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Enhancement and Deepening of the Competitiveness of the Philippine Electronics Industry Under a Bilateral Setting

Myrna S. Austria

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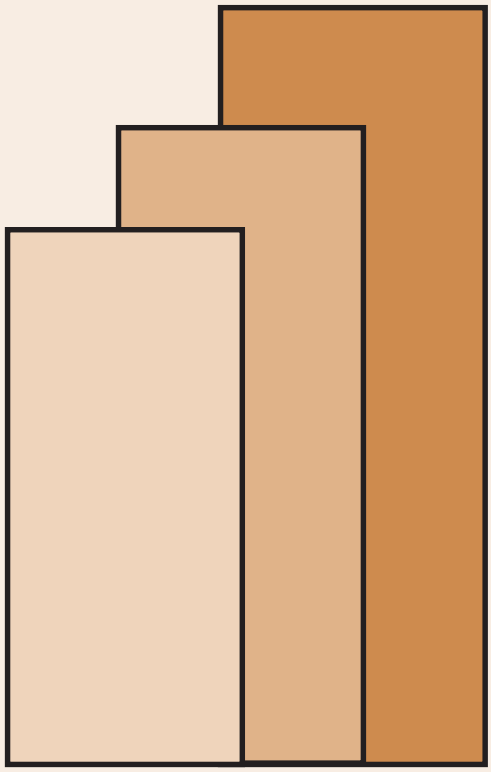

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For comments, suggestions or further inquiries please contact:
The Research Information Staff, Philippine Institute for Development Studies
3rd Floor, NEDA sa Makati Building, 106 Amorsolo Street, Legaspi Village, Makati City, Philippines
Tel Nos: 8924059 and 8935705; Fax No: 8939589; E-mail: publications@pidsnet.pids.gov.ph
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Enhancement and Deepening of the Competitiveness of the Philippine Electronics Industry Under a Bilateral Setting

Myrna S. Austria, Ph.D.

Abstract

The participation of the Philippines in the global production network of multinational electronic companies has undoubtedly shaped the pattern and structure of the country's international trade since the early 1990s. While the industry has remained the largest foreign exchange earner for the country, the country's participation in the global production network industry is confronted, for the longest time, with one major issue. That is, the country hardly progressed beyond the lowest level of the production chain - labor intensive and import dependent assembly and testing; and hence, the value added of the industry has remained small. The industry is competitive in 18 electronic products that accounted for about 86 percent of the industry's total exports. The government, however, needs to address the weaknesses and inadequacies of the local support structures that have constrained the ability of the country to move towards higher levels of the value chain in order to ensure that the global players currently operating in the country will remain and expand operations. Since the global production network is market-driven, negotiations under an RP-US Free Trade Area should be focused on trade and investment liberalization and facilitation in order to improve the functioning of the markets of both economies.

Keywords: International trade, global production networks, competitiveness, free trade agreements, local support structures, harmonization of standards, mutual recognition of procedures

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Executive Summary

The electronics industry has been the country's leading exports since the 1990s. Much of the trade generated could be explained by the participation of the country in the global production networks (GPN) of multinational companies from developed economies. The global production network is a production scheme where various stages of a manufacturing process are undertaken at different geographic locations where they can be carried out most efficiently. The country is a host to a critical mass of global players in the industry like Intel and Texas Instruments from the United States; Siemens and Phillips from Europe; Sony, Toshiba, Hitachi and Fujitsu from Japan; Samsung and Goldstar from South Korea; and Acer from Taiwan.

However, for the longest time, the country's participation in the global production network is confronted with one major issue. That is, it hardly progressed beyond the lowest level of the production chain - assembly and testing. Given that this segment of the production chain generates the lowest value added, it is therefore not surprising that the high growth of the country's exports of high-technology electronic products was not accompanied by a concomitant increase in the growth of the manufacturing sector. This experience of the country is a big contrast to the experience of the Newly Industrializing Economies (NIEs) - South Korea, Singapore, Hong Kong and Taiwan - who were the initial hosts to the global production network. The rapid expansion of the manufacturing exports of these economies was accompanied by the faster growth of their manufacturing sector.

The primary goal of this study is to assess the competitiveness of the country's electronics industry vis-à-vis the country's competitors, particularly in the USA market. In the light of a possible free trade arrangement between the US and the Philippines, the competitiveness of the country's electronics industry becomes more critical. Given the growing bilateral and regional free trade arrangements involving the US, the country's electronics industry is up for greater competition.

Major Findings

While exports of the industry are still highly concentrated in semiconductors, this study has shown that there has been a gradual change in the structure of exports. The share of semiconductors in total exports has been decreasing while the shares of electronic data processing and automotive electronics have been increasing. The emerging changing structure is a significant development as it indicates technological deepening in the industry.

The findings of the study also show that the country is competitive in only 3 sub-sectors: semiconductors, electronic data processing and automotive electronics. In terms of products, the country is competitive in 18 products only and these are parts and components. Nonetheless, these products accounted for at least 86 percent of the country's total exports. Likewise, while most of the products are still not competitive, there has been some improvement in the degree of competitiveness between 1997 and 2001.

A comparison of the country's competitiveness with its competitors from East Asia shows that each economy is specializing on a particular product. That is, each economy differs in the products in which it is competitive. That this is the case, however, is not surprising. By its nature, trade under the global production network is driven by product specialization.

The USA is the largest market for Philippine exports of electronics. However, the share of the USA has been declining for a number of reasons. *First*, most American electronic MNCs have already established their subsidiaries in the country and have made the country a part of their export platform in East Asia for their global markets. Thus, instead of shipping their products to the US and then re-export these to other countries, these MNCs now export directly from the Philippines to their markets in East Asia and the rest of the world. *Second*, as first-tier suppliers in the production chain, the NIEs are increasingly outsourcing the assembly and testing of parts and components from second-tier suppliers, like the Philippines. Thus, the share of the NIEs to the country's exports is increasing. *Third*, Mexico and China have become significant trading partners of the USA. NAFTA, in which Mexico is a member, and the cheap export products from China have displaced the country's exports in the US market. These two countries accounted for the bulk of US imports of electronic products, reaching as high as 50 percent for certain products. In contrast, the share of the Philippines in most products is less than 1 percent and has been declining.

Nonetheless, there are potentials for expanding Philippine exports under an RP-US FTA, based on the comparison between the products where the Philippines is competitive and the products that accounted for the largest shares in US imports or the fastest growing imports of the US. Potentials for export expansion can be found in electronic data processing, semiconductors and telecommunications. In particular, the potential is largest in parts for typewriters & other office machines (HS 8473) under electronic data processing. These products topped US imports of electronics, accounting for about one-fifth of the total annual imports over the period 1997-2001. Other products with potential for expansion are automatic data processing machines (HS 8471), electronic integrated circuits and micro-assembly parts (HS 8542), and semiconductor devices, light-emit diodes etc., parts (HS 8541), which ranked 6th, 7th and 9th, respectively in the top 10 US imports. Other products are microphones, loudspeakers, sound amplifiers, etc., parts (HS 8518) which ranked 6th among the fastest growing imports of the US.

This study also identified the inadequacies of the country's local support structures as the main culprit for the inability of the country to move towards the higher levels of the production chain. These include poor infrastructures and logistics, high power cost, poor quality and unreliable power, high cost of unskilled labor, lack of supplier industries, and inadequate technological capabilities that constrained industrial upgrading.

Policy Recommendations

The above constraints need to be addressed for two major reasons namely, (i) to ensure that the global players currently operating in the country will remain and expand operations; and (ii) to ensure the long-term competitiveness of the industry and hence, the participation of the country in the global production network. The government therefore needs to adopt an activist approach by addressing the above constraints. *First*, the government needs to recognize that remaining at the labor-intensive assembly and testing segment of the production chain is no longer a viable option, given the country's relatively high cost of unskilled labor. The big challenge for the government is industrial upgrading, i.e. to leap-frog and vie for the role of a first-tier supplier to the global suppliers and lead firms. Given the low cost structure in China, the key strategy is not to compete with China but to find niches which are complementary to China in the value chain. With industrial upgrading, MNCs can locate their labor intensive activities in China while doing the high-value production segment in the Philippines.

Industrial upgrading, however, necessitates a strong base of domestic knowledge. It requires the development of specialized skills and technological capabilities, ahead of what the market requires. One possible short-term measure is to give incentives that encourage researchers, university professors and students to interact closely with the electronics industry through sabbatical programs and internships. Another would be investment in specialized technical training schools to enhance the technical competencies of the labor force. A very good example is the Advanced Research Competency Development Institute (ARCDI) established by the association of the local electronics industry itself. The government needs to support this kind of initiatives by the industry.

A long-term measure necessary for industrial upgrading is to put greater emphasis on science and technology at all levels of education – primary, secondary and tertiary. Emphasis should be given to developing the capability, creativity and willingness of students to develop new products and processes. This would require re-designing the curriculum at all levels. For the tertiary level, the industry should be involved in designing the curriculum (particularly in engineering and science curriculum) to ensure that graduates have the kind of education the industry needs.

Second, developing the local supplier industries should also be a priority for the government. This is the only avenue to increase the domestic content of the operations of MNCs in the country. This will require a package of technical assistance and specialized training to develop skills of local suppliers as well as ensuring the availability of and access to finance.

Third, given the regional and global orientation of the operations of MNCs, good infrastructure and logistics that lower production cost and facilitate easy supply chain management, from the procurement of inputs (whether local or imported) to the export of output, are crucial. This means reducing power and communication costs, providing adequate port systems, cutting travel time and offering travel and shipment options. Opening up infrastructure and services to private sector investment is a step in the right direction, as

the huge budget deficit limits the ability of the government to invest in physical infrastructures and utilities. However, the regulatory and legal environment must be aimed at reinforcing the longer-term stability of investment agreements in private-infrastructure projects so as to strengthen the credibility of the policy environment and increase the confidence of foreign investors on the economy.

Implementing the above suggested measures will not only increase the attractiveness of the country to the global production network but it will also make the participation of the country to the production chain create a greater impact on the country's economic development.

The activities of the electronics global production network are market-driven. Thus, negotiations in an RP-US Free Trade Area concerning electronics should be focused on improving the functioning of markets of both economies. This includes elimination of remaining tariffs, trade facilitation (harmonization of product standards, testing procedures), technical assistance on the new requirements of trade and security, and technological training and capacity building. The Philippine government should also use the negotiations, whenever appropriate, as one avenue to address the issues concerning local support structures discussed above. Admittedly, the solutions to most of the issues are internal and domestic in nature; and hence, not appropriate for any bilateral negotiation.

Enhancement and Deepening of the Competitiveness of the Philippine Electronics Industry Under a Bilateral Setting[1]

Myrna S. Austria[2]

1. Introduction

The electronics industry has been the country's leading exports since the 1990s. However, exports have been highly concentrated in one product, semiconductors. Much of the trade generated could be explained by the participation of the country in the global production networks (GPN) of multinational companies from developed economies, particularly US, Japan and Europe. However, while electronics are high-technology products, the role of the country in the production network has been limited to the labor-intensive assembly and testing segment of the production chain. This has given rise to exports that are highly import-dependent and hence, domestic value added is minimal. This feature of the country's exports is one of the reasons why the rapid expansion of exports in the 1990s has not been accompanied by a rapid growth of the manufacturing sector (Austria 2003b). The experience of the country is a big contrast to the experience of the Newly Industrializing Economies (NIEs) - South Korea, Singapore, Hong Kong and Taiwan, who were the initial hosts to the global production network, where the rapid expansion of their manufacturing exports was accompanied by the faster growth of their manufacturing sector.

An assessment of the industry's competitiveness is therefore very timely. In the light of a possible free trade arrangement between the US and the Philippines, the competitiveness of the country's electronics industry becomes more critical. Given the growing bilateral and regional free trade arrangements involving the US, the country's electronics industry is up for greater competition.

The objectives of this study are as follows: (i) to assess the competitiveness of the country's electronics industry vis-à-vis the country's competitors, particularly in the US market; (ii) to examine the local support structures and their effects on the competitiveness of the electronics industry; (iii) to assess the potential for expansion of RP exports to US and US investment to RP; (iv) to identify policy measures that would enhance the attractiveness of the country in the global production network; and (v) identify possible areas for negotiations under an RP-US Free Trade Area.

The paper is organized as follows. Section 2 discusses the role of global production network to the growth of the electronics industry, highlighting the factors that are crucial to

[1] This study is part of the project "Prospects for a Philippine-US Free Trade Area" funded by the Philippine APEC Study Center Network (PASCN).

[2] Associate Professor, Economics Department and Director, Center for Business and Economics Research and Development, De La Salle University- Manila. The author would like to acknowledge the comments of Mr. Ernie Santiago of SEIPI and the participants to the technical workshop on 19 November 2004 and the conference on 26 January 2005 where earlier drafts of the paper was presented. The author would like to acknowledge the research assistance provided by Ruben Carlo O. Asuncion.

GPN, as well as the emerging issues affecting the participation of developing economies in GPN. Section 3 discusses domestic policy environment for the Philippine electronics industry. Section 4 discusses the RP-US bilateral trade and investment in electronics. Section 5 examines the competitiveness of the Philippine electronics industry. Section 6 analyzes the local support structures affecting the competitiveness of the industry. Section 7 examines the prospects for expanding RP exports US and US investment to RP. Section 8 discusses the policy recommendations for enhancing the attractiveness of the country to GPN, as well as the possible areas for negotiation in an RP-US Free Trade Area. Finally, Section 9 presents the summary and conclusion.

2. The Electronics Industry and the Global Production Network

The global production network (GPN), also called international production sharing, of multinational companies of developed economies is an important feature behind the changing nature and increasing scale of world trade (UNCTAD 2002). Under this production scheme, the labor-intensive segments of technologically complex production are separated from the capital- and skill-intensive segments and are located in developing economies, linked through international subcontracting or outsourcing arrangements. The capital- and skill-intensive parts and components are manufactured in developed economies and exported to developing economies for the labor-intensive assembly and testing. The finished product is then re-exported back to the developed economies for sale to domestic consumers or for exports to other countries. Such arrangements allow MNCs to exploit the comparative advantage specific to the production of a particular component and the differences in labor costs across developing countries (Austria 2002).

Since the 1970s, international production sharing has undergone several migration (Gereffi 1999). In the 1970s and 1980s, the rise in wage cost, shortage of labor and the appreciation of the Japanese yen following the Plaza Accord in 1985 forced Japanese multinational companies to undergo industrial restructuring and upgrading by establishing their affiliates in the NIEs whose wages were then relatively cheap. Soon, multinational companies from the USA and Europe followed as part of their global strategy to remain competitive. However, in the 1990s, the NIEs experienced similar rising wage rates and production costs, causing them also to move their production offshore - this time to the ASEAN, China and a number of other developing countries in South Asia.

International production sharing is commonly applied more intensively in trade in electronics, automotive, and the textiles and garments industries. However, these industries followed contrasting models of development. Electronics and semiconductors, and the automotive industries are classic examples of producer-driven commodity chain while textiles and garments are classic examples of buyer-driven commodity chain (Gereffi 1999 & 2001). Producer-driven commodity chain is characterized by capital- and technology-intensive industries, where multinational companies (i.e. global oligopolies) play the central roles in coordinating production networks, including their backward and forward linkages

(Gereffi 1999 & 2001)[3]. Production system is FDI-driven and multi-layered involving thousands of firms, from the parent companies (also the lead firms in the production chain), subsidiaries and sub-contractors. Each layer in the system involves a specific production process located in a particular country.

The lead firms concentrate on their "core competencies" considered essential to their competitive advantage and rely on specialized suppliers to provide the non-core functions (Sturgeon and Lester 2004). The primary purpose of the production network is to provide the lead firms with quick and low-cost access to resources, capabilities, and knowledge that complement its core competencies (Ernst 2004). Such a strategy enables the lead firms to establish and maintain substantial market presence without the fixed costs of establishing a vertically integrated corporate organization (Sturgeon and Lester 2004).

As shown in Figure 1, the core competencies of lead firms include research, product design and development, sales and marketing, and supply chain management. The latter refers to managing a firm's external relationships such as where to source, whether to buy or produce, and what sort of relationship to have with buyers and customers (Heaver 2004). The outsourcing of none-core functions by the lead firms opened the opportunity for developing economies to participate in the complex production chain, following a supplier-oriented industrial upgrading path (Figure 1).

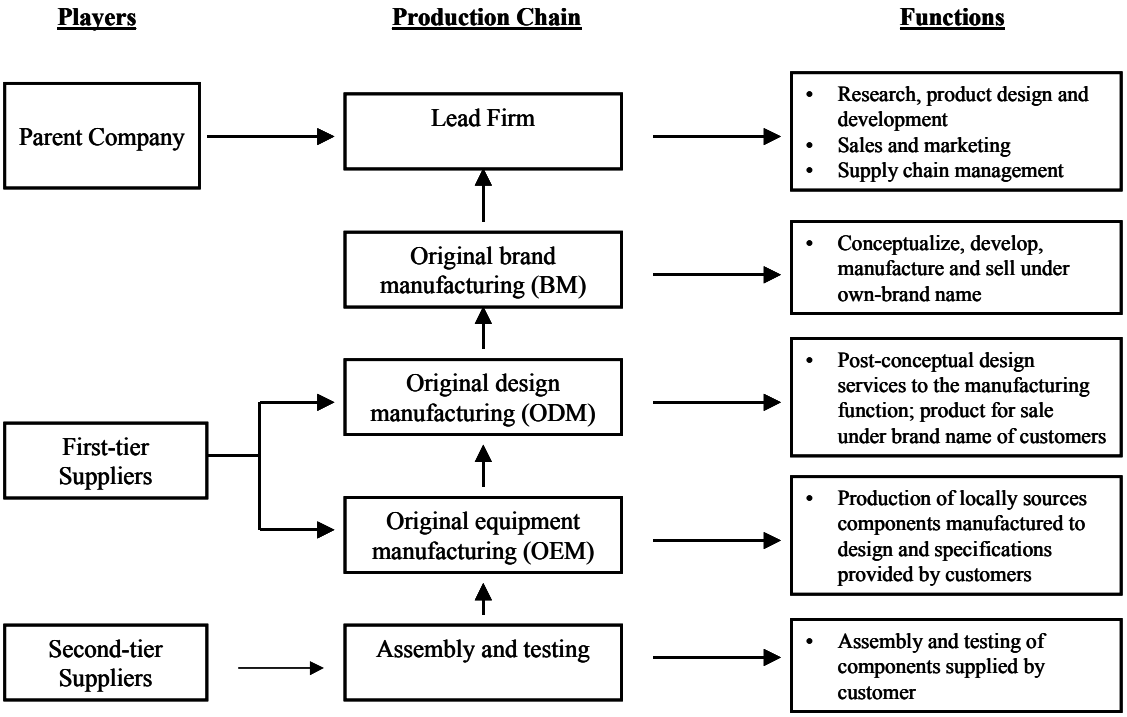
This industrial upgrading path is best exemplified by the experience of the NIEs and the ASEAN over the last three decades. At the initial stage (1970s), the NIEs were involved in the assembly and testing of parts and components supplied by the lead firms, involving cheap labor. Over time, they were involved in original equipment manufacturing (OEM), where they produced a product according to the design and specification of the lead firms but the product is sold under the lead firms' brand name. This is followed by original design manufacturing (ODM) where local suppliers make the design and produce the product but the product is sold under lead firms' brand the name. The development of in-house product design allows local firms to capture more of the value added and final price of the product. Both OEM and ODM activities generated substantial backward linkages in the domestic economy as contractors are expected to develop their sources of inputs.

As the NIEs learned about the upstream and downstream segments of the production chain, they are now pushing for original brand manufacturing (OBM), producing and exporting their own brands and product. Examples of such firms are Acer (computer) of Taiwan, and Samsung and Goldstar (consumer electronics) of South Korea. It is important to note, however, that although many East Asian firms have successfully made the shift from

[3]Buyer-driven commodity chain, on the other hand, is characterized by globally dispersed production networks, predominantly locally owned, and typically located in developing economies. However, large retailers, branded marketers and branded manufacturers from developed economies act as strategic brokers in linking overseas factories to product niches in the consumer markets in developed economies (Gereffi 1999 & 2001). Production system is also multi-tiered but often involved outsourcing where contractors from developing economies make finished goods to the specification of foreign buyers. This production system is typical of the garments and textiles industry where marketers link retailers to manufacturers. The result is horizontal integration and trade in differentiated product.

OEM to ODM, not many succeeded in shifting from ODM to OBM (Sturgeon and Lester 2004). The reason being that East Asian firms had difficulty in functions associated with OBM like importing, sales, marketing and distribution, which are considered very different from their core competencies in manufacturing and design.

Figure 1. Supplier-Oriented Industrial Upgrading Path.



The production shifts in the NIEs from assembly to OEM/ODM and OBM changed the geographical landscape of international trade in electronics. As the NIEs become first-tier suppliers to the lead firms, they opened the opportunity for the ASEAN-4 (Indonesia, Malaysia, Philippines and Thailand) and recently, China and India to be integrated into the production network as second-tier suppliers, performing the assembly and testing requirements of the NIEs.

As first-tier suppliers, the NIEs played an intermediary role between the lead firms and the second-tier suppliers. Malaysia, Thailand and Indonesia are considered to have the broadest and most mature assembly capacity for components (Ng and Yeats 2002)[4]. On the other hand, the Philippines is considered to be promising in the semiconductor industry.

[4]Thailand is considered to be the most promising regional production base for the automobile industry (Flynn, Alkire and Senter 1999). The country is poised to become the automotive hub of ASEAN, both in terms of commercial and passenger vehicles as well as parts manufacturing (Tham 2003).

Factors Crucial to the Growth of Global Production Network in East Asia

The success of the electronics global production network in East Asia could be attributed to a host of factors. *First*, the unilateral and multilateral reduction of barriers to trade and investment in the region resulted to domestic efficiency and increased competitiveness. This is turn attracted foreign direct investment from Japan, the USA and European countries where MNCs established their subsidiaries in the region to leverage the advantages of cheap labor, which are in abundant supply in the region.

Second, since MNCs are concerned about systemic efficiencies in their global production chain where a given location is judged by how cost-efficient it performs a given function in coordination with other functions located elsewhere (UNCTAD 2002), the NIEs invested in world class infrastructures and logistics oriented to the worldwide management of the production chain. New ports and container terminals were developed across the region (for example, Laem Chabang in Thailand, Tanjung Pelepas in Malaysia, Tanjung Priok in Indonesia, and Yantian, Chiwan, and Shekou in China) (Heaver 2004). Airport services also improved and expanded, cutting travel time and offering travel and shipment options. Singapore's Changi Airport and Hong Kong's Chek Lap Kok best exemplified efficient airport services where the airports' computer-linked system of customs clearance simplified customs procedures and facilitated the smooth flow of goods.

The efficient ports and airport services, together with information technology, resulted to improved logistics. The advances in information technology enabled lead firms to coordinate dispersed activities and synchronize production and marketing. It allowed them to plan, implement and control the efficient flow and storage of goods, services and information across the various points in the supply chain (UNCTAD 2002; Heaver 2004). With good logistics, firms are able to outsource in low-cost locations not only production tasks but also back-office functions. Efficient logistics also allow just-in-time delivery where deliveries are timed to respond to the immediate needs of users thus, minimizing inventories and consequently, costs. Just-in-time delivery can only happen with the availability of efficient air transport services and airports. Crucial here, however, is the role of the logistics service industry, like freight forwarders who specializes in arranging transportation, storage and handling of goods within and between countries. Freight forwarders are equipped with web-based capabilities which allow shippers to perform on-line services and monitor the location and status of their shipments, as well as receivers to monitor the status of their orders, thus allowing them to take early actions to minimize costs associated with delays in delivery (Heaver 2004).

Third, the NIEs developed their technological capability by investing in research and development. They established specialized research institutes specifically for the electronics industry[5]. Technologies developed were transferred to private companies for commercial

[5] Taiwan has the Industrial Technology Research Institute (ITRI) and the Electronic Research Service Organization (ERSO), both funded by the government. South Korea has the Korea Institute of Science and Technology, the National Industrial Research Institutes, and the Korea Institute of Electronics Technology. Singapore, on the other hand, has the Information Technology Institute (Hanna, et. al. 1996).

production. In addition, instead of relying solely on foreign direct investment for technology transfer, they used technology licensing to acquire foreign technology.

Fourth, industrial upgrading to higher value-added products was a deliberate policy response of the NIEs to remain competitive and stay in the global production chain (Hanna et. al 1996; Hong 1997). Developing their technological capability enabled them to build their supplier industries whose function is to provide parts and components in the production chain. Local procurement of parts and components is about 80 percent. These strategies enabled the NIEs to switch away from the labor-intensive segment of the production chain and into the skill- and technology-intensive segment, thereby increasing the domestic value added of their exports (Wilson 2000; 2003; Gereffi 2001). Taiwan for example, had no indigenous semiconductor manufacturing capability until the mid-1970s, but it became a major supplier of computers and semiconductor devices in the world market by the mid-1980s. The country is now known for its computers (Acer). South Korea also did not have any semiconductor manufacturing capability until the early 1980s, yet it has now become one of the world's largest producers of dynamic random access memories (DRAMs). South Korea is also known for its consumer electronics (Samsung and Goldstar).

Finally, the NIEs' strategies in human resource development took various forms. They sent engineers and scientists for training in industrial establishment, research institutes and universities so they can learn advanced technologies. When they return home, they occupied key positions in research institutes and eventually set up their own electronics companies (Hanna et. al. 1996). They also established public vocational training institutes and gave incentives to firms that provide trainings to their employees.

GPN, Economic Growth, and Economic Integration

The participation of East Asian firms in the production network provided them with access to the main growth markets of the electronics industry, (i.e. developed economies) (Ernst 2004; Yusuf 2004). To enhance their overall competitive position in the international markets, lead firms provide their local affiliates and local suppliers with newer technology, more rapid technological upgrading, and greater attention to quality control, cost control as well as human resource development. They also attract other foreign investors, including their competitors and foreign suppliers to cluster in the same area. The combination of the these factors (cutting-edge technology, exporting into competitive world markets and clustering of foreign investor activity) generate substantial spillovers and externalities that far exceed the standard positive effects of foreign direct investment (Moran 1998).

The outcome was the rapid expansion of intra-industry trade in such products as computers and office equipment, telecommunications, video and audio equipment, and semiconductors, and the rising market shares of East Asian economies for such products (UNCTAD 2002)[6]. In general, the global production network contributed to the significant improvement in the economic performance of the region and the intensification of economic

[6] Intra-industry trade is a new form of trade that emerged in the 1980s because of the global production network. It is defined as the export and import of products belonging to the same industry

linkages and integration among the economies in Northeast Asia, Southeast Asia, and North America. The latter is measured by the intra-industry trade index, which has been observed to be increasing in the 1990s, indicating increasing economic integration (see for example studies by Bora (1996), Austria (2003c), and Austria (2004a).

At the individual economy level, however, the impact of the global production network on economic development depends to a large extent on how much of the activities of the lead firms are linked to domestic economic activity. In general, the lower the level an economy is in the production chain, the smaller is the impact of the production network to its economic development. As pointed out earlier, the experience of the NIEs best exemplified this. The pattern of their integration into the global production networks was a major determinant of the success of their industrialization.

On the other hand, second-tier suppliers (like the ASEAN, China) are highly import-dependent, involved basically in the labor-intensive assembly and testing segment of the production chain. Thus, the rapid expansion of their high-technology and skills-intensive exports was not accompanied by concomitant increases in value added and hence, income. Much of the skills and technology in these exports are embodied in parts and components produced in the technologically more advanced members of the production chain. Thus, much of the value added in these kinds of exports accrues to those involved in the higher levels of the production chain.

Thus, unless the second-tier members of the network undergo industrial upgrading, their prospects of staying in the chain become weak, simply because their part of the chain involves the type of foreign investment that is highly mobile. That is, cost advantages can be easily lost due to wage increases or to the emergence of more attractive locations.

Emerging Issues Affecting Electronics Industry in East Asia

There are three major issues currently affecting the electronics industry in East Asia namely, (i) the emergence of global contract manufacturers based in North America; (ii) the emergence of China as a priority investment target for electronics global production networks; and (iii) growing bilateral free trade areas (FTAs) and regional trading arrangements (RTAs).

On the first issue, since the mid-1990s, outsourcing through subcontracting gained a new dimension following the divestment strategies of OBM firms. Wanting to get rid of their low-margin manufacturing, lead firms sold a number of their overseas affiliates. Likewise, by way of streamlining the management of their outsourcing relationships, lead firms consolidated their contract manufacturing activities by giving a larger share of their activities to a smaller group of large and technologically sophisticated contract manufacturers that have global presence (Ernst 2004; Sturgeon and Lester 2004). In other words, lead firms now prefer to outsource some of the functions that are previously carried out in-house.

This strategy was first adopted by North American brand leaders (like Compaq, Dell, Hewlett–Packard, IBM, Motorola) but European (Ericcson, Philips, Siemens) and Japanese (NEC, Sony, Fujitsu) companies eventually followed (Ernst 2004). Large contract manufacturers seized the opportunity through acquisitions, capacity expansions and establishing their international operations, first in America and Europe and recently, in East Asia. The top five contract manufacturers or global suppliers are all based on North America – Celestica (Toronto, Canada), Flextronics (San Jose, California), Jabil Circuit (St. Petersburg, Florida), Sanmina/SCI (San Jose, California), and Solectron (Milpitas, California) (Sturgeon and Lester 2004).

These global suppliers were chosen based on their capability to provide the new global sourcing requirements of lead firms in order to trim down costs. These include global support for product and component design, component sourcing, inventory management, testing, packaging, and logistics functions. Likewise, global suppliers are also considered by lead firms as less of a competitive threat compared to East Asian suppliers who are focused on eventually becoming a competitor in the product markets, as the experience during the past decade shows (Sturgeon and Lester 2004). This is the reason why in recent years the lead firms have become less willing to outsource their inputs from the classic OEM/ODM firms.

The global suppliers therefore provide stiff competition to East Asian suppliers. Likewise, the shift in strategy of lead firms of becoming more dependent on global suppliers presents an important challenge to the ASEAN, China and India who would like to follow the supplier-industrial upgrading development path of the NIEs.

On the second issue, there is no doubt that China has emerged as the priority investment site of global production networks. Since the late 1990s, there has been a shift in network location away from the traditional export platform in Southeast Asia and toward China. For example, because the electronics industry is highly sensitive to assembly costs, the cheap labor cost in China has made the country the principal gainer in the export market for electronic products, particularly in telecommunication equipment, computers and disk drives (Wilson, et. al. 2003), while the ASEAN is slowly losing its comparative advantage in this segment of the production chain.

China is not only a provider of cheap labor but its recent attraction to global production network is attributed to other factors: (i) a booming market for information technology products and services; (ii) an unlimited supply of low-cost information technology skills who are involved in R&D; (iii) abundant land and a rapidly improving infrastructure; (iv) a massive rush of capital flows into China; (v) support policies by the government to rely on FDI for industrial upgrading (Ernst 2004).

