2	3.5
JV – with SOEs	1.3	0.6	0.9	1.1	1.3	1.3	1.4
Fully owned	27.5	14.6	16.7	19.1	19.6	21.6	25.1
(3) Employment (%)	100	100	100	100	100	100	100
Domestic private firms	33.4	36.1	38.0	38.9	36.3	33.5	36.0
SOEs	44.4	36.0	33.8	30.1	30.3	29.0	33.9
FIEs	22.3	27.9	28.2	31.0	33.4	37.5	30.1
JV – with domestic private firms	3.9	3.8	3.6	3.4	3.3	3.2	3.5
JV – with SOEs	0.8	1.1	1.3	1.6	1.6	1.8	1.4
Fully owned	17.6	22.9	23.3	26.0	28.5	32.5	25.1
(4) Capital stock[1] (%)	100	100	100	100	100	100	100
Domestic private firms	13.6	17.5	20.5	22.5	23.5	22.5	20.0
SOEs	35.0	34.0	31.9	30.5	31.4	33.4	32.7
FIEs	51.4	48.4	47.6	46.9	45.1	44.1	47.3
JV – with domestic private firms	23.0	19.5	17.0	16.4	13.8	12.3	17.0
JV – with SOEs	1.4	1.2	1.5	1.6	1.6	1.5	1.5
Fully owned	27.1	27.6	29.1	28.9	29.7	30.4	28.8

(*Continued overleaf*)

Table 9.3 Continued

Indicator/ownership category	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2000–05*[2]
(5) Capital per worker[1] (US$)							
All firms	6714	5725	6094	5691	6022	6444	6115
Domestic private firms	2735	2781	3292	3301	3898	4335	3390
SOEs	5284	5411	5764	5768	6229	7402	5976
FIEs	15508	9946	10265	8619	8141	7585	10011
JV – with domestic private firms	9390	9167	8633	7476	5435	4832	7489
JV – with SOEs	12699	6606	6931	5630	5946	5281	7182
Fully owned	10322	6893	7599	6332	6274	6025	7241
(6) Wage per worker (US$)[1]							
All firms	675	591	648	678	672	678	657
Domestic private firms	465	438	481	509	548	571	502
SOEs	703	678	719	781	725	747	726
FIEs	934	678	790	791	757	719	778
JV – with domestic private firms	1441	1155	1377	1425	1302	1337	1340
JV – with SOEs	947	583	898	626	664	653	729
Fully owned	821	603	692	718	700	662	699

Source: Compiled from unpublished returns to the Annual Manufacturing Census provided by the General Statistical Office, Hanoi.

Notes:
1. At constant (2000) prices.
2. Annual average.

Export performance

The most visible contribution of FIEs to the Vietnamese economy is in export expansion. During the reform era until the early 1990s crude petroleum and agricultural products dominated the export structure of Vietnam. Since then there has been a notable increase in the role of manufacturing in export expansion. The share of manufactured goods in total non-oil exports increased from about 20 per cent in the early 1990s to over 80 per cent in 2006. FIEs have played a pivotal role in this export transition. The share of FIEs in total manufacturing exports increased from about 20 per cent to over 50 per cent over this period (Figure 9.1). This increase has been accompanied by a continuous rise in Vietnam's share in total world manufacturing exports, from 0.07 per cent in the early 1990s to over 0.30 per cent in 2006. This pattern suggests that FIE participation has unequivocally been export creating.

There is evidence that FIEs, in addition to their direct contribution to export expansion, act as conduits for the expansion of exports by local firms (both SOEs and newly emerging private firms) by opening up marketing channels (Kokko and Sjoholm 2006). For instance, following the entry of foreign firms

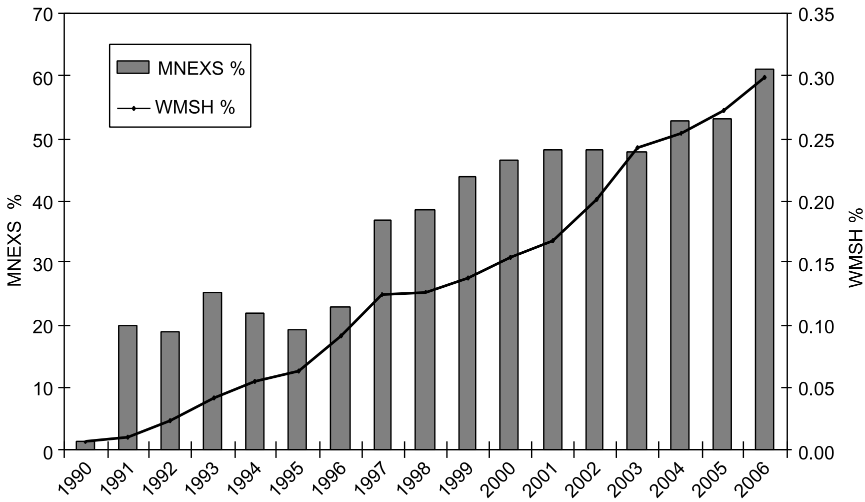


Figure 9.1 The role of foreign invested enterprises in manufacturing export expansion from Vietnam: FIEs' share in exports (FIEXS) (left scale) and Vietnam's share in world exports (WMSH) (right scale).

Source: Based on data compiled from Vietnam General Statistical Office, *Statistical Yearbook* (various issues) and UN *Comtrade* database.

into garments and other light consumer goods industries, many international buying groups,[6] which had long-established market links with these firms, expanded their global procurement networks to cover Vietnam. These buying groups have subsequently begun to procure supplies directly from local firms. Moreover, in some export-oriented industries MNEs carry out production in Vietnam entirely through subcontracting arrangements with pure local firms (eg. Nike in footwear and Ikea in furniture), while directly engaging only in procurement and marketing tasks through liaison offices. Naturally these export activities are not captured in FIE export data depicted in Figure 9.1.

During the early years of the reform the standard labour-intensive goods (in particular, textiles and garments, footwear and miscellaneous manufactures) dominated the export composition of FIEs. Over the past decade or so, electrical machinery and apparatus have emerged as the single most important export line of FIEs operating in Vietnam (Table 9.4). This product category predominantly comprises parts and components of information technology products (office, accounting and computing machinery, and electrical machinery and apparatus which fall under Sections 75, 76 and 77 of the Standard International Trade Classification, SITC) (Figure 9.2). Over 90 per cent of these exports are to countries in ASEAN, Taiwan, Korea and China. Interestingly, the geographic profile of Vietnam's exports and imports of parts and components belonging to these product categories is very similar to that of imports. These patterns are clearly indicative of the role of foreign firms in linking Vietnam to rapidly evolving regional production networks

Table 9.4 Commodity composition of exports by foreign invested enterprises, 1996–2005

VSIC		*1996–98*	*2002–05*
15	Food products and beverages	5.9	6.5
16	Manufacture of tobacco products	0.0	0.0
17	Manufacture of textiles	10.7	4.0
18	Manufacture of wearing apparel	9.5	11.8
19	Manufacture of leather products	30.9	21.3
20	Manufacture of wood and wood products	0.0	0.4
21	Paper and paper products	0.3	0.6
22	Publishing and printing	0.0	0.1
23	Coke and refined petroleum products	0.0	0.0
24	Chemicals and chemical products	2.1	2.9
25	Rubber and plastic products	1.2	2.1
26	Manufacture of other non-metallic mineral products	1.2	0.9
27	Manufacture of basic metals	0.2	0.9
28	Fabricated metal products	1.3	2.2
29	Machinery and equipment n.e.c	1.0	2.6
30	Office, accounting and computing machineries	0.0	0.2
31	Electrical machinery and apparatus n.e.c	29.2	32.8
32	Radio, television and communication equipment	2.2	1.4
33	Medical and optical instruments, watches and clocks	0.5	0.6
34	Motor vehicles, trailers and semi-trailers	0.2	1.9
35	Manufacture of other transport equipment	0.4	2.1
36	Manufacture of furniture, manufacturing n.e.c	3.2	4.7
	Total	100	100
	US$ million	1109	3114

Source: Compiled from data provided by the Ministry of Planning and Investment, Hanoi

Note:
VSIC Vietnam Standard Industry Classification (based on the International Standard Industry Classification, ISIC)

based on its comparative advantage in component assembly (see Athukorala and Hill, Chapter 2 in this volume). Notwithstanding recent rapid growth, exports from Vietnam still account for a tiny share (less than 1 per cent) of total machinery parts and component exports of the ASEAN countries (Athukorala 2008). However, given the recent entry of Intel Corporation and the subsequent arrival of a number of major global players in electronics and electrical machinery industry, network trade based on international production fragmentation is likely to be the prime mover of export-led industrialization in Vietnam in the years to come.

In sum, the export patterns of FIEs in Vietnam are basically consistent with the country's comparative advantage in international production. Contrary to the policy-makers' expectations, FIEs in so-called heavy industries such as chemical and chemical products, basic metal products, fabricated metal products and motor vehicles have not contributed to export expansion. There

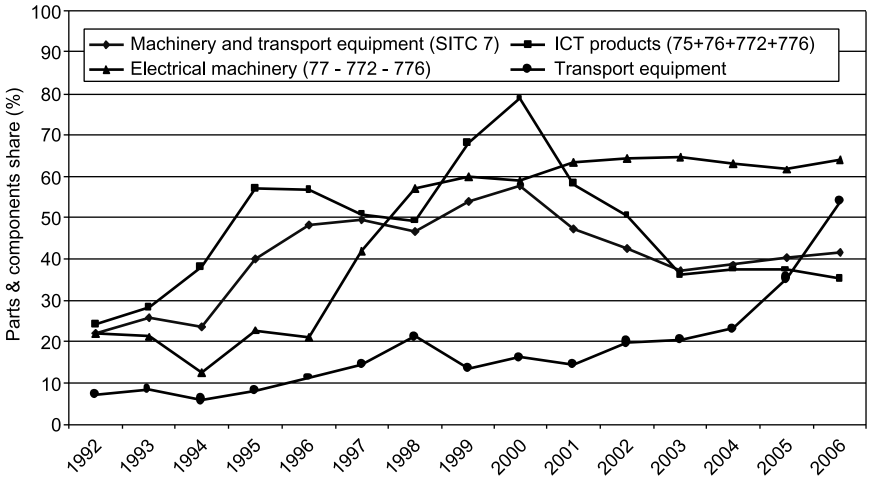


Figure 9.2 Share of parts and components in exports of machinery and transport equipment (1992–2006).

Source: Based on data compiled from UN *Comtrade* database.

is no evidence to suggest that export performance requirements and the related tax and import duty concessions, which were in force until recently, have had a noticeable impact on the performance of FIEs in these industries.

Employment

In the 1990s, while employment in manufacturing FIEs increased notably, the share of FIEs in total manufacturing employment consistently lagged behind their rate of output expansion (Jenkins 2003). For instance, in that decade, total manufacturing output grew by an impressive 9.5 per cent, but employment grew only by a mere 1.8 per cent. This reflected the capital intensity bias infused into FIE production by the heavy-industry emphasis of the investment approval policy and the structure of protection moulded by this policy.

There are clear signs that the employment record of FIEs began to improve from about the late 1990s in an environment that has become more conducive for export-oriented production (Figure 9.3). Between 1999 and 2005 total employment in manufacturing FIEs recorded a fivefold increase (from 217 thousand to 1.1 million), and their share in total manufacturing employment increased from 20 per cent to 38 per cent (Table 9.5). FIEs contributed over half of the total manufacturing employment increment between these two years.

This notable contribution of FIEs to expansion in manufacturing employment has been underpinned by a persistent decline in the share of FIEs in fixed investment in manufacturing (Table 9.3, Item 4). The share of FIEs in manufacturing fixed investment increased from about 20 per cent in the late 1980s to

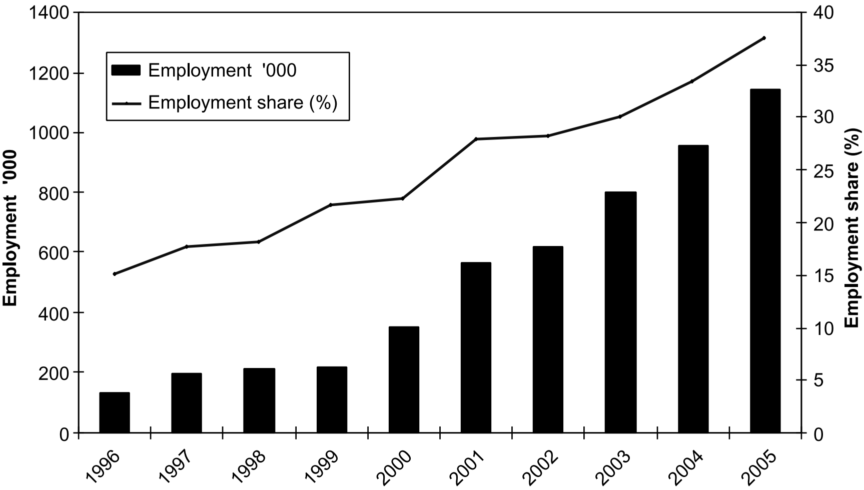


Figure 9.3 Employment in foreign invested enterprises in Vietnamese manufacturing: number of workers (left scale) and share in total employment (right scale).

Based on data compiled from General Statistical Office, *Statistical Yearbook* (various issues) and www.gso.gov.vn.

nearly 30 per cent in the mid-90s and then declined to about 17 per cent during 2000–2005. The share of FIEs in the total manufacturing capital stock was 44 per cent in 2005, down from 51.4 per cent five years previously as against a persistent increase in this figure for both SOEs and domestic private firms.

The decline in capital intensity (improvement in employment intensity) of FDI has in turn been underpinned by a notable shift in their output composition away from domestic-market-oriented production and towards export-oriented production. During 2005–2005 over 70 per cent of total manufacturing employment was accounted for by industries which exported more than 50 per cent of their output (Table 9.5). The data points to a close relationship between the degree of export orientation of FIE firms and their employment growth across industries listed in the Table (compare columns 1 and 6; the rank correlation coefficient between the two variables is 0.64). The data on employment and capital per worker disaggregated by ownership type shows that employment intensity of output expansion in fully-owned FIEs has been much greater compared to all the other four ownership categories (domestic private firms, SOEs, FIE joint ventures with domestic private firms, FIE joint ventures with SOEs). This reflects the fact that full ownership is generally the preferred mode of entry of most (if not all) export-oriented foreign firms.

The results of an econometric exercise undertaken to examine the determinants of capital intensity of production (measured by real capital stock per worker) in Vietnamese manufacturing, while taking into account firm ownership and controlling for export orientation and other determinants, are reported in Table 9.6. Equation 1 compares capital intensity differential

Table 9.5 Vietnam: contribution of foreign invested enterprises to manufacturing employment and related data, 2000–2005

VSIC code	*Industry*	*Export orientation of FIEs (%)*	*Capital per worker in FIEs 1000 US$*	*FIE share in employment[1] (%)*	*Industry composition of FIE employment[1] (%)*	*Growth of employment[1]*		*FIE share in employment*	*Average wage (US$)[1,2]*	
						FIEs	*Local firms*	*increment during 2000–2005 (%)*	*FIEs*	*Local firms*
15	Food products and beverages	18.5	122	14.3	5.2	14.3	8.3	22.3	1426	674
16	Manufacture of tobacco products	—	298	2.4	0.0	4.5	3.8	3.3	1767	1973
17	Manufacture of textiles	49.2	114	22.8	4.8	13.4	3.8	51.3	888	626
18	Manufacture of wearing apparel	85.7	17.0	35.8	19.8	39.2	9.6	63.4	705	666
19	Manufacture of leather products	99.1	10	52.1	33.0	24.7	2.8	89.6	721	555
20	Manufacture of wood and wood products	87.0	147	13.9	1.5	18.2	15.3	18.0	808	491
21	Paper and paper products	29.3	127	14.3	1.1	21.0	11.2	21.3	1117	769
22	Publishing and printing	21.8	51	3.9	0.1	45.7	10.9	11.7	1212	1252
24	Chemicals and chemical products	12.2	98	19.1	1.5	15.4	4.4	42.2	2314	1141
25	Rubber and plastic products	35.5	78	32.1	3.6	26.5	14.6	46.0	975	872
27	Manufacture of basic metals	5.5	235	12.2	0.4	19.4	6.2	28.0	2116	1149
26	Other non-metallic mineral products	6.1	251	9.5	1.4	17.2	10.5	13.7	1640	816

(Continued overleaf)

Table 9.5 Continued

VSIC code	*Industry*	*Export orientation of FIEs (%)*	*Capital per worker in FIEs 1000 US$*	*FIE share in employment[1] (%)*	*Industry composition of FIE employment[1] (%)*	*Growth of employment[1]*		*FIE share in employment*	*Average wage (US$)[1,2]*	
						FIEs	*Local firms*	*increment during 2000–2005 (%)*	*FIEs*	*Local firms*
28	Fabricated metal products	28.4	94	25.1	2.6	26.5	17.6	32.1	1157	729
29	Machinery and equipment n.e.c	67.5	58	11.8	0.7	21.4	8.5	26.6	1347	816
30	Office, accounting and computing machineries	25.3	226	94.8	0.8	28.4	57.2	94.4	1094	808
31	Electrical machinery and apparatus n.e.c	81.7	61	63.5	5.5	20.2	6.9	83.4	1054	1331
32	Radio, television and communication equipment	30	91	62.1	1.9	24.8	2.9	92.7	1371	1094
33	Medical/ optical instruments, watches and clocks	49.7	79	52.5	0.8	19.0	7.7	72.2	1252	816
34	Motor vehicles, trailers and semi-trailers	4.4	107	40.0	1.2	26.9	13.3	56.1	1371	895
35	Manufacture of other transport	20.2	59	33.8	1.8	31.2	12.0	51.0	1220	895
36	Miscellaneous	97.0	25	48.5	12.2	36.8	20.9	55.9	666	666
	Total	42.0	72	31.0	100.0	26.0	9.1	53.3	927	745

Source: Compiled from unpublished returns to the Annual Manufacturing Census provided by the Central Statistical Office, Hanoi.

Notes:
1. Period average.
2. At constant (2000) price.
VSIC: Vietnam Standard Industry Classification

Table 9.6 Regression results of determinants of capital intensity in Vietnamese manufacturing (dependent variable: log of real capital stock per worker)[1]

Explanatory variables	*Equation 1*	*Equation 2*
Log real output (*Y*)	0.161	0.151
	(49.00*)	(42.69)*
Log wage (*W*)	0.428	0.419
	(39.91)*	(39.16)*
Dummy for exporting firms (*EX*)	–0.273	–0.283
	(15.87)*	(13.66)*
Log age of firm (*AGE*)	–0.009	–0.011
	(15.66)*	(18.02)*
Foreign ownership dummy (*FOR*)	0.756	
	(28.69)*	
*FOR*EX*	–0.061*	
	(15.66)	
Joint Ventures (*JV*)		1.038
		(28.83)*
*JV*EX*		–0.014
		(0.26)
Fully-foreign owned (*FFW*)		0.663
		(21.02)*
*FWN*EX*		–0.016
		(0.004)*
SOE		0.182
		(9.49)*
*SOE*EX*		–0.010
		(0.33)
Regional dummies	Yes	Yes
Industry dummies	Yes	Yes
Time dummies	Yes	Yes
F	775	718
$\bar{R}^2$	0.42	0.42
N	39169	39169

Source: Estimated using firm level data from the Annual Manufacturing Census conducted by the General Statistical Office, Hanoi (2000–05).

Notes:
1. Estimated by pooled OLS with control for heteroscedasticity. Robust t-ratios are reported in parentheses.

* Significant at 1% level.

between all FIEs as a group and all domestic firms. In Equation 2, there are three ownership categories: FIE joint ventures (with both SOEs and local private firms),[7] fully owned FIEs and SOEs are identified separately using domestic firms as the base dummy. The coefficient of *EX* in both equations is consistent with the hypothesis that production processes of exporting firms (both local and foreign) are generally more labour intensive (or less capital intensive) compared to purely domestic-market-oriented firms. On average, the degree of capital intensity of exporting firms seems to be 28 per cent lower compared to non-exporting firms. Results for the disaggregated ownership dummies in Equation 2 are consistent with our previous inference based on simple inspection of data that production processes of fully-foreign owned firms are more labour intensive compared to FIE joint ventures. There is also weak statistical support for the hypothesis that exporting foreign firms are about 6 per cent more labour intensive compared to their non-exporting counterpart (Equation 1). However, the interaction term with export performance (*EX*) is not significant for any of the three ownership dummies. In sum, the results suggest that the greater employment intensity of FIEs that we have noted earlier has been the outcome of greater concentration of FIEs in industries with greater export potential (as determined by Vietnam's comparative advantage in international production) compared to their local counterparts. When appropriately controlled for the other relevant variables, there is no strong empirical evidence to support the view that they are more export-oriented than purely domestic firms.

Finally, the average wage of manufacturing FIEs has been consistently higher than that of non-FIEs across all industries. This pattern is consistent with the findings of a large literature on the wage behavior of foreign affiliates of MNEs in various countries (Lipsey 2004). However, data disaggregated by entry mode (Table 9.3) suggests that the average wage per worker in fully-owned FIEs is somewhat lower compared to that of both joint ventures with domestic private firms and joint ventures with SOEs. These differences seem to reflect the greater concentration of fully-owned FIEs in export-oriented production.

Productivity growth

A consideration central to any assessment of national gains to host countries from FDI is the contribution of FIEs to productivity growth in the national economy. FIEs are expected to contribute to productivity growth both directly (through their role as part of the domestic economy) and through a spillover effect on the performance of domestic firms.

The results of an econometric exercise undertaken to examine the relative contribution of FIEs are reported in Table 9.7. The methodology applied here is the estimation of a production function using pooled firm-level data, with ownership dummies included as additional explanatory variables. In addition to capital and labour, industry concentration, skill composition of employment and export ordination are used as control variables. Under the assumption that the standard input variables and other control variables are capable of explaining differences in output growth among firms during the period under study, the estimates coefficient of the ownership dummy provides for an appropriate test as to whether ownership makes a special contribution to inter-firm differences in productivity growth.

The standard OLS estimates are reported in Table 9.7 as Equations 1 and 2. Foreign-owned firms are represented in terms of a composite dummy

Table 9.7 Contribution of foreign invested enterprises to productivity of Vietnamese manufacturing[1] (dependent variable: real value added (Y))

Explanatory variables[2]	*OLS estimates*		*Hausman-Tayler estimates*	
	Equation 1	Equation 2	Equation 3	Equation 4
K	0.579	0.576	0.501	0.648
	(105.48)**	(106.92)**	(71.93)**	(107.23)**
L	0.123	0.132	0.142	0.040
	(1.35)	(0.92)	(1.34)	(1.01)
CON	–0.037	–0.043	0.006	0.008
	(0.58)	(0.67)	(0.76)	(0.86)
SCALE	0.028	0.028	0.023	0.031
	(10.48)**	(10.43)**	(31.39)**	(28.24)**
SKILL	0.001	0.001	0.003	0.003
	(4.65)**	(4.57)**	(10.84)**	(9.3124)**
AGE	0.002	0.002	0.001	0.002
	(2.86)**	(2.87)**	(1.96)*	(2.034)*
EX	0.353	0.236	0.414	0.472
	(4.23)**	(3.68)**	(7.03)**	(4.25)**
FIE	–0.204		–1.1	
	(10.34)**		(6.26)**	
*EX*FIE*	0.466		6.29	
	(16.50)**		(18.09)**	
FOFIE		–0.106		–0.156
		(13.66)**		(11.83)**
JVFIE		0.183		0.167
		(4.89)**		(3.675)**
*EX*FOFIE*		0.521		0.602
		(15.98)**		(16.21)**
*EX*JVFIE*		0.161		0.187
		(5.34)**		(6.78)**
Observations	85669	85669	85669	85669
Time dummies	Yes	Yes	Yes	Yes
R-squared	0.41	0.42	0.42	0.43

Source and method of data compilation: as for Table 9.6.

Notes:
1. Figures in parentheses are standard errors corrected for arbitrary heteroscedasticity and intra-group correlation. Statistical significance (one-tail test) is denoted as ** 1% and *5%.
2. Variable definitions: K: beginning of the year capital stock; L: Labour (number of workers); CON: industry concentration (measured using the Herfindahl index at the four-digit level of the Vietnamese Standard Industry Classification, VSIC)); SCALE: scale of operation (measured as the ratio of firms output and the average output at the related four-digit VSIC industry), SKILL: ratio of skill workers to total number of workers; AGE: operation age of firm; EX: export orientation; FIE: a binary dummy variable which takes value 1 for all foreign invested enterprises and zero for other firms; FOFIE: a binary dummy variable which takes value 1 for all fully-foreign owned enterprises and zero for other firms; JVFIE: a binary dummy variable which takes value 1 for all fully-foreign owned enterprises and zero for other firms.

variable (*FIE*) in Equations 1 and 3. Equations 2 and 4 distinguished among foreign-invested joint venture firms (JVFIEs) and fully foreign owned firms (FOFIEs). As a robustness check, the same equations estimated using the Hausman-Taylor random effect estimator are reported as Equations 2 and 4. The alternative estimates are strikingly similar. The following discussion focuses on methodologically superior Hausman-Taylor estimates.

The coefficient of the overall general foreign ownership dummy (*FIE*) is statistically significant with the perverse (negative) sign, suggesting that the presence of FIEs retards, rather than promotes, productivity of domestic manufacturing. However, the coefficient of the slope interaction dummy (*EX**FIE*) turns out to be positive and statistically significant; the results suggest that the rate of total factor productivity growth of export-oriented FIEs is about 60 per cent higher than that of local firms (used as the base dummy). When the two foreign-ownership categories are treated separately, export orientation is found to be more important in explaining productivity performance of fully-owned foreign firms compared to joint-venture foreign firms; on average the rate of productivity growth of export-oriented fully-owned foreign firms is 0.30 percentage points higher than that of their joint-venture counterparts.

Concluding remarks

Over the past decade there has been significant improvement in Vietnam's legal and institutional framework and the overall investment climate for FDI. In particular, reforms since 2003 have served to set the stage for FDI participation in the economy in line with its comparative advantage in international production.

The trends in FDI flows to Vietnam over the past one-and-a-half decades largely mirror changes/shifts in the domestic investment climate rather than global trends. The FDI boom in the first half of the 1990s came to an end by 1996, well before the onset of the East Asian crisis, reflecting the impact of policy backsliding. Reform implemented in response to this decline and reconfirmation of government commitment to promote FDI seems to have contributed to reversing the downturn from around early 2000.

A comparison of the economic impact of FDI on the Vietnamese economy during the first half of the last decade with that in the 1990s provides strong support for the conventional wisdom that concomitant liberalization of trade *and* investment regimes, accompanied by creating a congenial environment for market-based decisions by private agents, is vital for reaping developmental gains from FDI. During the 1990s employment expansion in FIEs lagged behind their rapid output growth, reflecting the capital-intensity bias of industries in a protectionist trade and investment regime. However, there are clear signs that with the continuing increase in the relative importance of export-oriented ventures among FIEs, the employment potential of FIEs began to improve from the late 1990s. Of particular significance in this connection is the growing importance of assembly activities in the global electronics industry and other high-tech industries as an area of involvement for foreign investors in Vietnam.

Notes

1 Key references, which also provide useful listing of related works, include Huang 2003a, Lardy 2002, Naughton 2007, Lankes and Stern 1997 and MacBean 2000.
2 The eight conditional sectors identified in the new law are: (a) national defense and social security, (b) finance and banking, (c) community health, (d) culture, information, publishing and printing, (e) entertainment services, (f) real estate business, (g) natural resource exploration and environment, and (h) education and training (Article 29).
3 Data reported in this paragraph are from Vietnam General Statistical Office, *Statistical Yearbook*, various issues.
4 The Hitachi plant in Ho Chi Minh City commenced operation in 2000. It currently employs about 4,000 workers.
5 Unless otherwise stated, the data used in this section are from General Statistical Organization, *Statistical Yearbook* (www.gso.gov.vn).
6 International buying groups are worldwide purchasing organizations of large retail chains in developed countries, which specialize in worldwide purchase of consumer goods such as apparel, toys and footwear.
7 There were not a sufficient number of observations in the data set to make a distinction between these two ownership types.

10 US and Japanese FDI and production networks in Asia

Nobuaki Yamashita[1]

The debate about whether significant differences exist between operations of US and Japanese multinational enterprises (MNEs) in developing Asia has a long history. It has been often claimed that operations of Japanese MNEs affiliates are a relatively closed system with tightly controlled buyer–supplier linkages (Belderbos 1997, Borrus et al. 2000, Encarnation 1999, Lipsey 1998). On the other hand, operations of US MNEs are often described as an open system characterized by fully-integrated modularity and extensive use of subcontractors and contract manufacturers (Sturgeon 2003). Some of the early studies, while acknowledging these differences, have argued that with the passage of time operations of Japanese MNEs would become similar to those of their US counterparts as the former gain maturity and the ongoing process of globalization forces firms to emulate international best practices in global business operations. A more recent study has in fact found some evidence in support of this 'convergence' hypothesis (Dunning et al. 2007). There is also evidence that international cost pressure has contributed to increasing use of outside manufacturers by Japanese MNEs (Paprzycki 2004, Ando and Kimura 2005, Sturgeon 2003).

This chapter aims to contribute to this debate by undertaking a comparative analysis of US and Japanese FDI in developing Asia using more up-to-date affiliates-level data. Most of the comparative studies of US and Japanese FDI listed above have covered the period of the 1980s and early 1990s. Three major events in the subsequent years – the Asian financial crisis, the rise of China, and the acceleration of the process of economic globalization from the mid-1990s – justify revisiting the debate using up-to-date data. The present study also differs from the previous studies in the particular attention paid to differences and similarities of US and Japanese MNEs in their participation in regional production networks and the related cross-border trade. Towards this end, a trade flow modeling exercise is undertaken to probe possible differences between US and Japanese MNEs in relation to the link between trade and foreign direct investment (FDI).

The chapter is organized as follows. The first section provides an overview of US and Japanese FDI in developing Asia. The next section compares operational characteristics of US and Japanese MNEs operating in the region, followed by estimating the gravity model to probe the trade–investment nexus. The final section summarizes key findings.

US and Japanese foreign direct investment in Asia

Overview

Figure 10.1 displays the presence of US and Japanese FDI in the FDI stock of developing Asia over the period from 1982 to 2007. Between 1984 and 1989 the share of US MNEs in the aggregate FDI stock in developing Asia remained around 7 per cent. After a gradual increase in the 1990s and a dip during the financial crisis (1998–99), it rapidly increased from 11 per cent in 2000 to 16 per cent in 2007. Overall, the importance of US investment in developing Asia significantly increased in the first decade of the new millennium.

The time patterns of Japanese FDI are notably different, especially in the 2000s. Interestingly, there was a clear break in the trend in the total FDI stock in the regions following the onset of the Asian financial crisis. In 1998, the Japanese FDI stock dropped from $77 billion (10 per cent of the total FDI stock) to $44 billion (5 per cent) in 1999 and has remained well below the pre-crisis levels during the ensuing years.

Table 10.1 shows country/region distribution of US and Japanese FDI stock during 1996 and 2007 (the period for which the most recent comparable data are available). Several differences between US and Japanese FDI

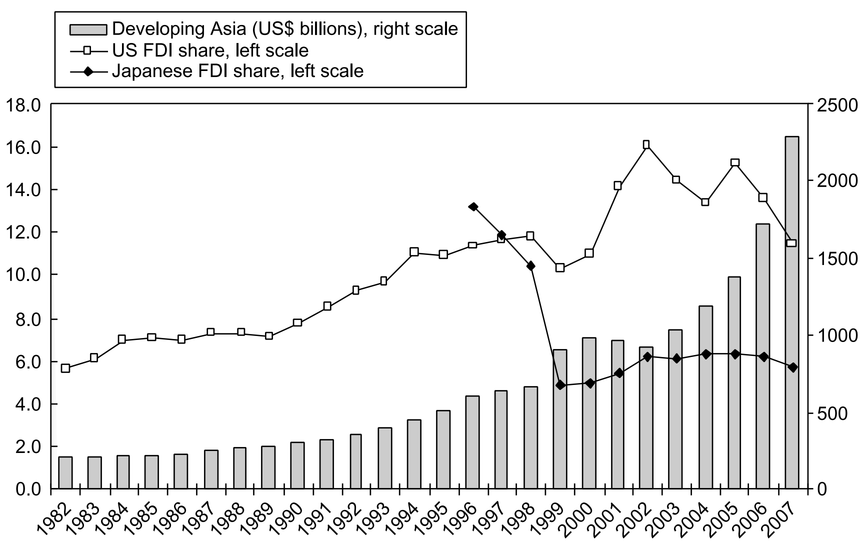


Figure 10.1 Stock of Japanese and US FDI in Asia, 1982–2007.

Source: UNCTAD, http://www.unctad.org/Templates/Page.asp?intItemID=1923&lang=1
The US Bureau of Economic Analysis, http://www.bea.gov/international/index.htm#omc
JETRO, http://www.jetro.go.jp/indexj.html

Table 10.1 Country/region composition of US and Japanese FDI stock, 1996 and 2007 (%)

Host country/region	*US*		*Japan*	
	1996	*2007*	*1996*	*2007*
Developing Asia	9.6	10.5	33.0	25.8
China	0.5	1.1	3.4	7.4
Hong Kong	2.0	1.9	3.9	1.8
Korea, Rep. of	0.9	1.1	1.5	2.4
Singapore	2.1	3.3	4.8	3.4
Taiwan	0.6	0.7	1.7	1.5
Indonesia	1.2	0.4	7.2	1.6
Malaysia	0.8	0.6	2.4	1.6
Philippines	0.5	0.3	1.2	1.1
Thailand	0.7	0.6	6.6	3.9
Vietnam	0.0	0.0	0.0	0.3
India	0.2	0.5	0.3	0.8
Japan	4.9	4.1		
Oceania	5.1	3.4	4.1	3.7
Europe	55.2	62.1	20.0	29.0
South and central America	8.1	3.7	5.0	10.7
Africa	1.2	1.1	0.2	0.8
Middle East	1.2	1.2	0.4	0.6
TOTAL	100	100	100	100
US$ billion	705.7	2498.5	238.4	512.9

Sources: The US Bureau of Economic Analysis, http://www.bea.gov/international/index.htm#omc; JETRO, http://www.jetro.go.jp/indexj.html

patterns emerge: First, the importance of developing Asia as their investment location is different between Japanese and US MNEs. In 1996, developing Asia accounted for 33 per cent of Japanese worldwide FDI stock, whereas it only represented less than 10 per cent of US FDI stock. The majority of US investment stock was in Europe, up from 55 per cent of the share in 1996 to 62 per cent in 2007.

Second, between 1996 and 2007 the share of developing Asia in Japanese total FDI stock declined, whereas that of US FDI remained virtually unchanged. Indonesia contributed most to this decline of Japanese FDI. In 1996, Japan's stock of FDI in Indonesia amounted to US$17 billion, which was 7.2 per cent of the world stock of Japanese FDI. This is the largest share within individual countries listed in developing Asia at that time. However, this share had declined to 1.6 per cent in 2007. Indonesia became less attractive for Japanese FDI in the post-crisis period due to political instability and social unrest. However, US investment in Indonesia recorded an increase, from US$8.3 billion in 1996 to US$10 billion in 2007.

Third, China became a much more important destination for Japanese FDI, compared with US FDI. In 1996, US FDI stock in China was US$3.8 billion, which increased to US$28.3 billion in 2007. However, it only accounts for 1.1 per cent of total US FDI stock. In contrast, between 1996 and 2007 Japanese FDI into China increased from US$8 billion to US$37.8 billion, and the share of China in Japanese global FDI stock rose from 3.4 per cent to 7.4 per cent. In 2007 China had the largest Japanese FDI stock in developing Asia. However, there is no evidence in support of the popular view (the 'China fear') that China was crowding out FDI inflow into other countries in developing Asia. The increase in US and Japanese FDI in China has not occurred through a reduction of the absolute level of US and Japanese investment in other countries in the region. This observation is consistent with the inference in other studies that the 'China fear' should not be overstated (Athukorala and Hill, Chapter 2 of this volume, Eichengreen and Tong 2007).

US manufacturing FDI

The composition of US investment has been gradually shifting towards service industries from around the beginning of the1990s (Figure 10.2). Between 1982 and 1988, manufacturing in US total outward FDI stock accounted for 40 per cent, but fell to 20 per cent in 2007. As in the case of total FDI, Europe accounted for around a half of US manufacturing FDI for the entire period of

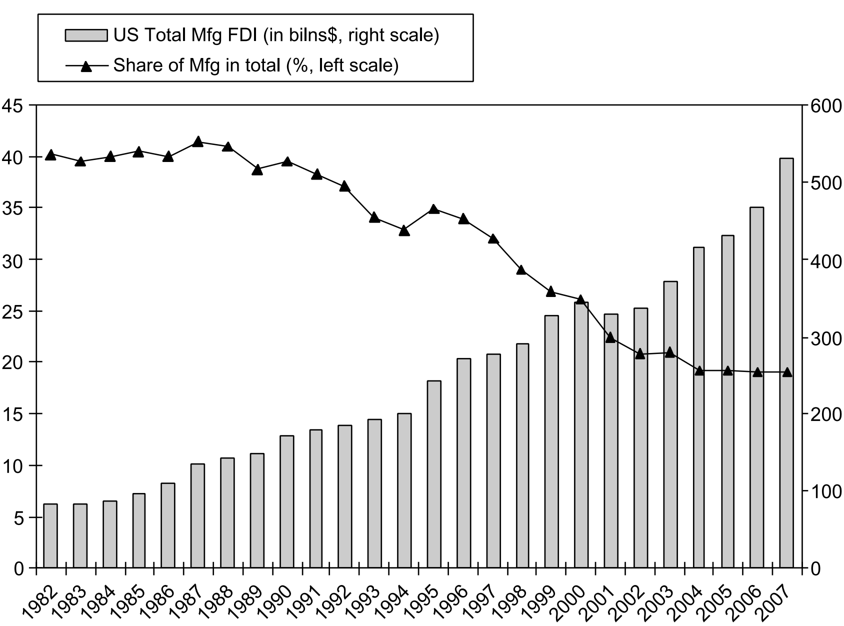


Figure 10.2 Share of US manufacturing in total FDI, 1982–2007.

Source: UNCTAD, http://www.unctad.org/Templates/Page.asp?intItemID=1923&lang=1

1982 to 2007 (Table 10.2). Developing Asia accounted for 12.7 per cent in US manufacturing FDI in 2007, up from 3.1 per cent in 1982. As with total FDI, the share of China in US manufacturing FDI has been increasing, but absolute levels of FDI with other parts of developing Asia have not gone down.

