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

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Abstract: This paper examines the implications of global production sharing for economic integration in East Asia, with emphasis on the behaviour of trade flows in the wake of the 2008 global economic crisis. 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

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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 comments 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,

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[1] The term 'production sharing' was coined by Drucker (1977). In the recent literature an array of alternative terms have bee 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

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[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 record 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 complied by mapping parts and components in the UN Broad Economic Classification (BEC) Registry (available at http:/www. unstats.un.org/unsd/cr/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 firms-level surveys conducted in Thailand and Malaysia was used to fill gaps in the list. The full list of parts and components is given in the Appendix. Data compiled at the HS 6-digit level were converted to SITC for the final analysis using the UN HS-SITC concordance.

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 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.[4] 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 is 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

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[4] 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 ,[5] 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.

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5 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 more 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 transhipment hub in the region, tops the overall logistics quality ranking in the world. The other major transhipment 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 word 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,

$$QX = \alpha + \beta_1 YW + \beta_2 PGDP + \beta_3 RWG + \beta_5 RER + \beta_5 LPI + \beta_6 DIST + \beta_7 DCH + \beta_8 DEA + \beta_9 DASN + \beta_{10} DODC + \gamma T + \varepsilon_{ij}$$

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	Word 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 in 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.[6] 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

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[6] 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 equations[7]. 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,

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[7] 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.[8] 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.[9] 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.

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[8] See for example Drysdale and Garnaut 1997; Frankel and Wei 1997; and Park and Shin 2009.

[9] 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.[10] 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 contrition in the present crisis compared to the Great Depression. Vertical integration of production implies that a

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[10] 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, notabll 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 Tables12 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 in 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 shoes 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 tends to substitute low-end products for high-ed 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.

Appendix: List of Parts and Components[1]

Seriel Number	Codes HS	Codes SITC-Rev 3	Nomenclatures
1	392113	58291	Plates, sheets etc. Nesoi, cellular polyurethanes
2	392119	58291	Plates, sheets etc. Nesoi, cellular plastic nesoi
3	381800	59850	Chem elem doped, used in electron, discs Wafers Etc
4	420400	61210	Articles of leather used in machinery/mech applian
5	400920	62142	Pipe, reinforced/combine w/metal only, w/o fittin
6	400930	62143	Pipe, reinforced/combine w/ textiles, w/o fitting
7	400940	62144	Pipe, reinforced/combine w/ material, w/o fitting
8	400950	62145	Tubes, pipe etc, vulcan soft rubber, with fitting
9	401021	62921	Endless Transms Blt, Trapz, Circumfrn >60cm <180c
10	401022	62921	Endless Transms Blt, Circumference > 180cm < 240c
11	401011	62929	Conveyor belts or belting reinforced with metal
12	401012	62929	Conveyor belts reinforced with textile materials
13	401013	62929	Conveyor belts reinforced only with plastics
14	401019	62929	Conveyor belts/belting of vulcanize rubber, nesoi
15	401023	62929	Endless Synchron Blt, Circumference >60cm <150cm
16	401024	62929	Endless Synchron Blt, Circumference >150cm <198cm
17	401029	62929	Transmission belt/belting, of vulcanize rub, neso
18	401699	62999	Articles of soft vulcanized rubber nesoi
19	401693	62999	Gasket, washers & other seals, of vulcanized rub
20	580710	65621	Textile labels, badges etc, not embroidered, woven
21	560311	65720	Nonwovens of manmade filaments weighing < 25 g/m2
22	560312	65720	Nonwovens, of mmf weighing > 25 g/m2 but < 70 g/m2
23	560790	65751	Twine, cord whet/nt plait impreg w/rub/plast neso
24	560122	65771	Wadding; other articles of wadding of manmade fib
25	591110	65773	Text fabric for card clothing & other tech uses
26	591120	65773	Bolting cloth, whether or not made-up
27	591131	65773	Textile fabrics etc, papermaking, under 650 g/m2
28	591132	65773	Textile fabrics etc, papermaking, 650 g/m2 or more
29	590900	65791	Textile hosepiping and similar textile tubing
30	591000	65792	Transmsn/convyr belt,tex mat,whthr/nt reinfcd, ctd
31	681310	66382	Brake linings a pads, asbestos, oth minrls, celuls
32	700711	66471	Toughnd safety gls of size a shape for vehcls etc
33	700721	66472	Laminated safety glass for vehicles, aircraft etc.
34	700910	66481	Rear-view mirrors for vehicles
35	701710	66591	Lab, hygienic, pharmaceut glswr, fusd qurtz/silica
36	702000	66599	Articles Of Glass, Nesoi (used in lectronics)\
37	820220	69551	Bandsaw blades, and base metal parts thereof
38	820231	69552	Circ saw blds bse mtl w wrkng pt of steel
39	820239	69553	Circ saw blades,bse mtl,wrkng pt oth thn stl,prts

40	820240	69554	Chn sw blds (lngths o ct to sz) a pts, bs mtl
41	820291	69555	Straight saw blades for working metal, bs mtl
42	820299	69559	Saw blades nesoi and parts, of base metal nesoi
43	820810	69561	Knvs a cttng blds f mtl wrkng a prts
44	820820	69561	Knvs a cttng blds f wood wrkng a prts
45	820830	69561	Kns a cttng blds f ktchn appln o fd ind mach a pts
46	820840	69561	Knvs a cttng blds f agric o frstry mach, a pts
47	820890	69561	Oth knvs a cttng blds f mach or mech eqp, pts b mt
48	820900	69562	Plates, sticks tips etc f tools unmountd cermets
49	820713	69563	Rck drlng earth borng tls wrkng pt cermets, & pts
50	820719	69563	Interchangeable tools for hand or machines;& parts
51	820720	69564	Dies drw o extr mtl a pts thrf
52	820730	69564	Tools for pressing, stamping or punching, b m pts
53	820740	69564	Tools for tapping or threading, pts, of bs mtl
54	820750	69564	Tools for drilling other than rock drill, b m pts
55	820760	69564	Tools for boring or broaching, and pts, base mtl
56	820770	69564	Tools for milling, and parts, base metal
57	820780	69564	Tools for turning of base metal
58	820790	69564	Interchangeable tools nesoi, and parts, base mtl
59	821194	69680	Blades for knives, nesoi
60	821195	69680	Handles bs mtl fr knives wth cuttng blades nt 8208
61	830230	69915	Oth bs metl mountngs fttngs etc for motor vehicles
62	830810	69933	Hooks, eyes and eyelets, of base metal
63	830890	69933	Clasps, buckles etc and parts of base metal, nesoi
64	732010	69941	Leaf springs and leaves therefor, of iron or steel
65	732020	69941	Helical springs of iron or steel
66	840290	71191	Super-heated water boilers & steam genrtn boil pts
67	840490	71192	Parts for aux plt for blrs,cond for stm,vpr pr unt
68	840690	71280	Parts for steam and other vapor turbines
69	840710	71311	Aircraft engines (spark-ignition/rotary int cmbus)
70	840910	71319	Parts for aircraft engines (sp-ign, rot or comp)
71	840731	71321	Sprk-ign piston eng f veh ex railwy not ovr 50 cc
72	840732	71321	Spark-Igntn Recprctng Pistn Engine Etc Nov 250cc
73	840733	71321	Spark-igntn recrctng pistn eng etc >250 nov1000cc
74	840734	71322	Spark-igntn recprcting piston engine etc > 1000 cc
75	840820	71323	Compression-igntn int combustion piston engine etc
76	840729	71332	Inboard engines for marine propulsion
77	840810	71333	Marine compress-ignin combustion piston engine etc
78	840790	71381	Spark-igntn rcprctng/rotary int combstn eng, nesoi
79	840991	71391	Spark-ignition int combustion piston eng pts nesoi
80	840999	71392	Spark-ignition reciprocating int com pistn eng pts