It is also argued that the increase of investment in China is a consolidation of production in response to the increasing popularity of global suppliers (Sturgeon and Lester 2004). All these developments in China pose a serious challenge to the ASEAN and other developing economies wanting to participate in the global production networks as part of their development strategy. The less developed members of the ASEAN - Cambodia, Laos,

Myanmar and Vietnam – (CLMV) appear to be at most risk in the immediate future since they are in danger of being 'leapfrogged' in the value chain (Wilson, et. al. 2003).

On the third issue, the growing regional trading arrangements (RTAs) and bilateral free trade areas (FTAs) in recent years have been affecting the location of foreign direct investment not only in electronics but in other industries as well (Austria 2005). Lower barriers to trade and investment, reduced transaction costs, harmonized standards and legal norms, etc. characterize FTAs and RTAs. These factors increase the attractiveness of lead firms from the US, Japan and European economies to locate their subsidiaries or outsource their production in economies in which their own economies are linked through free trade agreements (Stein and Daude 2001). Also, the rules of origin (ROR) in FTAs and RTAs encourage MNCs to locate in economies that belong to the same RTA/FTA as their source economies in order to overcome the ROR. The ROR determines how much domestic content a product must have to qualify as an internal product in a preferential trade agreement. In short, RTAs/FTAs in which an economy is not a member may displace that economy's exports.

Also, the rules of origin (ROR) in FTAs and RTAs encourage MNCs to locate in economies where their source economies belong to the same FTA/RTA in order to overcome the ROR. The ROR determines how much domestic content a product must have to qualify as an internal product in a preferential trade agreement.

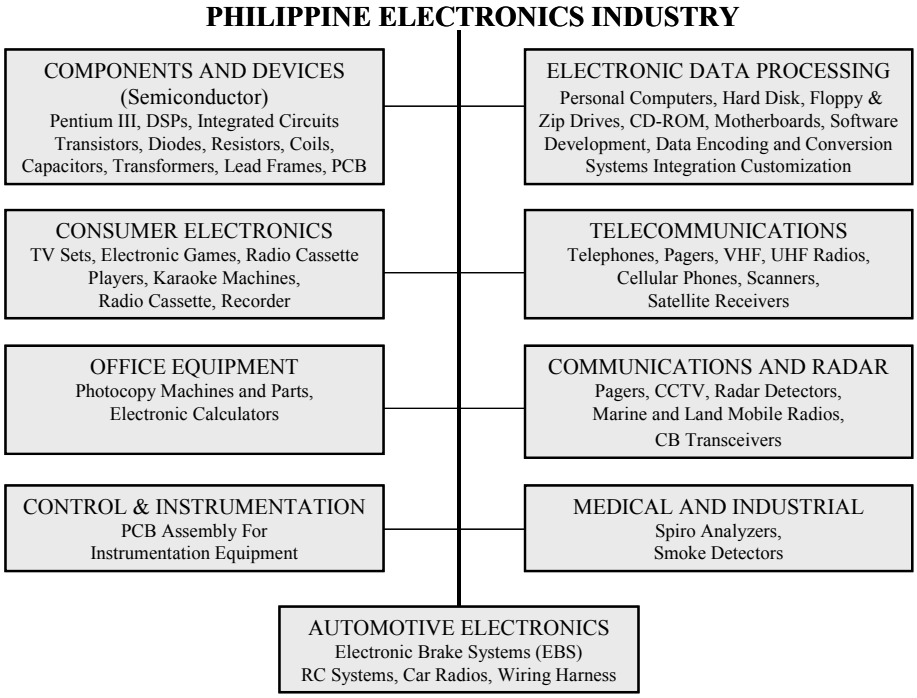
Thus, economies in East Asia are now competing, as hosts to GPN-related foreign investment, with other developing economies that belong to the same RTAs/FTAs as the US, Japan and European economies. A very good example of this is the North-American FTA (NAFTA) that gives Mexico an advantage for US investment over other developing economies. Likewise, given the growing bilateral FTAs between individual economies in East Asia and the US or Japan, these economies will find themselves competing with each other as location of GPN.

3. Domestic Policy Environment and the Philippine Electronics Industry

The electronics industry has developed into one of the fastest growing and important industries in the Philippines. As of 2003, the industry is composed of about 865 electronics firms, majority of which are by multinational companies (72%) (SEIPI 2003a). These are mostly located in the special economic zones and industrial parks in the CALABARZON area (50%) and Metro Manila (41%). The industry boasts of having a critical mass of global players operating in the country like Intel and Texas Instruments from the United States; Siemens and Phillips from Europe; Sony, Toshiba, Hitachi and Fujitsu from Japan; Samsung and Goldstar from South Korea; and Acer from Taiwan. The industry produces 50 percent and 10 percent of world production of 2.5 inches and 3.5 inches hard disk drive (HDD), respectively. Employment generated increased from 69,000 in 1990 to 346,000 in 2003, or an average growth rate of 13.2 percent per year over the period (SEIPI 2003). The industry

is composed of 9 sub-sectors, with semiconductors (components and devices) as the biggest sub-sector (Figure 2). Products classified under each sub-sector are found in Appendix 1.

Figure 2. Classification of Philippine Electronics Industry.



Source: DTI; SEIPI (2003a)

A number of factors changed the overall domestic policy environment in the country in the 1990s. There was a general policy of openness with the reduction of tariffs and other trade barriers; expansion of areas, particularly services and infrastructure, opened for foreign direct investment; and foreign exchange rate deregulation.

Tariff rates have substantially gone down in the electronics industry between 1990 and 2004 (Appendix Table 2). Tariff rates for most products were in the 20-50% range in 1990. These have gone down to zero in 2000 for all products of electronic data processing; office equipment, except for 1 product; and semiconductors, except for 27% of the products. Tariff rates in 2004 are still in the 3%, 10% and 15% for most products under automotive electronics, consumer electronics, telecommunications, and control and estimation.

The government also implements a comprehensive incentive system to encourage foreign investors to locate in the country, although the same incentives are available to local investors. The investment incentives consist of the incentives under the Omnibus Investment Code (OIC) and the incentives under the export processing zones (EPZs) and special economic zones (SEZs). An enterprise can avail of the incentives under the OIC if it invests in preferred areas of investment listed in the Investment Priorities Plan (IPP). The electronics industry, identified as an export winner, has always been included in the list of

industries covered by the country's Investment Priorities Plan (IPP). As such, enterprises in the industry are qualified for the incentive package under the OIC that include income tax holiday for a specified number of years, tax and duty exemptions on imported capital equipment and accompanying spare parts, tax credits, and non-fiscal incentives like simplified customs procedures, access to bonded warehouses, and employment of foreign nationals in supervisory, technical or advisory positions.

Most electronic firms are located in the EPZs and SEZs. Apart from the incentives under the OIC, firms operating in the zones enjoy additional fiscal incentives like exemptions from payment of local taxes and licenses, contractor's taxes, wharfage fees and export tax; an tax deductability of labor training expenses, organizational and operating expenses. Other incentives come in the form of streamlined government procedures, infrastructure services and good transport links to ports and seaports that are normally not available outside the zones.

The above locational incentives have strategic-trade properties (Austria 2005). They are meant to promote exports and encourage use of domestic labor as well as indigenous raw materials. That is, to be eligible of the incentives, an enterprise has to meet certain requirements on export-performance, domestic-content, and capital-labor ratio. Eligibility for the income tax holiday under the OIC, for example, requires the following:

- Capital-labor ratio should not exceed US$10,000 per worker;
- Use of indigenous materials should not be lower than 50% of raw material costs; and
- Net foreign exchange earnings or savings should be at least US$500,000 per year for the first three years of operation.

The government needs to re-think about the balance between the costs and benefits that these locational incentives may bring. Studies have shown that these locational factors have the same effect as trade restrictions (tariffs) in reducing allocative and dynamic efficiency (Brewer and Young 1999; WTO 2000). A restrictive investment environment with conditions such as mandatory joint partnership, licensing, and domestic resource requirements tend to attract foreign investment that are less efficient, exhibit older technology and business practices and lag in technology upgrading (Moran 1998).

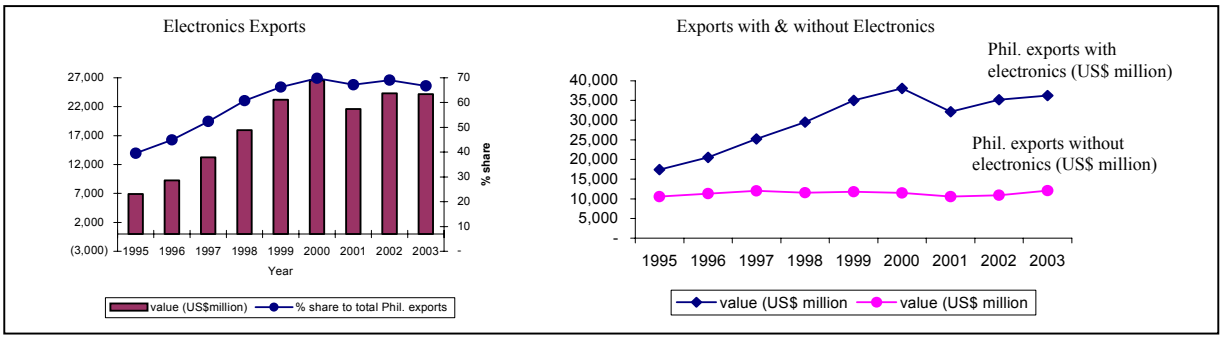
4. RP-US Bilateral Trade and Investments in Electronics

Overall Philippine trade in electronics

The electronics industry boasts of being the largest foreign exchange earner for the Philippines since the 1990s, with an export value of US$24.2 billion in 2003, up from only US$6.9 billion in 1995 (Figure 3). The industry's contribution to the country's total exports increased from less than 40 percent in 1995 to almost 67 percent in 2003. As shown in Figure 3, the growth in the country's total exports was generated by the electronics industry. Wthout the electronics industry, total exports of the country hardly grew.

However, an analysis of the industry's sub-sectors reveals the industry's structural weakness. That is, exports are highly concentrated in just one sub-sector, i.e. semiconductors. On the average, semiconductors accounted for about three-fourths per year of the industry's total exports during the period 1995-2003 (Table 1). The other sub-sectors contributed less than 5 percent each, except for electronic data processing whose share has been rapidly increasing since 1995, i.e. from 6.4 percent in 1995 to 23.4 percent in 2003. The high concentration of exports to just one sector is very risky, especially since the country relies on the industry for its major foreign exchange earnings. It makes the country vulnerable to the cyclical demand downturns of the industry, particularly of semiconductors.

Figure 3. Philippine Exports of Electronics, 1995-2003.



Source of Basic Data: DTI-Bureau of Export Trade Promotion

Table 1. Philippine Exports of Electronics, By Sub-Sectors, 1995-2003

Sub-Sector	1995	1996	1997	1998	1999	2000	2001	2002	2003
Value (in million US$)									
Components/Devices (Semiconductors)	5,621.73	7,189.37	9,871.30	13,985.19	18,067.71	20,116.38	14,907.09	16,891.78	17,016.95
Electronic Data Processing	440.89	865.22	2,074.43	2,686.80	4,124.27	4,933.63	5,067.13	5,892.38	5,660.10
Office Equipment	0.17	20.46	68.52	92.04	88.03	80.00	180.67	125.18	184.01
Medical/Industrial Instrumentation	0.04	0.08	0.26	0.30	0.80	1.12	1.06	1.81	3.70
Control And Instrumentation	1.51	3.62	2.06	9.52	12.98	15.10	19.59	13.89	5.05
Communication And Radar	108.84	87.52	64.00	92.23	110.85	441.61	391.21	379.61	340.50
Telecommunications	223.23	486.40	565.36	393.32	222.13	179.20	218.04	205.33	96.08
Automotive Electronics	162.31	180.67	212.59	250.40	269.03	343.56	366.10	317.86	325.92
Consumer Electronics	350.27	411.61	364.12	421.90	325.35	458.23	469.14	494.07	535.99
Total	6,909.00	9,244.95	13,222.63	17,931.69	23,221.17	26,568.82	21,620.04	24,321.90	24,168.31
Percentage Distribution (%)									
Components/Devices (Semiconductors)	81.37	77.77	74.65	77.99	77.81	75.71	68.95	69.45	70.41
Electronic Data Processing	6.38	9.36	15.69	14.98	17.76	18.57	23.44	24.23	23.42
Office Equipment	0.00	0.22	0.52	0.51	0.38	0.30	0.84	0.51	0.76
Medical/Industrial Instrumentation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02
Control And Instrumentation	0.02	0.04	0.02	0.05	0.06	0.06	0.09	0.06	0.02
Communication And Radar	1.58	0.95	0.48	0.51	0.48	1.66	1.81	1.56	1.41
Telecommunications	3.23	5.26	4.28	2.19	0.96	0.67	1.01	0.84	0.40
Automotive Electronics	2.35	1.95	1.61	1.40	1.16	1.29	1.69	1.31	1.35
Consumer Electronics	5.07	4.45	2.75	2.35	1.40	1.72	2.17	2.03	2.22
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source of Basic Data: Department of Trade & Industry-Bureau of Export Trade Promotion (http://tradelinephil.dti.gov.ph/betp/trade_stat.expcod_sumprod).

Some degree of structural change can be observed in the industry. The share of semiconductors to the total exports of electronics declined from 81 percent in 1995 to 70 percent in 2003 (Table 1). On the other hand, the share of electronic data processing and office equipment has been increasing. These two sub-sectors show great potential for exports. In particular, while office equipment accounted for less than 1 percent of the industry's total exports, the sub-sector registered the highest average annual real growth rate of 135.2 percent over the period 1995-2003 (Table 2). The emerging structural change is a significant development as this indicates technological deepening in the industry. It also lessens the risks of vulnerability due to high concentration of exports to just 1 sub-sector.

On the other hand, between 1996 and 2003, imports of the Philippine electronics industry increased from US$4.6 billion in 1996 to US$11.1 billion in 2003 (Figure 4), or an average real growth rate of 11.7 percent per year (Table 3). The industry's imports represent 13.8 percent of the country's total merchandise imports in 1996 and this has been increasing over the years, reaching almost 30 percent in 2003 (Figure 4).

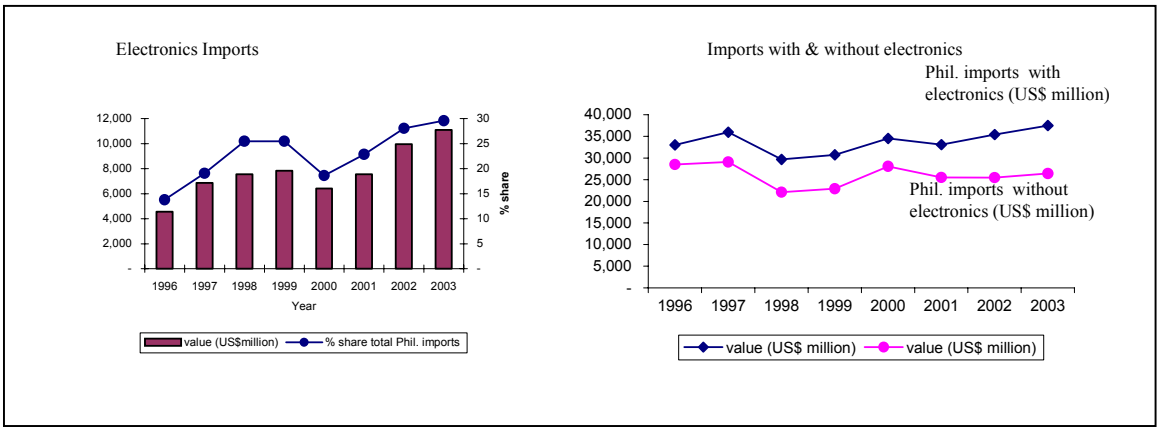
The industry's imports are dominated by components and devices or semiconductors, with the sub-sector accounting for an average annual share of almost 50 percent of total imports over the period 1996-2003 (Table 4). Since semiconductors also dominate the industry's exports, this has some negative implications on the industry's terms of trade. That is, while imports consist of high-value added components and devices, the industry's semiconductor exports consist of low-value added final assemblies.

Table 2. Average Annual Real Growth Rate of Exports, By Sub-Sectors & Major Trading Partners, Philippine Electronics (%) (1995=100)

Sub-sectors	1995-2000	2000-2003	1995-2003
Components/Devices (Semiconductors)	26.94	-7.14	12.90
Electronic Data Processing	59.45	2.79	35.24
Office Equipment	236.29	29.61	135.20
Medical/Industrial Instrumentation	95.47	46.11	75.26
Control And Instrumentation	55.82	-31.83	14.28
Communication And Radar	30.17	-9.97	13.36
Telecommunications	-5.86	-20.24	-11.53
Automotive Electronics	14.28	-3.52	7.25
Consumer Electronics	3.80	3.45	3.67
Total Philippine Electronic Exports	28.78	-4.87	14.96

Source of Basic Data: http://tradelinephil.dti.gov.ph/betp/trade_stat.expcod_sumprod

Figure 4. Philippine Imports of Electronics, 1995-2003.



Source of Basic Data: DTI-Bureau of Export Trade Promotion

Table 3. Average Annual Real Growth Rate of Imports, By Sub-Sectors & Major Trading Partners, Philippine Electronics (%) (1995=100)

Sub-sectors	1995-2000	2000-2003	1995-2003
Components/Devices (Semiconductors)	15.87	27.27	20.62
Electronic Data Processing	13.47	27.81	19.40
Office Equipment	0.80	17.75	7.74
Medical/Industrial Instrumentation	-4.75	-14.87	-9.23
Control And Instrumentation	-6.84	2.08	-3.12
Communication And Radar	0.33	-4.11	-1.60
Telecommunications	-3.95	-18.81	-10.63
Automotive Electronics	0.13	-7.89	-3.39
Consumer Electronics	-4.76	-9.57	-6.85
Total Philippine Electronic Imports	7.22	17.86	11.66

Source of Basic Data: http://tradelinephil.dti.gov.ph/betp/trade_stat.impcod_sumprod

Also worrisome is the fact that imports of semiconductors is growing at a faster rate at 20.6 percent (Table 3) than exports of the same at 12.9 percent (Table 2). This is also reflected in the share of semiconductors in total exports and imports of electronics. While the share of semiconductors in total exports has been going down (Table 1), thereby reducing the vulnerability of electronics exports to cyclical downturn in semiconductors, the share of semiconductors in total imports has been going up (Table 4).

The other sub-sectors accounted for less than 5 percent of electronics' total imports, except electronic data processing whose share has increased from 18.3 percent in 1996 to 29.2 percent in 2003 (Table 4). The imports of the sub-sector also registered a high growth rate at 19.4 percent per year (Table 3).

The balance of trade registered a surplus every year for the period 1996-2003 (Table 5). The surplus was increasing from 1996 to 2000 but started to decline since 2001. However, not all the sub-sectors experienced a surplus. Only semiconductors, electronic data processing, and automotive electronics registered a yearly surplus over the period 1996-2003. Office equipment registered a deficit in 1996-1997 and then a surplus thereafter. Consumer electronics also recorded a surplus but only in 2002-2003.

RP-US Bilateral Trade in Electronics

The USA accounted for the largest share in total Philippine exports of electronics (Table 6). However, its share has been on a downtrend - from 34 percent in 1995, it declined to 14 percent in 2003. This is also reflected in the negative average annual real growth rate of exports to the US over the period 2000-2003 (Table 7). In terms of sub-sectors, the decline in the share of the US is highest in semiconductors, electronic data processing, office equipment, control and instrumentation, telecommunications, and automotive electronics (Figure 5). Except for automotive electronics, these are the same sectors where Philippine exports are increasingly bound to China, Malaysia and the NIEs (Austria 2004b).

Three factors could help explain the declining share of the USA in Philippine exports. *First*, most American electronic MNCs have established their subsidiaries in the country and have made the country a part of their export platform in East Asia for their global markets. Thus, instead of shipping their products to the US and then re-export these to other countries, these MNCs now export directly from the Philippines to their markets in East Asia and the rest of the world. *Second*, as first-tier suppliers in the production chain, the NIEs are increasingly outsourcing the assembly and testing of parts and components from second-tier suppliers, like the Philippines. The share of these economies in the Philippines' total exports of electronics increased from 20.4 percent in 1995 to 31.8 percent in 2003.

Third is the increasing importance of Mexico and China to US trade. NAFTA, in which Mexico is a member, and the cheap export products from China could have displaced the country's exports in the US market. These two countries accounted for the bulk of US imports of most electronics products, reaching as high as 50% for certain products (Table 8). Their shares are also increasing for most products. In contrast, the share of the Philippines in US imports is less than 1% for most products and is also decreasing. The latter is also reflected in the decline in Philippine exports to the US. In short, while the US is important to the Philippines, the same cannot be said of the Philippines to the US.

In terms of imports, the US is also the country's major source of imports of electronics, accounting for an average share of 25 percent of total imports per year (Table 9). Imports from the USA are highest in semiconductors (average of 40.26% per year), medical/industrial instrumentation (26.11% per year), and control & instrumentation (32.44% per year) (Figure 6). Nonetheless, imports from the US have been falling for all sub-sectors since 1996, except for semiconductors.

Table 4. Philippine Imports of Electronics, By Sub-Sectors, 1996-2003

Sub-Sector	1996	1997	1998	1999	2000	2001	2002	2003
Value (in million US$)								
Components/Devices (Semiconductors)	1,499.91	2,964.51	4,565.31	5,038.93	2,880.52	3,290.18	5,173.88	6,272.92
Electronic Data Processing	832.47	1,343.93	1,526.89	1,440.01	1,470.25	2,151.08	3,186.22	3,242.63
Office Equipment	54.22	74.79	53.08	57.56	59.65	74.03	83.63	102.87
Medical/Industrial Instrumentation	42.98	46.76	36.55	43.16	37.69	32.26	46.04	24.57
Control And Instrumentation	100.83	128.86	100.17	92.69	80.92	67.68	70.42	90.92
Communication And Radar	399.73	364.12	130.09	141.65	431.48	539.00	490.39	401.89
Telecommunications	900.69	1,060.04	696.03	518.22	816.73	909.47	407.23	461.70
Automotive Electronics	13.54	10.36	6.99	7.27	14.50	11.43	10.07	11.97
Consumer Electronics	711.49	858.20	446.09	496.07	623.77	477.47	482.54	487.25
Total	4,555.87	6,851.57	7,561.20	7,835.57	6,415.51	7,552.60	9,950.42	11,096.73
Percentage Distribution (%)								
Components/Devices (Semiconductors)	32.92	43.27	60.38	64.31	44.90	43.56	52.00	56.53
Electronic Data Processing	18.27	19.61	20.19	18.38	22.92	28.48	32.02	29.22
Office Equipment	1.19	1.09	0.70	0.73	0.93	0.98	0.84	0.93
Medical/Industrial Instrumentation	0.94	0.68	0.48	0.55	0.59	0.43	0.46	0.22
Control And Instrumentation	2.21	1.88	1.32	1.18	1.26	0.90	0.71	0.82
Communication And Radar	8.77	5.31	1.72	1.81	6.73	7.14	4.93	3.62
Telecommunications	19.77	15.47	9.21	6.61	12.73	12.04	4.09	4.16
Automotive Electronics	0.30	0.15	0.09	0.09	0.23	0.15	0.10	0.11
Consumer Electronics	15.62	12.53	5.90	6.33	9.72	6.32	4.85	4.39
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source of Basic Data: Department of Trade & Industry-Bureau of Export Trade Promotion (http://tradelinephil.dti.gov.ph/betp/trade_stat.impcod_sumprod).

Table 5. Balance of Trade, Philippine Electronics, By Sub-Sectors, 1996-2003.

Sub-Sector	1996	1997	1998	1999	2000	2001	2002	2003
Components/Devices (Semiconductors)	5,689.46	6,906.79	9,419.88	13,028.78	17,235.86	11,616.91	11,717.90	10,744.03
Electronic Data Processing	32.76	730.50	1,159.90	2,684.26	3,463.37	2,916.05	2,706.16	2,417.47
Office Equipment	(33.77)	(6.26)	38.95	30.48	20.35	106.64	41.55	81.14
Medical/Industrial Instrumentation	(42.90)	(46.51)	(36.25)	(42.36)	(36.57)	(31.19)	(44.23)	(20.87)
Control And Instrumentation	(97.22)	(126.79)	(90.65)	(79.71)	(65.82)	(48.09)	(56.53)	(85.87)
Communication And Radar	(312.21)	(300.13)	(37.86)	(30.80)	10.13	(147.79)	(110.78)	(61.38)
Telecommunications	(414.30)	(494.68)	(302.71)	(296.09)	(637.52)	(691.44)	(201.90)	(365.62)
Automotive Electronics	167.13	202.23	243.41	261.77	329.06	354.67	307.79	313.95
Consumer Electronics	(299.87)	(494.08)	(24.19)	(170.72)	(165.54)	(8.32)	11.52	48.74
Total Balance of Trade	4,689.08	6,371.06	10,370.49	15,385.60	20,153.31	14,067.44	14,371.47	13,071.58

Source of Basic Data: Department of Trade & Industry-Bureau of Export Trade Promotion (http://tradelinephil.dti.gov.ph/betp/trade_stat.expcod_sumprod).

Table 6. Philippine Exports of Electronics, By Major Trading Partners, 1995-2003

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003
Value (in million US$)									
U.S.A.	2,349.68	3,062.11	4,735.07	5,317.87	5,463.83	6,876.38	4,838.64	4,734.60	3,473.25
Japan	835.66	1,547.23	2,027.56	2,394.53	2,647.19	3,422.67	3,175.97	3,392.72	3,641.76
Germany	314.29	464.98	671.74	726.64	962.99	1,071.56	1,044.80	1,122.82	951.38
Netherlands	257.24	526.45	828.12	1,200.48	1,909.78	2,582.45	2,616.26	2,792.28	2,538.16
Hong Kong	353.22	373.02	671.91	930.10	1,527.13	1,512.69	1,244.02	1,976.25	2,676.81
South Korea	68.88	114.37	144.05	285.35	727.96	822.94	698.16	956.70	873.29
Taiwan	380.71	460.81	936.11	1,538.90	2,741.86	2,522.63	1,803.92	2,155.65	2,122.74
Singapore	608.47	566.28	858.19	1,035.77	1,636.68	2,631.89	1,974.20	2,120.30	2,020.69
Malaysia	218.41	576.55	471.83	999.34	1,315.55	1,173.19	828.78	1,303.77	2,063.65
China	5.60	9.72	18.75	103.67	274.47	341.03	447.02	931.76	1,565.67
Others	1,516.83	1,543.43	1,859.30	3,399.03	4,013.72	3,611.39	2,948.28	2,835.04	2,240.92
Total	6,909.00	9,244.95	13,222.63	17,931.69	23,221.17	26,568.82	21,620.04	24,321.90	24,168.31
Percentage Distribution (%)									
U.S.A.	34.01	33.12	35.81	29.66	23.53	25.88	22.38	19.47	14.37
Japan	12.10	16.74	15.33	13.35	11.40	12.88	14.69	13.95	13.90
Germany	4.55	5.03	5.08	4.05	4.15	4.03	4.83	4.62	3.94
Netherlands	3.72	5.69	6.26	6.69	8.22	9.72	12.10	11.48	10.50
Hong Kong	5.11	4.03	5.08	5.19	6.58	5.69	5.75	8.13	11.08
South Korea	1.00	1.24	1.09	1.59	3.13	3.10	3.23	3.93	3.61
Taiwan	5.51	4.98	7.08	8.58	11.81	9.49	8.34	8.86	8.78
Singapore	8.81	6.13	6.49	5.78	7.05	9.91	9.13	8.72	8.36
Malaysia	3.16	6.24	3.57	5.57	5.67	4.42	3.83	5.36	8.54
China	0.08	0.11	0.14	0.58	1.18	1.28	2.07	3.83	6.48
Others	21.95	16.69	14.06	18.96	17.28	13.59	13.64	11.66	9.27
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source of Basic Data: Department of Trade & Industry-Bureau of Export Trade Promotion (http://tradelinephil.dti.gov.ph/betp/trade_stat.expcod_sumprod).

Table 7. Average Annual Real Growth Rate, RP-US Bilateral Trade (at 1995 prices) (%).

Period	Exports	Imports
1995-2000	21.93	0.16
2000-2003	-21.81	25.26
1995-2003	3.22	10.23

Source of Basic Data: PC-TAS

Overall, the balance of trade between the Philippines and the US recorded an annual surplus over the period 1996-2003 (Figure 7). The surplus started to decline, however, in 2001. Much of the surplus was generated by trade in semiconductors (Figure 8). The surplus of the sub-sector, however, started to fall in 2001 until it turned deficit in 2003. This is also reflected in the decline of exports of semiconductors to the US (Figure 5) but an increase in imports from the US (Figure 6). This is alarming in the sense that the Philippines is losing its market in the US and yet, it is increasing its imports from the US. More worrisome is the fact that Philippine exports are low valued-added products while its imports are high value-added products. Given this, the terms of trade is against the Philippines.

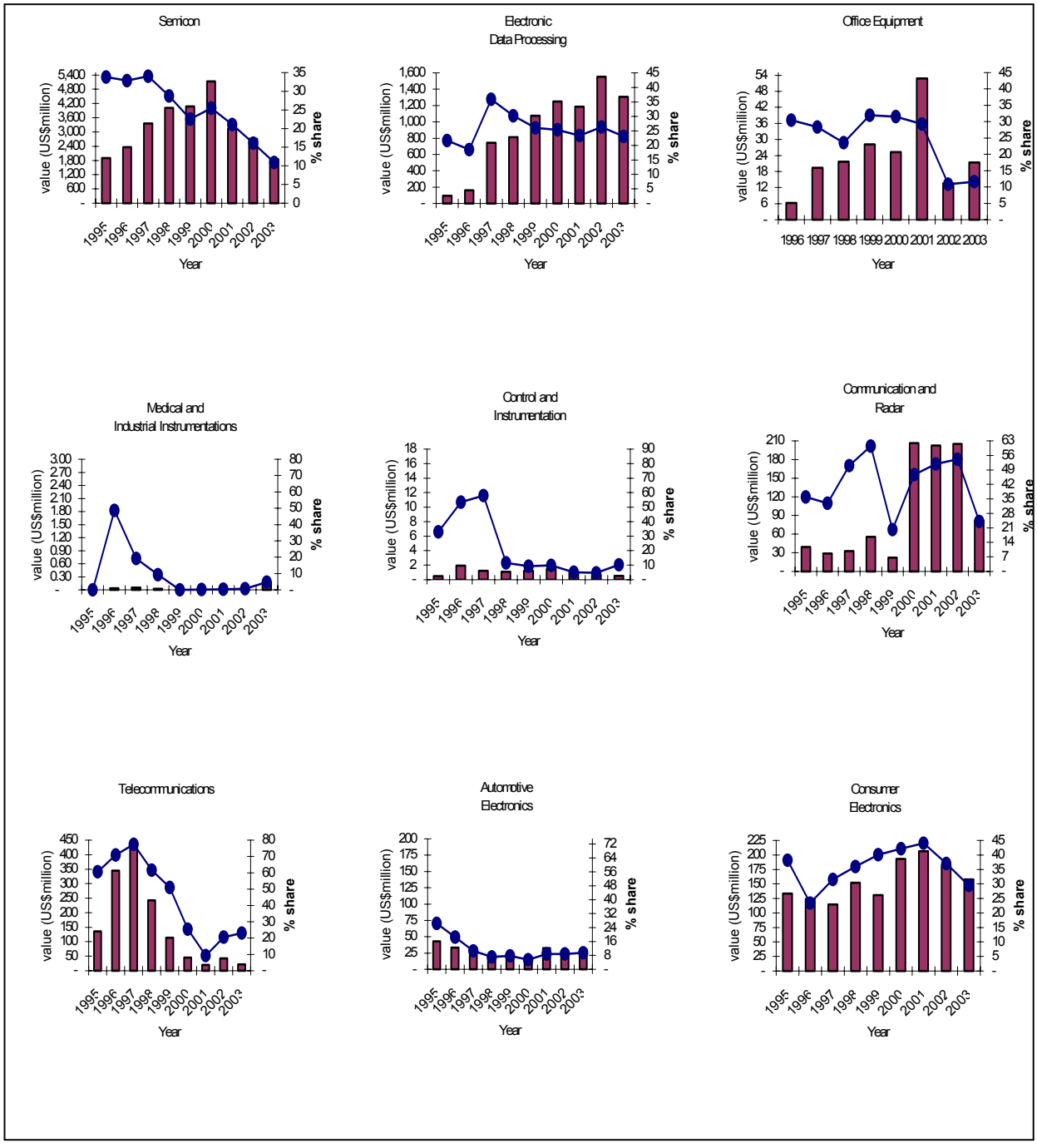
A promising sub-sector in the RP-US trade is electronic data processing. Philippine exports of the products are increasing (Figure 5) while imports are decreasing (Figure 6); thus, creating a balance of trade in favor of the Philippines (Figure 8). Telecommunications also registered a trade surplus although it was decreasing until it turned deficit starting 2000. Among the sub-sectors, medical/industrial instrumentation, and control and instrumentation were the only sub-sectors that registered a deficit every year over the period since 1996.