US manufacturing FDI in developing Asia is largely concentrated in electronics and electrical equipment (Table 10.3). Between 1999 and 2007 computer and electronic products accounted for 34.5 per cent in US manufacturing FDI in developing Asia, as compared to 14.1 per cent globally. Interestingly, the share of electrical equipment in developing Asia was significantly smaller at only 2.4 per cent in 1999–2007, while globally it was 17.3 per cent. The share of chemical industry in developing Asia declined from 30.5 per cent in 1989–98 down to 19 per cent in 1999–07, though the share of chemical industry for US manufacturing FDI was unchanged elsewhere in the world. The share of other manufacturing (comprising textiles, petroleum and coal products, and plastic and rubber products) also has increased from 14.5 per cent in 1982–88 to 25.4 per cent in 1999–2007.

Table 10.4 presents industry distribution of US manufacturing FDI in individual countries in developing Asia. In China computers and electronic

Table 10.2 County composition of US manufacturing FDI stock, 1982, 1996 and 2007 (%)

	1982	*1996*	*2007*
Developing Asia	3.1	7.9	12.7
China	0.0	0.5	2.8
Hong Kong	0.4	1.0	0.7
Korea, Rep. of	0.2	0.9	2.1
Singapore	0.7	1.9	2.6
Taiwan	0.4	1.1	0.9
Indonesia	0.2	0.1	0.1
Malaysia	0.3	1.1	1.1
Philippines	0.4	0.5	0.6
Thailand	0.2	0.6	1.3
Vietnam			
India	0.3	0.2	0.5
Japan	3.7	6.5	3.6
Oceania	3.9	2.8	2.6
Europe	45.3	50.2	48.4
South and Central America	18.9	14.9	12
Africa	1.6	0.5	0.6
Middle East	0.5	0.6	2
Total mfg stock	100	100	100
US$ billion	83.5	244.0	531.3
Mfg share in total stock	40.2	34.9	19.6

Source: The US Bureau of Economic Analysis, http://www.bea.gov/international/index.htm#omc

Table 10.3 Industry distribution of US manufacturing FDI stock, 1982–2007 (%)

	World			*Developing Asia*		
	1982–1988	*1989–1998*	*1999–2007*	*1982–1988*	*1989–1998*	*1999–2007*
Food and kindred products	9.5	11.1	6.6	6.2	8.2	3.9
Chemicals and allied products	21.8	24.7	23.9	30.5	21.8	18.9
Primary and fabricated metals	5.6	5.5	6.0	2.5	2.9	4.3
Industrial machinery and equipment	19.0	14.0	6.1	20.8	18.2	4.9
Computers and electronic products			14.1			34.5
Electrical equipment, appliances, and components	8.4	9.9	17.3	16.8	23.6	2.4
Transportation equipment	12.9	13.0	12.7	8.4	7.9	8.7
Other manufacturing	22.7	21.7	28.4	14.5	17.2	25.4
Manufacturing	100	100	100	100	100	100
Manufacturing (US$ billion)	105.3	216.0	394.8	13.6	36.4	74.6

Source: The US Bureau of Economic Analysis, http://www.bea.gov/international/index.htm#omc

products accounted for over 40 per cent of total US manufacturing investment in 1999–2002, but it declined to less than 20 per cent in 2003–07. This decline presumably reflects the increased reliance of US MNEs on contract manufacturers for final assembly in China while undertaking headquarter functions and high-end component production in other East Asian countries (Athukorala and Yamashita 2009). On the other hand, the share of transport equipment increased from 10.4 per cent in 1999–2002 to 16.7 per cent in 2003–07. Similarly, the share of chemical industry has risen from 16.5 per cent in 1999–2002 to 23 per cent in 2003–07. The changing industry composition might partly reflect the rising importance of local market-oriented US FDI in China. In general, FDI in chemical and transport equipment industry is basically serving the domestic market.

Industry distribution of US manufacturing FDI in Indonesia is peculiar for the heavy concentration in the chemical industry compared to other developing Asian countries. FDI in this industry is generally aimed at producing for the domestic market rather than for exporting. For the period of 1999–2003, around 70 per cent of US manufacturing FDI in Indonesia was in the chemical industry, whereas the electronics, electrical goods and transport equipment industries attracted little US FDI. This is in sharp contrast to the pivotal role played by US MNEs in global production networks in these industries, encompassing a number of other countries in the region (Urata 2002; Dunning 1998).

Table 10.4 Industry distribution of US manufacturing FDI stock in countries of developing Asia, 1992–2007

	China		*Hong Kong*		*India*		*Indonesia*		*Korea*		*Malaysia*		*Philippines*		*Singapore*		*Taiwan*		*Thailand*	
	1999–2002	*2003–2007*	*1999–2002*	*2003–2007*	*1999–2002*	*2003–2007*	*1999–2002*	*2003–2007*	*1999–2002*	*2003–2007*	*1999–2002*	*2003–2007*	*1999–2002*	*2003–2007*	*1999–2002*	*2003–2007*	*1999–2002*	*2003–2007*	*1999–2002*	*2003–2007*
Food	5.0	4.9	0.2	0.0	4.3	2.3	4.1	5.0	7.4	7.8	0.1	0.6	9.9	7.8	0.1	0.1	2.1	1.7	2.1	1.0
Chemical	16.5	22.9	7.2	8.5	22.3	31.0	69.4	74.7	15.9	16.1	5.0	15.5	15.6	15.7	5.2	10.3	39.3	22.8	30.6	18.4
Metals	2.6	5.1	1.7	3.2	3.7	4.5	3.8	0.0	1.4	1.2	0.3	0.7	1.0	0.5	1.1	0.4	1.8	1.8	3.3	2.3
Machinery	3.7	5.7	2.9	1.7	28.3	24.7	2.9	3.1	6.8	3.2	1.5	1.6	1.1	1.2	2.9	7.5	3.5	3.0	0.8	5.9
Electronic products	42.7	19.7	45.6	35.3	7.1	13.8	4.4	2.1	34.7	31.0	84.4	71.7	41.9	51.9	72.9	62.8	38.3	40.9	31.2	22.6
Electrical goods	7.6	5.1	4.0	8.7	1.1	4.0	1.6	0.9	0.6	2.1	0.0	0.1	0.3	0.0	1.1	2.0	0.3	1.4	0.5	0.7
Transportation equipment	10.4	16.7	0.9	1.0	0.4	5.0	0.0	0.0	10.4	11.4	0.1	0.7	0.0	0.1	4.7	9.4	0.4	2.1	3.8	8.4
Total manufacturing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: The US Bureau of Economic Analysis, http://www.bea.gov/international/index.htm#omc

Operational characteristics of US and Japanese affiliates

Table 10.5 presents data on the export-orientation of US and Japanese affiliates' operation in developing Asia in 2003 (the latest year for which comparable data is available). The Japanese MNE affiliates are more export-oriented compared to their US counterparts. The average export–sales ratio of Japanese affiliates is 51.7 per cent compared to 46.8 per cent for their US counterparts. At the individual country level, Japanese affiliates are more export-oriented than US affiliates in all countries, with the sole exception of those in Malaysia. Malaysia's unique position reflects the dominant presence of US major electronics producers such as Intel, whose assembly operations are a vital part of their global operations. Contrary to the popular perception (Branstetter and Foley 2009), there is no evidence to suggest that US affiliates in China are primarily export-oriented: only 30.7 per cent of total sales of US affiliates in China are destined for foreign markets compared to 54.5 per cent of Japanese affiliates. This difference is consistent with the available evidence that US firms in electronics and electrical industries, unlike their Japanese counterparts, rely heavily on contract manufacturers for final assembly operations in China. Geographical distance and the related trade costs could be another factor (Ahn et al. 2008; Branstetter and Foley 2009). In addition, the data in Table 10.5 also shows that a relatively larger share of Japanese affiliates' exports from developing Asian countries is destined for the home country (Japanese) market (48.6 per cent) compared to US affiliates (36.5 per

Table 10.5 Export-orientation of US and Japanese MNEs activity in Asia, 2003

Host country/ country group	*US MNEs*		*Japanese MNEs*	
	Exports-sales ratio (5)	*Exports to US as a share of total exports*	*Exports-sales ratio (5)*	*Exports to Japan as a share of total exports*
Developing Asia	46.8	36.5	51.7	48.6
China	30.7	24.8	54.5	61.8
Hong Kong	42.9	35.4	68.8	54.7
India	12.8	43.8	15.3	22.4
Indonesia	14.7	13.6	44.8	53.2
Korea, Rep.	27.2	39.0	39.0	48.2
Malaysia	66.9	57.7	44.8	39.1
Philippines	72.4	48.1	77.5	54.6
Singapore	58.8	26.2	64.7	25.0
Taiwan	41.7	36.8	32.6	46.3
Thailand	37.9	30.6	49.0	44.7
Vietnam			63.1	66.1
Japan	9.3	34.4		

Source: Compiled using data extracted from The US Bureau of Economic Analysis, http://www.bea.gov/international/index.htm#omc and RIETI, Japan, http://www.rieti.go.jp/jp/database/d08.html cent). The difference is particularly large for affiliates in China (Japanese affiliates 61.8 per cent; US affiliates 24.8 per cent), presumably reflecting difference in the distance-related trade cost.

Table 10.6 summarizes activities of US and Japanese affiliates in developing Asia at industry level. The data is not strictly comparable because of differences in the industry classification in the data reporting systems. However, the data reveals some general patterns. Both US and Japanese affiliates in developing Asia have high export intensity in electronic-related industries. This is consistent with the available evidence that both US and Japanese MNEs use the region as the assembly point in their global operations for world manufacturing exports (Athukorala and Hill, Chapter 2 of this volume). In comparison, in transport equipment production both US and Japanese affiliates are more local market oriented: about 70 per cent and 66 per cent of total sales of US affiliates and Japanese affiliates respectively goes to local markets. There are two possible explanations of the larger share of local sales in transportation equipment compared to the electronics industry. Firstly, almost all countries in the region have continued to use high import tariffs to protect the domestic automobile industry. Therefore, producing for the domestic market has been a primary consideration in the site-section decision of MNEs. Secondly, compared to electronics components, automotive parts (e.g., body parts, vehicle bumpers and vehicle engines) are much heavier and bulkier, resulting in a higher transportation cost relative to export value. Consequently, there is a tendency for automotive part producers to locate their plants closer to the final vehicle assembly plants in a given country.

Trade–investment nexus

The previous section highlighted some key differences and similarities between US and Japanese MNE operations in developing Asia. This section undertakes a more formal examination of their differences using the gravity model of trade flows. The focus of regression analysis is on how trade–investment linkage related to production networks differs between the US and Japanese MNEs after controlling for the factors affecting the bilateral trade. Trade in parts and components is used as a proxy for the extent of production networks connecting between the US/Japan and each of the host countries. While it is not perfect, trade in parts and components is the key manifestation of the growing importance of production networks in vertically integrated industries (Yeats 2001, Athukorala 2005b). The basic specification follows Athukorala and Yamashita (2006 and 2008) but we include some additional explanatory variables.

The basic specification takes the following form:

$$\ln XM_{j,k,t} = \beta_0 + \beta_1 \ln GDP_{k,t} + \beta_2 \ln GDPP_{k,t} + \beta_3 \ln Dst_k + \beta_4 \ln ULC_{j,k,t} + \beta_5 \ln TAF_{j,k,t} + \beta_6 \ln MNE_{j,k,t-q} + ASIA + t_t + \varepsilon_{j,k,t} \qquad (1)$$

Table 10.6 US and Japanese MNE affiliates in developing Asia by industry breakdown, 2003

(a) US affiliates

	Food	*Chemicals*	*Primary and fabricated metals*	*Machinery*	*Computers and electronic products*	*Electrical equipment, appliances, and components*	*Transportation equipment*	*Total manufacturing*
Sales to US (%)	4.4	1.6	0.5	5.2	27.1	23.0	12.7	17.1
Sales to other foreign countries (%)	22.1	32.5	0.0	37.2	34.4	32.6	16.5	29.7
Local sales (%)	73.5	65.9	99.5	57.6	38.4	44.4	70.9	53.2

Source: The US Bureau of Economic Analysis, http://www.bea.gov/international/index.htm#omc

(b) Japanese affiliates

	Textiles	*Other manufacturing*	*Chemicals*	*Primary metals*	*Metal products*	*General machinery*	*Electrical machinery*	*Communications*	*Transport equipment*	*Precision machinery*	*Total manufacturing*
Sales to Japan (%)	28.8	27.1	11.1	17.1	21.4	32.6	25.6	31.6	15.9	48.2	25.1
Sales to other foreign countries (%)	24.5	20.2	33.3	23.6	20.6	20.4	31.4	33.1	17.9	19.9	26.5
Local sales (%)	46.6	52.7	55.7	59.0	57.3	47.0	42.9	35.4	66.1	30.9	48.3

Source: RIETI, http://www.rieti.go.jp/jp/database/d08.html where subscripts *j*, *k*, and *t* symbolize industry, country, and time, respectively. A symbol *ln* before a variable denotes the natural logarithms. The dependent variable (*XM*) is trade flows (exports or imports) of machinery parts and components.

The first three explanatory variables, *GDP* and GDP per capita (*GDPP*) of trading countries and the geographical distance (*Dst*) between US/Japan and them, are the familiar gravity variables. The gravity model in Equation (1) includes a measure of US/Japanese MNE affiliates activity, denoted *MNE*, in order to capture the effect of trade–investment nexus in US and Japanese production networks. The presence of MNE involvement is captured by total sales of US/Japanese affiliates in host countries.

The model also includes three cost variables which are most relevant to trade flows. Unit labour cost (*ULC*) of host countries is frequently cited as one of the key factors of attracting MNE production (Jones 2000; Jones and Kierzkowski 2001b). The greater the differences in labour costs, the more the incentives to relocate production processes that use this factor relatively intensively. In this account, rather than using simply manufacturing wages, labour cost adjusted for labour productivity is employed. Other cost variables included in the model are tariffs (*TAF*) and real exchange rates (*RER*), which capture the international competitiveness of traded-goods production. A dummy variable for developing Asian countries (*ASIA*) is expected to capture whether the modality of production network is significant as compared to other parts of the world, after controlling for other determinants. Finally, the time-specific dummies are included to control for general technological changes and other time-varying factors. The details on variable definition and data sources are given in Appendix Table 10.A.1.

Equation 1 is estimated using a three-dimensional (country, industry and year) panel data set for the period of 1988–2005. The data set covers the 41 trade partner countries of US/Japan, which are selected based on world share of machinery exports accounting for 0.1 per cent or more in 2000, and they represent over a 95 per cent share of Japan's machinery exports in 2000 (see Appendix Table 10.A.1 for a list of countries). The data sets cover five machinery industries at three-digit International Standard Industry Classification (ISIC): ISIC 381 (Fabricated metal products), ISIC 382 (Machinery, except electrical), ISIC 383 (Electric machinery), ISIC 384 (Transport equipment), and ISIC 385 (Professional and scientific equipment). The dataset was assembled from five different databases: the UN Comtrade, Nicita and Olarreaga (2007), the United Nations Industrial Development Organization (UNIDO 2006), the Annual Survey of US Direct Investment Abroad from the Bureau of Economic Analysis (BEA) and the Research Institute of Economy, Trade and Industry (RIETI) Foreign Direct Investment (FDI) Database (see Appendix Table 10.A.2 for the detailed data source). The initial period of the dataset is 1988, because this is the first year that the UN Comtrade database started reporting under SITC Revision 3, upon which the commodity listing of parts and components in this study is based (see Yamashita 2009 for more details).

The model is estimated separately for imports and exports of trade in parts and components. The preferred estimation method is the random effect (RE) model in order to exploit the panel nature of the dataset. The alternative within-transformation estimation is not appropriate since it eliminates all the variables including the distance variable which is essential for the present investigation. The major econometric issue in estimating the gravity model (1) is the possible endogeneity problem on the *MNE* variable, as commonly found in this strand of literature (Lipsey 2003 and 2004). This claim is valid because some country characteristics make them attractive for the location of FDI and the destination/source of trade flows at the same time. Following Head and Ries (2001), one year of time lag is taken on the MNE presence variable in order to deal with this possible endogeneity problem.[2] Thus, the coefficient of the MNE presence variables will not reflect the contemporaneous effect on trade flows. Ideally, the instrument variables approach is employed to address the endogeneity issue. However, the difficulty with this approach is finding the appropriate instrumental variables. It requires exogenous variables that have direct effects on MNEs' presence, but are not directly related to fragmentation trade flows. In the absence of a satisfactory instrument variable, the second best approach is to take time lags of the endogenous variable. In order to guard against possible violation of the assumption of homothetic residuals, the heteroscedasticity-consistent standard errors (i.e., the White correction) are used.

Results

Table 10.7 presents the estimation results. The model performs remarkably well, with alternative specifications explaining over 50 per cent of the variation in the data. There is strong statistical support for the hypothesis that the presence of foreign affiliates of MNEs in a host country is positively correlated with trade flows of parts and components on both exports and imports side. In other words, there is a strong trade–investment linkage between FDI affiliate activity and trade flows. Interestingly, the magnitude of this linkage effect appears to be quite similar between the US and Japan: a 10 per cent increase of affiliate sales leads to around 1.6–2 per cent increase of trade flows in components.

The estimated coefficient of a dummy for developing Asia (*ASIA*) is positive and significant for all regressions in Table 10.7, but the dummy variable seems to have the larger effect for the US in terms of the magnitude and the statistical significance. This finding suggests that developing Asia is becoming the dominant production base for US production networks, as compared to other parts of the world. The results for Japan are interesting, but the result might be partly driven by a correlation between *ASIA* and *DST*.

The estimation results for other variables can be summarized as follows. The

Table 10.7 Determinants of trade in parts and components in US and Japanese manufacturing industries, 1988–2005

	Equation 1	*Equation 2*	*Equation 3*	*Equation 4*
	US		*Japan*	
	Exports	*Imports*	*Exports*	*Imports*
MNE	0.16***	0.18***	0.17***	0.21***
	[0.05]	[0.05]	[0.06]	[0.06]
ASIA	2.77***	2.07***	0.88*	1.28*
	[0.39]	[0.42]	[0.49]	[0.75]
GDP	0.69***	0.82***	0.40**	0.89***
	[0.11]	[0.14]	[0.19]	[0.29]
GDPP	–0.01	0.02	0.15	0.27
	[0.14]	[0.16]	[0.12]	[0.19]
DST	–0.71**	–0.76**	–1.13***	–2.10***
	[0.35]	[0.36]	[0.29]	[0.67]
ULC	0.10***	0.14***	–0.01	–0.10
	[0.02]	[0.02]	[0.10]	[0.12]
RER	0.09	0.06	–0.61***	–0.87**
	[0.18]	[0.20]	[0.19]	[0.36]
TARIFF	7.16***	4.45**	5.94**	4.02
	[2.27]	[2.13]	[2.33]	[3.14]
Constant	–32.04**	–23.27**	–23.78*	–23.67
	[12.94]	[11.27]	[14.08]	[20.83]
Observations	1503	1503	679	679
R-squared	0.56	0.52	0.66	0.53

Note:
The results time dummies are not reported. Standard errors based on White's heteroscedasticity correction cluster by country are given in brackets. Statistical significance denoted as: *** 1%, ** 5%, and * 10%.

estimated coefficient for *GDP* and *DST* are with the expected signs and closely resemble the typical gravity-model variables. The effect of distance on trade flows is found to be larger for Japan than for the US. Hence, there is a bias for Japan to find production sites geographically closer. Interestingly, the estimated coefficient of *DST* for the imports equation is persistently larger than that of the exports equation. The estimated elasticity for *DST* is about 2.1 in imports regression compared to less than 1.1 in export regressions (Equations 3 and 4). This seems to reflect the dominant preference of Japanese firms for importing machinery parts from geographically closer countries in order to facilitate 'just-in-time' delivery and to maintain high quality.

The coefficient of *GDPP*, which is considered a proxy for infrastructure quality and skill endowment, is not statistically significant. The coefficient of *ULC* has the expected sign in all equations but is statistically significant only in the equation for US FDI. The coefficient of the US equation indicates that a 10 per cent increase in *ULC* leads to about a 1–1.4 per cent increase of trade in components. The estimated coefficients for *TAF* are significant, but with the wrong sign. It is possible that *TAF* is picking up some other important industry effects. The results are not sensitive to the deletion of this variable.

In sum, the results suggest an important linkage between the presence of MNE affiliates and trade flows in components between the US/Japan and the host countries of their FDI. This finding is consistent with a view that increasingly complementarity between trade and FDI is largely driven by the expansion of regional as well as global production networks. In particular, developing Asia plays a pivotal role in the expansion of trade in components by US MNEs.

Conclusions

One of the main conclusions from previous studies is that US and Japanese MNEs in developing Asia behave differently. We have re-examined this convergence hypothesis, using data assembled from various FDI sources and its linkage with global/regional production networks. The trade–investment nexus for US and Japanese FDI was also examined by estimating a variant of the gravity model of trade flows.

It is found that the degree of participation of US MNEs in developing Asia increased following the 1997–98 Asian crisis, whereas that of Japanese MNEs declined significantly. Over the years, operations of US and Japanese MNEs have become similar in many ways, as predicted by earlier studies. There are still some notable differences: Japanese MNE affiliates have continued to remain more export oriented compared to their US counterparts and Japanese MNE affiliates play a much more significant role in final assembly activities within regional production compared to their US counterparts, whose activities have become increasingly concentrated in parts and components production and headquarter activities while relying on contract manufacturers and pure local firms for final assembly.

US affiliates in China are relatively local-market oriented as compared with Japanese affiliates. In fact, there has been the rising importance of chemicals and automotives industry which are more domestic-market oriented by US investment in China. On the other hand, around a half of total sales by Japanese affiliates in China were still exported.

The gravity model estimates confirmed the strong trade–investment nexus for both the US and Japan. In particular, there is strong evidence to suggest that developing Asia is becoming the primary production point for the production networks of US MNEs.

Appendix

Table 10.A.1 Countries covered in regression analysis

Country	*Share of machinery exports in world (%)*	*Country*	*Share of machinery exports in world (%)*
Costa Rica	0.1	Ireland	0.9
Argentina	0.1	Switzerland	1.0
Slovenia	0.1	Thailand	1.2
India	0.2	The Philippines	1.2
Slovakia	0.2	Belgium	1.6
Russian Federation	0.2	Sweden	1.7
South Africa	0.2	Spain	1.7
Turkey	0.2	Netherlands	2.2
Norway	0.2	Singapore	2.4
Australia	0.2	Malaysia	2.9
Portugal	0.3	Italy	3.1
Indonesia	0.4	Mexico	3.7
Israel	0.4	Rep. of Korea	3.7
Poland	0.4	Taiwan	4.0
Denmark	0.4	United Kingdom	4.4
Czech Rep.	0.5	Canada	4.5
Brazil	0.6	France	4.9
Hungary	0.7	China	5.4
Finland	0.7	Germany	10.6
Hong Kong SAR	0.8	Japan	13.1
Austria	0.8	USA	16.4

Table 10.A.2 Variable definition and data source

Label	*Definition*	*Data source*
FRG[1]	Trade flows of machinery parts and components	Trade data: The UN Comtrade (online database at http://comtrade.un.org/db/)[1] Trade price indices: Japan: Bank of Japan (BOJ), online database at http://www.boj.or.jp/theme/research/stat/pi/cgpi/index.htm. U.S: online database of the Bureau of Labour Statistics, the US Department of Labour at http://www.bls.gov/home.htm
GDP, GDPP	GDP in constant US$	World Bank Development Indicators online database, The World Bank, http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/
Exchange rates	Period average exchange rates vis-à-vis US$	As above
Distance	The geographical distance in kilometres	Joe Haveman’s International Trade Data Source, http://www.macalester.edu/research/economics/PAGE/HAVEMAN/Trade.Resources/TradeData.html.

Tariff rates	Import-weighted tariff rates	Nicita and Olarreaga (2007)
ULC	Unit labour cost in US MNEs foreign affiliates	For countries except for the US, the data are compiled from the electronic data files of the *Annual Survey of US Direct Investment Abroad*, the Bureau of Economic Analysis, US Department of Commerce, http://www.bea.gov/scb/account_articles/international/iidguide.htm#page3 The US wage rates are obtained from the Bureau of Labour Statistics, the US Department of Labour at http://www.bls.gov/home.htm
MNE	Gross sales of foreign affiliates of Japanese and US MNEs	Japanese MNEs: FDI database of the Research Institute of Economy, Trade and Industry (RIETI) http://www.rieti.go.jp/jp/database/d08.html. US MNEs: electronic data files of the *Annual Survey of US Direct Investment Abroad*, the Bureau of Economic Analysis, US Department of Commerce http://www.bea.gov/scb/account_articles/international/iidguide.htm#page3

Note:

1. The compilation of the data series of parts and components involved three steps. First parts and components were identified at 5-digit SITC level following the procedure described in Athukorala and Hill, Chapter 2 (Appendix). Then these items were re-classified under five machinery sectors of the International Standard Industry Classification (ISIC) using the concordance developed by Maskus (1991, Table 1.6). The Maskus (1991, p. 42, Table 1.62) concordance relates to SITC Rev 2, while a list of parts and components is developed based on SITC Rev 3. Hence, the data were first mapped into SITC Rev 2 by using the concordance table available at the classification registry at the Statistical Division of the United Nations before reclassifying them under ISIC. Finally, the data series (in current US$) were deflated by export and import price indices (2000 = 100) obtained from the Bank of Japan database.

Notes

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2 The estimation results based on two years of time lags does not essentially change the results and they are omitted for brevity.

Part 4

Structural changes and policy issues

11 The rise of China and India

Adjustment pressures and challenges for resource-rich Asian developing countries

Ian Coxhead and Sisira Jayasuriya

The recent rapid growth of China and India, the world's two most populous countries and the two largest economies of developing Asia, has transformed the global economic and political landscape.[1] Though the global financial crisis has dampened the growth of both China and India, they appear set to maintain a significant growth rate differential with developed economies. Indeed, recent developments will probably further strengthen their pivotal role in the regional economy, emphasizing their importance for the neighboring Asian economies.

The rapid growth of China, followed by India, has had major effects on every facet of the global economy. They have become major competitors as well as important trading partners for other developing countries. The expansion of labor-intensive manufactured exports (from China in particular) exerts competitive pressures on similar exports from other developing countries. On the other hand, their growth also stimulates an expansion of demand for imports of both raw materials and skill-intensive manufactured parts and components. This demand for raw materials generated the "commodity price boom" that lasted for several years up until the onset of the 2008 global financial crisis while the demand for parts and components has led to a process of deepening economic integration based on product fragmentation and production networks.

Using a simple trade theoretic model, we analyze these twin pressures emanating from the growth of the "giants" and discuss in particular how differences in relative factor endowments of resource-rich economies can produce quite different outcomes. Countries that are better endowed with capital and skills and at a higher rung of industrialization are more likely to be able to adjust to competitive pressures and benefit from the new demands than countries that are less well endowed with capital and skills and at a lower stage of industrialization. The latter are more likely to be affected by "resource curse" effects producing deindustrialization and environmental degradation. We illustrate these different impacts by considering the circumstances and experiences of selected Southeast Asian countries.

The context

The emergence of China and India as major economic powers, forcing other countries to "dance with the giants" (Winters and Yusuf 2007), has already led to major changes in trade and investment patterns in Asia, producing an intensification of intra-regional trade and integration, while also exerting major competitive pressures on exporters of labor-intensive manufactured products. Intra-regional trade in Asia, for example, has been growing much faster than global trade, doubling between 1995 and 2004, and has now reached levels comparable to that within the EU (ADB, 2007). China in particular has emerged not only as a huge exporter to the world of labor-intensive manufactured products but also as a major importer of resources as well as manufactured parts and components. In fact, within the region China is a net importer; given its large overall trade surplus, this means that it has become, indirectly, a key export outlet from Asia as a whole to the rest of the world.

In considering the complementary aspect of Chinese and Indian growth with that of Southeast Asian economies, most emphasis has been placed on the role of China and India as resource importers responsible for the recent commodity boom when demand for resources grew very rapidly for all types of primary commodities.[2] China emerged as the world's largest consumer of most of the main metals (accounting for a quarter or more of world imports), and a major consumer of energy and many other minerals and primary commodities (Streifel 2006). It is the largest consumer of a wide range of agricultural commodities: wheat, rice, palm oil, cotton and rubber; and the second largest in soybeans, soybean oil and tea. India – arriving later on the fast growth path and yet to embark on Chinese-style industrialization – is fifth in overall energy use (third largest in coal), seventh or eighth in many of the main metals, and a large consumer of agricultural goods (largest in sugar and tea, second largest in wheat, rice, palm oil and cotton). Between 1990 and 2003, Chinese demand for major metals grew at an average of 14.7 percent per year; from 1999, it grew at over 17 percent until the onset of the global recession and absorbed around two thirds of incremental global output. Over the medium to longer run, assuming Chinese and Indian growth will pick up pace again and that India will emulate China, the combined impact on global commodity demand and prices is likely to be huge.[3]

The growing demand for commodities from these fast-growing economies has led to a global search for suppliers. Both China and India have reached out not only to neighboring resource-rich countries in Asia, but also to suppliers elsewhere, including Africa and Latin America. This has led to major changes in trade patterns as well as new investment flows. China, for example, became the third most important export destination for Brazil and its fourth most important import source. China signed a free trade agreement with Chile in 2005, and became its second most important trading partner after the US. Half of China's global FDI stock is now located in Latin America. A similar development is seen in Africa, with China and, to a lesser extent India, emerging as major trading partners (Broadman 2007).[4] In 2005 Asia's share of African exports (27 percent) was nearly equal to that of the EU (32 percent) or the US (29 percent). Asian exports to Africa have also been growing rapidly, by an average 18 percent per year from 2000 to 2005. These trade links have been reinforced by increasingly strong investment links; Chinese and Indian FDI into Africa, particularly targeting extractive industries, has been growing steadily. However, despite the growth in Chinese and Indian trade and investment links with Africa and Latin America, it is their relationships with the rest of developing Asia – in particular with the countries of Southeast Asia – that are pre-eminent. This is due in part to proximity and the historical strength of trade ties, and partly because in Asia – specifically, in Southeast Asia – these links involve dense networks of trade both in manufactures and in primary commodities.

The focus on the commodity boom and the role of China and India as resource importers has tended to downplay the importance of their role – in particular, the role of China – as a source of demand for manufactured intermediates (parts and components) associated with the expansion of international production networks and fragmentation trade – that is, trade in different "slices" of a product (see Athukorala and Hill, Chapter 2 of this volume). However, this is an area of trade which has grown very rapidly in recent years and is playing a major role in the structural changes being experienced by several Southeast Asian economies. In principle, of course, commodity trade can be thought of as a form of fragmentation trade in that it is an input into production of other goods that are further up the value chain, just like a manufactured part or component. Both are driven by comparative advantage and are facilitated by declines in transport costs and in policy-related impediments to trade – although trade in commodities obviously has a much longer history than that in manufactured intermediates. However, there are some fundamental differences between them that may have significant implications for long-term economic development.

Most importantly, comparative advantage in commodities derives from immobile resources such as mineral-laden or forest-covered land, climate etc. By contrast comparative advantage in manufacturing depends largely on past investments in infrastructure, physical plant and human capital; it is, therefore, something that evolves more quickly and more directly as a result of policy and international market conditions. Maintaining comparative advantage in manufacturing requires continuing investments in human capital and infrastructure and flexible factor and product markets and complementary institutions. The place occupied by a particular country in an international production network and the nature of products in which it would have a comparative advantage will depend on its relative factor endowments *vis à vis* the other partners of the network. Here it is important to pay attention to the diversity within even the resource-rich Southeast Asian economies.

Malaysia, Indonesia and, to a lesser extent, Thailand are often loosely described as resource-rich, but they obviously differ very significantly in relative endowments of skills, infrastructure and other forms of capital. In a ranking of countries on the basis of resource endowments typically considered most relevant for comparative advantage in manufacturing (physical capital and human capital etc.), resource-rich Southeast Asian countries would not all be on one side of China; for example, countries such as Malaysia and Thailand are more capital-rich, and Indonesia is relatively capital poor. Overall, they differ significantly in relative factor endowments and in the structure of production and trade. This diversity among Southeast Asian economies raises the possibility that the twin supply and demand forces generated by the growth of the "giants" may lead to quite different outcomes within the region. In order to analyze and understand the adjustment pressures and challenges facing these resource-rich Southeast Asian countries we need analytical models that can simultaneously address commodity booms and fragmentation trade. The trade and growth implications of commodity booms are commonly analyzed through the lens of Dutch Disease models, but these typically incorporate too little detail on the structure of manufacturing industry to yield insights relevant to fragmentation trade.

In the next section we briefly describe an analytical framework that can help address the issues set out above.

Theory [5]

In order to explore how changes in trade are linked to changes in the scale and structure of production in developing economies, we need a framework that allows us to establish the determinants of changing patterns of trade in a multi-good, multi-country context. A useful framework is given by Deardorff's (1987) two-factor, *n*-good, *m*-country model in which the pattern of trade is determined by comparative costs and transport costs or equivalent trade barriers.[6] In Coxhead and Jayasuriya (2008), we have re-interpreted this model, and look at the case where the country using capital and labor produces a range of manufactured goods ranked by the relative capital-intensity of their production processes. In the absence of transport costs the pattern of trade is determined by comparative production costs. In equilibrium, each country produces a range of goods that are contiguous in terms of skill-intensity, with equilibrium relative factor price determined as part of the global trading equilibrium, and need not be equal across economies due to specialization in production. If preferences are the same in all countries and trade is unimpeded, then no good is produced in more than one country – the so-called 'neutral' case.[7] If we consider three developing countries, A to C, ranked by relative labor endowment, then A produces the set of the most labor-intensive goods, X_1, B the next most labor-intensive set X_2, and C the most skill-intensive set, X_3.

We can think of the factor endowment ranking as corresponding to a per-capita income ranking, so we can think of A as a low-income country, B as lower-middle income, and *C* as upper middle-income. In the neutral case, the poorest country exports the most labor-intensive goods, and the richest exports the most skill-intensive goods. Then, each good is produced and exported only by one country: that in which unit costs are lowest.

In the real world, of course, similar but differentiated goods can be sourced from many countries, and two-way trade is widespread. The model generates somewhat more realistic outcomes once we allow for trade costs (transport costs or equivalent trade restrictions). With trade costs (assuming, for simplicity, that trade costs are the same for all goods and countries), a country will import a specific product only if the landed price is less than the domestic cost of production. Comparative cost is now no longer the sole determinant of propensity to produce and export, and as a result, some countries produce some goods solely for home market consumption. Then some goods can be produced in two countries. One country is the sole exporter of each good, while the other produces only for its own domestic market. The key point here is that production for the home market only occurs for goods at either end of a country's capital-intensity range. For example, country *B* may produce a good just beyond the "edge" of its comparative cost determined set, even though its production costs are higher than in countries *A* and *C* respectively, because once trade costs are included, *B* can source these goods more cheaply from its own producers.[8]

This model with trade costs allows us to analyze two empirically important cases. First, we can mimic the effects of global market liberalization or reductions in other trade barriers by reducing or removing trade costs and examine how trade patterns alter in response to such changes. Second, we can simulate the effects of *ceteris paribus* productivity growth (or of policy reforms that have productivity-increasing effects) in just one country, by considering an exogenous lowering of its unit production costs relative to those in other countries. The model then yields predictions about the resulting changes in the pattern of production and trade for each country. If production costs in one country fall, holding others constant, the range of goods produced by that country expands, and resulting changes in its exports and imports are predictable. It continues to export all goods that it previously exported; but now it adds to its exports those "marginal" goods that it previously produced only for home consumption – and possibly also other goods that it did not previously produce at all. In doing so, it captures a larger share of the global market at the expense of countries that are adjacent in terms of factor endowments.

This is a comparative static analysis of how enhanced productivity in a country can impact on its trading partners. But we can also use the same intuition to understand – in an intuitive manner – the consequences of fast(er) growth driven by improved efficiency in such an economy. Consider faster growth in China relative to its trading partners driven by efficiency improvements. This model suggests that such growth would cause China to begin producing and exporting new products at *both* the labor-intensive *and* the skill-intensive ends of the range of goods that it produced in the initial equilibrium. Moreover, China's import demand for adjacent "marginal" goods produced in other countries would also diminish as unit costs fell in its own domestic industries. Meanwhile, any country that is slightly more labor-(skill-)abundant than China will lose global market share at the skill-(labor-) intensive end of its range of exports, as China both expands the range of its own exports and also reduces its own import demand in those sets of goods. Here we focus on the implications of the enormous productivity/efficiency changes brought about by policy and institutional reforms that have raised output in China and India to historically unprecedented levels, while recognizing that as growth proceeds, dynamic comparative advantage will shift over time in line with changes in relative factor endowments. In that "conventional growth case," an economy enhances its comparative advantage at the skill-intensive end of its endowment range but loses it at the labor-intensive end (e.g. Krueger 1977).

This model generates helpful insights for trends in international trade. For the purpose of analyzing resource-rich country outcomes, however, its applicability is limited in that its input side is restricted to two factors of production, while the issues with which we are concerned involve endowments of land or other natural resources in addition to labor and capital. We can augment the basic continuum of goods model, in which manufacturing industries produce a range of goods of differing skill-intensity, by the addition of a resource sector (Krueger 1977). Focusing now on the case of a single price-taking country, the specific factors (SF) model (Jones 1971) provides a convenient starting-point for thinking through the structural implications of trade shocks. The SF model divides capital into two sector-specific stocks, with labor used in each sector and freely mobile between them. For our purposes, one sector can be assumed to produce the resource well; the capital in that sector is composed of an underlying natural resource stock (e.g. soils, forests, fisheries or mineral-laden land) together with the plant and equipment required to exploit or extract it. The other sector uses labor and its own endowment of specific capital (which we can refer to as "skills") to produce some subset of manufactured goods along the factor-intensity continuum. The exact subset of goods produced will depend on the economy's factor endowments, the scale of production in the resources sector, and international prices.

Assuming a flexible wage such that full employment holds in each economy, we can categorize country types based on factor endowments. Countries with relatively small endowments of manufacturing sector capital ("skills") will tend to export mainly resource products and to import manufactures; since aggregate skill–labor ratios and per capita incomes are correlated, these are mainly low-income economies. Other low-income countries may have relatively sparse natural resource stocks as well as low stocks of skilled workers in relation to labor; they are likely to produce mainly labor-intensive manufactures. Resource-poor middle-income economies will produce mostly higher skill-intensive manufactures. Resource-rich middle-income economies will initially produce some mix of resource products and more skill-intensive products.

