RIETI Discussion Paper Series 15-E-016

Enjoying the Fruits of their Labor: Redirecting exports to Asian consumers

THORBECKE, Willem
RIETI

RIETI
Research Institute of Economy, Trade & Industry, IAA

The Research Institute of Economy, Trade and Industry
http://www.rieti.go.jp/en/

RIETI Discussion Paper Series 15-E-016
February 2015

Enjoying the Fruits of their Labor: Redirecting exports to Asian consumers[1]

Willem THORBECKE*
Research Institute of Economy, Trade and Industry

Abstract

There has been an explosion of parts and components traded within East Asian production networks. China has emerged as the final assembly point for the goods produced. These goods then flow primarily outside of the region. When the Global Financial Crisis (GFC) occurred, the decrease in Western demand led to a synchronized decline in Asian exports. If more final goods could flow to Asian consumers, this would provide insurance against another slowdown in the rest of the world. This paper uses a gravity model to investigate if emerging Asia is importing fewer consumption goods than predicted. The results indicate that, after the GFC, China and the Association of Southeast Asian Nations (ASEAN) have imported more final goods than expected. Nevertheless, the ratio of China's imports per capita relative to gross domestic product (GDP) per capita remains much lower than the corresponding ratio for other countries. This highlights the need to address structural issues such as tariffs that can lead to the under-importing of final goods.

Keywords: Production networks, Gravity models, Consumption
JEL classification: F13, F14

[1]This study is conducted as a part of the Project "East Asian Production Networks, Trade, Exchange Rates, and Global Imbalances" undertaken at Research Institute of Economy, Trade and Industry(RIETI).
Acknowledgement: I thank many colleagues including Masahisa Fujita, Minoru Kaneko, Atsuyuki Kato, Masayuki Morikawa, Yuji Muranaga, Atsushi Nakajima, Keiichiro Oda, Keisuke Kondo, and especially Takatoshi Ito for very valuable comments. Any errors are my own responsibility.
* Willem Thorbecke, Senior Fellow, Research Institute of Economy, Trade and Industry
1-3-1 Kasumigaseki, Chiyoda-ku, Tokyo, 100-8901 Japan
Tel.: + 81-3-3501-8248; Fax: +81-3-3501-8414; E-mail: wthorbec@gmu.edu

1. Introduction

The value of intermediate goods traded between East Asian countries increased 40 times between 1980 and 2012. In 2012 more than $450 billion in intermediate goods were traded within the region.[1] This explosion in intra-regional trade reflects the development of intricate production networks. Firms have exploited comparative advantage by slicing up production processes and allocating the production modules to different locations based on differences in factor endowments across the fragmented production blocks (see Kimura and Ando, 2005).

This slicing up of the value chain began in earnest after the yen appreciated 60% following the Plaza Accord in September 1985. Japanese multinational enterprises lost their price competitiveness and responded by shifting labor-intensive activities to the Republic of Korea (henceforth, Korea) and Taipei,China. However, in the late 1980s both wages and exchange rates in these economies skyrocketed. The locational advantage of assembling labor-intensive goods in the newly industrialized economies declined, and Japanese firms transferred production to the Association of Southeast Asian Nations **(**ASEAN) countries. Surplus labor in ASEAN held wages down, and exchange rates in these countries were pegged at competitive levels relative to the US dollar. After the People's Republic of China (PRC) joined the World Trade Organization in 2001, there was a surge in foreign direct investment (FDI) and parts and components exports from East Asian countries to the PRC. The PRC's WTO accession gave foreign investors confidence that the PRC would sustain an FDI-friendly environment. The PRC quickly became the final assembly point of intricate production and distribution networks. It

[1] These data come from the CEPII-CHELEM database. East Asia includes Japan, Malaysia, Indonesia, Korea, the PRC, Singapore, Taipei,China, and Thailand. 49 percent of the $450 billion of intermediate goods traded in 2012 comes from electronic components; 20 percent from engines, vehicle components, and rubber items such as tires; 11 percent from miscellaneous hardware; 6 percent from yarns and fabrics; and the rest from paints, paper, tubes, plastics, metallic structures, wood articles, and fertilizers.

imported hundreds of billions of dollars of parts and components from East Asia and exported the final assembled products throughout the world.

