



THE AUSTRALIAN NATIONAL UNIVERSITY

Working Papers in
Trade and Development

Production Networks and Trade Patterns:
East Asia in a Global Context

Prema-chandra Athukorala

October 2009

Working Paper No. 2009/15

The Arndt-Corden Division of Economics
ANU College of Asia and the Pacific

Production Networks and Trade Patterns:
East Asia in a Global Context

Prema-chandra Athukorala
The Arndt-Corden Division of Economics
College of Asia and the Pacific
The Australian National University

Corresponding Address :
Prema-chandra Athukorala
The Arndt-Corden Division of Economics
College of Asia and the Pacific
The Australian National University
Canberra ACT 0200
Email: prema-chandra.athukorala@anu.edu.au

October 2009
Working paper No. 2009/15

This Working Paper series provides a vehicle for preliminary circulation of research results in the fields of economic development and international trade. The series is intended to stimulate discussion and critical comment. Staff and visitors in any part of the Australian National University are encouraged to contribute. To facilitate prompt distribution, papers are screened, but not formally refereed.

Copies may be obtained from WWW Site
<http://rspas.anu.edu.au/economics/publications.php>

Production Networks and Trade Patterns: East Asia in a Global Context

Prema-chandra Athukorala

Arndt-Corden Division of Economics
Crawford School of Economics and Government
The Australian National University
E-mail: prema-chandra.athukorala@anu.edu.au

Abstract: This paper examines the implications of global production sharing for regional and global trade patterns in East Asia using a new data set culled from the UN trade database. It is found that, while ‘network trade’ has generally grown faster than total world trade in manufacturing, the degree of dependence of East Asia on this new form of international specialisation is proportionately larger than elsewhere in the world. Trade within production networks has certainly strengthened economic interdependence among countries in the region, with China playing a pivotal role as the premier centre of final assembly. However, this, contrary to the popular belief, has not lessened the dependence of export dynamism of these countries on the global economy. The rise of global production sharing has strengthened the case for a global, rather than a regional, approach to trade and investment policymaking.

Key words: production sharing, trade patterns, East Asia, China

JEL Classification: F10, F14, O53

Paper for the ADB-BNM-EC Joint Conference: ‘Beyond the Global Crisis: A New Asian Growth Model’?, 19-20 October 2009, Kuala Lumpur, Malaysia.

Production Networks and Trade Patterns: East Asia in a Global Context

1. Introduction

Global production sharing—the break-up of the production process into geographically separated stages—has been an increasingly important facet of economic globalisation over the past three decades.¹ With a modest start in electronics and clothing industries, multinational production networks have gradually evolved and spread into many industries such as sport footwear, automobiles, televisions and radio receivers, sewing machines, office equipment, power and machine tools, cameras and watches, and printing and publishing. This great transformation in world trade has been underpinned by three mutually reinforcing developments. First, rapid advancements in production technology have enabled the industry to slice the value chain into finer, ‘portable’, components. Second, technological innovations in communication and transportation have shrunk the distance that once separated the world’s nations, and improved the speed, efficiency and economy of coordinating geographically dispersed production processes. This has facilitated the establishment of ‘services links’ to combine various fragments of the production process in a timely and cost-effective manner. Third, liberalisation policy reforms in both home and host countries have considerably removed barriers to trade and investment (Jones 2000; Jones and Kierzkowski 2001).

Global production sharing has evolved through three distinct phases. At the formative stage, the production sharing involved locating small fragments of the production process in a low-cost country and reimporting the assembled components to be incorporated in the final product. Subsequently, production networks began to encompass many countries engaged in the assembly process at different stages, resulting in multiple border crossings by product fragments before they are incorporated in the final product. As international networks of parts and components supply have become firmly established, producers in advanced countries have begun to move the final assembly of an increasing range of consumer durables (for example, computers,

¹ The term ‘production sharing’ was coined by Drucker (1977). In the recent literature an array of alternative terms have been used to describe this phenomenon, including ‘international production fragmentation’, ‘vertical specialisation’, ‘slicing the value chain’ and ‘outsourcing’.

cameras, TV sets and motor cars) to overseas locations in order to be physically closer to their final users and/or take advantage of cheap labour.

In the case of standard consumer goods such as clothing and footwear, global production sharing normally takes place through arm's length relationships, with international buyers playing a key role in linking producers and sellers in developed countries (Helleiner 1973, Gereffi *et al.* 2005). Production sharing within vertically integrated global industries such as electronics, electrical goods and automotive, on the other hand, has evolved in a different manner. In the beginning, the process essentially involved a multinational enterprise (MNE) setting up an overseas subsidiary to perform some of the functions that it once did at home. As production operations in the host countries became firmly established, production process in these industries eventually has begun to spread beyond the MNEs. MNE subsidiaries began to subcontract some activities to local (host-country) firms, providing the latter with detailed specifications and even fragments of their own technology. At the same time, many firms which were not part of MNE networks began to procure components globally through arm's length trade. However, the bulk of global production sharing within high-tech industries still takes place under the aegis of MNEs. This is because the production of final goods requires highly customized and specialized components whose quality cannot be verified or assured by a third party. Even if it were possible, it is difficult to write a contract between the final producer and input supplier which would fully specify product quality (Antras 2005).

There is a sizeable theoretical literature examining the causes and modalities of global production sharing.² This literature has demonstrated the fragility of the conventional approach to trade flow analysis which is based on the notion that countries trade in goods that are produced from start to finish in just one country. Global production sharing 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. In this context, the decisions of how much to produce and for which market have to be combined with decisions of where to produce and with what degree of intra-product specialisation. Consequently, trade flow analysis based on data coming from a reporting system designed at a time when countries were trading only in final goods naturally distorted values of exports and imports leading to a falsification of the nature of emerging trade patterns. The degree of falsification is likely to

² Spenser 2005, Helpman 2007 and Feenstra 2008 provide extensive surveys.

increase over time as more complex production networks are created with an ever increasing number of participating.

The purpose of this paper is to examine the size and dynamics of global production sharing and network trade in East Asia with special emphasis on the regional and global integration of countries in the region. The paper is organised as follows. Section 2 discusses the procedure followed in extracting data from the UN trade data tapes and data quality. Section 3 examines the nature and extent of global network trade and the role of East Asia countries in this new global division of labour. Section 4 probes inter-country differences in the intensity of network trade, with the aim of broadening our understanding of East Asia's relative position within global production networks. Section 5 deals with the implications of this new form of international exchange for intra-regional trade and for creating new supply-side complementariness among countries in the region, with emphasis on the emerging role of China in regional production networks. In Section 6 the latest available data are pieced together to examine the role of network trade in determining the impact of the global crisis on export performance of East Asian economies. The final section presents policy inferences.

2. Data

Previous studies have used two alternative approaches to quantifying the magnitude and pattern of trade taking place within global production networks ('network trade').³ The first approach relies on records kept by OECD countries (in particular the US and the European Union) in connection with special tariff provisions on overseas processing and assembly of domestically produced components ('outward processing trade (OPT) statistics') (Helleiner 1973, Sharpton 1975, USITC 1999, Gorg 2000). OPT records provide data on parts and components exported from source countries and assembled goods received in turn. However, the OPT schemes only cover a limited range of products, and the actual product coverage has varied significantly both

³ A number of recent studies have used imported input content of industrial production, estimated using input-output tables, to measure the growth of global production sharing in world trade at the industry/country level (growth in the measured degree of imported-input dependence between two time points is interpreted as an indicator of the growth of global production sharing) (Dean et al. 2007; Hummels et al. 2001). This approach is not relevant for the present study, which aims to examine the patterns and determinants of production-sharing driven trade flows.

within and among countries over time. Perhaps more importantly, recent trends in unilateral trade and investment liberalization, and the proliferation of bilateral and regional economic integration agreements, have significantly reduced the importance of such tariff concessions in promoting global sourcing (and therefore the actual utilization of these schemes). Moreover, by their very nature, these administrative records leave out cross-border transitions among third countries within global production networks.

The second approach, pioneered by Yeats (2001) and pursued in a number of recent studies (Ng and Yeats 2003, Athukorala 2005, Athukorala and Yamashita 2008, Kimura 2006) involves delineating trade in parts and components, using individual-country trade statistics extracted from the UN trade data reporting system (Comtrade database). This approach permits a comprehensive and consistent coverage of parts and components trade encompassing a large number of countries. But, it suffers from two major limitations to the commodity coverage of network trade. First, the commodity coverage is limited to parts and components which can be directly identifiable based on the commodity nomenclature of the US Standard International Trade Classification (SITC). These items are confined to the product classes of machinery and transport equipment (SITC 7) and SITC 8. However, there is evidence that global production sharing 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). Second, and more importantly, even if we ignore problem of under coverage, parts and components are only one of the facets of network trade; As we have noted at the outset, there as been a notable expansion of network activities from pure component production/assembly and to final assembly. Moreover, the relative importance of these two tasks varies among countries, and over time in a given country, making it problematic to use data on parts and components trade as a general indicator of the trends and evolving patterns of network trade over time and across countries.

The analysis in this paper makes use of data extracted from the US trade data system following a procedure which aims to redress these two limitations (to the extent permitted by the nature of data availability). We use a list of parts and components encompassing the entire spectrum of manufacturing trade. The list was compiled by mapping parts and components in the UN Broad Economic Classification (BEC) Registry (available at <http://www.unstats.un.org/unsd/ct/registry>) in the product list of the WTO Information Technology Agreement with the Harmonise System (HS) of trade classification at the six digit level.

Information gathered from a survey of firm in Thailand was used to fill gaps in the list. Data compiled at the HS 6-digit level was converted to SITC for the final analysis using the UN HS-SITC concordance.⁴

There is no hard and fast rule applicable to distinguishing between parts and components and assembled products in international trade data. The only practical way of doing this is to focus on the specific industries in which network trade is heavily concentrated. Once these industries are identified assembly trade can be tentatively estimated as the difference between parts and components, directly identified based on our list, and recorded trade in these product categories. Guided by the available literature on production sharing, we identified seven product categories: office machines and automatic data processing machines (SITC 75), telecommunication and sound recording equipment (SITC 76), semiconductors and semiconductor devices (SITC 772 and 776); electrical goods (SITC 77 – 772 -776), road vehicles (SITC 78), professional and scientific equipment (SITC 87) and photographic apparatus (SITC 88). It is quite reasonable to assume that these product categories contain virtually no products produced from start to finish in a given country. However, admittedly the estimates based on this list do not provide a full coverage of final assembly in world trade. For instance, outsourcing of final assembly does takes place in various miscellaneous product categories such as clothing, furniture, sport goods and leather products. However, it is not possible to meaningfully delineate parts and components and assembled goods in reported trade in these product categories because they contain a significant (yet unknown) share of ‘horizontal’ trade. Likewise, assembly activities in software trade have recorded impressive expansion in recent years, but these are lumped together in the UN data system with ‘special transactions’ under SITC 9. However, the magnitude of the bias resulting from the failure to cover these items is unlikely to be substantial because network trade in final assembly is heavily concentrated in the product categories covered in our decomposition (Yeats 2003, Krugman 2008).

As regards country coverage, Asia is defined here to encompass the economies of East Asia. East Asia includes Japan, and Developing East Asia (DEA), which covers the newly industrialized economies (NIEs) in North Asia (Republic of Korea, Taipei, China and Hong Kong, China), People’s Republic of China (PRC) and members of the Association of Southeast Asian

⁴ The list of parts and components and a note on the compilation procedures is available on request from the author.

Nations (ASEAN). Among the ASEAN countries, only the six largest economies —Indonesia, Malaysia, the Philippines, Thailand, Singapore and Vietnam— are covered in the statistical analysis; Brunei, Cambodia, Lao PDR and Myanmar are excluded because of data limitations. The East Asian experience is examined in the wider global context, focusing on the region's performance relative to the North American Free Trade Area (NAFTA) and the European Union (EU).

The data are tabulated using importer records, which are considered to be more appropriate for analysing trade patterns than the corresponding exporter records. Compared to country records, 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: Appendix 1; Feenstra *et al.* 1999). Some countries also fail to properly report goods shipped from their own export-processing zones; they tend to be grouped into one highly aggregated category of 'special transactions' under SITC 9. It is difficult to find a satisfactory solution for these problems, but it is generally believed that data compiled from importer records are less susceptible to recording errors and reveals the origin and composition of trade more accurately than other records, because there are normally important legal penalties for incorrectly specifying this information on customs declarations. Data for Taipei, China (which is not covered in the UN data system) are obtained from the trade database (based on the same classification system) of the Council for Economic Planning and Development, Taipei. The analysis covers the period from 1992 to 2007. The year 1992 was selected as the starting point because by this time, countries accounting for over 95% of total world manufacturing trade had adopted the revised data reporting system. Meanwhile, 2007 was the most recent year for which data were available for all reporting countries.

3. East Asia in Global Production Networks

Rapid export growth has been the hallmark of East Asia's rise in the global economy. The combined share of East Asian countries in world non-oil exports recorded a three-fold increase, from 11% to 33%, between 1969/70 and 2006/7.⁵ The region accounted for over 40% of the total increment in world exports over this period. In the 1970s and 1980s, Japan dominated the region's trade, accounting for nearly 60% of its exports and imports. The picture has changed dramatically over the past two decades with the share of developing East Asian countries, increasing rapidly in face of a relative decline in Japan's position in World trade. By the middle of this decade these countries accounted for over 80% of total regional trade. The rise of China has been the dominant factor behind this structural shift, but the other countries in the region (Taiwan, Korea, and the ASEAN countries) have also increased their world market shares.

Rapid export growth in East Asia has been underpinned by a pronounced shift in export structure away from primary commodities and toward manufacturing. By 2005/07 manufacturing accounted for 92% of total exports from Asia, up from 78% four decades ago. 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. The share of Asia in world machinery and transport equipment exports increased from 14.5% in 1994/95 to 42.4% in 2006/07, with DEA accounting for over four-fifths of the increment. By 2006/07, over 58% of total world ICT exports originated from Asia, with China alone accounting for 23%. In electrical goods, China's world market share increased from 3.1% to 20.6% between these two years. As we will see below, export dynamism in these product lines has been driven by the ongoing process of global production sharing and the increasingly deep integration of East Asian countries into the global production networks.

Table 1 presents data on world trade based on global production sharing ('network trade') and East Asia's relative position in this new international exchange. World network trade

⁵ Trade magnitudes throughout the paper are measured in current US dollars unless otherwise indicated. 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. All data reported, unless otherwise stated, are compiled from the UN Comtrade database.

increased from US\$ 1207 billion (about 23.8% of total exports) in 1992/93 to US\$4525 billion (45.5%) in 2006/07, accounting for over a half of the total increment in world manufacturing exports between these two years. There has been a palpable shift in global production sharing away from mature industrial economies towards developing countries and in particular towards East Asia. The share of developing countries in total network exports increased from 22.0% in 1992/3 to 45.7 % in 2005/6, driven primarily by the growing importance of East Asian countries in global production sharing (Figure 1). The share of East Asia (including Japan) increased from 32.2 % in 1992/93 to 40.3% in 2006/7, despite a notable decline in Japan's share, from 18.4% to 9.5%. The major driving force has been PRC whose share increased from 2.1% to 14.5%. Within East Asia, world market shares of ASEAN countries, with the exception of Singapore, have grown faster than the regional average. The mild decline in Singapore's share reflects a marked shift in its role in global production networks for high-tech industries, away from the standard assembly and testing activities to oversight functions, product design, and capital and technology-intensive tasks in the production process. Some, if not most, of these new activities are in the form of services and are therefore not captured in merchandise trade data (Wong 2007, Athukorala 2008).

Between 1992/3 and 2006/7 there has been a sharp increase in the share of parts and components (henceforth referred to as 'components' for brevity) across all countries in the region (table 1, last column). In all countries except China and Thailand components accounted for well over a half of total network export (and imports) by 2006/07. Components share is particularly high among the countries in ASEAN. There is a remarkable similarity in component share figures on export and import side across countries reflecting overlapping specialisation patterns in component assembly and testing among countries in the region.

Table 2 presents comparative statistics on the share of network trade in total manufacturing exports and imports at the country/country group level. It is evident that the share of network trade of East Asia is much higher, compared to all other regions in the world. In 2006/07, exports within production networks accounted for over 60.3% of total manufacturing trade in East Asia, compared to the world average of 50.9%. Within East Asia, ASEAN countries stand out for their heavy dependence on production fragmentation trade – a critical part of their export dynamism. In 2006/07, network export accounted for 66% of total manufacturing exports in ASEAN, up from 56.8% in 1992/93. The patterns observed on export and import sides are strikingly similar reflecting growing cross border trade within production networks.