81	841111	71441	Turbojets of a thrust not exceeding 25 kn
82	841112	71441	Turbojets of a thrust exceeding 25 kn
83	841210	71449	Reaction engines other than turbojets
84	841121	71481	Turbopropellers of a power not exceeding 1,100 kw
85	841122	71481	Turbopropellers of a power exceeding 1,100 kw
86	841181	71489	Gas turbines of a power not exceeding 5,000 kw
87	841182	71489	Gas turbines of a power exceeding 5,000 kw
88	841191	71491	Turbojet and turboproller parts
89	841199	71499	Gas turbine parts nesoi
90	850110	71610	Electric motors of an output not exceeding 37.5 w
91	850131	71620	Dc motors & generators w output n ov 750 w
92	850132	71620	Dc Motors & Generators W Output > 750w; N Ov 75 Kw
93	850133	71620	Dc Motors & Generators W Output > 75kw; N Ov 375kw
94	850134	71620	Dc motors & generators of output exceeding 375 kw
95	850120	71631	Universal ac/dc motors of an output > 37.5 w
96	850140	71631	Ac motors nesoi, single-phase
97	850151	71631	Ac motors, multi-phase, output not exceeding 750 w
98	850152	71631	Ac Motors,Multi-Phase;Output > 750w Not Over 75 Kw
99	850153	71631	Ac motors, multi-phase, of an output > 75 kw
100	850220	71651	Generating set w spark-ignition int combustion eng
101	850300	71690	Parts of electric motors, generators & sets
102	841090	71819	Parts, inc regulators, for hydraulic turb & wtr wh
103	840140	71878	Parts of nuclear reactors
104	841290	71899	Engine and motor parts, nesoi
105	843290	72119	Agric hort/forest machy & lawn/ground roller parts
106	843390	72129	Parts for harvester, grass mowers, sorting egg etc
107	843490	72139	Parts of milking machines and dairy machinery
108	843590	72198	Pts,pres,crush&sim mac,use in mfg of fruit juices
109	843691	72199	Parts of poultry-keep mac or poultry incub & brood
110	843699	72199	Pts for agric, hort, forest, bee-keep mach nesoi
111	843141	72391	Buckets, shovels, grabs & grips for derricks etc
112	843142	72392	Bulldozer or angledozer blades
113	843143	72393	Parts for boring or sinking machinery, nesoi
114	843149	72399	Parts and attachments nesoi for derricks etc.
115	845230	72439	Sewing machine needles
116	845240	72439	Furniture, bases & covers for sewing mach & parts
117	845290	72439	Parts for sewing machines, nesoi
118	844820	72449	Pt & access for mach for extruding mm text mtl etc
119	844831	72449	Card clothing

120	844832	72449	Pts of mach for prepar textile fibrs ex card cloth
121	844833	72449	Spindles,spin flyers,spin rings & ring travellers
122	844839	72449	Pts & access for spinning, winding mach etc nesoi
123	844811	72461	Dob & jac;card reduc,copy,punch,assm mac as aux mc
124	844819	72461	Auxiliary mac for text machines (head 8444 - 8447)
125	844841	72467	Shuttles for looms
126	844842	72467	Reeds for looms, healds and heald-frames
127	844849	72467	Parts & acces of weav mach or their aux mach,nesoi
128	844851	72468	Sinkers needles & oth arts used in formng stitches
129	844859	72468	Pts & access nesoi for mach for knittng, braid etc
130	845390	72488	Parts of mach f prep or make art of hides,leather
131	845090	72491	Pts of household or lndry-typ wash mac inc wsh/dry
132	845190	72492	Pts for wash/clean, pasting floor covers etc
133	843991	72591	Parts of mach f make pulp of fibr cellulosic matl
134	843999	72591	Pts for machy mkg or finishing paper or paperboard
135	844190	72599	Pts of mac fr make up paper pulp,paper/papbrd,cut
136	844250	72635	Print type, blocks, cylinders etc for print purpse
137	844090	72689	Parts for bookbind mach, inc book-sew machines
138	844240	72691	Parts of mach & equip f make print blocks, etc
139	844390	72699	Pts for print machy & mach anchillary to printing
140	843790	72719	Parts of mach f clean,sort, mill grain,veg,ex farm
141	843890	72729	Parts of mach of ch 84, nesoi,ind prep food,drink
142	846691	72819	Parts for machines of heading 8464
143	846692	72819	Parts for machines of heading 8465
144	847490	72839	Parts of mach for sorting etc earth stone ores etc
145	847590	72851	Parts of mach for assmbl elec lamp etc mfg glsswre
146	847790	72852	Pts mach for work rubber/plast/mfg rbbr/plstc prod
147	847890	72853	Parts of mach,nesoi,for prep or making up tobacco
148	847990	72855	Pts of mach/mechncl appl w indvdul function nesoi
149	846610	73511	Tool holdrs & self-opening dieheads for machines
150	846620	73513	Work holders for machine tools
151	846630	73515	Dividing heads & ot spec attachments for mach tool
152	846693	73591	Parts and accessories for use with mach tool nesoi
153	846694	73595	Parts for machines of heading 8462 or 8463
154	845490	73719	Pts for converters ladles etc used in met foundry
155	845530	73729	Rolls for metal-rolling mills
156	845590	73729	Parts for metal rolling mills exc rolls for rol mi
157	851590	73739	Pt elect laser ultrasonic,etc,hot spray metal mach
158	846890	73749	Machy & appr pts for soldrng brazng weldng, nesoi
159	841690	74128	Parts of furnace burners
160	851490	74135	Parts for ind, lab furnaces,ovens or heating equip