The surge in final goods exports from the PRC has been breathtaking. Its exports of computers, consumer electronics goods, and telecommunications equipment increased more than 70 times between 1993 and 2012 and equaled $500 billion in 2012. In 1993 2.5 percent of the world's exports of these electronics goods came from the PRC whereas in 2012 43 percent of the world's exports of these goods came from the PRC. The next leading exporting country in 2012 exported only 5 percent of the world's final electronics goods.[2]

Athukorala (2014) documented that, while intermediate goods trade in East Asia has exploded, demand for final goods produced within production networks comes primarily from outside of the region. He found that the PRC did not provide a cushion against export contraction during the Global Financial Crisis (GFC). He also observed that the decrease in demand in the rest of the world during the GFC caused a synchronized trade contraction in East Asia.

Figure 1a shows the share of final electronics goods going to East Asia and outside of East Asia.[3] The figure shows that more than 80 percent of these goods flow outside of the region, and that East Asia's share has not been increasing. Figure 1b shows that the share going to North America has increased since to GFC to about 36 percent. The share going to Europe has fallen since the crisis to 23 percent. The share going to other countries has increased steadily and now exceeds the share going to Europe.

Exports within Asian production networks are more sensitive to demand shocks caused by events such as the GFC then to supply shocks caused by events such as the Great East Japan

[2] These data come from the CEPII-CHELEM database.
[3] East Asia in the figure includes Japan, Malaysia, Indonesia, Korea, the PRC, Singapore, Taipei,China, and Thailand.

Earthquake or the Thai flooding that began in 2011. This is clear in Figures 2a and 2b. The figures present data on the volume of Japanese exports of automobile parts and semiconductors. These are two of the main categories of Japanese parts and components exports within regional production networks. Following the GFC, exports of both categories fell by more than 70 percent and took almost two years to return to pre-crisis levels. By contrast, the drops in exports following the Great East Japan Earthquake and the Thai floods were an order of magnitude smaller and the recoveries rapid. Ando and Kimura (2012) have presented careful evidence indicating that the GFC had a prolonged effect of Japanese exports whereas the earthquake did not.

One lesson of the GFC is that it would be desirable for regional production networks to decouple from final demand in the West. The Ministry of Economy, Trade and Industry (METI) (2009) reported that there are 930 million people in Asia who are in the middle class or above. Thus, there is a huge potential for demand by Asian consumers to function as a second engine of growth. Channeling more final goods to the region would also allow Asian workers to enjoy more of the fruits of their own labor.

This paper investigates whether the countries involved in East Asian production networks are importing fewer final goods than one would expect. The key economies involved in these regional supply chains are Japan, Korea, Malaysia, the Philippines, the PRC, Singapore, Taipei,China, and Thailand. To examine whether they are importing fewer consumption goods than expected, the gravity model is employed. This model is a workhorse for estimating bilateral trade flows. Traditional gravity models, as developed by Tinbergen (1962), posit that bilateral trade between two countries is directly proportional to GDP in the two countries and inversely proportional to the distance between them. As Leamer and Levinsohn (1995) and Baltagi,

Egger, and Pfaffermayr (2014) discussed, gravity models yield some of the clearest and most robust findings not only in international economics but in all of economics. This model is thus used to predict consumption goods imports by Asian countries.

The results indicate that actual consumption imports into China and ASEAN have increased relative to their predicted values and in 2012 were more than predicted by the gravity model. Thus emerging Asia is redirecting final goods to the region.

The evidence reported below also indicates that more progress is necessary. This paper thus considers how to redress structural factors such as trade barriers that can impede consumption imports.

The next section presents the data and methodology. Section 3 presents the results. Section 4 contains a discussion. Section 5 concludes.