A comparison of the data on the share of components in total exports and imports (Table 2) highlights an important difference between PRC and the rest of DEA. In PRC, components accounted for a much larger share of imports (44.2% in 2006/07) compared to exports (25.6%). In other East Asian countries, the percentage shares are broadly similar on the import and export sides, reflecting their predominant involvement in component production/assembly within regional production networks. Figure 2 illustrates the nature of PRC's involvement within regional production networks. The bulk of components used in final assembly in PRC comes from other countries in the region. At the same time, final goods (total exports minus components) account for an overwhelming share of PRC's exports to the rest of the world, mostly to the US and EU. In 2005/6, components accounted for a mere 12% of total PRC exports to the rest of the world. The share of components in PRC's total manufacturing imports from East Asia increased from 18% in 1994/5 to over 44% in 2006/7. Within manufacturing, this share is much larger in machinery and transport equipment imports, at nearly three-fourths in 2006/7. Interestingly, although PRC's importance as a market for the rest of East Asia has increased during the period under study, the importance of the region for PRC's export expansion has declined notably. For instance, only 32% of PRC's total manufacturing exports were destined for regional markets in 2006/7, compared to 53.3% in 1994/5. By contrast, on the import side, the regional share increased from 20% to 32.7% between the same period. Overall, these patterns reflect PRC's important role as the premier final assembly centre, linking the rest of East Asia with the rest of the world through global production networks.

Data on the composition of network trade are summarized by major country groups in Table 3. A striking feature of network trade in East Asia is its heavy concentration in electrical machinery, semiconductor devices in particular. In all countries/regions, component trade is heavily concentrated in the machinery and transport equipment sector (SITC 7). This sector accounts for over 90% of the combined component trade of SITC 7. Within SITC 7, both component exports and imports of East Asia are heavily concentrated in electronics and electrical industries. Semiconductors and other electronics components (components within SITC 77) alone accounted for 50% of component exports from East Asia in 2006/07. Adding components of telecommunication equipment (SITC 76) and office and automated data processing machines (SITC 75) to these items increases the concentration ratio to almost 90 per cent of total exports of components. The balance consists largely of electrical machinery (SITC 77 and auto parts (SITC 78). Concentration of component trade on electronics is much larger in AFTA (over 60%)

compared to the regional average. Electronics and electrical products are also major areas of activity in other countries/regions. But the trade patterns of these countries/regions are characterized by a significant presence of other items, in particular automotive components (components of motor vehicles (SITC 78) and other transport equipment (SITC 79). For instance, components of these two product categories accounted for a mere 4.7% of total component exports in developing East Asia in 2005/6 compared to over a third in NAFTA and EU15. Moreover, unlike in NAFTA and EU15, shares of automotive components in East Asian imports are much higher compared to exports. This asymmetry is an indication of their relatively low level of participation in network trade.

The relatively low levels of network trade in automobile and transport equipment in East Asian countries cannot be explained in terms of their competitive edge in electronics and electrical industries alone. The total trade figures behind these export shares show that export growth in these products during 1992-2007 was much slower (a mere 5% in current US dollar terms) compared to over 20% in NAFTA and over 15% in EU15. There are two possible reasons for this contrast which deserve further study. First, in most East Asian countries, binding content protection requirements for the domestic production of automotives and tariffs on final products (usually side by side with low or zero tariffs on components) remained relatively high until recently (Abrenica 1999). Tariff protection and content protection requirements usually lead to more components being produced domestically. They also tend to retard exports not only because of the incentive bias against exports, but also because domestic market-oriented production usually does not achieve the quality standards and cost competitiveness required for export success. Second, unlike electronics and electrical industries, components in the automotive industry,⁶ are generally characterized by low value-to-weight ratios, which make it too costly to use air transport for timely delivery (Hummels 2007). This could well be an important consideration for locating parts and component producing/assembly plants close to the final assembly plants within automobile production networks: the data point to a heavy concentration of international trade in automotive components within NAFTA (Klier and Rubenstein 2006) and EU (Anderton and di Mauro 2008) compared to East Asia and other regions.

⁶ Air shipping is the mode of transport for over two-thirds of electronics exports from Singapore, Philippine, Thailand and Malaysia (estimate based on US Trade Commission data on trade by mode of transport during 2000-2005).

4. Determinants of East Asia's Growing Role in Network Trade

We have seen that while rapid growth of global production sharing is a global phenomenon, East Asia is unique in the world for its pre-eminent position in this new form of international exchange. For developing East Asian countries, the world market share in fragmentation-based trade has increased at a much faster rate than that of either NAFTA or EU countries. What explain this East Asian dominance in network trade? This issue is central to our understanding of the determinants of inter-country difference in the intensity of network trade, particularly because of the pessimistic prognoses prevailed in the 1990s about the future of network trade in East Asia in the aftermaths of the formation of NAFTA in 1991 and the integration of some new countries emerging from the former Soviet Union with the rest of Europe. There were speculations at the time that significant tariff reduction, proximity to industrial countries and relatively low wages by regional standards (though not compared to some East Asian countries) would confer important advantages on Mexico (in penetrating the US market) and countries on the European periphery (in penetrating the EU), resulting in an erosion in East Asia's relative position (Kierzkowski 2001; Kaminski and Ng 2005).

At least four factors seem to have underpinned East Asia's continued attractiveness as a centre of global production sharing. First, Asia exhibits great diversity in labour supply conditions and wages ranging from Japan and the four high income NIEs to the second-tier countries in Southeast Asia and to Vietnam. Over the past two decades wages in Korea, Taiwan and Hong Kong have rapidly been approaching the developed-country levels. But, despite rapid growth, manufacturing wages in PRC and other latecomers to export-oriented industrialisation in East Asia (Malaysia, Thailand, Vietnam and the Philippines) remain lower than or comparable to those in countries on the European periphery and Mexico (Table 4). In particular, China's average hourly compensation in manufacturing is only a mere 3% of that in the USA. Moreover, there are significant differences in wages among countries in the region, providing a basis for shift in activities to lower wage sources within the region and rapid expansion of intra-regional product sharing systems, permitting

Second, the relative factor cost advantage has been supplemented by relatively more favourable trade and investment policy regimes and better port and communication systems that

facilitate trade by reducing the cost of maintaining 'services links' in global production sharing (Carruthers *et al.* 2003, Arvis *et al.* 2007). Most countries in the region, including PRC, rank favourably in the World Bank's global logistics performance index (LPI) (Table 5). Singapore, by far the biggest transshipment hub in the region, tops the overall logistics quality ranking in the world. The other major transshipment hub in the region, Hong Kong, China, is eighth in the global ranking. According to data on inward FDI, East Asia has been the most favoured region in the world for global spread MNE operations (Athukorala 2007, Chapter 2).

Third, as first-comers in this area of international specialization, countries in Southeast Asia (in particular Malaysia, Singapore and Thailand) seem to offer considerable agglomeration advantages for companies that are already located there. Site selection decisions of MNEs operating in assembly activities are strongly influenced by the presence of other key market players in a given country or neighboring countries. Having enjoyed a long period of successful operation in the region, many MNEs (particularly US-owned ones) have significantly upgraded the technical activities of their regional production networks, and assigned global production responsibilities to local affiliates (specifically Singapore, and more recently Malaysia and Thailand [Athukorala 2008, Borrus *et al.*, 2000, McKendrick *et al.*, 2000)). When selecting new sites, MNEs operating in assembly activities are strongly influenced by the presence of other key market players in a given country or neighbouring countries. With a long period of successful operation in the region, many MNEs (particularly those based in the United States) have significantly upgraded technical activities in their regional production networks in East Asia and assigned global production responsibilities to affiliates located in more mature countries (in particular Singapore and Taiwan, and also Malaysia in recent years).

Forth, for over three decades there has been rapid economic expansion in several countries in the region, and this seems to have brought about 'market thickness', with a positive impact on the location of outsourcing activity (Grossman and Helpman 2005). The term market thickness here refers to the diversification of the composition of traded goods of a country as an outcome of rapid growth and structural transformation.

Finally, PRC's emergence as the premier low-cost assembly centre in the world in a wide range of electrical and electronics products has boosted components production and assembly activities in other countries in the region. PRC's role is particularly important in this connection

because of its *hinterland* advantage (*a la* Jones 2000); PRC is endowed with vast supply of labour, which can be readily brought into production activities to meet changing international demand, without causing large disturbances in factor prices (Jones 2000, Chapter 3).

Table 6 reports the preliminary results of an econometric exercise undertaken to examine determinants of inter-country difference in network trade intensity with emphasis on East Asia's unique role in this new form of international exchange.

The estimation equation is,

$$QX = \alpha + \beta_1 RP + \beta_2 YW + \beta_3 PGDP + \beta_4 RWG + \beta_5 RER + \beta_6 LPI + \beta_7 DIST + \beta_7 DCH \\ + \beta_9 DEA + \beta_{10} DASN + \beta_{11} DODC + \gamma T + \varepsilon_{ij}$$

where QX is the volume of the country's exports (export value deflated by world price). The explanatory variables are defined below (with the expected sign of the regression coefficient in brackets):

YW	World income (weighted average GNP of the ten major importing countries)
$PGDP$	Real GDP per capita (+),
RWG	Manufacturing wage relative to that of trading partners (-)
$RER (+)$	Real exchange rate: world price (expressed in domestic currency), PW relative to domestic price (PD) (+),
LPI	World Bank index of logistic performance (trade-related institutional setting and infrastructure) (+)
DST	Distance to major trading partner countries (-)
DCH	Intercept dummy variable for PRC (+ or -)
DEA	Intercept dummy variable for developing East Asian countries (other than PRC) (+ or -)
$DASN$	Intercept dummy variable for ASEAN member countries (+ or -)
$DODC$	Intercept dummy variable for other developing countries Korea (+ or -)
T	A set of time dummy variables to capture year-specific 'fixed' effects
α	A constant term, and
ε	A stochastic error term, representing the omitted other influences on bilateral trade.

YW is included to capture the impact of world demand on export performance. Distance (*DST*) is a proxy for transport (shipping) costs and other costs associated with time lags such as internet charges, spoilage, and costs associated with physical distance such as ignorance of foreign customs and tastes. Distance can in fact be a more important influence on component trade compared to final trade, because of multiple border-crossings involved in the value adding chain. Technological advances during the post-World War II era have certainly contributed to a remarkable reduction in international communication cost. There is, however, 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). The quality of trade-related logistics (*LIP*) has received increased emphasis in recent years as a key determinant of trade performance of developing countries. In particular, a country with better infrastructure (such as well established broadband networking) is presumably a preferable location for global sourcing because of lower cost of establishing service links. *PGDP* aims to capture the impact of the level of economic advancement on export performance, operating through channels other than logistics quality. We can hypothesize that GDP per capita has a positive effect on export performance; as countries grow richer, the scale of industrial output becomes conducive to global production sharing.

The relative wage (*RWG*) is presumably a major factor impacting on the global spread of fragmentation-based specialisation (Jones and Kierzkowski 2001a&b). 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 real exchange rate, *RER* captures the overall international competitiveness of the economy in traded-goods production. Country group dummies for PRC (*DCH*), other developing East Asian countries (*DEA*) and other developing countries (*DODC*) are added (treating developed countries as the base dummy) to allow for the possible deviation in the overall levels of exports from these country groups from that of developed countries, after controlling for the other explanatory variables. Finally, the time-specific fixed effects (*T*) are included to control for general technological change and other time-varying factors.

The model was estimated using annual panel data for manufacturing trade of 41 countries over the period 1992-2007. The country list includes all countries each of which accounted for

0.1% or more of total world manufacturing exports in 2000/1. Of these, Hong Kong was combined with China because of its peculiar trade links with the latter.⁷ The trade data are compiled from the importers' records (CIF) of the UN Comtrade database following the procedure detailed in Section 2. The data on *LPI* came from the newly-developed *Logistics Performance Index database* of the World Bank (Arvis *et al* 2007). *DST* is the export-share weighted distance between a given country and its ten major export destinations, as reflected in export data for 2000. The data on distance come from the trade patterns data base of the French Institute for Research on the International Economy (CEPII). The CEPIT distance measure is a composite measure of the bilateral great-circle distance between major cities of each country compiled by taking into account the trading significance of each city in each country. World market shares of the ten major export destinations in 2000/1 are used in compiling the distance for a given country. The same weighting procedure is used in compiling data series of *RWG* and *RER*. For details on data sources and methods of variable construction see Appendix 1 (to be added).

We used both pooled OLS and random effects estimators and opted for the pooled OLS as our preferred estimator, based on the Bruesch-Pagan Lagrange multiplier test. The alternative fixed effect estimator is not appropriate because our model contains a number of time-invariant variables. However the coefficient estimates of the time varying variables were found to be remarkably resilient to the use of the fixed effects estimator after deleting the other (time invariant) variables.

To comment on the results, the coefficients of *GDP* and *PGDP* are quite consistent with the a priori expectation. Interestingly, the coefficient of *PGDP* is much larger in magnitude in all three cases compared to that of final and total export equations. This finding is consistent with the postulate that, when controlled for other relevant variables, the stage of development (which captures various prerequisites needed for providing efficient services links) has a positive impact on the attractiveness of a country as a location for components production/assembly within global production networks. The results for the distance variable (*DST*) provide strong support for the hypothesis that cost of transportation and other distance-related costs are an important determinant of trade flows. Interestingly, the distance coefficient in the component equation is much larger

⁷ We also treated Hong Kong as a separate country in experimental runs and found that results were insensitive to this alternative specification.

compared to that in total and final goods equations⁸. This difference is consistent with the hypothesis that component production/assembly, given the multiple border crossing involved in the production process, is much more sensitive to transport cost. Logistic quality (*LPI*) is a significant determinant of trade in both parts and components, and final goods. The coefficient of the relative manufacturing wages (*RWG*) is statistically significant with the expected sign in both equations. Thus, there is strong empirical support for the hypothesis that relative wage differentials are a significant determinant of cross border trade both in components and final products. However, interestingly the magnitude of the coefficient on *RWG* in the final goods equation is much larger compared to that in the parts and component equation. The coefficient of real exchange rate (*RER*) has the expected (positive) signs in all three equations but is (marginally) significant only in the equation for total exports. This implies that, the overall international competitiveness of the economy, unlike competitiveness in terms of wages, does not have a direct bearing upon a country's in network trade.

The results for the intercept dummies for PRC, developing East Asian countries (excluding China) and ASEAN are statically significant with positive signs. By contrast, the coefficient of the dummy for the other developing countries is statistically significant with the negative sign. These estimates are consistent with the superior performance of countries in East Asia in global production sharing from a comparative global perspective. They also consistent with the inference of Athukorala (2009) relating to the complementarity (rather than competition) among these countries in their participation within global production networks. Among the three East Asia dummies, the coefficient of the dummy for ASEAN is much larger in magnitude (almost three times of tat of DCH and DEA). The explanation for this unique results for ASEAN lies perhaps in economic history, the early choice of the region (firstly Singapore and subsequently Malaysia and other countries) by MNEs as a location of outsourcing activities (Athukorala 2007). Moreover, rapid economic expansion for over three decades in a number of countries in the region has presumably brought about 'market thickness' (the economic depth of trading nations) which positively impact on the location of outsourcing activity.

In sum, the results of the regression analysis are consistent with the *a priori* views of the sources of East Asia's dominance in global network trade. First, the region is well placed to benefit from fragmentation-based specialisation countries in terms of relative wages. Second,

⁸ The differences are statistically significant at one-percent level or better.

relative cost advantage arising from these wage patterns seems to have been nicely complemented by the quality of trade related logistics. Third, ‘First comer’ advantage, and market thickness and agglomeration benefits evolved over a long period of time seems to have played a pivotal role. The latter two factors would have jointly brought about significant cost advantages in maintaining ‘services links’ in production networks in the region.

5. Production networks and Trade Patterns

We have already drawn attention to the importance of fragmentation-based trade in East Asia. We now examine the implications of this new form of international specialization for the relative importance of intra-regional versus global economic integration.

There is a vast literature on what may be termed ‘standard trade data analysis’ based on the traditional notion of horizontal specialisation 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.⁹ This evidence figures prominently in the current regional debate concerning the establishment of regional trading arrangements covering some or all countries in East Asia. Another implication of the highly publicized apparent trade integration in the region was the so called ‘decoupling’ thesis, which was a popular theme in the Asian policy circles in the first decade of the new millennium until the onset of the recent financial crisis.¹⁰ This thesis held that 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 seen that component trade has played a much more important role in trade expansion in East Asia compared to the rest of the world.

⁹ See for example Drysdale and Garnaut 1997; Frankel and Wei 1997; and Park and Shin 2009.

¹⁰ See Yoshitomi (2007) and Park and Shin (2009) and the works cited therein.

Conventional trade flow analysis can yield an unbiased picture of regional economic integration only if parts and components and final trade follow the same geographic patterns. If component trade has a distinct intraregional bias, as one would reasonably anticipate in a context of growing network trade in the region, then the conventional trade flow analysis is bound to yield a misleading picture in regards to the relative importance of intra-regional trade, as compared to global trade, for growth dynamism in the region. This is because growth based on assembly activities depends on the demand for final goods, which in turn depends on extra-regional growth.

Table 7 reports data on component intensity (percentage shares of parts and components) in bilateral flows of manufacturing trade. The data vividly show that components accounts for a much larger share in intra-regional trade in East Asia compared to these countries world trade and trade with EU and NAFTA. Moreover, the share of components in total intra-regional imports is much larger than in exports, and has increased at a faster rate; this reflects the fact that the region relies more on the rest of the world as a market for final goods than as a market for components. Within East Asia, ASEAN countries stand out for the high share of components in their intra-regional trade flows. The share of components in total intra-regional exports in ASEAN countries increased from 34.6% in 1992/3 to 61.4% in 2006/7. On the import side, the increase was from 75.3 per cent to 84.4 per cent. According to country-level data (not reported here, for brevity), the share of components in manufacturing exports and imports amounted to over four-fifths in Singapore, Malaysia and the Philippines and over two-thirds in Thailand. South Korea and Taipei, China are also involved in sizeable trade in components with the other countries in the region.