161	841790	74139	Parts of ind or lab furn & oven,incinerat, nonelec
162	841891	74149	Furniture for refrigeration or freezing equipment
163	841899	74149	Refrigerator freezer and heat pump parts nesoi
164	841520	74155	Automotive air conditioners
165	841590	74159	Parts, nesoi, of air conditioning machines
166	840590	74172	Pts,prod gas,wtr gas,acetylene gas,wtr pro gas gen
167	841990	74190	Parts for machinery plant or lab equipment etc
168	841330	74220	Fuel, lub/cooling med pumps for int comb pistn eng
169	841391	74291	Parts of pumps for liquids
170	841392	74295	Parts of liquid elevators
171	842123	74363	Oil or fuel filters for internal combustion engine
172	842131	74364	Intake air filters for internal combustion engines
173	841490	74380	Air/gas pump, compressor and fan etc parts, nesoi
174	842191	74391	Parts of centrifuges, including centrifugal dryers
175	842199	74395	Filter/purify machine & apparatus parts
176	870990	74419	Parts for works trucks w/o lift equip
177	842542	74443	Jacks and hoists,hydraulic,exc blt-in jack systems
178	843110	74491	Pts for pulley tackle, hoist ex skip, winches, etc
179	843120	74492	Pts of frk lft trks & works trks with lift or hndl
180	843131	74493	Parts of elevators, exc cont action,sk hoist,escal
181	843139	74494	Pts for lifting, hndlng, loading/unldng mach nesoi
182	846791	74519	Parts of chain saws
183	846792	74519	Parts of pneumatic tools for working in the hand
184	846799	74519	Parts for hd tools self-con nonelectric motr neso
185	842290	74529	Parts for machines for dishwashing, packing, etc
186	842390	74539	Weighing machine weights & pts of weighing machine
187	842490	74568	Pts for mechanical appliance project liquid etc
188	842091	74593	Cylinders f rolling mach, exc f metals or glass
189	842099	74593	Parts,nesoi,f folling mach, exc f metals or glass
190	847690	74597	Parts of automatic vending machines
191	848210	74610	Ball bearings
192	848220	74620	Tapered roll brg, incl cone & roller assemblies
193	848230	74630	Spherical roller bearings
194	848240	74640	Needle roller bearings
195	848250	74650	Cylindrical roller bearing nesoi
196	848280	74680	Oth ball or roll brg, inc combined ball/roll brgs
197	848291	74691	Balls, needles and rollers for bearings
198	848299	74699	Parts of bearings, nesoi
199	848110	74710	Pressure-reducing valves
200	848120	74720	Valves f oleohydraulic or pneumatic transmissions
201	848130	74730	Check valves

202	848140	74740	Safety or relief valves
203	848180	74780	Taps cocks etc f pipe vat inc thermo control nesoi
204	848190	74790	Pts f taps etc f pipe vat inc press & thermo cntrl
205	848310	74810	Transmission shafts (inc cam-&crank-shaft), etc.
206	848320	74821	Housed bearings, incorp ball or roller bearings
207	848330	74822	Bearing housings; plain shaft bearings
208	731519	74839	Parts of articulated link chain of iron or steel
209	848340	74840	Gears; ball or roller screws; gear boxes, etc
210	848350	74850	Flywheels and pulleys, including pulley blocks
211	848360	74860	Clutches & shaft couplings (inc universal joints)
212	848390	74890	Toothed wheels,chain sprockets&oth trans elem; pts
213	848410	74920	Gaskets, metal layers, or other matl, mech seals
214	848490	74920	Sets or assortments of gaskets and similar joints
215	848510	74991	Ships' or boats' propellers and blades therefor
216	848420	74999	Mechanical seals
217	848590	74999	Machine parts with no electric features nesoi
218	847149	75230	Digital adp mac & units,entered as systems, nesoi
219	847150	75230	Digital processing units, n.e.s.o.i.
220	847160	75260	Adp input or output units, storage or not, nesoi
221	847170	75270	Automatic data processing storage units, n.e.s.o.i
222	847180	75290	Automatic data processing units, n.e.s.o.i.
223	847190	75290	Adp mac&unts thereof;mag/opt rder,trnscrb,proc dat
224	900990	75910	Parts and accessories of photocopying apparatus
225	847350	75990	Pts suitble fr use w mac of 2/more head 8469-8472
226	847310	75991	Typewriter & word process mach parts & accessories
227	847340	75993	Parts and accessories of office machines, nesoi
228	847321	75995	Parts of electronic calculating machines
229	847329	75995	Parts for mach,nesoi, incorp calculating device
230	847330	75997	Parts & accessories for adp machines & units
231	852721	76211	Radiobroadcast receivers for motor vehicles w rcos
232	852729	76212	Radiobroadcast receivers for motor vehicles nesoi
233	852731	76281	Radiobroadcast receivers,nesoi,with sound recorder
234	852732	76282	Radiobroadcast receivers,nesoi,with clock wo p & r
235	852739	76289	Radiobroadcast receivers nesoi
236	852520	76432	Transmission appr incorporating reception apparats
237	852790	76481	Reception appr radio-telephon/telegraph etc nesoi
238	851790	76491	Pt elect appr f line telephony or telegraphy etc.
239	851890	76492	Pts micro-head-ear-phone,elect snd ampl sets etc
240	852910	76493	Antennas and antenna reflectors and parts
241	852990	76493	Pts,ex antenna,for trnsmssn,rdr,radio,tv,etc nesoi
242	852210	76499	Pickup cartridgesfor sound recorders

243	852290	76499	Pts & access f sound/video reproducing,record appr
244	850421	77111	Liq Dielect Transformer Power Handl Cap Nov 650kva
245	850422	77111	Liq Dielect Transfrm Pwr Hnd Cap >650 Nov 10t Kva
246	850423	77111	Liq Dielect Transfrm Power Hand Cap > 10t Kva
247	850432	77119	Transformers, nesoi,> 1 kva but =< 16 kva
248	850433	77119	Transf nesoi, power handling cap >16 nov 500 kva
249	850434	77119	Transformers, nesoi, > 500 kva
250	850450	77125	Electrical inductors nesoi
251	850490	77129	Pts for elect transformers static converters indct
252	853400	77220	Printed circuits
253	853310	77231	Fixed carbon resistors, composition or film type
254	853321	77232	Fixed resistors, nesoi, pwr hand cap nov 20 w
255	853329	77232	Fixed resistors nesoi > 20 w power hdlg cpcy
256	853331	77233	Wirewound variable resistors, < 20 w
257	853339	77233	Wirewnd var resist inc rheostats etc nesoi
258	853340	77235	Variable resistors inc rheostat & potntiomtr nesoi
259	853390	77238	Parts for resistors, rheostats, potetiometers
260	853510	77241	Fuses for electrical apparatus, voltage > 1000 v
261	853521	77242	Automatic circuit breakers > 1000 v but < 72.5 kv
262	853529	77243	Auto circt breaker voltage 72.5 kv or more
263	853530	77244	Isolating Switch & Make-&-Break Swtch Volt > 1000v
264	853540	77245	Lightning arresters,voltage limiters,surge suppres
265	853590	77249	Elect appr f prtct to elect circt >1000 v nesoi
266	853610	77251	Fuses for voltage not exceeding 1000 v
267	853620	77252	Auto circuit breakers voltage not exceeding 1000 v
268	853630	77253	Other apparatus for protecting elc crts =< 1000 v
269	853641	77254	Relays for a voltage not exceeding 60 v
270	853649	77254	Relays For Voltage Over 60v More But Nt Over 1000v
271	853650	77255	Elect switches f voltage not over 1000 v, nesoi
272	853661	77257	Lampholders For Voltage Not Over 1000v
273	853669	77258	Elect plugs & sockets f voltage not over 1000 v
274	853690	77259	Elect appr f prtct to elect circt nov 1000 v nesoi
275	853710	77261	Controls etc w elect appr f elect cont nov 1000 v
276	853720	77262	Controls etc w elect appr f elect cont over 1000 v
277	853810	77281	Boards, panels, consoles etc of 8537 less apts
278	853890	77282	Pt f elect appr f elect circt; f elct contrl nesoi
279	854411	77311	Insulated winding wire of copper
280	854419	77311	Insulated winding wire, nesoi
281	854420	77312	Insulated coaxial cable & oth coaxial elect condct
282	854430	77313	Insulated wiring sets for vehicles ships aircraft
283	854441	77314	Insulated electric conductors =< 80 v with cntrs