In this framework, at given international prices, the structure of manufacturing production in each country depends not only on comparative costs in manufacturing, but also on conditions in the natural resource sector, since these influence relative wage costs through intersectoral competition in the labor market. A rise in the price of the resource sector's output (or some equivalent shock, such as an increase in the stock of resource sector-specific capital) will raise the value marginal product of labor in that sector; labor mobility will cause wages to rise and labor intensity in manufacturing to fall. In response, a country previously producing manufactures at the lowest end of the skill-intensity continuum might initiate production of a slightly more skill-intensive good, and could even cease production of its most labor-intensive good. Further increases in resource prices may spur continued movement up the scale of skill-intensity in manufacturing – with corresponding changes in the pattern of trade (Krueger 1977). Thus a resource-rich, wealthy (i.e. skill-abundant) economy will export a mix of resource products and skill-intensive manufactures and import labor-intensive manufactures (Norway and the United States are examples). The range of manufactures produced will depend in part on trade costs, which encourage domestic production of a wider range of goods.

In a world of many countries, *ceteris paribus* changes in a single economy that lower its production costs across the board will expand its manufacturing sector production at both the labor-intensive and the skill-intensive ends of its factor endowment range, as already described. The range of manufactures that it exports will increase, and with positive transport costs, the range that it produces for home consumption will also change. This expansion will be fueled by increased imports of manufactures in which other countries have comparative advantage. In the case of growth in a labor-abundant country like China, the additional manufactured imports will tend to be more skill-intensive than that country's own endowments. The expansion will also increase the country's demand for imports of resource goods from resource-rich countries. This will occur both because of the higher overall activity level in the expanding country, and also because growth in its production of manufactures will reduce the amount of labor available to produce resource goods domestically.

What are the effects of such growth on other low- or middle-income economies? If the expanding economy is large (that is, if it is large enough to influence world prices – as is the case with "giants" like China) then its growth will have effects on relative prices and resource allocation everywhere. From the foregoing it can now be seen that in the short run, its "boom" affects the structure of trade and production in other countries through two distinct channels, the markets for manufactures and for resource goods. In those countries, these two effects must also interact.

Consider first a middle-income economy with a higher skill to labor endowment ratio relative to the “giant” economy. Growth in the “giant” economy makes the middle-income country lose competitiveness in some of its most labor-intensive exports; it also increases demand for the resource good exports of the middle-income country. This leads to some re-allocation of labor to resource goods production. Increased intersectoral competition for labor and rising wages reduces labor intensity in the manufacturing sector. As a result, the skill intensity of manufacturing production increases. At the same time, this economy faces increased demand from the “giant” for its more skill-intensive manufacturing products. The two effects are complementary: the structure of production and trade should shift toward higher GDP and export shares of resource goods and skill-intensive manufactures alike at the expense of labor-intensive manufactures.

The change in relative factor prices will depend on the magnitude of two opposing effects: the resource sector’s expansion will raise the (unskilled labor) wage, while increased demand for skill-intensive manufactured exports will raise the return on skills. The extent to which these occur will depend on labor market conditions. In economies where the resource sector is relatively small, the latter effect will dominate. The higher return to skills (reflected in the skill premium in the domestic labor market) will rise and along with it, the incentives to acquire education and skills will also increase. A second possibility is that the economy will respond by opening its factor markets to foreign inflows. If the resource boom increases intersectoral competition for labor and constrains expansion in manufacturing, there will be pressures to open the borders to inflows of labor.

The situation will be somewhat different in a country with a somewhat lower skill to labor endowment ratio relative to the growing “giant.” As the latter economy expands, the poorer economy loses competitiveness in export markets for its most capital-intensive manufactures. This exogenous change in manufacturing sector comparative advantage is accompanied by increased demand for its natural resource exports. The resulting expansion of its resource sector draws out labor from manufacturing, raising the wage–rental ratio and increasing the skill intensity. Consequently, its most labor-intensive manufactures will become less profitable, and some goods at the most labor-intensive end of its range might no longer be produced. But – and here, the similarities with the previous case of a more skill-abundant economy end – the possibilities of expansion at the *more* skill-intensive range of manufactures in the poorer economy are bounded by the expansion that has occurred in the “giant,” whose unit costs for the poorer economy’s most skill-intensive manufactures have fallen.

Even assuming policies to be the same across all economies, the contrasting development implications of different initial endowments are stark. In upper middle-income economies, growth in the “giant” creates complementarities in manufacturing production and trade because of opportunities for participation in production networks and fragmentation trade.

In low-income economies, the same growth creates intensified competition. Moreover, whereas the giant's expanded import demand for resources is complementary in the wealthier economies with their shift toward more skill-intensive manufacturing, in poorer economies the same change induces inter-sectoral competition for labor in their most labor-intensive manufacturing industries. Labor costs rise, but there is no offsetting mechanism to raise returns on skilled labor used in manufacturing. Faced with higher labor costs and lower returns to skills, the manufacturing sectors of poorer economies face a growth trap.

To further clarify the role played in this process by the resource sector, it is helpful also to consider the case in which the poor economy has little or no tradable production. In this case, growth of the "giant" economy again results in attenuation of the more skill-intensive industries. If, however, there is no corresponding increase in labor demand from the resources sector, then v must fall and the resource-poor, labor-abundant economy will specialize in the least skill-intensive goods along the manufacturing spectrum. Given our focus on the interplay between resource wealth and other sectors, we will not consider this case in more detail. However, Bangladesh and Cambodia are representative of countries that fit this variant of the model. Each country earns approximately 80 percent of its export revenues from garments and closely related labor-intensive production activities, and these industries employ the largest fraction of the non-farm labor force.

Some country case studies

It is instructive to look at how the NIEs and other developing Asian economies evolved during the recent surge of Chinese and Indian growth, and especially during the commodity price boom (Figure 11.1). We look at the

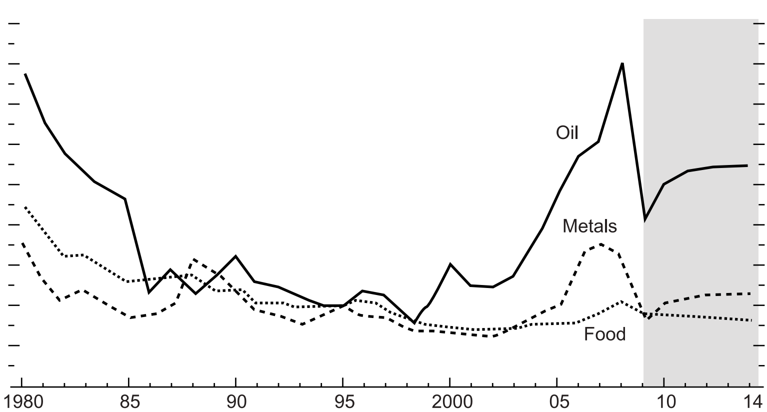

Figure 11.1 Real commodity price trends in world markets (1995 = 100).

Source: IMF *World Economic Outlook Update*, January 28 2009, http://www.imf.org/external/pubs/ft/weo/2009/update/01/index.htm.

composition of exports of Thailand, Malaysia and Indonesia. As noted, Thailand and Malaysia have somewhat higher relative skill endowments than the "giant" economy (in this case, China) – type C countries, while Indonesia appears as a type A country – with relative skill endowments somewhat lower than China.

The trade data are obtained from the UN Comtrade database and we use two-digit product divisions. The Standard International Trade Classification (SITC) taxonomy of products used in Comtrade, however, was established in an earlier, pre-fragmentation era when product characteristics, rather than factor content, were the primary determinants of trade flows. Thus the products grouped under SITC 7 (machinery and transport equipment) and SITC 8 (miscellaneous manufactures) display great diversity of capital-labor and skill-labor factor content ratios. Our goal is to distinguish manufactured products by skill intensity. Accordingly, we use a product breakdown that follows a different classification of industries, by skill intensity. This classification was based on the analysis of R&D expenditures and output of 12 OECD countries in the period from 1991 to 1999 (for details, see OECD 2007c). The categories based on the OECD classification are summarized in Table 11.1 (we have combined the OECD categories of low-tech and medium low-tech into one, and deleted non-manufactures). This classification sharpens the distinction in aggregate data between products with different skill-intensities.[9]

The changing composition of exports from selected Southeast Asian countries based on the above classification is summarized in Table 11.2. The

Table 11.1 Product divisions used in calculating skill-intensity of exports

Product by skill intensity		*SITC code*
High	Aircraft and spacecraft	95
	Pharmaceuticals	54
	Office, accounting and computing machinery	75, 87, 88
	Radio, TV and communications equipment	76, 77
	Medical, precision and optical instruments	87, 88
Medium-High	Other electrical machinery and apparatus	81
	Motor vehicles, trailers and semi-trailers	71
	Chemicals excl. pharmaceuticals	51, 52, 53, 55–59
	Railroad equipment and other transport equip.	78, 79
	Other machinery and equipment	72, 73, 74
Medium & Low	Rubber and plastics products	62
	Basic metals	67, 68
	Fabricated metal products, excl. machinery	66, 69, 96, 97
	Other manufacturing and recycling	82, 89
	Pulp, paper and printed products	63, 64,
	Textiles, textile products, leather and footwear	61, 65, 83, 84, 85

Source: OECD 2007c.

Table 11.2 Non-fuel export shares and growth for three SE Asian economies

	Share (%) in non-fuel merchandise exports					*Growth of export value since 2000 (%)*
	1980	*1990*	*2000*	*2005*	*2007*	
Indonesia						
Ag & NR (SITC 00–29)	80.2	30.5	17.3	22.5	25.1	14.92
Veg oils etc (SITC 4)	4.6	2.9	3.8	8.1	12.1	28.61
Chemicals (SITC 5 ex. 54)	1.1	4.2	6.6	7.0	7.3	10.63
Semi-mfctures (SITC 6)	10.0	39.3	26.8	23.3	22.2	6.17
Low-skill mfg nes (a)	1.9	20.0	21.3	16.3	14.3	3.02
Med-skill mfg ex. Chem. (b)	0.2	1.2	3.8	6.0	7.6	20.24
High-skill mfg (c)	1.8	1.9	20.4	16.8	11.3	0.13
TOTAL	100.0	100.0	100.0	100.0	100.0	7.47
Thailand*						
Ag & NR (SITC 00–29)	62.8	34.9	19.3	17.6	18.0	9.93
Veg oils etc (SITC 4)	0.2	0.0	0.1	0.2	0.2	18.41
Chemicals (SITC 5 ex. 54)	0.5	1.9	6.1	8.4	8.3	17.11
Semi-mfctures (SITC 6)	22.8	14.0	12.6	13.2	13.5	12.57
Low-skill mfg nes (a)	6.8	25.0	13.4	10.8	9.9	5.70
Med-skill mfg ex. Chem. (b)	0.9	3.9	10.0	16.7	16.9	21.35
High-skill mfg (c)	6.1	20.2	38.5	33.1	33.2	8.50
TOTAL	100.0	100.0	100.0	100.0	100.0	10.74
Malaysia						
Ag & NR (SITC 00–29)	48.0	23.1	5.4	5.9	6.3	10.3
Veg oils etc (SITC 4)	14.8	8.8	3.9	5.4	7.7	19.0
Chemicals (SITC 5 ex. 54)	0.7	1.8	4.1	6.2	6.9	16.0
Semi-mfctures (SITC 6)	17.5	9.9	7.7	8.6	10.3	12.3
Low-skill mfg nes (a)	2.9	10.6	6.9	7.4	7.9	9.8
Med-skill mfg ex. Chem. (b)	2.1	5.9	4.2	5.6	6.0	13.5
High-skill mfg (c)	14.0	39.9	67.8	61.0	54.9	4.6
TOTAL	100.0	100.0	100.0	100.0	100.0	7.26

Source: Compiled from UN Comtrade database. * Last year is 2006.

data suggest a high degree of consistency with the theoretical predictions of the model in section 3, at least as far as the composition of exports is concerned, though subject to the caveat that other changes besides the growth of trade with China (and to a much lesser extent, India) have occurred during this period.

Within Southeast Asia, Thailand and Malaysia exhibit recent trends of industrial structure and trade that also correspond very closely with the model prediction for countries with somewhat higher relative skill endowments than the "giant" economy. In the past decade, their exports of skill-intensive manufactures have grown much faster than exports of labor-intensive manufactures that drove their growth in previous decades.

This relative expansion of skill-intensive industries reflects responses both to pressures on their more labor-intensive manufacturing sectors due to the rapid expansion of China's labor-intensive exports, and increased Chinese demand for skill-intensive intermediates as inputs to its labor-intensive assembly operations. The positive effects of Chinese growth are not confined to manufactures, however. Both Thailand and Malaysia have also increased their exports of resource products, including energy, rubber, processed foods, and edible oils, to meet increased demand for these products both as intermediates in labor-intensive manufacturing and as final goods experiencing rapid consumer demand growth. Both countries, in addition, imported large stocks of unskilled workers from neighboring countries: Burmese in Thailand, and Indonesians in Malaysia (Athukorala and Manning 1999). These "labor imports" helped dampen cost growth in the most labor-intensive industries, including food crops, plantation agriculture and fisheries, thus slowing the rate of their decline (Kulkolkarn et al. 2007).

Trends in Thai export data appear strongly consistent with our model's predictions for a country of type C (Table 11.2). Thailand has considerable resource wealth in the form of agricultural land, but relatively little minerals, oil, gas, or forests. As early as 1990, manufacturing sectors accounted for half of the value of merchandise exports, with labor-intensive manufactures and medium-high/skill-intensive manufactures each worth about one-fourth. Over the subsequent 16 years skill-intensive exports rose to 50 percent of the total, while labor-intensive exports fell to about 10 percent. Exports of chemicals (SITC 5), which are also capital-intensive, also rose from less than 2 percent of exports to about 8 percent. The most labor-intensive resource-based sectors – agriculture and fisheries – experienced sharply declining export shares, but less labor-intensive resource sectors (SITC 4) increased. These trends coincide with the rise of China in world trade and as a trading partner for Thailand (Coxhead 2007), though of course this is not the only factor responsible for observed export share changes. From 2000 to 2006 Thailand experienced a continued slight decline in labor-intensive export share, matched by a modest increase in medium-skill export share, while other shares remained steady.

In a similar case, Malaysian export share trends since about 1990 were dominated by the decline of primary export shares and the rise of skill-intensive exports (Table 11.2). Malaysia's labor-intensive manufacturing exports peaked as a share of total exports in the early 1990s, and have since grown no faster or slower on average than total exports, maintaining a share of just less than 8 percent. As in Thailand, Malaysia's high-tech sectors have been prominent beneficiaries of China's growth (see Chapter 12 in this volume by Athukorala; Coxhead 2007). In Malaysia, however, the shares of medium- and high-skill manufactures in total merchandise exports have diminished somewhat – although the growth rates of total export values remain robust (Table 11.2, last column). These share trends reflect Malaysia's substantially greater natural resource wealth, on a per capita basis, compared with Thailand; in particular, the global boom in palm oil demand has had a very large effect on the composition of Malaysia's exports overall.

Indonesia is an example of a country "on the cusp" in the sense of having resource wealth as well as considerable tradable manufacturing capacity. In relation to China, it can be categorized as an A-type country and the evolution of its economy in recent years fits the predictions for an A-type economy with a lower relative skill endowment than the "giant." With large resource sectors and a relatively poorly developed skill-intensive manufacturing industry, Indonesian manufacturing as a whole has been squeezed between increasingly intense competition from China, and the Dutch Disease effects of the commodity price boom.[10] The share of labor-intensive manufactures in total exports has diminished by almost one-third since the early 1990s (Table 11.2). The shares of medium- and high-skill manufactures have not risen since 2000; in fact, these two categories of manufactures now account for only 19 percent of non-fuel exports, down from their 2000 peak of 24 percent. Indonesia's manufactured exports overall have experienced a relative downturn since 2000. In that year, labor-intensive and skill-intensive exports together amounted to over 40 percent of merchandise exports, but the growth of these two categories since 2000 has been poor, at 3 percent and 0.1 percent respectively (medium-skill exports have grown much faster, but from a low base of only 3.8 percent in 2000). Since 2000, natural resource sectors have once again become dominant in Indonesian exports, with palm oil (in SITC 4) leading the way. Among developing economies, and even within Southeast Asia, Indonesia and Thailand share fairly similar histories of educational attainment, FDI/GDP, and other indicators of potential productivity growth. Yet it seems that Indonesia has made far less progress toward greater sophistication in manufacturing than Thailand and its other regional neighbors (Coxhead and Li 2008), and that its progress in this direction has effectively come to a halt since about 2000.

Environmental and economic growth consequences

Our model does not directly address environmental implications of adjustment to the emergence of a giant economy. However, based on our analysis of the adjustment pressures that resource-rich countries face, we can identify some of the environment-related policy challenges facing such countries. As far as a resource-rich developing economy is concerned, our model posits that an exogenous shock in the form of a productivity-driven expansion in a large trading partner will undercut its most labor-intensive exports, but promote growth in the production and export of resource-based goods and more capital- or skill-intensive manufactures.

Implementing optimal resource exploitation policies that fully internalize environmental externalities is a challenge even for countries with well-developed institutions; it is a greater challenge for poorer developing economies. During commodity price boom periods pressures intensify for acceleration of resource exploitation and to ignore environmental costs. When a developing country faces twin pressures for de-industrialization – as we have seen in the case of Indonesia – the challenges are even more serious and difficult because of the temptation to compensate for the pressures on the weak manufacturing sectors by greater reliance on the resource sectors. In principle, to the extent that the positive income effects of the resource boom are larger, the country should experience a net welfare gain. However, it is possible that even a resource boom that generates such clearly positive direct and short-run income effects may have adverse long-term development consequences as considered in the growing literature on the "curse" of natural resources (e.g. Humphreys et al. 2007). Three such effects seem to be of particular importance in the Southeast Asia context, in particular among resource-abundant developing economies.

First, the growth of manufacturing in general, and of specific sectors within manufacturing, is argued to generate dynamic productivity gains through a variety of mechanisms: learning-by-doing, inter-industry spillovers of skills and knowledge, and scale-related phenomena leading to endogenous increases in the marginal product of factors employed in manufacturing. The expansion of a resource-intensive sector such as oil or forestry, to the extent that it raises production costs or investment incentives in manufacturing, reduces the potential for these dynamic productivity gains. Thus long-run economic growth may be negatively affected, but more specifically, the economy's future structure will also reflect lower returns to capital (outside of resource sectors) and reduce investments in human capital. In van Wijnbergen 1984, for example, the level of activity in manufacturing raises factor productivity in the future through learning-by-doing effects.[11] A resource boom reduces manufacturing sector output through the familiar Dutch Disease mechanisms, and this in turn lowers the potential for endogenous manufacturing sector productivity growth in the future. The economy's capacity to diversify away from dependence on natural resources is reduced. This effect is enhanced to the extent that resource sector profitability is boosted above its social optimal level if negative externalities generated by the sector – such as adverse environmental and ecological impacts of deforestation or extractive industries – are not fully reflected in private costs. The resulting over-specialization can be important from a welfare point of view when natural resources are subject to increasing extraction costs or outright exhaustion, since in that case the economy's level of specialization in natural resource sectors cannot be sustained in the long run.[12] The capacity of a developing country to implement policies that fully internalize costs of resource sector expansion is often limited by weak institutions and poor governance.

A second possible consequence of the economy's response to higher resource prices and diminished manufacturing export opportunities is that it becomes more vulnerable to trade-based shocks. Because primary commodities usually have low price elasticities of supply, their world prices have much higher variance than do manufacturing prices, which creates volatility in export earnings for price-taking exporters. Volatility is exacerbated by Dutch Disease effects that reduce the size of non-resource tradable sectors and increase that of non-tradable sectors, since changes in demand for the latter are resolved in large part by price adjustments rather than through the inter-sectoral movement of factors. If investors are risk-averse, this real exchange rate volatility may lead to inefficient specialization; investment in non-resource tradables sectors will be reduced by the higher capital costs needed to cover additional risk (Hausmann and Rigobon 2002; Rogoff and Chen 2002).

Finally, a higher share of income from resource rents is associated with higher inequality (except in cases where ownership of the resource stock is widely distributed; see Deininger and Squire 1996) and weak or corrupt institutions (Mauro 1995; Auty 2001). Greater inequality need not be the source of inefficiency or reduced growth opportunities. However, the concentration of incomes may be indicative of a deeper problem, in which the allocation of resources to rent-seeking rather than to productive activities widens the gap in returns between the two, and so creates an undesirable equilibrium characterized by high returns to rent-seeking and low returns to productive activities and innovation (Murphy et al. 1993). In this equilibrium, entrepreneurial activity is limited to rent-seeking activities, highlighting an interaction effect between resource rents and sectoral allocations of investment and effort that arises when institutions are not robust enough to tax resource rents or to prevent corrupt behavior.

In each of these cases, Dutch Disease or related mechanisms reduce returns on investments in the tradable manufacturing sector below socially optimal levels, when long-run welfare growth is the criterion. These are longer-term consequences of a resource boom in a typical developing economy. The case of oil palm illustrates several of these issues. Southeast Asia is the world's dominant producer and exporter of palm oil, a product whose price rose to record highs during the commodity boom due to rapid growth of demand, both from traditional sources such as food processors and from burgeoning markets for non-fossil fuel energy sources (palm oil is an ingredient in biodiesel production). Since the early 1980s oil palm area and production have grown tremendously in Malaysia and Indonesia; these countries account for the bulk of the world's commercial oil palm production and about 90 percent of palm oil exports. Malaysia's oil palm area covers one-eighth of the nation's land area, and its expansion has been claimed to be the cause for 87 percent of deforestation in that country from 1985 to 2000 (Wakker 2005). The area of oil palm planted in Indonesia now exceeds that in Malaysia, and is expanding much more rapidly; it has grown from 295,000 hectares in 1980 to 4,120,000 in 2005 (Zen, Barlow and Gondowarsito 2005); oil palm plantations are now a leading cause of deforestation worldwide. This boom has been driven by long-term rises in palm oil prices, recently stimulated by a number of demand shocks, including the rapid growth of consumer demand for processed foods, particularly emanating from China and India, and most recently, the global demand for biodiesel as an alternative energy source to fossil fuels.[13] Concern about the national and global environmental effects of oil palm expansion is now widespread (Curran et al. 2004).

An ongoing boom in palm oil price is likely to place even greater pressures on the capacity of countries like Indonesia to balance environmental consequences against private pressures for further plantation growth. How well they achieve this will depend critically on the quality of institutions and safeguards for natural resource management. The recent *World Investment Report* (UNCTAD 2007: xxv) conclusion on extractive industries can be readily extended more broadly to resource sectors in general:

> The management of a mineral-based economy is complex, and requires a well-developed governance system and well-considered national development objectives. In some mineral-rich developing countries, however, government policy-making may be aimed at short-term gains rather than long-term development objectives. Furthermore, the distribution and use of a host country's share of mineral revenues may be determined with little attention to development.

Whether the development opportunities are exploited or wasted will depend on policy responses and quality of institutions. As demonstrated by Australia, Canada, and Nordic countries – and also by Botswana in more recent times – resource booms can have not only immediate positive effects but, with the right policies, can also pave the way for long-term development. Thus growth in China and India offers developing countries both adjustment challenges and opportunities for growth. For countries like Indonesia, with relatively weaker institutions compared with a middle-income country like Malaysia, the challenges are particularly severe.

Like other resource exporters, Indonesia has done well (in trade terms) from the commodity boom. But its manufactured exports – or more specifically, its more skill-intensive exports – have suffered. Without more detailed research it is difficult to assert that its responses have been sub-optimal. However, it does raise danger signals. Unless policies are carefully crafted and implemented that ensure that environmental degradation and the foregone positive externalities from skill-intensive manufacturing are properly accounted for in policy, countries that are resource-abundant but not rich in human capital or other inputs to skill-intensive production may be long-term losers from the growth of the giants, especially if their resource stocks are vulnerable to overexploitation and exhaustion.

Conclusions

The rapid growth of China and India is having major effects on every facet of the global economy, including the environment, and this influence is projected to continue to expand. In this chapter we have explored these effects on the resource-rich economies. We showed analytically how the growth of the "giants" generates adjustment pressures on either side of the factor-intensity spectrum of their own factor endowment range. We discussed how differences in relative factor endowments can produce different outcomes in the face of new challenges to pre-existing patterns of comparative advantage. We then used insights from the model to explore the effects on production, trade, environment, and prospects for future growth.

An economy's endowments of skills and other factors used in advanced manufacturing are of great importance in establishing comparative advantage when fragmentation trade dominates total trade growth. However, commodity extraction and production has strong economic and environmental impacts, particularly when regulatory institutions are weak, and a commodity boom may also undermine incentives to invest in skills and other factors needed to establish and maintain comparative advantage in the more dynamic areas of manufacturing industry. In resource-exporting countries with weak institutions and poor governance, the interactions between low initial capital/skill endowments and a commodity boom could have serious consequences for growth, equity and the environment.

Notes

1 ". . . the growth of these giant economies will affect not only goods markets but also the flows of savings, investment, and even people around the world, and will place heavy demands on the global commons, such as the oceans and the atmosphere" (Winters and Yusuf 2007: 1, World Bank 2007).
2 Chinese demand for primary commodities has been a far more dominant factor than Indian demand in global commodity markets both because of its larger scale and because of the nature of Chinese growth, with its much stronger emphasis on the manufacturing industry.
3 Debate about the sustainability of the current global recession is beyond the scope of this chapter; however, once there is any substantial recovery in Chinese and Indian growth, there will again be major upward pressures on global commodity prices.
4 Broadman (2007: 10) points to the complementarities driving this trade: "Africa has growing demand for Asia's manufactured goods and machinery, and demand in Asia's developing economies is growing for Africa's natural resources, and increasingly for labor-intensive goods. Factor endowments and other economic resources will likely continue to yield these strong country-level African-Asian complementarities. . . ."
5 For a detailed exposition of the model, see Coxhead and Jayasuriya (2008).
6 The model abstracts from scale economies, imperfect competition, and existing distortionary policies.
7 This requires that $n > m$, a condition easily satisfied by the continuum of goods structure.
8 The results of the transport cost model depend on the assumption of identical homothetic preferences in all countries (Deardorff 1987: 8–10).
9 This analysis relies on a relatively broad sectoral breakdown and, therefore, not all intra-category relative changes are captured. This issue can be especially relevant for products with an extremely high degree of heterogeneity, such as high-technology products.

10 Coxhead and Li (2008) present a more detailed quantitative exploration of the Indonesian case.
11 In addition, the potential for productivity growth in fragmented intermediates production is higher than that in final goods (Grossman and Rossi-Hansberg 2008a).
12 This analysis is a precursor to endogenous growth models in which expansion of high-skill industries has positive productivity spillovers, which raise returns to skilled labor and induce additional investments in human capital. But human capital investments are financed by profits earned from production in lower-skill industries. So faster growth in lower-skill industries accelerates growth along with structural change (expansion of higher-skill output); conversely, lower world prices for lower-skill manufactures reduce profits, and thus reduce the rate of growth and structural change.
13 China is the world's largest importer of palm oil, and India is the third largest importer, just behind the EU. Chinese and Indian imports have increased sharply from 1,291,000 MT and 209,000 MT in 1990 to 4,500,000 MT and 3,800,000 MT respectively by 2005.

12 The rise of China and East Asian export performance

Prema-chandra Athukorala

Ever since China began to emerge as a major trading nation in the late 1970s, there has been a growing concern in policy circles in East Asian countries that competition from China could crowd-out their export opportunities. Initially, the 'China fear' was mainly related to export competition in standard labour-intensive manufactured goods (clothing, footwear, sports goods), but soon it turned out to be pervasive as China began to rapidly integrate into global production networks in electrical and electronics products through an unprecedented increase in foreign direct investment (FDI) in these industries. Rapid increase in China's world export share in these product lines, coupled with some anecdotal evidence of multinational enterprises (MNEs) operating in other countries in the region relocating to China, has led to concern that China is posing a serious threat to export performance not only of low-income countries but also of newly industrialized economies (NIEs), Japan and other advanced industrialized nations.

This concern has gained further impetus from China's recent accession to the WTO and the integration of textile and apparel products into the tariff-based system following the termination of the Multi-fibre Arrangement (MFA) with effect from January 2005. The WTO accession not only provides China with most-favoured nation (MFN) status in major markets but has also enhanced China's attractiveness to export-oriented investment by reducing country risk. In the lead-up to the expiry of the Multi-fibre Arrangement in January 2005 there was much anxiety (and confusion) in policy circles in second-tier exporting countries in the region about the future of their textile and apparel exports (Bergsten *et al.* 2006).

The purpose of this chapter is to examine China's emerging trade patterns and their implications for export performance of the other East Asian countries with a view to placing the policy debate on a firm factual and analytical footing. Much has been written about the implications of China's rise as a major trading nation and its implications for the rest of the world, and in particular for export performance of other Asian countries (Ahearne *et al.* 2003; Dimaranan *et al.* 2007; Eichengreen *et al.* 2007; Greenaway *et al.* 2008; IMF 2004; Albaladejo and Lall 2004; Rodrik 2006). However, this literature is based on the traditional notion of horizontal specialization in which countries trade goods that are produced from start to finish in just one country. So far little attention has been paid to the growing complementarity of production processes across countries in the region arising from China's rapid integration into global production networks as a major assembly centre (Athukorala and Yamashita 2008, 2009; Bergsten *et al.* 2006). This is a serious omission because the ongoing process of production fragmentation – cross-border dispersion of component production/assembly within vertically integrated manufacturing industries – opens up opportunities for countries to specialize in different slices (different tasks) of the production process depending on their relative cost advantage and other relevant economic fundamentals (Feenstra 1998, Jones 2000, Jones and Kierzkowski 2001a). This chapter aims to fill this gap by undertaking a comparative analysis of both China's export performance in the global context and emerging market opportunities in China, while paying particular attention to possible complementarities arising from China's rapid integration into global production networks.

The chapter begins with a survey of critical facts and dynamics underlying China's rapid export expansion to set the stage for a better understanding of the nature of the 'China challenge' and its likely evolution and impact. The next section examines the impact of China's export expansion on exports of other countries in third-country markets. The following section takes a similar approach to examining newly emerging market opportunities in China and comparative performance of East Asian countries in exploiting these market opportunities. The final section summarizes the key findings and offers some policy inferences.

China's trade performance: an overview

The rise of China as a major trading nation is one of the most momentous developments in the post-Second World War era, surpassing even the stunning rise of Germany and Japan. Total merchandise exports from China increased from US$8 billion (around 1 per cent of world exports) in 1978/9 when the process of liberalization reforms started to over US$1,500 billion (13.4 per cent) by 2006/7.[1] By 2006 China was the second largest exporting nation in the world after Germany, and assuming the current growth rates continue, will become the largest in about five years.

China's phenomenal export expansion has been underpinned by a shift in the commodity composition of exports away from primary products and towards manufacturing. The share of manufactures in China's total merchandise exports increased from less than 40 per cent in the late 1970s to nearly 80 per cent in the early 1990s and to 92 per cent in 2006/7. Until about the early 1990s, traditional labour-intensive manufactures – in particular, apparel, footwear, toys and sports goods – were the prime movers of export expansion. Since then, there has been a notable shift in the export composition away from conventional labour-intensive product lines and towards more sophisticated product lines – in particular, those within the broader category of machinery and transport equipment (SITC 7) (henceforth referred to as 'machinery') (Athukorala and Hill, Chapter 2 of this volume).

The expansion of machinery exports from China has been brought about by its highly publicized export success in a wide range of 'information and communication technology' (ICT) products (falling under SITC categories 75, 76 and 77). China's world market share of ICT products recorded a fivefold increase from 5 per cent in 1992/3 to 24.4 per cent in 2006/7. Among them the share of office machines increased from less than 2 per cent in 1992/93 to over 28 per cent in 2006/7. China is now the world's largest producer as well as the single largest exporter of personal computers, falling in this commodity group. China's world market share of telecommunication and sound recording equipment (dominated by mobile phones, DVD players and optical disc (CD) players) was 27.2 per cent in 2006/7, up from 7.9 per cent in 1992/3.

Trade data showing this phenomenal structural shift have been widely interpreted as an indication of China becoming an advanced-technology superpower, with the sophistication of its export basket rapidly approaching the levels of those of the most advanced industrial nations (e.g. Rodrik 2006, Yusuf *et al.* 2007). A closer examination of the data, however, suggests that such an inference is fundamentally flawed. In reality, the bulk of China's so-called 'high-tech' exports (such as notebook computers, display units, mobile phones, and DVD and CD players) are simply 'mass-market commodities' produced in huge quantities and at relatively low unit cost using imported high-tech parts and components; they are not 'leading-edge technology products' (Bergsten *et al.* 2006; Sung 2007).

What have been the implications of China's meteoric rise as an exporting nation and the changes in her export structure for the export performance of the other Asian countries? I now turn to addressing this question, focusing first on the comparative export performance in third-country markets and then on newly emerging opportunities for other countries to export to China.

Competition in third-country markets

Table 12.1 provides data on China's comparative performance in world manufacturing exports. Based on the survey of China's export trends in the previous section, data are reported separately for transport equipment (with information and communication technology (ICT) products identified as a separate category) and miscellaneous manufacturing (with clothing identified as a separate category). In order to delineate the implication of China's emergence as a major processing/assembly centre in global production networks for export performance of other countries, the data on total (reported) imports of machinery are further disaggregated into components and final goods (reported trade – components) in Table 12.2.[2]

The share of imports from China in total manufacturing imports of the rest of the world (total world imports less imports of China) increased from

Table 12.1 World manufacturing imports by source country: composition and growth (%)[1]

Source country/ country group[2]	*Total manufacturing (SITC 5 to 8 – 68)*			*Machinery and transport equipment (SITC 7)*[3]			*Information technology products*[4]			*Miscellaneous manufactures (SITC 8)*			*Clothing (SITC 84)*		
	Share 1992/3	*2005/6*	*Growth 1992–06*	*Share 1992/3*	*2005/6*	*Growth 1992–06*	*Share 1992/3*	*2004/5*	*Growth 1992–06*	*Share 1992/3*	*2004/5*	*Growth 1992–06*	*Share 1992/3*	*2004/5*	*Growth 1992–06*
China	3.7	12.6	8.5	1.3	11.3	13.1	2.6	22.5	13.2	11.5	2.6	6.8	14.9	27.3	5.6
EA	20.8	18.0	2.3	27.3	22.7	2.6	41.1	31.3	2.7	24.1	13.2	0.5	26.1	14.5	0.2
Japan	10.4	5.7	1.1	16.8	8.7	1.1	19.3	7.1	–0.1	5.6	2.9	0.4	0.3	0.2	0.5
DEA	10.4	12.3	3.3	10.5	14.0	4.5	21.8	24.4	4.2	18.5	10.3	0.7	25.8	14.3	0.1
Hong Kong	1.4	0.5	0.2	0.7	0.4	1.6	1.5	0.9	1.6	4.4	1.5	–0.9	8.4	3.2	–1.2
South Korea	2.2	2.8	4.1	2.0	3.8	6.2	3.8	5.3	5.4	3.7	1.0	–2.5	5.4	1.3	–3.3
Taiwan	2.5	2.7	2.5	2.8	3.2	3.8	5.3	5.6	3.8	4.3	1.6	–1.4	3.2	0.9	–2.4
ASEAN	4.3	6.3	4.0	5.0	6.6	4.4	11.4	12.5	4.6	6.1	6.2	3.3	8.8	8.8	2.4
Indonesia	0.6	0.6	3.2	0.1	0.3	7.7	0.2	0.6	7.9	1.5	1.4	2.6	2.3	2.6	2.6
Malaysia	1.1	1.8	4.8	1.5	2.5	5.2	3.4	5.1	5.7	1.0	0.8	2.4	1.6	1.2	0.7
Philippines	0.4	0.7	4.9	0.4	0.9	7.1	0.9	1.8	7.3	0.9	0.6	1.2	1.7	1.1	1.1
Singapore	1.3	1.1	2.3	2.3	1.4	1.6	5.4	2.6	1.5	0.7	0.4	0.4	0.9	0.1	–4.5
Thailand	0.9	1.7	4.3	0.7	1.4	5.6	1.5	2.3	54.0	1.8	1.5	2.3	2.0	1.8	2.3
Vietnam	0.0	0.4	13.3	0.0	0.1	10.1	0.0	0.1	27.7	0.2	1.5	12.6	0.3	2.1	10.2
South Asia	0.9	1.2	4.8	0.1	0.2	7.7	0.1	0.2	9.3	2.1	3.1	4.7	5.4	8.3	4.4
Oceania	0.2	0.2	3.7	0.2	0.2	2.9	0.1	0.1	4.1	0.1	0.2	5.1	0.1	0.1	3.8
Latin America	2.4	4.1	5.6	2.9	5.2	5.7	3.6	5.7	5.9	2.3	3.7	5.0	1.6	3.4	5.5
NAFTA	13.8	13.1	3.4	17.6	15.8	3.2	17.1	12.6	2.7	9.5	10.5	3.4	3.1	4.4	4.2
Mexico	1.1	2.2	6.2	1.5	2.7	5.2	2.0	3.0	4.0	0.8	1.9	6.4	0.8	2.4	9.8
EU 15	50.7	45.1	3.0	48.2	42.3	3.1	34.5	27.6	3.1	38.6	31.6	2.1	28.0	18.2	0.8
World	100	100	3.5	100	100	3.6	100	100	4	100	100	3.2	100	100	2.8

Source: Compiled from *Comtrade* database.

Notes:
1. Manufactures cover all products belonging to SITC Sections 5 through 8 less 68 (non-ferrous metals). The SITC product codes are given in brackets. The data reported here do not include imports to China.
2. EA: East Asia (excluding China); DEA: Developing East Asia (excluding China); ASEAN: Association of Southeast Asian Nations; NAFTA North American Free Trade Area; EU: The 15 initial member countries of the European Union.
3. Including information technology products.
4. Office machines and automatic data processing machines (75), Telecommunication and sound recording equipment (76), and semiconductors and semiconductor devices.