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 8. The table covers trade in East Asia 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% of total manufacturing trade, up from 53.2% 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. 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 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).

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, down from 50.3% 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 intraregional trade ratio (both measured using unadjusted data and data for final trade) has emanated largely from 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 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% of total East Asian manufacturing exports was absorbed within the region, compared to an intra-regional share of 64.4% in total manufacturing imports. For developing East Asia the comparable figures was 33.4% and 46.7% respectively.

This asymmetry is clearly seen across all sub-regions within East Asia. The asymmetry between intra-regional shares of import 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% in 1995 to 37% in 2007, whereas intra-regional import share increased from 56% to 63% between these two time points. The observed asymmetry in intra-regional trade in East Asia reflects the unique nature of the involvement of Japan and China in regional production networks.

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 policymaking rather than a regional one.

6. Production Networks and Trade Flows in the Crisis

A striking feature of the global economy following the onset of the on-going global financial crisis has been the precipitous drop in global trade at a faster rate than in the Great Depression (Eichengreen and O’Rourke 2009, Krugman 2009). From April 2008 to June 2009 world trade contracted by about 20% which amounted to almost the total contraction in world trade during the first thirty months (starting in April 1929) of the Great Depression.¹¹ Interestingly, trade contraction experienced by the East Asian countries during this period has been even greater than the contraction in world trade (Figure 3, Table 9).

Krugman (2009) points to the vertical integration of global production (the rise of globe production sharing) as a possible explanation for the surprisingly large trade contraction in the present crisis compared to the Great Depression. Vertical integration of production implies that a

¹¹ Numbers derived from Figure 4 in Eichengreen and O’Rourke 2009.

given degree of contraction in demand for a final (assembled) product has ramifications over trade flows from many other countries which are involved in the production chain. Given that global production sharing is much more important for trade expansion in East Asia compared to other countries this explanation also seems relevant for East Asia's greater trade contraction compared to overall trade contraction at the global level. However, there are also a number of other factors relevant for explaining larger contraction in trade volume in the current crisis. These include, much larger contraction of trade credit, a greater share of consumer durables in contemporary world trade compared to the 1930s, and the effect of recent advances in communication technology on inventory cycle and just-in-time procurement practices. The current state of data availability does not permit us to systematically delineate the impact of production sharing on trade contraction while appropriately controlling for these other possible factors. What we attempt to do in this section is to put together readily available data which have some bearing on this issue in order to set the stage for further analysis.

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 2008 (Table 10). The remarkably synchronized nature of the trade contraction across countries in the region, both on import and export sides, is generally consistent with close trade ties among the East Asian countries forged within regional production networks.

Among the East Asian countries Japan is by far the worst hit. A large share of Japan's exports consists of capital goods and high-end durable consumer goods, such as cars and electrical machinery, machine tools and their components. Exports of capital goods and high-end consumer durables are heavily concentrated in the US and other developed-country markets and therefore are directly exposed to the global economic decline. On the other hand, contrary to the predictions of the decoupling enthusiasts, Japan's growing exports to China have been indirectly affected by decline in final (assembled) exports from China (Fukao and Yuan 2009). The degree of export contraction suffered by Taiwan and Korea has been much smaller compared to Japan, but, on average, notably higher compared to the other East Asian countries. As in the case of Japan, growing exports to China does not seem to have provided a cushion against collapse in world demand for these two countries. The relatively lower degree of export contraction experienced by Korea, Taiwan and the second-tier exporting countries in the region compared to Japan could possibly reflect consumer preference for price-competitive low-end products in the crisis context.

An inspection of growth rates of exports by destination provides no support for the view that East Asian economies have become less susceptible to the world-wide trade contraction because of the regional growth dynamism. China's imports from most countries in the region have contracted at a much faster rate compared to exports, perhaps an indication of stocking of imported parts and components by Chinese firms given the gloomy outlook for exports. China's imports from Japan, Korea and Taiwan have shrunk more rapidly (at an average rate of 23.5%) than imports from other countries. This is not surprising, given the dominant role played by the former countries in the supply of parts and components to ICT assembly activities in China which are heavily exposed to contraction in import demand in the USA and other developed countries. Interestingly, intra-regional trade in East Asia has in general contracted at a faster rate compared to the regional trade with the USA and EU.

The data on export and import growth of China provide further evidence of the synchronized nature of the trade shock of the global economic crisis (Table 11). In the first quarter of 2009 China's exports to the USA contracted by 15.4% accompanied by contraction in exports to East Asia and the three sub-regions therein even at slightly higher rates (over 20%). China imports from most countries in the region have generally contracted at a much faster rate compared to exports, perhaps an indication of destocking of imported parts and components by Chinese firms given the gloomy market outlook for exports. Overall China's intra-regional imports have contracted at a much faster rate compared to her imports from the USA and EU.

The available data on trade growth of China and Singapore by major commodity category are reported in Tables 12 and 13. A notable pattern observable for manufacturing exports from these data is the relatively sharper contraction in the category of machinery exports (in which network trade is heavily concentrated) compared to other product categories, in particular traditional labour intensive products (textile and garments, footwear and other miscellaneous manufactures). Exports belonging to machinery and transport equipment category, in particular ICT products and electronics are predominantly consumer durables the demand for which is generally more susceptible to income contraction. In traditional labour intensive products, developing country producers have the ability to perform better purely on the basis of cost competitiveness even in a context of depressed demand.

Data on growth of manufacturing imports to the US are summarised in Table 14. A common pattern observable across the ten source countries covered is that component imports have generally contracted at a faster rate compared with total imports and final goods imports. This pattern is consistent with the view that in face of contraction in world demand, stock adjustment takes place at a faster rate in intermediate goods compared to final goods. The data also shows that the rate of contraction in final imports from China has been much smaller compared to the dramatic contraction in imports from Japan. This perhaps reflects the fact that under depressed market conditions consumers tend to substitute low-end products for high-end products. (To be expanded on)

7. Concluding remarks

Global production sharing has become an integral part of the economic landscape of East Asia. Trade within global production networks has been expanding more rapidly than conventional final-good trade. 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. A highly important recent development in international fragmentation of production has been the rapid integration of China into the regional production networks. This development 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 Asia 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. 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. China's emergence as a major trading power and an investment location is not a 'zero sum proposition' from the perspective of the region. Rather it seems to have added further dynamism to region-wide MNE operations.

Production fragmentation has certainly played a pivotal role in the continued dynamism of the East Asian economies and increasing intra-regional economic interdependence. This does not, however, mean that the process has contributed to lessening the region's dependence on the global economy. The high intra-regional trade shares reported in recent studies largely reflect rapidly expanding intra-regional trade in components. There is no evidence of rapid intra-regional trade integration in final products. In fact, the region's growth based on vertical specialisation

depends inexorably on its extra-regional trade in final goods, and this dependence has *increased* over the years. Extra-regional trade is likely to remain the engine of growth of the region in the foreseeable future. Put simply, growing trade in components has made the East Asian region increasingly reliant on extra-regional trade for its growth. This inference is basically consistent with the behavior of trade flows following the onset of the global financial crisis. 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. China has failed to provide cushion giants this export contraction as postulated by the decoupling thesis.

The rise of product fragmentation has strengthened the case for a global, rather than a regional, approach to trade and investment policymaking. 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.

In any case, It is doubtful whether FTA approach to trade liberalization is feasible in a context where global production networks are rapidly expanding, seamlessly encompassing many industries and countries. In reality, trade effect of any FTA would depend very much on the nature of rules of origin built into it. Trade-distorting effects of rules of origin are presumably more detrimental to network trade than to conventional final-goods trade, because of the inherent difficulties in defining the 'product' for duty exemption and because of the transaction costs associated with the bureaucratic supervision of the amount of value added in production coming from various sources. Formulating ROOs for network-related trade is rather complicated business. The conventional value-added criterion is not virtually applicable to this trade because the products involved are low-value added by their very nature. The only viable option is to go for 'change in tariff lines' based' ROOs, but this leads to insurmountable administrative problems because trade in electrical and electronics goods and the related parts and components belong to the same tariff codes at the HS-6 digit level, which is the normal base for designing this type of ROOs. Moreover, the process of global production sharing is characterized by continuous emergence of 'new' products. Given the obvious administrative problems involved in revising ROOs in tandem, emergence of new products naturally opens up room for unnecessary administrative delays and/or tweaking of rules as a means of disguised protection.

References

- Andeeton, Robert and Filippo di Mauro (2008), 'Globalisation and the trade Channels in the Euro Area', in in Filippo do Mauro, Stephanie Dees and Warwick McKibbin (eds.), *Globalisation, Regionalism and Economic Interdependence*, Cambridge: Cambridge University Press, 102-125.
- Antràs, P. (2005) 'Incomplete Contracts and the Product Cycle,' *American Economic Review*, 95(4), pp.1054-1073.
- Arvis, Jean-Francois, M. Mustra, J. Panzer, L. Ojala and T. Naula. (2007), *Connecting to Compete: Trade Logistics in the Global Economy: The Logistic Performance Index and Its Indicators*. Washington DC: World Bank.
- Athukorala, Prema-chandra. (2005) Product Fragmentation and Trade Patterns in East Asia. *Asian Economic Papers*, 4(3):1-27.
- Athukorala, Prema-chandra (2008) 'Singapore and ASEAN in the New Regional Division of Labour', *Singapore Economic Review* 53(3) 479-508.
- Athukorala, Prema-chandra. (2009), 'The Rise of China and East Asian Export Performance: Is the Crowding-out Fear Warranted?' *World Economy*, 32(2): 234–66.
- Athukorala, Prema-chandra and Nobuaki Yamashita (2008), 'Patterns and Determinants of Production Fragmentation in World Manufacturing Trade' in Filippo do Mauro, Stephanie Dees and Warwick McKibbin (eds.), *Globalisation, Regionalism and Economic Interdependence*, Cambridge: Cambridge University Press, 45-72.
- Athukorala, Prema-chandra, Nobuaki Yamashita (2009), 'Global Production Sharing and Sino-US Trade Relations', *China and World Economy*, 17(2), 39-56.
- Borras, Michael, Dieter Earnst and Stephen Haggard (2000), *International Production Networks in Asia: Rivalry or Riches?*. London: Rutledge.
- Brown, Clair and Greg Linden (2005), 'Offshoring in the Semiconductor Industry: A Historical Perspective', in Lael Brainard and Susan M. Collins (eds.), *The Brookings Trade Forum 2005: Offshoring White-Collar Work: The Issues and Implications* (pp.270-333). Washington DC: Brooking Institution Press.
- Dean, Judith, K.C. Fung and Zhi Wang (2008), 'Measuring the Vertical Specialization in Chinese Trade', *USITC Working Paper*, Washington, DC: U.S. International Trade Commission.
- Drysdale, Peter and Ross Garnaut. (1997) 'The Pacific: An Application of a General Theory of Economic Integration', in C. Fred Bergsten and Marcus Noland (eds), *Pacific Dynamism and the International Economic System*, Washington DC: Institute for International Economics, 183-224.
- Drucker, Peter (1977), 'The Rise of Production Sharing', *The Wall Street Journal*, March 15, p. 8.
- Eichengreen, Barry and Kevin O'Rourke (2009), 'A Tale of Two Depressions', 1 September, <http://www.voxeu.org/index.php?q=node/3421>
- Evans, Carolyn and James Harrigan (2003), 'Distance, Time and Specialization', *National Bureau of Economic Research (NBER) Working Paper 9729*, Cambridge, Mass: NBER.
- Feenstra, Robert (1998), 'Integration of Trade and Disintegration of production in the Global Economy', *Journal of economic Perspectives*, 14(4): 31-50.
- Feenstra, Robert C. (2008), *Óffshoring in the Global Economy (The Ohlin Lectures 2008)*, Stockholm School of Economics.
- Feenstra, RC, RE Lipsey, H Deng, AC Ma and H Mo (2005), 'World Trade Flows, 1962-2000', *National Bureau of Economic Research (NBER) Working Paper 11040*, Cambridge, MA: NBER. (<http://www.nber.org/papers/w11040>).

- Feenstra, Robert C., W. Hai, W. T. Woo and S. Uao (1999) 'Discrepancies in international trade data: an application to China–Hong Kong Entrepôt trade', *American Economic Review*, 89(2): 338–343.
- Frankel, Jeffrey A. and Wei, S-J. (1997) 'The New Regionalism and Asia: Impact and Policy Options', in Arvind Panagariya, M.G. Quibria and Narhari Rao (eds), *The Global Trading System and Developing Asia*, Oxford: oxford University Press, 83-130.
- Fukao, Kyoji, and Tangjun Yuan. 2009. Why is Japan so heavily affected by the global economic crisis? www.voxeu.org. 8 June.
- Gereffi, Gary, John Humphrey and Timothy Sturgeon (2005), 'The Governance of Global Value Chains. *Review of International Political Economy*, 12(1): 78-104.
- Gorg, H. (2000), Fragmentation and trade: US inward processing trade in the EU. *Weltwirtschaftliches Archiv*, 136 (3): 403-422.
- Grossman, Gene M. & Elhanan Helpman (2005), 'Outsourcing in a global economy', *Review of Economic Studies*, 72 (1):135-159.
- Helleiner, Gerand K. (1973), 'Manufactured Exports from Less-Developed Countries and Multinational Firms', *Economic Journal*, 83(329): 21-47.
- Helpman, Elhanan (2006), 'Trade, FDI, and the Organization of Firms', *Journal of Economic Literature*, 154: 589-630.
http://www.econ.ucdavis.edu/faculty/fzfeens/pdf/Feenstra_Ohlin_Lecture_2008.pdf
- Hummels, David, Jun Ishii and Kei-Mu Yi. (2001), 'The nature and growth of Vertical Specialization in World Trade', *Journal of International Economics*, 54(1): 75-96.
- Hummels, David. (2007) 'Transport Costs and International Trade in the Second Era of Globalization. *Journal of Economic Perspectives*, 21(2): 131-154.
- Jones, Ronald W. (2000), *Globalization and the theory of input trade*. Cambridge, Mass.: MIT Press.
- Jones, Ronald W. and H. Kierzkowski. (2001), 'Globalization and the consequences of international fragmentation', in R. Dornbusch, G. Calvo & M. Obstfeld (eds.), *Money, factor mobility and trade: the festschrift in honor of Robert A. Mundell* (pp. 365-381). Cambridge, Mass.: MIT Press.
- Carruthers, Robin, Jitendra N. Bajpai and David Hummels (2003), Trade and Logistics: An East Asian Perspective', n Hathie Krumn and Homi Kraras (eds.), *East Asia Integrates: A Trade Policy Agenda for Shares Growth*, Washington DC: World Bank.
- Kierzkowski, H. (2001), 'Joining the global economy: experience and prospects of the transition economies', in S.W. Arndt & H. Kierzkowski (eds.), *Fragmentation: New Production Patterns in the World Economy* (pp. 231-253). Oxford: Oxford University Press.
- Kimura, Fukunari (2006), 'International Production and Distribution Networks in East Asia: 18 Facts, Mechanics, and Policy Implications"', *Asian Economic Policy Review*, 1(1), 346-347.
- Krugman, Paul R. (2008), 'Trade and Wages, Reconsidered', *Brookings Papers on Economic Activity I: Macroeconomics*, 103- 138.
- Krugnam, Paul (2009), 'The Return of Depression Economics', Linoel Robbins Lectures (PPT presentation and th summary by Geoff Riley, 'Paul Krugman at LSE), http://cep.lse.ac.uk/_new/events/special_post.asp.
- McKendrick, D. G., Doner, R. F. & Haggard, S. (2000), *From Silicon Valley to Singapore: location and competitive advantage in the hard disk drive industry*. Stanford, Cal: Stanford University Press.
- Ng, F. and A.Yeats (2001), 'Production sharing in East Asia: who does what for whom, and why?', In L. K. Cheng & H. Kierzkowski (eds.), *Global production and trade in East Asia* (pp. 63-109). Boston: Kluwer Academic Publishers.

- Ng, F. and A. Yeats (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.
- Park, Y. C. and K. Shin (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), 107-140
- Quah, Danny T. (1997), 'Increasingly Weightless Economies', *Bank of England Quarterly Bulletin*, Feb.: 49-56.
- Rangan, S. and R. Lawrence (1999), *A prism on globalization*, Washington DC: Brookings Institution Press.
- Sharpton, Michael. (1975), 'International Subcontracting. *Oxford Economic Papers*, 27(1): 94-135.
- Spenser, Barbara J. (2005), 'International Outsourcing and Incomplete Contracts', *Canadian Journal of Economics*, 38(4): 1107-1135.
- Sturgeon, T.J. (2003), 'What Really goes on in Silicon Valley? Spatial clustering and dispersal in modular production networks. *Journal of Economic Geography*, 3: 199-225.
- USITC (United State International Trade Commission) 1999. *Production sharing: use of U.S. components and material in foreign assembly operations, 1995-1998*. USITC Publication 3265, Washington DC: USITC.
- Wong, Hpo Kam. (2007), 'The Remaking of Singapore's High-Tech Enterprise System', in Henry S. Rowen, Marguerite G. Hancock and Lilliam F. Miller (eds.), *Making IT: The Rise of Asian in High Tech* (pp.123-174). Stanford, CA: Stanford University Press.
- Yeats, Alexander (2001), 'Just How Big is Global Production Sharing?', in Seven Arndt and Henryk Kierzkowski (eds), *Fragmentation: New Production Patterns in the World Economy* (pp. 108-43). New York: Oxford University Press,
- Yi, K. (2003), 'Can vertical specialization explain the growth of world trade', *Journal of Political Economy*, 111 (1): 52-102.