284	854449	77314	Insulated electric conductors =< 80 v nesoi
285	854451	77315	Electrical Conductors > 80 But =< 1000v W Cnctrs
286	854459	77315	Elec Cond Ov 80v Nov 1000v Not Fitted W Connector
287	854460	77317	Electric conductors for voltage exceeding 1000 v
288	854470	77318	Insulated optical fiber cables with indvuly sh fbr
289	854610	77322	Electrical insulators of glass
290	854620	77323	Electrical insulators of ceramics
291	854690	77324	Electrical insulators, nesoi
292	854710	77326	Insulating fittings of ceramics for electrical mch
293	854720	77328	Insulating fittings for machines made of plastic
294	854790	77329	Inslt fit ex ceram/plas;elec cond tb/jnt,bmtl etc
295	902230	77423	X-ray tubes
296	902290	77429	X-ray/hi tnsn genr cntr pnl & dsk exm/trtmnt tb pt
297	851090	77549	Parts of electric shavers and hair clippers
298	850990	77579	Pts electromech domestc appl slf-cont elect motors
299	851690	77589	Pts f heaters,hairdressing appr,flt iron,stove etc
300	854011	77611	Cathode-ray tv picture tubes, color inc monitor
301	854012	77612	Cathode-ray tv picture tubes, black and white etc
302	854020	77621	Tv camera tbs; image cnvrtr & intnsfr; phtocthd tb
303	854040	77623	Data/graphic display tubes,color, w/ pitch < 0.4 m
304	854050	77623	Data/graphic display tubes, monochrome
305	854060	77623	Cathode-ray tubes, n.e.s.o.i.
306	854071	77625	Magnetron microwave tubes
307	854072	77625	Klystron microwave tubes
308	854079	77625	Microwave tubes, nesoi
309	854081	77627	Receiver or amplifier tubes
310	854089	77627	Thermionic and other cathode tubes nesoi
311	854091	77629	Parts of cathode-bay tubes
312	854099	77629	Parts of cathode tubes, nesoi
313	854110	77631	Diodes ex photosensitive or light-emitting diodes
314	854121	77632	Transistors ex photosenitive,disspation rate < 1 w
315	854129	77633	Transistors, other than photosensitive, nesoi
316	854130	77635	Thyristors, diac & triac, ex photosensitive device
317	854140	77637	Photosnsitve semicndctr dvice inc phtvltc cell etc
318	854150	77639	Semicndctr dvice ex photosensitive/photovoltaic cl
319	854212	77641	Cards incorp. Elec. Integrated crct (smart cards)
320	854213	77641	Metal oxide semiconductors(mos),mono digital inte
321	854214	77641	Monolithic digital integ circuits,bipolar tchnolg
322	854219	77641	Monolithic integrated circuits, digital, nesoi
323	854230	77643	Electronic monolithic integrated circuit,n.e.s.o.
324	854240	77645	Electronic hybrid integrated circuits

325	854250	77649	Electronic microassemblies
326	854160	77681	Mounted piezoelectric crystals
327	854190	77688	Parts for diodes, transistors & smlr semiconductrs
328	854290	77689	Electronic integrated circuits and mcrssmbls parts
329	850710	77812	Lead-acid batteries of a kind used for stg engines
330	850720	77812	Lead-acid storage batteries nesoi
331	850730	77812	Nickel-cadmium storage batteries
332	850740	77812	Nickel-iron storage batteries
333	850780	77812	Storage batteries nesoi
334	850690	77817	Primary battery and cell parts
335	850790	77819	Pts elect storage batteries inc separators thereof
336	853929	77821	Filament lamps ex ultraviolet/infrared lamps nesoi
337	853921	77821	Tungsten halogen electric filament lamps
338	853922	77821	Filament lamp power nov 200 w & voltage over 100 v
339	853931	77822	Discharge lamps, (ex ultraviolet), fluorescent
340	853932	77822	Mercury or sodium vapor lamps; metal halide lamps
341	853939	77822	Discharge lamps ex ultrvilt flurscnt ht cthde lamp
342	853910	77823	Sealed beam electric lamp units
343	853941	77824	Arc lamps
344	853949	77824	Ultraviolet or infrared lamps
345	853990	77829	Parts for elect filament, discharge or arc lamps
346	851110	77831	Internal combustion engine spark plugs
347	851120	77831	Internal combustion engine magnetos, magneto-dynam
348	851130	77831	Distributors; ignition coils
349	851140	77831	Internal combustion engine starter motors
350	851150	77831	Internal combustion engine generators, nesoi
351	851180	77831	Elect igntn/start eq f spark/comp eng; genrt nesoi
352	851190	77833	Pts elect igntn/start equip; generators & cut-outs
353	851210	77834	Lighting or visual signaling equipment for bicycle
354	851220	77834	Elect lighting/visual signlng eq ex for bicycles
355	851230	77834	Electrical sound signaling equipment for mtr vhl
356	851240	77834	Wndshield wipr dfrstr & dmstr for cycle/mtr vehcle
357	851290	77835	Pt elect lghtng/sgnlng eq wndshield wpr dfrstr etc
358	850890	77848	Electromechanical hand tool parts
359	853210	77861	Fixed capacitors, 50-60 hz, power, cpcty =>.5 kvar
360	853221	77862	Tantalum electrolytic fixed capacitors
361	853222	77863	Aluminum electrolytic fixed capacitors
362	853223	77864	Ceramic dielectric,single layer fixed capacitors
363	853224	77865	Ceramic dielectric, multilayer fixed capacitors
364	853225	77866	Dielectric fixed capacitors of paper or plastics
365	853229	77867	Fixed capacitors, nesoi

