# A Study of the Information Technology Trade between the United States and Asia-Pacific Economic Cooperation Nations 

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#### Abstract

This study examines the import and export of information technology between the United States and member nations of the Asia-Pacific Economic Cooperation. The countries are Australia, Brunei, Canada, Chile, China, Hong Kong, Indonesia, Japan, Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, Philippines, Russian Federation, Singapore, South Korea, Taiwan, Thailand, and Viet Nam. The information technology products include computer and peripheral equipment (3341), Communications Equipment (3342), Audio and Video Equipment (3343), and Semiconductor and Other Electronic Component (3344). In the last ten years, the trade balances between these twenty nations and United States have become increasingly undesirable. Put simply, the United States is purchasing more information technology from member nations of the Asia-Pacific Economic Cooperation than these nations are importing. This trend is especially troubling because the United States is a leading provider of information technology products and services. However, it appears that the United States has lost its niche and the deficit is even increasing at a fairly large rate.


Keywords: global trade, information technology products, import, export, trade balance

## 1. INTRODUCTION

Trade is a concept that has existed for over thousands of years. In essence, trade in-
volves that exchanging of goods or services between people, states, and nations. Trade is designed to capitalize on resources that are available and cheapest to produce, in
exchange for products or services that available resources can't produce or exceed the cost of production. The same concept applies when trading among nations occurs. Trade is a crucial and important aspect of one's nation to obtain products from other nations that they are unable to produce themselves. Free and open trading helps many economies to grow, to support goods jobs at home, help raise the standards of living, and help provide affordable goods and services to those involved in the trade (US Trade Representative, Trade Delivers, 2006, p. 1).

Among the many nations that form free trade groups, the United States is trade partners with a group of countries called Asia-Pacific Economic Cooperation (APEC). These include Australia, Brunei, Canada, Chile, China, Hong Kong, Indonesia, Japan, Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, Philippines, Russian Federation, Singapore, South Korea, Taiwan, Thailand, and Viet Nam. "APEC is an association of 21 economies bordering the Pacific Ocean who are working cooperatively to reduce barriers to trade and investment; ease the exchange of goods, services, resources ,and technical know-how; and strengthen economic and technical cooperation" (Nanto, 2001, p.2). Unlike the World Trade Organization (WTO) and other trade groups, APEC does not impose treaty obligations, all decisions are made by consensus, and commitments are on a voluntary basis. (Asia-Pacific Economic Cooperation, Fact Sheet, 2008) APEC members "account for more than a third of the world's population (2.6 billion people), over 50\% of the worlds GDP (US\$ 19,254), and in excess of $41 \%$ of world trade." (Asia-Pacific Economic Cooperation, Fact Sheet, 2008) The effect that APEC has had on open free trade, leads to better competition and lower prices. For example, as Panagariya (2003) pointed out, "Openness to trade promotes growth in a variety of ways. Entrepreneurs are forced to become increasingly efficient since they must compete against the best in the world to survive." (Panagariya, 2003, p. 21) Open trading also helps lower the cost of producing products or services, which in turn reduce the price of those goods, providing a win-win situation for all those involved. Trade also helps to create more and better jobs, within one's own country. As indicated by the Of-
fice of the United States Trade Representative, "Manufactured exports support more than 1 in 6 manufacturing jobs, and an estimated 5.2 million jobs in the U.S." (Dept. of Commerce, qtd. in ustr.gov)

However, there are those who believe that open free trade will hurt the jobs among the U.S. workforce. It is not to say that they are wrong, as Ben Bernanke (2005) indicated in his speech titled Embarrassing the Challenge of Free Trade: Competing and Prospering in a Global Economy, "The expansion of trade or changes in trading patterns can indeed destroy specific jobs." (p. 4) He mentioned an example that his home town of South Carolina was experiencing a loss of jobs in the textiles industry due to the overwhelming increase of competition in international trading. There are also those who fear that open free trading will lead to many U.S. jobs to be outsourced to other countries. With new advancements in technology and better communication between trading nations the fear of losing those jobs only grows more intense. But as Bernanke added in his speech regarding outsourcing jobs, he stated that just as U.S. firms move to other countries, foreigners also move jobs to the United States accounting for 1 million jobs in 2004 (U.S. Board of Governors, 2007, p. 4).

## 2. STATEMENT OF PROBLEM

The main problem is that the United States imports more than it exports (Balance of Trade). For example, "In 2006, Americans bought 1,928 billion of goods and services produced in foreign countries. In the same year, American sales of goods and service to foreigners amounted to only $\$ 1,304$ billion." (Crane, Crowley \& Quayyum, 2007, p. 2) Because the U.S. has a large trade deficit, it indicates that the "U.S. is borrowing from foreigners to finance its consumption of imports" (Crane, Crowley \& Quayyum, 2007, p. 2). This would indicate the U.S. owes foreign investors roughly 290 billion dollars.