Table 1: Geographic profile of world manufacturing trade: total trade and network trade**(a) Exports**

	Total manufacturing		Network products				Share of parts and components in network products (%)			
	1992/3	2006/07	Parts And components		Final assembly		Total		1992/3	2006/07
			1992/3	2006/07	1992/3	2006/07	1992/3	2006/07		
East Asia	28.3	34.0	29.6	42.8	34.1	37.5	32.2	40.3	39.0	56.5
Japan	12.3	7.2	15.2	9.1	20.8	9.9	18.4	9.5	35.0	51.3
Developing East Asia	16.0	26.8	14.4	33.7	13.3	27.6	13.8	30.9	44.3	58.1
PRC	4.5	14.3	1.7	13.5	2.4	15.7	2.1	14.5	35.0	49.4
Hong Kong, China	1.8	0.7	1.5	0.8	1.2	0.5	1.3	0.7	46.8	65.2
Taipei, China	2.9	2.5	3.7	4.0	2.0	2.2	2.7	3.2	58.4	67.2
Republic of Korea	2.3	3.4	2.2	5.6	2.0	3.7	2.1	4.7	45.0	63.5
ASEAN	4.5	6.0	5.2	9.8	5.8	5.5	5.6	7.8	39.9	66.9
Indonesia	0.6	0.6	0.1	0.5	0.1	0.5	0.1	0.5	40.3	56.1
Malaysia	1.2	1.7	1.7	3.4	1.9	1.8	1.8	2.6	40.5	68.1
Philippines	0.3	0.7	0.5	1.8	0.2	0.4	0.4	1.2	61.6	82.1
Singapore	1.5	1.4	2.3	2.6	2.6	1.0	2.5	1.9	38.7	74.1
Thailand	0.8	1.3	0.6	1.4	0.9	1.8	0.8	1.6	32.7	47.5
Vietnam	0.0	0.3	0.0	0.1	0.0	0.1	0.0	0.1	23.6	59.2
South Asia	0.9	1.3	0.1	0.4	0.1	0.2	0.1	0.3	44.1	72.7
India	0.6	1.0	0.1	0.4	0.1	0.2	0.1	0.3	47.2	73.5
Oceania	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	45.6	51.2
NAFTA	17.2	14.0	25.3	16.2	20.6	16.6	22.6	16.4	47.5	52.6
Mexico	1.2	2.2	2.7	2.8	1.5	3.8	2.0	3.3	57.7	45.1
EU15	41.3	35.4	39.2	29.3	35.3	31.4	37.0	30.3	44.9	51.5
Developed countries	72.4	56.6	76.7	52.7	78.6	56.1	77.8	54.3	41.8	51.7
Developing countries	27.6	43.4	20.8	46.8	22.9	44.4	22.0	45.7	40.1	54.6
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	42.4	53.2
	2651	8892	511	2409	696	2116	1207	4525		

(b) Imports

East Asia	21.7	23.7	30.1	36.6	14.3	18.1	21.0	28.1	61.2	70.3
Japan	4.1	3.5	4.0	3.8	3.0	3.3	3.4	3.5	49.9	57.7
Developing East Asia	17.6	20.3	26.1	32.8	11.2	14.9	17.6	24.5	63.4	72.1
PRC	2.9	7.1	3.0	11.5	1.5	6.0	2.2	9.0	59.3	69.0
Hong Kong, China	4.4	3.6	5.4	6.3	2.8	2.1	3.9	4.4	59.4	78.2
Taipei, China	2.1	1.6	3.1	2.3	1.4	1.2	2.1	1.8	62.1	69.9
Republic of Korea	2.0	2.2	3.1	2.5	1.1	1.6	1.9	2.1	67.4	64.8
ASEAN	6.2	5.8	11.5	10.2	4.4	4.0	7.4	7.3	66.1	74.9
Indonesia	0.8	0.4	1.1	0.3	0.3	0.3	0.6	0.3	74.7	58.0
Malaysia	1.4	1.3	3.0	2.4	1.1	1.2	1.9	1.9	66.7	69.4
Philippines	0.4	0.5	0.6	1.2	0.2	0.4	0.4	0.8	68.6	77.9
Singapore	2.3	2.1	4.8	4.5	2.0	1.5	3.2	3.2	64.6	77.7
Thailand	1.3	1.1	2.0	1.4	0.8	0.6	1.3	1.0	66.2	74.4
Vietnam	0.0	0.4	0.0	0.3	0.0	0.2	0.0	0.2		66.2
South Asia	0.9	1.3	0.7	1.1	0.4	0.9	0.6	1.0	56.4	59.1
India	0.5	1.1	0.4	0.9	0.2	0.8	0.3	0.8	62.2	57.4
NAFTA	16.6	18.6	31.8	19.6	8.5	17.9	18.5	18.8	73.7	56.3
Mexico	1.8	2.4	2.7	3.2	1.0	2.0	1.7	2.6	67.4	65.5
EU15	42.0	35.2	45.5	29.9	7.5	15.9	23.8	23.5	81.9	68.8
Developed countries	71.4	61.1	82.7	52.3	68.8	66.8	74.7	59.0	47.3	47.8
Developing countries	28.6	38.9	17.3	47.7	31.2	33.2	25.3	41.0	29.3	62.8
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	42.8	54.0
	2627	8813	514	2409	687	2055	1201	4464		

Source: data compiled from UN Comtrade database.

Table 2: Share of Network products in Manufacturing Trade, 1992/3 and 2006/7 (%)

	Parts and components		Final assembly		Total Network products	
	1992/3	2006/7	1992/3	2006/7	1992/3	2006/7
(a) Exports						
East Asia	20.2	34.1	31.6	26.2	51.8	60.3
Japan	23.9	34.4	44.5	32.6	68.4	67.0
Developing East Asia	17.3	34.0	21.8	24.5	39.1	58.5
PRC	7.4	25.6	13.7	26.2	21.1	51.8
Hong Kong, China	15.8	33.3	18.0	17.8	33.8	51.1
Taipei, China	24.7	44.2	17.6	21.6	42.3	65.8
Republic of Korea	18.1	44.2	22.2	25.4	40.3	69.5
ASEAN	22.7	44.2	34.1	21.9	56.8	66.1
Indonesia	3.8	21.5	5.6	16.8	9.3	38.4
Malaysia	27.7	53.6	40.7	25.1	68.4	78.8
Philippines	32.9	71.7	20.5	15.6	53.4	87.3
Singapore	29.0	49.3	45.9	17.2	74.9	66.5
Thailand	14.1	29.9	29.0	33.0	43.1	62.9
Vietnam	---	11.0	---	7.6	---	18.5
South Asia	2.3	8.2	2.9	3.1	5.1	11.3
India	3.0	10.4	3.4	3.8	6.4	14.2
NAFTA	28.4	31.2	31.4	28.1	59.7	59.3
Mexico	42.1	34.6	30.8	42.1	72.9	76.6
EU15	18.3	22.4	22.4	21.1	40.7	43.5
Developed countries	20.4	25.2	28.5	23.6	48.9	48.8
Developing countries	14.6	29.2	21.8	24.3	36.4	53.6
World	19.3	27.1	26.3	23.8	45.5	50.9

	Parts and components		Final assembly		Total Network products	
	1992/3	2006/7	1992/3	2006/7	1992/3	2006/7
(b) Imports						
East Asia	27.2	42.1	17.2	17.8	44.4	59.9
Japan	19.3	29.9	19.3	21.9	38.6	51.7
Developing East Asia	29.0	44.2	16.7	17.1	45.8	61.3
PRC	20.4	44.0	14.0	19.8	34.4	63.7
Hong Kong, China	24.1	48.5	16.5	13.5	40.6	62.1
Taipei, China	29.5	38.9	18.0	16.8	47.5	55.7
Republic of Korea	30.1	31.9	14.6	17.4	44.7	49.3
ASEAN	36.0	47.9	18.4	16.1	54.4	64.0
Indonesia	27.0	21.8	9.2	15.8	36.1	37.7
Malaysia	40.5	50.0	20.2	22.0	60.7	72.0
Philippines	32.6	61.3	15.0	17.4	47.6	78.6
Singapore	39.9	60.4	21.9	17.3	61.8	77.7
Thailand	30.6	36.1	15.6	12.4	46.2	48.5
Vietnam	---	19.1	---	9.7	---	28.8
South Asia	16.6	23.8	12.9	16.5	29.5	40.3
India	17.5	22.9	10.6	17.0	28.1	39.9
NAFTA	37.4	28.8	13.4	22.4	50.7	51.2
Mexico	29.4	36.1	14.2	19.0	43.7	55.1
EU15	21.2	23.2	4.7	10.6	25.9	33.8
Developed countries	22.6	23.4	25.2	25.5	47.8	48.9
Developing countries	11.9	33.6	28.6	19.9	40.4	53.4
World	19.6	27.3	26.2	23.3	45.7	50.7

... Data not available

Source: Compiled from UN Comtrade database.

Table 3: Commodity composition of network trade, 2006/7 (%)

	EA	Japan	DEA	China	TW+K	ASEAN	Malaysia	NAFTA	Mexico	EU15	World
(a) Parts and component exports											
Chemicals (SITC 5)	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.3	0.1	0.5	0.3
Resource based products (SITC 6 - SITC 68)	2.0	3.5	1.6	2.0	1.6	1.0	0.5	3.9	3.3	5.4	3.7
Machinery and transport equipment (SITC 7)	93.7	91.1	94.4	93.8	93.4	96.6	98.0	89.5	87.2	87.3	90.7
Power generating machines (71)	3.1	7.5	1.9	2.2	1.7	1.7	0.3	17.1	10.3	12.9	9.2
Specialized industrial machine (72)	3.8	6.7	3.0	3.6	1.7	3.5	3.3	5.0	2.2	6.8	5.0
Metal working machine (73)	0.5	1.2	0.4	0.4	0.5	0.2	0.1	0.7	0.1	1.4	0.9
General industrial machinery (74)	2.3	3.3	2.0	2.8	1.3	1.7	1.0	4.6	4.3	6.8	4.2
ICT products	67.1	43.9	73.3	67.6	76.7	78.8	87.1	30.2	31.3	26.3	45.8
Office machines and automatic data processing machines (75)	12.2	6.5	13.7	17.6	8.5	13.3	16.5	4.6	2.8	3.8	7.7
Telecommunication and sound recording equipment (76)	18.9	8.4	21.8	30.2	19.1	12.8	18.4	7.4	16.0	8.8	13.2
Semiconductors and semiconductor devices (772+776)	36.0	29.0	37.9	19.9	49.1	52.6	52.1	18.2	12.5	13.6	24.9
Electrical goods (77 - 772 - 776)	10.7	13.8	9.9	13.4	6.4	7.9	5.1	12.0	20.8	10.0	11.3
Road vehicles (78)	5.7	13.3	3.7	3.5	5.3	2.5	1.0	14.6	17.5	19.0	11.9
Other transport equipment (79)	0.5	1.4	0.3	0.2	0.3	0.3	0.1	5.3	0.5	4.2	2.5
Miscellaneous manufacturing (SITC 8)	4.2	5.1	3.9	4.0	5.0	2.3	1.5	6.3	9.5	6.8	5.3
Professional and scientific equipment (87)	1.0	1.9	0.8	1.1	0.4	0.6	0.3	0.2	0.0	0.6	0.7
Photographic apparatus (88)	0.7	0.8	0.7	0.7	0.5	0.6	0.2	1.5	0.6	2.9	1.6
Total	100	100	100	100	100	100	100	100	100	100	100
US\$ billion	1032	220	812	324	232	233	82	390	67	706	2409
(b) Parts and component imports											
	EA	Japan	DEA	China	TW+K	ASEAN	Malaysia	NAFTA	Mexico	EU15	World
Chemicals (SITC 5)	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.3	0.5	0.4	0.3
Resource based products (SITC 6 - SITC 68)	1.7	2.7	1.6	1.9	1.9	1.6	1.2	4.3	4.7	4.5	3.7
Machinery and transport equipment (SITC 7)	94.0	90.4	94.4	93.7	93.0	95.6	95.9	89.9	90.4	88.7	90.7
Power generating machines (71)	3.9	8.2	3.4	2.9	3.6	4.4	3.1	11.8	8.3	12.1	9.2
Specialized industrial machine (72)	3.7	4.8	3.5	2.4	3.7	6.0	1.7	4.7	1.6	5.9	5.0
Metal working machine (73)	0.7	1.0	0.6	0.8	1.0	0.5	0.5	0.8	0.8	1.0	0.9
General industrial machinery (74)	1.9	3.9	1.6	1.4	2.3	2.0	1.4	4.3	3.5	5.9	4.2
ICT products	67.3	53.3	68.9	72.5	68.9	58.6	59.6	37.1	46.7	32.8	45.8
Office machines and automatic data processing machines (75)	8.7	7.4	8.8	6.7	4.6	9.7	12.9	7.8	5.7	7.6	7.7

Telecommunication and sound recording equipment (76)	11.2	11.8	11.1	10.0	5.9	8.9	5.9	14.7	18.8	11.8	13.2
Semiconductors and semiconductor devices (772+776)	47.4	34.1	48.9	55.7	58.4	40.0	40.8	14.6	22.2	13.4	24.9
Electrical goods (77 - 772 - 776)	12.2	11.4	12.3	9.3	9.0	18.8	26.7	10.9	12.7	9.7	11.3
Road vehicles (78)	3.3	6.0	3.0	3.7	3.9	3.3	2.2	17.5	16.0	17.6	11.9
Other transport equipment (79)	1.1	1.9	1.0	0.7	0.8	2.1	0.8	2.7	0.7	3.7	2.5
Miscellaneous manufacturing (SITC 8)	4.1	6.8	3.8	4.2	5.0	2.6	2.8	5.5	4.4	6.4	5.3
Professional and scientific equipment (87)	0.9	1.4	0.9	0.7	0.8	0.7	0.5	0.5	0.2	0.7	0.7
Photographic apparatus (88)	0.8	1.1	0.8	0.8	0.9	0.5	0.4	1.0	1.0	2.3	1.6
Total	100	100	100	100	100	100	100	100	100	100	100
US\$ billion	881	91	790	276	116	238	58	473	77	720	2409
	EA	Japan	DEA	China	TW+K	ASEAN	Malaysia	NAFTA	Mexico	EU15	World
(c) Network product (parts and components + assembly) exports											
Chemicals (SITC 5)	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.2	0.0	0.2	0.2
Resource based products (SITC 6 - SITC 68)	1.2	1.8	0.9	1.0	1.0	0.7	0.3	2.1	1.5	2.8	2.0
Machinery and transport equipment (SITC 7)	89.7	87.5	90.3	91.6	84.0	94.7	95.9	86.0	88.1	87.9	88.1
Power generating machines (71)	1.8	3.8	1.1	1.1	1.1	1.2	0.2	9.0	4.6	6.6	4.9
Specialized industrial machine (72)	2.1	3.5	1.7	1.8	1.1	2.3	2.2	2.6	1.0	3.5	2.7
Metal working machine (73)	0.3	0.6	0.2	0.2	0.3	0.1	0.0	0.4	0.0	0.7	0.5
General industrial machinery (74)	1.3	1.7	1.2	1.4	0.9	1.2	0.7	2.4	2.0	3.5	2.3
ICT products	60.5	33.2	68.9	69.2	59.7	78.3	86.8	27.6	36.6	22.9	41.1
Office machines and automatic data processing machines (75)	19.6	8.2	23.1	29.0	8.7	27.0	29.7	7.2	7.1	7.6	12.4
Telecommunication and sound recording equipment (76)	18.7	9.0	21.7	28.3	16.1	14.9	20.7	9.6	23.8	7.9	13.1
Semiconductors and semiconductor devices (772+776)	22.2	16.0	24.2	11.8	34.9	36.4	36.4	10.8	5.8	7.5	15.7
Electrical goods (77 - 772 - 776)	9.7	8.1	10.2	14.2	6.1	6.4	4.7	8.2	14.3	8.5	9.3
Road vehicles (78)	12.7	35.0	5.9	3.2	12.6	4.4	0.9	26.5	29.2	36.4	23.0
Other transport equipment (79)	1.3	1.6	1.2	0.7	2.3	0.9	0.3	9.3	0.3	5.7	4.4
Miscellaneous manufacturing (SITC 8)	9.1	10.6	8.7	7.3	14.9	4.6	3.7	11.8	10.4	9.1	9.8
Professional and scientific equipment (87)	5.5	5.8	5.4	4.0	11.0	2.6	2.6	8.2	5.9	5.9	6.3
Photographic apparatus (88)	2.3	3.6	1.9	2.4	1.2	1.3	0.5	1.3	0.6	1.8	2.1
Total	100	100	100	100	100	100	100	100	100	100	100
US\$ billion	1826	428	1398	656	359	348	120	739	147	1366	4517