366	853230	77868	Variable or adjustable (pre-set) capacitors
367	853290	77869	Parts for electrical capacitors
368	854311	77871	Particle accelerators,ion implanters for smcndctrs
369	854319	77871	Particle accelerators, nesoi
370	854390	77879	Pt elec mach & appr w individual functions, nesoi
371	850511	77881	Permanent magnets made of metal
372	850519	77881	Permanent magnets made of materials o/t metal
373	850520	77881	Electromagnetic couplings, clutches and brakes
374	850530	77881	Electromagnetic lifting heads
375	850590	77881	Electromagnets,clamps, similr hldng devices & part
376	853010	77882	Electrical signaling or traffic control eqpt rail
377	853080	77882	Electrical signaling or traffic control eqpt,nesoi
378	853090	77883	Parts for elc signaling, traffic, safety equipmnt
379	853190	77885	Parts of electric sound or visual signaling aprts
380	854511	77886	Carbon electrodes of a kind used for furnaces
381	854519	77886	Carbon electrodes nesoi
382	854520	77886	Electrical carbon or graphite brushes
383	854590	77886	Electrical carbon or graphite articles, nesoi
384	854890	77889	Electrical parts of machinery nesoi in chapter 85
385	870600	78410	Chas w eng f trac, mtr veh f pass/gd & special pur
386	870710	78421	Bodies f mtr car/vehicles for transporting persons
387	870790	78425	Bodies f road tractors and motor veh(pub tran,etc)
388	870810	78431	Bumpers and parts, for motor vehicles
389	870821	78432	Safety seat belts for motor vehicles
390	870829	78432	Pts & access of bodies of motor vehicles, nesoi
391	870831	78433	Mounted brake linings for motor vehicles
392	870839	78433	Brakes and servo-brakes & pts for motor vehicles
393	870840	78434	Gear boxes for motor vehicles
394	870850	78435	Drive axles with differential for motor vehicles
395	870860	78436	Non-driving axles & pts thereof for motor vehicles
396	870870	78439	Road wheels & pts & accessories for motor vehicles
397	870880	78439	Suspension shock absorbers for motor vehicles
398	870891	78439	Radiators for motor vehicles
399	870892	78439	Mufflers and exhaust pipes for motor vehicles
400	870893	78439	Clutches and parts thereof for motor vehicles
401	870894	78439	Steering wheels, columns & boxes f motor vehicles
402	870899	78439	Parts and accessories of motor vehicles, nesoi
403	871411	78535	Saddles and seats of motorcycles
404	871419	78535	Parts of motorcycles, nesoi
405	871420	78536	Parts & accsries of carriages for disables persons
406	871491	78537	Frames and forks, and prts for bicycles etc.

407	871492	78537	Wheel rims and spokes for bicycles etc.
408	871493	78537	Hubs,other than coster brakn hubs,hb brks,spk,whls
409	871494	78537	Brakes, incl coaster brkng hubs,hub brks,prts,nes
410	871495	78537	Saddles for bicycles etc.
411	871496	78537	Pedals and crank-gear, parts of bicycles etc.
412	871499	78537	Parts and acessories nesoi of bicycles etc.
413	871690	78689	Pts trailers, semi-trailer & ot veh n mech propeld
414	860711	79199	Truck assemblies for self-propelled railway veh
415	860712	79199	Truck assemblies, railway, nesoi
416	860719	79199	Truck axles and wheels & pts, etc for rail vehicls
417	860721	79199	Airbrakes and parts thereof
418	860729	79199	Brakes, except airbrakes, and parts thereof
419	860730	79199	Hooks & oth coupling devices buffers & pts thereof
420	860791	79199	Parts, nesoi, of locomotives
421	860799	79199	Pts of railway/tramway exc locomo/rollg stck nesoi
422	880310	79291	Propellr rotor & pts of gliders & a/c, n-pwrd/pwrd
423	880320	79293	Undcarrge & pts gliders & a/c, non-powered/powered
424	880330	79295	Parts of airplanes or helicopters, nesoi
425	880390	79297	Parts of non-powered & powered aircraft etc nesoi
426	732211	81211	Radiators for centrl htng and parts, cast iron
427	732219	81211	Radiators for cntrl htng and parts, ios exc cstirn
428	732290	81215	Air htrs a hot air dist nt elec htd wfan, prts ios
429	840390	81219	Parts for central heating boilers
430	851390	81380	Parts for portable electric lamps nesoi
431	940591	81391	Parts for lamps etc. Of glass
432	940592	81392	Parts for lamps etc. Of plastic
433	940599	81399	Parts for lamps and lighting fittings, nesoi
434	940110	82111	Seats of a kind used for aircraft
435	940120	82112	Seats of a kind used for motor vehicles
436	940190	82119	Parts of seats (ex medical, barber, dental etc)
437	940390	82180	Parts of furniture, nesoi
438	621220	84552	Girdles & panty girdles, knit or crocheted or not
439	621230	84552	Corsets, knitted or crocheted or not
440	621290	84552	Braces suspenders garters art parts kt o ct
441	650300	84841	Felt hats & other felt headgear from heading 6501
442	650400	84842	Hats&othr hdgr,plaitd/assembld strips any material
443	650700	84848	Hdbands, linings, cvrs, frms, vsrs, etc chinstraps
444	900590	87119	Parts etc of binoculars, optical telescropes etc
445	901290	87139	Pts for microscopes, exc optical; diffraction
446	901190	87149	Pts & accessories for compound optical microscopes
447	901390	87199	Pts of liq crystal device, laser&oth optical,nesoi