Table 12.2 World imports of machinery and transport equipment disaggregated into parts and components (P&Cs) and final goods, 1992/93–2005/06[1]

Source country/ country group[2]	*Source-country composition (%)*					
	Total imports		*Parts and components*		*Final goods*	
	1992/3	*2005/6*	*1992/3*	*2005/6*	*1992/3*	*2005/6*
China	1.3	12.1	0.7	7.5	1.7	15.2
EA	30.7	28.4	29.6	33	31.4	24.3
Japan	19.2	11.1	16.6	11	20.9	11.2
DEA	11.5	17.3	13	22	10.5	13.1
Hong Kong	1.2	0.7	1.6	0.9	0.9	0.5
South Korea	2.0	4.4	2.2	4.5	1.9	4.4
Taiwan	3.1	3.6	3.2	5.6	3	2.2
ASEAN	5.2	8.6	6	11	4.7	6
Indonesia	0.1	0.5	0.1	0.6	0.1	0.5
Malaysia	1.7	2.8	2	3.8	1.5	2
Philippines	0.3	1.3	0.5	2.3	0.1	0.5
Singapore	2.4	2.1	2.6	2.5	2.3	1.4
Thailand	0.7	1.7	0.8	1.7	0.7	1.5
Vietnam	0	0.2	0	0.1	0	0.1
South Asia	0.1	0.2	0.1	0.5	0.1	0.2
Oceania	0.2	0.2	0.3	0.2	0.2	0.1
Latin America	2.9	5.1	4.1	5.4	2.3	5.2
NAFTA	17.6	15.6	19.9	17.1	16.1	15
Mexico	1.5	2.8	1.7	2.4	1.3	2.8
EU 15	48.2	41.5	47.8	41.6	48.5	41.8
World	100	100	100	100	100	100

Source: Compiled from UN *Comtrade* database.

Notes:
1. The data reported here do not include imports to China.
2. EA: East Asia (excluding China); DEA: Developing East Asia (excluding China); ASEAN: Association of Southeast Asian Nations NAFTA: North American Free Trade Area; EU: the 15 initial member countries of the European Union.

— Zero or negligible.

3.7 per cent to 12.6 per cent between 1992/3 and 2005/6. This increase mirrors a persistent decline in world market shares of Japan and the other advanced industrialized nations (represented in Table 12.1 by NAFTA (excluding Mexico) and EU). Contrary to popular belief, there is no evidence of a marked decline in the market share of developing East Asian countries; rather the combined market share of these countries increased from 10.6 per cent in 1992/3 to 12.3 per cent in 2005/6. The increase turns out to be sharper (from 9.2 per cent to 11.9 per cent) when Hong Kong (which has experienced a massive relocation of its manufacturing base to China over the past two decades) is excluded.

At the disaggregated level, the China effect on the overall export performance of the rest of Asia is clearly visible in traditional labour-intensive exports (classified here under miscellaneous manufactures), particularly in the clothing subcategory. The corresponding market share losses have, however, come predominantly from the three North Asian NIEs, Hong Kong, Korea and Taiwan. Labour-intensive product lines in these countries rapidly 'migrated' to China through strong investment links from the late 1980s. The degree of severity of Chinese competition experienced by each of the remaining countries seems to have varied depending on their stage of industrial advancement. Interestingly, among these countries, Vietnam recorded a persistent increase in market share reflecting its latecomer advantages (in spite of high tariffs faced in developed country markets as a non-WTO member country as well as a non-market economy).

The rate of market penetration of China in world machinery trade has been even faster than in traditional labour-intensive manufacturing. China's exports of machinery increased at a compound rate of 13.2 per cent between 1992 and 2006, shifting its world market share from a mere 1.3 per cent to 11.3 per cent. The corresponding market share losses have come solely from Japan and other developed countries. Interestingly, the other East Asian developing countries too have recorded increases in market shares in these product categories, with the sole exception of Singapore.[3] The patterns are similar, but much clearer, for export trade in information technology products. All in all, there appears to be clear complementarity, rather than competition, in export performance among China and the other developing East Asian countries.

When total machinery exports are disaggregated into components and final products, we can clearly see the emerging pattern of trade complementarity in global production sharing between China and the rest of East Asia (Table 12.2). Almost three-quarters of the increment in total machinery exports from China between 1992/3 and 2005/6 came from final assembly (that is, components accounted for 26.5 per cent), whereas the contribution of components was much larger in other countries. Market shares of developing East Asian countries in component trade have generally *increased* in the face of China's rise as a major player in world machinery trade. Interestingly, market share gains of these countries (with the exception of Singapore) in components have overwhelmed erosion in market shares in final goods to yield a notable increase in their market shares in total machinery exports. Between 1992/3 and 2005/6 the market share of developing East Asian countries in total machinery exports increased from 10.5 per cent to 14.0 per cent (from 3.7 per cent to 5.2 per cent, when Singapore is excluded).

China competition: an econometric test

It is clear from the discussion in the previous section that the widely held view that China's rapid world market penetration is at the expense of export opportunities for the other countries in East Asia (and other developing countries) is not consistent with the actual trade data. A negative impact was visible only in traditional labour-intensive products, but this impact seems to be country-specific, depending on a given country's comparative advantage in labour-intensive production. In machinery exports the impact appears to be more complementary than competing, presumably reflecting supply-side complementarities within regional production networks. I now turn to a more formal examination of the implications of these patterns for the export performance of Japan and other East Asian countries in the context of China's integration into global production networks.

The analytical tool used for this purpose is the gravity equation, which has established itself as the dominant empirical framework for analysing bilateral trade flows.[4] Two previous studies have used the gravity model to examine the impact of China on the export performance of Asian countries (Eichengreen *et al.* 2007; Greenaway *et al.* 2008). The major novelty of the present analysis lies in the specific emphasis placed on delineating the implications for export performance of other countries of China's rapid integration into regional production networks. This is done by carefully decomposing machinery and transport equipment exports into components and final goods and then estimating separate export equations for these categories. My approach also differs in that the relationship between China's export market penetration and export performance of Asian countries is examined in a broader global context, rather than focusing solely on selected Asian countries.

The analysis is carried out in two steps. First, the basic gravity equation is augmented by incorporating a number of explanatory variables suggested by recent theoretical and empirical advances in the emerging literature on international production fragmentation and then adding China's exports to the same destination markets (*CHXP*) as an additional explanatory variable. This is the benchmark specification of the analysis. The coefficient on *CHXP* in the estimated model provides a measure of the effect of China's exports on export performance of the countries covered by our analysis over and above that of the other relevant influences captured in the model variables. The second stage involves re-estimating the model by interacting *CHXP* with dummy variables specified for country groups/countries of interest to examine whether China's emergence as a major player has the same or differential effects on their export performance. For the purpose of this comparison, firstly four regional groups are delineated: East Asia (*EA*), Latin America (*LATM*), Central and Eastern Europe (*CEEU*), and the member countries of the Organisation for Economic Cooperation and Development (*OECD*). The OECD is the base dummy, so the difference between the coefficient on *CHXP* and each interaction variable indicates the extent to which the individual country-group's experience differs from the OECD level. Secondly, the EA interaction dummy variable is replaced by interaction dummy variables specified to represent the major economies in East Asia with a view to delineating country-specific effects of competition from China.

The benchmark model is:

$$lnEXP_{ij} = \alpha + \beta_1 lnGDP_i + \beta_2\, lnGDP_j + \beta_3\, lnPGDP_i + \beta_4\, lnPGDP_j + \beta_5 lnDST_{i,j} + \beta_6 ADJ_{i,j} + \beta_8 lnRULC_{i,j} + \beta_9\, lnRER_{i,j} + \beta_{32} CHXP_j + \gamma T + \varepsilon_{ij} \tag{1}$$

where subscripts *i* and *j* refer to the reporting (exporting) and the partner (importing) country. The variables are listed and defined below, with the postulated sign of the regression coefficient for the explanatory variables in brackets.

EXP	Bilateral exports between *i* and *j*
GDP	Real gross domestic product (GDP) (+)
PGDP	Real GDP per capita (+)
DST	The distance between the economic centres of *i* and *j* (–)
ADJ	A binary variable assuming the value 1 if *i* and *j* share a common land border and 0 otherwise (+)
RULC	Relative unit labour cost in manufacturing between *i* and *j* (–)
RER	An index of bilateral real exchange rates which measure the international competitiveness of country *i* against country *j* **(+)**
CHXP	China's exports (+ or –)
T	A set of time dummy variables to capture year-specific 'fixed' effects
α	A constant term
ε	An stochastic error term, representing the omitted other influences on bilateral trade

The first four explanatory variables (*GDP*, *GDPP*, *DST* and *ADJ*) are the standard gravity-model variables which do not require further discussion. Among the remaining variables, relative unit labour cost (*RULC*, relative manufacturing wage adjusted for labour productivity) is presumably a major factor impacting on the global spread of fragmentation-based specialisation (Jones 2000, Jones and Kierzkowski 2001b). In a context where both capital and components have become increasingly mobile, relative cost of production naturally becomes an important consideration in cost-border production. The inclusion of real exchange rate, *RER*, which captures international competitiveness of traded-goods production, is based on similar reasoning. Another important determinant of trade flows suggested by the theory of production fragmentation is the cost of 'service links' connecting 'production blocks' in different countries (Jones and Kierzkowski 2001b). There is no unique measure of the cost of service links. However, in our model, distance (*DST*) and adjacency (*ADJ*), and per capita income (*PGDP*) capture certain aspects of such costs. Technological advances during the post-war era have certainly contributed to a 'death of distance' (*à la* Cairncross 1997) when it comes to international communication cost. However, there is evidence that the geographical 'distance' is still a key factor in determining international transport cost, in particular shipping cost, and delivery time (Evans and Harrigan 2003). Timely delivery can in fact be a more important influence on vertical trade compared to final trade because of multiple border crossings involved in the value added chain. The common border dummy (*BRD*) captures possible additional advantages of proximity that are not captured by DST. Inclusion of *PGDP* as an explanatory variable allows for the fact that more developed countries have better ports and communication systems and other trade-related infrastructure as well as better institutional arrangements for contract enforcement that facilitate trade by reducing the cost of maintaining 'services links'. Finally, the time-specific fixed effects (*T*) are included to control for general technological change and other time-varying factors.[5]

The model is estimated using annual data over the period from 1992 to 2005 for all countries each of which accounted for 0.1 per cent or more of manufacturing trade in 2000/1. There are 41 countries which satisfied this criterion. Of these countries, Hong Kong is deleted from the country coverage because of its peculiar trade links with China. As exports from China form the key explanatory variable in the model, our data set relates to 39 countries. Data on bilateral exports are compiled from the importers' records (CIF) of the UN Comtrade database. Based on the survey of export patterns in the previous section, total manufacturing exports are disaggregated into three major categories – machinery and transport equipment (SITC 7), miscellaneous manufacturing (SITC 8), and other manufacturing (SITC 5 + 6 – 68). Machinery and transport equipment is further disaggregated into parts and components and final goods as discussed earlier. The countries covered are listed in the Appendix in Table 12.A.1 and the data source and methods of variable construction are explained in Table 12.A.2.

In estimating the model, it is important to take into account the possible endogeneity of Chinese exports (*CHXP*) in an equation designed to explain bilateral export flows among other countries. There are potential unobserved factors, such as improvements in production technology that enable firms to further disintegrate production and reduction in the cost of services links that impact on the export performance of China and other countries. Should this be the case, *CHXP* may be correlated with the disturbance term, thereby biasing the estimated coefficient on this variable. Mindful of this possibility, the model was estimated using the instrumental variable (two-stage least squares) technique with three excluded instrumental variables: the distance between China and the given export market (that is, the importing country in each bilateral trade pair), common language, and MNE presence in Chinese exports (proxied by the share of FIEs in total manufacturing exports from China, *MNESH*). The first two instruments are potentially correlated with *CHXP*, but not with the dependent variable (Frankel and Romer 1999). The choice of the third variable is based on the recent literature on the role of MNEs in export performance in China (Athukorala 2007, Chapter 3; Naughton 2007, Chapter 17). This is presumably a suitable instrumental variable because it is difficult to think that MNE presence in China could have significant direct effect on export performance of other countries except through its impact on China's trade to third-country markets.

The estimating technique used here is the instrumental variable estimator based on the generalized method of momentum (GMM-IV) estimator, which produces consistent and efficient estimates when the error process does not satisfy the standard homoscedasticity assumption (Baum *et al.* 2003).[6]

The use of the IV estimator over the simple OLS estimator is justified only if the instruments satisfy two conditions: they must be partially correlated with the endogenous explanatory variables ('instrument relevance' condition) and must not be correlated with the disturbance process of the second-stage equation ('orthogonality' condition). The instrument relevance condition is tested here using two alternative tests: the F test of the joint significance of the instruments in the first-stage regression and the Anderson canonical correlation likelihood ratio test. Instrument orthogonality is tested using the Hanson J statistic (the GMM equivalent of the Sargan test of over-identification restrictions) which is the most commonly used in GMM estimation for this purpose. It also provides a valid test of the suitability of the overall model specification. The benchmark regressions comfortably pass these tests as well as the Ramsey test for functional form specification (*RESET*). The overall fit ($\bar{R}^2$) of the regressions is highly satisfactory for an econometric exercise based on cross-country panel data.

The results are reported in Table 12.3. Alternative estimates undertaken to examine whether the impact varies among East Asia and other major country groups are reported in Panel 12.3a. Estimates with interaction dummies for the individual East Asian countries are reported in Panel 12.3b.

As in many other applications of the gravity model to bilateral trade flows, in all regressions the coefficients on the two central gravity variables – GDP and the distance – have the expected signs (positive and negative, respectively) and are significant at the 1 per cent level. The coefficients of adjacency (common border) dummy and the real exchange rate (*RER*) are also statistically significant at the 1 per cent level with the expected signs in all equations. The sign and statistical significance of partner country per capita income (*PGDP*) and unit labour cost (*ULC*) varies among the equation, reflecting the commodity specific nature of their effect on export performance. For instance, *ULC* is significant with the expected (positive) sign in the equation for parts and components exports, possibly reflecting the importance of difference in unit labour cost in determining cross-border dispersion of the value chain in component assembly and testing. The positive and significant coefficient of the partner country *PGDP* in the same equation is consistent with this inference.

The coefficient of *CHXP*, which captures the overall impact of exports from China on all countries covered in the study, is *positive* and statistically significant in all equations. The interpretation is that, on average, China's export expansion has not been associated with an absolute contraction in exports from other countries in third-country markets. On the contrary, China has

Table 12.3 Regression results: the impact of China's exports on exports from major regions and Asian countries

Explanatory variables	*Machinery and transport equipment (SITC 7)*			*Misc. manufactures (SITC 8)*	*Other manufactures (SITC 5 + 6 – 68)*	*Total manufactures (SITC 5 to 8 – 68)*
	Parts and components	*Final goods*	*Total*			
12.3a Impact on exports from major regions						
Log GDP, exporter	0.77***	0.83***	0.76***	0.95***	0.80***	0.82***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Log per capita GDP, exporter	0.24***	0.32***	0.27***	0.01	–0.09***	0.02***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Log GDP, importer	0.23***	0.26***	0.21***	0.41***	0.15***	0.28***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.05)	(0.02)
Log per capita GDP, importer	0.03**	–0.01	–0.01	–0.07***	–0.10***	–0.05***
	(0.01)	(0.17)	(0.01)	(0.01)	(0.05)	(0.01)
Log distance	–0.98***	–0.95***	–0.94***	–1.11***	–1.01***	–0.94***
	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Adjacency dummy	0.55***	0.33***	0.40***	0.40***	0.42***	0.42***
	(0.06)	(0.05)	(0.05)	(0.03)	(0.05)	(0.04)
Log real exchange rate	0.26***	0.18***	0.20***	0.11***	0.21***	0.14***
	(0.02)	(0.02)	(0.01)	(0.02)	(0.03)	(0.01)
Log relative unit labour cost	–0.13**	–0.01	–0.04**	–0.04	0.01	0.03
	(0.05)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)
Asian crisis dummy	–0.07	–0.05	–0.13**	0.07*	–0.25***	0.04
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)
China's exports (*CHXP*)	0.59***	0.54**	0.58***	0.42	0.69***	0.51***
	(0.02)	(0.03)	(0.03)	(0.02)	(0.07)	(0.03)
EA*CHXP	0.01	–0.08***	–0.04	0.13***	0.02	0.01
	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.01)

(*Continued overleaf*)

Table 12.3 Continued

Explanatory variables	*Machinery and transport equipment (SITC 7)*			*Misc. manufactures (SITC 8)*	*Other manufactures (SITC 5 + 6 – 68)*	*Total manufactures (SITC 5 to 8 – 68)*
	Parts and components	*Final goods*	*Total*			
LATM*CHXP	0.10***	0.13***	0.14***	–0.04	–0.02	0.04
	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)
CEEU*CHXP	0.02	0.07**	0.08***	–0.13	0.28***	0.01
	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)
Constant	–16.80***	–17.80***	–15.30**8	–18.28***	–15.90***	–14.36***
	(0.48)	(0.54)	(0.47)	(0.40)	(1.01)	(0.40)
R^2	0.65	0.6	0.69	0.78	0.76	0.77
RMSE	1.53	1.48	1.41	1.06	1.27	1.05
N	13278	13240	13312	13242	13264	13326
12.3b Impact on exports from East Asian countries and other regions						
Log GDP, exporter	0.97***	1.00***	0.94***	0.98***	0.91***	0.94***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Log per capita GDP, exporter	0.47***	0.56***	0.50***	–0.20***	0.11***	0.12***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Log GDP, importer	0.18***	0.20***	0.16***	0.39***	0.04	0.23***
	(0.02)	(0.02)	(0.02)	(0.04)	(0.05)	(0.02)
Log per capita GDP, importer	0.02	–0.08***	–0.08***	–0.08***	–0.24***	–0.10***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.05)	(0.01)
Log distance	–1.10***	–1.10***	–1.07***	–1.12***	–1.09***	–1.01***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Adjacency dummy	0.32***	0.10**	0.18***	0.35***	0.24***	0.29***
	(0.05)	(0.05)	(0.04)	(0.04)	(0.05)	(0.03)
Log real exchange rate	0.23***	0.16***	0.18***	0.10***	0.24***	0.14***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
Log relative unit labour cost	–0.16***	–0.01	–0.07**	0.02	–0.01	0.01
	(0.02)	(0.04)	(0.03)	(0.02)	(0.02)	(0.02)

Asian crisis dummy	–0.35***	–0.33***	–0.33***	0.10**	–0.47***	–0.17
	(0.05)	(0.04)	(0.05)	(0.04)	(0.05)	(0.41)
China's PCs exports (*CHXP*)	0.60***	0.56***	0.61***	0.41***	0.80***	0.54***
	(0.02)	(0.03)	(0.02)	(0.06)	(0.05)	(0.02)
Japan**CHXP***	–0.04	–0.10***	–0.09***	–0.09***	–0.06***	–0.03
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)
Korea**CHXP***	–0.09***	–0.08**	–0.09**	–0.14***	–0.14***	–0.12***
	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)
Singapore* *CHXP*	–0.01	0.05	–0.04	0.26***	–0.17***	0.01
	(0.03)	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)
Indonesia**CHXP***	0.39***	0.39**8	0.37***	0.22***	0.31***	0.22***
	(0.05)	(0.04)	(0.03)	(0.03)	(0.04)	(0.03)
Thailand**CHXP***	0.16***	0.25***	0.19***	0.05**	0.26***	0.16***
	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)
Malaysia**CHXP***	0.17***	0.24***	0.20***	0.25***	0.25**8	0.26***
	(0.05)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)
Philippines**CHXP***	0.28***	0.49***	0.44***	0.21***	0.32***	0.35***
	(0.05)	(0.03)	(0.06)	(0.04)	(0.06)	(0.05)
LAM**CHXP***	0.16***	0.09**	0.21***	–0.02	0.02	0.09***
	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)
CEEU**CHXP***	0.06***	0.12***	0.14***	–0.11***	0.30***	0.04**
	(0.02)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)
Constant	–20.28***	–21.72***	–19.01***	–18.71***	–13.69***	–16.10***
	(0.55)	(0.56)	(0.43)	(0.96)	(0.51)	(0.41)
R^2	0.73	0.76	0.76	0.80	0.79	0.81
RMSE	1.36	1.31	1.24	1.02	1.19	0.97
N	13278	13240	13312	13242	13264	13326

Source: see Appendix Table 12.A.2.

Note:
1. Results for the time dummies and for the intercept dummies for the country groups/countries are not reported. Figures in parentheses are standard errors corrected for arbitrary heteroscedasticity and intra-group correlation. Statistical significance (one-tail test) is denoted as *** 1%, ** 5% and * 10%.

gained market share in an expanding market. However, the magnitude of the estimated coefficient on *CHXP* is significantly below unity in all cases. This suggests that China's export expansion has had a significant dampening effect (though not a crowding-out effect) on the export growth of other countries. The coefficient in the total manufacturing equation suggests that, after controlling for the other relevant variables, a one percentage point increase in exports from China was associated with a 0.52 per cent increase in exports from other countries. As anticipated, the magnitude of the coefficient is significantly different among the five export categories. The coefficient is the smallest in the equation for miscellaneous manufacturing (0.38), which encompasses various standard labour-intensive products such as clothing, footwear, toys, and sport and travel goods. The coefficient of this variable in the equation for machinery and transport equipment (0.61) is the largest, confirming our observation based on simple inspection of trade patterns in the previous section that the shift in China's export composition away from the other product categories and toward machinery has brought about increased complementarity in export performance between China and the other countries. Within the machinery and transport equipment category, as expected the degree of Chinese competition faced by other countries is greater in final goods compared to parts and components.

According to the first set of regression estimates (Table 12.3a), there is no evidence to support the widely-held view that in global markets exports from the other East Asian countries are relatively more adversely affected by competition from China compared to those from the other trading nations. In the equation for total exports, the interaction dummies for all three country groups are not statistically significant. At the disaggregated level, the East Asia interaction dummy is negative and statistically significant only in the equation for final goods of machinery and transport equipment. According to this equation, a one per cent increase in total manufacturing exports from China is associated with a 0.46 percentage point increase in exports from the East Asian region, compared to 0.54 from the OECD countries (excluding Japan, Mexico and Korea), 0.64 from Latin America and 0.61 from countries in Central and Eastern Europe. This export displacement effect is, however, counterbalanced by the expansion of parts and components exports. Overall, the results for machinery and transport equipment exports are consistent with the earlier inference that, within the rapidly expanding regional production networks, China's comparative advantage lies largely in final assembly.

The relative growth rates of machinery and equipment exports from Latin America and the Central and Eastern Europe seem much larger compared to the other two country groups. This mostly reflects the fact that exports from these countries have been increasing from a rather low base. Also, given the relatively high manufacturing wages in these regions, presumably there is no significant overlap between tasks performed in these countries within global production networks and those undertaken in China and other second-tier exporting countries in East Asia (Kierzkowski 2001; IADB 2005).

The results for individual East Asian countries in Table 12.3b clearly illustrate the large differences among countries in terms of the degree of export growth associated with a given percentage point increase in China's exports. The differences are particularly notable between Japan and Korea on the one hand and the four major ASEAN economies (Indonesia, Thailand, Malaysia and the Philippines) on the other hand, with Singapore coming in between. In total manufacturing, a one per cent increase in exports from China is associated with 0.51 per cent growth in exports from Japan and 0.42 per cent growth in exports from Korea compared to a regional average of 0.54. The comparable figures for the four ASEAN countries are between 0.70 per cent for Thailand and 0.89 per cent for the Philippines. The figure for Singapore is not statistically different from the regional average, reflecting the fact that its exports are heavily concentrated in machinery and transport equipment (in particular parts and components therein) where competition from China is intense. The disaggregate estimates confirm that Japan, Korea and Singapore face much sharper competition from China in final machinery and transport equipment and miscellaneous manufacturing. Within the machinery and transport equipment category, ASEAN countries' superior performance compared to Japan and Korea in withstanding Chinese competition is clearly visible for both components and final goods. Notwithstanding these inter-country differences in the measured degree of severity of competition, for none of the countries or country groups considered here is the China effect (that is, the coefficient of *CHXP* plus that of the slope interaction dummy) negative.

China as a new export market

Over the past one-and-a-half decades all East Asian countries have recorded rapid, persistent growth in the share of total exports destined for China. By 2005/6 nearly a third of total exports from Taiwan and Korea went to China. The figure for Japan was around 17 per cent. The share in combined exports of ASEAN has shown the sharpest increase, although from a low base (from 2.2 per cent in 1992/3 to 13.7 per cent in 2005/6). The relative importance of exports to China in total exports is much higher for all East Asian countries compared to the average level for the rest of the world (3.7 per cent in 2005/6) (Table 12.4).

The share of imports from East Asia in total non-oil imports of China has remained around 56 per cent over the past two decades with only minor year to year fluctuation (Table 12.4). This pattern has been dictated by a mild but persistent decline in the share of Japan (from 20.9 per cent in the 1992/3 to 17.4 per cent in 2005/6) and a sharp decline in the share of Hong Kong (from 17.3 per cent 1992/3 to a mere 2.1 per cent in 2005/6). All other countries, with the exception of Indonesia (which experienced supply-side problems in export expansion during the post-Asian crisis era) have recorded increases in market shares, though at varying degrees. The combined share of ASEAN

Table 12.4 East Asia – China Trade (%)[1]

	Geographic profile of China's imports		*Exports to China relative to total exports by country/region*	
	1992/3	*2005/6*	*1992/3*	*2005/6*
East Asia	57.1	56.5	7.2	19.3
Japan	20.9	17.4	5.4	16.6
Developing East Asia	36.2	39.1	7.9	21.6
Hong Kong	17.3	2.1	29.6	19.5
Korea	4.3	11.9	5.7	26.2
Taiwan	10.7	12.5	10.2	30.6
ASEAN	3.9	12.6	2.2	13.7
Indonesia	1.0	1.1	3.9	8.6
Malaysia	1.0	3.3	2.0	12.8
Philippines	0.2	2.0	1.2	19.0
Singapore	0.8	2.3	1.7	12.0
Thailand	0.6	2.2	1.6	11.4
Vietnam	0.1	0.1	2.4	3.5
Other countries	42.8	43.6	1.5	3.7
World	100.0	100.0	2.7	6.7
US$ billion	175.2	1109.2	—	—

Source: Compiled from *Comtrade* database.

Note:
1. Covers non-oil trade (total trade net of trade reported under SITC 3).

and developing East Asia increased from 3.9 per cent to 12.6 per cent, and 36.2 per cent to 39.1 per cent respectively between 1992/3 and 2005/6. The difference between these two country groups in the degree of market penetration in China (through direct exports) seems to lie in the well-known differences in the degree of relocation of their domestic production bases to China. Relocation of production to China has taken place at a much faster rate in Taiwan compared to Korea (Naughton 2007, Chapters 15 and 16).

Table 12.5 provides data on East Asia–China machinery trade, while focusing separately on components and final products. The data clearly reflect China's evolving role as an assembly centre within the East Asian region. The share of East Asia in total parts and component imports to China has increased sharply. By contrast, China's final goods exports are heavily concentrated in extra-regional markets, particularly in industrialized countries in Europe and North America. Between 1992/3 and 2005/6, the share of Chinese exports to developing East Asia in total final goods exports declined from 49.5 per cent to 26.5 per cent. The shares of developed countries in China's component imports have declined persistently from 30.6 per cent to 19.5 per cent between 1992/3 and 2005/6. There is a close similarity between the country composition of China's components imports and exports, with East Asia accounting for the lion's share on both sides. This reflects the

Table 12.5 Direction of China's trade in machinery and transport equipment: destination/source country composition and growth (%)

Designation country/ region	*Geographic composition (%)*					
	Total		*Parts and components*		*Final goods*	
	1992/3	*2004/5*	*1992/3*	*2004/5*	*1992/3*	*2004/5*
12.5a Exports						
East Asia	58.4	47.2	66.2	64.3	55	38.1
Japan	7.8	12.0	13.0	12.9	5.5	11.4
Developing East Asia	50.6	35.2	53.2	51.3	49.5	26.5
Hong Kong	42.0	21.0	42.4	29.9	41.8	16.2
Korea	1.1	3.5	2.1	4.6	0.6	2.8
Taiwan	1.8	2.6	2.8	3.7	1.4	2.0
ASEAN	5.7	8.1	5.8	13.1	5.7	5.2
Indonesia	1.2	0.9	1.1	0.9	1.2	0.9
Malaysia	1.0	2.3	1.2	4.9	0.9	0.9
Philippines	0.3	0.6	0.3	0.8	0.4	0.5
Singapore	2.1	3.0	2.6	4.7	1.8	2.0
Thailand	1.2	1.3	0.7	1.8	1.4	1.0
Vietnam	0.2	0.5	0.2	0.4	0.2	0.5
OECD countries	35.1	46.5	31.6	45.4	35.6	54.4
Other	6.5	8.3	2.2	7.3	10.4	8.5
World	100	100	100	100	100	100
12.5b Imports						
East Asia	55.1	60.3	64.8	67.7	50.4	47.8
Japan	27.4	22.9	26.8	22.6	27.7	23.4
Developing East Asia	27.6	37.4	37.9	45.1	22.6	24.4
Hong Kong	13.6	3.7	24.2	4.9	8.5	1.7
Korea	2.1	9.1	3.0	9.4	1.6	8.7
Taiwan	10.8	13.1	9.1	14.9	11.6	9.9
ASEAN	1.1	11.6	1.6	16.0	0.8	4.5
Indonesia	—	0.6	—	0.6	—	0.6
Malaysia	0.2	4.3	0.2	6.8	0.1	0.2
Philippines	—	2.3	0	3.4	—	0.4
Singapore	0.7	2.7	1.2	2.9	0.5	2.4
Thailand	0.1	1.9	0.1	2.3	0.1	1.2
Vietnam	—	—	0.1	—	—	0.1
OECD	37.4	27.9	30.6	19.5	40.7	42.2
Other	7.5	11.8	4.6	12.8	8.9	10.0
World	100	100	100	100	100	100

Source: Compiled from UN *Comtrade* database.

Notes:
— Zero or negligible.

multiple border-crossing of components between China and the other countries in the region at different stages of the production process.

China's import propensity: an econometric test

This section aims to quantify the impact of China's economic expansion on export performance of other countries operating through its own import demand. The alternative formulations of the gravity model estimated for this purpose are reported in Table 12.6. The coefficient of GDP in each equation shows the average degree of import elasticity of China's economic expansion. The estimated coefficient of a given interaction variable indicates the degree to which the degree of elasticity of imports from the particular country group/country deviates from that average level. In the preliminary regression runs, China's GDP and per capita GDP variables were found to be highly correlated.

The results suggest that China's economic expansion has been accompanied by an increase in total non-oil merchandise imports at a rate of over one-and-a-half times that of average GDP growth (9 per cent) in the country during the period under study (Table 12.6b). Among the broader commodity categories considered here, the sharpest rate of expansion was in machinery components. Imports of this commodity category grew at a rate of more than twice the GDP growth rate. The results for the GDP interaction dummy for the three country groups suggest that the rate of growth of imports from East Asia associated with a one percentage point increase in GDP in China was about 0.70 percentage points higher compared to imports from OECD countries, after controlling for other relevant determinants. The results show a much greater propensity for importing from Latin American countries, but as already noted this probably reflects the rather low initial base of imports from these countries.

The results for machinery imports, disaggregated into components and final goods, confirm our earlier inference about China's heavy reliance on parts and component imports from the region for domestic output expansion. The results for the slope dummy variables reported in Table 12.6b point to the emerging patterns of increasing reliance on parts and component imports from ASEAN countries. Overall, across all product categories, the degree of propensity to import from Korea is greater compared to imports from Japan.

Concluding remarks

The emergence of China as a major exporter has obviously begun to have a considerable impact on the trading environment faced by other countries in the region. However, the gloomy predictions of the implications of increased Chinese competition may be misleading. There is clear evidence that competition from China does not necessarily imply proportionate losses in market

Table 12.6 Regression results: determinants of China's non-oil imports from major regions and East Asian countries

Explanatory variables	*Machinery and transport equipment (SITC 7)*			*Misc. manufactures (SITC 8)*	*Other manufactures (SITC 5 + 6 – 68)*	*Total manufactures (SITC 5 to 8 – 68)*	*Primary products*	*Total non-oil imports*
	Parts and components	*Final goods*	*Total*					
12.6a Imports from major regions								
Log GDP, exporter	0.97***	1.02***	0.94***	1.12***	1.10***	1.02***	1.27	1.03***
	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)***	(0.04)
Log per capita GDP, exporter	0.89***	0.88***	0.90***	0.80***	0.20***	0.43***	–0.50***	0.24***
	(0.09)	(0.10)	(0.09)	(0.08)	(0.07)	(0.07)	(0.08)	(0.07)
Log GDP China (**GDPCH**)	2.08***	1.00***	1.47***	2.24***	1.40***	1.53***	1.92***	1.56***
	(0.29)	(0.25)	(0.27)	(0.23)	(0.20)	(0.20)	(0.32)	(0.19)
Log distance	–2.42***	–2.00***	–2.14***	–2.27***	–1.55***	–1.61***	–1.13***	–1.40***
	(0.28)	(0.26)	(0.26)	(0.30)	(0.26)	(0.22)	(0.32)	(0.22)
Log real exchange rate	0.65***	0.40**	0.66**	0.39*	–0.28**	–0.13	0.08	–0.08
	(0.23)	(0.22)	(0.25)	(0.23)	(0.13)	(0.13)	(0.14)	(0.12)
Log relative wage index	–0.10	–0.05	–0.18	–0.20	–0.01	–0.21*	–0.15	0.26**
	(0.26)	(0.22)	(0.24)	(0.20)	(0.17)	(0.18)	(0.23)	(0.16)
Asian crisis dummy	0.92***	0.43*	0.70**	0.24*	0.43*	0.42**	0.45**	0.33*
	(0.33)	(0.28)	(0.30)	(0.19)	(0.32)	(0.23)	(0.22)	(0.21)
EA*Log GDPCH	**2.02*** **	**1.79*** **	**2.01*** **	**0.22**	**0.04**	**1.06** **	**–0.57***	**0.71** **
	(0.48)	**(0.44)**	**(0.45)**	**(0.37)**	**(0.38)**	**(0.36)**	**(0.43)**	**(0.32)**
LATM* Log GDPCH	**3.71** **	**2.59*** **	**3.39*** **	**1.76** **	**–0.53**	**1.94*** **	**–0.12**	**1.66*** **
	(1.83)	**(0.72)**	**(0.91)**	**(0.73)**	**(0.62)**	**(0.62)**	**(0.61)**	**(0.51)**
CEEU* Log GDPCH	**–0.35**	**–0.37**	**–0.84**	**1.35** **	**–0.59**	**–0.47**	**–0.15**	**–0.32**
	(0.68)	**(0.62)**	**(0.61)**	**(0.69)**	**(0.49)**	**(0.42)**	**(0.62)**	**(0.39)**
Constant	**–57.70*** **	**–31.80*** **	**–41.10*** **	**–67.50*** **	**–42.40*** **	**–43.90*** **	**–58.70*** **	**–44.80*** **
	(7.69)	**(6.94)**	**(7.17)**	**(6.73)**	**(5.62)**	**(5.51)**	**(8.96)**	**(5.33)**

(*Continued overleaf*)

Table 12.6 Continued

Explanatory variables	*Machinery and transport equipment (SITC 7)*			*Misc. manufactures (SITC 8)*	*Other manufactures (SITC 5 + 6 – 68)*	*Total manufactures (SITC 5 to 8 – 68)*	*Primary products*	*Total non-oil imports*
	Parts and components	*Final goods*	*Total*					
R^2	0.75	0.75	0.76	0.84	0.77	0.80	0.70	0.81
RMSE	1.39	1.29	1.28	1.13	1.03	0.98	1.37	0.93
N	486	483	486	483	482	489	487	489
12.6b Imports from individual East Asian countries and other major regions								
Log GDP, exporter	1.24***	1.26***	1.18***	1.32***	1.24***	1.18***	1.45	1.20
	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)		(0.04)
Log per capita GDP, exporter	1.28***	1.41***	1.38***	1.21***	0.27***	0.69***	–0.34	0.44
	(0.10)	(0.11)	(0.11)	(0.10)	(0.11)	(0.10)		(0.09)
Log GDP China (**GDPCHN**)	2.20***	1.18***	1.64***	2.22***	1.45***	1.61***	1.89	1.60
	(0.26)	(0.23)	(0.24)	(0.21)	(0.19)	(0.19)		(0.18)
Log distance	–3.20***	–2.83***	–2.98***	–3.54***	–2.05***	–2.36***	–1.13	–1.96
	(0.35)	(0.35)	(0.35)	(0.37)	(0.35)	(0.31)		(0.31)
Log real exchange rate	0.55***	0.34	0.58***	0.43**	–0.21**	–0.09	0.01	–0.06
	(0.19)	(0.15)	(0.22)	(0.17)	(0.14)	(0.13)		(0.10)
Log relative wage index	–0.31*	–0.29**	–0.44**	–0.32*	–0.06	–0.36**	0.17	0.37
	(0.24)	(0.19)	(0.22)	(0.19)	(0.15)	(0.17)		(0.15)
Asian crisis dummy	0.27	–0.22	0.02	–0.17**	0.07	–0.06	–0.05	–0.13
	(0.12)	(0.99)	(0.11)	(0.10)	(0.07)	(0.11)		(0.09)
Japan* Log GDPCH	**–0.06**	**–0.21**	**0.03**	**–0.42****	**–0.44****	**–0.14**	**–0.41**	**–0.09**
	(0.26)	**(0.33)**	**(0.30)**	**(0.27)**	**(0.19)**	**(0.23)**		**(0.23)**
Korea* Log GDPCH	**0.21**	**0.10**	**0.31**	**–0.06**	**–0.38***	**0.03**	**–0.67**	**0.11**
	(0.29)	**(0.33)**	**(0.31)**	**(0.44)**	**(0.23)**	**(0.26)**		**(0.23)**

Singapore* Log GDPCH	**–0.03**	**0.41***	**0.36**	**–0.24**	**0.05**	**0.30***	**–1.69**	**0.20**
	(0.38)	**(0.32)**	**(0.37)**	**(0.28)**	**(0.22)**	**(0.23)**		**(0.21)**
Indonesia* Log GDPCH	**3.64*****	**2.48*****	**2.59*****	**–1.04*****	**–0.37**	**0.08**	**0.34**	**0.34**
	(0.63)	**(0.47)**	**(0.56)**	**(0.33)**	**(0.30)**	**(0.30)**		**(0.26)**
Thailand* Log GDPCH	**2.67*****	**2.35*****	**2.68*****	**0.44****	**1.13*****	**1.96*****	**–0.74**	**1.05**
	(0.44)	**(0.30)**	**(0.35)**	**(0.28)**	**(0.26)**	**(0.29)**		**(0.17)**
Malaysia* Log GDPCH	**2.61*****	**1.66*****	**2.57*****	**0.61****	**–0.33***	**1.27*****	**–1.31**	**0.46**
	(0.34)	**(0.33)**	**(0.35)**	**(0.29)**	**(0.21)**	**(0.20)**		**(0.17)**
Philippines* Log GDPCH	**5.33*****	**4.04*****	**4.89*****	**1.90*****	**–1.00****	**3.34*****	**–0.58**	**2.37**
	(0.47)	**(0.30)**	**(0.32)**	**(0.36)**	**(0.36)**	**(0.58)**		**(0.45)**
LATM* Log GDPCH	**3.95*****	**2.76*****	**3.57*****	**1.87****	**–0.53**	**1.85****	**–0.09**	**1.60**
	(1.12)	**(0.75)**	**(0.95)**	**(0.76)**	**(0.62)**	**(0.63)**		**(0.53)**
CEEU* Log GDPCH	**–0.47**	**–0.64**	**–1.05****	**1.25**	**–0.70***	**–0.64***	**–0.12**	**–0.44**
	(0.63)	**(0.60)**	**(0.57)**	**(0.68)**	**(0.49)**	**(0.43)**		**(0.38)**
Constant	–65.30***	–41.10***	–49.70	–65.70***	–43.80***	–46.80***	–64.30	–47.60
	(7.39)	(6.83)	(6.88)	(6.22)	(5.79)	(5.67)		(5.50)
R^2	0.82	0.81	0.82	0.87	0.83	0.86	0.74	0.85
RMSE	1.19	1.12	1.09	0.99	0.88	0.84	1.29	0.81
N	486	483	486	483	482	489	487	489

Source: see Appendix Table 12.A.2.