Second, open and free trading has affected the number of IT jobs available. Many of these jobs have been outsourced to India, China, and South America where the salaries are much lower. It is estimated that some 16 million private sector jobs in the U.S. were lost due to international trade (U.S. Board of Governors, 2007, p. 3).

Finally, the weak U.S. Dollar has also affected imports, exports, and balance of trade within the information technology (IT) sector. Global clients are looking for substitutes from other sources. In cases where close substitutes are not available, global clients have also resorted to limiting the demand for new innovations or simply by delaying their adoption of the technology to reduce operating cost.

## 3. STATEMENT OF OBJECTIVE

The objective of this study is to examine the information technology trade between the U.S. and APEC countries (Australia, Brunei, Canada, Chile, China, Hong Kong, Indonesia, Japan, Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, Philippines, Russian Federation, Singapore, South Korea, Taiwan, Thailand, and Viet Nam). Specifically, this research analyzes the import, export and balance of trade of four IT products (3341, 3342, 3343, and 3344) from 1998 to 2007. According to the U.S Census Bureau the description of each individual product is as follows:

3341 Computer and Peripheral Equipment Manufacturing: This industry group comprises establishments primarily engaged in manufacturing and/or assembling electronic computers, such as mainframes, personal computers, workstations, laptops, and computer servers; and computer peripheral equipment, such as storage devices, printers, monitors, input/output devices and terminals. Computers can be analog, digital, or hybrid.
3342 Communications Equipment
Manufacturing: This industry group comprises establishments primarily engaged in one or more of the following manufacturing activities such as telephone equipment; radio and television broadcasting and wireless communications equipment; and other communications equipment.
3343 Audio and Video Equipment Manufacturing: This industry group comprises establishments primarily engaged in manufacturing electronic audio and video equipment for home entertainment, motor vehicle, public address and musical instrument amplifications. Examples of products made by these establishments are video cassette recorders, televisions, stereo equipment, speaker systems, household-
type video cameras, jukeboxes, and amplifiers for musical instruments and public address systems.
33443344 Semiconductor and Other Electronic Component Manufacturing: This industry group comprises establishments primarily engaged in manufacturing semiconductors and other components for electronic applications. Examples of products made by these establishments are capacitors, resistors, microprocessors, bare and loaded printed circuit boards, electron tubes, electronic connectors, and computer modems" (U.S. Census Bureau, 2002, p. 4).

According to the U.S. Census Bureau, "The Computer and Electronic Product Manufacturing industries have been combined in the hierarchy of NAICS because of the economic significance they have attained. Their rapid growth suggests that they will become even more important to the economies of all three North American countries in the future, and in addition their manufacturing processes are fundamentally different from the manufacturing processes of other machinery and equipment." (U.S. Census Bureau, 2002, p. 3) Therefore this research specifically studies products $3341,3342,3342$, and 3344.
The primary issue for this study includes identifying patterns, cycles, and trends of trade between the countries within APEC and the United States over the last ten years. By looking at the data set, the least and most important trading partners within APEC, in relation to the imports, exports, and balances of trade of information technology products with the United States, are also identified.

The outcomes of this study would provide some understanding about the underlying of economic effects that trade in the computer industry with the APEC countries has had on the U.S. in the last ten years, as well as the future implications that could potentially occur if the given trade is allowed to continue. By identifying patterns of trade with APEC and the United States, policy makers are better prepare with managing and predicting future outcomes of trade in the years to come. Moreover, the computed information such as the change in volume and slope over a ten year period can also be used to identify those individual countries that have the most and least impact to the United States
in the past and use the information to develop policies for a more competitive future.

## 4. METHODOLOGY

The ten-year data on the imports and exports for the four products between the APEC and the US were collected from the International Trade Administration of the Department of Commerce website. Analyses performed for this study include:

1. For each product, the 10-year totals on import and on export are first computed for each country.
2. Each country is ranked based on the computed total.
3. The total rate of change (the slope) for each product over the ten-year period is also computed.
4. Each country is ranked based on the computed slope.

## 5. FINDINGS

Tables 1 through 4 display the ten-year totals in imports, exports and balance of trade of the four information technology products, namely 3341 through 3344 between the individual countries within APEC and the U.S. from 1998 to 2007. In the case of product 3341 (Table 1), the U.S. imported the least amount of products from Brunei, with a total of $\$ 43,000$. China imported the highest amount, $\$ 207,144,800,000$ to the U.S. Viet Nam ranks the highest in terms of slope with a rate of change of $81,616.67$. Taiwan ranks the lowest in terms of slope with a rate of change of 0.28 . The U.S. exported the least amount of products to Papua New Guinea, with a total amount of $\$ 12,565,000$, and the most to Canada, with a total amount of $\$ 78,247,778,000$. Viet Nam ranks the highest in terms of slope with a rate of change of 10.00. Papua New Guinea ranks the lowest in terms of slope with a rate of change of 0.19 . Canada contributes the best balance of trade with a total of $\$ 65,794,219,000$ while China contributes the worst balance of trade with a total of $\$ 192,537,649,000$. In terms of rate of change, Viet Nam ranks the lowest with 25.11, whereas China ranks the highest with a slope of 12.04 .