RP-US Bilateral Investment in Electronics

Total accumulated foreign equity investments in the electronics industry over the period 1995-2003 reached PhP264,200 million, 95 percent of which were registered with the Philippine Export Processing Authority (PEZA) (Table 10). Almost 13 percent of the accumulated total was accounted for by the US.

The largest US investment was made in 1995 at 64.1 percent of total FDI during the year (Table 10). Investment from the US, however, started to slow down starting 1996. The average annual share of the US was less than 4 percent during the period 1996-2001. The share started to increase thereafter at 14.7 percent and 17.1 percent in 2002 and 2003, respectively.

Figure 5. Value of Philippine Exports to the US and Percentage Share of US to Philippine Exports, by Sub-sector, Electronics, 1995-2003.



Source of Basic Data: PC-TAS

Table 8. Market Share in US Electronics Market, Philippines vis-à-vis its Competitors, 1997-2001 (%)

Sub-Sector/HS Code/Product Description	Philippines					China					Hong Kong					Malaysia					Mexico				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
Automotive Electronics	0.35	0.34	0.21	0.16	0.33	7.54	8.37	8.29	9.44	8.94	0.35	0.26	0.33	0.27	0.28	4.05	3.60	3.93	3.70	3.29	31.68	31.20	32.40	35.56	38.89
8512 - Electric light etc. equip; windsh wipers etc., parts	0.00	0.01	0.59	0.67	1.90	3.70	3.79	4.14	5.42	3.60	1.24	1.47	1.70	1.23	0.99	0.04	0.08	0.06	0.19	0.53	17.83	18.86	24.70	27.40	26.16
8527 - Reception apparatus for radiotelephony, etc.	0.65	0.62	0.25	0.11	0.14	10.17	11.50	10.49	11.11	9.84	0.39	0.20	0.25	0.22	0.28	7.49	6.77	7.46	6.66	5.87	48.08	47.09	48.55	50.72	57.06
8708 - Parts & access for motor vehicles	0.00	0.03	0.01	0.08	0.04	4.67	5.14	6.43	8.10	9.52	-	-	-	-	-	-	-	-	-	-	10.74	11.51	11.19	13.05	13.09
Communication & Radar	2.79	1.39	1.33	1.28	1.13	5.54	4.35	4.59	5.00	6.21	0.18	0.15	0.19	0.13	0.09	2.50	2.36	4.08	5.89	6.94	21.92	27.97	26.08	28.66	28.55
8525 - Trans appar for radiotele etc; tv camera & rec	2.83	1.39	1.42	1.36	1.17	5.58	4.16	4.45	4.95	6.14	0.15	0.13	0.14	0.11	0.08	2.81	2.59	4.44	6.26	7.29	21.25	27.63	25.65	29.03	28.41
8526 - Radar apparatus, radio navig aid & remote cont app	0.04	0.14	0.24	0.24	0.62	2.69	2.22	2.74	3.13	4.10	0.29	0.29	0.41	0.26	0.22	0.16	0.34	0.48	0.55	1.66	11.62	9.40	10.70	19.51	33.79
8527 - Reception apparatus for radiotelephony, etc.	7.58	3.32	0.85	0.18	0.32	10.47	10.79	10.35	11.40	16.60	0.40	0.35	0.88	0.86	0.56	0.40	1.14	1.55	2.28	3.07	55.83	61.71	58.44	33.18	20.30
Control & Instrumentation	0.41	0.43	0.42	0.17	0.34	1.28	1.31	1.73	2.31	3.16	0.10	0.16	0.10	0.15	0.08	0.19	0.23	0.27	0.64	1.59	10.37	14.32	13.63	12.81	13.58
9010 - Apparatus etc for photo labs etc nesoi; parts etc.	-	-	-	-	-	0.07	0.07	0.11	0.08	0.07	-	-	-	-	-	-	-	-	-	-	0.11	0.97	1.21	1.31	1.51
9011 - Compound optical microscopes; parts & accessories	0.01	-	-	-	0.99	4.38	5.29	6.73	8.00	6.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9012 - Microscopes, except optical; diffract appar; parts	-	-	-	-	-	0.14	0.29	0.38	0.52	0.79	-	-	-	-	-	-	0.00	-	0.00	0.98	-	0.00	-	0.00	0.98
9016 - Bal of a senstvty 5 cg or bttr w/ or w/o weights	-	-	-	-	-	0.42	1.16	3.12	6.42	5.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9017 - Drawng, markng-out or mathl calculatng insts, nes	-	-	-	-	-	1.21	1.14	1.90	12.10	14.78	0.47	0.29	0.37	2.06	1.53	0.65	1.21	0.24	0.14	0.67	0.47	0.17	0.03	0.39	0.23
9023 - Inst, appts & models, for demonstrational use & parts	-	-	-	-	-	4.34	5.59	6.55	4.46	4.90	0.39	0.48	0.46	1.16	0.91	-	-	-	-	-	2.13	3.30	3.50	2.88	1.21
9026 - Inst etc measure or check flow, level etc, pts etc	0.01	0.05	0.19	0.06	0.01	4.15	3.88	4.31	5.05	5.58	0.14	1.00	0.34	0.51	0.20	0.07	0.24	0.08	0.09	0.15	10.89	12.70	16.44	18.60	17.10
9027 - Inst etc for physical etc anal etc; microtome; pts	-	-	-	-	-	0.66	0.73	1.57	3.43	7.05	0.01	0.00	0.02	0.16	0.00	0.00	0.07	0.11	0.07	0.13	0.81	4.97	4.77	3.57	2.38
9030 - Oscilloscopes, spectrum analyzers etc, parts etc.	0.06	0.10	0.10	0.12	0.43	1.96	2.13	2.19	2.28	2.39	0.20	0.09	0.07	0.04	0.10	0.49	0.57	0.86	2.46	6.75	0.64	0.45	0.43	0.45	0.40
9031 - Machines; Profile project, pt	0.01	0.03	0.15	0.30	0.41	0.42	0.25	0.69	1.03	0.96	-	-	-	-	-	0.05	0.08	0.49	0.49	0.71	4.26	3.90	3.19	1.94	1.79
9032 - Automatic regulating or control instruments; parts	1.53	1.42	1.37	0.50	0.85	1.02	0.87	1.43	1.74	1.62	0.11	0.20	0.16	0.15	0.08	0.26	0.20	0.22	0.16	0.20	35.58	42.57	40.46	41.17	45.17
Consumer Electronics	0.49	0.52	0.41	0.42	0.35	10.24	12.01	13.49	14.42	17.09	0.47	0.45	0.29	0.46	0.30	10.20	8.83	8.74	8.76	9.00	24.19	28.42	24.55	22.32	23.53
8479 - Machines etc having individual functions nesoi, pt	0.00	0.00	0.00	0.00	0.00	0.50	0.61	1.06	0.86	1.24	0.21	0.22	0.16	0.04	0.10	0.20	0.10	0.06	0.43	0.32	0.64	0.95	0.80	0.62	1.05
8518 - Microphones; Loudspeakers; Sound Amplifier etc, pt	1.18	0.97	1.01	0.89	0.84	27.20	28.87	29.21	31.56	35.45	1.63	1.65	1.00	1.08	0.95	6.39	7.75	5.62	6.48	5.37	20.63	20.93	20.90	21.22	22.86
8519 - Turntables, record & cassette players etc.	0.06	0.02	0.00	-	0.02	24.49	32.01	34.73	35.43	45.85	0.41	0.65	0.56	0.58	0.58	14.68	12.85	12.83	10.78	9.59	18.57	18.61	11.94	15.90	7.39
8520 - Magntic tap recordrs incting sound rproducng app, nes	-	-	-	-	-	9.64	7.40	7.86	21.13	31.66	1.32	0.48	0.31	1.68	0.70	22.28	18.35	6.95	8.00	20.49	22.28	18.35	6.95	8.00	20.49
8521 - Video recrdng/reproduc appar wheth/nt video tuner	0.01	0.01	0.00	0.40	0.37	6.77	9.34	12.61	17.53	24.97	0.41	0.56	0.11	0.65	0.15	12.21	9.85	9.40	11.18	11.94	2.24	3.65	3.91	2.74	1.94
8523 - Prepared unrecorded media (no film) for sound etc.	-	-	-	-	-	0.24	0.33	0.30	0.21	0.85	0.13	0.10	0.20	0.26	0.30	0.02	0.17	0.09	0.31	0.11	13.94	9.88	6.43	3.19	1.76
8524 - Recorded gramophone records	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.84	20.15	28.92	20.42	1.86
8527 - Reception apparatus for radiotelephony etc	2.08	1.86	1.97	1.30	1.03	38.45	45.53	46.57	44.23	44.91	1.02	0.47	0.49	0.51	0.62	35.11	29.64	27.71	25.15	24.71	0.44	0.62	2.19	1.74	2.74
8528 - TV receivers, incl video monitors & projectors	0.18	0.21	0.19	0.10	0.06	1.20	1.22	2.09	2.57	3.27	0.02	0.04	0.08	0.11	0.10	10.22	7.79	10.82	10.90	9.87	69.28	74.87	68.12	62.60	57.91
8529 - Parts for television, radio and radar apparatus	1.28	1.75	0.92	0.92	0.80	3.92	5.39	7.38	6.44	7.70	0.45	0.48	0.33	0.52	0.35	2.80	2.45	1.04	1.66	2.92	32.87	30.88	28.59	28.36	31.49
8536 - Electrical apparatus for switching etc, nov 1000 V	0.11	0.20	0.09	0.11	0.07	4.86	5.42	5.57	6.96	7.02	0.65	0.53	0.62	0.55	0.48	1.92	1.53	0.72	0.72	0.53	33.77	29.04	30.92	30.23	32.30
8540 - Thermionic, cold cathode or photocthode tubes, pt	-	-	-	-	-	0.72	0.90	1.21	1.38	1.39	0.00	-	-	0.02	0.99	2.39	4.79	8.67	9.22	4.84	24.50	28.17	35.27	47.59	51.93
Electronic Data Processing	1.67	3.47	2.95	2.02	2.82	6.79	7.57	8.63	9.29	12.02	0.91	0.52	0.35	0.35	0.32	3.72	9.58	10.18	8.66	10.61	10.63	9.38	9.56	10.35	11.43
8471 - Automatic data process machines; magn reader etc	0.19	0.08	0.70	1.22	7.00	0.20	0.12	0.26	0.18	0.32	0.01	-	-	0.01	-	0.61	0.26	0.06	0.70	14.06	37.86	28.20	26.82	23.26	19.79
8473 - Parts etc for typewriters & other office machines	2.08	4.28	3.51	2.31	1.67	8.05	8.97	10.28	11.60	16.04	1.08	0.62	0.39	0.41	0.42	4.28	11.67	12.43	10.87	10.08	5.50	6.12	6.55	7.30	8.77
8523 - Prepared unrecorded media (no film) for sound etc.	0.00	0.07	0.09	0.00	0.00	6.60	5.85	6.27	5.50	6.84	0.67	0.29	0.47	0.48	0.24	3.96	2.46	2.67	1.70	1.42	10.35	9.47	7.12	11.16	11.65
Medical/Industrial Instrumentation	0.97	0.65	0.62	0.61	0.27	4.88	4.75	4.68	5.33	5.37	1.16	0.80	0.74	0.51	0.19	0.47	0.46	0.31	0.30	0.25	7.52	9.20	9.92	8.74	8.73
8530 - Electrical signal, safety or traffic control equip	0.00	0.00	0.00	0.00	0.00	0.80	1.22	0.70	3.79	4.85	-	-	-	-	-	0.00	0.07	0.07	1.00	1.62	19.79	17.04	16.02	13.36	11.96
8531 - Electric sound or visual signaling apparatus, pts	3.04	2.26	2.25	2.35	1.18	13.17	14.90	14.34	16.53	19.01	3.55	2.75	2.62	1.81	0.82	0.96	1.21	0.93	0.81	0.91	15.29	20.98	22.84	17.93	21.11
8543 - Electrical mach etc, with ind functions nesoi, pts	-	-	-	-	-	2.12	6.48	9.44	7.25	3.08	-	-	-	-	-	2.50	2.49	1.84	5.49	1.98	0.70	3.98	3.28	6.83	6.19
9018 - Medical, surgical, dental or vet inst, no elec, pt	-	-	-	-	-	2.11	0.94	1.69	1.79	1.89	0.12	0.05	0.05	0.07	0.06	0.38	0.13	0.08	0.07	0.02	0.29	0.57	1.45	3.05	4.62
9021 - Hearing aids, excluding parts and accessories	-	-	-	-	-	0.01	0.00	0.00	0.04	0.16	-	-	-	-	-	-	-	-	-	-	0.28	0.98	1.07	1.13	0.99
9022 - X-ray etc apparatus; tubes, panels, screen etc, pt	-	0.00	0.00	0.02	0.10	0.15	0.36	0.23	1.32	2.42	-	-	-	0.08	-	0.07	0.13	0.03	0.00	0.02	6.89	8.06	9.12	9.38	8.26
Office Equipment	0.33	0.16	0.16	0.18	0.10	17.13	19.73	22.08	23.96	25.76	3.06	2.17	1.78	1.29	1.70	2.67	2.32	1.54	2.90	3.49	1.76	4.13	3.95	6.80	7.23
8469 - Automatic typewriters and wordprocessing machines	-	-	-	-	-	5.43	6.07	0.80	4.50	16.26	-	-	-	-	-	-	-	-	-	28.44	38.84	71.81	48.05	0.36	-
8470 - Calculting & account machines, cash registers etc	-	-	-	-	-	34.51	34.66	37.33	38.17	40.09	1.40	1.56	1.10	0.98	1.32	8.39	8.11	4.85	8.83	7.10	0.00	0.01	2.56	13.10	10.77
8472 - Office machines nesoi (hectograph, adressing etc)	0.29	0.20	0.21	0.27	0.19	21.53	24.52	33.77	32.10	35.69	1.55	1.15	1.18	1.13	1.73	1.77	1.23	1.19	1.31	1.50	1.11	4.37	5.29	7.60	7.60
8473 - Parts etc for typewriters & other office machines	0.03	0.29	0.11	0.02	0.01	4.08	5.45	12.46	17.81	14.77	5.56	4.12	1.95	0.88	2.95	8.97	7.64	2.96	2.95	5.06	5.63	3.41	4.08	2.75	5.65
9009 - Photocopy apparatus & thermocopy apparatus; pts	0.47	0.17	0.22	0.29	0.19	13.37	16.07	14.40	14.30	12.52	3.54	2.35	2.22	1.65	1.46	0.39	0.02	0.03	0.03	0.18	1.43	5.11	3.92	3.98	4.50

Con't. Table 8

Sub-Sector/HS Code/Product Description	Philippines					China					Hong Kong					Malaysia					Mexico				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
Semiconductors	4.89	5.63	5.91	6.36	5.76	7.29	8.41	9.26	9.46	11.11	2.63	2.65	1.80	1.60	1.31	7.14	7.43	7.24	7.37	5.82	14.65	14.84	15.05	14.43	16.53
8504 - Elec trans, static conv & induct, adp pwr supp, pt	3.10	4.50	5.01	4.48	4.09	17.76	20.16	22.97	24.60	25.87	2.81	2.45	1.74	1.71	1.56	2.95	2.32	2.17	2.09	2.11	25.79	26.15	23.90	23.19	24.47
8518 - Microphones; Loudspeakers; Sound Amplifier etc, pt	0.19	0.65	0.37	0.41	0.46	10.63	15.22	19.26	20.15	22.45	1.14	1.57	0.89	1.26	1.20	4.44	7.78	5.25	7.00	5.46	13.69	12.67	10.08	11.71	12.61
8531 - Electric sound or visual signaling apparatus, pts	8.84	6.05	4.44	2.09	1.79	10.41	14.60	19.03	17.70	17.04	8.16	9.84	4.26	3.57	2.58	14.16	10.38	5.82	2.97	3.89	0.27	0.39	1.04	0.84	1.49
8532 - Electric capacitors, fixed, var or adj (preset) pt	0.00	0.00	0.10	0.13	0.19	0.59	0.87	0.76	1.16	1.97	0.17	0.28	0.28	0.66	0.34	0.80	1.03	0.82	1.56	2.21	27.49	25.52	30.79	21.41	23.25
8533 - Electrical resistors except heating resistors, pts	2.58	2.40	2.33	2.21	1.10	1.12	1.49	1.11	1.74	2.86	0.10	0.25	0.25	0.37	0.23	2.52	2.66	3.34	5.04	3.55	14.08	15.51	17.30	13.75	21.86
8534 - Printed circuits	0.31	3.13	0.41	0.35	0.40	7.41	8.02	8.16	10.81	12.19	4.86	4.09	4.04	3.54	3.52	1.63	3.66	2.87	2.72	1.70	1.99	2.85	3.69	3.69	6.20
8536 - Electrical apparatus for switching etc, nov 1000 V	0.50	0.40	0.72	0.73	0.72	7.26	7.32	7.73	8.98	9.28	0.75	1.22	1.14	0.78	0.48	1.47	1.17	1.01	1.29	1.27	26.28	27.27	27.12	29.28	29.74
8540 - Thermionic, cold cathode or photocthode tubes, pt	-	-	-	-	-	1.18	1.11	1.12	1.09	1.86	-	-	-	-	-	-	-	-	-	-	35.19	33.58	30.91	33.24	32.91
8541 - Semiconductor devices; light-emit diodes etc, pts	6.71	6.78	4.99	4.72	5.75	4.05	4.58	4.80	4.86	6.05	2.01	1.82	1.80	1.81	1.05	16.68	16.38	16.27	14.55	11.73	8.30	8.60	9.68	10.29	13.30
8542 - Electronic integrated circuits & microassembl, pts	12.21	13.41	16.19	19.72	18.51	0.48	0.75	1.24	1.14	1.37	3.60	3.76	1.92	1.46	1.22	12.89	15.20	15.53	16.59	13.42	1.79	1.61	2.06	2.39	2.81
9022 - X-ray tubes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Telecommunications	0.66	0.73	0.60	0.47	0.81	12.10	14.22	12.57	11.78	14.20	1.09	1.24	0.68	0.53	0.74	2.76	2.08	1.90	0.89	1.46	17.86	19.01	17.33	15.82	18.08
8517 - Electric apparatus for line telephony etc, parts	0.07	0.02	0.03	0.02	0.13	2.01	1.94	2.28	3.92	4.95	0.63	0.69	0.33	0.21	0.59	3.20	2.03	1.98	0.62	1.67	2.95	4.26	6.52	7.76	9.67
8518 - Microphones; loudspeakers; sound amplifier etc, pt	5.87	5.39	4.23	4.07	6.96	31.20	33.20	34.52	46.22	53.49	2.25	2.34	2.03	1.96	1.49	4.59	2.93	2.23	1.93	2.57	17.09	16.59	13.29	10.21	6.80
8520 - Telephone answering machines	0.06	2.96	1.35	0.06	0.00	40.35	39.13	48.92	43.75	64.33	0.42	1.18	0.20	0.16	0.08	11.30	3.59	4.23	1.39	4.36	26.42	33.72	27.13	20.36	10.32
8522 - Parts & accessories for 8519-8521	0.34	0.04	0.02	0.26	0.09	26.54	46.24	42.86	44.01	46.16	3.19	3.41	2.46	2.89	2.82	3.18	2.74	2.33	3.33	2.14	5.58	5.42	3.62	1.11	3.13
8544 - Insulated wire, cable etc; opt sheath fib cables	0.92	1.08	1.17	0.98	1.06	16.49	17.83	19.34	18.73	17.91	1.14	1.27	0.80	0.70	0.65	1.28	1.82	1.50	0.98	0.85	36.68	38.59	37.87	36.43	34.07
Total	1.89	2.41	2.28	2.13	1.97	8.08	9.05	9.65	9.97	11.72	1.23	1.03	0.69	0.64	0.49	5.28	6.57	6.72	6.39	6.81	15.52	17.13	16.53	16.91	18.69

Source of basic data: PC-TAS

Con't. Table 8.

Sub-Sector/HS Code/Product Description	Singapore					South Korea					Taiwan					Thailand				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
Automotive Electronics	1.97	1.21	0.59	0.32	0.45	2.59	2.18	1.56	2.34	2.42	2.63	2.97	3.25	2.93	3.49	0.82	1.02	1.53	1.47	2.08
8512 - Electric light etc. equip; windsh wipers etc., parts	-	-	-	-	-	1.70	1.44	1.70	2.10	2.91	16.67	19.13	19.95	18.65	21.61	0.01	0.01	0.12	0.29	0.24
8527 - Reception apparatus for radiotelephony, etc.	3.64	2.27	1.13	0.59	0.82	4.02	3.36	1.87	3.06	3.02	0.61	0.58	0.62	0.31	0.27	1.49	1.85	2.77	2.53	3.67
8708 - Parts & access for motor vehicles	-	-	-	-	-	0.66	0.66	1.04	1.22	1.21	1.47	1.62	1.66	1.68	1.77	0.05	0.10	0.16	0.11	0.11
Communication & Radar	2.04	1.56	1.55	1.07	1.08	6.74	10.70	16.88	18.04	24.15	11.67	11.28	10.27	7.52	5.09	1.43	1.16	0.68	0.43	0.41
8525 - Trans appar for radiotele etc; tv camera & rec	1.16	0.76	1.32	0.96	1.02	7.35	11.78	18.22	18.98	25.67	11.44	10.63	9.70	6.70	4.32	1.54	1.29	0.73	0.46	0.43
8526 - Radar apparatus, radio navig aid & remote cont app	11.22	9.00	5.24	3.58	2.37	0.82	1.05	1.35	1.17	0.83	18.48	24.32	22.57	23.12	19.09	-	-	-	-	-
8527 - Reception apparatus for radiotelephony, etc.	1.27	4.84	1.25	0.18	0.59	6.33	5.58	10.49	16.06	7.04	2.71	3.60	4.49	7.46	6.51	2.02	0.60	0.66	0.38	0.04
Control & Instrumentation	1.31	2.17	2.58	1.81	1.85	0.56	0.62	0.67	0.53	0.51	1.31	1.27	1.13	1.16	1.07	0.10	0.05	0.05	0.18	0.46
9010 - Apparatus etc for photo labs etc nesoi; parts etc.	-	-	-	-	-	0.18	0.61	0.52	0.33	0.43	0.34	0.59	0.40	0.31	0.44	-	-	-	-	-
9011 - Compound optical microscopes; parts & accessories	2.85	3.25	4.66	4.70	3.62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9012 - Microscopes, except optical; diffract appar; parts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9016 - Bal of a senstvty 5 cg or bttr w/ or w/o weights	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9017 - Drawng, markng-out or mathl calculatng insts, nes	4.62	18.23	29.70	3.17	0.07	-	-	-	-	-	2.77	1.43	0.85	12.44	13.46	-	-	-	-	-
9023 - Inst, appts & models, for demonstrational use & parts	-	-	-	-	-	1.02	0.60	0.84	1.08	0.96	0.63	0.99	2.13	2.96	2.22	-	-	-	-	-
9026 - Inst etc measure or check flow, level etc, pts etc	5.48	8.17	7.65	6.57	4.01	0.16	0.53	0.16	0.20	0.40	3.72	3.83	3.52	2.98	2.97	-	-	-	-	-
9027 - Inst etc for physical etc anal etc; microtome; pts	0.84	2.62	3.27	4.02	3.66	0.03	0.02	0.05	0.14	0.05	1.40	1.61	1.08	0.81	0.50	0.01	0.00	0.01	0.58	1.28
9030 - Oscilloscopes, spectrum analyzers etc, parts etc.	0.44	0.54	0.26	0.69	1.46	1.59	1.88	2.02	1.31	0.97	2.82	2.55	2.43	2.19	2.21	0.43	0.29	0.23	0.22	0.63
9031 - Machines; Profile project, pt	0.43	0.30	0.34	0.88	0.61	0.96	0.07	0.28	1.77	0.78	0.65	0.64	0.52	0.98	0.70	0.45	0.02	0.09	0.78	1.55
9032 - Automatic regulating or control instruments; parts	1.88	1.41	1.73	1.37	1.56	0.58	0.47	0.58	0.39	0.58	0.45	0.29	0.34	0.38	0.31	-	-	-	-	-
Consumer Electronics	1.45	1.14	1.09	1.23	1.33	2.51	2.78	3.88	4.38	4.51	2.21	2.05	3.15	3.91	3.96	3.73	3.07	2.85	2.86	2.84
8479 - Machines etc having individual functions nesoi, pt	0.23	0.52	0.31	0.53	0.36	1.96	1.66	1.36	1.62	1.62	0.98	1.21	1.06	1.05	1.00	0.32	0.27	0.04	0.03	0.00
8518 - Microphones; Loudspeakers; Sound Amplifier etc, pt	1.19	0.64	0.44	0.47	0.33	6.41	5.45	6.07	5.75	6.07	9.44	8.26	7.63	6.68	5.08	2.81	3.29	3.59	2.72	1.48
8519 - Turntables, record & cassette players etc.	2.43	2.01	1.72	1.39	1.53	2.37	1.16	1.12	1.35	2.76	0.94	0.93	2.24	1.87	1.88	2.66	2.84	2.25	3.11	5.28
8520 - Magntic tap recordrs incting sound rproducng app, nes	2.60	7.18	0.26	0.56	0.17	0.55	0.71	2.19	16.24	10.86	0.98	0.91	5.15	2.08	11.91	1.20	0.03	0.01	0.03	-
8521 - Video recrdng/reproduc appar wheth/nt video tuner	1.83	0.42	0.53	0.45	0.46	3.47	4.27	6.78	7.86	8.56	0.90	0.89	2.23	2.46	1.56	6.58	2.74	2.05	2.15	2.13
8523 - Prepared unrecorded media (no film) for sound etc.	8.03	8.68	5.02	2.38	1.96	0.73	1.55	0.60	0.88	0.92	7.30	21.10	45.41	57.67	64.15	0.03	-	-	0.02	0.14
8524 - Recorded gramophone records	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8527 - Reception apparatus for radiotelephony etc	3.68	4.81	5.67	8.93	9.09	1.79	1.02	1.16	4.51	4.35	1.30	1.26	1.03	0.98	1.07	0.90	0.83	0.05	0.52	0.64
8528 - TV receivers, incl video monitors & projectors	0.12	0.10	0.09	0.08	0.05	1.83	1.71	2.67	2.20	2.81	0.44	0.40	0.82	1.81	1.70	8.20	7.10	6.88	7.33	5.80
8529 - Parts for television, radio and radar apparatus	1.59	1.35	1.18	1.14	2.36	1.56	4.97	5.66	4.30	2.85	3.87	2.92	2.23	3.82	4.16	0.51	0.98	2.62	2.13	2.67
8536 - Electrical apparatus for switching etc, nov 1000 V	0.59	0.50	0.55	0.56	0.77	0.51	0.41	0.44	0.44	0.44	4.85	5.02	5.02	6.36	6.83	0.23	0.31	0.45	0.56	0.17
8540 - Thermionic, cold cathode or photocthode tubes, pt	0.71	0.56	0.38	0.12	0.01	2.45	2.10	5.99	9.76	6.86	1.65	1.13	2.82	0.79	0.14	-	-	-	-	-
Electronic Data Processing	11.39	9.89	8.95	8.05	6.68	7.29	5.67	5.39	8.07	5.46	20.11	19.16	19.15	19.36	18.60	0.94	0.83	0.56	0.56	1.02
8471 - Automatic data process machines; magn reader etc	6.70	13.07	7.97	2.09	1.53	1.00	2.10	1.79	4.37	3.50	31.55	32.63	47.16	53.74	42.67	0.01	0.01	0.01	0.05	0.00
8473 - Parts etc for typewriters & other office machines	13.12	9.96	9.56	9.79	8.70	8.14	5.96	5.70	8.78	5.69	19.15	17.79	14.75	11.98	11.74	1.04	0.94	0.64	0.67	1.29
8523 - Prepared unrecorded media (no film) for sound etc.	0.50	0.54	0.94	0.88	0.20	11.64	10.68	11.74	11.04	11.87	4.56	4.74	6.18	6.76	6.51	1.96	1.16	1.01	0.94	1.99
Medical/Industrial Instrumentation	0.74	1.21	1.82	2.06	1.47	2.22	2.02	2.24	2.90	1.85	5.60	4.52	4.50	4.29	3.39	0.02	0.02	0.04	0.11	0.01
8530 - Electrical signal, safety or traffic control equip	-	-	-	-	-	1.39	1.54	1.30	1.02	0.56	4.61	4.14	5.17	4.14	6.08	-	0.05	1.46	4.11	-
8531 - Electric sound or visual signaling apparatus, pts	0.35	0.08	0.11	0.21	0.32	5.21	5.04	5.17	6.33	4.00	16.76	15.35	15.78	16.12	15.34	0.07	0.08	0.07	0.12	0.05
8543 - Electrical mach etc, with ind functions nesoi, pts	-	-	-	-	-	-	-	-	-	-	12.10	2.84	2.80	3.59	1.61	-	-	-	-	-
9018 - Medical, surgical, dental or vet inst, no elec, pt	0.28	0.03	0.08	0.05	0.28	1.65	1.63	2.31	3.79	3.00	0.19	0.09	0.08	0.07	0.31	-	-	-	-	-
9021 - Hearing aids, excluding parts and accessories	13.65	24.83	26.08	18.59	8.28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9022 - X-ray etc apparatus; tubes, panels, screen etc, pt	0.09	0.01	0.04	0.19	0.38	0.20	0.16	0.14	0.18	0.18	0.01	0.05	0.03	0.12	0.02	-	-	-	-	-
Office Equipment	1.69	1.84	2.09	2.31	3.16	0.91	1.28	2.19	2.51	2.42	4.53	3.50	4.54	4.46	3.77	3.14	3.12	3.60	4.38	4.31
8469 - Automatic typewriters and wordprocessing machines	-	-	-	-	-	-	-	-	-	-	33.04	0.01	-	0.04	0.05	5.82	0.10	-	-	-
8470 - Calculting & account machines, cash registers etc	6.76	8.07	7.85	6.47	5.50	1.95	1.97	2.62	2.10	1.87	15.88	10.09	12.75	9.64	4.80	4.22	3.76	2.24	1.44	0.47
8472 - Office machines nesoi (hectograph, adressing etc)	-	-	-	-	-	1.66	2.03	4.74	6.08	5.96	4.32	2.99	2.73	2.91	3.07	1.70	1.40	2.65	2.45	1.77
8473 - Parts etc for typewriters & other office machines	2.72	2.84	3.63	4.25	7.85	0.79	0.85	1.13	1.24	1.80	8.65	11.96	11.10	9.32	8.76	0.57	0.19	0.27	0.04	0.42
9009 - Photocopy apparatus & thermocopy apparatus; pts	0.55	0.29	0.12	0.20	0.35	0.47	0.93	1.46	1.75	1.48	0.53	0.30	0.45	0.62	0.85	3.53	3.89	5.16	8.11	11.07