	EA	Japan	DEA	China	TW+K	ASEAN	Malaysia	NAFTA	Mexico	EU15	World
(d) Network product (parts and components + assembly) Imports											
Chemicals (SITC 5)	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.4	0.2	0.2
Resource based products (SITC 6 - SITC 68)	1.2	1.5	1.2	1.3	1.3	1.2	0.8	2.4	3.1	2.2	2.0
Machinery and transport equipment (SITC 7)	85.5	82.5	85.9	80.8	81.0	92.4	93.0	87.4	84.7	89.1	88.1
Power generating machines (71)	2.7	4.7	2.4	2.0	2.4	3.2	2.2	6.7	5.4	6.0	5.0
Specialized industrial machine (72)	2.6	2.8	2.6	1.6	2.4	4.5	1.2	2.7	1.1	2.9	2.7
Metal working machine (73)	0.5	0.6	0.5	0.5	0.7	0.4	0.4	0.5	0.5	0.5	0.5
General industrial machinery (74)	1.3	2.3	1.2	1.0	1.5	1.5	1.0	2.4	2.3	2.9	2.3
ICT products	59.8	48.0	61.5	59.5	55.0	59.2	62.6	35.9	41.1	32.1	40.6
Office machines and automatic data processing machines (75)	12.6	15.8	12.1	10.8	7.7	12.9	12.7	10.8	9.4	12.8	12.3
Telecommunication and sound recording equipment (76)	11.3	12.5	11.2	8.9	7.1	8.7	5.7	16.3	15.4	12.3	13.1
Semiconductors and semiconductor devices (772+776)	35.9	19.7	38.2	39.8	40.2	37.5	44.2	8.8	16.3	7.0	15.2
Electrical goods (77 - 772 - 776)	10.4	11.2	10.3	8.1	10.8	14.1	18.5	10.8	11.4	8.9	9.4
Road vehicles (78)	4.9	9.3	4.3	4.9	5.0	4.9	3.8	25.3	21.7	30.4	23.3
Other transport equipment (79)	3.2	3.7	3.1	3.2	3.1	4.7	3.4	3.1	1.2	5.4	4.4
Miscellaneous manufacturing (SITC 8)	13.2	15.9	12.8	17.7	17.6	6.3	6.1	10.0	11.9	8.5	9.8
Professional and scientific equipment (87)	8.3	9.5	8.1	13.5	9.4	3.7	3.7	6.2	8.5	5.1	6.1
Photographic apparatus (88)	3.2	3.9	3.1	2.4	6.1	1.6	1.1	1.8	1.4	2.0	2.2
Total	100	100	100	100	100	100	100	100	100	100	100
US\$ billion	1254	158	1096	401	173	320	83	839	117	1453	4455

Table 4: Hourly Compensation Cost of Manufacturing Production Workers in selected countries relative to the USA level (%) (Two-year averages)

	1989/90	1999/00	2006/7
PRC	...	2.9	3.2 ¹
Hong Kong SAR	20.6	27.7	23.7
Japan	85.0	107.6	81.5
Indonesia ⁴	2.2	2.9	3.1 ³
Korea, Republic of	22.8	39.2	62.6
Malaysia ⁴	6.7	7.9	7.5 ³
Philippine	5.0 ²	3.9	4.3
Singapore	23.9	37.0	34.9
Thailand ⁴	3.9	6.0	6.2
Taiwan	25.4	28.6	27.0
Vietnam ⁴	...	1.2	1.1 ³
Brazil		17.62	22.4
Mexico	10.0	9.9	10.6
Czech Republic	...	14.8	20.7
Hungary	...	14.5	29.0
Ireland	79.0	72.9	112.3
Memo item			
USA, hourly compensation \$	14.61	19.51	24.4

Notes:

- 1 Average for 2005 and 2006.
- 2 Average for 1991 and 1992.
- 3 Average for 2004 and 2005.
- 4 Estimates based on annual wage.
- ... Data not available.

Source: US Bureau of Labor Statistics website (ftp.bls.gov) and ILO, Yearbook of Labor Statistics (for estimates for Malaysia, Thailand and Indonesia)

Table 5: World Bank Logistic Performance Index and its Composite Indices (circa 2006)

Country	Sub Indices							Composite index	
	Customs	Infra-Structure	International shipments	Logistics competence	Tracking & tracing	Domestic logistics	Timeliness	Index	Global ranking ²
Korea, Rep.	3.2	3.4	3.4	3.6	3.6	2.7	3.9	3.5	25
PRC	3.0	3.2	3.3	3.4	3.4	3.0	3.7	3.3	30
Hong Kong, SAR	3.8	4.1	3.8	4.0	4.1	2.7	4.3	4.0	8
Indonesia	2.7	2.8	3.1	2.9	3.3	2.8	3.3	3.0	43
Malaysia	3.4	3.3	3.4	3.4	3.5	3.1	4.0	3.5	27
Philippines	2.6	2.3	2.8	2.7	2.7	3.3	3.1	2.7	65
Singapore	3.9	4.3	4.0	4.2	4.3	2.7	4.5	4.2	1
Thailand	3.0	3.2	3.2	3.3	3.3	3.2	3.9	3.3	31
Vietnam	2.9	2.5	3.0	2.8	2.9	3.3	3.2	2.9	53
Memorandum Items									
Hi High income countries	3.45	3.66	3.52	3.64	3.71	2.58	4.05	3.67	
Upper middle income countries	2.64	2.7	2.84	2.8	2.83	2.94	3.31	2.85	
Lower middle income	2.31	2.27	2.48	2.4	2.45	3.01	2.93	2.47	
Low income	2.12	2.06	2.32	2.29	2.25	2.99	2.71	2.29	
Europe	2.39	2.39	2.61	2.53	2.55	2.97	3.04	2.59	
Latin America & Caribbean	2.38	2.38	2.55	2.52	2.58	2.97	3.02	2.57	
Sub-Saharan Africa	2.21	2.11	2.36	2.33	2.31	2.98	2.77	2.35	

Note: (1) This is based on a worldwide survey of the global freight forwarders and express carriers complemented by a number of qualitative and quantitative indicators of the domestic logistics environment, institutions, and performance of supply chains. Logistic quality of the individual countries covered are assessed using a 5-point scale (1 for the worst performance and 5 for the best) focusing on seven areas of performance are: (a) efficiency of the clearance process by customs and other border agencies; (b) quality of transport and information technology infrastructure; (c) Ease and affordability of arranging international shipments; (d) Competence of the local logistics industry; (e) ability to track and trace international shipments, (f) domestic logistic costs, (g) timeliness of shipment in reaching destination. The composite LPI index has been constructed by combining the seven sub indices using the principal component analysis. (2) Ranking (in descending order) among 150 countries

Source: Arvis et al (2007)

**Table 6: Determinants of Manufacturing trade
(Random Effects estimate)¹**

	<i>Total</i>	<i>Parts and</i>	<i>Final</i>
		<i>components</i>	
World income	+0.82 (15.55)***	+0.62 (11.87)***	+0.82 (15.47)***
Per capita GNP	+0.23 (4.66)***	+0.56 (9.90)***	+0.21 (4.20)***
Real exchange rate	+ 0.12 (1.56)*	+0.06 (0.59)***	+0.05 (0.26)***
Logistic performance index	+1.27 (6.71)***	+1.80 (7.24)***	+1.29 (5.88)***
Relative wage	-0.25 (2.65)***	-0.24 (2.57)*	-0.34 (6.99)***
Distance to export markets	-0.79 (13.77)***	-0.82 (12.12)***	-0.79 (13.97)***
PRC dummy	+1.61 (4.41)***	+2.25 (4.92)***	+1.57 (4.01)***
ASEN dummy	+2.61 (3.43)***	+3.25 (3.95)***	+2.57 (3.23)***
DEA dummy	+1.28 (10.77)***	+1.57 (14.37)***	+1.25 (9.32)***
DODC dummy	-0.26 (1.76)*	-0.17 (0.87)	-0.27 (1.82)*
Constant term	-9.58 (7.02)***	-9.28 (6.13)****	-9.73 (6.48)***
Number of observation	656	656	656
Number of countries	41	41	41
R-sq	0.76	0.80	0.75
F	233.14	342.84	236.47
Root MSE	1.48	1.69	1.49

1. T-ratios of regression coefficients (based on robust standard errors) are given in brackets, with the level of statistical significance is denoted as: *** one percent, ** five percent and * ten percent.

Country coverage:

Argentina	Costa Rica	India	Mexico	Russian Federation	Switzerland
Australia	Czech Rep.	Indonesia	Netherlands	Singapore	Thailand
Austria	Denmark	Ireland	Norway	Slovakia	Turkey
Belgium	Finland	Israel	Philippines	Slovenia	United Kingdom
Brazil	France	Italy	Poland	South Africa	USA
Canada	Germany	Japan	Portugal	Spain	
China	Hungary	Malaysia	Rep. of Korea	Sweden	

Table 7: Share of parts and components in bilateral trade flows, 2006/7 (%)

Reporting country		EA	Japan	DEA	PRC	ASEAN	NAFTA	EU15	World
(a) Exports									
East Asia (EA)	1992/3	23.6	13.9	24.9	18.5	32.1	21.1	17.7	20.2
	2006/7	47.6	32.9	50.1	51.6	54.5	25.1	24.1	34.1
Japan	1992/3	28.9	0.0	28.9	18.9	31.4	25.5	20.9	23.9
	2006/7	42.0	0.0	42.0	41.5	47.9	31.5	30.4	34.4
Developing East Asia (DEA)	1992/3	20.1	13.9	21.6	17.8	32.8	17.0	14.7	17.3
	2006/7	48.1	33.4	53.9	0.0	65.2	22.7	21.6	34.0
PRC	1992/3	8.7	6.0	9.4	0.0	14.6	5.8	6.0	7.4
	2006/7	36.2	25.2	40.6	0.0	49.1	17.1	16.3	25.6
Korea	1992/3	19.2	15.6	21.0	9.5	25.6	20.6	16.3	18.1
	2006/7	61.9	51.5	63.5	57.3	63.7	36.6	26.8	44.2
Taipei, China	1992/3	24.1	19.5	25.3	22.8	29.8	23.9	31.9	24.7
	2006/7	51.5	59.0	50.5	39.5	61.2	35.0	37.6	44.2
ASEAN	1992/3	29.4	18.0	32.6	7.7	34.6	21.1	17.3	22.7
	2006/7	58.2	39.9	61.4	64.0	56.0	32.1	33.9	44.2
NAFTA	1992/3	30.0	26.7	31.5	15.7	36.8	29.0	30.4	28.4
	2006/7	46.7	36.5	49.8	34.8	67.9	28.8	30.6	31.2
EU15	1992/3	17.4	10.0	20.5	20.0	24.3	23.1	18.4	18.3
	2006/7	31.4	18.7	34.8	30.4	46.5	22.1	22.0	22.4
(b) Imports									
East Asia (EA)	1992/3	35.5	43.5	30.3	8.2	49.8	42.8	23.3	27.2
	2006/7	51.7	48.8	52.8	34.8	68.3	54.7	33.1	42.1
Japan	1992/3	19.3	0.0	19.3	5.2	28.1	35.2	12.3	19.3
	2006/7	34.2	0.0	34.2	23.1	44.9	41.0	18.9	29.9
Developing East Asia (DEA)	1992/3	37.8	43.8	32.9	9.0	55.6	45.3	27.7	29.0
	2006/7	55.5	47.7	59.5	0.0	74.3	40.3	31.7	44.2
China	1992/3	24.6	25.0	23.7	0.0	11.5	19.7	23.5	20.4
	2006/7	55.2	47.5	59.2	0.0	74.0	40.1	31.6	44.0
Korea	1992/3	36.1	35.2	38.8	5.5	45.2	35.3	16.5	30.1
	2006/7	33.0	26.6	38.1	26.1	55.7	38.9	22.9	31.9
Taiwan	1992/3	37.2	36.5	39.4	6.6	44.4	29.9	19.8	29.5
	2006/7	46.7	33.8	58.3	44.1	68.8	40.2	28.0	38.9
ASEAN10	1992/3	41.6	40.6	42.6	11.9	50.4	45.2	28.0	36.0
	2006/7	50.3	47.2	51.4	40.1	55.9	67.5	41.7	47.9
NAFTA	1992/3	36.5	44.1	29.5	6.3	41.2	47.6	35.5	37.4
	2006/7	29.4	39.3	26.0	17.7	40.5	36.3	25.1	28.8
EU15	1992/3	22.2	26.1	18.5	4.7	24.3	36.0	20.5	21.2
	2006/7	25.0	33.6	22.8	14.9	37.9	34.1	22.1	23.4

Source: Compiled from UN Comtrade database.

Table 8: Intra-regional shares of Manufacturing Trade: Total, Parts and Components, and Final Trade (%), 1992/3 and 2006/07

	East Asia	Developing East Asia	ASEAN	NAFTA	EU15
Total manufacturing					
Exports	47.2	38.2	20.7	44.4	61.2
1992/3	43.9	33.4	18.4	48.1	56.9
2006/7					
Imports					
1992/3	58.2	34.9	15.5	36.3	64.1
2006/7	64.4	46.7	20.8	32	57.9
Trade (exports + imports)					
1992/93	53.2	36.5	17.8	39.9	62.6
2006/7	55.1	40	20.1	38.4	57.4
Parts and components					
Exports					
1992/3	50.2	42.6	30.3	43.5	62.3
2006/7	61.1	53.9	25.4	46.9	55.9
Imports					
1992/3	65.9	35.3	20.2	39.5	58
2006/7	66.9	50.9	22.9	39.9	55.2
Trade					
1992/3	57.7	38.7	24.2	41.4	60.1
2006/7	62.9	52.1	23.1	43.2	55.5
Final goods					
Exports					
1992/3	46.6	36.8	16.1	44.7	60.9
2006/7	36.9	28.3	15.9	48.7	57
Imports					
1992/3	55.4	34.7	12.9	35.3	65.6
2006/7	63.0	42.8	20.6	30.2	58.5
Trade					
1992/3	50.3	35.7	14.3	39.4	63.2
2006/7	44.4	34.1	18.1	37.3	57.7

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

Table 9: Growth of total merchandise exports and imports, 2007Q1–2009Q1
(Year-on-year % change)¹

	2008Q1	2008Q2	2008Q3	2008Q4	2009Q1	2009Q2
Exports						
East Asia (EA)	20.6	21.0	19.3	-5.6	-30.1	-32.5
Developing EA	19.0	21.3	19.9	-4.7	-26.6	-27.2
ASEAN	18.9	26.9	22.9	-10.3	-36.8	-39.3
Japan	22.9	16.4	15.2	-8.1	-42.1	-41.1
HK	10.5	8.3	5.7	-2.1	-21.0	-23.4
China	21.1	22.4	23.0	4.6	-20.1	-22.7
Korea	17.4	23.2	27.1	-9.9	-24.5	-20.1
Taiwan	17.4	18.2	7.6	-24.6	-35.9	-28.3
Indonesia	31.9	29.4	27.9	-5.3	-32.5	-33.2
Malaysia	19.4	28.5	21.6	-12.6	-27.6	-28.2
Philippines	-2.0	-0.6	2.0	-22.3	-33.9	-36.3
Singapore	21.7	26.4	21.2	-12.9	-30.7	-31.2
Thailand	25.5	25.5	27.2	-10.2	-23.0	-24.4
Viet Nam	27.7	31.8	37.5	6.0	-14.8	-11.7
India	37.9	37.4	24.7	-8.0	-19.8	-20.2
Imports						
East Asia (EA)	29.6	29	29.8	-4.1	-32.5	-33.1
Developing EA	29	28.9	26.6	-8.0	-32.1	-34.2
ASEAN	37.9	36.2	32.6	-5.0	-37.2	-36.7
Japan	25.6	26.8	35.8	8.3	-29.0	-28.5
Hong Kong	12.0	9.6	7.0	-4.0	-20.8	-22.3
China	29.4	32.9	25.9	-8.0	-30.8	-31.7
Korea	29.0	30.5	42.9	-8.8	-32.8	-35.6
Taiwan	26.1	19.2	20.3	-21.9	-45.9	-46.3
Indonesia	91.6	96.1	82.3	33.3	-35.9	-36.2
Malaysia	16.1	17.3	14.5	-17.1	-36.8	-36.1
Philippines	22.1	8.4	4.5	-23.4	-30.3	-31.3
Singapore	32.1	35.4	32.9	-9.3	-30.0	-28.1
Thailand	39.6	25.7	37.8	3.8	-39.7	-40.5
Vietnam	69.0	61.0	22.8	-8.2	-36.5	-34.1
India	52.2	36.8	53.5	6.9	-21.6	-23.2

¹ Growth rates calculated using current US\$ values.