Notes:
1. Figures in parentheses are standard errors adjusted for arbitrary heteroscedasticity and intra-group correlation.
***, ** and * indicates significance level of 1%, 5% and 10%.

share for all developing countries. China's rapid integration into cross-border production networks of vertically integrated global industries as a major assembly centre has created new opportunities for the other East Asian countries to specialize in parts and components production and assembly. This development is an important counterpoint to the popular belief that China's global integration would crowd out other countries' opportunities for international specialization. Moreover, China's rapid world market penetration in labour-intensive manufactured goods has occurred largely at the expense of the high-wage East Asian NIEs, which have been rapidly losing comparative advantage in these product lines as an integral part of the export-led industrial transformation.

Is China's reliance on other countries in the region for sourcing components for its burgeoning electronics and electrical industries a structural feature of the ongoing process of its rapid economic integration or simply a passing phenomenon which will last only until China develops its own domestic production capabilities? Some analysts have alluded to the latter possibility, arguing that China has the potential to build a strong electronics industry based predominantly on locally produced components within its boundaries (e.g. Albaladejo and Lall 2004; Yusuf *et al.* 2007; Freeman 2005). This is of course an interesting issue for further study, but there is ample evidence that firms involved in vertically integrated global industries tend to rely increasingly on international networks of production, which embrace different territories and different forms of cooperation to optimize their competitiveness. Because of technological complexities and intrinsic country-specific cost advantages, countries are becoming specialized in specific activities in the value chain and in certain kinds of products. Moreover, over a long period of time many MNEs (particularly US-based MNEs) have significantly upgraded the technical capabilities of their regional production networks in other East Asian countries and have assigned global production responsibilities to affiliates located in more mature countries in the region. Naturally, country-risk considerations would have a much greater bearing on any corporate decision to deviate from these well-established global practices compared to simple relative cost considerations. Furthermore, China is still at a very early stage of developing private property rights, respect for intellectual property and venture capital financing practices which are important long-run contributors to converting scientific and technological innovations into successful commercial ventures (Huang 2003a; Gilboy 2004).

Given the current state of China's factor market conditions (as surveyed in a number of recent studies, including Blanchard and Giavazzi 2006, Cooper 2006 and Naughton 2007), one can speculate that China's trade patterns are unlikely to change dramatically in the short to medium run. China still has about half of its labour force (over 350 million) in agriculture where its productivity is, on average, barely one-eighth of that in industry and about a quarter of that in the service sector. Agriculture still accounts for over 45 per cent of total employment in the country even though agriculture's share in

GDP is only 13 per cent. GDP per worker in the economy as a whole is three times the value added per worker in agriculture. The country still remains very rural, with a rate of urbanization of about 40 per cent of the total population, much lower than a 'normal' level of 60 per cent consistent with China's income level. These features, coupled with the high skilled–unskilled wage differential (which, according to some estimates, has risen from 1.3 to 2.1 over the past decade), suggest that China still has much potential for moving unskilled workers out of agriculture and into manufacturing and other productive urban sector activities. For this to materialize, the global trading environment would need to remain accommodative and Chinese policies receptive to gains from specialization on the basis of comparative advantage.

Appendix

Table 12.A.1 Country coverage

Argentina	Finland	Malaysia	Slovakia
Australia	France	Mexico	Slovenia
Austria	Germany	Netherlands	South Africa
Belgium	Hungary	Norway	Spain
Brazil	India	Philippines	Sweden
Canada	Indonesia	Poland	Switzerland
China	Ireland	Portugal	Thailand
Costa Rica	Israel	Rep. of Korea	Turkey
Czech Republic	Italy	Russia	United Kingdom
Denmark	Japan	Singapore	

Table 12.A.2 Definition of variables and data sources

Label	*Definition*	*Data source/variable construction*
EXP	Value of bilateral exports in US$ measured at constant (2000) price.	Exports (at CIF price, US$): compiled from importer records of UN-COMTRADE, online database (http://www.bls.gov/ppi/home.htm). Exports value series was deflated by the machinery and transport equipment sub-index of the US producer price index.
GDP, GDPP	Real GDP, and real per capita GDP (at 1995 price)	World Development Indicators database, The World Bank
DIST	Weighted distance measure of the French Institute for Research on the International Economy (CEPII), which measures the bilateral great-circle distance between major cities of each country	CEPII database
ADJ	A binary dummy variable which takes value 1 for countries which share a common land border and 0 otherwise	CEPII database
RULC	The ratio of unit labour cost in country *i* and country *j*. Unit labour cost is measured as the ratio of the average manufacturing wage to manufacturing value added per worker. By construct, an increase (a decrease) in *RULC* indicates a deterioration (an improvement) in *i*'s cost competitiveness relative to *j*.	Annual manufacturing wages data for USA: 'Interactive database of National Income and Product Accounts', http://www.bea.gov/scb/account_articles/international/iidguide.htm#page3 All other countries: US Bureau of Economic Analysis (BEA) online database, 'Survey of US Direct Investment Abroad', http://www.bea.gov/scb/account_articles/international/iidguide.htm#page3
RER	Real exchange rate: $RER_{ij} = NER{*}\frac{P_i^W}{P_j^D}$ where *NER* is the nominal bilateral exchange rate index, P^W is price level of country *j* measured by the producer price index and P^D is the domestic price index of country I measured by the GDP deflator. By construct, an increase (decrease) in RER_{ij} indicates an improvement (deterioration) in *i*'s competitiveness vis a vis *j* in traded-good production	Constructed using data obtained from World Bank, World Development Indicators database. Following Soloaga and Winters (2001), mean-adjusted RER is used in the model. This variable specification assumes that countries are in exchange rate equilibrium at the mean.
EAS, LATM, CEEU, OECD	Dummy variables to identify whether the given country belongs to East Asia (EAS), Latin America (LATM), Central and Eastern Europe (CEEU), or the Organization of Economic Cooperation and Development (OECD).	In constructing these variables Japan and Korea are classified under EAS, and Mexico under LATM.

Notes

1 The data reported in the paper, unless otherwise stated, come from the UN *Comtrade* database. Throughout the paper inter-temporal comparison calculations are made for the two-year averages relating to the end points of the period under study so as to reduce the impact of year-to-year fluctuations of trade flows.
2 For details of the classification system see Appendix to Chapter 2.
3 Singapore's role in global production networks in high-tech industries shows a palpable shift in the standard assembly and testing activities to product designing and undertaking capital- and technology-intensive tasks in the production process, and providing headquarter services. Some, and perhaps most, of these activities are not captured in the data on merchandise trade (Athukorala 2008).
4 For recent applications of the gravity equation for trade flow analysis and extensive listing of the related literature see Anderson and Marcouiller (2002) and Soloaga and Winters (2001).
5 In experimental runs we also included binary dummy variables to represent common language, common colonial relationship, landlockedness, and island status of countries. These were subsequently omitted because of statistical insignificance and erratic sign changes among alternative specifications. We also tested two variables, telephone mainlines per 1,000 people (*TELE*) and per capita electricity production in kilowatts (kwh) (*ELET*) to represent infrastructure-related trade cost, and an index of institutional quality (Kaufmann *et al.* 2006) to capture transaction costs associated with contract enforcement. These variables were found to be highly correlated with PGDP. Exclusion of these variables (jointly and individually) was supported by the standard variable deletion (*F*) test.
6 The preliminary estimates using the simple IV method failed to pass the Pagan-Hall test of residual homoscedasticity. As a robustness check, I also used the Hausman-Taylor estimator which derives instruments within the model in the context of the standard random effect (RE) estimator. The results were remarkably consistent with those based on the IV-GMM estimator. The standard fixed effect (FE) estimator is not appropriate for estimating a gravity model since it does not permit retaining the distance variable, which is time-invariant (Egger 2005).

13 Trade and labour market outcomes

Why have the East Asian cubs lagged behind the tigers?[1]

Chris Manning and Alberto Posso

The 'High Performing Asian Economies' (HPAEs) of East Asia share much in common in terms of growth rates and patterns compared with other parts of the developing world (World Bank, 1993; Balassa, 1988). However, they differed in several other respects, such as the stock of human capital and governance arrangements in support of public policy, during the early decades of sustained growth (Booth, 1999). One lesser-known contrast was the more rapid real wage growth that underpinned a labour market transition and earlier industrial upgrading among the four newly industrialized economies (NIEs) (Hong Kong, Korea, Singapore and Taiwan), compared with the latecomers (the 'second-tier NIEs') in Southeast Asia. This remains a neglected area of research of the East Asian development experience. Analysis of these trends has wider implications for broadening our understanding of labour market dynamics associated with industrial transformation in other parts of the developing world, including in the rapidly growing Chinese and Indian economies.

This chapter takes a fresh look at factors contributing to this earlier and sustained labour market transition in the NIEs compared with the latecomers to export-led industrialization in Southeast Asia. One obvious explanation for the difference between the two groups of countries is simply earlier and more rapid economic growth over the 30 years leading up to the Asian economic crisis in 1997–98. However, while of relevance, this explanation is not entirely satisfactory. Although growing at slower rates than the NIEs, the main Southeast Asian economies (with the exception of the Philippines) performed credibly by developing country standards roughly over the same time span. Another explanation seems to lie in differences in the patterns of growth. For example, on the demand side of the labour market, the greater focus of NIEs on promoting the export of labour-intensive manufacturing could have played a significant role in contributing to shortages of unskilled labour and faster wage growth.

A final factor, which has so far received less attention, is the interaction between the increased demand for unskilled labour and characteristics of the supply side of the labour market for unskilled labour. It is well known that manufacturing in most East Asian countries drew on a quite elastic supply of labour from low-productivity agriculture in the early stages of development (Booth and Sundrum, 1985; Galenson, 1992; Fields, 1994). Less is known of the possible role that supplies of 'surplus' labour from agriculture had on distinct patterns of wage growth, and hence subsequent industrial transition. This factor is given special attention in this chapter. It is contended that the labour 'surplus' to be transferred from agriculture to manufacturing was smaller in the NIEs. As a result, real unskilled wages rose earlier and more sharply in these countries compared with the Southeast Asian countries (Booth, 1999).

Tests are also undertaken to examine whether labour market policies, which brought about greater labour market flexibility, might have played a complementary role in determining the divergent path in wages in the NIEs compared with the Southeast Asian countries. Greater labour market flexibility may have helped ensure faster mobility of labour from the low-productivity sectors into the rapidly growing export-oriented sectors in the NIEs.

We compare the growth experience and interaction with labour market trends in the NIEs in their first 20 years of rapid growth (1965–85) with the three selected ASEAN countries over a similar, but later time period (1975–95). We first present some data on the main variables, to set the stage for the later discussion. The next section seeks to place these developments within a broader analytical framework, taking the Lewis model of the 'labour surplus' economy as a point of departure. We then report on the results of several simple regression exercises which seek to explain different rates of growth in manufacturing wages in general in East Asia, among the two groups of countries. A final concluding section discusses some policy implications and qualifications.

Economic growth and contrasting labour market outcomes

Before turning to the econometric analysis, a quick look is taken at the trends in the key variables covered in the analysis. First, as regards our dependent variable, unskilled wages, Figure 13.1 shows how the two NIEs have outperformed ASEAN-3s by experiencing higher growth in real unskilled wage rates. The figure shows that Korea and Taiwan performed better than every other nation in terms of average annual real unskilled wage growth. In both Korea and Taiwan, real wage growth in unskilled manufacturing industries accelerated around the middle of the period as labour markets for unskilled labour tightened, after 10–15 years of rapid economic growth.[2] Among the ASEAN-3 countries, Malaysia experienced relatively high wage growth, although the rate of growth was slower than in Korea and Taiwan. In Thailand and Indonesia wages of unskilled workers grew slowly, despite large increases in employment in unskilled-labour-intensive industries.

Second, we examine trends in the demand-side variables studied in this paper: labour-intensive manufacturing output, productivity and exports. While Table 13.1 indicates similarities in the performance of the NIEs and

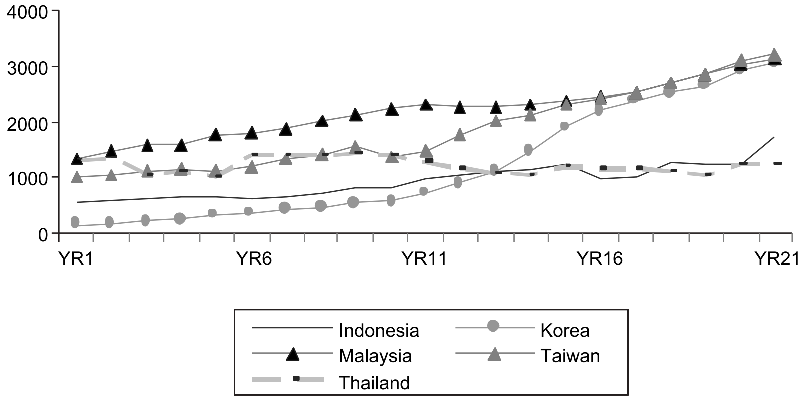

Figure 13.1 Real unskilled wages in selected East Asian countries, 20 years of sustained growth (1980 USD).

Source: Based on data compiled from UNIDO (2006), Taiwan Statistical Yearbook, and International Financial Statistics, IMF. Real wages per worker are calculated using wage and employment data from UNIDO (2006). Real wages are presented in 1980 USD.

Table 13.1 Trends in demand-side variables: exports, output, and productivity, 20 years of sustained growth (manufacturing)

	NIEs		*ASEAN-3*	
	YR1–10	*YR11–20*	*YR1–10*	*YR11–20*
Export-gross output ratio (%)	32	47	12	30
Real output (millions 1980 US$)	2610	10205	3226	12180
Productivity (thousands 1980 US$)	11	18	11	16

Source: UNIDO (2006) and UN *Comtrade*.

Notes: The data relates to the labour-intensive manufacturing sector. Output and productivity are in 1980 USD. Productivity is measured as output per worker.

ASEAN-3, the NIEs consistently outperformed ASEAN-3 in terms of the ratio of exports to GDP. While export orientation played an important role in the development strategy of both sub regions, it was more visible in the NIES (Balassa, 1988).

Contrasts between the two groups in employment experience were more marked than that of wages. The rate of growth of employment in unskilled industries was much faster in each of the two NIEs over the first ten years, compared to the ASEAN-3 countries, in particular Malaysia (Figure 13.2). Employment in unskilled industries in Korea and Taiwan recorded a twofold increase in the first decade of accelerated growth, whereas employment in these industries began to accelerate only in the second decade of rapid growth in the ASEAN-3. It is therefore no surprise that pressure for unskilled wage increases shown in Figure 13.1 only began to build towards the end of the period of accelerated growth in the ASEAN-3. These strains dissipated,

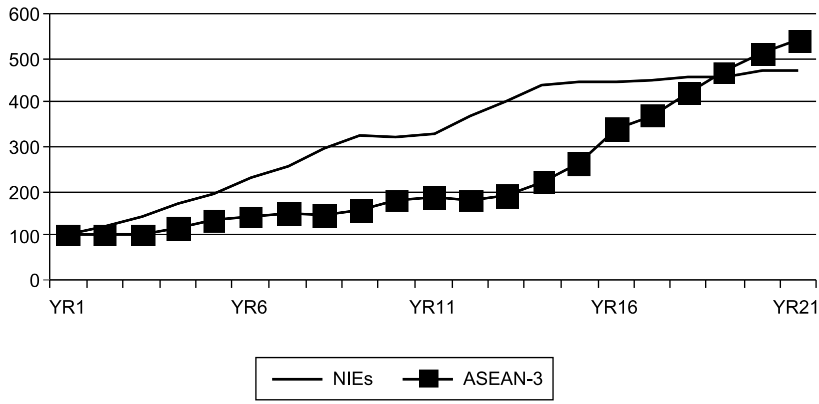

Figure 13.2 Growth rates of employment in labour-intensive manufacturing during the first 20 years of rapid growth, NIEs v ASEAN-3.

Source: Calculations based on UNIDO (2006) and data on employment in unskilled manufacturing industries cited in Galenson (1979: 390).

subsequently, with the onset of the East Asian financial crisis that hit this group of countries hardest.

These patterns of growth in wages and employment in unskilled-labour-intensive industries are the starting point of our analysis. Next we need to introduce into the story differences in labour supply characteristics between the NIEs and the ASEAN-3. For this purpose we draw upon the Lewis model, which helps explain the determination of supply price of labour to the modern sector, at different stages of development in an economy which embarks on industrialization from surplus labour conditions in the traditional sector.

A hybrid Lewis model

The Lewis model explains the growth of a developing country in terms of the movement of labour between the low-productive 'traditional' sector and the high-productivity modern sector (where production decisions are driven by profit maximization) (Lewis, 1954, 1958, 1979). The transfer of surplus labour occurs at constant real wage rates over time into more productive jobs in the modern sectors in the early stages of development. This generates profits for capital accumulation and industrialization until real wages begin to rise, leading to a convergence of wages between the modern and traditional sectors.[3] The main focus in this chapter is on the relationship between the supply of labour in the traditional sector (proxied by employment in agriculture) and growth in wages in the modern sector.

The outcome in terms of labour markets depends partly on both the rate of growth of the modern sector as well as the relative size of the traditional sector. At one extreme, if the traditional sector is small, or the wage and productivity gap with the modern sector is not large, rapid growth in the modern sector might be sufficient to absorb most low-productivity labour and contribute to rising wage rates. We expect this situation to more closely parallel labour market developments among the NIEs.

At the other extreme, if growth is slower in the modern sector or the supply of low-productivity labour is large relative to the size of the modern sector, surplus labour is shed at a much slower pace into the modern sector, and the productivity gap between the two sectors remains distinct for longer periods. This situation is expected to more closely reflect labour market conditions in the ASEAN countries.

The former case fits initial labour market conditions in the two NIEs where agriculture diversified and modernized in the 1960s and 1970s. Agricultural employment fell and labour productivity rose sharply. Faced with labour scarcity, employers were induced to substitute capital for labour, contributing to a narrowing gap in productivity with the modern sector (Booth and Sundrum, 1985: 50). As shown in Figure 13.3, the agricultural share of total employment fell from around half to 20 per cent in both Korea and Taiwan over two decades to the mid 1980s.

A similar pattern is apparent in Malaysia, which in this respect appears to have responded more like the NIEs than the other ASEAN countries. In Thailand and Indonesia, labour productivity grew less quickly in agriculture compared with the two NIEs, and technological change and growth in the

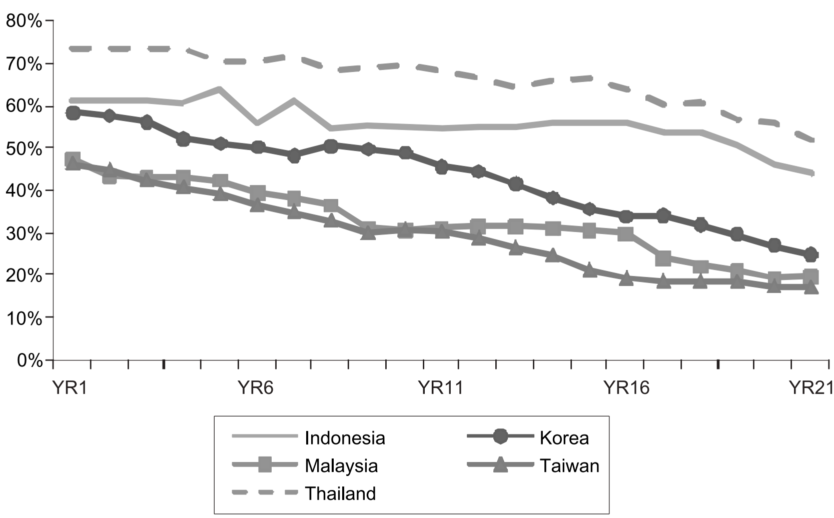

Figure 13.3 Percentage of employment in the agricultural sector in selected East Asian countries, 20 years of sustained growth.

Source: ADB, *Key Indicators* (various years) and annual statistical yearbooks for individual countries and years (for agricultural employment data).

area cultivated were labour-absorbing in the early stages of accelerated growth (see Booth and Sundrum, 1985: 50). Agricultural employment share was still around 50 per cent of total employment at the end of the twenty-year period, around double the share in the two NIEs and Malaysia (see Figure 13.3)

If the transition is rapid, shortages of unskilled labour in the modern sector also contribute to industrial upgrading, and the entrepreneurs engage in more capital-intensive and skill-intensive activities. The export of relatively labour-intensive products, based on a comparative advantage in the deployment of unskilled labour, gives way to a shift to more capital- and skill-intensive exports as labour markets tighten.

Determinants of wage growth

We now turn to an econometric analysis of the determinants of real wages in labour-intensive manufacturing in the two groups of countries. The main hypothesis is that not only demand-side but also supply-side variables related to the supply of unskilled manpower to the modern sector are important in influencing wage outcomes. The analysis involves estimating an equation which captures the impact of both labour supply and labour demand factors on wages:

$$W_{it} = \beta_1 A_{i,t-1} + \beta_2 Z_{i,t-1} + \alpha_i + D_2 + \varepsilon_{it} \tag{1}$$

where W_{it} refer to labour intensive employment and real wages of country i at time t, $A_{i,\ t-1}$ is a measure of labour supply conditions proxied by the share of agricultural employment in total employment in the previous period; $Z_{i,t-1}$ is a vector of labour demand variables in the previous period; α_i is a country fixed effect, D_2 is a second decade dummy variable, and ε_{it} is a normally-distributed mean-zero error term.

On the demand side, we concentrate on output, labour productivity and exports in labour-intensive industries, which were identified in World Bank (1993) and other authors as one of the main drivers of growth during this initial period (Kuo, Ranis and Fei, 1981; Krueger, 1983: Chapter 2). Labour intensive manufacturing exports are computed as a share of total manufacturing gross output. Productivity in labour-intensive manufacturing is proxied as the ratio of output to employment in these industries.[4] On the supply side, the share of unskilled labour employed in agriculture is adopted as a proxy variable for supply-side pressures on the wages in the 'modern' labour-intensive manufacturing sector.

The time period (20 years) is arbitrarily chosen for each group of countries partly for ease of exposition. However, the starting point differs for each group. For the NIEs group we have taken 1965 as the starting point. Figure 13.4 provides a justification of our choice of years. The figure indicates that the onset of the almost exponential increase in the growth rate of

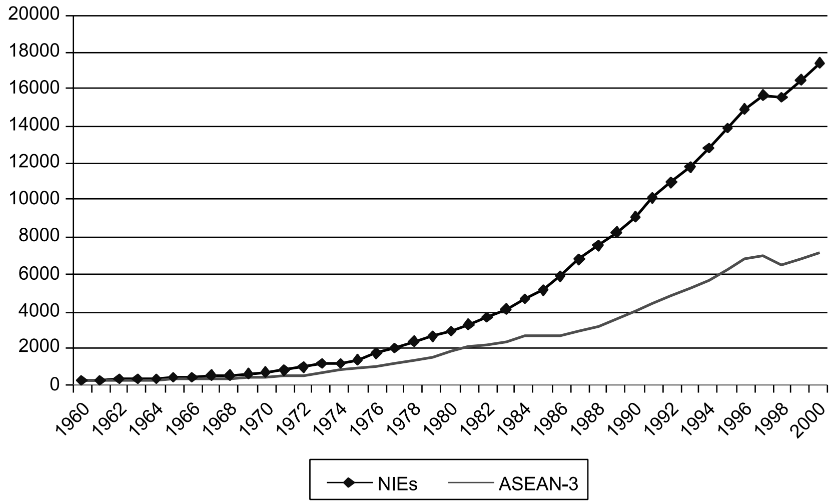

Figure 13.4 Real GDP per capita in the NIEs and ASEAN-3s, 1960–2000.

Source: Heston *et al.* (2006).

real GDP per capita in the NIEs occurred in the mid to late 1960s. We therefore define the first 20 years of sustained economic growth of the NIEs to be from 1965 to 1985. Figure 13.4 also indicates that the ASEAN-3s experienced their period of high sustained growth around the mid-1970s. We therefore define the first 20 years of sustained economic growth in ASEAN-3 nations to be 1975 to 1995.

With regard to end points, the data clearly show that economic growth slowed, and the role of manufacturing in growth changed as the modern service sectors became more prominent in the NIEs in the mid 1980s when the Plaza accord was signed, realigning Japanese, Korean and Taiwanese exchange rates (World Bank, 1986). In the case of the ASEAN-3, the long period of accelerated growth came to a sudden halt in 1997–98, with the onset of the Asian financial crisis.[5]

Employment, wage, and output data on labour-intensive industries are taken from UNIDO (2006). Agricultural employment data are derived from statistical yearbooks in the early years in the case of Korea and Taiwan, from data collected in National Labour Force Surveys and from the Asian Development Bank annual publication of *Key Indicators of Developing Asian and Pacific Countries* from 1977 onwards. Trade data for all nations, excluding Taiwan, comes from UN *Comtrade*. Taiwan trade data comes from the Taiwan Statistical Database (1994), and other data on Taiwan from the annual *Taiwan Statistical Data Book*. See Appendix 13.A.1 for details.

Real unskilled manufacturing output and wages are measured in 1980 US dollars using CPI as the price deflator. Labour-intensive, manufactured exports are classified according to the methodology in Lall (2000), which relies on grouping goods according to SITC (revision 2). Wages, employment and output in unskilled industries are calculated following an adoption of the classification employed in Ariff and Hill (1985), which relies on ISIC (revision 2).

To ensure that the estimates capture the lagged effects, we regressed the current year's dependent variables on the past year's independent variables. In experimental runs we lagged the dependent variables by up to five years. The results remained largely unchanged and we therefore do not present these estimates here. Our preliminary regression analysis also showed the presence of an AR (2) process in terms of the Arellano-Bond and Wooldridge tests. Although autocorrelation of this nature does not affect coefficient estimates, it does affect standard errors. We therefore compute Newey-West standard errors which provide for t-statistics that are robust to autocorrelation and heteroscedasticity.[6]

Results

The results are provided in Table 13.2. The results are robust to estimation with and without country fixed effects. However, we prefer the fixed effects estimates as they explicitly control for omitted variables that vary across countries but are constant within countries.

There is a positive and significant relationship between labour-intensive real wages and both output and productivity. Productivity is of particular

Table 13.2 Labour-intensive real wages regressions, with and without fixed effects

Dep var: L-int real wages	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Ag empl share	–3.54***	–3.84***	–2.07***	–3.91***	–1.79***	–3.14***
	(–4.03)	(–5.28)	(–4.98)	(–7.74)	(–5.68)	(–4.77)
L-int man output	0.38**	0.47***				
	(3.00)	(6.25)				
L-int man productivity			0.81***	0.77***	0.80***	0.76***
			(15.21)	(11.27)	(15.10)	(10.20)
L-int man exports	–0.95	–1.96**	–0.36	–1.06**		
	(–1.38)	(–3.12)	(–1.27)	(–3.16)		
D2	–0.09	–0.11	–0.03	–0.06	–0.05	–0.13*
	(–0.54)	(–1.44)	(–0.55)	(–1.03)	(–0.91)	(–2.34)
Country fixed effects?	No	Yes	No	Yes	No	Yes
Observations	100	100	100	100	100	100
R-squared	0.66	0.91	0.91	0.95	0.91	0.94

Notes: Robust Newey-West t-statistics in parentheses, *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Independent variables are lagged by one year with respect to the dependent variable. All variables are presented in log form.

interest here as this variable presumably captures some of the supply-side variation in the data because it is likely to be determined by the capacity of workers to adapt to and efficiently work in the modern sector. The results, thus, suggest that a worker's capacity to adapt to the modern sector is an important determinant of wage growth. We do not have data on the educational composition of low-wage workers between the two groups of countries. But given significantly higher levels of secondary schooling enrolments in the NIEs early on (Booth, 1999), we might expect productivity effects to be stronger in the former group of countries (see below). The results suggest that an increase in labour-intensive output or productivity by 10 percent will result in an increase in real labour-intensive manufacturing wages by approximately 5 and 8 percent, respectively.

Interestingly, labour-intensive exports (measured as a percentage of manufacturing output) are found to have a negative and significant effect on real labour-intensive wages in our fixed-effects specification. This has to do with the high level of collinearity between exports and the remaining variables as suggested by large R^2. Annex Table 13.A.3 shows strong correlation between exports and the remaining variables. It is not surprising for output and productivity to be highly correlated with exports in these nations since the push for export-oriented industrialization has been identified as a key factor driving growth in these nations (Balassa, 1988). However, we did not expect *a priori* for labour surplus and exports to be strongly negatively correlated (the correlation coefficient is –0.78). A possible explanation for this strong correlation may be due to our construction of this variable. Labour surplus is proxied as the share of workers employed in agriculture. Hence, as the export-oriented sector expands, this agricultural share contracts as workers move towards higher earning sectors of the economy. We deduce that the negative correlation between exports and labour surplus is stronger than with other demand variables simply because export expansion is driving growth in manufacturing output and productivity.[7]

There are only two possible ways of redressing the collinearity problem. One is to collect more data, which is not possible in this study. The other is to drop some insignificant variables. However, doing so may generate omitted-variable biases in the estimated coefficients. We therefore run Equation (1) with and without exports and conclude that omitted variable bias is unlikely and that our results seem robust to various specifications.

With regard to supply-side variables, the estimates show a negative relationship between wages in labour-intensive manufacturing and surplus labour, under various specifications as well as with and without country fixed effects. There is also evidence that a decrease in labour surplus by 10 per cent is associated with an increase in real labour-intensive wages by approximately 35 per cent on average. In all instances the estimated coefficient is significant at a 1 per cent level. Interestingly, this result is remarkably robust to the alternative estimation methods.

Overall, the effect of labour surplus dominates all demand-side influences in wage determination, in terms of both level of significance and coefficient estimates. Figure 13.5 summarizes the results with respect to labour surplus. It shows a strong negative relationship between labour surplus and real wages in labour-intensive manufacturing in East Asia. Clearly, if labour-intensive manufacturing industries face a large pool of unskilled workers, then it is difficult for workers to bid up wages even in the face of strong growth in demand for labour.

The basic model demonstrated the importance of the role of labour surplus in explaining wage outcomes. Since this is an area that has been neglected in the literature, it has received more attention in this study. In particular, it is pertinent to ask whether the relationship discussed above can be observed in both sub-regions. This is an important question because it is possible that labour surplus may create greater downward pressure on wages in one sub-region than in the other. To answer this question we introduce interactive dummy variables into the model, interacting a sub-regional binary dummy variable with the ratio of agricultural employment to total employment:

$$W_{it} = \beta_1 A_{i,t-1} + \beta_2 A_{i,t-1} * S\_region + \beta_3 Z_{i,t-1} + \alpha_i + D_2 + \varepsilon_{it}, \tag{2}$$

where the variable *S_region* is a binary dummy variable that is one if a particular country is within the sub-region being tested. The interpretation of the results for the interactive dummy is as follows: the estimated effect of an increase in the ratio of agricultural to total employment in the sub-region in question is given by $\beta_1+\beta_2$. If β_2 is found to be insignificant, we can deduce

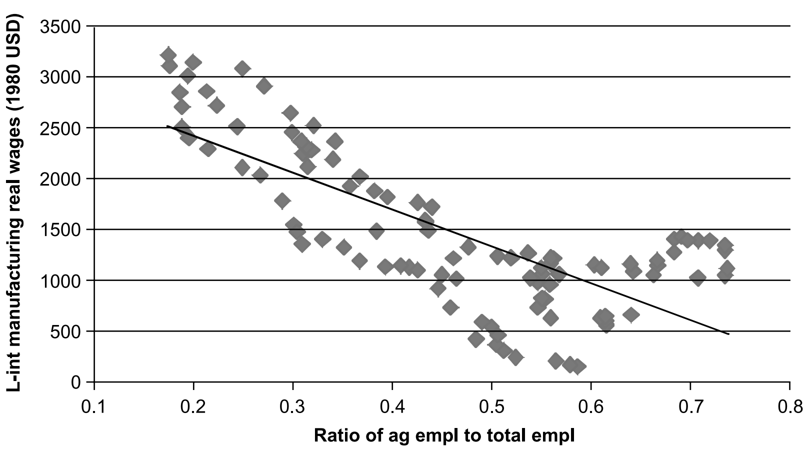

Figure 13.5 Real L-intensive manufacturing wages versus the ratio of agricultural to total employment.

Source: Calculation based on data from UNIDO (2006), IMF International Financial Statistics, ADB, *Key Indicators* (various years) and annual statistical yearbooks for individual countries and years (for agricultural employment data).

that there are no marked differences between the sub-region and the rest of the sample.

Two separate exercises were undertaken. First, an NIE dummy variable was interacted with the labour surplus proxy. The results confirmed a negative and significant relationship between labour surplus and real wages (Table 13.3). Columns 1 to 3 in Table 13.3 indicate that the relationship between labour surplus and real labour-intensive wages in the NIEs was always negative and significant. The coefficient estimate for the effect of labour surplus on wages in the NIEs is approximately –4.

The results of the second exercise are reported Columns 4 to 6 in Table 13.3. The estimated coefficient for the ASEAN-3 interactive dummy was found to be positive and significant. Column 4, for instance, indicates that an increase in labour surplus by 10 per cent, as captured by a rise in the ratio of agricultural to total employment, will result in a decrease in labour-intensive real wages by approximately 10 (–47 + 37) per cent in ASEAN-3 nations. This is substantially less than the expected decrease for the NIEs.

It is instructive to note also that there is little difference between the two groups of countries in terms of the relationship between the demand-side variables and real wages. Output and productivity were positive and significant in both cases. Thus the possible effects of higher levels of education in the NIEs on productivity mentioned above do not seem to have had

Table 13.3 Wage equations with sub-regional interactive dummy variables

Dep var: L-int real wages	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Ag empl share	–1.02 (–1.04)	–2.65*** (–3.86)	–1.68** (–2.79)	–4.75*** (–5.65)	–4.40*** (–7.81)	–4.07*** (–5.28)
Ag empl share in NIEs	–3.73** (–3.26)	–1.76* (–2.26)	–2.39** (–3.10)			
Ag empl share in ASEAN3				3.73** (3.26)	1.76* (2.26)	2.39** (3.10)
L-int man output	0.42*** (5.97)			0.42*** (5.97)		
L-int man productivity		0.71*** (9.32)	0.68*** (8.95)		0.71*** (9.32)	0.68*** (8.95)
L-int man exports	–1.30* (–2.07)	–0.80* (–2.23)		–1.30* (–2.07)	–0.80* (–2.23)	
D2	–0.05 (–0.76)	–0.03 (–0.56)	–0.07 (–1.24)	–0.05 (–0.76)	–0.03 (–0.56)	–0.07 (–1.24)
Country fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes
Observations	100	100	100	100	100	100
R-squared	0.93	0.95	0.95	0.93	0.95	0.95

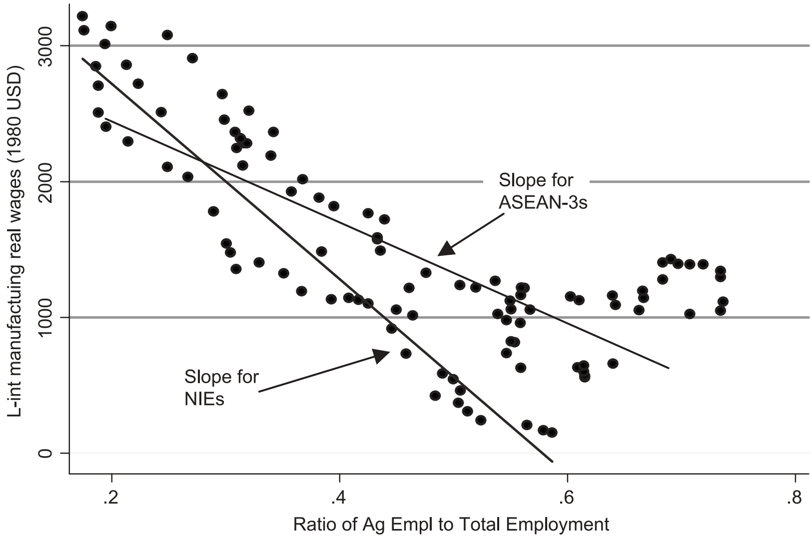

Figure 13.6 Explaining the results: real L-intensive manufacturing wages versus the ratio of agricultural to total employment, the difference between the NIEs and ASEAN-3.

Source: See Figure 13.5. Slope estimates based on regressions with interactive sub-regional dummy variables.

a significant effect on differences in real wage outcomes between the two groups of countries.

One possible interpretation is that labour was less mobile in the ASEAN-3 compared with the NIEs; that is, workers were unable to swiftly and easily move from agriculture to industry, whereas labour markets were highly integrated in the NIEs across sectors. However, policy factors may also have played a role. It is possible that Indonesia and Thailand experienced a higher degree of labour market rigidity that impeded the movement of labour from agriculture to industry. Although some authors have argued that developing East Asia in general has had highly flexible labour markets (Fields, 1994; Edwards and Lustig, 1997), greater regulation of labour markets might explain the less significant finding for the labour surplus variable in the ASEAN-3, compared with the NIEs. We examine this possibility below.

Labour market rigidities

So far, our analysis suggests that labour surplus is associated with very strong negative movements in real wages in the NIEs and weaker, though still significant, movements in the same direction in ASEAN-3. Here we test whether this stems from differences in labour market rigidities in these nations. In particular, we ask whether labour markets are less regulated in the NIEs than in ASEAN-3 nations. In order to address this issue, Equation (2) was re-run with an additional explanatory variable: the labour market rigidities index (*Li1*) constructed by Forteza and Rama (2001). *Li1* is also interacted with the ASEAN dummy (*Li1* ASEAN*-3) to examine the impact of this variable in the ASEAN-3 countries by themselves.