Con't. Table 8

Sub-Sector/HS Code/Product Description	Singapore					South Korea					Taiwan					Thailand				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
Semiconductors	3.63	3.88	3.25	3.32	2.84	3.72	3.09	3.52	3.81	3.26	11.58	11.05	11.32	10.79	9.86	2.72	2.55	2.82	2.56	2.90
8504 - Elec trans, static conv & induct, adp pwr supp, pt	0.79	0.70	0.69	0.60	0.59	1.88	1.37	1.36	1.31	1.12	10.54	8.37	8.30	7.94	6.20	3.37	3.39	4.24	3.88	4.56
8518 - Microphones; Loudspeakers; Sound Amplifier etc, pt	0.41	1.28	0.85	0.60	0.84	4.91	3.90	4.24	3.93	4.02	28.63	27.85	30.11	32.34	27.38	0.63	0.82	1.12	1.23	1.99
8531 - Electric sound or visual signaling apparatus, pts	2.44	1.37	0.30	0.41	1.11	4.01	3.59	3.80	3.08	2.60	5.76	7.85	10.34	13.07	13.77	8.12	5.58	5.03	3.44	7.15
8532 - Electric capacitors, fixed, var or adj (preset) pt	1.28	1.49	1.39	1.63	0.92	1.50	1.82	2.13	3.72	2.46	4.68	4.56	3.72	4.27	3.49	1.07	0.87	0.68	0.82	0.77
8533 - Electrical resistors except heating resistors, pts	0.87	0.88	0.74	0.77	0.81	0.90	0.78	0.60	1.00	0.59	7.60	7.55	6.92	10.01	8.10	0.52	0.69	0.84	1.04	0.95
8534 - Printed circuits	4.69	4.84	7.56	6.23	6.89	6.41	6.03	7.19	7.45	7.16	28.70	25.48	26.67	30.07	25.70	4.04	3.27	3.17	2.41	2.23
8536 - Electrical apparatus for switching etc, nov 1000 V	1.15	1.18	1.10	1.01	1.12	0.64	0.58	0.73	0.86	1.16	6.48	6.31	6.26	5.87	5.14	0.72	0.65	0.45	0.40	0.43
8540 - Thermionic, cold cathode or photocthode tubes, pt	1.24	0.37	0.21	1.09	0.65	1.92	0.20	0.53	0.61	0.47	5.52	5.15	6.56	7.33	7.27	0.95	0.99	0.78	0.51	0.22
8541 - Semiconductor devices; light-emit diodes etc, pts	1.88	2.16	1.33	1.23	1.67	3.09	2.72	2.90	3.43	1.87	6.73	6.35	5.40	5.16	4.28	1.41	1.68	1.60	2.23	2.28
8542 - Electronic integrated circuits & microassembl, pts	11.15	12.23	8.77	9.61	7.79	8.36	6.56	7.66	7.71	8.01	16.08	17.16	18.74	15.32	16.81	3.91	3.60	4.35	3.87	4.17
9022 - X-ray tubes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Telecommunications	0.46	0.23	0.16	0.23	0.20	1.06	1.30	1.12	1.45	3.27	4.02	3.52	2.82	2.72	3.29	1.50	1.09	0.64	0.56	0.61
8517 - Electric apparatus for line telephony etc, parts	0.44	0.08	0.10	0.21	0.17	0.72	0.78	0.45	0.52	0.84	1.68	2.00	0.96	1.54	2.68	1.88	1.06	0.54	0.48	0.58
8518 - Microphones; loudspeakers; sound amplifier etc, pt	0.48	0.49	0.28	0.18	0.22	9.93	9.12	9.92	7.74	6.66	4.39	4.15	3.12	3.40	2.81	-	-	-	-	-
8520 - Telephone answering machines	-	-	-	-	-	1.13	1.43	1.35	3.30	4.35	6.05	3.38	0.27	0.17	0.21	3.31	0.89	0.08	0.08	0.15
8522 - Parts & accessories for 8519-8521	1.71	0.91	0.63	1.18	0.83	1.24	3.31	3.79	3.77	1.17	3.06	1.64	1.68	2.03	2.18	0.47	0.59	0.59	0.43	0.64
8544 - Insulated wire, cable etc; opt sheath fib cables	0.29	0.25	0.18	0.16	0.17	0.51	0.62	0.66	2.23	6.63	6.68	5.65	6.20	5.42	4.46	1.27	1.35	0.91	0.84	0.74
Total	4.59	4.19	3.79	3.30	2.80	3.97	3.76	4.60	5.90	6.43	9.89	9.39	9.68	9.23	8.29	2.00	1.74	1.60	1.54	1.68

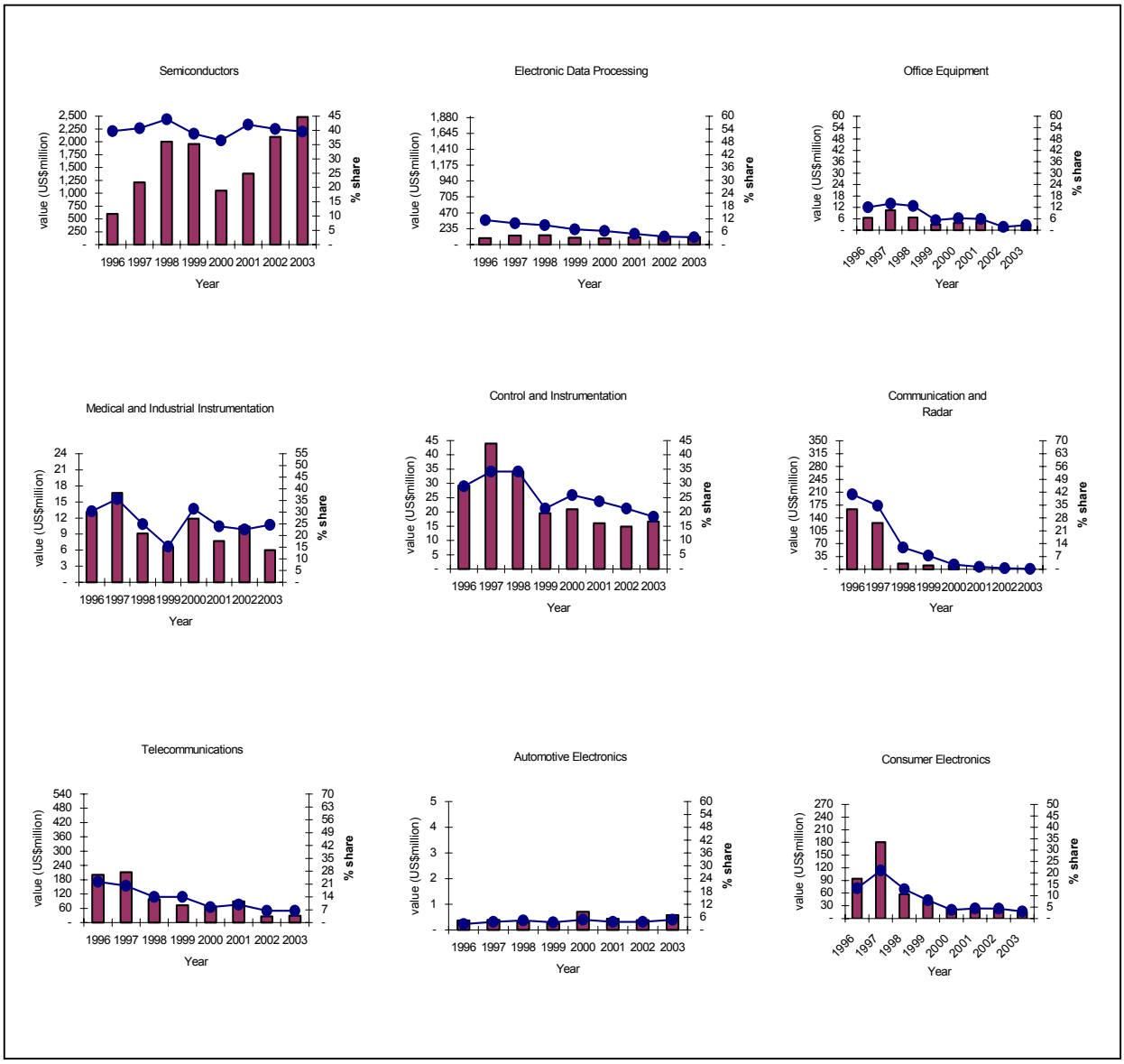
Source of basic data: PC-TAS

Table 9. Philippine Imports of Electronics, By Major Trading Partners, 1996-2003

Country	1996	1997	1998	1999	2000	2001	2002	2003
Value (in million US$)								
U.S.A.	1,199.51	1,934.87	2,364.16	2,214.04	1,286.10	1,637.45	2,296.63	2,670.24
Japan	1,112.50	1,641.56	1,943.76	1,765.52	1,550.36	2,055.68	3,237.95	3,458.02
Germany	227.92	304.44	217.06	154.30	138.74	170.23	129.46	190.25
Netherlands	36.31	54.20	26.19	28.77	107.33	82.25	101.94	128.55
Hong Kong	379.09	428.02	404.85	305.52	305.37	487.42	819.43	733.53
South Korea	220.24	375.70	659.86	1,277.29	573.59	704.45	972.88	927.03
Taiwan	155.90	204.22	194.21	321.39	428.20	327.67	304.93	485.79
Singapore	421.43	639.62	528.44	564.36	648.49	624.74	755.32	796.82
Malaysia	87.08	171.75	293.04	345.05	236.40	157.90	297.06	352.48
China	47.27	101.44	78.08	88.26	77.36	142.16	204.15	446.55
Others	668.61	995.75	851.56	771.06	1,063.57	1,162.65	830.69	907.46
Total	4,555.87	6,851.57	7,561.20	7,835.57	6,415.51	7,552.60	9,950.42	11,096.73
Percentage Distribution (%)								
U.S.A.	26.33	28.24	31.27	28.26	20.05	21.68	23.08	25.37
Japan	24.42	23.96	25.71	22.53	24.17	27.22	32.54	26.46
Germany	5.00	4.44	2.87	1.97	2.16	2.25	1.30	1.71
Netherlands	0.80	0.79	0.35	0.37	1.67	1.09	1.02	1.16
Hong Kong	8.32	6.25	5.35	3.90	4.76	6.45	8.24	6.61
South Korea	4.83	5.48	8.73	16.30	8.94	9.33	9.78	8.35
Singapore	9.25	9.34	6.99	7.20	10.11	8.27	7.59	7.18
Taiwan	3.42	2.98	2.57	4.10	6.67	4.34	3.06	4.38
Malaysia	1.91	2.51	3.88	4.40	3.68	2.09	2.99	3.18
China	1.04	1.48	1.03	1.13	1.21	1.88	2.05	4.02
Others	14.68	14.53	11.26	9.84	16.58	15.39	8.35	8.18
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

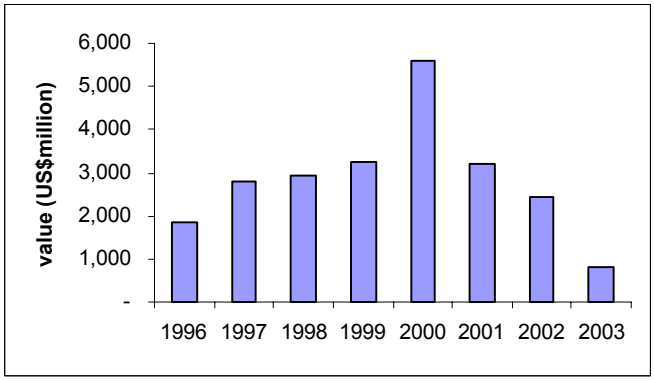
Source: Department of Trade & Industry-Bureau of Export Trade Promotion (http://tradelinephil.dti.gov.ph/betp/trade_stat.impcod_sumprod).

Figure 6. Value of Philippine Imports from the US and Percentage Share of US to Philippine Imports, by Sub-sector, Electronics, 1995-2003



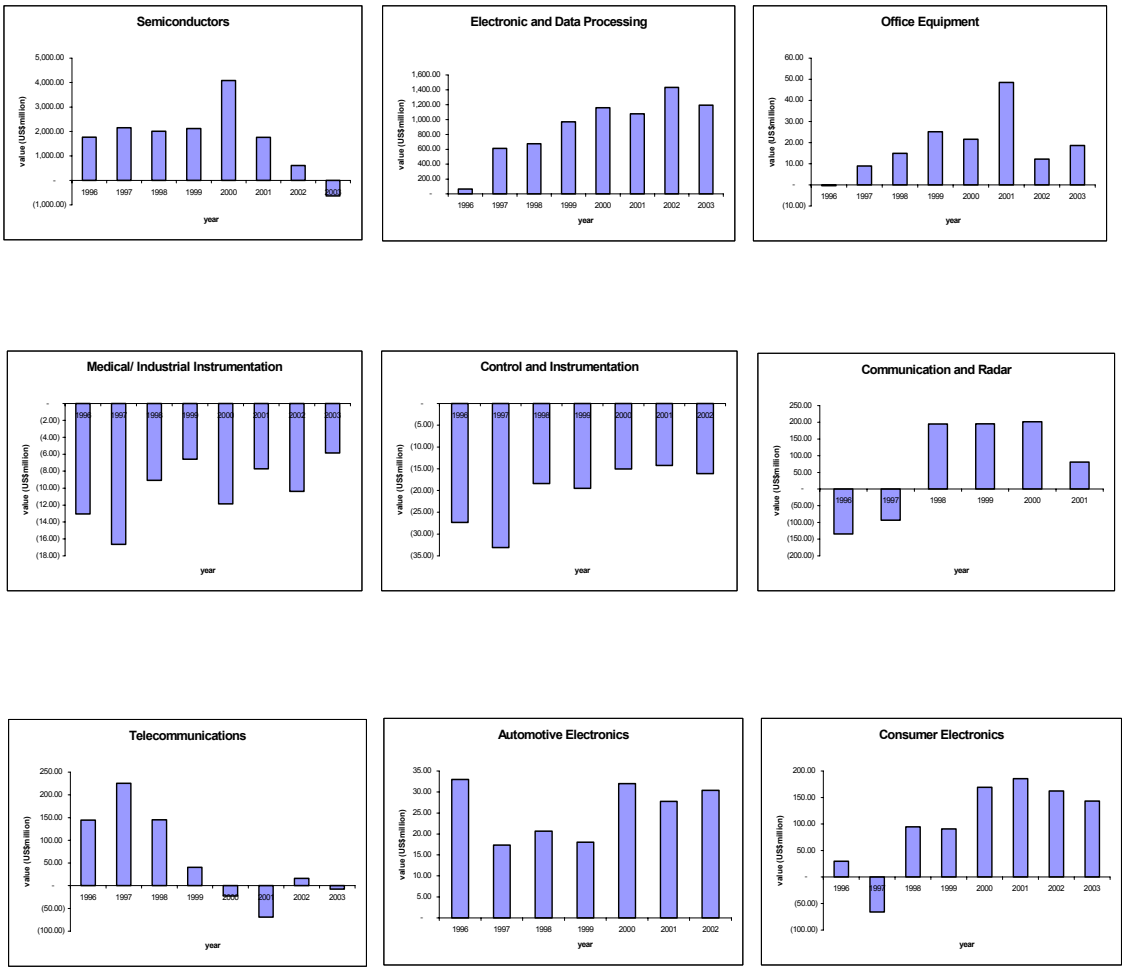
Source of Basic Data: PC-TAS

Figure 7. RP-US Balance of Trade, Electronics, 1996-2003.



Source of Basic Data: PC-TAS

Figure 8. RP-US Balance of Trade, Electronics, by sub-sectors, 1996-2003.



Source of Basic Data: PC-TAS

Table 10. Total FDI and US Foreign Equity Investments in the Philippine Electronics Industry, 1990-2003

Year	Total FDI in Electronics			US FDI in Electronics			% Share of the US		
	BOI	PEZA	Total	BOI	PEZA	Total	BOI	PEZA	Total
Value (PhP Million)									
1995	332.64	33268.37	33601.01	-	21554.11	21554.11	-	64.8	64.1
1996	517.26	13382.01	13899.27	169.99	312.72	482.711	32.9	2.3	3.5
1997	683.22	47295.81	47979.03	557.70	595.02	1152.72	81.6	1.3	2.4
1998	5163.15	31054.31	36217.46	3092.48	149.99	3242.47	59.9	0.5	9.0
1999	3540.85	27940.13	31480.98	593.98	55.03	649.01	16.8	0.2	2.1
2000	1056.74	54458.71	55515.45	472.50	2722.41	3194.913	44.7	5.0	5.8
2001	304.00	24171.55	24475.55	-	8.13	8.13	-	0.0	0.0
2002	117.15	7477.75	7594.90	-	1117.81	1117.81	-	14.9	14.7
2003	712.95	12723.12	13436.07	7.00	2297.12	2304.12	1.0	18.1	17.1
Accumulated total	12428	251771.76	264199.7	4893.65	28812.34	33705.99	39.4	11.4	12.8
% Distribution									
1995	0.99	99.01	100.00	-	100.00	100.00			
1996	3.72	96.28	100.00	35.22	64.78	100.00			
1997	1.42	98.58	100.00	48.38	51.62	100.00			
1998	14.26	85.74	100.00	95.37	4.63	100.00			
1999	11.25	88.75	100.00	91.52	8.48	100.00			
2000	1.90	98.10	100.00	14.79	85.21	100.00			
2001	1.24	98.76	100.00	-	100.00	100.00			
2002	1.54	98.46	100.00	-	100.00	100.00			
2003	5.31	94.69	100.00	0.30	99.70	100.00			
Accumulated total	4.70	95.30	100.00	14.52	85.48	100.00			

Note: Value is based on approved foreign equity investments.

Sources: BOI-DTI; PEZA.

5. Assessment of the Competitiveness of the Philippine Electronics Industry

Competitiveness is the key to remaining in the electronics global production chain. This section of the paper examines the competitiveness of the country's electronics industry vis-à-vis the country's competitors from East Asia. Likewise, since much of the trade generated by the global production network is intra-industry trade, i.e. exports and imports of products belonging to the same industry, the extent of intra-industry trade between the Philippines and the US will be analyzed.

Measurement Tools

Competitiveness. Two measures of competitiveness are used: (i) success in expanding shares in the world market; and (ii) revealed comparative advantage (RCA). Market share is measured simply as the percentage share of Philippine exports in total exports of the world. On the other hand, RCA is measured by the ratio of a product's share in a country's exports to the product's share in world exports, as follows:

$$RCA = (x_{ij} / X_j) \div (x_{iw} / X_w)$$

where:

x_{ij} = product i exported by country j;

X_j = total exports of country j;

x_{iw} = world exports of product i; and

X_w = total world exports

A ratio of greater than 1 indicates that a country has a comparative advantage in that product while a ratio of less than 1 indicates the opposite. The analysis will be made vis-à-vis the country's major competitors. Analysis will be made at the 4-digit HS level. Products with RCA greater than 1 will be considered as the country's product niches.

Economic integration with the USA. The intra-industry trade index (IIT) will be measured as an indicator of economic integration. There are several measures of the IIT index. The most commonly used, however, is the Grubel-Lloyd Index, given by the following formula (Grimwade 2000):

$$IIT_{ij}^{k} = \frac{\Sigma(X_{ij}^{k} + M_{ij}^{k}) - \Sigma\left|X_{ij}^{k} - M_{ij}^{k}\right|}{\Sigma(X_{ij}^{k} + M_{ij}^{k})} x100$$

where:

X = exports

M = imports

Subscript i refers to reporting country (i.e. Philippines).

Subscript j refers to partner country (i.e. major trading partners of the Philippines).

Superscript k represent product.

$\sum$ refers to the sum of products/commodities at the 4-digit HS code

The straight brackets around the expression $X_{ij} - M_{ij}$ denotes that the sign of the trade balance is ignored.

The index measures intra-industry trade as the percentage of a country's total trade (X+M) that was matched or balanced (X=M). The index has a value between 0 and 100. If all trade was balanced, the index will be 100. If all trade was one-way, the index will be 0. Hence, the closer the value of the index to 100, the greater the importance of intra-industry trade.

The index will be measured at the 4-digit HS (Harmonized System) code. HS has three levels of aggregation namely, 2-digits, 4-digits and 6-digits. The 2-digit level represents too high a level of aggregation such that intra-industry trade could be overestimated. On the other hand, the 6-digit level may represent too low a level of aggregation such that intra-industry trade could be underestimated.

The index will be estimated in relation to the bilateral trade flows between the Philippines and the USA. The IIT index will be used as an indicator of the degree of economic integration between the two economies. Following OECD (2002) and using a slight modification, intra-industry trade is considered high if the IIT index is above 50, and low if the IIT index is below 50. Likewise, IIT is considered increasing if the change is greater than 0, and decreasing if the change is less than 0.

Competitiveness and Export Niches

Estimates of RCA shows that among the sub-sectors of the electronics industry, the country is competitive only in semiconductors, electronic data processing, and automotive electronics (Table 11). These are the same sub-sectors which managed to capture at least 1 percent of the world market; and the market shares have increased between 1997 and 2001. Among the three sub-sectors, the increase in competitiveness, either in terms of market share or RCA, was recorded highest by the electronic data processing.

Of the non-competitive sectors, office equipment showed some potential of becoming competitive. Its RCA was greater than 1 in 2001; and its share in the world market has increased, reaching almost 1 percent in 2001 (Table 11).

In terms of products by sub-sectors, most of the products are not competitive as shown by their RCA of less than 1 (Figure 9). Nonetheless, competitiveness is improving as shown by the scatter plot that becomes more dispersed away from 1 every year since 1997.

The country is competitive in eighteen (18) parts and components electronic products, most of which are semiconductors (Table 12). These products can be considered as the country's exports niches. Despite the small number of competitive products, it is worth noting that these products alone accounted for at least 86 percent of the country's total exports (Table 13). This is

further supported by the scatter plot in Figure 9, where the competitive products accounted for the largest shares in the country's total exports of electronics.

Most of the competitive products are also increasing in their competitiveness as shown by the increasing values of the RCAs (Table 12). The largest increases were registered by automatic data processing machines (HS 8471), photocopy apparatus & thermocopy apparatus parts (HS 9009), electric capacitors parts (HS 8532) and thermionic, cold cathode or photothode tubes parts (HS 8540). These products were not competitive until 2001.

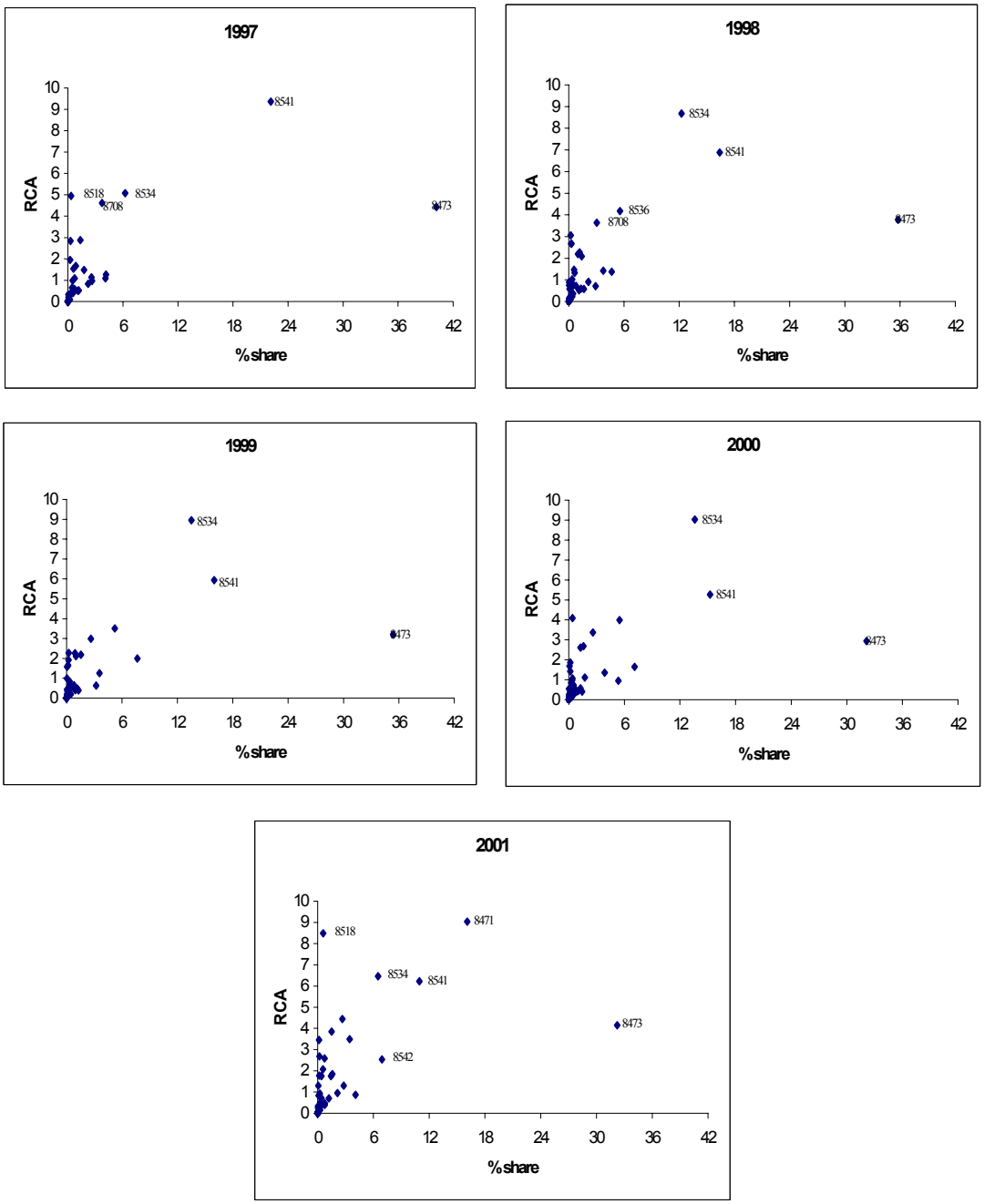
The country is not competitive in any product under the sub-sectors of communication and radar, and medical/industrial instrumentation

Table 11. Indicators of Competitiveness, Philippine Electronics, 1997-2001.

Indicators of Competitiveness / Sub-Sectors	Year					Change
	1997	1998	1999	2000	2001	1997-2001
A. Share in World Market (%)						
Components/Devices (Semiconductors)	1.43	1.71	1.95	1.81	1.74	0.31
Electronic Data Processing	1.71	1.74	1.73	1.62	2.88	1.17
Office Equipment	0.30	0.48	0.43	0.38	0.88	0.58
Medical/Industrial Instrumentation	0.00	0.00	0.02	0.02	0.00	0.00
Control & Instrumentation	0.06	0.08	0.07	0.07	0.11	0.05
Communication & Radar	0.53	0.44	0.41	0.62	0.51	-0.02
Telecommunications	0.35	0.33	0.30	0.32	0.50	0.16
Automotive Electronics	1.29	1.46	1.49	1.70	2.01	0.73
Consumer Electronics	0.32	0.61	0.55	0.56	0.47	0.14
B. Revealed Comparative Advantage						
Components/Devices (Semiconductors)	2.80	2.86	2.84	2.71	2.91	0.11
Electronic Data Processing	3.35	2.91	2.53	2.42	4.81	1.46
Office Equipment	0.58	0.81	0.63	0.56	1.46	0.88
Medical/Industrial Instrumentation	0.00	0.00	0.03	0.02	0.00	0.00
Control & Instrumentation	0.12	0.13	0.10	0.10	0.18	0.06
Communication & Radar	1.05	0.74	0.61	0.92	0.85	-0.19
Telecommunications	0.69	0.56	0.44	0.48	0.84	0.16
Automotive Electronics	2.53	2.44	2.17	2.55	3.37	0.84
Consumer Electronics	0.63	1.02	0.80	0.83	0.78	0.14

Source: Estimates by the author using the PC-TAS database.

Figure 9. Revealed Comparative Advantage and Percentage Share to Total Philippine Electronic exports, 1997-2001



Source: Estimates by the author using the PC-TAS database.