2. Data and Methodology

The gravity model is a workhorse for estimating bilateral trade flows. As developed by Tinbergen (1962), gravity models posit that bilateral trade between two countries is directly proportional to GDP in the two countries and inversely proportional to the distance between them. In addition to GDP and distance these models typically include other factors affecting bilateral trade costs such as whether trading partners share a common language. The model takes the form:

$$Ex_{ijt} = \beta_0 + \beta_1 Y_{it} + \beta_2 Y_{jt} + \beta_3 DIST_{ij} + \beta_4 LANG_{ij} + \beta_5 RER_{ijt} + \partial_i + \Omega_j + \pi_t + \varepsilon_{ijt} \qquad (1)$$

where Ex_{ijt} represents real exports from country *i* to country *j*, *t* represents time, Y represents real GDP, DIST represents the geodesic distance between the two countries, LANG is a dummy

variables equaling 1 if the countries share a common language and 0 otherwise, RER is the bilateral real exchange rate between the two countries, and ∂i , Ωj , and π_t are country i, country j, and time fixed effects.[4]

Data on consumption exports are obtained from the CEPII-CHELEM database.[5] These include the following goods: beverages, carpets, cars, cereal products, cinematographic equipment, clocks, clothing, consumer electronics, domestic electrical appliances, knitwear, miscellaneous manufactured articles, pharmaceuticals, photographic equipment, preserved fruit and vegetable products, preserved meat and fish products, soaps and perfumes (including chemical preparations), sports equipment, toiletries, toys, and watches.[6]

Gaulier, Lemoine, and Unal (2011) noted that automobile imports into China largely reflect purchases by rich Chinese consumers. Many of these are luxury cars imported from Germany. In one specification these predominantly high end imports are excluded.

Data on real GDP and real exchange rates are obtained from the CEPII-CHELEM data base. The real exchange rate is the CPI-deflated bilateral real exchange rate between the exporting and importing countries measured in levels.

Data on distance and common language are obtained from www.cepii.fr. Distance is measured in kilometers and represents the geodesic distance between economic centers.

[4] Anderson, Vesselovsky, and Yotov (2013) have shown that exchange rates can exert real effects in the context of a gravity models when there is incomplete pass-through or scale effects.

[5] The category optics is not included in consumption imports because, in the case of China, many optical imports are inputs into the production process rather than final consumption goods. These inputs include unworked lens blanks of plastic, unworked lens blanks of glass, fiber optic cable for live transmission of images, and photolithography equipment for the manufacture of semiconductors.

[6] Some consumption goods such as cars and consumer electronics are much more durable than other consumption goods such as cereal products and pharmaceuticals. In 2009, imports of cars fell by 36 percent and imports of consumer electronics by 18 percent. By contrast, imports of cereal products fell by less than 10 percent and imports of pharmaceutical products increased. Thus, during the GFC, trade in consumer durables experienced a much larger drop than trade in non-durables.

Common language is a dummy variable equaling 1 if two countries share a common language and 0 otherwise.

The gravity model is estimated as a panel using annual data for 31 countries over the 1988-2012 sample period. The countries are Australia, Austria, Brazil, Canada, China, Denmark, Finland, France, Germany, India, Indonesia, Ireland, Italy, Japan, Malaysia, Mexico, the Netherlands, Norway, the Philippines, Poland, Saudi Arabia, Singapore, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, the United Kingdom, and the United States.

Equation (1) has often been estimated as a log-linear model using panel least squares methods. Santos Silva and Tenreyro (2006) showed that this approach can lead to biased estimates when there is heteroskedasticity in the data-generating process. They reported simulation results indicating that Poisson pseudo-maximum-likelihood (PPML) estimators perform better both in terms of bias and efficiency in several cases. PPML techniques are thus used to estimate (1).

Anderson and Van Wincoop (2003) have argued that exports should depend on outward and inward multilateral resistance terms. These terms capture the fact that exports and imports between two countries depend, not only on trade costs between the two countries, but also on changing trade costs between third countries. For instance, exports from country *i* to country *j* can be affected if country *i* enters a preferential trade agreement with a third country *k*.

Models based on Anderson and Van Wincoop's (2003) approach can be estimated by the equation:

$$\ln Ex_{ijt} = \beta_0 + \beta_1 \ln DIST_{ij} + \beta_2 LANG_{ij} + \beta_3 RER_{ijt} + \partial_i + \Omega_j + \pi_t + \varepsilon_{ijt} \qquad (2)$$

where the variables are as defined above. Here the distance and language variables capture trade costs for exports between countries *i* and j and the exporter and importer fixed effects variables capture the multilateral resistance terms. Time-varying fixed effects can also be included. Equation (2) is estimated as a sensitivity check for the results from equation (1).