448	902890	87319	Pt acces gas lqd elec supply mtr inc clbrating mtr
449	902920	87325	Speedometers and tachometers; stroboscopes
450	902990	87329	Pts for revolution counters, odometer, etc
451	901490	87412	Pts, for direct find compasses, navigational inst
452	901590	87414	Parts and accessories for surveying etc nesoi
453	901790	87424	Pts, for drawing etc & inst for measuring lgth ins
454	903190	87426	Pts, of mach nesoi in this chap,& profile projectr
455	902690	87439	Pts, inst & apprts measure/check variables liq/gas
456	902490	87454	Pts, machine & appln, test hardness/strength, etc
457	902590	87456	Pts, hydrometers, therometers, pyrometers, etc
458	903210	87461	Thermostats
459	903220	87463	Manostats
460	903290	87469	Pts, autom regulating/controlling inst & apprts
461	903090	87479	Pts of inst f meas elect quat alpha beta inzng rdt
462	903300	87490	Pts, nesoi for machines,appln,inst/appts of chap90
463	900662	88112	Photo flashbulbs, flashcubes and the like
464	900661	88113	Photo discharge lamp (electronic) flashlght apprts
465	900669	88113	Photographic flashlight apparatus nesoi
466	900691	88114	Parts and accessories for still photo cameras
467	900699	88115	Pts, photographic flashlight exc nesoi
468	900791	88123	Parts and accessories for cinema cameras
469	900792	88124	Parts and accessories for cinema projectors
470	900890	88134	Pts, of image projector,enlarger&reducer exc cinem
471	901090	88136	Pts & access of apprt & equip for photo/cinema lab
472	900390	88422	Parts for frames and mountings, spectacles, etc
473	900211	88431	Objctve lenses pts access for cameras projectr etc
474	900219	88432	Objective lenses and parts, nesoi
475	900220	88433	Filters & parts & accessories for instr & appratus
476	900290	88439	Prism, mirrors, mounted & parts & accessorie, neso
477	910400	88571	Inst panel clk & clk simlr,for vehicle,aircrft,etc
478	911110	88591	Wtch cases,prcs metal or metal clad w prcs metal
479	911120	88591	Watch cases of base metals, gold or silver plated
480	911180	88591	Watch cases, nesoi
481	911190	88591	Parts for watch cases of any material
482	911210	88597	Clock cases of metal
483	911280	88597	Clock cases of other than metal
484	911290	88597	Parts for clock cases, nesoi
485	911011	88598	Complete movements of watches,unassem/ptly assembl
486	911012	88598	Incomplete movements of watches, assembled
487	911019	88598	Rough movements of watches
488	911090	88598	Compl clk movemnt, unassemble/ptly assem,rough etc

489	911410	88599	Clock or watch springs, including hair springs
490	911420	88599	Clock or watch jewels
491	911430	88599	Clock or watch dials
492	911440	88599	Clock or watch plates and bridges
493	911490	88599	Parts for clocks or watches, nesoi
494	930610	89121	Cartridges for riveting or similar tools & parts
495	930529	89195	Parts of sport shotgun and rifles, nesoi
496	482110	89281	Paper and paperboard labels of all kinds, printed
497	392630	89395	Fittings for furniture, coachwork etc, of plastics
498	950291	89423	Doll garments and accessories, footwear & headwr
499	950299	89423	Doll parts and accessories nesoi
500	852440	89860	Magnet tapes fr reproducing other than sound/image
501	852452	89865	Mag Tape,Sound or Image,Recorded,Ovr 4mm N/O 6.5mm
502	852453	89867	Magnetic Tape and 0r Image,Recorded,Ovr 6.5mm Wide
503	852460	89879	Recorded, cards incorp. A magnetic stripe
504	852491	89879	Ohtr recorded media,nesoi,for reprod othr than s/i
505	852499	89879	Recorded media for reproducing snd or image, nesoi
506	852431	89879	Laser discs for reproducing other than sound/image
507	852439	89879	Discs for laser reading systems, nesoi
508	920910	89890	Metronomes, tuning forks and pitch pipes
509	920920	89890	Mechanisms for music boxes
510	920930	89890	Music instrument strings
511	920991	89890	Parts and accessories for pianos
512	920992	89890	Pts & accessories for string music inst nesoi
513	920993	89890	Pts & accessories for keyboard pipe organs etc.
514	920994	89890	Pts & accessories for musical inst of heading 9207
515	920999	89890	Pts & accessories for musical instruments nesoi
516	961390	89935	Parts of lighters, except flints and wicks
517	660310	89949	Handles and knobs for umbrellas, whips etc.
518	660320	89949	Umbrella frames, mounted, shaft/stick
519	660390	89949	Parts, trimmings & access of umbrellas etc.
520	960610	89983	Press-fasteners, snap-fastners & press-studs& pts
521	960621	89983	Buttons of plastics, not covered with text materls
522	960622	89983	Buttons,of base metal,not coverd w textile mat
523	960719	89985	Slide fasteners, nesoi
524	960720	89986	Parts of slide fasteners
525	670100	89992	Skins & oth parts of birds w feathers processed

Note: 1 Listed in ascending order of SITC codes

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Table 1: Geographic profile of world manufacturing trade: total trade and network trade

(a) Exports

	Total manufacturing		Network products							
			Parts And components		Final assembly		Total		Share of parts and components in network products (%)	
	1992/3	2006/07	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)

	Sub Indices							Composite index	
Country	Customs	Infra-Structure	International shipments	Logistics competence	Tracking & tracing	Domestic logistics	Timeliness	Index	Global raking[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 assed 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 be 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]

	Total	*Parts and components*	*Final*
World income	+0.82	+0.62	+0.82
	(15.55)***	(11.87)***	(15.47)***
Per capita GNP	+0.23	+0.56	+0.21
	(4.66)***	(9.90)***	(4.20)***
Real exchange rate	+ 0.12	+0.06	+0.05
	(1.56)*	(0.59)***	(0.26)***
Logistic performance index	+1.27	+1.80	+1.29
	(6.71)***	(7.24)***	(5.88)***
Relative wage	-0.25	-0.24	-0.34
	(2.65)***	(2.57)*	(6.99)***
Distance to export markets	-0.79	-0.82	-0.79
	(13.77)***	(12.12)***	(13.97)***
PRC dummy	+1.61	+2.25	+1.57
	(4.41)***	(4.92)***	(4.01)***
ASEN dummy	+2.61	+3.25	+2.57
	(3.43)***	(3.95)***	(3.23)***
DEA dummy	+1.28	+1.57	+1.25
	(10.77)***	(14.37)***	(9.32)***
DODC dummy	-0.26	-0.17	-0.27
	(1.76)*	(0.87)	(1.82)*
Constant term	-9.58	-9.28	-9.73
	(7.02)***	(6.13)****	(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								