This index is a composite measure encompassing minimum wages (the most commonly observed distortion); mandated benefits (which include all age pensions, health insurance, maternity leave, mandated job security and high firing costs); trade union membership; and the share of government employment in the total labour force (these workers are subject to more stringent regulation than the rest of the economy). The index is normalized so that it varies in the range of 0 to 1.[8]

The results are reported in Table 13.4. Li1 was consistently found to have no significant effect on labour-intensive real wages. Also, its inclusion into the models makes little difference to the estimates of the other coefficients. The upshot is that the stronger effect of labour surplus on wage outcomes in the NIEs than in ASEAN-3 nations is robust to the presence (or absence) of labour market rigidities.[9]

Table 13.4 Wage equations controlling for labour market rigidities

Dependent variable: real wages	*(1)*	*(2)*	*(3)*	*(4)*
Ag empl share	–5.40***	–4.83***	–5.30***	–4.74***
	(–7.51)	(–7.05)	(–7.01)	(–7.56)
Ag empl share in ASEAN3	3.13***	2.05*	2.65*	1.72
	(3.44)	(2.13)	(2.62)	(1.84)
Li1	0.59	0.26	0.15	–0.10
	(1.49)	(0.65)	(0.28)	(–0.21)
Li1*ASEAN-3			0.82	0.71
			(1.28)	(1.22)
L-int man output	0.13*		0.11	
	(2.02)		(1.71)	
L-int man productivity		0.34**		0.30**
		(2.87)		(2.65)
L-int man exports	–0.29	–0.22	–0.34	–0.30
	(–0.71)	(–0.74)	(–0.82)	(–0.91)
D2	–0.03	–0.05	–0.04	–0.05
	(–0.47)	(–0.61)	(–0.52)	(–0.68)
Country fixed effects?	Yes	Yes	Yes	Yes
Observations	85	85	85	85
R-squared	0.92	0.92	0.92	0.93

Notes: Robust t-statistics in parentheses, *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Independent variables are lagged by 5–10 years with respect to the dependent variable. All variables are in log form.

Conclusions

In this chapter we posed a puzzle: why did real wages rise so quickly in the New Industrializing Economies (NIEs) compared with a second group of rapidly expanding East Asian economies in Southeast Asia (the ASEAN-3), during their respective early periods of rapid economic growth? One simple explanation is that the NIE economies grew faster than the three ASEAN economies. But we have argued that this is not enough to explain why real wages rose so rapidly and so much earlier in the development process in the NIEs.

In the case of Korea, Amsden (1989: 195, 199) notes that 'unrivalled' wage behaviour in the history of earlier industrial revolutions needs to be explained through reference to a variety of factors: rapid capital accumulation, the low base level of wages when industrialization took off in earnest, the structure of Korean agriculture, long working weeks and labour market segmentation. We have suggested a similar, though slightly different explanation for the NIEs as a group. This concentrates on the development strategy that took advantage of abundant unskilled labour, and single-mindedly promoted labour-intensive manufacturing output. The ASEAN-3 countries adopted a similar strategy. But they did so later in the development process, and their efforts were cut short by the Asian economic crisis, just over 20 years later.

The regression results are consistent with our hypothesis that both demand factors associated with output and productivity in labour-intensive manufacturing and supply factors associated with the stock of unskilled labour significantly affected real wage growth. The results suggest that supply-side factors were more significant in the NIEs than in the ASEAN-3. The larger and more backward agricultural sector slowed wage growth and subsequent structural change in the ASEAN-3, and especially in Thailand and Indonesia.

Unlike in Malaysia, Thailand and Indonesia, the NIEs did not have the luxury of abundant agricultural land as an option for absorbing surplus labour during the early stage of rapid economic growth. Thus, in pursuing a policy that sought to maximize growth and deploy relatively abundant unskilled labour into higher productivity occupations, the NIEs adopted policies that created opportunities outside agriculture. It was found that the rapid decline in the share of the labour force in agriculture played a greater role in determining the wage outcomes in labour-intensive industries than the demand variables included in the analysis. There is no evidence to suggest that labour market policies played a significant role in determining different rates of growth of real wages in the ASEAN-3 during this early period of accelerated economic growth.

The broader significance of this chapter lies in its pinpointing a key difference in the development strategies among several of the 'miracle economies' in East Asia. The findings help explain why one group (NIEs) are now among the developed industrial and service-based economies of the world and the other (ASEAN-3) is still struggling as middle- and lower-middle-income countries. The NIEs, of course, progressed quickly beyond the labour-intensive stage of development, supported by heavy investment in schooling and skills development. The ASEAN-3 countries, particularly Thailand and Indonesia, are still trying to find better jobs for the majority of workers engaged in low-productivity agriculture and the informal sector.

A number of qualifications should be noted. First, the selection of countries was somewhat arbitrary. Some were excluded because of data problems, and we have lumped together countries with different characteristics into two groups; Malaysia, in particular, displayed several features which were closer to the NIEs than the other ASEAN countries. Second, the first 20 years of rapid growth for each group of countries have also been selected somewhat arbitrarily. Within each group of countries, the timing of programmes of economic reform and accelerated growth differed. Third, our measure of labour surplus – the relative share of the workforce in agriculture – is a crude one. Not all workers in agriculture are engaged in low-productivity jobs, even at early stages of development, and low-productivity workers were also likely to be heavily concentrated in the 'informal sector' in the early stages of development (Manning and Pang, 1990). In the case of Malaysia and Thailand, cheap migrant workers (many of them unregistered) were under-enumerated in agriculture and other low wage sectors towards the end of the 20 year period (Athukorala and Manning, 1999). This probably contributed to the weaker results which we obtained for the labour supply variable for the ASEAN-3 countries.

Appendix

Table 13.A.1 The share of agriculture in GDP NIEs and the ASEAN-3 countries during the first 20 years of accelerated economic growth

	Years	*Korea*	*Taiwan*	*Years*	*Indonesia*	*Malaysia*	*Thailand*
YR1	1965	0.42	0.44	1975		0.45	
YR2	1966	0.38	0.44	1976		0.43	
YR3	1967	0.33	0.42	1977	0.28	0.46	0.12
YR4	1968	0.25	0.41	1978	0.27	0.44	0.12
YR5	1969	0.26	0.36	1979	0.22	0.43	0.13
YR6	1970	0.27	0.38	1980	0.26	0.45	0.12
YR7	1971	0.30	0.32	1981	0.19	0.47	0.11
YR8	1972	0.25	0.34	1982	0.26	0.50	0.11
YR9	1973	0.22	0.38	1983	0.24	0.55	0.11
YR10	1974	0.23	0.38	1984	0.24	0.56	0.09
YR11	1975	0.26	0.40	1985	0.25	0.57	0.09
YR12	1976	0.27	0.38	1986	0.26	0.59	0.09
YR13	1977	0.27	0.39	1987	0.25	0.59	0.10
YR14	1978	0.29	0.38	1988	0.23	0.58	0.10
YR15	1979	0.33	0.48	1989	0.22	0.58	0.09
YR16	1980	0.26	0.48	1990	0.19	0.54	0.08
YR17	1981	0.31	0.47	1991	0.19	0.64	0.10
YR18	1982	0.31	0.46	1992	0.20	0.70	0.09
YR19	1983	0.32	0.40	1993	0.21	0.71	0.09
YR20	1984	0.37	0.37	1994	0.24	0.71	0.10
YR21	1985	0.40	0.39	1995	0.26	0.65	0.12

Source: Asian Development Bank, Key Indicators of Development in Asia, various years, and individual country statistical yearbooks, various years.

Table 13.A.2 Descriptive statistics

Variable	*Mean*	*Std. Dev.*	*Min*	*Max*
Real L-int wages	1,479	770	150	3,216
L-int exports (%)	28	18	2	65
L-int real output (millions)	8,880	8,450	287	43,300
L-int productivity	12,810	5,707	1,441	27,498
Ag empl share (%)	46	16	17	74

Notes: Real wages, output and productivity are expressed in 1980 USD.

Table 13.A.3 Annex: correlation coefficients of main variables

	Real L-int wages	*L-int exports*	*L-int real output*	*L-int productivity*
Real L-int wages	1			
L-int exports	0.5919	1		
L-int real output	0.6664	0.5811	1	
L-int productivity	0.9309	0.5189	0.7648	1
Ag empl share	–0.6342	–0.7749	–0.3587	–0.4683

Notes: Calculations are undertaken using the log of the variable so as to maintain a higher degree of consistency with the regression analysis. The log transformations do not generate significant differences in the correlation coefficients.

Notes

1 Earlier versions of this paper were presented at a seminar at the Global Development Network Conference in Brisbane, January 31 to February 1, 2008, at the Division of Economics, Research School of Pacific and Asian Studies, ANU on May 27, 2008, and at the East Asian Economics Association Convention in Manila, November 15–16, 2008. The authors would like to thank participants at both meetings for comments and especially Professor Prema-chandra Athukorala for valuable inputs into the structure and content of the paper. The normal disclaimers apply.
2 Kuo, Ranis and Fei (1981: 12–26) discuss these patterns in the case of Taiwan; Bai (1985) examines the 'turning point' in Korea around the mid 1970s.
3 In the Lewis model, there is no need for a presumption that the supply of unskilled labour is perfectly elastic to the modern sector (implying zero marginal product in traditional activities). The only requirement is that the supply curve is quite elastic so that labour can be transferred into at low marginal cost relative to productivity in the modern sector.
4 Labour-intensive industries are defined using the ISIC codes identified in Ariff and Hill (1985).
5 The year 1995 seems to be an appropriate ending point for the ASEAN-3. Although growth was still rapid in 1996 in Malaysia and Indonesia, the Thai economy began to falter seriously in 1996 when export growth fell from a sustained annual growth rate of around 15–20 percent to register a negative figure, the first for almost 15 years (Warr, 2005a: 6).
6 This is performed in a straightforward manner in STATA by using the newey2 command setting the lag order to 2.
7 We re-estimated a 'bivariate' fixed-effects model with exports as the only explanatory variables and found the expected positive and significant relationship. These results are not reported as they may suffer from omitted variable bias and thus have little explanatory power.
8 Two limitations of using a composite labour market rigidity index relate to uncertainty as to which component of the index is relevant for wage outcomes, and the fact that different components will dominate the labour market effect, in individual countries.
9 Democratization could well have had an impact on the role played by governments and unions in setting wages in NIEs and in Indonesia; but this occurred for the most part after the 20-year period of rapid growth in both groups of countries.

14 The ending of the trade policy bias against agriculture

Evidence for Indonesia and Thailand

Peter Warr

In a famous multi-country study for the World Bank, Krueger, Schiff, and Valdés (1988) documented a consistent and widespread trade policy bias in developing countries. The bias operated against agriculture and in favour of manufacturing and this pattern was demonstrated throughout Africa, Latin America and Asia, including most countries of Southeast Asia. The data used in that study covered the period ending in the late 1970s. The present chapter asks whether that pattern can still be detected today, using updated information for two Southeast Asian countries – Indonesia, a major food importer, and Thailand, a major food exporter.

The analysis is based on detailed comparisons between the prices of agricultural commodities in domestic and international markets. The analysis confirms the Krueger *et al.* conclusion for the period covered by their study but concludes that since then the overall structure of protection has shifted markedly. Overall, protection is now roughly neutral between agriculture and manufacturing in both countries. Nevertheless, despite this change in the overall bias of trade policy there remains considerable variation in the protection accorded to different agricultural industries.

The discussion in the present chapter focuses on just three important commodities: rice, sugar and an important input, urea fertilizer. Detailed analyses on a wider range of agricultural commodities are available in Fane and Warr (2007) and Warr and Kohpaiboon (2007), both available online,[1] and these analyses support the conclusions of this paper.

Indonesia

In Indonesia, the staple food, rice, is a net import and this one commodity has been a central focus of Indonesian food policy throughout the (almost) six decades since the country's independence. Self-sufficiency in rice, meaning the elimination of rice imports, has been a cherished goal of agricultural policy for all of this time. It is an emotive subject, closely linked in the public imagination to Indonesian nationalism. When asked his proudest single achievement, Suharto, Indonesia's president for the 32 years from 1966 to 1998, cited the (temporary) achievement of self-sufficiency in rice during the mid-1980s.

Policy evolution

Indonesia obtained its independence from the Netherlands in 1949. The first post-independence government of President Sukarno pursued a nationalistic, quasi-socialist economic policy that produced hyperinflation and economic stagnation. In 1966 Sukarno was displaced amid economic chaos by one of his generals, Suharto, whose regime, called the 'New Order', lasted until the macroeconomic crisis of 1998. Upon assuming power, Suharto speedily introduced a macroeconomic stabilization programme and then began liberalizing Indonesia's trade and investment policies.

In the wake of the commodity boom of 1972–73 and the oil price shocks of 1973–74 and 1979–80, trade policy became increasingly inward-looking. The government taxed or banned some traditional exports, pursued self-sufficiency in rice, and used part of the burgeoning oil revenues to establish import-substituting manufacturing industries, which it then protected. In the early to mid-1980s several traditional export industries were subjected to quantitative trade restrictions. Licensing systems were introduced for exports of vegetable oils, several spices, coffee and some grades of rubber.

From 1982 onwards, the price of oil began to decline. By the mid 1980s it had fallen from US$28 to $10 per barrel. Unlike many other oil-producing countries, Indonesia responded quickly by cutting public spending and devaluing its currency, partly to promote non-oil exports. At first, trade policy became increasingly oriented towards import substitution and the system of import licensing was extended. But after this initial protectionist response to lower petroleum export revenues, trade policy was significantly liberalized from 1985 onwards. In addition to the lowering of tariff rates, many NTBs were replaced by tariffs. The coverage of 'restrictive' NTBs declined from 44 per cent of total value added in all traded industries in 1986 to 23 per cent in 1995. In the wake of the financial crisis of 1997–98, the government was obliged to allow free imports of both rice and sugar as a condition for borrowing from the IMF. However, with the ending of the IMF programme, imports of rice and sugar have again been restricted by both tariffs and NTBs.

The effective rate of protection in agriculture declined from 24 per cent in 1987 to 14 per cent in 1994, and that in manufacturing declined much further, from 86 per cent to 29 per cent over the same period (Fane and Condon 1996). Since there was probably more 'water' in the tariffs in 1987 than in 1995, the true reductions in protection were probably somewhat smaller than these numbers indicate, but the decline was still substantial.

Agricultural protection by sector

Rice

The most important and most enduring non-tariff barriers have been those on rice and sugar. During the period under study the domestic wholesale price of rice fluctuated much less than the border price and domestic prices did not differ greatly, on average, from the trend level of border prices (Fane and Warr 2007, Figure 1). Price stabilization was achieved by giving the state logistics agency, *Bulog* (*Badan Urusan Logistik*), a monopoly over international trade in rice and directing it to build up buffer stocks to smooth out fluctuations in domestic supply. It is significant that this stabilization of domestic prices was achieved while keeping the trend value of domestic prices roughly in line with the trend of world prices. Average rates of protection in the output market for rice were very low. This low rate of protection for rice is shown in Table 14.1, which summarizes nominal rates of protection for eight major agricultural commodities (including rice) plus urea fertilizer. These estimates are based on comparisons of the annual average domestic wholesale prices of these commodities with their corresponding CIF (cost, insurance and freight) import prices or their FOB (free on board) export prices, whichever is relevant, the latter adjusted by estimates of the transport and handling costs incurred between the border and the wholesale level.

In the late 1980s, the strict policy of zero imports of rice was replaced by a policy of 'borrowing' rice from Vietnam in times of shortage and repaying the rice loans in times of surplus. In the early 1990s, it gradually became apparent that Indonesia was unable to maintain rice self-sufficiency, even on average and over a period of years. To satisfy domestic demand at 'acceptable' prices, *Bulog* was forced to undertake substantial net imports.

When the Asian crisis forced Indonesia to borrow from the IMF in 1997, one of the loan conditions to which the government agreed was the removal of *Bulog*'s monopoly on rice imports. Until 1999, there was also no import duty on rice but the IMF's aim of free trade in rice proved illusory because the financial crisis briefly converted rice into a potential export and the government banned exports to reduce pressure on domestic prices. The general increase in domestic prices in 1998–99 and the stabilization of the exchange rate after mid-1998 removed the incentive to export rice. *Bulog*'s monopoly on imports was not immediately re-imposed, but a 20 per cent tariff on rice

Table 14.1 Indonesia: nominal rate of assistance at wholesale level, by commodity, 1970 to 2004

Year	*Rice*	*Sugar*	*Soybean*	*Maize*	*Rubber*	*Copra*	*Coffee*	*Tea*	*Fertilizer (smoothed)*
1970–74	0	48.08	−13.62	−40.32	−6.54	−15.02	−50.38	−22.52	−67.9
1975–79	−6.2	73.9	29.18	15.02	−3.52	4.04	−36.88	23.46	−52.02
1980–84	−0.26	150.36	32	14.02	−9.14	−14.64	−51.86	−19.56	−56.34
1985–89	−4.76	156.76	26.46	13.16	−1.8	−44	−39.32	−39.2	−52.36
1990–94	−11.46	89.6	34.72	28.18	6.14	−77.36	−25.14	−48.68	−31.1
1995–99	−11.56	176.14	18.5	20.02	10.76	−55.78	−10.92	−58.28	−26.74
2000–04	20.14	270.54	2.46	2.84	−5.52	−20.94	−4.5	−51.76	−22.12

Source: Fane and Warr (2007).

imports was introduced in 1999. Problems with under-invoicing by importers resulted in this tariff being converted to a specific tariff at Rp 430/kg. In 2002, *Bulog*'s monopoly over imports was restored and since 2004 imports have officially been banned, although *Bulog* has occasionally been issued with special import permits.

Sugar

The Indonesian sugar industry is dominated by the state-owned mills, mainly on Java, that were acquired by the nationalization of the formerly Dutch-owned sugar estates in 1957. Investment and technical progress in this sector have been extremely sluggish and the industry has languished behind protective barriers. The finished product of these antiquated factories, known as 'plantation white sugar', is not exactly comparable to either the refined or the raw sugar traded on the world market. Most firms in the food and beverage sectors cannot use plantation white sugar because of its relatively high level of impurities; their needs are mainly met by imports of raw sugar, although there is a small amount of raw sugar produced domestically.

As in the case of rice, the main motive behind government policy for sugar appears to be the desire to stabilize the domestic price at an 'acceptable' level. In addition, in the case of sugar, the government has tried to protect the sugar factories that it owns. For much of the period since 1970, domestic prices were about twice the border price, implying a nominal rate of protection (NRP) of about 100 percent (Table 14.1). However, in 2006 this gap was greatly narrowed by the abrupt rise of world prices.

Fertilizer

From the 1970s onwards, the Suharto government used part of its new oil wealth to promote self-sufficiency in rice, by subsidizing the adoption of high-yielding varieties that had been made available by the 'Green Revolution'. An important motivation for this policy was fear of a repetition of the riots precipitated by high food prices in 1965. Under the *Bimas* programme, introduced with the explicit goal of rice self-sufficiency, farmers received agricultural extension services and subsidized credit, seeds, fertilizers and pesticides. Lower world oil prices and advice from the World Bank contributed to the reduction in agricultural input subsidies in the late 1980s and early 1990s. Exports of urea require special approval from the Ministry of Trade, under an export licensing scheme. The year-to-year determination of the magnitude of these licences is non-transparent, but the Ministry tends to place priority on ensuring that domestic supplies are stable at a price lower than world market prices and this results in the negative nominal rates of protection.

Imputed protection at the farm level

So far, the discussion of protection has related to the effects that policy interventions have at the wholesale market level. In this section, the analysis is extended to consider the way protection (or its opposite) at the wholesale level produces price effects at the farm level.

Theory

One of the intentions of agricultural protection policy is to influence prices at the farm level. But the goods produced directly by farmers seldom enter international trade themselves. The raw commodities produced by farmers are generally non-traded, whereas the commodities which enter international trade are the processed or partially processed versions of these raw products. Between the non-traded raw product produced by the farmer and the traded processed commodity which enters international trade, there may be several steps of transport, storage, milling, processing and re-packaging.

The significance of this point is that protection policy operates directly on the goods which actually enter international trade, either exported or imported, not the raw commodities produced by farmers. Protection at the farm level is therefore a derived effect. It depends on the extent to which policies applied to trade in processed agricultural goods induce changes in their prices which are then transmitted to the prices actually faced by farmers. The question thus arises as to what extent price changes at the wholesale level, induced by protection policy, affect the prices actually received by farmers for the raw products they sell.

We construct a simple econometric model to investigate this issue. We shall use the notational convention that upper case letters (like X) will denote the values of variables in their levels and lower case letters (like x) will denote their natural logarithms. Thus $x = \ln X$. Protection at the wholesale level is defined as

$$P_{it}^{W} = P_{it}^{*}(1 + T_{it}^{W}), \tag{1}$$

where P_{it}^{W} denotes the level of the wholesale price of commodity i at time t, and P_{it}^{*} is the corresponding border price, expressed in the domestic currency and adjusted for handling costs in getting the commodity from the CIF level to the domestic wholesale level, in the case of an import, and for the cost of getting it from the wholesale level to the FOB level in the case of an export. The nominal rate of protection at the wholesale level is given by T_{it}^{W}. In this discussion, both the border price and the nominal rate of protection are treated as exogenous variables. The border price is determined by world markets and the country concerned is presumed to be a price taker. The nominal rate of protection is determined by the government's protection policy.

The farm gate price of the raw material is denoted by P^F_{it} and its logarithm, p^F_{it}, is related to the logarithm of the wholesale price by

$$P^F_{it} = a_i + b_i p^W_{it} + u_{it}, \tag{2}$$

where a_i and b_i are coefficients and u_{it} is a random error term. The coefficient b_i is the 'pass-through' or 'transmission' elasticity. The estimated values of the coefficients a_i and b_i are denoted $\hat{a}_i$ and $\hat{b}_i$, respectively. The econometric estimation of these parameters is discussed below.

The estimated coefficients are used as follows. We estimate the logarithm of the farm price that would obtain in the *absence* of any protection as

$$\hat{p}^{F*}_{it} = \hat{a}_i + \hat{b}_i p^{W*}_{it}, \tag{3}$$

where p^{W*}_{it} is the estimated value of the wholesale price that would obtain in the absence of protection, $P^{W*}_{it} = \ln P^{W*}_{it}$. This is then compared with the estimated value of the wholesale price in the *presence* of protection

$$\hat{p}^F_{it} = \hat{a}_i + \hat{b}_i p^W_{it}, \tag{4}$$

denoting the anti-logs of $\hat{p}^F_{it}$ and $\hat{p}^{F*}_{it}$ by $\hat{P}^F_{it}$ and $\hat{P}^{F*}_{it}$, respectively. The nominal rate of protection at the farm level is then estimated as

$$\hat{T}^F_{it} = (\hat{P}^F_{it} - \hat{P}^{F*}_{it})/\hat{P}^F_{it}. \tag{5}$$

It is important to observe that the value of the protection-inclusive farm level price used in these calculations is the level estimated from the econometric model (Equation 4) rather than the actual price given by the raw data. The reason is that our intention is to use the model to estimate the *change* in the farm gate price caused by protection at the wholesale level. Thus both the protection-inclusive and the protection-exclusive prices used in (5) are their predicted values, obtained from the model.

The implied nominal rate of protection at the farm level can be related to the nominal rate of protection at the wholesale level, as follows. Substituting $\hat{P}^F_{it} = \hat{A}_i(\hat{P}^W_{it})^{\hat{b}_i}$ and $\hat{P}^{F*}_{it} = \hat{A}_i(\hat{P}^{W*}_{it})^{\hat{b}_i}$ into equation (5), where $\hat{A}_i$ is the anti-log of $\hat{a}_i$, rearranging, and using equation (1), we obtain the simple expression

$$\hat{T}^F_{it} = (1 + T^W_{it})^{\hat{b}_i} - 1. \tag{6}$$

Obviously, if $T^W_{it} = 0$, then $\hat{T}^F_{it} = 0$, regardless of the value of $\hat{b}_i$. Similarly, if $\hat{b}_i = 0$, then $\hat{T}^F_{it} = 0$, regardless of the value of T^W_{it}. Also, if $\hat{b}_i = 1$, then $\hat{T}^F_{it} = T^W_{it}$. It can readily be seen that when $T^W_{it} > 0$, $\hat{T}^F \geq T^W_{it}$ as $\hat{b}_i \geq 1$ and $\hat{T}^F \leq T^W_{it}$ as $\hat{b}_i \leq 1$. When $T^W_{it} < 0$, $\hat{T}^F \leq T^W_{it}$ as $\hat{b}_i \geq 1$ and $\hat{T}^F \geq T^W_{it}$ as $\hat{b}_i \leq 1$.

Estimation of protection at farm level

We first estimated the transmission elasticity (parameter $\hat{b}_i$ in Equation 1) for each commodity using annual data over the period 1976 to 2001. Table 14.2 summarizes the estimates.[2] Given the estimated value of the transmission elasticity, equation (6) was used together with the estimated nominal rates of protection at the wholesale level, discussed above, to produce estimates of imputed NRPs at the farm level. These are shown in Table 14.3, which may be compared with the corresponding estimates at the wholesale level summarized in Table 14.1. Because usable estimates of the transmission elasticity could not be obtained for three commodities – maize, coffee and copra – the estimated values for rice, tea and rubber, respectively, were used instead, as proxies for the true elasticities for these commodities. Because the transmission elasticities lie between zero and unity, the imputed nominal rates of protection at the farm level are somewhat lower in absolute value than the nominal rates at the wholesale level, but (because of the assumption of constant transmission elasticities) they track the pattern of the wholesale level results closely.

Table 14.2 Indonesia: estimates of transmission elasticities from wholesale to farm prices

Commodity	*Estimated elasticity*	*(t-statistic)*
Rice	0.7345	(5.24)
Soybeans	0.5294	(3.17)
Sugar	0.6128	(2.29)
Rubber	0.4365	(2.60)
Tea	0.2607	(2.65)

Source: Fane and Warr (2007).

Note: t-statistics are shown in parentheses.

Table 14.3 Indonesia: nominal rate of assistance at farm level, by commodity, 1970 to 2004

	Rice	*Sugar*	*Soybean*	*Maize*	*Rubber*	*Copra*	*Coffee*	*Tea*
1970–74	10.6	16.3	−9.7	−17.8	−1.6	−7.2	−17.2	−18.7
1975–79	5.6	16.0	28.7	7.4	−17.3	0.9	−11.3	−7.6
1980–84	−0.4	24.5	45.1	14.6	−30.9	−8.1	−17.7	−1.9
1985–89	−6.4	16.6	12.4	17.3	−32.0	−24.7	−12.7	−6.1
1990–94	−11.3	−2.9	14.6	19.5	−37.8	−47.8	−7.3	−5.0
1995–99	−15.5	47.8	14.9	22.2	32.2	−31.9	−3.2	−16.1
2000–04	16.4	138.4	−1.0	−8.2	12.9	−9.8	−1.2	−17.4

Source: Fane and Warr (2007).

Note: See text for explanation of estimation. The nominal rate of assistance (NRA) and nominal rate of protection (NRP) are synonymous.

Aggregate measures of agricultural protection

In this section aggregate measures of rates of protection are calculated using the information assembled from the preceding analysis and Fane and Warr (2007) following the methodology outlined in Anderson *et al.* (2008). First, Table 14.4 calculates the *direct rates of assistance* at the farm level, taking account of assistance to fertilizer inputs. The direct rate of assistance to a particular commodity is calculated as its nominal rate of protection (synonymous with nominal rate of assistance) *minus* the product of the cost share of fertilizer in production of the commodity concerned and the nominal rate of assistance to fertilizer. The calculations use the estimates of *nominal rates of protection* (nominal rates of assistance) for commodities at the farm level from Table 14.3 and the estimated nominal rate of protection for fertilizer at the wholesale level from Table 14.1. The nominal rate of assistance to fertilizer is negative in each year, meaning that fertilizer use is subsidized, although the rates of subsidy have declined over time. The direct rates of assistance therefore exceed the nominal rates for every commodity which uses fertilizer as an input.

The calculations of direct rates of assistance confirm that during the period 2000 to 2004, import-competing commodities rice and sugar were significantly protected, especially sugar. Other import-competing commodities, soybeans and maize, receive little or no assistance. Export commodities such as rubber, copra and coffee are either lightly taxed or untaxed today, having been significantly taxed two decades ago. Tea exports are still moderately taxed. For the subsequent discussion, it is notable that rates of export taxation, especially for copra, were the highest in the late 1980s to mid-1990s.

Estimates of sector-wide and economy-wide rates of assistance are summarized in Table 14.5. Column (5) estimates the anti-trade bias among agricultural sectors as

$$ATB^A = (1 + DRA_M^A)/(1 + DRA_X^A), \tag{7}$$

where DRA_M^A denotes the direct rate of assistance to imported agricultural

Table 14.4 Indonesia: direct rate of assistance at farm level, by commodity, 1970 to 2004

	Rice	*Sugar*	*Soybean*	*Maize*	*Rubber*	*Copra*	*Coffee*	*Tea*
1970–74	21.9	27.3	–6.0	–15.4	15.2	–5.9	–7.1	–6.3
1975–79	13.9	25.5	31.8	10.2	–3.4	2.2	–3.7	–1.9
1980–84	7.5	35.3	49.0	18.7	–16.2	–6.1	–8.6	1.8
1985–89	–0.9	26.0	17.0	21.9	–20.5	–22.0	–2.3	–2.3
1990–94	–8.8	2.4	17.7	22.5	–31.9	–45.7	–0.5	–2.5
1995–99	–13.0	52.0	17.5	24.6	37.0	–29.4	2.3	–13.9
2000–04	18.7	141.6	1.2	10.9	16.7	–7.2	3.0	–15.5

Source: Fane and Warr (2007).

Table 14.5 Indonesia: aggregate direct and total rates of agricultural assistance and anti-trade bias, 1970 to 2004

	Total agriculture (1)	*Import agriculture* (2)	*Export agriculture* (3)	*Manufacturing* (4)	*Anti-trade bias within agriculture* (5)	*Total rate of assistance to agriculture* (6)
1970–74	14.6	18.1	1.6	48.0	–2.8	–33.4
1975–79	11.7	15.8	–1.5	48.0	2.4	–36.3
1980–84	8.8	13.8	–9.3	48.0	–10.7	–39.2
1985–89	0.9	4.2	–15.6	45.9	–0.8	–45.0
1990–94	–6.2	–2.1	–30.9	30.5	0.0	–36.7
1995–99	0.1	–1.8	7.6	18.3	–0.1	–18.2
2000–04	20.1	23.8	6.2	14.1	–4.2	6.0

Source: Fane and Warr (2007).

products and DRA_X^A denotes the direct rate of assistance to exported agricultural products. An ATB greater than unity indicates that within agriculture, import-competing products are more highly protected than exports. In Indonesia, the ATB within agriculture exceeds unity most years shown and is seemingly increasing, but it has not yet reached the levels of the first half of the 1990s.

Finally, the *total rate of assistance (TRA) to agriculture* (column (6)) is calculated as the difference between the direct rate of assistance to total agriculture (column (1)) and the direct rate of assistance to manufacturing. The latter is estimated from effective rates of protection for manufacturing estimated by Fane and Condon (1996). For all years before 1987 we have used the 1987 values, even though some tariff reduction had occurred during the few years before 1987. For the years between 1987 and 1995 and between 1995 and 2003, we have interpolated linearly. For 2004 we have used the 2003 value. As noted above, the objective of this discussion is to identify broad trends over time in the structure of protection, and not year-to-year changes.

These estimates show that agriculture has moved from being a net taxed sector to a net subsidized sector. This transition occurred shortly after the Asian crisis of 1997–99. The approximations described above undoubtedly *understate* rates of manufacturing protection prior to 1987. More accurate estimates of manufacturing protection during this period would show *larger* TRA negative numbers. Our rough estimates for manufacturing protection therefore introduce errors whose correction would reinforce, rather than undermine our broad conclusions.

Thailand

Thailand is a major net agricultural exporter and its agricultural trade policy is dominated by this fact. Agricultural exports include many of the most important agricultural products produced and consumed within the country, including the staple food, rice, exports of which account for between 30 and 50 percent of its total output, but also cassava, sugar, rubber and poultry products. The list of imported agricultural commodities is much thinner. Maize has been a net export in most years but was a net import for some years in the 1990s. Soybeans was a net export for several decades, but since the early 1990s it has become a net import. Palm oil has fluctuated between a net import and a net export but has been a net export since the late 1990s.

Policy evolution

Historically, Thailand's large agricultural surplus has led to a degree of policy complacency regarding the agricultural sector. Until the 1980s, agricultural exports were viewed as a source of revenue for the central government. Unlike manufacturing, traditional agriculture was not seen as a dynamic sector of the economy which could contribute to rapid growth. Because the price elasticity of supply of most agricultural products was very low, at least in the short run, their production could be taxed heavily without producing a significant contraction of output. Moreover, most agricultural producers were impoverished, poorly educated and politically unorganized. Each of these statements applied in particular to rice, so taxing agriculture, and especially rice, was politically attractive and rice exports were indeed taxed until 1986.

With greatly increased incomes per person, rapid urbanization and the move to more democratic political institutions, policy has shifted away from taxing agriculture and towards a more neutral trade policy. This change has almost certainly owed more to politics – the political necessity of finding ways to attract the support of the huge rural electorate and the desire of the urban electorate for better economic conditions for the farm population – than to a desire to liberalize agricultural trade for the efficiency-based reasons that economists emphasize. But the move away from taxing agriculture has not progressed far in the direction of subsidizing it, for one key reason. The fact that so many of the important agricultural commodities are net exports has made subsidizing agriculture problematic, inhibiting what would otherwise have been strong political pressure to protect.

Thailand is an active member of the Cairns Group of agricultural exporting countries, but it cannot be described as a free-trading country with regard to agricultural commodities. Within Thailand, opposition to agricultural import liberalization is strong in the cases of soybeans, palm oil, rubber, rice and sugar. The set of import controls includes import prohibitions, strict licensing arrangements, local content rules and requirements for special case-by-case approval of imports. The commodities for which these restrictions are applied include the five mentioned above and also onions, garlic, potatoes, pepper, tea, raw silk, maize, coconut products and coffee.

The inclusion of rice in this list of commodities subject to import restrictions may seem strange. Thailand is the world's largest exporter of rice and is undoubtedly one of the world's most efficient producers. Why should its rice industry require protection from imports? Imports of rice are in fact *prohibited* unless specifically approved by the Ministry of Commerce. The Ministry of Agriculture and Cooperatives vigorously opposes any liberalization commitments with regard to rice. The reasons apparently relate to the Ministry's wish to keep its options open with respect to rice policy in the event that market conditions should change unexpectedly. Sudden changes in the price of rice can have far-reaching political consequences.

A lesser reason for the import controls on rice is that, as with most agricultural commodities, 'rice' is in fact a highly differentiated commodity. Not all grades of rice are produced efficiently within Thailand and the government wishes to protect domestic producers from imports of grades of rice that are closer substitutes for local grades on the consumption side than they are on the production side.

In Thailand, poverty is heavily concentrated in rural areas and public opinion favours government support for the rural poor. Since the economic crisis of 1997–98, and especially during the government of Prime Minister Thaksin Shinawatra (2001–6), a wide range of income support programmes, cash grants to villages and subsidized credit schemes was introduced. Support for these schemes was a significant component of the 'populist' economic policy agenda of the Thaksin government. However, few if any of these schemes were linked directly to the production of agricultural commodities. Thus, it seems that they were not 'distorting' in terms of resource allocation. The results of the present study will make it possible to check this point. It will be possible to assess whether the price incentives facing agricultural producers were indeed 'distorted' relative to international prices during this period of populist government.

The changing structure of protection at the wholesale level

In their pioneering study of agricultural price policy in Thailand up to the mid-1980s, Siamwalla and Setboonsarng (1989 and 1991) make the point that policies for the various agricultural commodities were determined individually, in response to political circumstances which varied among the commodities concerned, rather than as a part of a single, integrated agricultural policy strategy. For this reason, they argue that it is best to consider the main commodities one at a time, which they do for the commodities rice, sugar, maize and rubber. The discussion which follows will also adopt this strategy, except that the range of agricultural commodities considered includes cassava, soybeans and palm oil, in addition to the four reviewed by Siamwalla and Setboonsarng, and our analysis also considers a major input, urea fertilizer.

The structure of the discussion for each commodity is first to relate domestic and border prices on a comparable basis to calculate nominal rates of protection (NRPs) for each commodity. This analysis is conducted at the wholesale level, meaning that the 'domestic price' means the domestic wholesale price.

The price data used in these NRP calculations and the formula used are reported in Table 2 in Warr and Kohpaiboon (2007). The estimates of nominal rates of protection at the wholesale level for six major commodities and fertilizer are presented in Table 14.6. The following discussion summarizes these results for rice, sugar and fertilizer.

Rice

From the end of World War II to 1986, Thailand taxed its exports of rice. There were four individual instruments of export taxation, each with different legal foundations, each under the control of different parts of the bureaucracy, and each generating revenues that went to different destinations within the government (Siamwalla and Setboonsarng 1991). Their combined effect was a rate of export taxation of around 40 per cent from the late 1950s to the early 1970s. The rate increased to around 60 per cent during the commodity price boom of 1972–74, but subsequently diminished quickly to about 20 percent. There was a further peak of about 40 per cent, at the time of the second OPEC oil price shock in 1979–80, and then a steady decline until all four forms of tax were suspended in 1986. Rice exports have remained untaxed for the two decades since then (Warr 2001).

The implications of these events for NRP are summarized in Table 14.7. The NRP calculations that emerge are similar to those that would be inferred from the rates of taxation described above, except that the NRPs after 1986 are not zero, but have declined from around –11 per cent in the late 1980s to around –3 per cent two decades later, in 2005. It is possible that the transport and handling costs between the wholesale and FOB locations are not fully accounted for in the data used for these calculations. If so, it is difficult to explain why this statistical discrepancy could have declined so much over the 20 years concerned. But it is also possible that 'unofficial' taxes have been levied on Thai rice exports, at steadily declining rates, over the past two decades. Notwithstanding this puzzle, the NRP estimates support the view

Table 14.6 Thailand: nominal rate of assistance at wholesale level, by commodity, 1970 to 2005

	Rice	*Maize*	*Cassava*	*Soybean*	*Sugar*	*Rubber*	*Fertilizer*
1970–74	–44.5	0.1	–16.0	–19.9	16.3	–3.2	8.5
1975–79	–32.7	–0.8	–8.9	–19.9	–1.5	–14.8	8.5
1980–84	–21.4	–0.3	–12.2	–19.9	40.1	–19.3	8.5
1985–89	–14.8	–3.0	–13.8	–15.3	81.8	–9.7	21.7
1990–94	–15.1	–1.3	–9.8	10.6	75.6	–3.0	15.5
1995–99	–9.2	–11.3	–6.8	30.3	55.5	–0.8	11.2
2000–04	–5.2	0.5	–3.5	39.7	47.7	2.4	5.5
2005	–2.9	–3.6	–2.9	24.9	39.1	1.5	1.3

Source: Warr and Kohpaiboon (2007).

that Thailand's rice exports are currently neither protected nor subsidized to any significant extent.