Table 1 presents descriptive statistics for the variables. Since the data cover 31 countries over a 25 year period, there is a lot of variation in the data. The first row presents basic statistics for consumption exports excluding cars and the second for consumption exports including cars. The minimum value is zero. These zero values indicate that in some years one country in the sample did not export consumption goods to another. These zero values occur in less than 0.4 percent of the observations. It is not surprising that some of the countries do not trade consumption goods with each other in some years, especially for countries that are smaller and farther apart. This should not affect the findings since Santos Silva and Tenreyro (2006) reported that the PPML technique used here is robust to the presence of zero values of the dependent variable.

The first row of Table 1 also indicates that the maximum value for consumption exports excluding automobiles exceeds $90 billion. For consumption exports excluding automobiles, there are eight observations where the values exceed $60 billion. These are for China's consumption exports to the U.S. over the eight years between 2005 and 2012. Similarly for consumption exports including automobiles, the eight largest observations are for China's exports to the US between 2005 and 2008 and these all exceed $60 billion.

Rows 3 through 6 report descriptive statistics for (the logs of) GDP, distance, and the real exchange rate and for the common language dummy variable. The means and standard deviations indicate that the values are spread over a wide range. The large degree of variation in

the independent variables should help make the parameter estimates more precise. For the real exchange rate, the distribution is symmetric and centered around zero. This occurs because the log of the real exchange rate for exports from country A to country B equals minus the log of the real exchange rate for exports from country B and country A and because both sets of exchange rates are included. For the common language, the results indicate that 10 percent of the country pairs in the sample share a common language.

3. Results

Table 2 presents gravity estimates. Columns (1), (3), and (5) present results using consumer goods excluding cars and columns (2), (4), and (6) present results including cars. Columns (1) and (2) present results including importer and exporter GDP. Columns (3)-(6) present results excluding the GDP variables. In columns (3) and (4) time-varying exporter fixed effects and importer fixed effects are included. In columns (5) and (6) exporter and importer fixed effects are included.

The coefficients on exporter and importer real GDP are large and statistically significant. They are larger in column (2) where the dependent variable includes cars than in column (1) where it excludes cars. This indicates that higher incomes tend to be associated with more car imports.[7]

The coefficients on distance and common language are of the expected signs and statistically significant in all cases. The results in every specification indicate that distance is an important deterrent of trade and that sharing a common language is an important facilitator of

[7] There may be a non-linear relationship between automobile consumption and income. This would be true if there is a threshold per-capita income level at which people start buying automobiles. I am indebted to Professor Takatoshi Ito for this observation.

trade. The coefficient on the real exchange rate is negative in four cases and positive in two. Overall the gravity models perform well.

In the discussion that follows the focus is on the estimation in columns (1) and (2) that includes exporter and importer GDPs. The results in columns (3) through (6) reveal similar patterns to those discussed below (viz., that consumption imports in emerging Asia are increasing relative to predicted values).

Figures 3a and 3b present the percent difference between actual and predicted imports for the PRC and the three emerging ASEAN countries that are most involved in regional production networks (Malaysia, the Philippines, and Thailand). Figure 3a presents results for consumption imports excluding cars and Figure 3b for consumption imports including cars. Both figures indicate that actual consumption imports have risen relative to predicted consumption imports between 2005 and 2012. For the ASEAN countries, in 2012 consumption imports excluding cars were 12-13 percent greater than predicted and consumption imports including cars were 12-15 percent greater. For the PRC, in 2012 consumption imports excluding cars were 10 percent greater than predicted and consumption imports including cars were 20 percent greater. For all four countries actual imports have been growing relative to predicted imports since the Global Financial Crisis.