2008Q1	12.7	-1.4	13.7	11.6	36.6	8.4	-0.9	10.5
2008Q2	9	-0.4	9.6	8	27.6	8.2	-1.4	8.3
2008Q3	4.6	3.4	4.6	3.9	12.6	10	0.6	5.7
2008Q4	0.1	4	-2.4	-2.4	2.3	-0.6	-7.8	-2.1
2009Q1	-30.6	3.3	-32.7	-34.5	-19.8	-2	-7	-21.3
2009Q2	-16.5	-24.4	-15.5	-14.1	-19.3	-36.1	-36.7	-22.6
China								
2008Q1	23.7	12.1	31.2		31.2	5.4	25.0	16.3
2008Q2	25.1	18.0	29.2		29.2	12.2	29.7	19.0
2008Q3	28.2	18.1	33.9		33.9	15.3	23.5	20.2
2008Q4	4.5	7.9	2.7		2.7	0.7	4.1	0.9
2009Q1	-22.9	-16.7	-26.3		-26.3	-15.4	-22.6	-21.1
2009Q2	-25.6	-23.8	-26.5		-26.5	-18.5	-26.6	-23.5
2009July	-24.8	-20.1	-27.1		-27.1	-14.1	-26.0	-21.7
Korea								
2008Q1	19	12.3	19.9	20.5	35.5	18.4	-2.7	17.4
2008Q2	29.4	16.8	30.7	33.7	38.8	10.1	5.6	23.2
2008Q3	24.9	14.5	25.6	21.5	48.5	17.4	9.9	27.1
2008Q4	-17.4	-11.5	-20.1	-24.1	-5.6	-15.4	-6.2	-9.9
2009Q1	-37.1	-34.3	-38.1	-38.6	-37.7	-40.3	-27.9	-20.1
2009Q2	-20.8	-31.3	-19.2	-13.4	-33.8	-26	-18.2	-23.4
Taipei, China								
2008Q1	22.3	-0.7	25	41.5	30.7	12.1	-0.6	17.4
2008Q2	21.7	18.3	21.4	38.3	19.8	14.8	-1.4	18.2
2008Q3	6.4	21.5	4.9	8.9	12.2	9.2	3.4	7.6
2008Q4	-29.7	4.9	-33.6	-39.6	-23.7	-14.8	-16.4	-24.6
2009Q1	-51.9	-17.8	-55.8	-63.5	-51.1	-32.7	-26.5	44
2009Q2	-26.8	-10.5	-29.2	-32.6	-36.6	-34.7	-24.7	-28.2
2009July								-35.9
Indonesia								
2008Q1	40.1	32.2	40.8	44.4	39.9	17.4	13.3	31.9
2008Q2	27.3	11.9	36.7	29.6	38.6	18.2	20.4	29.4
2008Q3	28.7	35.7	20.1	32.5	18.9	18.3	20.6	27.9
2008Q4	-6.1	-3.6	-9	-19.5	-2.5	-4.5	-3.3	-5.3
2009Q1								-31.9
2009Q2								-26.0

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							

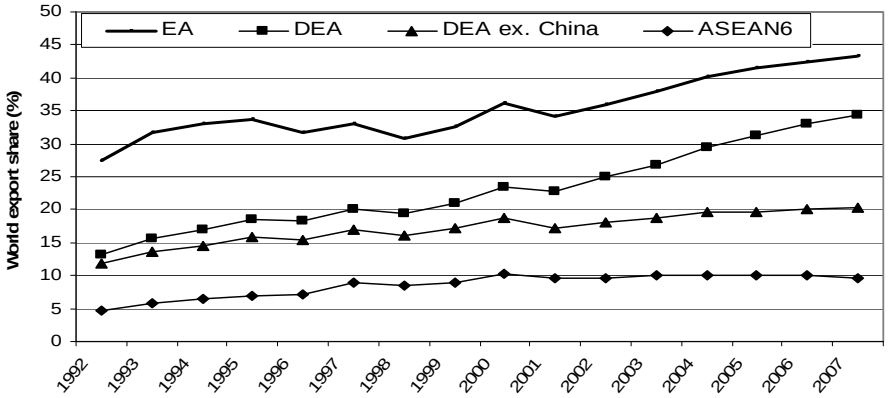
Total manufacturing	2.8	3.9	-4.2	-11.8	-25.2	-27.6	-17.0
Parts and components	-3.6	-4.3	-7.6	-15.1	-31.0	-32.7	-17.7
Assembly	10.1	12.0	-6.6	-11.8	-21.6	-23.8	-11.3
Total network trade[1]	3.3	4.1	-7.1	-13.2	-26.0	-27.8	-14.1
World							
Total manufacturing	2.9	4.5	3.5	-9.2	-25.4	-29.3	-25.1
Parts and 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.

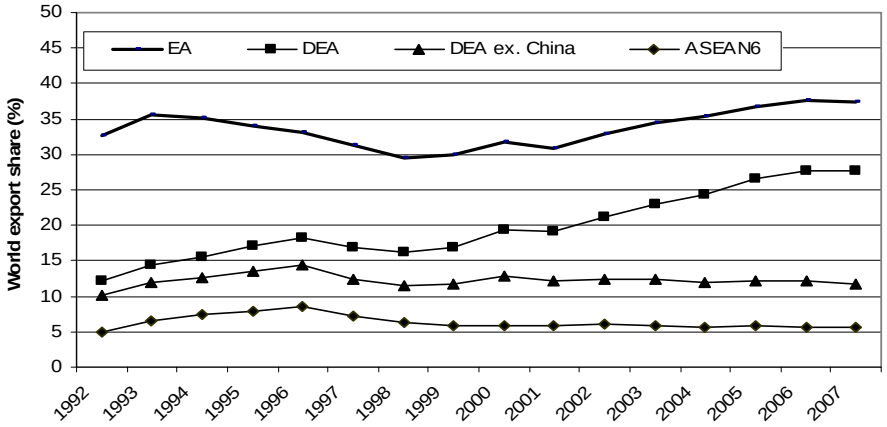
Source: Compiled from US International Trade Commission on-line database.