Source: Compiled from CIEM database

Table 10: Export growth by destination region/country, 2007Q1- February 2009
(Year-on-year %)²

	East Asia	Japan	DEA ²	PRC	ASEAN	US	EU	World
East Asia (EA)								
2008Q1	18.1	15	18.8	17.8	23.8	16.8	-1.5	20.6
2008Q2	19.6	16	20.8	22.8	25.1	15.8	5.4	21.0
2008Q3	16.5	18.4	17.4	14.5	21.5	14.3	5.8	19.3
2008Q4	-9.6	5.9	-12.6	-17	-10.1	-5.9	-8	-5.6
2009Q1								-29.6
2009Q2								-27.5
2009July								-27.6
Developing EA								
2008Q1	17.2	14.6	16.7	17.2	21.8	15.2	-1.9	19
2008Q2	20.6	16.8	20.2	23.5	24.5	16.9	5.1	21.3
2008Q3	17.4	19.6	16.7	13.5	21.4	15.5	5.7	19.9
2008Q4	-9.2	9.2	-13.6	-16.3	-11.8	-3.8	-7.7	-4.7
2009Q1								-24.2
2009Q2								-25.3
2009July								-24.3
ASEAN								
2008Q1	15.9	21.9	13.6	12.4	15.9	4.4	-10.3	21.7
2008Q2	22.2	19	22.4	31	22.8	3.4	-1.2	25.5
2008Q3	19.2	23.5	18.4	23.5	18.8	3.9	-6.6	22.1
2008Q4	-10.4	16.3	-16.2	-17	-15.8	-12.4	-18.5	-11.9
2009Q1								-31.0
2009Q2								-31.7
2009July								-28.7
Japan								
2008Q1	24.9		24.4	24.5	31.9	7.9	23.9	22.9
2008Q2	20.5		19.8	26	24.9	1.4	10.2	16.4
2008Q3	19.7		19.7	21.4	24.2	-4.6	8.3	15.2
2008Q4	-7.1		-7.3	-4.7	3.6	-16.2	-16.1	-8.1
2009Q1	-43.2		-43.5	-41.5	-37.7	-49.8	-43.9	-44.4
2009Q2	-45.8		-45.8	-39	-51.5	-58	-54.2	-34.9
2009July								-39.3
Hong Kong, China								

2009July									-23.7
Malaysia									
2008Q1	12.9	25.2	9.7	13.8	13.9	2.9	-17.6	19.4	
2008Q2	28.2	23.9	28.6	55.2	23.4	-3.7	-0.3	28.5	
2008Q3	23.9	27.2	23.6	38	21	1.2	-9.5	21.6	
2008Q4	-5.8	43.6	-16.7	-18.3	-15.2	-14.2	-22.1	-12.6	
2009Q1	-27.8	-3.6	-34.8	-33.3	-38.5	-29.3	-33.1	-28.7	
2009Q2	-11.1	-1	-12.5	6.9	-21.1	-35.5	-31.5	-35.4	
2009July									-33.7
Philippines									
2008Q1	0.8	12.4	-2.6	1.5	-0.9		3.3	-2	
2008Q2	5.9	13.5	3.9	14.1	-6.8		3.8	-0.6	
2008Q3	6.4	8.5	5.8	3.5	3.6		-4.6	2	
2008Q4	-24.5	-12	-28.6	-35.3	-39.8		-18.3	-22.4	
2009Q1	-50.4	-38.3	-54.4	-67.6	-53.6		-33.6	-30.4	
2009Q2									-19.7
2009July									-9.7
Singapore									
2008Q1	23.4	28.8	21.4	8.7	22.6	9.7	-3.3	21.7	
2008Q2	27.4	31.8	26.6	23.4	31	25.1	-5	26.4	
2008Q3	21	14.8	22	21	23.8	12.6	-10.6	21.2	
2008Q4	-16.8	-8.3	-17.8	-19.3	-17.8	-12.8	-19.3	-12.9	
2009Q1	-45.2	-35.1	-46.9	-53.4	-47.4	-22.4	-47.3	-31.9	
2009Q2	-29.3	-37.8	-27.6	-19.2	-33.2	-34.8	-46.5	-33.0	
2009July									-29.9
Thailand									
2008Q1	23.7	9.5	27.9	26	32.6	19	10.2	25.5	
2008Q2	27.9	18.8	30.5	22.9	42.9	11.6	7.6	25.5	
2008Q3	24.8	23.3	25.4	15.8	37.5	15	14.3	27.2	
2008Q4	-12.3	-6.4	-15.1	-5.6	-20.5	-9	-11.7	-10.2	
2009Q1	-37.1	-20.9	-41.3	-47.7	-39.2	-29.5	-29.5	-22.2	
2009Q2									-23.4

1 Growth rates calculated using current US\$ values.

2. Developing East Asia (East Asia excluding Japan)

Source: Compiled from the database.

Table 11: China: Growth of total merchandise exports and imports by trading partner countries, 2007Q1 – 2009Q1 (Year-on-year parentage change, current US\$)

	2008Q1	2008Q2	2008Q3	2008Q4	2009Q1	2009Q2	2009July
(a) Exports							
East Asia (EA)	23.7	25.1	28.2	4.5	-22.9	-25.6	-24.8
Developing EA	31.2	29.2	33.9	2.7	-26.3	-26.5	-27.1
ASEAN	34.2	26.0	27.4	2.8	-22.6	-16.8	-17.4
Japan	12.1	18.0	18.1	7.9	-16.7	-23.8	-20.1
Korea	33.1	38.3	52.9	7.5	-29.2	-36.6	-41.1
Taipei, China	15.4	21.1	17.3	-10.4	-34.5	-38.8	-29.7
Hong Kong, China	10.8	6.5	11.0	-9.9	-24.0	-21.6	-19.0
Indonesia	33.2	41.5	54.8	20.2	-26.4	-21.0	-31.8
Malaysia	33.3	28.2	20.8	7.1	-23.9	-12.2	-5.8
Philippines	30.4	22.8	34.5	1.3	-11.8	-18.7	-23.7
Singapore	15.3	5.9	17.1	-0.6	-17.1	-12.3	-22.4
Thailand	37.2	42.1	38.3	5.9	-27.3	-29.6	-24.2
Vietnam	88.8	45.1	16.0	-11.1	-30.0	-15.9	15.4
USA	5.4	12.2	15.3	0.7	-15.4	-18.5	-14.1
North America	5.9	11.6	15.1	2.1	-15.1	-19.0	-15.0
EU	25.0	29.7	23.5	4.1	-22.6	-26.6	-26.0
Total export	16.3	19.0	20.2	0.9	-21.1	-23.5	-21.7
(b) Imports							
East Asia	18.8	24.1	13.2	-18.1	-33.3	-22.8	-19.4
Developing EA	19.6	24.3	10.8	-23.6	-34.7	-23.5	-18.8
ASEAN	19.9	23.8	12.7	-18.9	-33.8	-22.1	-12.8
Japan	17.0	23.7	18.7	-5.0	-29.8	-21.4	-20.6
Korea	14.9	25.0	14.8	-18.5	-26.6	-18.8	-18.9
Taiwan	24.5	24.2	5.0	-33.3	-43.9	-29.9	-25.4
Hong Kong	26.0	-2.5	11.0	-21.4	-49.1	-32.9	-33.3
Indonesia	31.7	30.3	17.3	-13.5	-38.0	-18.4	-5.6
Malaysia	18.4	29.5	22.4	-16.1	-25.0	-17.0	-8.8
Philippines	12.7	5.7	-23.2	-48.6	-61.3	-51.7	-38.9
Singapore	6.7	35.5	27.4	-9.3	-23.7	-28.2	-10.3
Thailand	26.0	22.9	15.8	-5.6	-29.2	-6.6	-0.8
Vietnam	64.3	19.0	69.4	6.8	-7.9	23.6	-23.7
USA	29.7	23.0	15.7	3.7	-17.7	-13.1	-12.4
North America	28.6	23.4	16.4	2.8	-18.1	-12.5	-12.0
EU	25.9	33.0	22.7	2.3	-14.7	-11.2	-7.4
Total imports	21.2	25.0	15.1	-12.2	-28.3	-19.6	-16.6

1 Growth rates calculated using current US\$ values.

Source: Compiled from CIEM database

Table 12: PRC: Growth of total merchandise exports and imports by commodity category, 2008Q1– 2009Q1 (Year-on-year % change, current US\$)

	2008Q1	2008Q2	2008Q3	2008Q4	2009Q1	2009Q2
Exports						
Total exports	21.1	22.4	23.0	4.6	-20.1	-178.2
Primary	16.3	24.9	29.9	8.6	-17.9	-13.6
Agro-based raw material	10.6	7.5	8.5	7.5	-16.3	-7.3
Manufacturing	21.2	23.8	22.0	2.6	-20.7	-18.2
Products of the Chemical or Allied Industries	48.5	54.0	42.2	3.1	-25.2	-24.9
Plastics and Articles thereof, Rubber and Articles	13.8	10.1	16.1	10.7	-21.1	-17.1
Textiles and Textile Articles	22.5	5.3	4.1	8.0	-11.4	2.6
Footwear, Headgear, Umbrellas, etc	14.7	14.4	19.7	21.3	-1.3	7.2
Base Metals & Articles Of Base Metal	23.3	18.5	26.4	22.0	-9.0	-1.5
Machinery and Mechanical Appliances, etc (ME)	15.9	-15.7	20.9	4.3	-31.6	-38.8
Electronics	6.2	12.5	61.5	17.2	-33.5	-36.5
Electrical Machinery and Equipment	20.3	27.0	20.4	-1.1	-21.5	-19.5
Vehicles, Aircraft, Vessels etc	18.8	26.5	22.9	5.1	-18.4	-16.6
Miscellaneous Manufactured Articles	41.5	39.0	31.7	9.1	-17.0	-19.7
Optical, Photographic, Cinematographic, etc	21.6	27.5	18.6	-5.4	-24.0	-22.3
(b) Imports						
	2008Q1	2008Q2	2008Q3	2008Q4	2009Q1	2009Q2
Total imports	29.4	32.9	25.9	-8.0	-30.8	-25.4
Primary	73.5	74.9	72.5	5.2	-40.7	-35.3
Manufacturing	16.3	19.1	11.4	-12.1	-26.2	-21.1
Products of the Chemical or Allied Industries	19.6	23.5	19.6	-10.5	-23.9	-18.2
Plastics and Articles thereof, Rubber and Articles	16.3	22.5	22.7	-15.6	-29.2	20.1
Textiles and Textile Articles	6.3	2.7	-3.4	-9.2	-22.8	-22.8
Footwear, Headgear, Umbrellas, etc	47.5	47.7	24.8	12.6	-2.8	-18.7
Base Metals & Articles Of Base Metal	14.1	5.8	8.3	-15.0	-26.3	-16.9
Machinery and Mechanical Appliances, etc (ME)	11.7	18.0	9.8	-10.7	-24.1	-17.9
Electronics	16.3	19.9	15.0	-1.0	-19.8	-19.5
Electrical Machinery and Equipment	9.5	17.1	7.4	-15.2	-26.3	-17.4
Vehicles, Aircraft, Vessels etc	20.0	28.5	14.4	-1.3	-17.1	-22.1
Miscellaneous Manufactured Articles	11.6	20.8	1.4	-8.1	-5.4	1.6
Optical, Photographic, Cinematographic, etc	42.3	35.1	9.8	-21.4	-40.2	-33.5

Source: Compiled from CEIM database.

Table 13: Singapore: Growth of total merchandise exports and imports by commodity category, 2008Q1– 2009Q1
(Year-on-year % change, current US\$)

	2007Q1	2007Q2	2007Q3	2007Q4	2008Q1	2008Q2	2008Q3	2008Q4	2009Q1	2009Q2	2009Jul
(a) Exports											
Total excl. Petroleum	4.2	1.4	5.2	0.7	3.2	1.6	-1.9	-12.6	-23.7	-17.7	-13.0
Primary products excl. petroleum	18.9	6.9	11.1	15.6	9.4	19.2	10.5	-0.6	-18.1	-16.2	-5.0
Mineral Fuels	0.8	12.5	0.7	48.2	61.6	64.2	75.3	-9.4	-40.6	-45.5	-44.5
Manufactures	3.8	1.2	5.1	0.2	3.0	1.0	-2.3	-13.0	-23.9	-17.8	-13.3
Chemicals and Chemical Products (CH)	15.1	16.3	20.8	3.4	-3.1	-5.5	-9.0	-31.2	-24.1	-9.8	-1.3
Resource-based manufactured Goods	25.5	19.3	22.3	10.2	2.2	15.9	4.7	-13.2	-21.5	-25.5	-27.5
Machinery and Transport Equipment	0.4	-2.4	0.8	-1.1	3.6	1.8	-1.6	-11.2	-27.1	-20.7	-15.9
Electronics Valves	-0.8	-6.7	0.9	-0.1	3.1	2.2	-0.7	-17.3	-29.5	-16.4	-16.7
Parts for Office & DP Machines	0.9	9.2	-6.7	-1.1	-1.5	-6.3	5.8	-11.2	-35.9	-32.4	-20.4
Communication Equipment	-3.0	0.3	3.0	-14.9	-14.3	-11.1	-26.6	-38.1	-37.4	-46.0	-35.0
Electrical Machinery	1.6	-3.5	4.7	-2.6	1.3	-9.4	-11.7	-21.9	-39.0	-20.9	-19.4
Electrical Circuit Apparatus	-9.4	-9.4	-4.5	0.0	0.1	2.3	-8.3	-18.6	-35.4	-25.9	-12.0
Miscellaneous Manufactured Articles	1.6	5.3	6.0	1.3	11.3	-2.0	0.4	0.9	-18.2	-4.8	-1.4
Disc Media Products & Plastic Articles	12.4	11.3	12.6	-5.5	8.5	-2.9	10.2	6.1	-23.1	-3.8	-4.9
Scientific Instruments & Apparatus	6.6	22.1	8.3	12.0	20.2	-4.8	-10.0	0.4	-11.5	3.8	20.7
Photographic Supplies, Watches & Optical Goods	-21.7	-16.9	4.5	3.2	15.8	8.9	2.4	-0.7	-13.8	-9.3	-6.7
(b) Imports											
Total excl. Petroleum	3.8	1.1	2.8	3.8	8.3	7.6	5.8	-10.1	-25.2	-22.0	-19.0

Primary products excl. petroleum	9.8	14.2	12.2	18.8	18.5	16.0	20.0	3.5	-6.1	-6.5	-4.5
Mineral Fuels	-0.9	13.2	-8.2	59.1	75.3	69.9	87.3	0.3	-36.2	-43.5	-43.7
Manufactures	3.5	0.5	2.4	3.2	7.9	7.2	5.1	-10.8	-26.1	-22.8	-19.9
Chemicals and Chemical Products (CH)	2.8	13.6	0.1	6.1	8.5	-2.1	9.7	-16.5	-32.7	-15.7	-14.5
Resource-based manufactured Goods	19.4	5.6	10.9	7.8	13.0	17.0	22.1	5.0	-18.9	-30.2	-30.9
Machinery and Transport Equipment	1.8	-1.8	1.2	1.0	7.7	7.8	2.5	-12.7	-26.9	-22.9	-19.8
Electronics Valves	-1.4	-8.6	0.9	5.7	1.0	-2.7	-1.0	-19.3	-32.4	-21.0	-15.7
Parts for Office & DP Machines	-8.1	4.3	4.0	4.6	-1.9	-7.2	5.3	-1.3	-36.2	-35.3	-32.2
Communication Equipment	-0.3	-6.5	1.1	-14.2	-14.7	-7.2	-19.1	-31.3	-28.0	-30.0	-31.6
Electrical Machinery	-3.1	-17.4	-17.5	-17.5	-2.7	2.7	-1.1	-6.5	-40.6	-25.3	-17.6
Electrical Circuit Apparatus	-7.4	-7.7	-7.8	-2.5	-4.1	0.0	-3.4	-21.7	-35.1	-25.4	-21.4
Miscellaneous Manufactured Articles	3.2	4.4	4.4	12.7	2.9	0.8	2.4	-9.1	-21.8	-18.3	-11.6
Disc Media Products & Plastic Articles	10.5	14.2	8.3	28.5	15.6	7.8	17.2	-6.3	-27.0	-18.4	-8.2
Scientific Instruments & Apparatus	0.1	6.2	0.7	-5.5	-9.3	-13.1	-2.5	-10.0	-19.9	-16.6	-10.0
Photographic Supplies, Watches & Optical Goods	4.0	-1.6	9.4	14.2	2.0	8.9	-2.9	-10.5	-23.5	-18.6	-15.4

Source: Compiled from CEIM database.