Table 12. Revealed Comparative Advantage & % Share in World Market, Philippines, By Product, 1997-2001

Sub-Sector/HS Code/ Product Description	Revealed Compartive Advantage					% Share in World Exports				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
A. Competitive										
Automotive Electronics										
8527 - Reception apparatus for radiotelephony, etc.	1.09	2.09	2.19	2.69	3.86	0.56	1.25	1.50	1.80	2.31
8708 - Parts & access for motor vehicles	4.62	3.64	2.99	3.37	4.45	2.35	2.17	2.05	2.25	2.66
Control & Instrumentation										
9012 - Microscopes, except optical; diffract appar; parts	-	0.90	1.57	1.68	3.45	-	0.54	1.08	1.12	2.07
9023 - Inst, appts & models, for demonstrational use & parts	1.95	2.67	1.66	1.86	2.68	1.00	1.59	1.14	1.24	1.60
Consumer Electronics										
8529 - Parts for television, radio and radar apparatus	0.97	1.42	1.26	1.36	1.30	0.50	0.85	0.86	0.91	0.78
8536 - Electrical apparatus for switching etc, nov 1000 V	1.48	4.18	3.51	3.99	3.49	0.76	2.50	2.41	2.67	2.09
Electronic Data Processing										
8473 - Parts etc for typewriters & other office machines	4.42	3.78	3.21	2.94	4.15	2.25	2.26	2.20	1.96	2.48
8471 - Automatic data process machines; magn reader etc	0.06	0.01	0.02	0.33	9.03	0.03	0.01	0.02	0.22	5.40
Office Equipment										
8473 - Parts etc for typewriters & other office machines	1.67	2.28	2.27	1.07	2.08	0.85	1.36	1.55	0.71	1.24
9009 - Photocopy apparatus & thermocopy apparatus; pts	0.40	0.37	0.27	0.55	1.84	0.21	0.22	0.18	0.37	1.10
Semiconductors										
8518 - Microphones; Loudspeakers; Sound Amplifier etc, pt	2.84	2.67	1.92	1.42	1.78	1.45	1.60	1.32	0.95	1.06
8532 - Electric capacitors, fixed, var or adj (preset) pt	0.59	0.72	0.64	1.11	1.75	0.30	0.43	0.44	0.74	1.05
8533 - Electrical resistors except heating resistors, pts	2.88	2.19	2.11	2.61	2.58	1.47	1.31	1.45	1.74	1.54
8534 - Printed circuits	5.07	8.68	8.96	9.04	6.46	2.58	5.18	6.14	6.04	3.87
8540 - Thermionic, cold cathode or photocthode tubes, pt	0.28	1.03	0.84	0.98	1.75	0.14	0.61	0.57	0.65	1.05
8541 - Semiconductor devices; light-emit diodes etc, pts	9.36	6.88	5.94	5.27	6.22	4.77	4.11	4.07	3.52	3.72
8542 - Electronic integrated circuits & microassembl, pts	1.27	1.38	1.99	1.65	2.54	0.65	0.82	1.37	1.10	1.52
Telecommunications										
8518 - Microphones; loudspeakers; sound amplifier etc, pt	4.94	3.05	2.27	4.10	8.49	2.52	1.82	1.56	2.74	5.08
B. Non-Competitive										
Automotive Electronics										
8512 - Electric light etc. equip; windsh wipers etc., parts	0.19	0.15	0.16	0.16	0.05	0.10	0.09	0.11	0.11	0.03
Communication & Radar										
8525 - Trans appar for radiotele etc; tv camera & rec	1.09	0.71	0.64	0.96	0.87	0.56	0.42	0.44	0.64	0.52
8526 - Radar apparatus, radio navig aid & remote cont app	1.53	1.47	0.46	0.85	0.93	0.78	0.88	0.31	0.57	0.56
8527 - Reception apparatus for radiotelephony, etc.	-	-	-	-	-	-	-	-	-	-
Control & Instrumentation										
9010 - Apparatus etc for photo labs etc nesoi; parts etc.	0.03	0.03	0.01	0.02	0.00	0.01	0.02	0.01	0.01	0.00
9011 - Compound optical microscopes; parts & accessories	-	0.75	0.99	0.55	1.30	-	0.45	0.68	0.36	0.78
9026 - Inst etc measure or check flow, level etc, pts etc	0.21	0.02	0.03	0.04	0.04	0.11	0.01	0.02	0.02	0.02
9027 - Inst etc for physical etc anal etc; microtome; pts	0.02	0.00	0.01	0.04	0.14	0.01	0.00	0.01	0.02	0.08

Con't Table 12

Sub-Sector/HS Code/ Product Description	Revealed Compartive Advantage					% Share in World Exports				
	1997	1998	1999	2000	2001	1,997	1,998	1,999	2,000	2,001
9030 - Oscilloscopes, spectrum analyzers etc, parts etc.	0.06	0.06	0.07	0.05	0.07	0.03	0.03	0.05	0.04	0.04
9031 - Machines; Profile project, pt	-	-	-	-	-	-	-	-	-	-
9032 - Automatic regulating or control instruments; parts	0.10	0.08	0.06	0.07	0.06	0.05	0.05	0.04	0.05	0.04
Consumer Electronics										
8479 - Machines etc having individual functions nesoi, pt	0.09	0.11	0.19	0.12	0.15	0.05	0.07	0.13	0.08	0.09
8518 - Microphones; Loudspeakers; Sound Amplifier etc, pt	0.65	0.74	0.54	0.72	0.72	0.33	0.44	0.37	0.48	0.43
8519 - Turntables, record & cassette players etc.	0.98	1.33	0.69	0.38	0.27	0.50	0.80	0.47	0.25	0.16
8521 - Video recrdng/reproduc appar wheth/nt video tuner	0.00	0.04	0.01	0.00	0.00	0.00	0.02	0.01	0.00	0.00
8523 - Prepared unrecorded media (no film) for sound etc.	0.01	0.01	0.03	0.04	0.83	0.00	0.01	0.02	0.03	0.50
8527 - Reception apparatus for radiotelephony etc	0.37	0.21	0.18	0.08	0.05	0.19	0.13	0.13	0.06	0.03
8528 - TV receivers, incl video monitors & projectors	1.13	0.91	0.41	0.46	0.40	0.58	0.54	0.28	0.31	0.24
8540 - Thermionic, cold cathode or photocthode tubes, pt	-	0.01	0.01	0.01	0.03	-	0.01	0.01	0.01	0.02
Electronic Data Processing										
8523 - Prepared unrecorded media (no film) for sound etc.	0.02	0.00	0.00	-	0.01	0.01	0.00	0.00	-	0.00
Medical/Industrial Instrumentation										
8530 - Electrical signal, safety or traffic control equip	-	-	-	-	-	-	-	-	-	-
8531 - Electric sound or visual signaling apparatus, pts	0.00	0.00	0.13	0.10	0.00	0.00	0.00	0.09	0.07	0.00
8543 - Electrical mach etc, with ind functions nesoi, pts	-	-	-	-	-	-	-	-	-	-
9018 - Medical, surgical, dental or vet inst, no elec, pt	-	-	-	-	-	-	-	-	-	-
9022 - X-ray etc apparatus; tubes, panels, screen etc, pt	-	-	-	-	-	-	-	-	-	-
Office Equipment										
8470 - Calculting & account machines, cash registers etc	0.00	0.00	0.34	0.10	0.00	0.00	0.00	0.23	0.06	0.00
8472 - Office machines nesoi (hectograph, adressing etc)	0.04	0.92	0.18	0.25	0.26	0.02	0.55	0.13	0.17	0.16
Semiconductors										
8504 - Elec trans, static conv & induct, adp pwr supp, pt	0.52	0.59	0.48	0.56	0.71	0.27	0.35	0.33	0.38	0.42
8531 - Electric sound or visual signaling apparatus, pts	0.34	0.59	0.44	0.26	0.33	0.17	0.35	0.30	0.18	0.20
8536 - Electrical apparatus for switching etc, nov 1000 V	0.08	0.23	0.20	0.23	0.36	0.04	0.14	0.14	0.16	0.22
Telecommunications										
8517 - Electric apparatus for line telephony etc, parts	0.83	0.58	0.40	0.41	0.96	0.42	0.35	0.27	0.27	0.57
8522 - Parts & accessories for 8519-8521	0.34	0.38	0.46	0.50	0.50	0.17	0.23	0.32	0.33	0.30
8544 - Insulated wire, cable etc; opt sheath fib cables	0.51	0.52	0.42	0.42	0.47	0.26	0.31	0.29	0.28	0.28

Source: Estimates of the author using the PC-TAS database.

Table 13. Percentage Share of Competitive & Non-Competitive Products in Total Philippine Exports of Electronics, 1997-2001 (%)

Year	Competitve	Non-Competitive	Total
1997	86.06	13.94	100.00
1998	87.49	12.51	100.00
1999	89.72	10.28	100.00
2000	87.48	12.52	100.00
2001	88.91	11.09	100.00

Source: Estimates by the author using the PC-TAS database.

Competitiveness vis-à-vis Competitors from East Asia

On the semiconductor products of which the Philippines is competitive, Taiwan is still the economy to bit, i.e. the values of the RCAs of competitive Philippine products are lower compared to the RCAs of Taiwan (Table 14). However, among the ASEAN, the Philippines is the most competitive in semiconductors, except for electronic integrated circuits & micro-assemblies (HS8542) where Malaysia and Singapore are more competitive as shown by their higher RCAs. Likewise, Vietnam is fast catching up with the Philippines in microphones, loudspeakers, sound amplifier parts (HS 8518), printed circuits (HS 8534)

On electronic data processing, Taiwan is again the country to bit in terms of competitiveness (Table 15). The Philippines is more competitive than the other ASEAN in parts, etc. for typewriters & other office machines (HS 8473), although Malaysia and Singapore are also competitive on these products.

On office equipment, the Philippines is the only competitive among the ASEAN in parts, etc. for typewriters and other machines (HS 8473) (Table 16). On the other hand, Malaysia, Singapore and China are competitive in calculating & account machines, cash registers, etc. (HS 8470) while the Philippines is not.

On telecommunications, the Philippines is the most competitive among the ASEAN, and even compared with China, in microphones, loudspeakers, sound amplifiers, etc. parts (HS 8518) (Table 17). However, the country is not competitive in telephone answering machines (HS 8520) and parts and accessories for HS 8519-8521 (HS 8522) while the ASEAN and China are competitive.

On automotive electronics, the Philippines is more competitive than Malaysia in reception apparatus for radio telephony, etc (HS 8527) (Table 18). Also, the country is the only competitive economy among the economies in the region in the manufacture of parts and accessories for motor vehicles (HS 8708).

Table 14. Revealed Comparative Advantage, By Country, Semiconductors, 1997-2001.

Country/HS Code/ Product Description	Year				
	1997	1998	1999	2000	2001
8504 - Elec trans, static conv & induct, adp pwr supp, pt					
Philippines	0.5208	0.5923	0.4831	0.5645	0.7076
Indonesia	0.1458	0.1067	0.1160	0.2494	0.2775
Malaysia	0.5143	0.4401	0.4568	0.5680	0.4578
Singapore	0.6154	0.5641	0.5150	0.5352	0.4936
Thailand	0.8147	0.7975	0.8401	0.7628	0.8445
Viet Nam	0.2756	0.3230	0.5994	0.5992	0.5095
Hong Kong	1.2317	0.8222	0.9291	1.0222	0.6959
South Korea	0.3376	0.2922	0.3121	0.3041	0.2867
Taiwan	4.8934	4.4582	3.3661	3.6594	3.9016
China	0.9040	0.9918	1.0865	1.0298	0.9900
8518 - Microphones; Loudspeakers; Sound Amplifier etc, pt					
Philippines	2.8431	2.6722	1.9218	1.4195	1.7775
Indonesia	0.4368	0.4772	0.5988	0.8875	1.0994
Malaysia	1.2994	1.6841	0.8656	1.0274	0.8403
Singapore	0.8848	1.2229	1.4187	1.9503	2.0523
Thailand	0.3493	0.4668	0.4852	0.4322	0.2825
Viet Nam	0.6177	0.4999	1.3241	1.2896	1.7474
Hong Kong	1.6350	1.0668	1.2410	1.8407	3.5297
South Korea	0.8807	0.6648	1.0067	0.9212	1.0566
Taiwan	15.9172	13.1319	11.4120	16.7970	25.5340
China	0.9341	1.0660	1.0875	0.9344	0.8780
8531 - Electric sound or visual signaling apparatus, pts					
Philippines	0.3371	0.5869	0.4408	0.2619	0.3311
Indonesia	0.0920	0.1610	0.0732	0.0853	0.1479
Malaysia	0.6843	0.6514	0.3977	0.0554	0.2311
Singapore	0.8614	0.8389	1.0253	1.5050	1.2062
Thailand	0.3265	0.2882	0.2830	0.4247	0.6133
Viet Nam	-	-	-	-	-
Hong Kong	0.0328	0.0373	0.0832	0.0328	0.0373
South Korea	2.5667	0.3789	0.1890	0.2987	0.4914
Taiwan	10.1985	9.4464	8.2476	12.9623	15.0068
China	0.7165	0.8658	1.1217	0.8051	1.3623

Cont. Table 14

8532 - Electric capacitors, fixed, var or adj (preset) pt					
Philippines	0.5921	0.7213	0.6432	1.1135	1.7529
Indonesia	0.0645	0.0710	0.0547	0.0898	0.1249
Malaysia	0.5791	0.6790	0.6868	0.8032	1.0805
Singapore	1.5243	1.7305	1.5272	1.3509	1.6342
Thailand	0.4404	0.4319	0.4218	0.3369	0.4531
Viet Nam	0.8143	0.5814	0.5526	0.3856	0.6570
Hong Kong	0.1498	0.1786	0.1988	0.2136	0.1722
South Korea	0.3792	0.3635	0.3209	0.3808	0.4729
Taiwan	2.9196	3.1288	2.2192	2.6616	4.4327
China	0.3186	0.3466	0.4262	0.3390	0.3925
8533 - Electrical resistors except heating resistors, pts					
Philippines	2.8770	2.1916	2.1116	2.6107	2.5814
Indonesia	0.3057	0.1559	0.3366	0.3044	0.3854
Malaysia	0.8156	0.8535	0.6815	0.6284	0.7051
Singapore	1.2767	1.3945	1.4488	1.2224	1.4258
Thailand	0.3104	0.3187	0.3063	0.3004	0.3049
Viet Nam	0.1317	0.2079	-	-	-
Hong Kong	0.3328	0.2410	0.2636	0.2055	0.2333
South Korea	0.2657	0.2077	0.1669	0.1622	0.1836
Taiwan	5.1299	4.9525	3.7306	5.0557	7.5198
China	0.3022	0.3001	0.3669	0.3062	0.3726
8534 - Printed circuits					
Philippines	5.0717	8.6783	8.9578	9.0420	6.4620
Indonesia	0.0194	0.0117	0.0333	0.2825	0.4388
Malaysia	1.9974	3.1439	2.5419	1.9604	2.4237
Singapore	0.6717	0.6236	0.7359	0.6737	0.7477
Thailand	1.5788	1.7877	1.7321	1.7890	1.3318
Viet Nam	6.0677	7.8305	2.0212	0.8811	5.3846
Hong Kong	2.0809	1.4388	1.3064	1.3109	1.2984
South Korea	0.4836	0.4506	0.4734	0.4953	0.5143
Taiwan	7.8369	8.3726	7.0662	9.3978	12.0162
China	0.5712	0.6394	0.6322	0.6210	0.7202

Cont. Table 14

8536 - Electrical apparatus for switching etc, nov 1000 V					
Philippines	0.0795	0.2301	0.2034	0.2336	0.3640
Indonesia	0.0171	0.0065	0.0190	0.1163	0.1328
Malaysia	0.2289	0.2098	0.1850	0.1776	0.1732
Singapore	0.3208	0.3236	0.3939	0.3155	0.3181
Thailand	0.2714	0.2811	0.3422	0.2983	0.2738
Viet Nam	0.1186	0.1622	0.1053	0.0858	0.0875
Hong Kong	0.1727	0.1342	0.1117	0.1098	0.1165
South Korea	0.1229	0.0977	0.1245	0.1431	0.1516
Taiwan	2.0668	2.0167	1.6348	1.8804	2.1717
China	0.3725	0.3715	0.4047	0.3904	0.3747
8540 - Thermionic, cold cathode or photocthode tubes, pt					
Philippines	0.2826	1.0266	0.8387	0.9785	1.7524
Indonesia	0.1289	0.1552	0.0006	0.2969	0.2464
Malaysia	0.4942	0.3365	0.3884	0.5440	0.5772
Singapore	0.5648	0.6700	0.5501	0.5500	0.5064
Thailand	0.3520	0.4664	0.5000	0.5639	0.5300
Viet Nam	0.4715	0.9098	0.8163	0.7198	0.9660
Hong Kong	-	-	-	-	-
South Korea	1.0486	1.3587	1.7115	1.9304	2.4042
Taiwan	3.2998	3.9792	2.8597	3.1495	3.7488
China	0.1616	0.2323	0.3758	0.4509	0.5192
8541 - Semiconductor devices; light-emit diodes etc, pts					
Philippines	9.3578	6.8812	5.9385	5.2684	6.2227
Indonesia	0.0423	0.0528	0.0513	0.1208	0.1650
Malaysia	1.9107	1.9579	1.7557	1.4525	1.6519
Singapore	1.3719	1.5855	1.7284	1.8163	1.7772
Thailand	0.9125	0.9636	0.8771	0.8341	0.9795
Viet Nam	0.0241	0.0117	0.0000	0.0274	0.0668
Hong Kong	1.1453	1.0712	0.9561	0.9477	1.0367
South Korea	0.5079	0.4295	0.4014	0.3660	0.3642
Taiwan	3.7363	4.0451	2.9571	3.2914	4.8331
China	0.2749	0.3156	0.3901	0.3542	0.3730

Cont. Table 14

8542 - Electronic integrated circuits & microassembl, pts					
Philippines	1.2712	1.3752	1.9938	1.6483	2.5398
Indonesia	0.0150	0.0047	0.0142	0.0212	0.0112
Malaysia	2.0544	2.3250	2.5486	2.0346	2.3256
Singapore	3.3363	3.6812	3.8922	3.9631	3.9576
Thailand	1.5993	1.5591	0.9550	0.8315	0.9543
Viet Nam	0.0373	0.1467	0.0009	0.0007	0.0047
Hong Kong	2.8959	2.6837	1.9432	1.8208	2.2144
South Korea	0.1340	0.1045	0.0956	0.0728	0.0709
Taiwan	6.4248	7.4393	6.1305	7.5641	10.4726
China	0.1271	0.1523	0.1744	0.1599	0.1997

Note: "- " means no exports reported.
Source: Estimates of the author using the PC-TAS database.

On consumer electronics, Singapore, Thailand, Malaysia, South Korea and Taiwan are competitive in a number of the consumer electronics products while the Philippines is competitive in only two products, i.e. parts for television radio and radar apparatus (HS 8529) and electrical apparatus for switching (HS 8536) (Table 19).

In general, the above analysis shows that there is product specialization among the economies in the region participating in the global production network. But this is not surprising as product specialization is the true spirit of the production chain.

Table 15. Revealed Comparative Advantage, By Country, Electronic Data Processing, 1997-2001.

Country/HS Code/ Product Description	Year				
	1997	1998	1999	2000	2001
8471 - Automatic data process machines; magn reader etc					
Philippines	0.0572	0.0107	0.0228	0.3308	9.0343
Indonesia	0.0474	0.0371	0.0115	0.0997	0.2399
Malaysia	0.2973	0.6092	0.8727	1.0287	1.7457
Singapore	1.1137	0.7336	0.4710	0.2407	0.2194
Thailand	0.0150	0.0171	0.3001	0.0267	0.0022
Viet Nam	-	-	-	-	-
Hong Kong	0.0015	0.0055	0.0044	0.0236	0.0123
South Korea	0.1264	0.1570	0.1719	0.3511	0.4564
Taiwan	12.2993	13.8695	15.3575	23.4221	20.8428
China	0.1095	0.1357	0.0940	0.3067	0.2750
8473 - Parts etc for typewriters & other office machines					
Philippines	4.4247	3.7770	3.2114	2.9401	4.1458
Indonesia	0.2195	0.2547	0.2882	0.2408	0.2593
Malaysia	1.2705	1.5596	2.0415	2.0167	1.6166
Singapore	1.5468	1.6008	1.3956	1.1704	1.3273
Thailand	1.4132	2.0165	1.6813	1.4130	1.4909
Viet Nam	0.0610	0.0247	0.0557	0.0486	0.1981
Hong Kong	0.5327	0.4696	0.4187	0.3309	0.2897
South Korea	0.1214	0.0892	0.3610	0.8704	0.6124
Taiwan	6.4187	7.4172	5.5550	5.6107	7.1706
China	0.2273	0.3111	0.3180	0.3375	0.4898
8523 - Prepared unrecorded media (no film) for sound etc.					
Philippines	0.0190	0.0006	0.0040	-	0.0056
Indonesia	0.0667	0.0797	0.0598	0.0866	0.1195
Malaysia	0.4758	0.2906	0.1925	0.1341	0.1551
Singapore	0.8740	1.2677	0.9041	0.8702	0.9793
Thailand	0.5136	0.4633	0.4362	0.7381	0.7890
Viet Nam	-	-	-	-	-
Hong Kong	0.2678	0.2213	0.1497	0.2063	0.2608
South Korea	0.9852	0.7847	0.7542	0.7737	0.9003
Taiwan	0.9710	1.4619	1.5709	1.9182	2.3171
China	0.3511	0.3192	0.2529	0.2430	0.2547

Note: " – " means no exports reported.
Source: Estimates of the author using the PC-TAS database.

Table 16. Revealed Comparative Advantage, By Country, Office Equipment, 1997-2001.					
Country/HS Code/ Product Description	Year				
	1997	1998	1999	2000	2001
8469 - Automatic typewriters and word processing machines					
Philippines	-	-	-	-	-
Indonesia	1.8627	2.8065	2.9182	4.5663	4.5111
Malaysia	-	-	-	-	-
Singapore	-	-	-	-	-
Thailand	-	-	-	-	-
Viet Nam	-	-	-	-	-
Hong Kong	-	-	-	-	-
South Korea	-	-	-	-	-
Taiwan	23.2420	9.5063	3.4133	5.7815	0.0059
China	0.9547	1.5195	2.1970	0.9216	0.0018
8470 - Calculting & account machines, cash registers etc					
Philippines	0.0005	0.0011	0.3393	0.0954	0.0005
Indonesia	0.2124	0.2412	0.2797	0.1439	0.0821
Malaysia	1.0251	0.9092	1.1674	1.3328	1.2630
Singapore	2.2292	2.2623	1.7200	1.8530	1.5627
Thailand	1.3892	1.0724	0.5542	0.3338	0.1462
Viet Nam	-	-	-	-	-
Hong Kong	0.3604	0.1935	0.0980	0.0737	0.0760
South Korea	0.4239	0.4493	0.3640	0.3542	0.3262
Taiwan	5.4271	4.3079	3.9774	3.7850	3.3869
China	1.7449	1.8217	1.7780	1.7818	1.5009
8472 - Office machines nesoi (hectograph, addressing etc)					
Philippines	0.0375	0.9193	0.1845	0.2471	0.2602
Indonesia	-	-	-	-	-
Malaysia	0.2366	0.1818	0.2236	0.4048	0.3856
Singapore	0.1056	0.0706	0.0477	0.0525	0.0402
Thailand	0.0355	0.0307	0.0429	0.0337	0.0367
Viet Nam	-	0.2020	0.1402	0.0266	0.0184
Hong Kong	0.0695	0.0801	0.0380	0.0322	0.0574
South Korea	0.1462	0.1364	0.2279	0.2941	0.4211
Taiwan	1.8983	1.6241	1.1186	1.0972	1.1659
China	0.5056	0.4294	0.5727	0.5440	0.6472
8473 - Parts etc for typewriters & other office machines					
Philippines	1.6726	2.2771	2.2652	1.0671	2.0774
Indonesia	0.0171	0.0144	0.0227	0.0082	0.0158
Malaysia	0.5548	0.2913	0.2371	0.5409	0.2546
Singapore	0.6203	0.6274	1.1273	1.1204	0.8014
Thailand	0.1119	0.0314	0.0172	0.0610	0.0917
Viet Nam	-	-	-	-	-
Hong Kong	1.4698	1.5458	2.0961	1.1601	0.5952
South Korea	0.0226	0.0249	0.0301	0.0488	0.0768
Taiwan	1.8263	2.1571	2.0382	1.9976	3.0192
China	0.1265	0.1340	0.1251	0.1626	0.3382
9009 - Photocopy apparatus & thermocopy apparatus; pts					
Philippines	0.4027	0.3652	0.2690	0.5485	1.8446
Indonesia	0.0095	0.0062	0.0049	0.0048	0.0074
Malaysia	0.0423	0.0570	0.0370	0.0233	0.0322
Singapore	0.2443	0.2033	0.1863	0.2784	0.3401
Thailand	0.5548	0.6928	0.5605	0.6116	0.5618
Viet Nam	-	-	-	-	-
Hong Kong	1.8593	1.9464	1.8691	1.8966	2.1432
South Korea	0.0901	0.1071	0.1114	0.1767	0.1795
Taiwan	0.2788	0.2146	0.1637	0.2023	0.2502
China	0.6638	0.6755	0.6240	0.6562	0.7993

Note: "-" means no exports reported.
Source: Estimates of the author using the PC-TAS database.

Table 17. Revealed Comparative Advantage, By Country, Telecommunications, 1997-2001.					
Country/HS Code/ Product Description	Year				
	1997	1998	1999	2000	2001
8517 - Electric apparatus for line telephony etc, parts					
Philippines	0.8283	0.5787	0.3952	0.4083	0.9560
Indonesia	0.0985	0.1423	0.0693	0.1481	0.0675
Malaysia	0.2373	0.2020	0.1637	0.1190	0.1404
Singapore	0.1638	0.1647	0.1298	0.1074	0.1328
Thailand	0.1368	0.1090	0.1111	0.0889	0.0874
Viet Nam	0.0447	-	0.0001	0.0215	0.0179
Hong Kong	0.5847	0.4655	0.3583	0.3289	0.4875
South Korea	0.1478	0.1314	0.1288	0.0748	0.0842
Taiwan	0.8704	0.8567	0.6417	0.7099	1.1496
China	0.1031	0.1184	0.1298	0.1495	0.2481
8518 - Microphones; loudspeakers; sound amplifier etc, pt					
Philippines	4.9427	3.0517	2.2750	4.0965	8.4922
Indonesia	0.9703	0.9280	0.5695	1.3336	0.8992
Malaysia	0.3895	0.3546	0.3462	0.5955	0.2188
Singapore	0.5951	0.5271	0.3055	0.3728	0.3850
Thailand	0.1750	0.1640	0.0649	0.0681	0.0110
Viet Nam	-	-	-	0.3256	2.2666
Hong Kong	0.0968	0.1952	0.2998	0.3150	0.1470
South Korea	1.5329	1.2994	0.9638	0.9176	0.8797
Taiwan	4.0029	4.6683	2.9657	2.7373	2.4111
China	1.5107	1.5154	2.2246	1.3949	1.5262
8520 - Telephone answering machines					
Philippines	-	-	-	-	-
Indonesia	3.8220	1.7831	1.4414	0.8645	0.1003
Malaysia	1.3678	0.8770	0.3704	0.4274	0.5143
Singapore	0.7400	0.4005	0.8417	0.5111	0.6015
Thailand	0.5985	0.4023	0.4662	0.9277	0.8891
Viet Nam	-	-	-	-	-
Hong Kong	0.1939	0.0938	0.0637	0.0008	0.0025
South Korea	0.0112	0.0857	0.0468	0.0463	0.0655
Taiwan	1.9670	1.3702	0.4782	0.0540	0.0921
China	2.2205	2.1531	1.7686	1.6202	1.9754
8522 - Parts & accessories for 8519-8521					
Philippines	0.3372	0.3836	0.4601	0.4992	0.5036
Indonesia	0.2396	0.2322	0.8329	2.2118	2.6941
Malaysia	2.2913	1.8287	1.2812	0.8816	0.8159
Singapore	2.2941	2.2290	1.7589	1.4141	1.2600
Thailand	1.1775	1.2996	1.2662	1.5179	1.7256
Viet Nam	0.5416	0.1083	0.5153	0.2350	0.0535
Hong Kong	2.7958	2.4678	1.0717	0.8185	0.5141
South Korea	0.7418	0.6986	1.0165	1.3034	1.3896
Taiwan	1.3325	1.3654	0.6113	0.8148	1.0201
China	1.2849	1.4702	1.8772	1.8543	1.9771
8544 - Insulated wire, cable etc; opt sheath fib cables					
Philippines	0.5123	0.5212	0.4193	0.4208	0.4744
Indonesia	0.2161	0.3070	0.3096	0.2776	0.3701
Malaysia	0.3130	0.2942	0.2838	0.2886	0.2664
Singapore	0.3022	0.2778	0.2669	0.2447	0.2509
Thailand	0.2957	0.3230	0.3708	0.2727	0.2459
Viet Nam	0.0182	0.0625	0.2149	0.2149	0.3371
Hong Kong	0.1581	0.1214	0.1049	0.0885	0.0705
South Korea	0.3190	0.2834	0.2812	0.2622	0.4317
Taiwan	2.7476	2.5991	1.9685	2.0033	2.2303
China	0.3201	0.3578	0.4208	0.3969	0.4027

Note: "-" means no exports reported.
Source: Estimates of the author using the PC-TAS database.

Table 18. Revealed Comparative Advantage, By Country, Automotive Electronics, 1997-2001.					
Country/HS Code/ Product Description	Year				
	1997	1998	1999	2000	2001
8512 - Electric light etc. equip; windsh wipers etc., parts					
Philippines	0.1891	0.1521	0.1590	0.1634	0.0539
Indonesia	0.0273	0.0229	0.0689	0.2132	0.1929
Malaysia	0.1050	0.0965	0.0427	0.0391	0.0388
Singapore	0.0635	0.0637	0.0690	0.1053	0.0644
Thailand	0.2056	0.1680	0.1741	0.2683	0.3192
Viet Nam	-	-	-	-	-
Hong Kong	0.1663	0.1784	0.2669	0.2151	0.1374
South Korea	0.0679	0.0769	0.0806	0.1019	0.1139
Taiwan	3.5864	3.9157	3.2349	3.6403	4.8924
China	0.0791	0.0816	0.0943	0.1031	0.0972
8527 - Reception apparatus for radiotelephony, etc.					
Philippines	1.0917	2.0923	2.1913	2.6875	3.8554
Indonesia	0.6143	0.6078	0.4896	1.1114	2.0941
Malaysia	1.5294	1.7495	2.1280	1.3752	1.0595
Singapore	0.7163	0.5564	0.3757	0.2936	0.3891
Thailand	0.0678	0.7645	0.3608	0.7823	0.7066
Viet Nam	-	-	-	-	-
Hong Kong	0.0397	0.0094	0.0016	0.0003	0.0026
South Korea	0.5188	0.4151	0.2634	0.4203	0.4406
Taiwan	0.3134	0.2933	0.2654	0.1941	0.3048
China	0.5964	0.5401	0.3596	0.4380	0.4945
8708 - Parts & access for motor vehicles					
Philippines	4.6183	3.6367	2.9882	3.3740	4.4457
Indonesia	0.0001	0.0048	0.0213	0.0194	0.0166
Malaysia	0.0080	0.0094	0.0079	0.0066	0.0069
Singapore	0.0138	0.0117	0.0162	0.0101	0.0109
Thailand	0.0437	0.0401	0.0431	0.0558	0.0675
Viet Nam	-	-	-	-	-
Hong Kong	-	-	-	-	-
South Korea	0.0459	0.0580	0.0722	0.0743	0.0883
Taiwan	0.3495	0.3678	0.2792	0.2972	0.3841
China	0.0977	0.1468	0.2032	0.1903	0.2020

Note: " –" means no exports reported.
Source: Estimates of the author using the PC-TAS database.

Table 19. Revealed Comparative Advantage, By Country, Consumer Electronics, 1997-2001.