As seen In the Table 2, the least amount of product 3342 was imported from Papua New Guinea, with a total of $\$ 10,000$. China imported the highest total amount of product to the U.S., $\$ 85,387,027,000$. Singapore ranks the highest in terms of slope with a rate of change of 21.79 . Brunei, Papua New Guinea and Viet Nam all had a zero rate of change.

The least amount of products exported was to Papua New Guinea, with a total amount of $\$ 12,045,000$ whereas the most was exported to Canada, with a total amount of $\$ 28,668,045,000$. Malaysia ranks the highest in terms of the rate of change, 3.72 while the Russian Federation ranks the lowest with 0.17 . As far as the balance of trade is concerned, Australia contributes the best balance of trade with a total of $\$ 3,654,357,000$. China, on the other hand, contributes the worst balance of trade with a total of $-\$ 78,024,900,000$. China ranks the highest in terms of slope with a rate of change of 18.39 whereas Vietnam ranks the lowest with 0.005 .

Table 3 shows the imports, exports, and the trade balance of product 3343 between the individual countries within APEC and the U.S. over the ten-year period. The findings are equally interesting. The United States imported a total of $\$ 7,000$, the least amount of products from Papua New Guinea and imported the highest amount of products from China, with a total amount of $\$ 105,965,992,000$. Viet Nam ranks the highest in terms of slope with a rate of change of $9,492.38$. Malaysia ranks the lowest in terms of slope with a rate of change of 0.65 .
U.S. exported the least amount of products to Papua New Guinea, with a total of $\$ 1,138,000$, and the most to Canada, with a total amount of $\$ 20,047,631,000$. Viet Nam ranks the highest in terms of slope with a rate of change of 2.98 while Papua New Guinea has the lowest rate of change of 0.37.

Canada contributes the best balance of trade with a total amount of $\$ 18,763,866,000$. China contributes the worst balance of trade with a total amount of -\$104,420,208,000. Viet Nam had the lowest rate of change of 63.68 while China had the fastest rate of change of 4.43.

Table 4 shows the imports, exports, and trade balance of product 3344 between the individual countries within APEC and the U.S. from 1998 to 2007. The findings shared many similar trends with the other three products. Again the United States imported the least amount of products from Papua New Guinea, with a total of $\$ 723,000$. The U.S. imported the highest amount of products from Japan, with a total of $\$ 90,758,414,000$. Viet Nam ranks the highest in terms of slope with a rate of change of 60.10. Hong Kong ranks the lowest in terms of slope with a rate of change of 0.18 .

Once again, the United States exported the least amount of products to Papua New Guinea, with a total of $\$ 7,649,000$. The U.S. exported the highest amount of products to Mexico, with a total of $\$ 112,052,414,000$. China ranks the highest in terms of slope with a rate of change of 10.22 , and Papua New Guinea ranks the lowest in terms of slope with a rate of change of 0.20 .
Mexico contributes the best balance of trade with a total of $\$ 50,506,324,000$. Japan contributes the worst balance of trade with a total amount of $-\$ 5,392,071$. Singapore ranks the highest in terms of slope with a rate of change of 32.84 . Philippines ranks the lowest in terms of slope with a rate of change of -0.74 .

## 6. CONCLUSIONS

The overall balance of trade between APEC and the U.S. for product 3341 has increasingly maintained a negative balance for exceeding ten years, and implies the negative balance of trade trend to continue on its current path. Based on the inclination of its continuous diminishing balance of trade throughout the last ten years, our findings also conclude the same implications for the future overall balance of trade for product 3342. According to the findings on product 3343 the results also show a continuous negative path, which indicates that the negative slope will continue. Although product 3344 also maintains a continually negative balance, it is the only product to have a positive slope. We can conclude that the future balance of trade of product 3344 could potentially become balanced. Of the NAICS 334 products, product 3344 displays the on-
ly prospective positive investment for the United States.

Based on our findings and are given limitations, we can conclude the overall balance of trade per IT related products between the U.S. and APEC on average has had a continuous negative slope and implies the negative trade trend to continue for future year to come. The National Trade Deficit will continue to increase stating that the U.S. will continue; "borrow from foreigners to finance its consumption of imports" (Crane, Crowley \& Quayyum, 2007, p. 2). Based on the fact that the trade deficit continues to increase by the minute, foreign investors will potentially be reluctant to invest in the United States in fear of not being compensated for their investments.