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

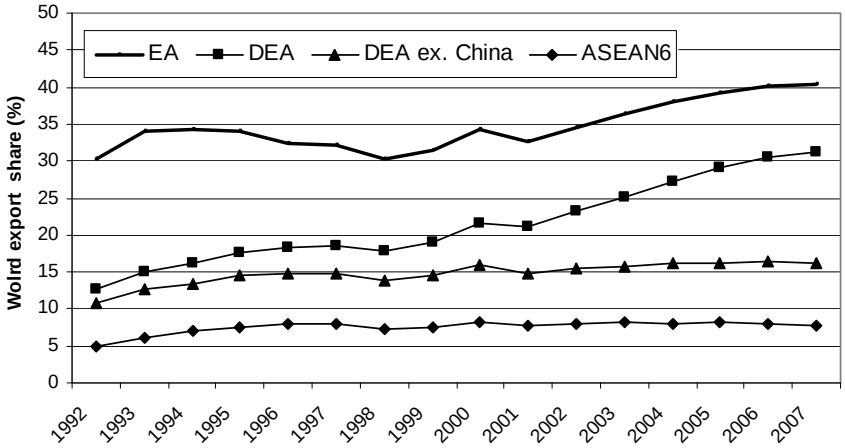
(a) Parts and components



(b) Final assembly



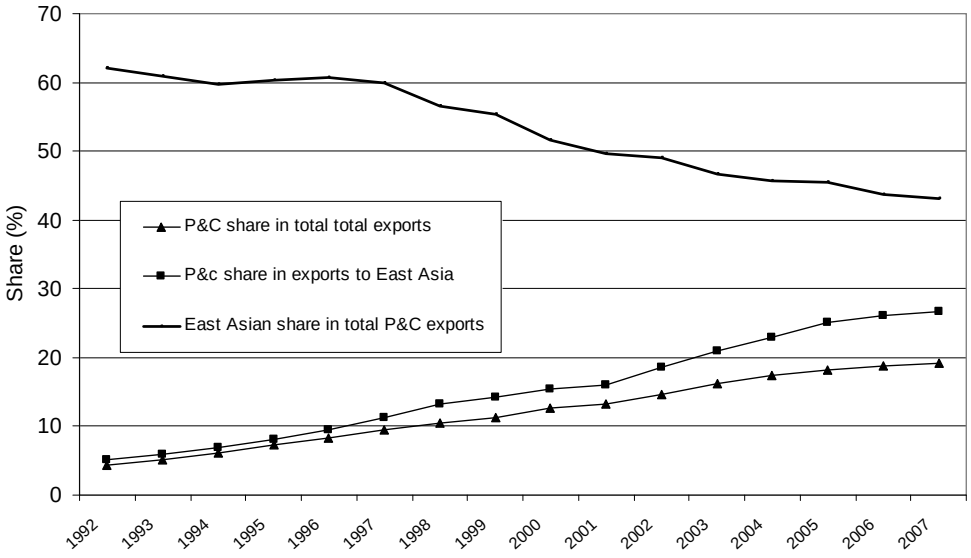
(c) Total network exports



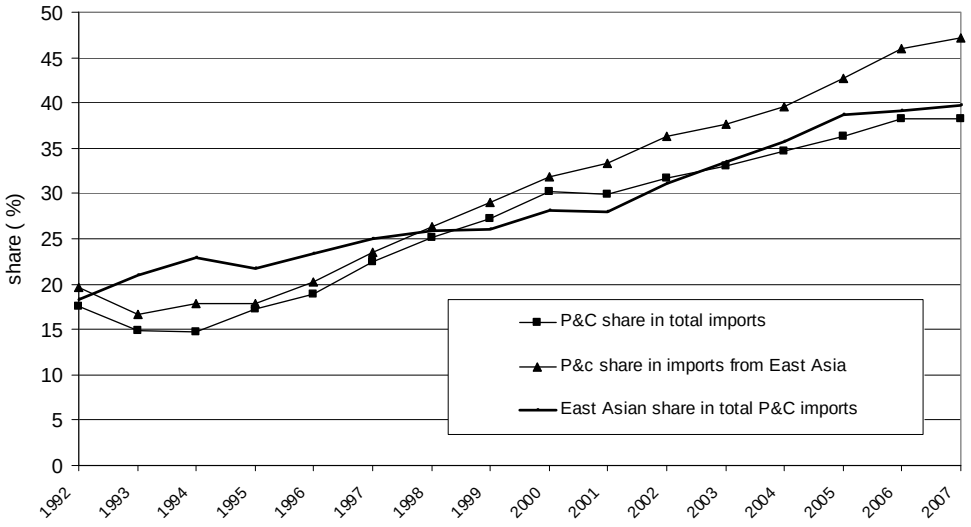
Source: Based on data compiled from UN Comtrade database.

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

A: Manufacturing exports



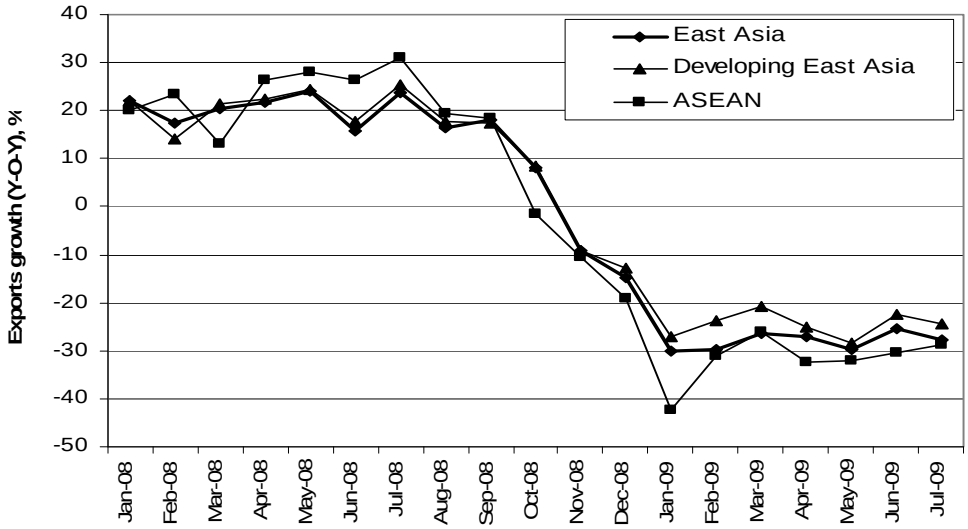
A: Manufacturing imports



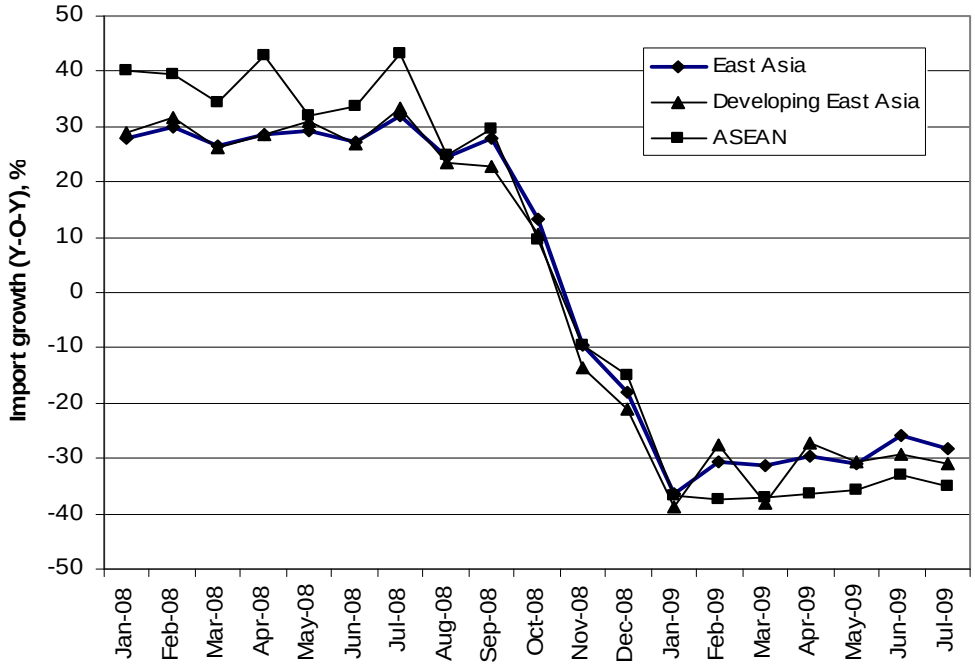
Source: Based on data compiled from UN Comtrade database.

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.

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