Country/HS Code/ Product Description	Year				
	1997	1998	1999	2000	2001
8479 - Machines etc having individual functions nesoi, pt					
Philippines	0.0921	0.1129	0.1933	0.1214	0.1546
Indonesia	0.0002	0.0021	0.0036	0.0043	0.0029
Malaysia	0.0785	0.1102	0.0911	0.0613	0.0846
Singapore	0.2516	0.2396	0.2952	0.4680	0.3031
Thailand	0.0446	0.0441	0.0364	0.0421	0.1048
Viet Nam	-	0.0174	0.0905	0.0235	0.0989
Hong Kong	0.0874	0.0572	0.0438	0.0477	0.0534
South Korea	0.4619	0.3363	0.2851	0.2943	0.3664
Taiwan	1.2591	1.1768	0.8073	0.9056	1.6194
China	0.0558	0.0397	0.0461	0.0232	0.0421
8518 - Microphones; Loudspeakers; Sound Amplifier etc, pt					
Philippines	0.6457	0.7442	0.5384	0.7201	0.7207
Indonesia	0.6690	0.4818	0.5560	0.7910	0.8288
Malaysia	1.2277	1.5454	1.1411	1.2221	1.1633
Singapore	0.7262	0.6340	0.4851	0.4439	0.4226
Thailand	0.4817	0.4956	0.4775	0.4032	0.3004
Viet Nam	0.4394	0.4017	0.2533	0.1943	0.3149
Hong Kong	0.0409	0.0756	0.0659	0.0441	0.0328
South Korea	0.8361	0.6384	0.5942	0.5986	0.6168
Taiwan	3.5977	3.4902	2.3275	2.2054	2.2788
China	1.0055	1.1382	1.2495	1.0918	1.0468
8519 - Turntables, record & cassette players etc.					
Philippines	0.9790	1.3338	0.6886	0.3778	0.2700
Indonesia	0.6253	0.7809	1.0945	1.0292	0.7640
Malaysia	3.3861	3.8359	3.0691	3.6641	3.6230
Singapore	0.9524	0.8824	0.8094	0.8380	0.8425
Thailand	1.6586	1.0254	1.2032	0.8356	0.7057
Viet Nam	-	-	-	-	-
Hong Kong	-	-	-	-	-
South Korea	0.7669	0.7223	0.6375	0.3825	0.4851
Taiwan	0.6070	0.6429	0.8117	0.9020	1.4950
China	0.8056	1.1754	1.4016	1.4520	1.4722
8520 - Magnetic tape recrdrs & other sound recrdng appar, nes					
Philippines	-	-	-	-	-
Indonesia	0.2390	0.1280	0.0260	0.0582	0.1308
Malaysia	0.6046	0.5843	0.9476	0.9464	3.1879
Singapore	0.1216	0.0688	0.0702	0.1510	0.0931
Thailand	0.0215	0.0543	0.1021	0.0826	0.3741
Viet Nam	-	-	-	-	-
Hong Kong	-	-	-	-	-
South Korea	1.1144	0.9086	1.1892	1.6274	2.2275
Taiwan	0.2888	0.5055	0.8614	0.5295	3.5839
China	0.1008	0.0941	0.0826	0.1679	0.3363

Cont. Table 19

8521 - Video recrdng/reproduc appar wheth/nt video tuner					
Philippines	0.0043	0.0397	0.0123	0.0039	0.0024
Indonesia	1.7874	1.0155	0.6751	1.0876	1.2622
Malaysia	2.5516	1.9853	1.4368	1.4519	1.5728
Singapore	1.1288	0.6935	0.5361	0.3650	0.4168
Thailand	0.8860	0.6863	0.4337	0.3465	0.2935
Viet Nam	0.1311	0.0007	0.0002	0.0002	-
Hong Kong	-	-	-	-	-
South Korea	1.0224	0.7593	0.8725	0.8563	0.8983
Taiwan	0.7553	0.6123	0.7796	1.1200	1.1424
China	0.4478	0.4370	0.5621	0.7675	1.1267
8523 - Prepared unrecorded media (no film) for sound etc.					
Philippines	0.0091	0.0090	0.0258	0.0390	0.8306
Indonesia	0.1103	0.0055	0.5981	0.9976	0.2568
Malaysia	0.9048	0.6647	0.6678	0.4209	1.0344
Singapore	1.4701	1.5069	1.1052	1.0843	0.8175
Thailand	0.6735	0.6100	0.5131	0.4629	0.2790
Viet Nam	-	-	-	-	-
Hong Kong	0.2797	0.3620	0.9450	1.9436	1.9692
South Korea	0.1859	0.2644	0.1680	0.2044	0.2178
Taiwan	3.8874	7.5461	18.7747	33.8611	42.4308
China	0.0505	0.0444	0.0509	0.0670	0.0652
8524 - Recorded gramophone records					
Philippines	-	-	-	-	-
Indonesia	-	-	0.0028	0.0468	0.1416
Malaysia	-	-	-	-	-
Singapore	0.2698	0.0306	0.0316	0.0168	0.0045
Thailand	0.0357	0.2473	0.6697	0.2483	0.1522
Viet Nam	-	-	-	-	-
Hong Kong	-	-	-	-	-
South Korea	0.0318	0.0636	0.0868	0.0024	0.0002
Taiwan	-	-	-	-	-
China	-	-	-	-	-
8527 - Reception apparatus for radiotelephony etc					
Philippines	0.3693	0.2102	0.1827	0.0841	0.0543
Indonesia	0.3034	0.1575	0.2323	1.2962	1.2417
Malaysia	5.4457	4.8283	5.0282	4.9095	4.9125
Singapore	1.8795	2.0649	1.6139	1.4445	1.7062
Thailand	0.3459	0.6595	0.4890	0.6663	0.9525
Viet Nam	-	-	-	-	-
Hong Kong	0.0116	0.0132	0.0081	0.0128	0.0094
South Korea	0.1688	0.0573	0.1909	0.4457	0.4360
Taiwan	0.5016	0.5463	0.3124	0.2717	0.3777
China	2.2180	2.6030	2.5059	2.1887	1.9629

Cont. Table 19

8528 - TV receivers, incl video monitors & projectors					
Philippines	1.1344	0.9109	0.4137	0.4589	0.3970
Indonesia	0.0944	0.0671	0.0617	0.3610	0.4087
Malaysia	1.6204	1.3697	1.3343	1.4574	1.3722
Singapore	0.7045	0.4374	0.3377	0.2971	0.3067
Thailand	1.4029	1.2583	0.9827	1.1316	0.9282
Viet Nam	0.4550	0.4378	0.3608	0.2424	0.2328
Hong Kong	0.0151	0.0065	0.0008	0.0022	0.0004
South Korea	0.8897	0.6376	0.7089	0.6539	0.6778
Taiwan	0.4972	0.4174	0.4895	0.8802	1.2280
China	0.2784	0.2781	0.3243	0.3706	0.3942
8529 - Parts for television, radio and radar apparatus					
Philippines	0.9733	1.4178	1.2621	1.3615	1.2967
Indonesia	0.2116	0.2726	0.3928	0.4425	0.4302
Malaysia	0.8976	0.8381	0.6704	0.7086	0.6769
Singapore	0.8906	0.8886	0.8582	0.7229	0.7228
Thailand	0.3175	0.3006	0.4007	0.3609	0.3585
Viet Nam	0.1851	0.2152	0.1676	0.3020	0.3624
Hong Kong	1.0360	0.7468	0.5548	0.5438	0.4679
South Korea	0.6072	0.5753	0.6763	0.6614	0.8683
Taiwan	1.4806	1.3930	1.0794	1.4164	1.8903
China	0.4111	0.4399	0.4830	0.5446	0.6895
8536 - Electrical apparatus for switching etc, nov 1000 V					
Philippines	1.4838	4.1793	3.5141	3.9902	3.4927
Indonesia	0.0733	0.1277	0.0841	0.2319	0.2481
Malaysia	0.2475	0.2409	0.2140	0.2092	0.2483
Singapore	0.8605	0.8508	0.8996	0.8968	0.9088
Thailand	0.1367	0.0981	0.1631	0.1692	0.1567
Viet Nam	0.0980	0.0568	0.1295	0.0603	0.0434
Hong Kong	0.4072	0.2268	0.1696	0.1732	0.1683
South Korea	0.0815	0.0655	0.0727	0.0672	0.0815
Taiwan	2.6842	2.3168	1.7411	2.3362	2.9684
China	0.1498	0.1549	0.1915	0.1601	0.1724
8540 - Thermionic, cold cathode or photocthode tubes, pt					
Philippines	-	0.0125	0.0143	0.0112	0.0261
Indonesia	0.0681	0.0309	0.0086	0.3336	0.4240
Malaysia	1.7703	1.7295	1.5869	1.5389	1.4283
Singapore	1.2526	1.0490	1.1763	1.0645	0.8591
Thailand	0.3268	0.3634	0.6261	0.6555	0.5757
Viet Nam	0.7719	1.0669	0.8578	2.1214	1.6920
Hong Kong	-	-	-	-	-
South Korea	1.8093	2.1270	2.4621	2.2707	2.2046
Taiwan	2.8145	4.5311	4.5964	3.8203	3.6714
China	0.1579	0.2646	0.2607	0.3470	0.4209

Note: "-: means no exports reported.
Source: Estimates of the author using the PC-TAS database.

Economic Integration with the USA

Intra-industry trade between the Philippines and the USA is high and increasing in six (6) products, mostly semiconductors (Table 20). This indicates increasing economic integration in these products between the two economies. The highest increase in intra-industry trade occurred in office machines nesoi (HS 8472).

Intra-industry trade is high but decreasing in parts, etc. for typewriters & other office machines (HS 8473).

Trade in a number of products between RP and US can be characterized as one-way trade, i.e. IIT=0 (Table 20). This means that trade between the two economies in these products are either exports only or imports only, but not both exports and imports. Six of these products are considered competitive (HS8527, 8708, 9012, 8540, 8473 & 8518). This could be explained by the tri-lateral nature of trade in the electronics global production network in East Asia. Since the Philippines is a second-tier supplier in the chain, it could be importing parts and components for assembly and testing from the NIEs or elsewhere, and exporting them to the USA; or importing from the USA and exporting them to the NIEs or elsewhere.

Table 20. Intra-Industry Trade Index, Philippines-U.S.A., By Sub-Sector & Product, 1997-2001.

Classification	Sub-Sector	HS Code/ Product Description	Average IIT		Change
			1997-1999	2000-2001	
High & Increasing	Control & Instrumentation	9032 - Automatic regulating or control instruments; parts	61.39	74.88	13.49
	Office Equipment	8472 - Office machines nesoi (hectograph, adressing etc)	15.18	76.42	61.24
	Semiconductors	8504 - Elec trans, static conv & induct, adp pwr supp, pt	28.24	52.98	24.74
		8518 - Microphones; Loudspeakers; Sound Amplifier etc, pt	52.85	78.11	25.26
		8532 - Electric capacitors, fixed, var or adj (preset) pt	15.52	53.89	38.37
	Telecommunications	8517 - Electric apparatus for line telephony etc, parts	46.41	61.16	14.75
High & Decreasing	Electronic Data Processing	8473 - Parts etc for typewriters & other office machines	54.97	53.13	-1.84
Low & Increasing	Consumer Electronics	8527 - Reception apparatus for radiotelephony etc	23.95	29.32	5.37
	Medical/Industrial Instrumentation	8531 - Electric sound or visual signaling apparatus, pts	9.15	23.67	14.52
	Semiconductors	8531 - Electric sound or visual signaling apparatus, pts	10.23	44.80	34.57
		8542 - Electronic integrated circuits & microassembl, pts	1.88	4.15	2.27
Low & Decreasing	Communication & Radar	8525 - Trans appar for radiotele etc; tv camera & rec	4.47	2.57	-1.90
	Control & Instrumentation	9023 - Inst, appts & models, for demonstrational use & parts	43.46	42.96	-0.51
	Consumer Electronics	8479 - Machines etc having individual functions nesoi, pt	11.72	8.06	-3.67
		8518 - Microphones; Loudspeakers; Sound Amplifier etc, pt	21.07	4.29	-16.79
		8528 - TV receivers, incl video monitors & projectors	60.96	19.23	-41.74
		8529 - Parts for television, radio and radar apparatus	64.26	42.39	-21.87
		8536 - Electrical apparatus for switching etc, nov 1000 V	48.75	25.21	-23.55
	Electronic Data Processing	8471 - Automatic data process machines; magn reader etc	22.03	16.48	-5.55
	Office Equipment	9009 - Photocopy apparatus & thermocopy apparatus; pts	6.63	6.32	-0.31
	Semiconductors	8533 - Electrical resistors except heating resistors, pts	16.32	15.74	-0.58
		8534 - Printed circuits	48.61	29.92	-18.69
		8536 - Electrical apparatus for switching etc, nov 1000 V	25.97	20.80	-5.17
		8541 - Semiconductor devices; light-emit diodes etc, pts	12.98	6.69	-6.29
	Telecommunications	8522 - Parts & accessories for 8519-8521	65.93	42.80	-23.13
		8544 - Insulated wire, cable etc; opt sheath fib cables	24.96	22.92	-2.04
No IIT (i.e, one-way trade)	Automotive Electronics	8512 - Electric light etc. equip; windsh wipers etc., parts	*	*	*
		8527 - Reception apparatus for radiotelephony, etc.	0.00	0.00	0.00
		8708 - Parts & access for motor vehicles	0.00	0.00	0.00
	Communication & Radar	8526 - Radar apparatus, radio navig aid & remote cont app	0.00	0.00	0.00
		8527 - Reception apparatus for radiotelephony, etc.	*	*	*
	Control & Instrumentation	9010 - Apparatus etc for photo labs etc nesoi; parts etc.	*	*	*
		9011 - Compound optical microscopes; parts & accessories	*	*	*
		9012 - Microscopes, except optical; diffract appar; parts	*	*	*
		9026 - Inst etc measure or check flow, level etc, pts etc	0.00	0.00	0.00
		9027 - Inst etc for physical etc anal etc; microtome; pts	0.00	0.00	0.00
		9030 - Oscilloscopes, spectrum analyzers etc, parts etc.	0.00	0.00	0.00
		9031 - Machines; Profile project, pt	0.00	0.00	0.00
	Consumer Electronics	8519 - Turntables, record & cassette players etc.	0.00	0.00	0.00
		8521 - Video recrdng/reproduc appar wheth/nt video tuner	*	*	*
		8523 - Prepared unrecorded media (no film) for sound etc.	*	*	*
		8540 - Thermionic, cold cathode or photocthode tubes, pt	*	*	*
	Electronic Data Processing	8523 - Prepared unrecorded media (no film) for sound etc.	0.00	0.00	0.00
	Medical/Industrial Instrumentation	8530 - Electrical signal, safety or traffic control equip	*	*	*
		8543 - Electrical mach etc, with ind functions nesoi, pts	*	*	*
		9018 - Medical, surgical, dental or vet inst, no elec, pt	0.00	0.00	0.00
		9022 - X-ray etc apparatus; tubes, panels, screen etc, pt	0.00	0.00	0.00
	Office Equipment	8470 - Calculting & account machines, cash registers etc	0.00	0.00	0.00
		8473 - Parts etc for typewriters & other office machines	0.00	0.00	0.00
	Semiconductors	8540 - Thermionic, cold cathode or photocthode tubes, pt	*	*	*
	Telecommunications	8518 - Microphones; loudspeakers; sound amplifier etc, pt	0.00	0.00	0.00

Source: Estimates of the author using the PC-TAS database.

6. Local Support Structures and the Competitiveness of the Philippine Electronics Industry

With trade and investment barriers rapidly going down globally in the 1990s, local support structures have become more important factors in determining an economy's attractiveness to the global production network. As discussed in Section 2, the experience of the NIEs showed that local support structures played an important role not only in increasing the competitiveness of these economies' electronics industry but also in enabling global production networks contribute to their economic development. What can be said about local support structures in the Philippines?

Infrastructure, Transport and Logistics

Infrastructure and transport services in the 1990s improved significantly compared to the 1980s (Serafica 2002). The liberalization and deregulation of the services sector and the opening up of infrastructure to private sector investment are the primary reasons for the significant change. Reforms in the shipping and air transport industries also improved competition and efficiency in these sectors although much is still desired (Austria 2002 and 2003a).

The key factor in the current competitiveness of the country's industrial parks in Subic and Clark is good logistics – presence of seaport, airport, infrastructure, and service logistics industries, like freight forwarders. However, there is fear that it is just a matter of time and China and India will have the same kind and quality of logistics. The government therefore should think of long-term strategies to maintain and even strengthen the competitiveness of the industrial parks and export processing zones vis-à-vis its emerging competitors.

While much has been achieved, the country's current state of logistics and infrastructure fails in comparison with other countries in East Asia. In particular, there is inefficiency in the ports system given the longer time spent in loading, unloading and carrying out administrative procedures for customs clearance. As the experience of Singapore shows, the availability of electronic systems for simplified customs, both in airports and seaports, is a key factor for the efficiency and stability of international transport and distribution of the global production networks.

The quality of the country's infrastructure and efficiency in transport services and logistics are important determinants of the competitiveness of the electronics industry. In particular, an efficient air transport service is important for the time-sensitive products and intermediate inputs traded between countries in the production chain. On the other hand, efficient logistics do not just reduce costs of transport and transit time but also lowers the cost of production. If logistics services are inefficient, firms will maintain higher inventories at each stage of production chain, requiring additional working capital (Ernst 2004).

As trade protection has drastically gone down globally, the state of the country's logistics and infrastructure will become even more crucial in determining the country's competitiveness. Austria (2003b) concluded that the country's role in the production network, as confined largely to the labor-intensive import-dependent segment of the production chain, is a response to the kind of infrastructure and logistics the country has. The lack of good infrastructure limits foreign investment to types of industries that do not have strong linkages to the rest of the economy, as the lack of infrastructure raises the costs of production, making industries unable to compete in the export market.

Utilities

The cost of electricity in the country is the highest in the region. It could reach as high as 41% of total operating costs compared to 10% in Malaysia (SEIPI 2003b). The prohibitive cost is the primary reason for the recent relocation of some of the electronics companies operating in the country to China.

Not only is power cost high, the quality and reliability of power is also poor. The equipment and processes in the production of high technology products are extremely sensitive to stable power supply. Unscheduled power fluctuations and interruptions can cause severe damage to expensive equipment and delays in production. Companies therefore have to install protective devices for their power supply like power line conditioners (PLCs) and uninterrupted power supply (UPS), or alternative power supply like generators. Cost for PLCs and UPS could be around US$9-15 million and US$17 million for generators. All these associated costs lower the competitiveness of the industry.

Furthermore, the quality and reliability of power falls short of the requirements of the industry, as shown in Table 21.

The recent move by the Energy Regulatory Board (ERB) to phase out the cross-subsidy given by large commercial and industrial power consumers to the residential customers of the Manila Electric Company (MERALCO) is a welcome development. The phase-out will result in a more competitive power rates in the country. Likewise, the government recently agreed to allow electronics companies registered with the BOI and the PEZA open and direct access to independent power producers. Again, this is expected to lower power costs.

Table 21. Actual vs Desired Power Quality and Reliability

	Actual	Requirements for assembly and testing	Requirements for a water fabrication
Blackout	2 incidents per year	zero	zero
Voltage	+/- 10%	+/- 3%	+/- 0.5%
Frequency	60 +/- 1 hz	60 +/- 0.5 hz	60 +/- 0.3 hz
Recovery time	8 hours	2 hours	immediate

Source: SEIPI (2003b).

Allied and Supplier Industries

Local supplier industries in the Philippines are few and still immature. Common problems are the following: (i) local materials are not available; (ii) local suppliers are difficult to find; (iii) unreliability of local suppliers; (iv) local materials are more expensive; (v) local materials do not meet the required quality standards; and (vi) industry local requirements are not known to many (Santiago 2005).

The above problems force multinational companies to import their intermediate inputs. For example, Japanese firms procure fewer inputs locally in the Philippines than in any other ASEAN countries where they operate (Tecson 1995). This practice makes foreign investors more vulnerable to import price changes induced by exchange rate volatility and hence, can make production costs higher.

Over the past few years, however, efforts were geared at overcoming this constraint through supplier clustering in the export processing zones and industrial parks (Austria 2004). The aim of clustering is to upgrade the production process in order for the domestic economy to capture a larger share of the value added in the global production chain. Nonetheless, the clustering is still limited to foreign suppliers of parts and components. A case study by Kimura (2001) on Fujitsu's experience in the Philippines shows that a large number of upstream suppliers from Japan and other developed countries have established their affiliates in the country, supplying the parts and components requirements of Fujitsu. However, the experience of some foreign suppliers based in the country's export processing zones in outsourcing some of their production process to local suppliers has not been favorable (See Box 1 for details).

Human Resources

The country is well known for its manpower: high literacy, good quality of secondary education, easy to train, and the ability to speak English. The compensation package is also relatively low for mid-level management and skilled workers. Because of these factors, several surveys have ranked the Filipino worker higher than his counterparts in other Asian economies.

The availability of skilled workers on a three-shift, 24-hour basis is one of the advantages considered by Japan's Fujitsu Ltd. in locating its hard disk drive assembly plant in one of the export processing zones in the Philippines in 1995 (Kimura 2000). These workers (engineers) command salaries much lower than their counterparts in developed countries[7]. The final assembly process is highly capital-intensive because of the machines and equipment used. Given rapid product innovation, quick depreciation of capital is necessary, i.e. machines must be used intensively. This is made possible only by the availability of manpower for a 24-hour round- the-clock operation. The Fujitsu Plant in the country employed around 400 engineers in 1998 and has added roughly 100 new ones every

[7] It should be noted that local engineers in the electronics industry received relatively higher salaries compared to their counterparts in other industries in the country. However, their salaries are lower compared to their counterparts in developed countries.

year since (Kimura 2001). In short, the availability of relatively cheap skilled labor in the country makes the capital-intensive assembly process profitable.

However, there are major constraints in the country's manpower namely, (i) inadequate technical and vocational skills, (ii) lack of specialized skills for high value-added products; and (ii) high cost of unskilled labor relative to other countries. These factors lessen the attractiveness of the country as an investment site for labor-intensive segment of the production chain. In recent years, local skills required by companies in the export processing zones are no longer readily available. Similarly, with rapid product innovation, the skills requirements, especially those beyond final assembly, are also changing. However, the country's engineers do not have the specialized skills for high value-added products. Companies spend substantial amounts in sending their manpower to the US for training. The high cost of training erodes their competitiveness. Compounding the situation is the fact that the average stay of this kind of manpower is only two years, since they are being pirated by companies overseas.

The cost of unskilled labor in the country is relatively high compared to other countries in the region. This is compounded by the fact that labor productivity fails to keep pace with wage increases; unlike in other ASEAN economies where productivity outstrips wage increases. An important factor contributing to this phenomenon is the long time practice of minimum wage setting which is being becoming more politicized.

Box 1. Supplier Clustering

Wistron Infocom (Philippines), formerly ACER International, is located at the Subic Bay Industrial Park with an investment of US$105 million and total employment of 3,500. The company manufactures motherboards and computer notebooks solely for exports. The excellent infrastructure of the industrial park attracted the company's suppliers originally located in Taiwan to also locate in the park. This enabled the company to overcome the non-availability of local suppliers for its parts and components. The suppliers include the following:

- Catcher Technology Philippines, Inc. – manufacturer of computer and notebook casings and peripherals.
- Comoss Electronics Philippines – manufacturer of cable assemblies, peripherals for computers and computer tables
- Golden Net International Company, Inc. – printing, designs, binding, packaging and assembly of manuals
- Sanyo Denki – manufacturer of cooling systems for computers or micro fan
- Sankyo Seiki – manufacturer of micromotors for disk drives
- Shan Soong – manufacturer of plastics moldings
- Win Cross – manufacturer of di-casting

These foreign suppliers form an agglomeration inside the park to the advantage of Wistron. When the demand from Wistron is low, they also supply the parts and component requirements of other companies in the country, particularly those located in other industrial parks. The proximity of foreign suppliers to Wistron and other companies in the country not only reduces production cost, but it also increases the value added of exports.

The foreign suppliers have also established linkage, through outsourcing, with local suppliers within the vicinity of the industrial park. The linkage, however, is still minimal because of two reasons: (a) poor quality of output of local suppliers; and (b) outsourcing makes production cost more expensive. A firm located inside the industrial park is exempted from paying the local taxes, but not the local suppliers. Thus, when part of the production chain is contracted or outsourced to local suppliers, the local taxes are passed on to foreign suppliers in terms of higher prices.

Source: Austria (2005).

Technology and Industrial upgrading

The Philippine electronics industry has evolved from assembly and delivery during the 1970s-1980s to testing during 1990s, and to some other value-added activities like process manufacturing and materials development during the last few years (Santiago 2004). To date, these segment of the production chain comprise the core competencies of the local electronics industry.

Some companies have a pool of design engineers. In general, however, the industry does not have design capability. On a scale of 1 to 10, (with 10 being the highest), the rating of the technological capability of a local engineer ranges only from 1 to 3. Moving up to the next ladder of the production chain requires technological capabilities, which unfortunately

the Philippines does not have. The lack of technological capabilities, in turn, is a result of the low investment in research and fragmented research and development (R&D) efforts of the government. R&D activities are still done by the lead firms.

The government is expecting multinational companies to bring in high technologies with the hope of upgrading its technological capabilities. However, technology spillover has been limited; and this is largely due to the lack of local suppliers. The linkage of local suppliers to MNCs is the channel through which technology is transferred. MNCs can help prospective local suppliers set up their production facilities and provide technical assistance so that the latter can produce to specification the parts and components MNCs require. Given the lack of local supplier industries, the opportunity for technology transfer is therefore restricted.

The limited technological spillover is also a good illustration of the differences in expectations of the host country on the one hand and the actual behavior of the MNC on the other hand. While the Philippines is expecting MNCs to bring in technologies, the MNCs operating in the country, being constrained by the lack of supplier industries, are only interested in its cheap skilled labor.

Thus, unless the government gives priority to investing in R&D in order to upgrade technological capabilities, the development of local suppliers that are able to meet the requirements of MNCs will be constrained. The lack of local suppliers will in turn constrain MNCs to transfer technology.

7. Potential for Expansion of RP Exports to US and US Investments to RP

To assess the potential for expansion of Philippine exports to the US, a comparison is made between the products where the Philippines is competitive and the products that accounted for the largest shares in US imports, or the fastest growing imports of the US. In other words, are the products with which the Philippines is competitive also the major imports of the US?

Based on the structure of US imports, the potential for expanding Philippine exports are in electronic data processing and semiconductors (Table 22). In particular, the potential is largest in parts, etc. for typewriters & other office machines (HS 8473) under electronic data processing. These products topped US imports, accounting for about one-fifth of the total annual imports over the period 1997-2001. Other products with potential for expansion are automatic data processing machines (HS 8471), electronic integrated circuits & microassembly parts (HS 8542), and semiconductor devices, light-emit diodes etc, parts (HS 8541), which ranked 6th, 7th and 9th, respectively in the top 10 US imports.

On the other hand, if the comparison is based on the fastest growing imports of the US, the potential for expansion of exports is in microphones, loudspeakers, sound amplifiers etc. parts (HS 8518) under telecommunications. These products ranked 6th among the fastest growing imports of the US (Table 22).

The above five products are also the same products where the Philippines got the highest shares in the US market (Table 8). However, the share of the Philippines exhibited a decreasing trend in parts, etc. for typewriters & other machines (HS 8473) from 2.1% in 1997 to 1.7% in 2001; and in semiconductor devices, light-emit diodes etc, parts (HS 8541) from 6.7% in 1997 to 5.8% in 2001. The other three products, on the other hand, are increasingly capturing the US markets. The share of automatic data processing machines (HS 8471) registered the highest increase, from 0.2% in 1997 to 7% in 2001. The share of electronic integrated circuits & micro-assembly parts (HS 8542) also went up from 12.2% in 1997 to 18.5% in 2001; while the share of microphones, loudspeakers, sound amplifiers etc. parts (HS 8518) increased from 5.9% in 1997 to 7% in 2001.

Given the above analysis, the challenges confronting RP-US bilateral trade and investments include the following:

- Increase in the number of competitive Philippine products which are consistent with the major imports or fastest growing imports of the US;
- Increase in the Philippine market share in the US; and,
- Given that production and trade in electronics is driven by foreign investment, increase in US investment in the sub-sectors where the Philippines is competitive.

Whether the above potentials can be realized depends much on whether the Philippine government can address the issues on local support structures discussed in the preceding section of the paper.

Table 22. Structure & Average Real Growth Rate of Imports, US Electronics Industry, 1997-2001

Sub-Sector/HS Code/ Product Description	Philippine Competitive Products	Structure of US Imports		Average Annual Growth Rate	
		Average % Share	Top 10	1997-2001	Top 10
Automotive Electronics		4.26		12.15	
8512 - Electric light etc. equip; windsh wipers etc., parts		0.49		14.54	
8527 - Reception apparatus for radiotelephony, etc.	X	2.30		12.33	
8708 - Parts & access for motor vehicles	X	1.47		11.14	
Communication & Radar		8.30		33.25	
8525 - Trans appar for radiotele etc; tv camera & rec		7.56	2	35.76	2
8526 - Radar apparatus, radio navig aid & remote cont app		0.49		18.81	9
8527 - Reception apparatus for radiotelephony, etc.		0.25		12.15	
Control & Instrumentation		6.47		14.13	
9010 - Apparatus etc for photo labs etc nesoi; parts etc.		1.10		11.38	
9011 - Compound optical microscopes; parts & accessories		0.13		10.59	
9012 - Microscopes, except optical; diffract appar; parts	X	0.09		10.33	
9016 - Bal of a senstvty 5 cg or bttr w/ or w/o weights		0.03		10.53	
9017 - Drawng, markng-out or mathl calculatng insts, nes		0.13		1.90	
9023 - Inst, appts & models, for demonstrational use & parts	X	0.12		16.00	
9026 - Inst etc measure or check flow, level etc, pts etc		0.44		14.37	
9027 - Inst etc for physical etc anal etc; microtome; pts		1.17		19.80	7
9030 - Oscilloscopes, spectrum analyzers etc, parts etc.		1.30		16.03	
9031 - Machines; Profile project, pt		0.25		11.72	
9032 - Automatic regulating or control instruments; parts		1.71		14.02	
Consumer Electronics		20.70		13.97	
8479 - Machines etc having individual functions nesoi, pt		1.92		10.20	
8518 - Microphones; Loudspeakers; Sound Amplifier etc, pt		1.51		11.39	
8519 - Turntables, record & cassette players etc.		1.48		9.18	
8520 - Magntic tap recordrs incting sound rproducng app, nes		0.16		28.36	3
8521 - Video recrdng/reproduc appar wheth/nt video tuner		4.94	3	16.10	
8523 - Prepared unrecorded media (no film) for sound etc.		0.39		28.25	4
8524 - Recorded gramophone records		0.02		11.78	
8527 - Reception apparatus for radiotelephony etc		1.69		11.92	
8528 - TV receivers, incl video monitors & projectors		4.75	5	18.26	10
8529 - Parts for television, radio and radar apparatus	X	2.69		14.22	
8536 - Electrical apparatus for switching etc, nov 1000 V	X	0.81		8.66	
8540 - Thermionic, cold cathode or photocthode tubes, pt		0.33		8.63	
Electronic Data Processing		26.05		11.40	
8471 - Automatic data process machines; magn reader etc	X	4.37	6	17.51	
8473 - Parts etc for typewriters & other office machines	X	20.42	1	10.48	
8523 - Prepared unrecorded media (no film) for sound etc.		1.27		8.33	
Medical/Industrial Instrumentation		3.36		15.53	
8530 - Electrical signal, safety or traffic control equip		0.06		26.65	5
8531 - Electric sound or visual signaling apparatus, pts		0.89		9.97	
8543 - Electrical mach etc, with ind functions nesoi, pts		0.03		7.85	
9018 - Medical, surgical, dental or vet inst, no elec, pt		1.05		17.49	
9021 - Hearing aids, excluding parts and accessories		0.28		59.55	1
9022 - X-ray etc apparatus; tubes, panels, screen etc, pt		1.05		14.00	
Office Equipment		4.10		5.42	
8469 - Automatic typewriters and wordprocessing machines		0.01		2.06	
8470 - Calculting & account machines, cash registers etc		0.85		10.61	
8472 - Office machines nesoi (hectograph, adressing etc)		0.65		6.58	
8473 - Parts etc for typewriters & other office machines	X	0.44		9.69	
9009 - Photocopy apparatus & thermocopy apparatus; pts	X	2.14		3.11	
Semiconductors		20.10		9.97	
8504 - Elec trans, static conv & induct, adp pwr supp, pt		4.77	4	10.35	
8518 - Microphones; Loudspeakers; Sound Amplifier etc, pt	X	0.21		8.02	
8531 - Electric sound or visual signaling apparatus, pts		0.71		8.28	
8532 - Electric capacitors, fixed, var or adj (preset) pt	X	1.36		11.67	
8533 - Electrical resistors except heating resistors, pts	X	0.58		10.62	
8534 - Printed circuits	X	1.78		10.30	
8536 - Electrical apparatus for switching etc, nov 1000 V		2.83	10	9.94	
8540 - Thermionic, cold cathode or photocthode tubes, pt	X	0.33		7.61	
8541 - Semiconductor devices; light-emit diodes etc, pts	X	3.21	9	10.44	
8542 - Electronic integrated circuits & microassembl, pts	X	4.24	7	9.11	
9022 - X-ray tubes		0.08		13.85	
Telecommunications		6.65		16.11	
8517 - Electric apparatus for line telephony etc, parts		3.55	8	19.21	8
8518 - Microphones; loudspeakers; sound amplifier etc, pt	X	0.28		20.02	6
8520 - Telephone answering machines		0.11		3.86	
8522 - Parts & accessories for 8519-8521		0.40		8.45	
8544 - Insulated wire, cable etc; opt sheath fib cables		2.31		14.70	
Total		100.00		12.94	

Source of Basic Data: Estimates by the author using the PC-TAS database.