Sugar

In many, perhaps most, countries of the world, the sugar industry receives unusually favourable treatment. Thailand is no exception. Sugar was an import item until the late 1950s, but has since been a net export for over four decades. Nevertheless, it receives protection in the form of a 'home price scheme'. This type of scheme involves taxing consumers and using the proceeds to subsidize exports. A scheme of this kind was practised in the Australian sugar and dairy industries in the 1950s and 1960s. Reportedly, a Thai economics student at an Australian university learned about the scheme in the 1960s and imported the ideas on his return home. The scheme was subsequently applied to the Thai sugar industry, long after it was abandoned in Australia.

A home price scheme drives up the domestic consumer and producer prices. It subsidizes the producer at the expense of the consumer. To make the scheme work, leakage from the export market to the more profitable home consumption market has to be prevented. In most industries, this is difficult. Re-importing for domestic consumption must also be restricted, and as Corden (1971: 17) points out, this can be achieved by a sufficiently restrictive tariff. From the point of view of the finance ministry, an attraction is that the scheme is self-financing. But as a protectionist device, a limitation of the scheme is that the capacity of the consumption tax to subsidize exports is reduced if the volume of exports becomes a large share of total output (exports plus domestic consumption). This has been an issue in the case of the Thai sugar industry.

Siamwalla and Setboonsarng (1989) attribute the political power of the Thai sugar industry to technological changes within the sugar milling industry which required large mills and precise scheduling of sugar cane deliveries to these mills. Sugar milling is a highly capital-intensive business and during the sugar processing season it is essential that the processing plants be fully utilized. Growers and millers have bickered over prices, but they have been able to combine their efforts to lobby the government for intervention on their behalf, something other agricultural export industries in Thailand have been unable to achieve. In Thailand, sugar growers and millers are highly organized. In the case of the Thai sugar industry, the technological changes mentioned above also helped restrict leakage from the export market to home consumption, because the mills were large and few in number.

The scheme was successful in stabilizing domestic consumer prices of sugar, relative to the export price. The peak export prices of the early 1970s were not transmitted to consumers or producers, but for most of the duration of the scheme, consumer and producer prices have been well above export prices. Since the mid 1980s the NRPs have averaged over 60 per cent. Even though it is exported, sugar is by far the most heavily protected of Thailand's agricultural industries, with the possible exception of its small and inefficient dairy industry.

Fertilizer

Thailand imports urea for use as fertilizer and urea imports have been subjected to declining rates of tariff protection. Of course, taxation of imports of this agricultural input implies disprotection for the agricultural industries which use it. The decline in tariff rates began in the early 1990s. By the early 2000s the tariff rates were negligible. These policy changes are confirmed by the outcome of the price comparisons reported in Table 14.6. Nominal rates of protection have declined steadily, becoming virtually zero by 2004. This treatment of fertilizer in Thailand – steadily declining rates of taxation – contrasts with several neighbouring countries, where fertilizer use has tended to be subsidized as part of a general programme of agricultural subsidization.

Imputed protection at the farm level

So far, the discussion of protection has related to the effects that policy interventions have at the wholesale market level. In this section, we extend the analysis of the effects that policy interventions have at the wholesale market level to consider the way protection (or its opposite) at the wholesale level produces price effects at the farm level. The methods used are those discussed for Indonesia above.

Table 14.7 summarizes the estimates of the transmission elasticity for each of the commodities included in Table 14.6. Given the estimated value of the transmission elasticity, equation (6) was used together with the estimated nominal rates of protection at the wholesale level, discussed above, to

Table 14.7 Thailand: estimates of transmission elasticities from wholesale to farm prices

Commodity	*Estimated elasticity*	*(t-statistic)*
Rice	0.7587	(7.30)
Maize	0.8089	(14.38)
Cassava	1.0695	(8.20)
Soybeans	0.8003	(11.23)
Sugar	0.5309	(3.93)
Palm oil	[0.8981][a]	(19.97)
Rubber	0.8981	(19.97)
Fertilizer	0.8889	(17.70)

Source: Warr and Kohpaiboon (2007).

Notes:
t-statistics are shown in parentheses.
a. Estimation for palm oil was not possible, due to insufficient data points, and the estimated value for rubber was used instead.

produce estimates of imputed NRPs at the farm level for each commodity. These are shown in Table 14.8.

The imputed nominal rates of assistance at the farm level are negative in all years for rice, and in most years for maize, cassava and rubber. For these commodities, the absolute magnitudes of these negative rates have declined over time. For soybeans, the nominal rate was negative until soybeans became a net import in the early 1990s. Since then soybeans have been significantly protected. Sugar has been a highly protected commodity since 1980.

Aggregate measures of agricultural protection

In this section we calculate aggregate measures of rates of protection using the information assembled from the preceding analysis and following the same methodology applied for Indonesia. Table 14.9 reports *direct rates of assistance* estimated at the farm level, taking account of assistance to fertilizer inputs. The direct rate of assistance to a particular commodity is calculated

Table 14.8 Thailand: nominal rate of assistance at farm level, by commodity, 1970 to 2005

	Rice	*Maize*	*Cassava*	*Soybean*	*Sugar*	*Rubber*
1970–74	–28.5	0.0	–22.0	–16.3	14.4	0.2
1975–79	–27.1	–0.6	0.5	–16.3	–1.4	–8.0
1980–84	–16.9	–0.3	–7.6	–16.3	14.4	–17.1
1985–89	–12.0	–2.4	–13.2	–12.5	40.9	–11.1
1990–94	–14.0	–1.0	–8.2	7.3	37.0	–2.9
1995–99	–9.2	–9.6	–11.9	23.5	24.3	0.5
2000–04	–6.6	0.4	–9.1	30.7	13.5	1.6
2005	–1.7	–2.9	–9.5	19.5	33.1	–4.9

Source: Warr and Kohpaiboon (2007).

Note: See text for explanation of estimation. The nominal rate of assistance (NRA) and nominal rate of protection (NRP) are synonymous.

Table 14.9 Thailand: direct rate of assistance at farm level, by commodity, 1970 to 2005

	Rice	*Maize*	*Cassava*	*Soybean*	*Sugar*	*Rubber*
1970–74	–29.5	–2.2	–23.1	–17.4	12.6	–0.6
1975–79	–27.7	–2.6	–0.8	–17.7	–3.2	–8.7
1980–84	–17.3	–2.2	–9.0	–17.8	12.7	–17.9
1985–89	–14.3	–7.6	–16.6	–16.3	36.8	–13.3
1990–94	–15.5	–4.5	–10.8	4.5	34.0	–4.4
1995–99	–10.2	–11.5	–13.8	21.5	22.4	–1.1
2000–04	–6.8	–0.3	–10.0	30.0	12.6	0.2
2005	–1.2	–3.0	–9.7	19.4	32.9	–5.4

Source: Warr and Kohpaiboon (2007).

as its nominal rate of protection (synonymous with nominal rate of assistance) at the farm level *minus* the product of the cost share of fertilizer in production of the commodity concerned and the nominal rate of assistance to fertilizer. The nominal rate of assistance to fertilizer is negative in every year but one, meaning that fertilizer use is taxed in every year but one, although the rates of taxation have declined since the mid-1980s. The direct rates of assistance are therefore below the nominal rates at the farm level for every commodity using fertilizer as an input.

Estimates of sector-wide and economy-wide rates of assistance are summarized in Table 14.10. The *total rate of assistance to agriculture* (TRA) (in column (5)) is calculated as the difference between the direct rate of assistance to total agriculture (column (1)) and the direct rate of assistance to manufacturing (column (4)). The latter is derived from effective rates of protection for manufacturing estimated from Nicita and Olarreaga (2006). The estimated TRA for agriculture is negative in every year, but has declined in absolute value from over 40 per cent in the 1970s to less than 10 per cent since 2000.

The Nicita and Olarreaga (2006) data are presumably highly incomplete and *understate* rates of manufacturing protection prior to 1989. As in the case of Indonesia, more accurate estimates of manufacturing protection during this period would show *larger* negative numbers.

As noted above, the objective of this discussion is to identify broad trends over time in the structure of protection, and not year-to-year changes. Our estimates show that agriculture has remained a net taxed sector, relative to manufacturing, throughout the three-and-a-half decades covered by our data. But the rate of net taxation has declined dramatically. The transition from high to low rates of net taxation occurred in the mid-1990s.

Table 14.10 Thailand: aggregate direct and total rates of agricultural assistance and anti-trade bias, 1970 to 2005

Year	*Direct Rates of Assistance*				*Total rate of assistance to agriculture*
	Total agriculture (1)	*Import agriculture (2)*	*Export agriculture (3)*	*Manufacturing (4)*	*(5)*
1970–74	–10.3	0.0	–10.3	32.9	–43.2
1975–79	–10.3	0.0	–10.3	32.9	–43.3
1980–84	–9.2	0.0	–9.2	32.9	–42.2
1985–89	–6.0	–11.7	–5.8	32.9	–38.9
1990–94	0.2	3.3	–0.6	34.6	–34.4
1995–99	1.0	5.6	–1.0	14.5	–13.5
2000–04	3.3	26.4	–0.9	10.4	–7.0
2005	4.3	6.5	3.5	10.6	–6.3

Source: Warr and Kohpaiboon (2007).

Conclusions

Agricultural taxation in both Indonesia and Thailand has ended *in aggregate*, although in each country there remains considerable variation in the treatment of individual commodities. One overall political theme seemingly unites the Indonesian and Thai experiences – the growth of democracy. As farmers and their sympathizers become politically enfranchised, they demand support from their governments. This makes it much more difficult to sustain the agricultural taxation and industrial protection that characterized both Indonesia and Thailand in the 1970s when the Krueger-Schiff-Valdés analysis ended. Whether the trend away from taxing agriculture will now develop into agricultural subsidization, as has occurred in North Asia, Europe and the United States, remains to be seen. Unfortunately, this outcome seems likely, especially in a food-importing country like Indonesia.

Notes

1 Fane and Warr (2007) is available at http://siteresources.worldbank.org/INTTRADERESEARCH/Resources/544824-1146153362267/Indonesia_0308rev2.pdf; Warr and Kohpaiboon (2007) is available at http://siteresources.worldbank.org/INTTRADERESEARCH/Resources/544824-1146153362267/Thailand_0308rev.pdf (both accessed on 7 January 2010).
2 Details of the econometric analysis are provided in a statistical appendix, available upon request from the author.

References

Abanyi, G. (2006) 'Linking Greater Mekong subregion enterprises to international markets: the role of global value chains, international production networks and enterprise clusters', *Studies in Trade and Investment* 59, Bangkok: Economic and Social Commission for Asia and the Pacific (ESCAP).

Abramovitz, M. (1986) 'Catching-up, forging ahead and falling behind', *Journal of Economic History*, 46, pp. 385–406.

ADB (Asian Development Bank) (2007) *Asian Development Outlook 2007*, Manila: ADB.

Agarwal, A. (2001) 'Liberalisation, multinational enterprises and export performance: evidence from Indian manufacturing', *Working Paper No. 69*, New Delhi: Indian Council for Research on International Economic Relations (ICRIER).

Agarwal, P., Gokarn, S., Mishra, V., Parikh, K.S. and Sen, K. (1995) *Economic Restructuring in East Asia and India: Perspectives on Policy Reform*, Basingstoke: Macmillan.

Ahearne, A.G., Fernald, J.G., Loungani, P. and Schindler, J.W. (2003) 'China and emerging Asia: comrades or competitors?', *International Finance Discussion Paper No. 789*, New York: Board of Governors of the Federal Reserve System.

Ahluwalia, I.J. (1991) *Industrial Growth in India*, New Delhi: Oxford University Press.

—— (1999) 'India's economic reforms: an appraisal', in J.D. Sachs, A. Varshney and N. Bajpai (eds) *India in the Era of Economic Reforms*, New Delhi: Oxford University Press.

Ahn, S., Fukao, K. and Ito, K. (2008) 'Outsourcing in East Asia and its impact on the Japanese and South Korean labour markets', presented at the Ninth Global Development Network Conference Research Workshop: Emerging Trends and Patterns of Trade and Investment in Asia, Brisbane, Australia, February.

Aitkin, B. and Harrison, A. (1999) 'Do domestic firms benefit from direct foreign investment', *American Economic Review* (3), 605–19.

Albaladejo, M. and Lall, S. (2004) 'China's competitive performance: A threat to East Asian manufactured exports?', *World Development*, 32(9), 1441–66.

Amano, T. (1999) 'Recent trends of Japanese, US, and Taiwan electronics industries' International Division of Labor with Asia and Their International Competition Strategies' (Nichi/Bei/Taiwan Denshi Kikai Sangyō No Ajia To no Kokusai Bungyō No Jittai To Kokusai Kyōsō Senryaku)', Tokyo: Japan Machinery Center for Trade & Investment (supervised by Nishiguchi Toshihiro).

—— (2005) *East Asian Linkage and Japanese Firms: A New Perspective of Corporate*

Growth (Higashi Ajia No Kokusai Bungyō To Nihon Kigyō: Aratana Kigyō Seichō He No Tenbō), Tokyo:Yuhikaku.

Amano, T. and Kato, H. (2004) 'Global strategy and competitive advantage: analysis of strategies of Japanese and US Firms in the HDD Industry' (Gurōbaru Senryaku To Kyōsō Yūi: HDD Sangyō Ni Miru Higashi Ajia Ni Okeru Nichi Bei Kigyō No Senryaku Bunseki)', Tokyo: Toyo Keizai Shinpo-sha (*Hitotsubashi Business Review*) 52 (3), 2–18.

Amiti, M. (2005) 'Location of vertically linked industries: agglomeration versus comparative advantage', *European Economic Review*, 49(4), 809–32.

Amiti, M. and Wei, S.J. (2006) 'Service offshoring and productivity: evidence from the United States', NBER Working Paper No.11926, Cambridge, MA: National Bureau of Economic Research.

—— (2005) 'Fear of outsourcing: is it justified?', *Economic Policy*, April, 308–48.

Amsden, A.H. (1989) *Asia's Next Giant: South Korea and Late Industrialization*, Oxford Oxford University Press.

Amsden, A.H. and Chu, W.-w. (2003) *Beyond Late Development: Taiwan's Upgrading Policies*, Cambridge, MA: MIT Press.

Anderson, J.E. and Marcouiller, D. (2002) 'Insecurity and the patterns of trade: an empirical investigation', *Review of Economics and Statistics*, *84*, 2, 342–52.

Anderson, K., Kurzweil, M., Martin, W., Sandri, D. and Valenzuela, E. (2008) 'Measuring distortions to agricultural incentives, revisited', *World Trade Review*, 7(4): 675–704.

Ando, M. (2006) 'Fragmentation and vertical intra-industry trade in East Asia', *North American Journal of Economics and Finance*, 17(3), 257–81.

Ando, M. and Kimura, F. (2005) 'The formation of international production and distribution networks in East Asia', in T. Ito and A. Rose (eds) *International Trade, NBER-East Asia Seminar on Economics*, Chicago: The University of Chicago Press 14, 177–213.

—— (2007) 'Fragmentation in Europe and East Asia: evidences from international trade and FDI data', in J.-K. Kim and P.-B. Ruffini (eds) *Corporate Strategies in the Age of Regional Integration*, Cheltenham: Edward Elgar, pp. 52–76.

Ando, M., Arndt, S.W. and Kimura, F. (2006) 'Production networks in East Asia: strategic behavior by Japanese and US firms' *JCER Discussion Paper* No.103. Available at http://www.jcer.or.jp/report/discussion/detail3085.html (accessed 6 January 2010).

Antràs, P. (2003) 'Firms, contracts, and trade structure', *Quarterly Journal of Economics*, 118, 1375–1418.

—— (2005a) 'Incomplete contracts and the product cycle', *American Economic Review*, 95(4), 1054–1073.

—— (2005b) 'Property rights and the industrial organization of production', *American Economic Review*, 95(2), 25–32.

Antràs, P. and Helpman, E. (2004) 'Global sourcing', *Journal of Political Economy* 112, pp. 552–80.

Archanun, K. (2007) *Multinational Enterprises and Industrial Transformation: Evidence from Thailand*, Cheltenham: Edward Elgar.

Ariff, M. and Hill, H. (1985) *Export-Oriented Industrialisation: The ASEAN Experience*, Sydney: Allen & Unwin.

Arndt, S.W., and Kierzkowski, H. (ed.) (2001) *Fragmentation: New Production Patterns in the World Economy*, Oxford: Oxford University Press.

ASEAN Secretariat (2007) ‘Table 26 – ASEAN foreign direct investments net inflow from selected partner countries/regions’, 13 August 2007, http://www.aseansec.org/Stat/Table26.pdf, accessed 6 January 2010.

Athreye, S. and Kapur, S. (2001) ‘Private foreign investment in India: Pain or panacea?’, *The World Economy*, 24(3), 399–424.

Athukorala, P. (1998) *Trade Policy Issues in Asian Development*. New York and London: Routledge.

—— (2002) ‘Foreign direct investment and manufacturing exports: opportunities and strategies, background paper to the World Bank study “Vietnam’s exports: policies and prospects” ’, Hanoi: World Bank Vietnam.

—— (2003) ‘FDI in crisis and recovery: lessons from the 1997–98 Asian crisis’, *Australian Economic History Review*, 43(2), 197–213.

—— (2005a) ‘Trade policy in Malaysia: Liberalization process, structure of protection, and reform agenda’, *ASEAN Economic Bulletin*, 22(1), 19–34.

—— (2005b) ‘Product fragmentation and trade patterns in East Asia’, *Asian Economic Papers* 4(3), 1–27.

—— (2006a) ‘Post-crisis export performance: the Indonesian experience in regional perspective’, *Bulletin of Indonesian Economic Studies* 42(2), 177–212.

—— (2006b) ‘Comments’, *Asian Economic Papers* 6(1), 40–43.

—— (2006c) ‘Trade policy reforms and the structure of protection in Vietnam’, *World Economy* 29(2): 161–87.

—— (2007) *Multinational Enterprises in Asian Development*, Cheltenham: Edward Elgar.

—— (2008) ‘Singapore and ASEAN in the new regional division of labour’, *Singapore Economic Review* 53(3): 479–508.

—— (2009a) ‘The rise of China and East Asian export performance: is the crowding-out fear warranted?’, *World Economy*, Vol. 32, No. 2, 234–66.

—— (2009b) ‘Outward direct investment from India’, *Asian Development Review* (Asian Development Bank), 26(3), 131–59.

Athukorala, P. and Hill, H. (2002) ‘FDI and host country development: The East Asian experience’, in B. Bora (ed.), *Foreign Direct Investment: Research Issues*, London: Routledge, pp. 168–194.

Athukorala, P. and Kohpaiboon, A. (2009) ‘Intra-regional trade in East Asia: The decoupling fallacy, crisis, and policy challenges’, paper presented at the conference on Global Financial and Economic Crisis: Impact, Lessons and Growth Rebalancing, Asian Development Bank Institution, Tokyo, 22–23 April.

Athukorala, P. and Manning, C. (1999) *Structural Change and International Migration in East Asia*, Melbourne: Oxford University Press.

Athukorala, P. and Rajapatirana, S. (2000) *Liberalization and Industrial Transformation: Sri Lanka in International Perspective*, Delhi and Oxford: Oxford University Press.

Athukorala, P. and Yamashita, N. (2006) ‘Production fragmentation and trade integration: East Asia in a global context’, *North American Journal of Economics and Finance*, 17(3), 233–56.

—— (2008) ‘Patterns and determinants of production fragmentation in world manufacturing trade’, in F. di Mauro, W. McKibbin and S. Dees (eds) *Globalization, Regionalism and Economic Interdependence*, Cambridge: Cambridge University Press, pp. 45–72.

—— (2009) 'Global production sharing and Sino-US trade relations', *China and World Economy*, 17(2), 39–56.

Aturupane, C., Djankov, S. and Hoekman, B. (1999) 'Horizontal and Vertical Intra-Industry Trade between Eastern Europe and the European Union', *Weltwirtschaftliches Archiv* 135, 62–91.

Auty, R.M. (2001) 'The political economy of resource-driven growth', *European Economic Review* 45: 839–46.

Bai, C.-E., Li, D.D., Qian, Y. and Wang, Y. (1999) 'Anonymous banking and financial repression: How does China's reform limit government predation without reducing its revenue?', Working Paper 99014, Stanford University, Department of Economics.

Bai, M.-K. (1985) 'The turning point in the Korean economy', *The Developing Economies*, 20 (2), 117–39.

Bajpai, N. and Sachs, J. (2000) 'Foreign Direct Investment in India: issues and problems', *Development Discussion Paper No. 759*, Harvard Institution for International Development.

Balakrishnan, P. and Pushpangadan, K. (1994) 'Total factor productivity growth in Indian manufacturing: a new look', *Economic and Political Weekly*, 9(31): 2028–35.

Balakrishnan, P., Pushpangadan, K. and Suresh Babu, M. (2002) 'Trade liberalisation, market power and scale efficiency in Indian industry', Centre for Development Studies, Working Paper No. 336.

Balassa, B. (1988) 'The lessons of East Asian development: an overview', *Economic Development and Cultural Change* 36(3), S273–S290.

Baldwin, R.E. (2006) 'Multilateralising regionalism: spaghetti bowls as building block on the way to global free trade', *World Economy*, 29(11), 1451–1518.

Baldwin, R.E., Forslid, R., Martin, P., Ottaviano, G. and Robert-Nicoud, F. (2003) *Economic Geography and Public Policy*, Princeton: Princeton University Press.

Baldwin, R.E. and Robert-Nicoud, F.L. (2007) 'Offshoring: general equilibrium effects on wages, production and trade' (April 2007) NBER Working Paper No. W12991.

Bardhan, P. (2006) 'Awakening giants, feet of clay: a comparative assessment of the rise of China and India', *Journal of South Asian Development*, 1(1), 1–18.

Barker, R., and Herdt, R.W. (1985) *The Rice Economy of Asia*, Washington, DC: Resources for the Future.

Batra, G., Kaufmann, D. and Stone, A.H.W. (2003) *Investment climate around the world: Voices of the firms from the World Business Environment Survey*, Washington, DC: World Bank.

Baum, C.F., Schaffer, M.E. and Stillman, S.S. (2003) 'Instrumental variables and GMM: estimation and testing', *Stata Journal*, 3, 1–31.

Belderbos, R.A. (1997) *Japanese Electronics Multinationals and Strategic Trade Policy*, Oxford: Oxford University Press.

Bergsten, C.F., Gill, B., Lardy, N.R. and Mitchell, D. (2006) *China: The Balance Sheet*, New York: Public Affairs.

Bernard, A.B., Jensen, B. and Schott, P.K. (2005) 'Importers, exporters and multinationals: a portrait of firms in the US that trade goods', *NWBER working Paper 11404*, Cambridge, MA: National Bureau of Economic Research.

Bhagwati, J. (1993) *India in Transition: Freeing the Economy*, Oxford: Clarendon Press.

—— (1996) [1985] 'Investing abroad', in D. Irwin (ed.) *Political Economy and*

International Economics: Collected Essays of Jagdish Bhagwati, Cambridge, MA: MIT Press, pp. 309–39.

—— (2006) 'Why multinationals help reduce Poverty', *World Economy*, 29(11), 211–28.

—— (2007) *Termites in the Trading System: How Preferential Trading Undermines Free Trade*, Oxford: Oxford University Press.

Bhagwati, J. and Desai, P. (1970) *India: Planning for Industrialization*, London: Oxford University Press.

Bhagwati, J. and Srinivasan, T.N. (1975) *Foreign Trade Regimes and Economic Development: India*, New York: Columbia University Press.

Blanchard, O. and Giavazzi, F. (2006) 'Rebalancing growth in China: a three-handed approach', *China & World Economy*, 14(4), 1–20.

Booth, A. (1988) *Agricultural Development in Indonesia*, Sydney: Allen and Unwin.

—— (1999) 'Initial conditions and miraculous growth: why is Southeast Asia different from Taiwan and South Korea?' *World Development*, 27(2), 301–21.

Booth, A. and Sundrum, R.M. (1985) *Labour Absorption in Agriculture*, Oxford: Oxford University Press.

Borrus, M., Earnst, D. and Haggard, S. (2000) *International Production Networks in Asia: Rivalry or Riches*? London: Routledge.

Branstetter, L. and Foley, C.F. (forthcoming) 'Facts and fallacies about US FDI in China (with apologies to Rob Feenstra)', in R. Feenstra and S. Wei (eds) *China's Growing Role in World Trade*, Chicago: University of Chicago Press.

Broadman, H.G. (2007) 'Africa's silk road: China and India's new economic frontier', Washington, DC: World Bank.

Brooks, D. and Hill, H. (2004) *Managing FDI in a Global Economy: Asian Experiences*, Houndmills, UK: Palgrave Macmillan.

Brown, C. and Linden, G. (2005) 'Offshoring in the semiconductor industry: a historical perspective', in L. Brainard and S.M. Collins (eds) *The Brookings Trade Forum 2005: Offshoring White-Collar Work: The Issues and Implications*, Washington, DC: Brooking Institution Press, pp 270–333.

Cairncross, F. (1997) *The Death of Distance: How the Communication Revolution will Change our Lives*, London: Orion Business Books.

Caves, R.E. (2007) *Multinational Enterprise and Economic Analysis*, 3rd Edition, Cambridge: Cambridge University Press.

Chand, S. and Sen, K. (2002) 'Trade liberalisation and productivity growth: evidence from Indian manufacturing', *Review of Development Economics*, 6(1): 120–32.

China General Administration of Customs (1996) *China Monthly Exports and Imports*, Beijing: China General Administration of Customs.

China State Statistical Bureau (1996) *China Regional Economy: A Profile of 17 Years of Reform and Opening-up*, Beijing, Zhongguo tongji chubanshe.

Choeun, H., Godo, Y. and Hayami, Y. (2006) 'The economics and politics of rice export taxation in Thailand: a historical simulation analysis, 1950–85' *Journal of Asian Economics*, 17, 103–25.

CIEM (Central Institute for Economic Management) (2001) *Vietnam Economy in 2006*, Hanoi: CIEM.

Cohen, B. (1975) *Multinational Firms and Asian Exports*, New Haven: Yale University Press.

Collier, P. (2007) *Bottom Billion: Why the Poorest are Failing and What can be Done About It*? Oxford: Oxford University Press.

Cooper, R.N. (2006) 'How integrated are Chinese and Indian labor into the world economy', background paper for A.L. Winters and S. Yusuf (2007) *Dancing with Giants: China, India, and Global Economy*, Washington, DC: World Bank, available at http:/econ.worldbank.org/dancingwithgiants (accessed 6 January 2010).

Corden, W.M. (1971) *The Theory of Protection*, Oxford: Oxford University Press.

—— (1974) *Trade Policy and Economic Welfare*, Oxford: Clarendon Press.

—— (1984) 'Booming sector and Dutch Disease economics: a survey', *Oxford Economic Papers*, 36: 359–80.

—— (2003) *Too Sensational: On the Choice of Exchange Rate Regimes*. Cambridge, MA: MIT Press.

Coxhead, I. (2007) 'A new resource curse? Impact of China's boom on comparative advantage and resource dependence in Southeast Asia', *World Development* 35(7), 1099–1119.

Coxhead, I. and Jayasuriya, S. (2008) 'The rise of China and India and the commodity boom: economic and environmental implications for low income countries', *Department of Agricultural and Applied Economics Working Paper*, Madison: University of Wisconsin.

Coxhead, I. and Li, M. (2008) 'Prospects for skills-based export growth in a labor-abundant, resource-rich economy: Indonesia in comparative perspective', *Bulletin of Indonesian Economic Studies* 44(2), 199–228.

Curran, L.M., Trigg, S.N., McDonald, A.K., Astiani, D., Hardiono, Y., Siregar, P., Caniago, I. and Kasischke, E. (2004) 'Lowland forest loss in protected areas of Indonesian Borneo,' *Science* 303, 13 February, 1000–1003.

Das, D.K. (2003) 'Quantifying trade barriers: has protection declined substantially in Indian manufacturing', New Delhi: Indian Council for Research on International Economic Relations (ICRIER), Working Paper No. 105.

De Backer, K. and Sleuwaegen, L. (2003) 'Does foreign direct investment crowd out domestic entrepreneurship?' *Review of Industrial Organization* 22: 67–84.

Deardorff, A.V. (1987) 'The directions of developing-country trade: examples of pure theory', Gerald R. Ford School of Public Policy, University of Michigan: Post-Print Paper No. 1.

—— (2001a) 'Fragmentation across cones', in S.W. Arndt and H. Kierzkowski (eds) *Fragmentation: New Production Patterns in the World Economy*, New York: Oxford University Press, pp. 35–51.

—— (2001b) 'Fragmentation in simple trade models', *North American Journal of Economics and Finance* 12, 121–37.

Deininger, K. and Squire, L. (1996). 'Measuring income inequality: a new data-base', *World Bank Economic Review*, 10(3), 565–91.

Deyo, F. (1989) *Beneath the Miracle: Labour Subordination in the New Asian Industrialism*, Berkeley: University of California Press.

Dimaranan, B., Ianchovichina, E. and Martin, W. (2007) 'Competing with giants: who wins, who loses?', in L.A. Winters and S. Yusuf, *Dancing with Giants: China, India and the Global Economy*, Washington, DC: World Bank, pp. 67–100.

Dixit, A. and Grossman, G. M. (1982) 'Trade and protection with multi-stage production', *Review of Economic Studies*, 49, 583–94.

Dobson, W. and Chia, S.Y. (1997) *Multinationals and East Asian integration*, Singapore: Institute of Southeast Asian Studies.

Drysdale, P. and Garnaut, R. (1997) 'The Pacific: an application of a general theory of economic integration', in C.F. Bergsten and M. Noland (eds) *Pacific Dynamism*

and the International Economic System, Washington, DC: Institute for International Economics, pp. 183–224.
Dunning, J. (ed.) (1998) *Globalization, Trade and Foreign Direct Investment*, Amsterdam: Elsevier Science.
Dunning, J.H., Kim, Z. and Lee, C. (2007) 'Restructuring the regional distribution of FDI: The case of Japanese and US FDI', *Japan and the World Economy*, 19: 26–47.
Edwards, S. and Lustig, N. (1997) 'Introduction' in S. Edwards and N.C. Lustig (eds) *Labor Markets Latin America: Combining Social Protection with Market Flexibility*, Washington, DC: Brookings Institution Press, pp. 62–103.
Egger, P. (2005) 'Alternative techniques for estimation of cross-section gravity models', *Review of International Economics*, 31(5), 881–91.
Eichengreen, B. and Tong, H. (2007) 'Is China's FDI coming at the expense of other countries?' *Journal of the Japanese and International Economies*, 21(2): 153–72.
Eichengreen, B., Rhee, Y. and Tong, H. (2007) 'China and the exports of other Asian countries', *Review of World Economics*, 143(2), 201–26.
Encarnation, D.J. (1999) 'Introduction', in D. Encarnation (ed.) *Japanese Multinationals in Asia: Regional Operations in Comparative Perspective*, New York and Oxford: Oxford University Press, pp. 3–13.
Ethier, W.J. (1982) 'National and international returns to scale in the modern theory of international trade', *American Economic Review*, 72, 389–405.
EU Skills Study (2007): 'Skill Problems in European Industrial Sectors', Study prepared for DG Enterprise; The Vienna Institute for International Economic Studies (wiiw); Brussels/Vienna.
Evans, C. and Harrigan, J. (2003) 'Distance, time and specialization', *National Bureau of Economic Research* (NBER) Working Paper 9729, Cambridge, MA: NBER.
Fane, G. (2006) 'Trade Liberalization, Economic Reform and Poverty Reduction in Lao PDR', *Journal of the Asia Pacific Economy*, 11 (2), 213–226.
Fane, G. and Condon, T. (1996) 'Trade reforms in Indonesia: 1987–95', *Bulletin of Indonesian Economic Studies*, 27(1), 105–25.
Fane, G. and Warr, P. (2007) 'Distortions to agricultural incentives in Indonesia', Agricultural Distortions Research Project Working Paper xx, January 2007, Washington, DC: World Bank.
Feenstra, R.C. (1998) 'Integration of trade and disintegration of production in the global economy', *Journal of Economic Perspective*, 12(4), 31–50.
Feenstra, R.C. and Hanson G.H. (1996) 'Foreign investment, outsourcing, and relative wages', in R.C. Feenstra, G.M. Grossman and D.A. Irwin (eds) *The Political Economy of Trade Policy: Papers in Honor of Jagdish Bhagwati*, Cambridge, MA. and London: MIT Press, pp. 89–127.
—— (1999) 'The impact of outsourcing and high-technology capital on wages: estimates for the United States 1979–99', *Quarterly Journal of Economics*; 11483, 907–40.
—— (2005) 'Ownership and Control in Outsourcing to China: estimating the property rights theory of the firm', *Quarterly Journal of Economics*, 120, 729–61.
Feenstra, R.C., Hai, W., Woo, W.T. and Uao, S. (1999) 'Discrepancies in international trade data: an application to China–Hong Kong Entrepôt trade', *American Economic Review*, 89(2), 338–43.
Fields, G. (1994) 'Changing labor market conditions and economic development in Hong Kong, the republic of Korea, Singapore, and Taiwan, China', *The World Bank Economic Review* 8(3), 395–414.

Fields, G. and Wan, H. (1989) 'Wage setting institutions and economic growth', *World Development*, 17(9), 1471–93.

Finger, J.M. (1975) 'Tariff provisions for provision for offshore assembly and exports of developing countries', *Economic Journal* 85(338), 365–71.

Fontagne, L., Freudenberg, M. and Gaulier, G. (2006) 'A systematic decomposition of world trade into horizontal and vertical IIT', *Review of World Economics*, 142(3), 459–75.

Forteza, A. and Rama, M. (2001) 'Labour market rigidity and the success of economic reform across more than 100 countries', *Policy Research Working paper 2521*, Washington, DC: World Bank.

Frankel, J.A. and Romer, D. (1999) 'Does trade promote growth?', *American Economic Review*, 89(3), 379–99.

Frankel, J.A. and Wei, S.-J. (1997) 'The new regionalism and Asia: impact and policy options', in A. Panagariya, M.G. Quibria and N. Rao (eds) *The Global Trading System and Developing Asia*, Oxford: Oxford University Press, pp. 83–130.

Freeman, N.J., and Bartels, F.L. (eds) (2004) *The Future of Foreign Investment in Southeast Asia*, London: Routledge.

Freeman, R.B. (2005) 'Does globalization of scientific/engineering workforce threaten US economic leadership?', *National Bureau of Economic Research Working paper 11457*, Cambridge, MA: NBER.

Fujita, M. (2008) 'Promoting the harmonious integration in East Asia: from the viewpoint of spatial economics', paper presented at the symposium on Sustaining Development of Chinese Economy and East Asia, 12 January 2008, Nihon University, Tokyo.

Fujita, M., Krugman, P. and Venables, A.J. (1999) *The Spatial Economy: Cities, Regions, and International Trade*, Cambridge: MIT Press.

Fung, K.C. (1998) 'Accounting for Chinese trade: Some national and regional considerations', in R.E. Baldwin, R.E. Lipsey and J.D. Richardson (eds) *Geography and Ownership in Economic Accounting*, Chicago: University of Chicago Press, pp. 173–200.

Galenson, W. (1979) 'The labor force, wages and living standards', in W. Galenson (ed.) *Economic Growth and Structural Change in Taiwan*, Ithaca: Cornell University Press.

—— (1992) *Labour and Economic Development in Five Asian Countries: South Korea, Malaysia, Taiwan, Thailand and the Philippines*, New York: Praeger.

Ganesh-Kumar, G.A., Sen, K. and Vaidya, R.R. (2003) *International Competitiveness, Investment and Finance: A Case-Study of India*, London: Routledge.

Garnaut, R., Song, L., Tenev, S. and Yao, Y. (2005) *China's Ownership Transformation*, Washington, DC: International Finance Corporation.

Gelatt, T. (1983) 'New constitution improves, clarifies legal position of foreign investors', *East Asian Executive Report*, 15 February.

Gerschenkron, A. (1952): 'Economic backwardness in historical perspective' in B. Hoselitz, B. (ed.) *The Progress in Underdeveloped Areas*, Chicago: University of Chicago Press.

—— (1962) *Economic Backwardness in Historical Perspective*, Cambridge, MA: Harvard University Press.

Gilboy, G.J. (2004) 'The myth behind China's miracle', *Foreign Affairs*, 83(4), 33–48.

Gill, I. and Kharas, H. (2007) *An East Asian Renaissance: Ideas for Economic Growth*, Washington, DC: World Bank.

Gipouloux, F. (2000) 'Declining trend and uneven spatial distribution of FDI in China', *China Review 2000*, Hong Kong: The Chinese University Press, pp. 285–305.

Goh, K.S. (1993) 'What causes fast economic growth', 4th K.T. Li Lecture, 13 October 1993, Harvard University, reproduced in L. Low (ed.) (2003) *Wealth of East Asian Nations: Speeches and Writings by Goh Keng Swee*, Singapore: Federation Press, pp. 243–58.

Goldar, B. and Renganathan, V.S. (1990) 'Liberalisation of capital goods imports in India', *Working Paper No. 8*, New Delhi: National Institute of Public Finance and Policy.

Graham, E.M. and Wada, K. (2001) *Foreign Direct Investment in China: Effects on Growth and Economic Performance*, Canberra, Australia National University.

Greenaway, D., Mahabir, A. and Milner, C. (2008) 'Has China Displaced other Asian Countries' Exports?', *China Economic Review*, 19(2), 152–69.

Greenaway, D., Hine, R. and Milner, C.R. (1995) 'Vertical and Horizontal Intra-Industry Trade: A Cross-Industry Analysis for the United Kingdom', *Economic Journal* 105, 1505–18.

Grossman, G.M. and Helpman, E.H. (2002) 'Integration versus outsourcing in industry equilibrium', *Quarterly Journal of Economics*, 117(1), 85–119.