Implications for future studies suggest a more in depth look toward the balance of trade per multiple trade organizations as well as the individual countries the United States trades with. Further direction of the study should include the underlying economic factors that the National Trade Deficit implies.

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Appendix
Table 1 Import and Export of 3341 (in Thousands)

|  | Import 3341 |  |  |  | Export 3341 |  |  |  | Balance of Trade 3341 |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Ten-year Total | Rank | Slope | Rank | Ten-year Total | Rank | Slope | Rank | Ten-year Total | Rank | Slope | Rank |
| Australia | \$402,286 | 7 | 0.63 | 7 | \$8,879,979 | 13 | 0.93 | 8 | \$8,477,693 | 18 | 0.92 | 11 |
| Brunei | \$43 | 1 | 0 | 1 | \$17,137 | 2 | 0.33 | 2 | \$17,095 | 13 | 0.33 | 7 |
| Canada | \$12,453,560 | 11 | 0.83 | 10 | \$78,247,778 | 20 | 1.07 | 11 | \$65,794,219 | 20 | 1.14 | 13 |
| Chile | \$12,921 | 5 | 15.37 | 19 | \$3,883,873 | 9 | 1.95 | 15 | \$3,870,950 | 17 | 1.94 | 17 |
| China | \$207,144,800 | 20 | 10.15 | 17 | \$14,607,148 | 15 | 2.45 | 18 | -\$192,537,649 | 1 | 12.04 | 20 |
| Hong Kong | \$1,820,614 | 9 | 0.96 | 11 | \$14,907,283 | 16 | 1.02 | 10 | \$13,086,668 | 19 | 1.03 | 12 |
| Indonesia | \$4,123,923 | 10 | 1.45 | 14 | \$494,501 | 4 | 1.82 | 14 | -\$3,629,423 | 10 | 1.38 | 15 |
| Japan | \$87,271,834 | 19 | 0.51 | 5 | \$32,590,372 | 18 | 0.49 | 3 | -\$54,681,458 | 3 | 0.52 | 8 |
| Malaysia | \$72,641,423 | 18 | 3.45 | 16 | \$7,546,997 | 11 | 0.95 | 9 | -\$65,094,427 | 2 | 4.24 | 19 |
| Mexico | \$66,981,872 | 16 | 1.64 | 15 | \$55,555,941 | 19 | 2.22 | 16 | -\$11,425,930 | 9 | 0.27 | 4 |
| New Zealand | \$63,038 | 6 | 11.00 | 18 | \$931,887 | 5 | 0.83 | 7 | \$868,847 | 14 | 0.67 | 9 |
| Papua New Guinea | \$138 | 2 | 0 | 1 | \$12,565 | 1 | 0.19 | 1 | \$12,427 | 12 | 0.19 | 2 |
| Peru | \$4,400 | 3 | 0.71 | 8 | \$1,780,984 | 7 | 1.69 | 13 | \$1,776,585 | 16 | 1.69 | 16 |
| Philippines | \$15,353,450 | 12 | 0.72 | 9 | \$1,789,118 | 8 | 0.76 | 6 | -\$13,564,333 | 8 | 0.71 | 10 |
| Russian Federation | \$7,267 | 4 | 1 | 12 | \$1,465,011 | 6 | 2.31 | 17 | \$1,457,744 | 15 | 2.32 | 18 |
| Singapore | \$72,515,644 | 17 | 0.40 | 4 | \$18,091,917 | 17 | 0.72 | 5 | -\$54,423,726 | 4 | 0.32 | 6 |
| South Korea | \$25,587,128 | 14 | 0.55 | 6 | \$10,172,642 | 14 | 1.10 | 12 | -\$15,414,487 | 7 | 0.30 | 5 |
| Taiwan | \$53,850,161 | 15 | 0.28 | 3 | \$7,729,219 | 12 | 0.64 | 4 | -\$46,120,941 | 5 | 0.23 | 3 |
| Thailand | \$25,206,332 | 13 | 1.39 | 13 | \$5,455,908 | 10 | 3.74 | 19 | -\$19,750,426 | 6 | 1.17 | 14 |
| Viet Nam | \$665,158 | 8 | 81,616.67 | 20 | \$267,401 | 3 | 10.00 | 20 | -\$397,758 | 11 | -25.11 | 1 |
| Total | \$646,105,992 |  |  |  | 64,427,661 |  |  |  | \$381,678,330 |  |  |  |

Table 2 Import and Export of 3342 (in Thousands)


Proc CONISAR 2008, v1 (Phoenix): §3333 (refereed)
Table 3 Import and Export of 3343 (in Thousands)



Proc CONISAR 2008, v1 (Phoenix): §3333 (refereed)