8. Policy Recommendations and Areas for Negotiations Under an RP-US Free Trade Area

Policy Recommendations

For the longest time, the country's participation in the global production network is confronted with one major issue. That is, the country hardly progressed beyond the lowest level of the production chain, i.e. assembly and testing. Given that this segment of the production chain generates the lowest value added, it is therefore not surprising that the high growth of the country's exports of high-technology electronic products was not accompanied by a concomitant increase in the growth of the manufacturing sector.

The analysis of this study points to the weaknesses and inadequacies of the country's local support structures as the main culprit for the inability of the country to move towards the higher levels of the production chain. These include poor infrastructures and logistics, high power cost, poor quality and unreliable power, high cost of unskilled labor, lack of supplier industries, and inadequate technological capabilities that constrained industrial upgrading. These constraints need to be addressed for two major reasons namely, (i) to ensure that the global players currently operating in the country will remain and expand operations; (ii) to ensure the long-term competitiveness of the industry and hence, the participation of the country in the global production network.

The government therefore needs to adopt an activist approach by addressing the above constraints. *First*, the government needs to recognize that remaining at the labor-intensive assembly and testing segment of the production chain is no longer a viable option, given the country's relatively high cost of unskilled labor. The big challenge for the government is industrial upgrading - to leap-frog and vie for the role of a first-tier supplier to the global suppliers and lead firms. Given the low cost structure in China, the key strategy is not to compete with China but to find niches which are complementary to China in the value chain. With industrial upgrading, MNCs can locate their labor intensive activities in China while doing the high-value production segment in the Philippines.

Industrial upgrading, however, necessitates a strong base of domestic knowledge. It requires the development of specialized skills and technological capabilities, ahead of what the market requires. One possible short-term measure is to give incentives that encourage researchers, university professors and students to interact closely with the electronics industry through sabbatical programs and internships. Another would be investment in specialized technical training schools to enhance the technical competencies of the labor force. A very good example is the Advanced Research Competency Development Institute (ARCDI) established by the local electronics industry itself. The government needs to support this kind of initiatives by the industry.

A long-term measure necessary for industrial upgrading is to put greater emphasis on science and technology at all levels of education – primary, secondary and tertiary. Emphasis should be given to developing the capability, creativity and willingness of students to develop new products and processes. This would require re-designing the curriculum at

all levels. For the tertiary level, the industry should be involved in designing the curriculum (particularly in engineering and science curriculum) to ensure that graduates have the kind of education the industry needs.

Second, developing the local supplier industries should also be a priority for the government. This is the only avenue to increase the domestic content of the operations of MNCs in the country. This will require a package of technical assistance and specialized training to develop skills of local suppliers as well as ensuring the availability of and access to finance.

Third, given the regional and global orientation of the operations of MNCs, good infrastructure and logistics that lower production cost and facilitate easy supply chain management, from the procurement of inputs (whether local or imported) to the export of output, are crucial. This means reducing power and communication costs, providing adequate port systems, cutting travel time and offering travel and shipment options. Opening up infrastructure and services to private sector investment is a step in the right direction, as the huge budget deficit limits the ability of the government to invest in physical infrastructures and utilities. However, the regulatory and legal environment must be aimed at reinforcing the longer-term stability of investment agreements in private-infrastructure projects so as to strengthen the credibility of the policy environment and increase the confidence of foreign investors on the economy.

Implementing the above suggested measures will not only increase the attractiveness of the country to the global production network but it will also make the participation of the country to the production chain create a greater impact on the country's economic development.

Areas for Negotiations Under an RP-US Free Trade Area

The activities of the electronics global production network are market-driven. Thus, negotiations in an RP-US FTA concerning electronics should be focused on improving the functioning of markets of both economies. The Philippine government should also use the negotiations, whenever appropriate, as one avenue to address the issues concerning local support structures discussed above. Admittedly, the solutions to most of the issues are internal and domestic in nature; and hence, not appropriate for any bilateral negotiation.

Elimination of tariff rates on remaining products. Tariff rates on most electronic products for both countries are already zero, except for certain products (Appendix 2 and Appendix Table 3). The remaining tariffs must be reduced to zero. On the part of the Philippines, tariff rates are still relatively high (5%-15%) on consumer electronics, telecommunications, automotive electronics, and consumer electronics. The elimination of tariff rates on the remaining products will improve efficiency and competitiveness of the industry; and hence, increase the attractiveness of the country as a location to US GPN-related foreign investment.

On the part of the US, tariff rates (2-7%) still exist for a few products in semiconductors, automotive electronics, control and instrumentation, and consumer electronics. Of particular concern for the Philippines is the elimination of tariffs in automotive electronics because the country is competitive in this sub-sector; and yet, the country's share in the US market for these products is less than 1 percent.

Harmonization and/or mutual recognition of product standards and technical regulations. Differences in health and safety standards as well as technical regulations on product specification on electronics between the two economies increase production and administration costs. Harmonization and/or mutual recognition on standards and regulations should be part of the negotiating areas. However, considering the tri-lateral nature of trade in South East Asia, North East Asia and the North America, harmonization and/or MRAs between the US and the Philippines should be aligned with standards and regulations prevailing in East Asia.

Harmonization and/or mutual recognition of testing and certification procedures. Many end-consumer products, particularly consumer electronics require testing and certification before they can be distributed to consumers. Both economies should mutually recognize testing and certification procedures undertaken in each economy so as not to hinder or delay trade. Because of the lack of testing infrastructure in the Philippines, companies have to wait in long queues. Also in the Philippines, testing is subcontracted to an MNCs with local presence, which results in uneasiness among other MNCs that have to go through the testing procedure (McKinsey & Company 2003). Thus, MRAs on testing procedures can prevent such problems.

Again, considering the tri-lateral nature of trade in the region, MRAs on testing procedures should be aligned with those prevailing in the region.

Technical assistance on the new requirements of trade and security. Following the events of 11 September 2001, businesses in the Asia-Pacific, including the Philippines, are facing new costs associated with the need to achieve higher levels of security in the trading system (Austria 2004a). In particular, a number of mandatory and voluntary measures have been introduced to improve the security of the maritime trade to counter possible terrorist acts. For example, a 24-hour advance cargo information is now required prior to loading at ports of origin for cargo bound for the United States. This will greatly affect the Philippines as the US is the major destination of the country's exports. The business community is aware that there are associated costs in implementing and complying with these new security measures; and such costs will add to the cost of doing business.

The Philippine government, in partnership with the business sector, should seek technical assistance from the US; and both economies should exchange information on best practices associated with the adoption of new security measures. While adapting to new customs reporting requirements, the Philippine government should consider measures that would serve to expedite clearance procedures without compromising security.

Technological training and capacity building. The Philippine government should seek technical assistance in terms of training to improve the technological capability of the labor force along the lines required by the electronics industry.

9. Summary and Conclusion

The country's participation in the electronics industry's global production network has undoubtedly shaped the pattern and structure of trade and the industrialization path the country took since the early 1990s. The industry has remained the country's leading exports. While exports of the industry are still highly concentrated in semiconductors, this study has shown that there has been a gradual change in the structure of exports. The share of semiconductors in total exports has been decreasing while the shares of electronic data processing and automotive electronics have been increasing. The emerging changing structure is a significant development as it indicates technological deepening in the industry.

The country is competitive in the segment where it is now in the entire value chain of the electronics global production network, i.e. the labor-intensive and import-dependent assembly and testing. The problem, however is, this is that part of the value chain with the lowest value added. This explains the limited contribution of the industry to the country's economic development.

The findings of the study show that the country is competitive in only 3 sub-sectors: semiconductors, electronic data processing and automotive electronics. In terms of products, the country is competitive in 18 products only and these are parts and components. Nonetheless, these products accounted for at least 86 percent of the country's total exports. Likewise, while most of the products are still not competitive, there has been some improvement in the degree of competitiveness between 1997 and 2001.

A comparison of the country's competitiveness with its competitors and major trading partners from East Asia shows that each economy is specializing on a particular product. That is, each economy differs in the products in which it is competitive. That this is the case, however, is not surprising. By its nature, trade under the global production network is driven by product specialization.

The USA is the largest market for Philippine exports of electronics. However, the share of the USA has been declining for a number of reasons. These include: (i) increase in the number of American MNCs operating in the country and which exports their outputs directly from the Philippines to their markets in East Asia and other parts of the world; (ii) new role of the NIEs in the production network as firs-tier suppliers, thus increasing Philippine trade with these economies; and (iii) increased US trade with Mexico and China.

There are potentials for expanding Philippine exports under an RP-US FTA, based on the comparison between the products where the Philippines is competitive and the products that accounted for the largest shares in US imports or the fastest growing imports of the US. Potentials for export expansion can be found in electronic data processing, semiconductors

and telecommunications. Specific products include parts for typewriters & other office machines (HS 8473), automatic data processing machines (HS 8471), electronic integrated circuits and micro-assembly parts (HS 8542), semiconductor devices, light-emit diodes etc., parts (HS 8541), and microphones, loudspeakers, sound amplifiers, etc., parts (HS 8518).

The Philippines, however, needs to address the issues confronting the local support structures that have constrained the ability of the country to move towards higher levels of the production chain if it were to maintain the presence of the industry's global players in the country and at the same time ensure the industry long-term competitiveness. These include poor infrastructures and logistics, high power cost, poor quality and unreliable power, high cost of unskilled labor, lack of supplier industries, and inadequate technological capabilities that constrained industrial upgrading.

The above issues, however, are domestic in nature and hence, not appropriate for bilateral negotiations under an RP-US FTA. Since the global production network is market-driven, negotiations should instead focus on how to improve the functioning of the markets of both economies. This includes elimination of remaining tariffs, trade facilitation (harmonization of product standards, testing procedures), technical assistance on the new requirements of trade and security, and technological training and capacity building.

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Appendix 1. Electronics Industry Product Coverage

HS (4-Digits)	HS (6-Digits)	Product Description
Components/Devices (Semiconductors)		
8504	850410	Ballasts for discharge lamps or tubes
	850431	Transformers Nesoi, Power handling capacity nov 1kVA
	850440	Static converters (e.g., rectifiers) (Gross kg)
	850450	Other inductors (GK)
	850490	Inductor parts (Gross kg)
8518	851890*	Parts including printed circuit assemblies for products falling within the Information Technology Agreement
8531	853120	Indicator panels incorporating liquid crystal devices (LCD) or light emitting diodes (LED) (No.)
8532	853210	Fixed capacitors, 50-60 hz, power, capacity => 0.5 KVAR
	853221	Tantalum fixed capacitors
	853222	Aluminum electrolytic fixed capacitors (Gross kg)
	853223	Ceramic dielecric fixed capacitors, single-layer (Gross kg)
	853224	Ceramic dielecric fixed capacitors, multi-layer (Gross kg)
	853225	Paper or plastic dielectric fixed capacitors (Gross kg)
	853229	Fixed capacitors, nesoi
	853230	Variable or adjustable (pre-set) capacitors
	853290	Parts of electrical capacitors (Gross kg)
8533	853310	Fixed carbon resistors, composition or film types (Gross kg)
	853321	Fixed resistors for a power handling capacity not exceeding 20 W (Gross kg)
	853329	Other fixed resistors, n.e.s. (Gross kg)
	853331	Wirewound variable resistors, < 20 W
	853339	Other wirewound variable resistors (including rheostats & potentiometers) (Gross kg)
	853340	Variable resistors (inclucing rheostats & potentiometers) nesoi
	853390	Parts for the electrical resistors of subgroup 772.3 (Gross kg)
8534	853400	Printed circuits
8536	853641	Relays for a voltage not exceeding 60 V
	853649	Relays for a voltage exceeding 60 V (Gross kg)
	853650	Electric switches for voltage not over 1000 V, nesoi
	853669*	Audio/video sockets & cathode ray tube (CRT) sockets for TV or radio receivers
8540	854071	Magnetrons (No.)
	854072	Klystrons (No.)
	854079	Other microwave tubes (excluding grid-controlled tubes) other values & tubes
	854081	Receiver or amplifier values & tubes (No.)
	854089	Other electronic valves & tubes, n.e.s. (No.)
	854091	Parts of cathode ray tubes
	854099	Parts, n.e.s., of the electronic tubes & valves of subgroups 776.1 & 776.2 (Gross kg)
8541	854110	Diodes, not photosensitive nor light emitting diodes (Gross kg)
	854121	Transistors excluding photosensitive, dissipation rate < 1 W (Gross kg)
	854129	Transistors excluding photosensitive, dissipation rate > 1 W (Gross kg)
	854130	Thyristors, diacs & triacs excluding photosensitive devices (Gross kg)
	854140	Photosensitive semiconductor device including photovoltaic cell, etc.
	854150	Other semiconductor devices (Gross kg)
	854160	Piezo-electric crystals, mounted (Gross kg)
	854190	Parts for diodes, transistors & similar semiconductors
8542	854212	Cards incorporating electronic integrated circuits (Smart Cards)
	854213	Metal Oxide Semiconductors (MOS Technology)
	854214	Circuits obtained by bipolar technology
	854219	Other monolithic digital integrated circuits
	854230	Non-digital monolithic integrated units (Gross kg)
	854240	Hybrid integrated circuits (Gross kg)
	854250	Other electronic integrated circuits & micro assemblies (Gross kg)
	854290	Parts of electronic integrated circuits & micro assemblies (Gross kg)
9022	902230	X-ray tubes
9108	910813*	Goldwire for use in the manufacture of semiconductor devices
Electronic Data Processing		
8471	847110	Analogue or hybrid+(analogue-digital) automatic data processing machines
	847120	Digital automatic data processing machines containing in the same housing
	847130	Portable digital automatic processing machines, weighing not > 10 kg
	847149	Digital automatic data processing machines, presented in the form of systems

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	847150	Digital processing units which may contain same housing
	847160	Input or output units, whether or not presented with the rest of a system & whether or not in same housing
	847170	Storage units, whether or not presented with the rest of a system
	847180	Automatic data processing units, nesoi
	847190	Adp mac & units thereof; mag/opt rder, transcrb, proc dat
8473	847330	Parts & accessories for adp machines & units
8523	852311*	Computer magnetic tapes for sound recording, of a width < 4 mm
	852312*	Computer magnetic tapes for sound recording, of a width > 4 mm but not < 6.5 mm
	852313*	Computer magnetic tapes for sound recording, of a width > 6.5 mm
	852320*	Computer magnetic discs & diskettes, unrecorded
Office Equipment		
8469	846910	Automatic typewriters & word-processing machines
8470	847010	Electronic calculators capable of operation without an external source of electric & pocket-size data rec
	847021	Electronic calculating machines incorporating a printing device
	847029	Electornic calculating machines, not incorporating a printing device
	847030	Other calculating machines, n.e.s.
	847040	Accounting machines (including bookkeeping machines)
	847050	Cash registers incorporating a calculating device (No.)
	847090	Postage-franking machines & similar machines with calculating machines
8472	847290	Automatic banknote dispensers/automatic teller machines
8473	847310	Typewriter & word processing machine parts & accessories
	847321	Parts of electornic calculating machines
	847329	Parts for machines, nesoi, incorporating calculating device
	847340	Parts & accessories of office machines, nesoi
	847350	Parts suitable for use with machines of two or more head
9009	900911	Electrostatic photo-copying apparatus operating by reproducing original ontothe copy (direct process)
	900912	Electorstatic photo-copying apparatus opreating by reproducing original via an intermediate onto the copy
	900990	Parts & accessories of photo-copying apparatus
Medical/Industrial Instrumentation		
8530	853010	Electric signaling, safety or traffic control equipment for railways & tramways
	853080	Electric signaling, safety or traffic control equipment for roads, inland water-ways, parking facilities, etc.
	853090	Parts for electric signaling, traffic, safety equipment
8531	853110	Burglar or fire alarms & similar apparatus
	853180	Electric sound or visual signaling apparatus, nesoi
	853190	Parts of electric sound or visual signaling apparatus (Gross kg)
8543	854320	Signal generators
9018	901811	Electrocardiographs, & parts & accessories
	901812	Ultrasonic scanning apparatus
	901813	Magnetic resonance imaging apparatus
	901814	Scintigraphic apparatus
	901819	Electro-diagnostic apparatus nesoi, & parts etc.
	901820	Ultra-voilet or infra-red ray apparatus (No.)
	901829*	Parts & accessories of ultra-violet or infra-red ray apparatus (Gross kg)
9021	902140	Hearing aids (excluding parts & accessories) (No.)
	902150	Pacemakers for stimulating heart muscles (excluding parts & accessories) (No.)
9022	902211	Apparatus based on the use of x-rays, for medical, surgical (dental) or veterinary uses
	902212	Computed tomography apparatus
	902213	Apparatus based on the use of x-rays for dental uses
	902219	Apparatus based on the use of x-rays, for other uses (No.)
	902221	Apparatus base of alpha, beta, radiation, medical, surgery etc.
	902229	Apparatus based on the use of alpha, beta or gamma radiations, for other uses (No.)
	902290	X-ray/high tension generator cntr pnl & desk examination/treatment tb parts
Control & Instrumentation		
9010	901010	Apparatus & equipment, automatic developing photo film
	901020	Other apparatus & equipment for photographic (including cinematographic) laboratories; negatoscopes (Gross kg)
	901090	Parts & accessories for the cinematographic apparatus & equipment
9011	901110	Stereoscopic microscopes (No.)
	901120	Other microscopes for photomicrography, cinephotomicrography or micro projection (No.)
	901190	Parts & accessories for compound optical microscopes
9012	901210	Microphones (other than optical microphones) & diffraction apparatus (No.)
	901290	Parts & accessories of microscopes (other than optical microscopes) & diffraction apparatus (Gross kg)
9016	901600	Balances, sensitivity >=5 CG, W or without weight, & parts

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9017	901720	Other drawing, marking-out or mathematical calculating machines (No.)
9023	902300	Instruments, apparatus/models, designed for demonstration purposes, nes (No.)
9026	902610	Instruments & apparatus for measuring/checking flow/level of liquids (No.)
	902620	Other instruments & apparatus for measuring or checking pressure (No.)
	902680	Instruments measuring/checking variable liquids/gases, nesoi
9027	902720	Chromatographs & electrophoresis instrument (No.)
	902730	Spectometers, spectrophotometers & spectographs using optical radiations (UV, visible, IR) (No.)
	902740	Exposure meters (No.)
	902750	Instruments etc using optical radiations, nesoi
	902780	Instrument & apparatus for physical & chemical analysis, n.e.s. (No.)
	902790	Parts of instruments, physical/chemical analysis etc., nesoi
9030	903010	Instruments & apparatus for measuring or detecting ionizing radiations (No.)
	903020	Cathode-ray oscilloscopes & cathode-ray oscillographs (No.)
	903031	Multimeters (No.)
	903039	Other instruments & apparatus, for measuring or checking voltage, current, resistance or power, w/o rec device
	903040	Other instruments, specially designed for telecommunication
	903081	Other instruments & apparatus for measuring or checking electrical quantities, nes, with rec device
	903089	Other instruments & apparatus for measuring or checking electrical quantities, nes, w/o rec device
	903090	Parts of instruments for measuring electrical quantities, alpha beta inzng rdt
9031	903190	Parts, of machines nesoi, and profile projector
9032	903220	Pressure regulators & controllers (manostats) (No.)
	903281	Hydraulic or pneumatic regulating or controlling instruments & apparatus (No.)
	903289	Other regulating or controlling instruments & apparatus (No.)
	903290	Parts & accessories for automatic regulating or controlling instruments & apparatus (Gross kg)
Communication & Radar		
8525	852510*	Transmission apparatus for radio or television
	852520	Transmission apparatus incorporating reception apparatus
	852530	Televison cameras (No.)
8526	852610	Radar apparatus (No.)
	852691	Radio navigational aid apparatus
	852692	Radio remote control apparatus
8527	852790	Reception apparatus radio-telephone/telegraphic etc., nesoi
Telecommunications		
8517	851711	Line telephone sets with cordless handsets
	851721	Facsimile machines
	851722	Teleprinters
	851730	Telephonic or telegraphic switching apparatus
	851750	Other apparatus for carrier-current line systems or for digital line systems
	851780	Electric telephonic & telegraphic apparatus, nesoi
	851790*	Parts & accessories of other telephonic or telegraphic apparatus
8518	851830*	Line telephone handsets
8520	852020	Telephone answering machines
8522	852290	Parts & accessories of sound/video reproducing, record apparatus
8544	854411	Winding wire, of copper
	854419	Other winding wire
	854420	Co-axial cable & other co-axial conductors
	854441	Insulated electric conductors =< 80 V with cntrs
	854449	Insulated electric conductors =< 80 V, nesoi
	854451	Electrical conductors > 80 but =< 1000 V with cntrs
	854459	Electric conductors over 80 V not over 1000 V not fitted with connector
	854470	Insulated optical fiber cables with individually sheathed fibers
Automotive Electronics		
8512	851220	Electrical lighting/visual signaling equipment ex for bicycles
	851230	Electrical sound signaling equipment for motor vehicle
8527	852721	Radiobroadcast receivers for motor vehicles with rcos
	852729	Radiobroadcast receivers for motor vehicles, nesoi
8708	870839	Brakes & servo-brakes, & parts thereof (excluding mounted brake linings) of motor vehicles
Consumer Electronics		
8479	847989	Vidoe tape rewinders
8517	851719*	Videophones
8518	851810	Microphones & stands therefore
	851821	Single loudspeakers, mounted in their enclosures (No.)
	851822	Multiple loudspeakers, mounted in the same enclosure

	851829*	Loudspeakers, nesoi
	851840	Audio-frequency electric amplifiers
	851850	Electric sound amplifier sets
8519	851910	Record-players, coin or disc-operated, not incorporating a sound recording device
	851921	Record-players without loudspeakers, not incorporating a sound recording device
	851929	Other record-players, not incorporating a sound recording device, n.e.s.
	851931	Turntables (record-decks), with automatic record changing mechanism, not incorporating a sound rec device
	851939	Other turntables (record-decks), not incorporating a sound recording device
	851991	Sound reproducing apparatus, cassette-type
	851992	Pocket-size cassette player
	851999	Sound reproducing apparatus except cassette, nesoi
8520	852033	Magnetic tape recorders, cassette-type, incorporating a sound reproducing device
	852039	Tape recorder/reproducers, nesoi
	852090	Magnetic sound recording or reproducing equipment, nesoi
8521	852110	Video recording or reproducing apparatus, magnetic tape-type
	852190	Other video recording or reproducing apparatus, whether or not incorporating a video tuner
8523	852330	Cards incorporating a magnetic stripe (Net kg)
	852390	Unrecorded magnetic media nesoi
8524	852410	Phonograph records, recorded media
	852422	Magnetic tapes, recorded, of a width > 4mm < 6.5 mm
	852431	Discs for laser reading systems, recorded, for reproducing phenomena other than sound or image
	852432	Discs for laser reading systems, recorded, for reproducing sound only
	852439	Discs for laser reading systems, nesoi
	852440	Magnetic tapes, recorded, for reproducing phenomena other than sound or image (Gross kg)
	852451	Magnetic tapes, recorded, of a width < 4 mm
	852453	Magnetic tapes, recorded, of a width > 6.5 mm
	852460	Cards incorporating a magnetic stripe, recorded (Net kg)
	852491	Other recorded media for reproducing phenomena other than sound or image
	852499	Recorded media for reproducing sound or image, nesoi
8525	852540	Still image video cameras & other video camera recorder
8527	852712	Pocket-size radio cassette players
	852713	Other radio broadcast receivers capable of operating without an external source of power
	852719	Radio broadcast receivers capable of operating without an external source of power
	852731	Other radio broadcast receivers, combined with sound recording or reproducing apparatus
	852732	Other radio broadcast receivers, combined with sound recording or reproducing apparatus bt with clock
	852739	Other radio broadcast receivers, not combined with sound recording or reproducing apparatus nor clock
8528	852810	Television receivers, color (including receivers incorporating radiobroadcast), with sound or video rec
	852820	Television receivers, black & white or other monochrome (include rec inc radiobroad) with sound or vid rec
	852821	Video monitors, color
	852822	Video monitors, black & white or other monochrome
	852830	Video projectors
8529	852910**	Television receiving set antennae
	852990**	Parts, excluding antennae, for transmission, radar, radio, television, etc. nesoi
8536	853610	Glass fuses for television & radio receivers
	853690	Earphone/headphone jacks for television or radio receivers, junction blocks/ink box for automotive wiring hrn.
8540	854011	Color television picture tubes, cathode-ray (including video monitor cathode-ray tubes) (No.)
	854012	Black & white or other monochrome television picture tubes, cathode-ray (No.)
	854020	Television camera tubes; image converter & intensifier
	854030	Other cathode-ray tubes, n.e.s.
	854040	Data/graphic display tubes, colour, with a phosphor dot screen pitch smaller than 0.4 mm
	854050	Data/graphic display tubes, black & white or other monochrome

Source: Department of Trade and Industry

Notes: The 6-digit HS Code product classification under each sub-sector was provided by the DTI-BETP. An asterisk (*) indicates that the product can also be found in other sub-sectors. But for the 4-digit HS code classification, that product is classified under only one sub-sector. For example, HS Code 852510 is included in both Communication and Radar, and Telecommunication sub-sectors. However, for the 4-digit code HS 8525, it is included only in Communication and Radar.