Table 14: Growth manufacturing imports to the USA (Y-o-Y, %), 2008Q1-2009July

	2008Q1	2008Q2	2008Q3	2008Q4	2009Q1	2009Q2	2009July
East Asia (EA)							
Total manufacturing	2.0	4.1	4.9	-6.8	-22.3	-24.2	-22.0
Parts and components	-2.5	3.9	2.6	-14.3	-29.1	-29.3	-23.9
Assembly	6.0	8.5	4.8	-13.6	-30.6	-25.9	-21.6
Total network trade ¹	2.6	6.7	4.0	-13.8	-30.0	-27.2	-22.4
Developing EA							
Total manufacturing	1.1	4.5	7.5	-3.9	-15.4	-18.7	-19.0
Parts and components	-4.3	4.6	4.2	-12.8	-25.2	-26.1	-22.2
Assembly	5.3	9.8	10.0	-9.5	-17.6	-15.5	-16.1
Total network trade ¹	1.4	7.8	7.9	-10.6	-20.5	-19.4	-18.3
ASEAN							
Total manufacturing	0.4	1.8	-2.3	-15.2	-26.5	-24.1	-16.2
Parts and components	-6.5	4.3	-2.6	-21.2	-32.5	-31.1	-15.8
Assembly	3.0	4.8	-6.3	-25.1	-39.6	-36.5	-26.5
Total network trade ¹	-2.1	4.6	-4.7	-23.5	-36.5	-34.2	-22.1
Japan							
Total manufacturing	4.6	2.9	-4.1	-16.6	-42.3	-42.5	-33.5
Parts and components	1.6	2.1	-1.0	-17.7	-37.1	-37.4	-28.5
Assembly	7.5	6.0	-6.7	-23.2	-55.0	-49.6	-35.2
Total network trade ¹	5.3	4.5	-4.7	-21.4	-49.0	-45.3	-33.0
Korea							
Total manufacturing	0.4	7.6	11.5	-0.2	-15.1	-23.1	-25.1
Parts and components	-11.3	0.2	1.9	-14.4	-32.1	-33.3	-26.2
Assembly	4.3	13.9	14.4	-2.1	-9.4	-12.6	-17.7
Total network trade ¹	-1.2	9.3	10.0	-5.9	-16.5	-19.0	-20.4
Taipei, China							
Total manufacturing	5.8	2.8	4.1	-10.3	-28.5	-32.3	-22.9
Parts and components	11.8	12.1	3.9	-16.4	-30.8	-33.1	-21.2
Assembly	11.0	6.4	12.5	-7.5	-31.4	-32.0	-21.5
Total network trade ¹	11.0	9.3	7.8	-12.4	-31.1	-32.6	-21.3
PRC							
Total manufacturing	1.3	5.3	10.1	-0.6	-11.2	-16.0	-18.4
Parts and components	-1.6	5.9	7.7	-8.7	-20.2	-22.3	-23.6
Assembly	7.0	10.9	14.9	-6.1	-11.7	-9.3	-12.8
Total network trade ¹	3.7	9.0	12.4	-7.0	-14.8	-14.0	-16.5
Mexico							

Total manufacturing	2.8	3.9	-4.2	-11.8	-25.2	-27.6	-17.0
Parts and components	-3.6	-4.3	-7.6	-15.1	-31.0	-32.7	-17.7
Assembly	10.1	12.0	-6.6	-11.8	-21.6	-23.8	-11.3
Total network trade ¹	3.3	4.1	-7.1	-13.2	-26.0	-27.8	-14.1
World							
Total manufacturing	2.9	4.5	3.5	-9.2	-25.4	-29.3	-25.1
Parts and components	-0.3	1.8	0.0	-13.7	-28.4	-31.7	-24.8
Assembly	4.5	7.2	-0.1	-16.5	-31.9	-30.1	-22.6
Total network trade ¹	2.3	4.8	0.0	-15.4	-30.4	-30.8	-23.5

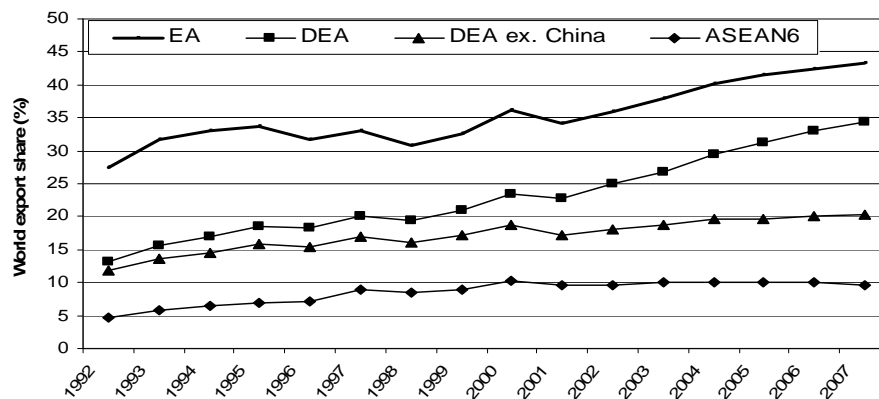
¹ Parts and components + final assembly.

Source: Compiled from US International Trade Commission on-line database.

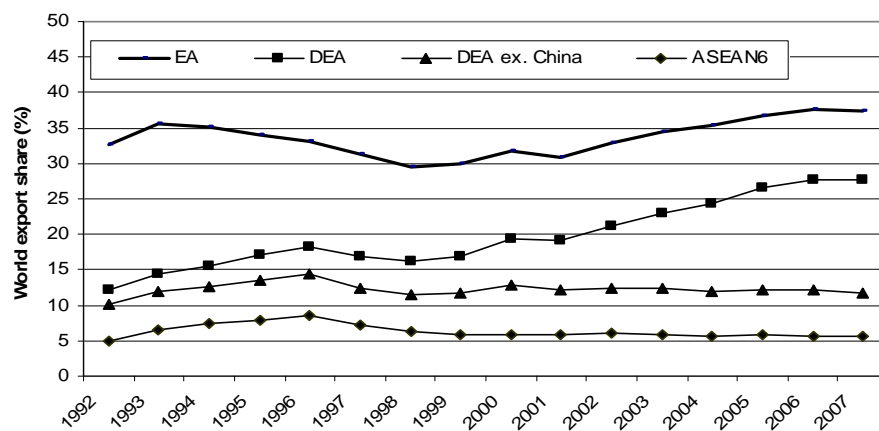
Figure 1: East Asia in world network trade: Share in world exports by country groups

(%)

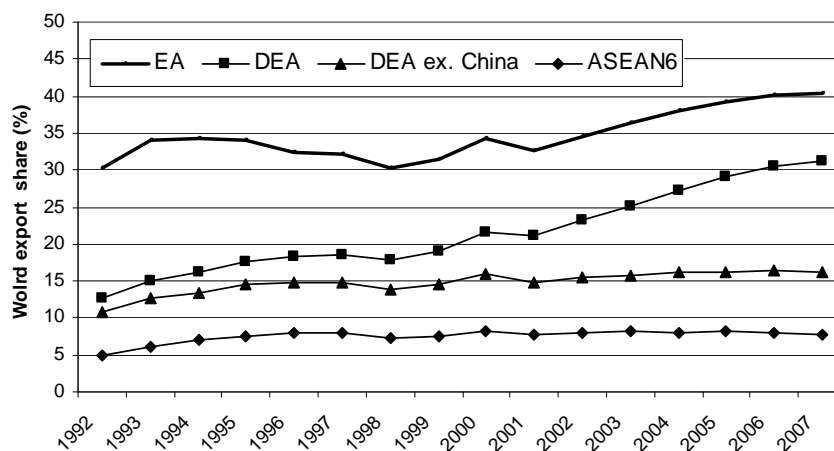
(a) Parts and components



(b) Final assembly



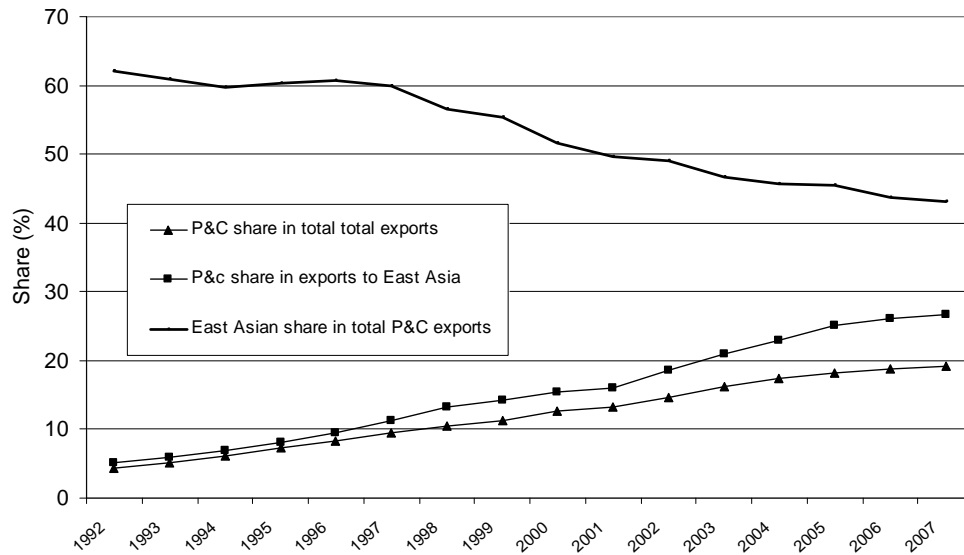
(c) Total network exports



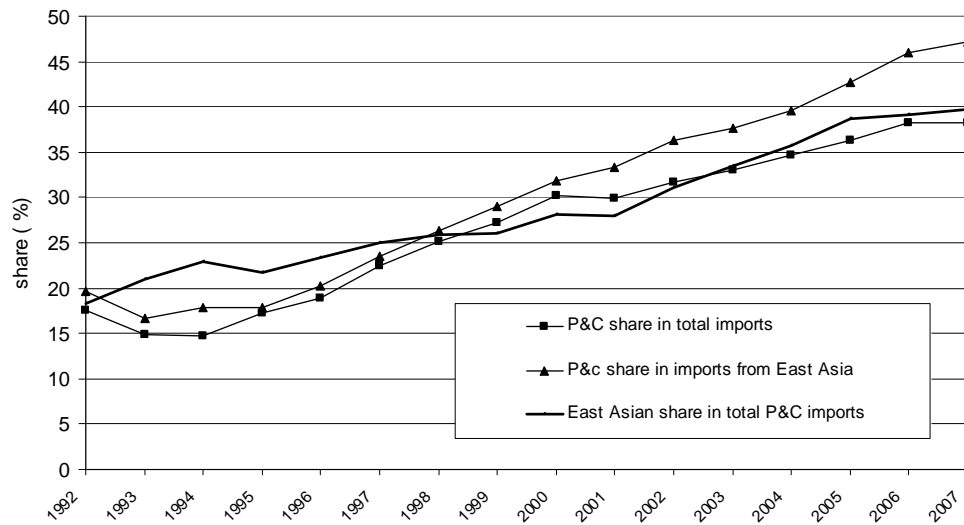
Source: Based on data compiled from UN Comtrade database.

Figure 2: Parts and components in China's Manufacturing trade, 1992 -2007

A: Manufacturing exports



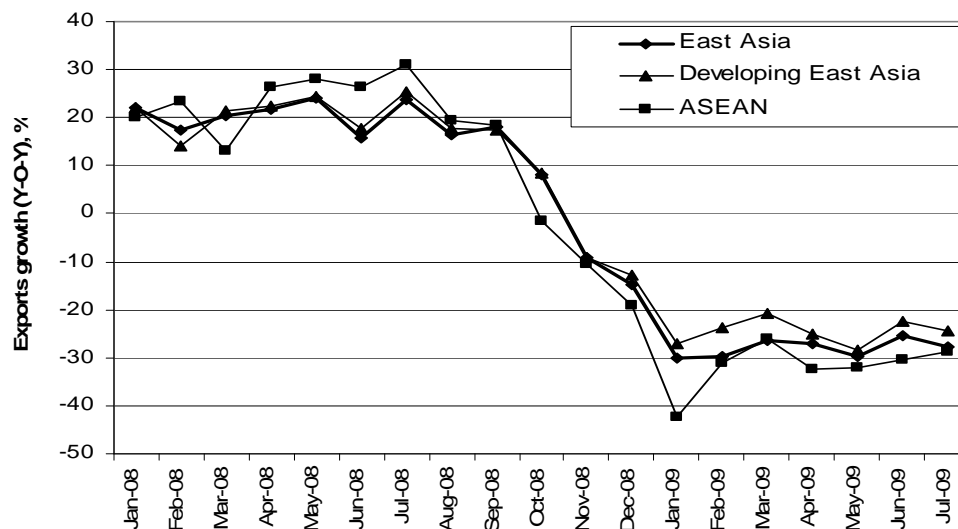
A: Manufacturing imports



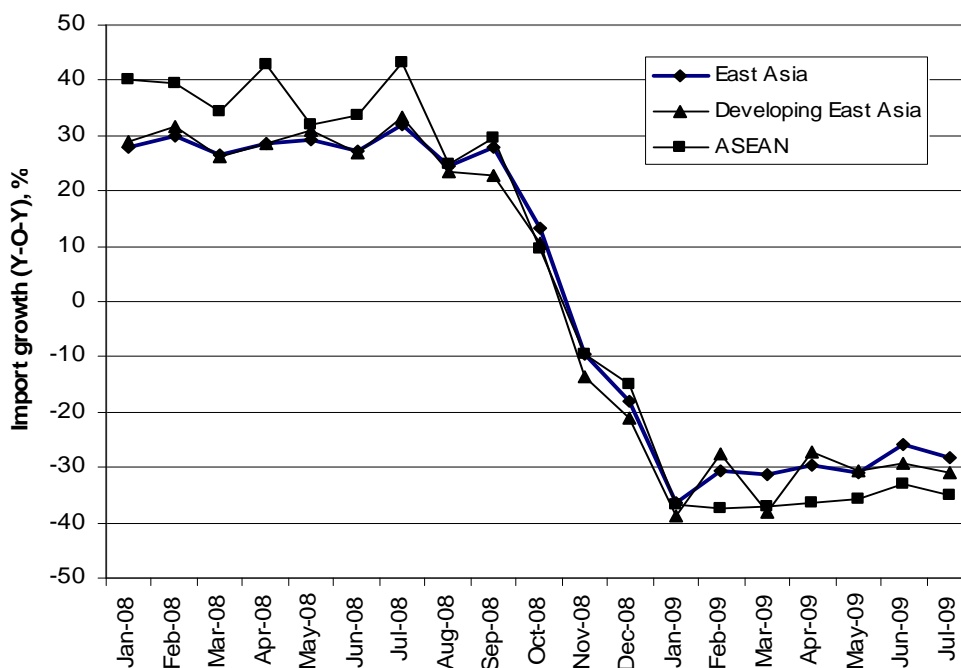
Source: Based on data compiled from UN Comtrade database.

Figure 3: Growth of merchandise trade: East Asia, Developing East Asia and ASEAN, January 2008 – July 2009 (Y-O-Y, %)

(a) Exports



(b) Imports



Source: Based on data compiled from CEIM database.

Working Papers in Trade and Development
List of Papers (including publication details as at 2009)

- 99/1 K K TANG, 'Property Markets and Policies in an Intertemporal General Equilibrium Model'.
- 99/2 HARYO ASWICAHYONO and HAL HILL, 'Perspiration' v/s 'Inspiration' in Asian Industrialization: Indonesia Before the Crisis'.
- 99/3 PETER G WARR, 'What Happened to Thailand?'.
- 99/4 DOMINIC WILSON, 'A Two-Sector Model of Trade and Growth'.
- 99/5 HAL HILL, 'Indonesia: The Strange and Sudden Death of a Tiger Economy'.
- 99/6 PREMA-CHANDRA ATHUKORALA and PETER G WARR, 'Vulnerability to a Currency Crisis: Lessons from the Asian Experience'.
- 99/7 PREMA-CHANDRA ATHUKORALA and SARATH RAJAPATIRANA, 'Liberalization and Industrial Transformation: Lessons from the Sri Lankan Experience'.
- 99/8 TUBAGUS FERIDHANUSETYAWAN, 'The Social Impact of the Indonesian Economic Crisis: What Do We Know?'.
- 99/9 KELLY BIRD, 'Leading Firm Turnover in an Industrializing Economy: The Case of Indonesia'.
- 99/10 PREMA-CHANDRA ATHUKORALA, 'Agricultural Trade Liberalization in South Asia: From the Uruguay Round to the Millennium Round'.
- 99/11 ARMIDA S ALISJAHBANA, 'Does Demand for Children's Schooling Quantity and Quality in Indonesia Differ across Expenditure Classes?'.
- 99/12 PREMA-CHANDRA ATHUKORALA, 'Manufactured Exports and Terms of Trade of Developing Countries: Evidence from Sri Lanka'.
- 00/01 HSIAO-CHUAN CHANG, 'Wage Differential, Trade, Productivity Growth and Education'.
- 00/02 PETER G WARR, 'Targeting Poverty'.
- 00/03 XIAOQIN FAN and PETER G WARR, 'Foreign Investment, Spillover Effects and the Technology Gap: Evidence from China'.
- 00/04 PETER G WARR, 'Macroeconomic Origins of the Korean Crisis'.
- 00/05 CHINNA A KANNAPIRAN, 'Inflation Targeting Policy in PNG: An Econometric Model Analysis'.