—— (2003) 'Outsourcing versus FDI in industry equilibrium', *Journal of European Economic Association*, 1(2), 317–27.

—— (2005) 'Outsourcing in global economy', *Review of Economic Studies*, 72, 135–60.

Grossman, G.M., Helpman, E.H. and Szeild, A. (2005) 'Complementarities between outsourcing and foreign sourcing', *American Economic Review*, 95(2), 19–24.

Grossman, G.M., and Rossi-Hansberg, E. (2006) 'The rise of offshoring: it's not wine for cloth anymore', manuscript, Princeton University, available at http://www.kc.frb.org/PUBLICAT/SYMPOS/2006/PDF/Grossmanand-Rossi-Hansberg.paper.0831.pdf (accessed 6 January 2010).

—— (2008a) 'Trading tasks: a simple theory of offshoring', *American Economic Review*, 98(5), 1978–97.

—— (2008b) 'Organization and inequality in a knowledge economy', *Quarterly Journal of Economics*, 121(4), 1383–1435.

Grunwald, J. and Flamm, K. (1985) *The Global Factory: Foreign Assembly in International Trade*, Washington, DC: Brookings Institution.

Guiheux, G. and Lecler, Y. (2000) 'Japanese car manufacturers and component makers in the ASEAN region: a case of expatriation under duress – or a strategy of regionally integrated production?', in J. Humphrey, Y. Lecler and M. Salerno (eds) *Global Strategies and Local Realities: the Auto Industry in Emerging Markets*, Basingstoke: Macmillan.

Hausmann, R. and Rigobon, R. (2002) 'An alternative interpretation of the "resource curse": theory and policy implications.' NBER Working Paper No. 9424.

Hausmann, R., Lim, E. and Spence, M. (2006) 'China and the global economy: medium-term issues and options, a synthesis report', *Centre for International Development Discussion Paper, RWP06–029*, John F. Kennedy School of Government, Harvard University.

Havrylchyk, O. and Poncet, S.P. (2007) 'Foreign direct investment in China: reward or remedy?', *The World Economy* 30(11), 1662–81.

Head, K. and Ries, J. (2001) 'Overseas investment and firm exports', *Review of International Economics* 9(1), 108–22.

—— (2002) 'Offshore production and skill upgrading in Japanese manufacturing firms', *Journal of International Economics* 58, 81–105.

Helleiner, G.K. (1973) 'Manufacturing exports from less developed countries and multinational firms', *Economic Journal* 83(329), 21–47.

Helpman, E.H. (1981) 'International trade in the presence of product differentiation, economies of scale and monopolistic competition: a Chamberlin-Heckscher-Ohlin approach', *Journal of International Economics*, 11, 305–40.

Helpman, E.H. and Krugman, P. (1985) *Market Structure and Foreign Trade*, Cambridge, MA: MIT Press.

Heston, A., Summers, R. and Aten, B. (2006), *Penn World Tables Version 6.1*, Center for International Comparison at the University of Pennsylvania, Philadelphia, available at http://pwt.econ.upenn.edu/ (accessed 7 January 2010).

Hill, H. (2000) *The Indonesian Economy Since 1966: Southeast Asia's Emerging Giant*, Cambridge: Cambridge University Press.

—— (2004) 'Six Asian economies: issues and lessons', in D.H. Brooks and H. Hill (eds) *Managing FDI in a Global Economy: Asian Experience*, Houndmills, UK: Palgrave Macmillan, pp. 29–78.

Hill, S.C. (2008) 'Growth effects of foreign direct investment: the role of host country factors', unpublished PhD dissertation, Canberra: The Australian National University.

Hobday, M. (1995) *Innovation in East Asia: The Challenge to Japan*, Cheltenham: Edward Elgar.

Hone, A. (1974) 'Multinational corporations and multinational buying groups: their impact on the growth of Asia's manufactured exports', *World Development*, 2(2), 145–49.

Huang, Y. (2003a) *Selling China: Foreign Direct Investment during the Reform Era*, Cambridge: Cambridge University Press.

—— (2003b) 'One country, two systems: foreign-invested enterprises and domestic firms in China', *China Economic Review* 14(4): 404–16.

—— (2007) 'Ownership biases and FDI in China: evidence from two provinces', *Business and Politics* 9(1), 1–45.

—— (2008) *Capitalism with Chinese Characteristics: Entrepreneurship and State*, Cambridge: Cambridge University Press.

Huang, Y., Ma, Y., Yang, Z. and Zhang, Y. (2008) 'A fire sale without fire: an explanation of labor-intensive FDI in China', MIT Sloan Research Paper No. 4713–08, available at SSRN: http://ssrn.com/abstract=1263907 (accessed 6 January 2010).

Huang, Y. and Wen, H. (2007) 'A tale of two provinces: foreign ownership and domestic private sector in Jiangsu and Zhejiang', *China Finance Review* 1(1).

Huff, G. (1994) *The Economic Growth of Singapore*, Cambridge: Cambridge University Press.

Hummels, D., Ishi, J. and Yi, K.-M. (2001) 'The nature and growth of vertical specialization in world trade', *Journal of International Economics*, 54 (1), 75–96.

Humphreys, M., Sachs, J. and Stiglitz, J. (eds) (2007) *Escaping the Resource Curse*, New York: Columbia University Press.

Hymer, S.H. (1976) *The International Operations of National Firms*, Cambridge, MA: MIT Press.

IADB (Inter-American Development Bank) (2005) *The Emergence of China: Opportunities and Challenges for Latin America and the Caribbean*, Washington, DC:

IADB, http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=549983 (accessed 6 January 2010).
IMF (International Monetary Fund) (2004) 'China's Emergence and Its Impact on the Global Economy', *World Economic Outlook*, Washington, DC: IMF, 82–102.
—— (2009) *World Economic Outlook*, September, Washington, DC: IMF.
Jenkins, R. (2003) 'Vietnam in the global economy: trade, employment and poverty', *Journal of International Development*, 16(1), 13–28.
Jenkins, R. and Sen, K. (2006) 'International trade and manufacturing employment in the south: four country case-studies', *Oxford Development Studies*, 34(3): 299–322.
Jomo, K.S. (2007) 'Making poverty history? Unequal development today', Wertheim Lecture 2007, Amsterdam.
Jones, R.W. (1971) 'A three-factor model in theory, trade and history', in J.N. Bhagwati *et al.* (eds): *Trade, Balance of Payments and Growth: Essays in Honor of C.P. Kindleberger*, Amsterdam: North-Holland, pp. 3–21.
—— (2000) *Globalization and the Theory of Input Trade*, Cambridge, MA: MIT Press.
Jones, R.W. and Kierzkowski, H. (1990) 'The role of services in production and international trade: a theoretical framework', in R.W. Jones and A.O. Krueger (eds) *The Political Economy of International Trade: Essays in Honor of R. E. Baldwin*, Oxford: Basil Blackwell, pp. 31–48.
—— (1999) 'Globalization and the consequences of international fragmentation', in R. Dornbusch, G. Calvo and M. Obstfeld (eds) *Money, Factor Mobility and Trade: Festschrift in Honor of Robert Mundell*, Cambridge, MA: MIT Press.
—— (2001a) 'A framework for fragmentation', in S.W. Arndt and H. Kierzkowski (eds) *Fragmentation: New Production Patterns in the World Economy*, New York and Oxford: Oxford University Press, pp. 17–34.
—— (2001b): 'Globalisation and the consequences of international fragmentation', in R. Dornbusch, G. Calvo and M. Obstfeld (eds) *Money, Factor Mobility and Trade: Festschrift in Honour of Robert A. Mundell*, Cambridge, MA: MIT Press, pp. 365–81.
Joshi, V. and Little, I.M.D. (1997) 'India: reform on hold', *Asian Development Review*, 15(2),1–42.
Kathuria, V. (2001) 'Foreign firms, technology transfer and knowledge spillovers to Indian manufacturing firms: a stochastic frontier analysis', *Applied Economics*, 33: 625–42.
—— (2002) 'Liberalisation, FDI and productivity spillovers: an analysis of Indian manufacturing firms', *Oxford Economic Papers*, 54: 688–718.
Kaufmann, D., Kraay, A. and Mastruzzi, M. (2006), *Governance Matters V: Aggregate and Individual Governance Indicators for 1996–2005*, *World Bank Policy Research Working Paper*, Washington DC: World Bank, available at www.govindicators.org (accessed 7 January 2010).
Kawai, M. and Urata, S. (1998) 'Are trade and direct investment substitutes or complements? An empirical analysis of Japanese manufacturing industries?', in H. Lee and D.W. Roland-Holst (eds) *Economic Development and Cooperation in the Pacific Basin: Trade, Investment, Environmental Issues*, Cambridge: Cambridge University Press, pp. 251–93.
Kierzkowski, H. (2001) 'Joining the global economy: experience and prospects of the transition economies', in S.W. Arndt and H. Kierzkowski (eds) *Fragmentation: New Production Patterns in the World Economy*, Oxford: Oxford University Press, pp. 231–54.

Kimura, F. (2006) 'International production and distribution networks in East Asia: 18 facts, mechanics, and policy implications', *Asian Economic Policy Review*, 1, 346–47.

Kimura, F. and Ando, M. (2005) 'Two-dimensional fragmentation in East Asia: conceptual framework and empirics', *International Review of Economics and Finance*, 14(3): 317–48.

Knabe, A. and Koebel, K. (2005) 'The economic rationale and labour market effects of outsourcing: a survey', in P. Barrar and R. Gervais (eds) *Global Outsourcing Strategies*, Aldershot: Gower, pp. 167–82.

Kogut, B. (1996) 'Direct investment, experimentation, and corporate governance in transitional economies', in R. Frydman, C.W. Gray and A. Rapaczynski (eds) *Corporate Governance in Central Europe and Russia*, Budapest: Central European Press.

Kokko, A. (1997) Managing the transition to free trade: Vietnamese trade policy for the 21st century', Stockholm: Stockholm School of Economics (mimeo).

Kokko, A. and Sjoholm, F. (2006) 'The internationalization of Vietnamese small and medium enterprises', *Asian Economic Papers*, 4(1), 152–77.

Kokko, A., Kotoglou, K. and Krohwinkel-Karisson, A. (2003) 'The implementation of FDI in Vietnam: an analysis of the characteristics of failed projects', *Transnational Corporations*, 12(3), 41–78.

Koo, B.Y. (1985) 'The role of direct foreign investment in Korea's recent economic growth', in W. Galenson (ed.) *Foreign Trade and Investment: Economic Development in the Newly Industrializing Asian Countries*, Madison: University of Wisconsin Press, pp. 176–216.

Kornai, J. (1992) *The Socialist System: The Political Economy of Communism*, Princeton, NJ: Princeton University Press.

Krause, L.B. (1982) *US Economic Policy Towards the Association of Southeast Asian Nations: Meeting the Japanese Challenge*, Washington, DC: The Brookings Institution.

Krueger, A.O. (1977) *Growth, Distortions, and Patterns of Trade Among Many Countries*, Princeton, NJ: Princeton Studies in International Finance No. 40.

—— (1983) *Trade and Employment in Developing Countries: Synthesis and Conclusions*, Volume 3. Chicago and London: University of Chicago Press.

Krueger, A.O., Schiff, M. and Valdés, A. (1988) 'Agricultural incentives in developing countries: measuring the effect of sectoral and economy wide policies', *World Bank Economic Review* 2, 255–71.

Krugman, P. (1980) 'Scale economies, product differentiation, and the pattern of trade', *American Economic Review* 70, 950–59.

—— (1995) 'Growing world trade: causes and consequences', *Brookings Papers on Economic Activity*, 25th Anniversary Issue, 327–77.

—— (2008) 'Trade and wages, reconsidered', *Brookings Papers on Economic Activity 1: Macroeconomics*, 103–38.

Kueh, Y.Y. (1992) 'Foreign investment and economic change in China', *China Quarterly* (131), 637–90.

Kulkolkarn, K., Potipiti, T. and Coxhead, I. (2007) 'Immigration and labor market outcomes in Thailand', Manuscript, Thammasat University and University of Wisconsin-Madison.

Kumar, N. (2005) 'Liberalisation, foreign direct investment flows and development: Indian experience in the 1990s', *Economic and Political Weekly*, April 2: 1459–69.

Kumar, N. and Pradhan, J.P. (2003) ‘Export competitiveness in knowledge-based industries: a firm-level analysis of Indian manufacturing’, RIS Discussion Paper 43/2003, New Delhi.
Kumar, N. and Siddharthan, N.S. (1994) ‘Technology, firm size and export behaviour in developing countries: the case of Indian enterprises’, *Journal of Development Studies*, 31(2): 289–309.
Kuo, S., Ranis, G. and Fei, J.C.H. (1981) *The Taiwan Success Story: Rapid Growth with Improved Distribution in the Republic of China, 1952–79*, Westview Press, Boulder, Colorado.
Kwan, C.H. (2001) *Yen Bloc: Toward Economic Integration in Asia*, Washington, DC: Brookings Institution Press.
Lall, S. (2000) ‘The technological structure and performance of developing country manufactured exports, 1985–98’, *Oxford Development Studies* 28(3), 337–69.
—— (2002) ‘FDI and Development: Research Issues in the Emerging Context’, in B. Bora (ed.) *Foreign Direct Investment: Research Issues*, London: Routledge, pp. 325–245.
—— (2003) ‘FDI and development: research issues in the global context’, in B. Bora (ed.) *Foreign Direct Investment: Research Issues*, London: Routledge, pp. 325–45.
Lall, S. and Streeten, P. (1977) *Foreign Investment, Transnationals and Developing Countries*, London: Macmillan.
Landesmann, M. and Stehrer, R. (2001) ‘Convergence patterns and switchovers in comparative advantage’, *Structural Change and Economic Dynamics* 12, 399–423.
—— (2002) ‘Evolving Competitiveness of CEECs in an Enlarged Europe’, *Rivista di Politica Economica* 92, 23–87.
—— (2004) ‘Technology diffusion, international competition and effective demand’, *Revue d’Economie Industrielle* 105, 23–46.
—— (2007) ‘Income distribution, technical change and the dynamics of international economic integration’, *Metroeconomica*, 58, 47–73.
—— (2008) ‘Structural economic dynamics in the context of globalization’, Vienna: The Vienna Institute for International Economic Studies (wiiw), mimeo.
—— (2009) ‘South-North integration, outsourcing and skills’, *Research Report, 353*, Vienna: The Vienna Institute for International Economic Studies.
Landesmann, M. and Woerz, J. (2006) ‘CEECs’ competitiveness in the global context’, *Research Report 327*, Vienna: The Vienna Institute for International Economic Studies.
Lankes, H. and Stern, N. (1997) ‘Capital flows to Eastern Europe’, in M. Felsten (ed.) *International Capital Flows*, Chicago: University of Chicago Press, pp. 57–110.
Lankes, H. and Venables, A.J. (1996) Foreign direct investment in economic transition: the changing pattern of investments’, *Economics of Transition*, 4(2), 331–47.
Lardy, N.R. (1992) *Foreign Trade and Economic Reform in China, 1978–1990*, New York: Cambridge University Press.
—— (2002) *Integrating China into the Global Economy*, Washington, DC: Brookings Institution Press.
Lary, H.B. (1968) *Imports of Manufactures from Less Developed Countries*, New York: Columbia University Press.
Le, B.L., Bui, T. and Hung, D.V. (2002) ‘FDI and development of manufacturing industries in Vietnam’, Hanoi: Institute of World Economy (unpublished project report).
Lee, H. and Roland-Holst, D.W. (eds) (1998) ‘Prelude to the Pacific century: overview of the region, leading issues and methodology’, in H. Lee and D.W. Roland-Holst

(eds) *Economic Development and Cooperation in the Pacific Basin: Trade, Investment, Environmental Issues*, Cambridge: Cambridge University Press, pp. 3–34.

Lee, K.Y. (2000) *From Third World to First: The Singapore Story: 1965–2000 Memoirs of Lee Kuan Yew*, Vol. 2. Singapore: Singapore Press Holding.

Legewie, J. (1999) ‘Driving regional integration: Japanese firms and the development of the ASEAN automobile industry’, Working Paper 99/1, Philipp Franz von Siebold Stiftung Deutsches Institut für Japanstudien.

Lewis, W.A. (1954) ‘Economic development with unlimited supplies of labour’, *The Manchester School of Economic and Social Studies*, 22, 139–91.

—— (1958) ‘Unlimited labour: further notes’, *The Manchester School of Economic and Social Studies*, 26(1), 1–32.

—— (1979) ‘Dual economy revisited’, *The Manchester School of Economic and Social Studies*, 47(3), 211–29.

Li, S. and Luo, C. (2008) ‘Growth pattern, employment and income inequality: what the experience of Republic of Korea and Taipei, China reveals for the People’s Republic of China’, *Asian Development Review* 25 (1–2), 100–118.

Lim, L.Y.C. and Fong, P.E. (1991), *Foreign direct investment and industrialization in Malaysia, Singapore, Taiwan and Thailand*, Paris: OECD.

Lindblad, J.T. (1998) *Foreign Investment in Southeast Asia in the Twentieth Century*, London: Macmillan.

Linder, B. (1986) *The Pacific Century: Economic and Political Consequences of Asian-Pacific Dynamism*, Stanford: Stanford University Press.

Lipsey, R.E. (1998) ‘Trade and production networks of US MNEs and exports by their Asian affiliates’, in J. Dunning (ed.) *Globalization, Trade and Foreign Direct Investment*, Amsterdam: Elsevier Science, pp. 204–16.

—— (2000) ‘The role of foreign direct investment in international capital flows’, in M. Feldstein (ed) *International Capital Flows*, Chicago: University of Chicago Press, pp. 307–30.

—— (2003) ‘Foreign direct investment and the operations of multinational firms: Concepts, history, and data’, in E. K. Choi and J. Harrigan (eds) *Handbook of International Trade*, Malden, MA, and Oxford: Basil Blackwell, pp. 287–319.

—— (2004) ‘Home and host country effects of FDI’, in R.E. Baldwin and L.A. Winters (eds) *Challenges to Globalization: Analyzing the Economics*, Chicago: Chicago University Press, pp. 333–82.

MacBean, A.I. (ed.) (2000) *Trade and Transition: Trade Promotion in Transitional Economies*, London: Frank Cass.

MacIntyre, A., Temple, T.J. and Ravenhill, J. (2008) ‘East Asia in the wake of the financial crisis’, in A. MacIntyre, T.J. Temple and J. Ravenhill (eds) *Crisis as Opportunity: Asia’s Dynamic Political Economy*, Ithaca: Cornell University Press, pp. 1–25.

Magennis, B. (2006) ‘Investment Law 2006’, Hanoi: Phillips Fox (paper prepared for the Investment and Enterprise Law Conference held at Hilton Opera on 5 April 2006).

Malaysian Bureau of National Economic Policy Studies (1994) ‘Malaysia: economic policies to the year 2000’, in V. Kanaparthy and I. M. Saleh (eds) *Malaysian Economy: Selected Issues and Policy Directions*, Kuala Lumpur: Institute of International and Strategic Studies (ISIS), pp. 1–52.

Mallon, R. (2004) ‘Managing investment climate reforms: Vietnamese case study’,

background paper prepared for World Development Report 2005, Washington, DC: World Bank.
Manning, C. (1998) *Indonesian Labour in Transition: An East Asian Success Story?* Cambridge: Cambridge University Press.
Manning, C. and Pang Eng Fong (1990) 'Labour market trends and structures in ASEAN and the East Asian NIES', *Asia-Pacific Economic Literature*, 4(2), 59–83.
Markusen, J.R. (1984) 'Multinationals, multi-plant economies, and the gains from trade', *Journal of International Economics*, 16, 205–26.
—— (1998) 'Multinational firms, location and trade', *The World Economy*, 21(6), 733–56.
—— (2002) *Multinational Firms and the Theory of International Trade*, London: MIT Press.
—— (2005) 'Modeling the offshoring of white-collar services: from comparative advantage to the new theories of trade and FDI', paper presented to the Brookings Forum, May 2005, Washington, DC: Brookings Institution.
Maskus, K.E. (1991) 'Comparing international trade and products and national characteristics data for the analysis of trade models', in P. Hooper and D.J. Richardson (eds) *International Economic Transactions: Issues in Measurement and Empirical Research*, Chicago: University of Chicago Press, 55, pp. 17–60.
Mauro, P. (1995) 'Corruption and growth', *Quarterly Journal of Economics* 110: 681–712.
McKendrick, D.G., Doner, R.F. and Haggard, S. (2000) *From Silicon Valley to Singapore: Location and Competitive Advantage in the Hard Disk Drive Industry*, Stanford: Stanford University Press.
McMillan, J. and Woodruff, C. (1999) 'Inter-firm relationships and informal credit in Vietnam', *Quarterly Journal of Economics*, 114(4), 1285–1320.
—— (2002) 'The Central Role of Entrepreneurs in Transition Economies', *Journal of Economic Perspectives*, 16(9), 153–93.
Medalla, E.M., Tecson, G.R., Bautista, R.M., Power, J.H. and Associates (1995/96) *Philippine Trade and Industrial Policies: Catching Up With Asia's Tigers*, volumes I and II, Makati: Philippine Institute for Development Studies.
Meenaphant, S. (1981) 'An economic analysis of Thailand's rice trade', PhD dissertation, Rice University, Texas.
Milner, C., Vencappa, D. and Wright, P. (2007) 'Trade policy and productivity growth in Indian manufacturing', *The World Economy*, 30(2): 249–65.
Mookherjee, D. (1995) *Indian Industry: Policies and Performance*, Delhi: Oxford University Press.
Moran, T.H. (1998) *Foreign Direct Investment and Development*, Washington, DC: Institute for International Economics.
Murphy, K., Schleifer, A., and Vishny, R. (1993) 'Why is rent-seeking so costly to growth?' *American Economic Review* 83(2), 409–14.
Nagaraj, R. (2003) 'Foreign direct investment in India in the 1990s', *Economic and Political Weekly*, April 26: 1701–12.
Naughton, B. (1996) 'China's Emergence and Prospects as a Trading Nation', *Brookings Papers on Economic Activity*, 2, 293–344.
Naughton, B. (ed) (1999) *The China Circle: Economics and Technology in the PRC, Taiwan and Hong Kong*, Washington, DC: Brookings Institution Press.
—— (2007) *China's Economy: Transition and Growth*, Cambridge, MA: MIT Press.

Naya, S. and Ramstetter, E.D. (1988) ‘Policy interactions and direct foreign investment in East and Southeast Asia’, *Journal of World Trade*. 22, 57–71.

Nayyar, D. (1978) ‘Transnational corporations and manufactured exports from poor countries’, *Economic Journal*, 88, 59–84.

—— (2006b) ‘India’s Unfinished Journey: Transforming Growth into Development’, *Modern Asian Studies* 40 (3), 797–832.

New York Times (2007) ‘Once a dream fuel, palm oil may be an eco-nightmare’, 31 January.

—— (2008) ‘A new, global oil quandary: costly fuel means costly calories’, 19 January.

Ng, F. and Yeats, A. (2001) ‘Production sharing in East Asia: who does what for whom, and why?’ in L.K. Cheng and H. Kierzkowski (eds) *Global Production and Trade in East Asia*, Boston: Kluwer Academic Publishers, pp. 63–109.

—— (2003) ‘Major trade trends in East Asia: what are their implications for regional cooperation and growth?’, *Policy Research Working Paper 3084*, Washington, DC: World Bank.

Ngo, V.G. (2006) ‘Development trends of the private economic sector in Vietnam’, *Vietnam Economic Review* (The Institute of the World Economy, Hanoi) 8, 36.

Nicita, A. and Olarreaga, M. (2006) *Trade, Production and Protection 1976–2004*, Washington, DC: World Bank.

—— (2007) ‘Trade, production, and protection database, 1976–2004’, *The World Bank Economic Review* 21(1), 1–7.

OECD (2002) ‘Intra-industry and intra-firm trade and the internationalisation of production, *OECD Economic Outlook 71*, May 2002, 159–170.

—— (2005) *OECD Science, Technology and Industry: Scoreboard 2005*, Paris: OECD.

—— (2006) ‘The globalisation of value chains: preliminary evidence and potential implications for policy’, Directorate for Science, Technology and Industry, 27–28 February 2006, DSTI/IND(2006)2, Paris: OECD.

—— (2007a) ‘The impact of air transport liberalisation: a gravity model approach’, Working Paper of the Trade Committee, TAD/TC/WP(2007)4, Paris: OECD.

—— (2007b) ‘The impact of services trade liberalisation on trade in non-agricultural products’, Working Paper of the Trade Committee, TAD/TC/WP(2007)21, Paris: OECD.

—— (2007c) *OECD Science, Technology and Industry Scoreboard*, Paris: OECD.

Olsen, K.B. (2006) ‘Productivity impacts of offshoring and outsourcing: a review’, OECD STI Working Paper, 2006/1, 2006, Paris: OECD.

Pages, C. and Roy, T. (2008) ‘Regulation: enforcement and adjudication in Indian labour markets: historical perspective, recent changes and way forward’, Washington, DC: The World Bank, mimeo.

Panagariya, A. (2008) *India: The Emerging Giant*, New York: Oxford University Press.

Paprzycki, R. (2004) *Interfirm Network in the Japanese Electronics Industry*, London and New York: Routledge Curzon.

Park, Y.C. and Shin, K. (2009) ‘Economic integration and changes in the business cycle in East Asia: is the region decoupling from the rest of the world?’, *Asian Economic Papers* 8(1), 107–40.

Petri, P. (1994) ‘Trading with the dynamos: East Asian interdependence and American interests’, *Current History*, December, 407–12.

Pinthong, C. (1984) ‘Distribution of benefit of government rice procurement policy in Thailand’, [in Thai] *Thammasat University Journal* 13, 166–87.

—— (1977) 'A price analysis of the Thai rice marketing system', PhD dissertation, Stanford University, California.
Plummer, M.G. (2007) 'Best practices in regional trading agreements: an application to Asia', *World Economy*, 30(12), 1771–96.
Pomfret, R. (1991) *Investing in China: Ten Years of the Open Door Policy*, New York: Harvester Wheatsheaf.
Porter, M.E. (1986) *Competition in Global Industries*, Boston: Harvard Business School Press.
Pritchett, L. (2008) 'Is India a flailing state? Detours on the four lane highway to modernization', JFK School of Government, Harvard University, mimeo.
Raballand, G. and Aldaz-Carroll, E. (2007) 'How do differing standards increase trade costs? The case of pallets', *The World Economy*, 34(4), 685–702.
Ranis, G. and Schive, C. (1985) 'Direct foreign investment in Taiwan's development', in W. Galenson (ed.) *Foreign Trade and Investment: Economic Development in the Newly Industrializing Asian Countries*, Madison: University of Wisconsin Press, pp. 85–137.
Riedel, J. and Comer, B. (1997) 'Transition to a market economy in Vietnam' in W.T. Woo, S. Parker and J.D. Sachs (eds) *Economies in Transition: Comparing Asia and Eastern Europe*, Cambridge, MA: MIT Press, pp. 189–214.
Rodriguez, F. and Rodrik, D. (2000) 'Trade policy and economic growth: a skeptic's guide to cross-national evidence', in B. Bernanke and K. Rogoff (eds) *NBER Macroeconomic Annual 2000*, Cambridge, MA: MIT Press.
Rodrik, D. (2004) *New Global Economy and Developing Countries: Making Openness Work*, Washington, DC: Overseas Development Council (distributed by Johns Hopkins University Press).
—— (2006) 'What's so special about China's exports?', *China and the World Economy*, 2.
—— (2007) *One Economics, Many Recipes: Globalization, Institutions and Economic Growth*, Princeton, NJ: Princeton University Press.
Rogoff, K., and Chen, Y. (2002) 'Commodity currencies and empirical exchange rate puzzles', IMF Working Papers 02/27, Washington, DC: IMF.
Roumasset, J., and Setboonsarng, S. (1988) 'Second-best agricultural policy: getting the price of Thai rice right', *Journal of Development Economics*, 28, 323–40.
Ryou, J.-W. (1998) 'Korea's outward foreign direct investment and the division of labor in the Asia Pacific', in H. Lee and D.W. Roland-Holst (eds) *Economic Development and Cooperation in the Pacific Basin: Trade, Investment, Environmental Issues*, Cambridge: Cambridge University Press.
Sachs, J. and Warner, A. (1995) 'Economic reforms and the process of global integration', *Brookings Papers on Economic Activity*, 25th anniversary Issue, 1–95, 1995.
Saxenian, A. (2002) 'Bangalore: The Silicon Valley of Asia?', in A.O. Krueger (ed.) *Economic Policy Reforms and the Indian Economy*, Delhi and Oxford: Oxford University Press, pp. 169–93.
Schive, C. (1990) *The Foreign Factor: The Multinational Corporation's Contribution to the Economic Modernization of the Republic of China*, Stanford, CA: Hoover Institution Press.
Schive, C. and Tu, J.-H. (1991) 'Foreign firms and structural change in Taiwan', in E.D. Ramstetter (ed.) *Direct Foreign Investment in Asia's Developing Economies and Structural Changes in the Asia-Pacific Region*, Boulder, CO: Westview Press, pp. 142–71.

Schott, P.K. (2001) 'Do rich and poor countries specialise in a different mix of goods? Evidence from product level US trade data', *NBER Working Paper 8492*, Cambridge, MA: National Bureau of Economic Research.

—— (2004) 'Across-product versus within-product specialization in international trade', *Quarterly Journal of Economics* 119, 647–78.

Sen, K. (2008a) *Trade Policy, Inequality and Performance in Indian Manufacturing*, London: Routledge.

—— (2008b) 'International trade and manufacturing employment outcomes in India: a comparative study', UNU-WIDER Research Paper No. 2008/87.

Siamwalla, A. and Setboonsarng, S. (1989) *Trade, Exchange Rate, and Agricultural Pricing Policies in Thailand*, Washington, DC: World Bank.

—— (1991) 'Thailand', in A.O. Krueger, M. Schiff, and A. Valdés (eds) *The Political Economy of Agricultural Pricing Policy: Vol. 2, Asia*, Baltimore: Johns Hopkins University Press, pp. 236–80.

Siamwalla, A., Setboonsarng, S. and Patamasiriwat, D. (1993) 'Agriculture', in P.G. Warr (ed) *The Thai Economy in Transition*, Cambridge: Cambridge University Press, pp. 81–117.

Soloaga, I. and Winters, L.A. (2001) 'Regionalism in the Nineties: what effect on trade?', *North American Journal of Economics and Finance*, 12, 1–15.

Somporn, I. and Poapongsakorn, N. (1995) 'Rice supply and demand in Thailand: the future outlook', Bangkok: Thailand Development Research Institute, January.

Song, B.-Y. (1990) *The Rise of the Korean Economy*, Oxford: Oxford University Press.

Srinivasan, T.N. (1998) 'India's export performance: a comparative analysis', in I.J. Ahluwalia and I.M.D. Little (eds) *India's Economic Reforms and Development*, Delhi: Oxford University Press, pp. 197–228.

Stern, N. (2007) *The Economics of Climate Change: The Stern Review*. Cambridge: Cambridge University Press.

Streifel, S. (2006) 'Impact of China and India on global commodity markets: focus on metals and minerals and petroleum', Background Paper for L.A. Winters and S. Yusuf (eds) *Dancing with the Giants: China, India and the Global Economy*, Washington, DC: World Bank and Singapore: Institute of Policy Studies.

Sturgeon, T.J. (2003) 'What really goes on in Silicon Valley? Spatial clustering and disposal in modular production networks', *Journal of Economic Geography* 3, 199–225.

Sung, Y. (2007) 'Made in China: from world sweatshop to a global manufacturing centre?', *Asian Economic Papers* (forthcoming).

Sung, Y.-W., Liu, P.-W., Wong, Y.R. and Lau, P.K. (1995) *The Fifth Dragon: The emergence of the Pearl River Delta*, Singapore: Addison Wesley.

Svejnar, J. and Woo, J. (1990) 'Development patterns in four countries', in W.A. Byrd and Q. Lin (eds) *China's Rural Industry*, New York: Oxford University Press.

Thanh, V.T. (2006) 'Vietnam's trade liberalization and international economic integration: evolution, problems and challenges', *ASEAN Economic Bulletin* 22(1): 75–91.

Timmer, C.P. (1996) 'Does BULOG stabilize rice prices in Indonesia? Should it try?', *Bulletin of Indonesian Economic Studies*, 32: 45–74.

Toyota (2002) *Toyota Data Book*, Tokyo: Toyota.

Tran, Q.T. (2007) 'Foreign direct investment in industrial transition: a case study of Vietnam', unpublished doctoral dissertation, Australian National University, Canberra.

Truong, D.H.D. and Gates, C.L. (1996) ‘Vietnam in ASEAN – economic reform, openness and transformation: an overview’, *ASEAN Economic Bulletin*, 13 (2),159–68.
Tsai, K.S. (2002) *Back Alley Banking: Private Entrepreneurs in China*, Ithaca: Cornell University Press.
Tseng, W. and Zebregs, H. (2002) ‘Foreign direct investment in China: Some lessons for other countries’, *IMF Policy Discussion Paper*, Washington, DC: IMF.
UNCTAD (2002) *World Investment Report 2002*, Geneva: United Nations.
—— (2005) *World Investment Report 2005*, Geneva: United Nations.
—— (2007) *World Investment Report 2007*, New York and Geneva: United Nations.
UNIDO (2006) *Industrial statistics database* (CD ROM), New York and Geneva: United Nations.
Urata, S. (1999) ‘Intrafirm technology transfer by Japanese multinationals in Asia’, in D. Encarnation (ed.) *Japanese Multinationals in Asia: Regional Operations in Comparative Perspective*, New York and Oxford: Oxford University Press, pp. 143–62.
—— (2002) ‘Japanese foreign direct investment in East Asia with particular focus on ASEAN 4’, presented at the Conference on Foreign Direct Investment: Opportunities and Challenges for Cambodia, Laos and Vietnam, held in Hanoi, Vietnam.
van Wijnbergen, S. (1984) ‘The Dutch disease: a disease after all?’ *Economic Journal* 94, 41–55.
Wacziarg, R. and Welch, K.H. (2003) ‘Trade liberalization and growth: new evidence’, *National Bureau of Economic Research (NBER) Working Paper 10152*, Cambridge, MA: NBER.
Wade, R. (1990) *Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization*, Toronto: Princeton University Press.
Wakker, E. (2005) ‘Greasy palms: the social and ecological impacts of large scale oil palm plantation development in Southeast Asia’, Friends of the Earth, UK, available at http://www.foe.co.uk/resource/reports/greasy_palms_impacts.pdf (accessed 6 January 2010).
Warr, P. (2001) ‘Welfare effects of an export tax: Thailand’s rice Premium’, *American Journal of Agricultural Economics*, 83, 903–20.
—— (2005a), *Thailand Beyond the Crisis*, London: Routledge.
—— (2005b) ‘Food policy and poverty in Indonesia: A general equilibrium analysis’, *Australian Journal of Agricultural and Resource Economics*, 49: 429–51.
Warr, P. and Kohpaiboon, A. (2007) ‘Distortions to agricultural incentives in Thailand’, Agricultural Distortions Research Project Working Paper, Washington, DC: World Bank.
Wei, S.-J. (2000) ‘Why does China attract so little foreign direct investment?’ in T. Ito and A.O. Krueger (eds) *The Role of Foreign Direct Investment in East Asian Economic Development*, Chicago: University of Chicago Press, pp. 239–65.
Wells, L.T. (1983) *Third World Multinationals*, Cambridge, MA: MIT Press.
Willenbockel, D. (2007) ‘The impact of China’s import demand growth on sectoral specialization in Brazil: a CGE assessment,’ MPRA Paper 6200, University Library of Munich, Germany, available at http://mpra.ub.uni-muenchen.de/6200/1/MPRA_paper_6200.pdf (accessed 6 January 2010).
Winchester, N.D., Greenaway, D. and Reed, G.V. (2006) ‘Skill classification and the effects of trade on wage inequality’, *Review of World Economics* 142, 287–306.
Winters, L.A. and Yusuf, S. (eds) (2007) *Dancing with the Giants: China, India and the*

Global Economy, Washington, DC: World Bank and Singapore: Institute of Policy Studies.

Wong, C.M. (1978) ‘A model for evaluating the effects of Thai government taxation of rice exports on trade and welfare’, *American Journal of Agricultural Economics* 60, 65–73.

Wood, A. and Calandrino, M. (2000) ‘When the other giant awakens: trade and human resources in India’, *Economic and Political Weekly*, December 30: 4677–94.

World Bank (1986) *World Development Report*, Washington, DC: World Bank.

—— (1993) *The East Asian Miracle: Economic Growth and Public Policy*, Oxford: Oxford University Press.

—— (1999) *World Development Indicators*, Washington, DC: World Bank.

—— (2003) *India: Sustaining Reform, Reducing Poverty*, Washington, DC: World Bank.

—— (2005) *Vietnam Development Report 2006: Business*, Hanoi: World Bank Vietnam.

—— (2007) *World Development Report*, Washington, DC: World Bank.

—— (2008) ‘Global purchasing power parities and real expenditures: 2005’, Washington DC: International Comparison Program, World Bank.

WTO (2007) *Trade Policy Review – Indonesia 2007*, Geneva: WTO.

—— (1999) *Trade Policy Review: Philippines 1999*, Geneva: WTO.

Yamashita, N. (2009) *International Fragmentation of Production: The Impact of Outsourcing on the Japanese Economy*, Cheltenham: Edward Elgar.

Yeats, A.J. (2001) ‘Just how big is global production sharing?’, in S.W. Arndt and H. Kierzkowski (eds) *Fragmentation: New Production Patterns in the World Economy*, Oxford: Oxford University Press, pp. 63–109.

Yi, K.M. (2003): ‘Can vertical specialization explain the growth of world trade?’, *Journal of Political Economy* 111, 52–102.

Yoshitomi, M. (2007) ‘Global imbalances and East Asian monetary cooperation’, in D.-K. Chung and B. Eichengreen (eds) *Towards an East Asian Exchange Rate Regime*, Washington, DC: Brookings Institutions Press, 22–48.

Yusuf, S. (2003) *Innovative East Asia: The Future of Growth*, New York: Oxford University Press.

Yusuf, S., Nabeshima, K. and Perkins, D. (2007) ‘China and India reshape global industrial geography’, in A.L. Winters and S. Yusuf (2007) *Dancing with Giants: China, India, and the Global Economy*, Washington, DC: World Bank, chapter 3.

Zen, Z., Barlow, C. and Gondowarsito, R. (2005) ‘Oil palm in Indonesian socio-economic improvement: a review of options’, Economics Department Discussion Paper 2005–11, RSPAS, Australian National University, Canberra.

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