Appendix Table 2. Tariff Rates of Electronics, Philippines, 1990, 2000 & 2004

HS (4-Digit)	HS (6-Digit)	Product Description	Tariff Rates		
			1990	2000	2004
Components/Devices (Semiconductors)					
8504	850410	Ballasts for discharge lamps or tubes	30	10	7
	850431	Transformers Nesoi, Power handling capacity nov 1kVA	50	3	1
	850440	Static converters (e.g., rectifiers) (Gross kg)	10	0	0
	850450	Other inductors (GK)	30	0	0
	850490	Inductor parts (Gross kg)	10	3	0
8518	851890*	Parts including printed circuit assemblies for products falling within the Information Technology Agreement	10	0	0
8531	853120	Indicator panels incorporating liquid crystal devices (LCD) or light emitting diodes (LED) (No.)	20	0	0
8532	853210	Fixed capacitors, 50-60 hz, power, capacity => 0.5 KVAR	10	0	0
	853221	Tantalum fixed capacitors	20	0	0
	853222	Aluminum electrolytic fixed capacitors (Gross kg)	20	0	0
	853223	Ceramic dielecric fixed capacitors, single-layer (Gross kg)	20	0	0
	853224	Ceramic dielecric fixed capacitors, multi-layer (Gross kg)	20	0	0
	853225	Paper or plastic dielectric fixed capacitors (Gross kg)	20	0	0
	853229	Fixed capacitors, nesoi	20	0	0
	853230	Variable or adjustable (pre-set) capacitors	20	0	0
	853290	Parts of electrical capacitors (Gross kg)	10	0	0
8533	853310	Fixed carbon resistors, composition or film types (Gross kg)	30	0	0
	853321	Fixed resistors for a power handling capacity not exceeding 20 W (Gross kg)	30	0	0
	853329	Other fixed resistors, n.e.s. (Gross kg)	30	0	0
	853331	Wirewound variable resistors, < 20 W	30	0	0
	853339	Other wirewound variable resistors (including rheostats & potentiometers) (Gross kg)	30	0	0
	853340	Variable resistors (inclucing rheostats & potentiometers) nesoi	30	0	0
	853390	Parts for the electrical resistors of subgroup 772.3 (Gross kg)	30	0	0
8534	853400	Printed circuits	10	0	0
8536	853641	Relays for a voltage not exceeding 60 V	10	3	1
	853649	Relays for a voltage exceeding 60 V (Gross kg)	10	3	1
	853650	Electric switches for voltage not over 1000 V, nesoi	10	10	7
	853669*	Audio/video sockets & cathode ray tube (CRT) sockets for TV or radio receivers	30	0	0
8540	854071	Magnetrons (No.)	-	3	1
	854072	Klystrons (No.)	-	3	3
	854079	Other microwave tubes (excluding grid-controlled tubes) other values & tubes	-	3	3
	854081	Receiver or amplifier values & tubes (No.)	20	3	3
	854089	Other electronic valves & tubes, n.e.s. (No.)	20	3	1
	854091	Parts of cathode ray tubes	40	3	1
	854099	Parts, n.e.s., of the electronic tubes & valves of subgroups 776.1 & 776.2 (Gross kg)	10	3	1
8541	854110	Diodes, not photosensitive nor light emitting diodes (Gross kg)	20	0	0
	854121	Transistors excluding photosensitive, dissipation rate < 1 W (Gross kg)	20	0	0
	854129	Transistors excluding photosensitive, dissipation rate > 1 W (Gross kg)	20	0	0
	854130	Thyristors, diacs & triacs excluding photosensitive devices (Gross kg)	20	0	0
	854140	Photosensitive semiconductor device including photovoltaic cell, etc.	20	0	0
	854150	Other semiconductor devices (Gross kg)	20	0	0
	854160	Piezo-electric crystals, mounted (Gross kg)	20	0	0
	854190	Parts for diodes, transistors & similar semiconductors	20	0	0
8542	854212	Cards incorporating electronic integrated circuits (Smart Cards)	-	0	0
	854213	Metal Oxide Semiconductors (MOS Technology)	-	0	0
	854214	Circuits obtained by bipolar technology	-	0	0
	854219	Other monolithic digital integrated circuits	20	0	0
	854230	Non-digital monolithic integrated units (Gross kg)	-	0	0
	854240	Hybrid integrated circuits (Gross kg)	-	0	0
	854250	Other electronic integrated circuits & micro assemblies (Gross kg)	-	0	0
	854290	Parts of electronic integrated circuits & micro assemblies (Gross kg)	20	0	0
9022	902230	X-ray tubes	10	3	3
9108	910813*	Goldwire for use in the manufacture of semiconductor devices	-	-	-
Electronic Data Processing					
8471	847110	Analogue or hybrid+(analogue-digital) automatic data processing machines	10	0	0
	847120	Digital automatic data processing machines containing in the same housing	10	0	0
	847130	Portable digital automatic processing machines, weighing not > 10 kg	-	0	0
	847149	Digital automatic data processing machines, presented in the form of systems	-	0	0

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	847150	Digital processing units which may contain same housing	-	0	0
	847160	Input or output units, whether or not presented with the rest of a system & whether or not in same housing	-	0	0
	847170	Storage units, whether or not presented with the rest of a system	-	0	0
	847180	Automatic data processing units, nesoi	-	0	0
	847190	Adp mac & units thereof; mag/opt rder, transcrb, proc dat	-	0	0
8473	847330	Parts & accessories for adp machines & units	20	0	0
8523	852311	Computer magnetic tapes for sound recording, of a width < 4 mm	50	0	0
	852312	Computer magnetic tapes for sound recording, of a width > 4 mm but not < 6.5 mm	50	0	0
	852313	Computer magnetic tapes for sound recording, of a width > 6.5 mm	10	0	0
	852320	Computer magnetic discs & diskettes, unrecorded	10	0	0
Office Equipment					
8469	846910	Automatic typewriters & word-processing machines	20	-	-
8470	847010	Electronic calculators capable of operation without an external source of electric & pocket-size data rec	20	0	0
	847021	Electronic calculating machines incorporating a printing device	20	0	0
	847029	Electornic calculating machines, not incorporating a printing device	20	0	0
	847030	Other calculating machines, n.e.s.	20	0	0
	847040	Accounting machines (including bookkeeping machines)	20	0	0
	847050	Cash registers incorporating a calculating device (No.)	20	0	0
	847090	Postage-franking machines & similar machines with calculating machines	20	0	0
8472	847290	Automatic banknote dispensers/automatic teller machines	20	0	0
8473	847310	Typewriter & word processing machine parts & accessories	20	3	3
	847321	Parts of electornic calculating machines	20	0	0
	847329	Parts for machines, nesoi, incorporating calculating device	20	0	0
	847340	Parts & accessories of office machines, nesoi	20	3	3
	847350	Parts suitable for use with machines of two or more head	-	0	0
9009	900911	Electrostatic photo-copying apparatus operating by reproducing original ontothe copy (direct process)	20	0	0
	900912	Electorstatic photo-copying apparatus opreating by reproducing original via an intermediate onto the copy	20	3	1
	900990	Parts & accessories of photo-copying apparatus	20	0	-
Medical/Industrial Instrumentation					
8530	853010	Electric signaling, safety or traffic control equipment for railways & tramways	10	3	3
	853080	Electric signaling, safety or traffic control equipment for roads, inland water-ways, parking facilities, etc.	10	3	3
	853090	Parts for electric signaling, traffic, safety equipment	10	3	3
8531	853110	Burglar or fire alarms & similar apparatus	20	3	1
	853180	Electric sound or visual signaling apparatus, nesoi	20	0	0
	853190	Parts of electric sound or visual signaling apparatus (Gross kg)	20	0	0
8543	854320	Signal generators	10	3	3
9018	901811	Electrocardiographs, & parts & accessories	10	3	3
	901812	Ultrasonic scanning apparatus	-	3	3
	901813	Magnetic resonance imaging apparatus	-	3	3
	901814	Scintigraphic apparatus	-	3	3
	901819	Electro-diagnostic apparatus nesoi, & parts etc.	10	3	1
	901820	Ultra-voilet or infra-red ray apparatus (No.)	10	3	3
	901829*	Parts & accessories of ultra-violet or infra-red ray apparatus (Gross kg)	-	-	-
9021	902140	Hearing aids (excluding parts & accessories) (No.)	10	3	3
	902150	Pacemakers for stimulating heart muscles (excluding parts & accessories) (No.)	10	3	1
9022	902211	Apparatus based on the use of x-rays, for medical, surgical (dental) or veterinary uses	10	-	-
	902212	Computed tomography apparatus	-	3	3
	902213	Apparatus based on the use of x-rays for dental uses	-	3	3
	902219	Apparatus based on the use of x-rays, for other uses (No.)	10	3	3
	902221	Apparatus base of alpha, beta, radiation, medical, surgery etc.	10	3	3
	902229	Apparatus based on the use of alpha, beta or gamma radiations, for other uses (No.)	10	3	3
	902290	X-ray/high tension generator cntr pnl & desk examination/treatment tb parts	10	3	3
Control & Instrumentation					
9010	901010	Apparatus & equipment, automatic developing photo film	20	3	3
	901020	Other apparatus & equipment for photographic (including cinematographic) laboratories; negatoscopes (Gross kg)	20	-	-
	901090	Parts & accessories for the cinematographic apparatus & equipment	20	0	0
9011	901110	Stereoscopic microscopes (No.)	10	0	0

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	901120	Other microscopes for photomicrography, cinephotomicrography or micro projection (No.)	10	0	0
	901190	Parts & accessories for compound optical microscopes	10	0	0
9012	901210	Microphones (other than optical microphones) & diffraction apparatus (No.)	10	0	0
	901290	Parts & accessories of microscopes (other than optical microscopes) & diffraction apparatus (Gross kg)	10	0	0
9016	901600	Balances, sensitivity >=5 CG, W or without weight, & parts	10	3	1
9017	901720	Other drawing, marking-out or mathematical calculating machines (No.)	30	10	7
9023	902300	Instruments, apparatus/models, designed for demonstration purposes, nes (No.)	10	3	1
9026	902610	Instruments & apparatus for measuring/checking flow/level of liquids (No.)	20	10	10
	902620	Other instruments & apparatus for measuring or checking pressure (No.)	20	10	10
	902680	Instruments measuring/checking variable liquids/gases, nesoi	20	0	0
9027	902720	Chromatographs & electrophoresis instrument (No.)	20	0	0
	902730	Spectometers, spectrophotometers & spectographs using optical radiations (UV, visible, IR) (No.)	20	0	0
	902740	Exposure meters (No.)	20	3	3
	902750	Instruments etc using optical radiations, nesoi	20	0	0
	902780	Instrument & apparatus for physical & chemical analysis, n.e.s. (No.)	20	0	0
	902790	Parts of instruments, physical/chemical analysis etc., nesoi	20	0	0
9030	903010	Instruments & apparatus for measuring or detecting ionizing radiations (No.)	10	3	3
	903020	Cathode-ray oscilloscopes & cathode-ray oscillographs (No.)	10	3	1
	903031	Multimeters (No.)	10	3	1
	903039	Other instruments & apparatus, for measuring or checking voltage, current, resistance or power, w/o rec device	10	10	10
	903040	Other instruments, specially designed for telecommunication	10	0	0
	903081	Other instruments & apparatus for measuring or checking electrical quantities, nes, with rec device	10	-	-
	903089	Other instruments & apparatus for measuring or checking electrical quantities, nes, w/o rec device	10	3	1
	903090	Parts of instruments for measuring electrical quantities, alpha beta inzng rdt	20	0	0
9031	903190	Parts, of machines nesoi, and profile projector	20	0	0
9032	903220	Pressure regulators & controllers (manostats) (No.)	20	3	1
	903281	Hydraulic or pneumatic regulating or controlling instruments & apparatus (No.)	10	3	1
	903289	Other regulating or controlling instruments & apparatus (No.)	10	3	1
	903290	Parts & accessories for automatic regulating or controlling instruments & apparatus (Gross kg)	20	3	1
Communication & Radar					
8525	852510	Transmission apparatus for radio or television	10	3	1
	852520	Transmission apparatus incorporating reception apparatus	10	0	0
	852530	Televison cameras (No.)	30	3	3
8526	852610	Radar apparatus (No.)	30	3	1
	852691	Radio navigational aid apparatus	30	3	1
	852692	Radio remote control apparatus	30	3	1
8527	852790	Reception apparatus radio-telephone/telegraphic etc., nesoi	50	20	15
Telecommunications					
8517	851711	Line telephone sets with cordless handsets	-	0	0
	851721	Facsimile machines	-	0	0
	851722	Teleprinters	-	0	0
	851730	Telephonic or telegraphic switching apparatus	10	0	0
	851750	Other apparatus for carrier-current line systems or for digital line systems	-	0	0
	851780	Electric telephonic & telegraphic apparatus, nesoi	-	0	0
	851790*	Parts & accessories of other telephonic or telegraphic apparatus	20	0	0
8518	851830*	Line telephone handsets	30	0	1
8520	852020	Telephone answering machines	50	0	0
8522	852290	Parts & accessories of sound/video reproducing, record apparatus	20	3	3
8544	854411	Winding wire, of copper	30	10	7
	854419	Other winding wire	30	10	7
	854420	Co-axial cable & other co-axial conductors	10	10	7
	854441	Insulated electric conductors =< 80 V with cntrs	10	10	7
	854449	Insulated electric conductors =< 80 V, nesoi	10	3	7
	854451	Electrical conductors > 80 but =< 1000 V with cntrs	10	20	15
	854459	Electric conductors over 80 V not over 1000 V not fitted with connector	10	20	15
	854470	Insulated optical fiber cables with individually sheathed fibers	30	0	0
Automotive Electronics					
8512	851220	Electrical lighting/visual signaling equipment ex for bicycles	30	3	3
	851230	Electrical sound signaling equipment for motor vehicle	30	3	3
8527	852721	Radiobroadcast receivers for motor vehicles with rcos	50	20	15
	852729	Radiobroadcast receivers for motor vehicles, nesoi	50	20	15

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8708	870839	Brakes & servo-brakes, & parts thereof (excluding mounted brake linings) of motor vehicles	30	10	10
Consumer Electronics					
8479	847989	Vidoe tape rewinders	20	0	0
8517	851719	Videophones	-	0	0
8518	851810	Microphones & stands therefore	30	0	0
	851821	Single loudspeakers, mounted in their enclosures (No.)	30	10	10
	851822	Multiple loudspeakers, mounted in the same enclosure	30	10	10
	851829	Loudspeakers, nesoi	30	0	0
	851840	Audio-frequency electric amplifiers	30	0	0
	851850	Electric sound amplifier sets	30	10	7
8519	851910	Record-players, coin or disc-operated, not incorporating a sound recording device	50	20	3
	851921	Record-players without loudspeakers, not incorporating a sound recording device	50	20	3
	851929	Other record-players, not incorporating a sound recording device, n.e.s.	50	20	3
	851931	Turntables (record-decks), with automatic record changing mechanism, not incorporating a sound rec device	50	20	3
	851939	Other turntables (record-decks), not incorporating a sound recording device	50	20	3
	851991	Sound reproducing apparatus, cassette-type	50	20	-
	851992	Pocket-size cassette player	-	20	15
	851999	Sound reproducing apparatus except cassette, nesoi	50	3	3
8520	852033	Magnetic tape recorders, cassette-type, incorporating a sound reproducing device	-	20	15
	852039	Tape recorder/reproducers, nesoi	50	20	15
	852090	Magnetic sound recording or reproducing equipment, nesoi	20	3	3
8521	852110	Video recording or reproducing apparatus, magnetic tape-type	50	20	5
	852190	Other video recording or reproducing apparatus, whether or not incorporating a video tuner	50	20	5
8523	852330	Cards incorporating a magnetic stripe (Net kg)	-	7	5
	852390	Unrecorded magnetic media nesoi	50	0	0
8524	852410	Phonograph records, recorded media	50	10	3
	852422	Magnetic tapes, recorded, of a width > 4mm < 6.5 mm	50	-	-
	852431	Discs for laser reading systems, recorded, for reproducing phenomena other than sound or image	-	0	0
	852432	Discs for laser reading systems, recorded, for reproducing sound only	-	10	10
	852439	Discs for laser reading systems, nesoi	-	0	0
	852440	Magnetic tapes, recorded, for reproducing phenomena other than sound or image (Gross kg)	-	0	0
	852451	Magnetic tapes, recorded, of a width < 4 mm	-	10	10
	852453	Magnetic tapes, recorded, of a width > 6.5 mm	-	10	10
	852460	Cards incorporating a magnetic stripe, recorded (Net kg)	-	7	5
	852491	Other recorded media for reproducing phenomena other than sound or image	-	0	0
	852499	Recorded media for reproducing sound or image, nesoi	-	0	0
8525	852540	Still image video cameras & other video camera recorder	-	0	0
8527	852712	Pocket-size radio cassette players	-	20	5
	852713	Other radio broadcast receivers capable of operating without an external source of power	-	20	15
	852719	Radio broadcast receivers capable of operating without an external source of power	50	20	15
	852731	Other radio broadcast receivers, combined with sound recording or reproducing apparatus	50	20	15
	852732	Other radio broadcast receivers, combined with sound recording or reproducing apparatus bt with clock	50	20	15
	852739	Other radio broadcast receivers, not combined with sound recording or reproducing apparatus nor clock	50	20	15
8528	852810	Television receivers, color (including receivers incorporating radiobroadcast), with sound or video rec	50	-	-
	852820	Television receivers, black & white or other monochrome (include rec inc radiobroad) with sound or vid rec	50	-	-
	852821	Video monitors, color	-	20	15
	852822	Video monitors, black & white or other monochrome	-	20	15
	852830	Video projectors	-	3	1
8529	852910	Television receiving set antennae	10	3	0
	852990	Parts, excluding antennae, for transmission, radar, radio, television, etc. nesoi	50	7	0
8536	853610	Glass fuses for television & radio receivers	30	3	1
	853690	Earphone/headphone jacks for television or radio receivers, junction blocks/ink box for automotive wiring hrn.	10	0	0
8540	854011	Color television picture tubes, cathode-ray (including video monitor cathode-ray tubes) (No.)	20	3	1
	854012	Black & white or other monochrome television picture tubes, cathode-ray (No.)	40	20	15
	854020	Television camera tubes; image converter & intensifier	20	3	3
	854030	Other cathode-ray tubes, n.e.s.	20	3	-
	854040	Data/graphic display tubes, colour, with a phosphor dot screen pitch smaller than 0.4 mm	-	3	3
	854050	Data/graphic display tubes, black & white or other monochrome	-	3	3

Source: Tariff Commission

Appendix Table 3. Tariff Rates, Electronics, US, 2004

HS (4-Digit)	HS (6-Digit)	Product Description	2004
Components/Devices (Semiconductors)			
8504	850410	Ballasts for discharge lamps or tubes	3
	850431	Transformers Nesoi, Power handling capacity nov 1kVA	6.6
	850440	Static converters (e.g., rectifiers) (Gross kg)	0
	850450	Other inductors (GK)	3
	850490	Inductor parts (Gross kg)	0
8518	851890*	Parts including printed circuit assemblies for products falling within the Information Technology Agreement	0
8531	853120	Indicator panels incorporating liquid crystal devices (LCD) or light emitting diodes (LED) (No.)	0
8532	853210	Fixed capacitors, 50-60 hz, power, capacity => 0.5 KVAR	0
	853221	Tantalum fixed capacitors	0
	853222	Aluminum electrolytic fixed capacitors (Gross kg)	0
	853223	Ceramic dielecric fixed capacitors, single-layer (Gross kg)	0
	853224	Ceramic dielecric fixed capacitors, multi-layer (Gross kg)	0
	853225	Paper or plastic dielectric fixed capacitors (Gross kg)	0
	853229	Fixed capacitors, nesoi	0
	853230	Variable or adjustable (pre-set) capacitors	0
	853290	Parts of electrical capacitors (Gross kg)	0
8533	853310	Fixed carbon resistors, composition or film types (Gross kg)	0
	853321	Fixed resistors for a power handling capacity not exceeding 20 W (Gross kg)	0
	853329	Other fixed resistors, n.e.s. (Gross kg)	0
	853331	Wirewound variable resistors, < 20 W	0
	853339	Other wirewound variable resistors (including rheostats & potentiometers) (Gross kg)	0
	853340	Variable resistors (inclucing rheostats & potentiometers) nesoi	0
	853390	Parts for the electrical resistors of subgroup 772.3 (Gross kg)	0
8534	853400	Printed circuits	0
8536	853641	Relays for a voltage not exceeding 60 V	2.7
	853649	Relays for a voltage exceeding 60 V (Gross kg)	2.7
	853650	Electric switches for voltage not over 1000 V, nesoi	2.7
	853669*	Audio/video sockets & cathode ray tube (CRT) sockets for TV or radio receivers	0
8540	854071	Magnetrons (No.)	0
	854072	Klystrons (No.)	3.3
	854079	Other microwave tubes (excluding grid-controlled tubes) other values & tubes	3.7
	854081	Receiver or amplifier values & tubes (No.)	4.2
	854089	Other electronic valves & tubes, n.e.s. (No.)	3.7
	854091	Parts of cathode ray tubes	5.4
	854099	Parts, n.e.s., of the electronic tubes & valves of subgroups 776.1 & 776.2 (Gross kg)	0
8541	854110	Diodes, not photosensitive nor light emitting diodes (Gross kg)	0
	854121	Transistors excluding photosensitive, dissipation rate < 1 W (Gross kg)	0
	854129	Transistors excluding photosensitive, dissipation rate > 1 W (Gross kg)	0
	854130	Thyristors, diacs & triacs excluding photosensitive devices (Gross kg)	0
	854140	Photosensitive semiconductor device including photovoltaic cell, etc.	0
	854150	Other semiconductor devices (Gross kg)	0
	854160	Piezo-electric crystals, mounted (Gross kg)	0

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	854190	Parts for diodes, transistors & similar semiconductors	0
8542	854212	Cards incorporating electronic integrated circuits (Smart Cards)	0
	854213	Metal Oxide Semiconductors (MOS Technology)	0
	854214	Circuits obtained by bipolar technology	0
	854219	Other monolithic digital integrated circuits	0
	854230	Non-digital monolithic integrated units (Gross kg)	0
	854240	Hybrid integrated circuits (Gross kg)	0
	854250	Other electronic integrated circuits & micro assemblies (Gross kg)	0
	854290	Parts of electronic integrated circuits & micro assemblies (Gross kg)	0
9022	902230	X-ray tubes	0.9
9108	910813*	Goldwire for use in the manufacture of semiconductor devices	*
Electronic Data Processing			
8471	847110	Analogue or hybrid+(analogue-digital) automatic data processing machines	0
	847120	Digital automatic data processing machines containing in the same housing	0
	847130	Portable digital automatic processing machines, weighing not > 10 kg	0
	847149	Digital automatic data processing machines, presented in the form of systems	0
	847150	Digital processing units which may contain same housing	0
	847160	Input or output units, whether or not presented with the rest of a system & whether or not in same housing	0
	847170	Storage units, whether or not presented with the rest of a system	0
	847180	Automatic data processing units, nesoi	0
	847190	Adp mac & units thereof; mag/opt rder, transcrb, proc dat	0
8473	847330	Parts & accessories for adp machines & units	0
8523	852311	Computer magnetic tapes for sound recording, of a width < 4 mm	0
	852312	Computer magnetic tapes for sound recording, of a width > 4 mm but not < 6.5 mm	0
	852313	Computer magnetic tapes for sound recording, of a width > 6.5 mm	0
	852320	Computer magnetic discs & diskettes, unrecorded	0
Office Equipment			
8469	846910	Automatic typewriters & word-processing machines	0
8470	847010	Electronic calculators capable of operation without an external source of electric & pocket-size data rec	0
	847021	Electronic calculating machines incorporating a printing device	0
	847029	Electornic calculating machines, not incorporating a printing device	0
	847030	Other calculating machines, n.e.s.	0
	847040	Accounting machines (including bookkeeping machines)	0
	847050	Cash registers incorporating a calculating device (No.)	0
	847090	Postage-franking machines & similar machines with calculating machines	0
8472	847290	Automatic banknote dispensers/automatic teller machines	0
8473	847310	Typewriter & word processing machine parts & accessories	0
	847321	Parts of electornic calculating machines	0
	847329	Parts for machines, nesoi, incorporating calculating device	0
	847340	Parts & accessories of office machines, nesoi	0
	847350	Parts suitable for use with machines of two or more head	0
9009	900911	Electrostatic photo-copying apparatus operating by reproducing original ontothe copy (direct process)	0
	900912	Electorstatic photo-copying apparatus opreating by reproducing original via an intermediate onto the copy	3.7
	900990	Parts & accessories of photo-copying apparatus	*

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Medical/Industrial Instrumentation			
8530	853010	Electric signaling, safety or traffic control equipment for railways & tramways	0
	853080	Electric signaling, safety or traffic control equipment for roads, inland water-ways, parking facilities, etc.	0
	853090	Parts for electric signaling, traffic, safety equipment	0
8531	853110	Burglar or fire alarms & similar apparatus	1.3
	853180	Electric sound or visual signaling apparatus, nesoi	1.3
	853190	Parts of electric sound or visual signaling apparatus (Gross kg)	0
8543	854320	Signal generators	2.6
9018	901811	Electrocardiographs, & parts & accessories	0
	901812	Ultrasonic scanning apparatus	0
	901813	Magnetic resonance imaging apparatus	0
	901814	Scintigraphic apparatus	0
	901819	Electro-diagnostic apparatus nesoi, & parts etc.	0
	901820	Ultra-voilet or infra-red ray apparatus (No.)	0
	901829*	Parts & accessories of ultra-violet or infra-red ray apparatus (Gross kg)	*
9021	902140	Hearing aids (excluding parts & accessories) (No.)	0
	902150	Pacemakers for stimulating heart muscles (excluding parts & accessories) (No.)	0
9022	902211	Apparatus based on the use of x-rays, for medical, surgical (dental) or veterinary uses	*
	902212	Computed tomography apparatus	0
	902213	Apparatus based on the use of x-rays for dental uses	0
	902219	Apparatus based on the use of x-rays, for other uses (No.)	0
	902221	Apparatus base of alpha, beta, radiation, medical, surgery etc.	0
	902229	Apparatus based on the use of alpha, beta or gamma radiations, for other uses (No.)	1
	902290	X-ray/high tension generator cntr pnl & desk examination/treatment tb parts	0.8
Control & Instrumentation			
9010	901010	Apparatus & equipment, automatic developing photo film	2.4
	901020	Other apparatus & equipment for photographic (including cinematographic) laboratories; negatoscopes (Gross kg)	*
	901090	Parts & accessories for the cinematographic apparatus & equipment	3.4
9011	901110	Stereoscopic microscopes (No.)	3.9
	901120	Other microscopes for photomicrography, cinephotomicrography or micro projection (No.)	3.9
	901190	Parts & accessories for compound optical microscopes	5.7
9012	901210	Microphones (other than optical microphones) & diffraction apparatus (No.)	3.5
	901290	Parts & accessories of microscopes (other than optical microscopes) & diffraction apparatus (Gross kg)	4.9
9016	901600	Balances, sensitivity >=5 CG, W or without weight, & parts	3.9
9017	901720	Other drawing, marking-out or mathematical calculating machines (No.)	3.9
9023	902300	Instruments, apparatus/models, designed for demonstration purposes, nes (No.)	0
9026	902610	Instruments & apparatus for measuring/checking flow/level of liquids (No.)	0
	902620	Other instruments & apparatus for measuring or checking pressure (No.)	0
	902680	Instruments measuring/checking variable liquids/gases, nesoi	0
9027	902720	Chromatographs & electrophoresis instrument (No.)	0
	902730	Spectometers, spectrophotometers & spectographs using optical radiations (UV, visible, IR) (No.)	0
	902740	Exposure meters (No.)	1.2
	902750	Instruments etc using optical radiations, nesoi	0
	902780	Instrument & apparatus for physical & chemical analysis, n.e.s. (No.)	0
	902790	Parts of instruments, physical/chemical analysis etc., nesoi	0
9030	903010	Instruments & apparatus for measuring or detecting ionizing radiations (No.)	1.6

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	903020	Cathode-ray oscilloscopes & cathode-ray oscillographs (No.)	1.7
	903031	Multimeters (No.)	1.7
	903039	Other instruments & apparatus, for measuring or checking voltage, current, resistance or power, w/o rec device	1.7
	903040	Other instruments, specially designed for telecommunication	0
	903081	Other instruments & apparatus for measuring or checking electrical quantities, nes, with rec device	*
	903089	Other instruments & apparatus for measuring or checking electrical quantities, nes, w/o rec device	1.7
	903090	Parts of instruments for measuring electrical quantities, alpha beta inzng rdt	1.6
9031	903190	Parts, of machines nesoi, and profile projector	2.5
9032	903220	Pressure regulators & controllers (manostats) (No.)	1.7
	903281	Hydraulic or pneumatic regulating or controlling instruments & apparatus (No.)	1.6
	903289	Other regulating or controlling instruments & apparatus (No.)	1.1
	903290	Parts & accessories for automatic regulating or controlling instruments & apparatus (Gross kg)	1.1
Communication & Radar			
8525	852510	Transmission apparatus for radio or television	0
	852520	Transmission apparatus incorporating reception apparatus	0
	852530	Televison cameras (No.)	2.1
8526	852610	Radar apparatus (No.)	0
	852691	Radio navigational aid apparatus	0
	852692	Radio remote control apparatus	4.9
8527	852790	Reception apparatus radio-telephone/telegraphic etc., nesoi	0
Telecommunications			
8517	851711	Line telephone sets with cordless handsets	0
	851721	Facsimile machines	0
	851722	Teleprinters	0
	851730	Telephonic or telegraphic switching apparatus	0
	851750	Other apparatus for carrier-current line systems or for digital line systems	0
	851780	Electric telephonic & telegraphic apparatus, nesoi	0
	851790*	Parts & accessories of other telephonic or telegraphic apparatus	0
8518	851830*	Line telephone handsets	0
8520	852020	Telephone answering machines	0
8522	852290	Parts & accessories of sound/video reproducing, record apparatus	2
8544	854411	Winding wire, of copper	3.5
	854419	Other winding wire	3.9
	854420	Co-axial cable & other co-axial conductors	5.3
	854441	Insulated electric conductors =< 80 V with cntrs	0
	854449	Insulated electric conductors =< 80 V, nesoi	0
	854451	Electrical conductors > 80 but =< 1000 V with cntrs	0
	854459	Electric conductors over 80 V not over 1000 V not fitted with connector	5.3
	854470	Insulated optical fiber cables with individually sheathed fibers	0
Automotive Electronics			
8512	851220	Electrical lighting/visual signaling equipment ex for bicycles	0
	851230	Electrical sound signaling equipment for motor vehicle	2.5
8527	852721	Radiobroadcast receivers for motor vehicles with rcos	2
	852729	Radiobroadcast receivers for motor vehicles, nesoi	4.4
8708	870839	Brakes & servo-brakes, & parts thereof (excluding mounted brake linings) of motor vehicles	2.5
Consumer Electronics			

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8479	847989	Vidoe tape rewinders	2.8
8517	851719	Videophones	0
8518	851810	Microphones & stands therefore	0
	851821	Single loudspeakers, mounted in their enclosures (No.)	4.9
	851822	Multiple loudspeakers, mounted in the same enclosure	4.9
	851829	Loudspeakers, nesoi	4.9
	851840	Audio-frequency electric amplifiers	0
	851850	Electric sound amplifier sets	4.9
8519	851910	Record-players, coin or disc-operated, not incorporating a sound recording device	0
	851921	Record-players without loudspeakers, not incorporating a sound recording device	0
	851929	Other record-players, not incorporating a sound recording device, n.e.s.	3.9
	851931	Turntables (record-decks), with automatic record changing mechanism, not incorporating a sound rec device	3.9
	851939	Other turntables (record-decks), not incorporating a sound recording device	0
	851991	Sound reproducing apparatus, cassette-type	*
	851992	Pocket-size cassette player	0
	851999	Sound reproducing apparatus except cassette, nesoi	0
8520	852033	Magnetic tape recorders, cassette-type, incorporating a sound reproducing device	0
	852039	Tape recorder/reproducers, nesoi	0
	852090	Magnetic sound recording or reproducing equipment, nesoi	0
8521	852110	Video recording or reproducing apparatus, magnetic tape-type	0
	852190	Other video recording or reproducing apparatus, whether or not incorporating a video tuner	0
8523	852330	Cards incorporating a magnetic stripe (Net kg)	0
	852390	Unrecorded magnetic media nesoi	0
8524	852410	Phonograph records, recorded media	1.8
	852422	Magnetic tapes, recorded, of a width > 4mm < 6.5 mm	*
	852431	Discs for laser reading systems, recorded, for reproducing phenomena other than sound or image	0
	852432	Discs for laser reading systems, recorded, for reproducing sound only	0
	852439	Discs for laser reading systems, nesoi	0
	852440	Magnetic tapes, recorded, for reproducing phenomena other than sound or image (Gross kg)	0
	852451	Magnetic tapes, recorded, of a width < 4 mm	0
	852453	Magnetic tapes, recorded, of a width > 6.5 mm	0
	852460	Cards incorporating a magnetic stripe, recorded (Net kg)	0
	852491	Other recorded media for reproducing phenomena other than sound or image	0
	852499	Recorded media for reproducing sound or image, nesoi	0
8525	852540	Still image video cameras & other video camera recorder	0
8527	852712	Pocket-size radio cassette players	0
	852713	Other radio broadcast receivers capable of operating without an external source of power	0
	852719	Radio broadcast receivers capable of operating without an external source of power	0
	852731	Other radio broadcast receivers, combined with sound recording or reproducing apparatus	4.9
	852732	Other radio broadcast receivers, combined with sound recording or reproducing apparatus bt with clock	0
	852739	Other radio broadcast receivers, not combined with sound recording or reproducing apparatus nor clock	3
8528	852810	Television receivers, color (including receivers incorporating radiobroadcast), with sound or video rec	*
	852820	Television receivers, black & white or other monochrome (include rec inc radiobroad) with sound or vid rec	*
	852821	Video monitors, color	0
	852822	Video monitors, black & white or other monochrome	5
	852830	Video projectors	0

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8529	852910	Television receiving set antennae	1.8
	852990	Parts, excluding antennae, for transmission, radar, radio, television, etc. nesoi	3.2
8536	853610	Glass fuses for television & radio receivers	2.7
	853690	Earphone/headphone jacks for television or radio receivers, junction blocks/ink box for automotive wiring hrn.	0
8540	854011	Color television picture tubes, cathode-ray (including video monitor cathode-ray tubes) (No.)	15
	854012	Black & white or other monochrome television picture tubes, cathode-ray (No.)	3.6
	854020	Television camera tubes; image converter & intensifier	6
	854030	Other cathode-ray tubes, n.e.s.	3.3
	854040	Data/graphic display tubes, colour, with a phosphor dot screen pitch smaller than 0.4 mm	3
	854050	Data/graphic display tubes, black & white or other monochrome	3

Source: United States International Trade Commission (http://hotdocs.usitc.gov/tariff_chapters_current/toc.html)