- 00/06 PREMA-CHANDRA ATHUKORALA, 'Capital Account Regimes, Crisis and Adjustment in Malaysia.'
- 00/07 CHANGMO AHN, 'The Monetary Policy in Australia: Inflation Targeting and Policy Reaction.'
- 00/08 PREMA-CHANDRA ATHUKORALA and HAL HILL, 'FDI and Host Country Development: The East Asian Experience.'
- 00/09 HAL HILL, 'East Timor: Development Policy Challenges for the World's Newest Nation.'
- 00/10 ADAM SZIRMAI, M P TIMMER and R VAN DER KAMP, 'Measuring Embodied Technological Change in Indonesian Textiles: The Core Machinery Approach.'
- 00/11 DAVID VINES and PETER WARR, 'Thailand's Investment-driven Boom and Crisis.'
- 01/01 RAGHBENDRA JHA and DEBA PRASAD RATH, 'On the Endogeneity of the Money Multiplier in India.'
- 01/02 RAGHBENDRA JHA and K V BHANU MURTHY, 'An Inverse Global Environmental Kuznets Curve.'
- 01/03 CHRIS MANNING, 'The East Asian Economic Crisis and Labour Migration: A Set-Back for International Economic Integration?'
- 01/04 MARDI DUNGEY and RENEE FRY, 'A Multi-Country Structural VAR Model.'
- 01/05 RAGHBENDRA JHA, 'Macroeconomics of Fiscal Policy in Developing Countries.'
- 01/06 ROBERT BREUNIG, 'Bias Correction for Inequality Measures: An application to China and Kenya.'
- 01/07 MEI WEN, 'Relocation and Agglomeration of Chinese Industry.'
- 01/08 ALEXANDRA SIDORENKO, 'Stochastic Model of Demand for Medical Care with Endogenous Labour Supply and Health Insurance.'
- 01/09 A SZIRMAI, M P TIMMER and R VAN DER KAMP, 'Measuring Embodied Technological Change in Indonesian Textiles: The Core Machinery Approach.'
- 01/10 GEORGE FANE and ROSS H MCLEOD, 'Banking Collapse and Restructuring in Indonesia, 1997-2001.'
- 01/11 HAL HILL, 'Technology and Innovation in Developing East Asia: An Interpretive Survey.'
- 01/12 PREMA-CHANDRA ATHUKORALA and KUNAL SEN, 'The Determinants of Private Saving in India.'

- 02/01 SIRIMAL ABEYRATNE, 'Economic Roots of Political Conflict: The Case of Sri Lanka.'
- 02/02 PRASANNA GAI, SIMON HAYES and HYUN SONG SHIN, 'Crisis Costs and Debtor Discipline: the efficacy of public policy in sovereign debt crises.'
- 02/03 RAGHBENDRA JHA, MANOJ PANDA and AJIT RANADE, 'An Asian Perspective on a World Environmental Organization.'
- 02/04 RAGHBENDRA JHA, 'Reducing Poverty and Inequality in India: Has Liberalization Helped?'
- 02/05 ARCHANUN KOHPAIBOON, 'Foreign Trade Regime and FDI-Growth Nexus: A Case Study of Thailand.'
- 02/06 ROSS H MCLEOD, 'Privatisation Failures in Indonesia.'
- 02/07 PREMA-CHANDRA ATHUKORALA, 'Malaysian Trade Policy and the 2001 WTO Trade Policy Review.'
- 02/08 M C BASRI and HAL HILL, 'Ideas, Interests and Oil Prices: The Political Economy of Trade Reform during Soeharto's Indonesia.'
- 02/09 RAGHBENDRA JHA, 'Innovative Sources of Development Finance - Global Cooperation in the 21st Century.'
- 02/10 ROSS H MCLEOD, 'Toward Improved Monetary Policy in Indonesia.'
- 03/01 MITSUHIRO HAYASHI, 'Development of SMEs in the Indonesian Economy.'
- 03/02 PREMA-CHANDRA ATHUKORALA and SARATH RAJAPATIRANA, 'Capital Inflows and the Real Exchange Rate: A Comparative Study of Asia and Latin America.'
- 03/03 PETER G WARR, 'Industrialisation, Trade Policy and Poverty Reduction: Evidence from Asia.'
- 03/04 PREMA-CHANDRA ATHUKORALA, 'FDI in Crisis and Recovery: Lessons from the 1997-98 Asian Crisis.'
- 03/05 ROSS H MCLEOD, 'Dealing with Bank System Failure: Indonesia, 1997-2002.'
- 03/06 RAGHBENDRA JHA and RAGHAV GAIHA, 'Determinants of Undernutrition in Rural India.'
- 03/07 RAGHBENDRA JHA and JOHN WHALLEY, 'Migration and Pollution.'
- 03/08 RAGHBENDRA JHA and K V BHANU MURTHY, 'A Critique of the Environmental Sustainability Index.'
- 03/09 ROBERT J BAROO and JONG-WHA LEE, 'IMF Programs: Who Is Chosen and What Are the Effects?'

- 03/10 ROSS H MCLEOD, 'After Soeharto: Prospects for reform and recovery in Indonesia.'
- 03/11 ROSS H MCLEOD, 'Rethinking vulnerability to currency crises: Comments on Athukorala and Warr.'
- 03/12 ROSS H MCLEOD, 'Equilibrium is good: Comments on Athukorala and Rajapatirana.'
- 03/13 PREMA-CHANDRA ATHUKORALA and SISIRA JAYASURIYA, 'Food Safety Issues, Trade and WTO Rules: A Developing Country Perspective.'
- 03/14 WARWICK J MCKIBBIN and PETER J WILCOXEN, 'Estimates of the Costs of Kyoto-Marrakesh Versus The McKibbin-Wilcoxen Blueprint.'
- 03/15 WARWICK J MCKIBBIN and DAVID VINES, 'Changes in Equity Risk Perceptions: Global Consequences and Policy Responses.'
- 03/16 JONG-WHA LEE and WARWICK J MCKIBBIN, 'Globalization and Disease: The Case of SARS.'
- 03/17 WARWICK J MCKIBBIN and WING THYE WOO, 'The consequences of China's WTO Accession on its Neighbors.'
- 03/18 MARDI DUNGEY, RENEE FRY and VANCE L MARTIN, 'Identification of Common and Idiosyncratic Shocks in Real Equity Prices: Australia, 1982 to 2002.'
- 03/19 VIJAY JOSHI, 'Financial Globalisation, Exchange Rates and Capital Controls in Developing Countries.'
- 03/20 ROBERT BREUNIG and ALISON STEGMAN, 'Testing for Regime Switching in Singaporean Business Cycles.'
- 03/21 PREMA-CHANDRA ATHUKORALA, 'Product Fragmentation and Trade Patterns in East Asia.'
- 04/01 ROSS H MCLEOD, 'Towards Improved Monetary Policy in Indonesia: Response to De Brouwer'
- 04/02 CHRIS MANNING and PRADIP PHATNAGAR, 'The Movement of Natural Persons in Southeast Asia: How Natural?'
- 04/03 RAGHBENDRA JHA and K V BHANU MURTHY, 'A Consumption Based Human Development Index and The Global Environment Kuznets Curve'
- 04/04 PREMA-CHANDRA ATHUKORALA and SUPHAT SUPHACHALASAI, 'Post-crisis Export Performance in Thailand'
- 04/05 GEORGE FANE and MARTIN RICHARDSON, 'Capital gains, negative gearing and effective tax rates on income from rented houses in Australia'
- 04/06 PREMA-CHANDRA ATHUKORALA, 'Agricultural trade reforms in the Doha Round: a developing country perspective'

- 04/07 BAMBANG-HERU SANTOSA and HEATH McMICHAEL, 'Industrial development in East Java: A special case?'
- 04/08 CHRIS MANNING, 'Legislating for Labour Protection: Betting on the Weak or the Strong?'
- 05/01 RAGHBENDRA JHA, 'Alleviating Environmental Degradation in the Asia-Pacific Region: International cooperation and the role of issue-linkage'
- 05/02 RAGHBENDRA JHA, RAGHAV GAIHA and ANURAG SHARMA, 'Poverty Nutrition Trap in Rural India'
- 05/03 PETER WARR, 'Food Policy and Poverty in Indonesia: A General Equilibrium Analysis'
- 05/04 PETER WARR, 'Roads and Poverty in Rural Laos'
- 05/05 PREMA-CHANDRA ATHUKORALA and BUDY P RESOSUDARMO, 'The Indian Ocean Tsunami: Economic Impact, Disaster Management and Lessons'
- 05/06 PREMA-CHANDRA ATHUKORALA, 'Trade Policy Reforms and the Structure of Protection in Vietnam'
- 05/07 PREMA-CHANDRA ATHUKORALA and NOBUAKI YAMASHITA, 'Production Fragmentation and Trade Integration: East Asia in a Global Context'
- 05/08 ROSS H MCLEOD, 'Indonesia's New Deposit Guarantee Law'
- 05/09 KELLY BIRD and CHRIS MANNING, 'Minimum Wages and Poverty in a Developing Country: Simulations from Indonesia's Household Survey'
- 05/10 HAL HILL, 'The Malaysian Economy: Past Successes, Future Challenges'
- 05/11 ZAHARI ZEN, COLIN BARLOW and RIA GONDOWARSITO, 'Oil Palm in Indonesian Socio-Economic Improvement: A Review of Options'
- 05/12 MEI WEN, 'Foreign Direct Investment, Regional Geographical and Market Conditions, and Regional Development: A Panel Study on China'
- 06/01 JUTHATHIP JONGWANICH, 'Exchange Rate Regimes, Capital Account Opening and Real Exchange Rates: Evidence from Thailand'
- 06/02 ROSS H MCLEOD, 'Private Sector Lessons for Public Sector Reform in Indonesia'
- 06/03 PETER WARR, 'The Gregory Thesis Visits the Tropics'
- 06/04 MATT BENGE and GEORGE FANE, 'Adjustment Costs and the Neutrality of Income Taxes'
- 06/05 RAGHBENDRA JHA, 'Vulnerability and Natural Disasters in Fiji, Papua New Guinea, Vanuatu and the Kyrgyz Republic'

- 06/06 PREMA-CHANDRA ATHUKORALA and ARCHANUN KOHPAIBOON, 'Multinational Enterprises and Globalization of R&D: A Study of U.S-based Firms
- 06/07 SANTANU GUPTA and RAGHBENDRA JHA, 'Local Public Goods in a Democracy: Theory and Evidence from Rural India'
- 06/08 CHRIS MANNING and ALEXANDRA SIDORENKO, 'The Regulation of Professional Migration in ASEAN - Insights from the Health and IT Sectors'
- 06/09 PREMA-CHANDRA ATHUKORALA, 'Multinational Production Networks and the New Geo-economic Division of Labour in the Pacific Rim'
- 06/10 RAGHBENDRA JHA, RAGHAV GAIHA and ANURAG SHARMA, 'On Modelling Variety in Consumption Expenditure on Food'
- 06/11 PREMA-CHANDRA ATHUKORALA, 'Singapore and ASEAN in the New Regional Division of Labour'
- 06/12 ROSS H MCLEOD, 'Doing Business in Indonesia: Legal and Bureaucratic Constraints'
- 06/13 DIONISIUS NARJOKO and HAL HILL, 'Winners and Losers during a Deep Economic Crisis; Firm-level Evidence from Indonesian Manufacturing'
- 06/14 ARSENIO M BALISACAN, HAL HILL and SHARON FAYE A PIZA, 'Regional Development Dynamics and Decentralization in the Philippines: Ten Lessons from a 'Fast Starter''
- 07/01 KELLY BIRD, SANDY CUTHBERTSON and HAL HILL, 'Making Trade Policy in a New Democracy after a Deep Crisis: Indonesia
- 07/02 RAGHBENDRA JHA and T PALANIVEL, 'Resource Augmentation for Meeting the Millennium Development Goals in the Asia Pacific Region'
- 07/03 SATOSHI YAMAZAKI and BUDY P RESOSUDARMO, 'Does Sending Farmers Back to School have an Impact? A Spatial Econometric Approach'
- 07/04 PIERRE VAN DER ENG, 'De-industrialisation' and Colonial Rule: The Cotton Textile Industry in Indonesia, 1820-1941'
- 07/05 DJONI HARTONO and BUDY P RESOSUDARMO, 'The Economy-wide Impact of Controlling Energy Consumption in Indonesia: An Analysis Using a Social Accounting Matrix Framework'
- 07/06 W MAX CORDEN, 'The Asian Crisis: A Perspective after Ten Years'
- 07/07 PREMA-CHANDRA ATHUKORALA, 'The Malaysian Capital Controls: A Success Story?
- 07/08 PREMA-CHANDRA ATHUKORALA and SATISH CHAND, 'Tariff-Growth Nexus in the Australian Economy, 1870-2002: Is there a Paradox?,'

- 07/09 ROD TYERS and IAN BAIN, 'Appreciating the Renbimbi'
- 07/10 PREMA-CHANDRA ATHUKORALA, 'The Rise of China and East Asian Export Performance: Is the Crowding-out Fear Warranted?'
- 08/01 RAGHBENDRA JHA, RAGHAV GAIHA AND SHYLASHRI SHANKAR, 'National Rural Employment Guarantee Programme in India – A Review'
- 08/02 HAL HILL, BUDY RESOSUDARMO and YOGI VIDYATTAMA, 'Indonesia's Changing Economic Geography'
- 08/03 ROSS H McLEOD, 'The Soeharto Era: From Beginning to End'
- 08/04 PREMA-CHANDRA ATHUKORALA, 'China's Integration into Global Production Networks and its Implications for Export-led Growth Strategy in Other Countries in the Region'
- 08/05 RAGHBENDRA JHA, RAGHAV GAIHA and SHYLASHRI SHANKAR, 'National Rural Employment Guarantee Programme in Andhra Pradesh: Some Recent Evidence'
- 08/06 NOBUAKI YAMASHITA, 'The Impact of Production Fragmentation on Skill Upgrading: New Evidence from Japanese Manufacturing'
- 08/07 RAGHBENDRA JHA, TU DANG and KRISHNA LAL SHARMA, 'Vulnerability to Poverty in Fiji'
- 08/08 RAGHBENDRA JHA, TU DANG, 'Vulnerability to Poverty in Papua New Guinea'
- 08/09 RAGHBENDRA JHA, TU DANG and YUSUF TASHRIFOV, 'Economic Vulnerability and Poverty in Tajikistan'
- 08/10 RAGHBENDRA JHA and TU DANG, 'Vulnerability to Poverty in Select Central Asian Countries'
- 08/11 RAGHBENDRA JHA and TU DANG, 'Vulnerability and Poverty in Timor- Leste'
- 08/12 SAMBIT BHATTACHARYYA, STEVE DOWRICK and JANE GOLLEY, 'Institutions and Trade: Competitors or Complements in Economic Development?'
- 08/13 SAMBIT BHATTACHARYYA, 'Trade Liberalization and Institutional Development'
- 08/14 SAMBIT BHATTACHARYYA, 'Unbundled Institutions, Human Capital and Growth'
- 08/15 SAMBIT BHATTACHARYYA, 'Institutions, Diseases and Economic Progress: A Unified Framework'
- 08/16 SAMBIT BHATTACHARYYA, 'Root causes of African Underdevelopment'

- 08/17 KELLY BIRD and HAL HILL, 'Philippine Economic Development: A Turning Point?'
- 08/18 HARYO ASWICAHYONO, DIONISIUS NARJOKO and HAL HILL, 'Industrialization after a Deep Economic Crisis: Indonesia'
- 08/19 PETER WARR, 'Poverty Reduction through Long-term Growth: The Thai Experience'
- 08/20 PIERRE VAN DER ENG, 'Labour-Intensive Industrialisation in Indonesia, 1930-1975: Output Trends and Government policies'
- 08/21 BUDY P RESOSUDARMO, CATUR SUGIYANTO and ARI KUNCORO, 'Livelihood Recovery after Natural Disasters and the Role of Aid: The Case of the 2006 Yogyakarta Earthquake'
- 08/22 PREMA-CHANDRA ATHUKORALA and NOBUAKI YAMASHITA, 'Global Production Sharing and US-China Trade Relations'
- 09/01 PIERRE VAN DER ENG, 'Total Factor Productivity and the Economic Growth in Indonesia'
- 09/02 SAMBIT BHATTACHARYYA and JEFFREY G WILLIAMSON, 'Commodity Price Shocks and the Australian Economy since Federation'
- 09/03 RUSSELL THOMSON, 'Tax Policy and the Globalisation of R & D'
- 09/04 PREMA-CHANDRA ATHUKORALA, 'China's Impact on Foreign Trade and Investment in other Asian Countries'
- 09/05 PREMA-CHANDRA ATHUKORALA, 'Transition to a Market Economy and Export Performance in Vietnam'
- 09/06 DAVID STERN, 'Interfuel Substitution: A Meta-Analysis'
- 09/07 PREMA-CHANDRA ATHUKORALA and ARCHANUN KOHPAIBOON, 'Globalization of R&D US-based Multinational Enterprises'
- 09/08 PREMA-CHANDRA ATHUKORALA, 'Trends and Patterns of Foreign Investments in Asia: A Comparative Perspective'
- 09/09 PREMA-CHANDRA ATHUKORALA and ARCHANUN KOHPAIBOON, 'Intra-Regional Trade in East Asia: The Decoupling Fallacy, Crisis, and Policy Challenges'
- 09/10 PETER WARR, 'Aggregate and Sectoral Productivity Growth in Thailand and Indonesia'
- 09/11 WALEERAT SUPHANNACHART and PETER WARR, 'Research and Productivity in Thai Agriculture'
- 09/12 PREMA-CHANDRA ATHUKORALA and HAL HILL, 'Asian Trade: Long-Term Patterns and Key Policy Issues'

- 09/13 PREMA-CHANDRA ATHUKORALA and ARCHANUN KOHPAIBOON, 'East Asian Exports in the Global Economic Crisis: The Decoupling Fallacy and Post-crisis Policy Challenges'.
- 09/14 PREMA-CHANDRA ATHUKORALA, 'Outward Direct Investment from India'
- 09/15 PREMA-CHANDRA ATHUKORALA, 'Production Networks and Trade Patterns: East Asia in a Global Context'