Figures 4a and 4b present the percent difference between actual and predicted imports for the ASEAN, the PRC, Japan, Korea, and Taipei,China. Figure 4a presents results excluding car imports and Figure 4b including car imports. In both figures imports into Japan and Korea are close to their predicted values and imports into the PRC and ASEAN are well above their predicted values. For Taipei,China, on the other hand, consumption imports in every year and in

both figures are far below their predicted values. For 2012 in Figure 4a they are 18 percent below their predicted value and in Figure 4b they are 22 percent below.

The important implication of the results presented here is that emerging Asian countries involved in regional production networks are rebalancing. More and more final goods are flowing to consumers in these countries.

On the other hand, as Figure 5 indicates, more progress is necessary. The figure shows consumption imports per capita. For Germany in 2012 they were $2026, for France $1755, for ASEAN $198, and for the PRC $36.

4. Discussion

Figure 5 indicates that emerging Asia's consumption imports are orders of magnitude smaller than consumption imports in advanced economies. Table 2 shows that there is a strong relationship between a country's consumption imports and its level of real GDP. Thorbecke (2011) reported statistically significant income elasticities exceeding unity for consumption imports into Malaysia, the Philippines, the PRC, and Thailand in the context of the Bickerdike-Robinson-Metzler imperfect substitutes model. These findings imply that the citizens of ASEAN and China will be able to consume more if their economies continue to grow and develop.

While promoting economic growth would increase consumption imports, another question is whether per capita consumption imports are less than one would expect given the level of income. Table 3 presents data on consumption imports per person relative to GDP per person for all 84 economies that the CEPII-CHELEM database provides data for. In 2012 China

ranked the lowest out of all 84 economies. The ratio for China was less than 0.00588, less than 10 percent of the average of 0.059 for the other 83 countries. China is thus an outlier.

Per-capita imported consumption divided by per capita income can be represented as the product of two fractions, per-capita imported consumption divided by per capita consumption and per capita consumption divided by per capita income.[8] If the first fraction is also small, then this suggests that there are structural factors leading to under-importing of final goods. Data are available from the World Bank on domestic consumption. China had the third lowest ratio out of all the countries examined in 2012 for per capita imported consumption goods divided by per capita consumption.[9]

There are several structural factors that can lead to the under-importing of final goods. One factor is tariffs on consumption imports into China and other protectionist obstacles. At the 2014 Asia Pacific Economic Co-operation (APEC) Summit, Chinese President Xi Jinping proposed a Free Trade Agreement for the Asia Pacific (FTAAP). This would promote freer trade among the 21 Pacific Rim nations that are members of APEC. By lowering the level of import protection, it would enable Chinese consumers to purchase more from abroad.[10]

Chinese regulatory distortions also favor investment at the expense of consumption. The Chinese government, in the 2013 Third Plenum blueprint, vowed to change this incentive structure. For instance, China caps the interest rate that households can earn on deposits. These and other banking sector regulations have resulted in an artificially low cost of capital to large firms, stimulating investment. At the same time, as Muellbauer (2014) noted, the value of

[8] I am indebted to Professor Takatoshi Ito and other colleagues for the discussion in this paragraph and the next two. They are not responsible for any errors in the analysis.

[9] There were 7 economies (e.g., Taiwan) that the World Bank did not provide consumption data for. China thus had the third lowest ratio out of the 77 countries for which data are available.

[10] Other free trade initiatives such as the Regional Comprehensive Economic Partnership between 16 East Asian countries would have a similar effect.

savings accounts equals four times annual disposable income and the interest rate caps suppress household income and spending. The government is determined to liberalize deposit rates.[11] As another example, large parts of the service sector are shielded from competition. Allowing open markets to play a larger role will help increase labor-intensive employment and thus raise incomes and consumption for many workers. The Plenum blueprint proposed that markets play a "decisive role" in allocating resources. As a third example, external costs associated with pollution in China have not been internalized. Firms thus produce more than the socially optimal amount. Chinese citizens pay huge costs in terms of health problems and lower life expectancies due to pollution.[12] The Chinese government has recently attached a high priority to reducing pollution. By following through with their proposed reforms, China can help to change the incentive structure that favors firms and production at the expense of consumers and consumption.

5. Conclusion

East Asia is characterized by intricate production and distribution relationships. Japan, Korea, Taipei,China and multinational corporations in ASEAN produce sophisticated technology-intensive intermediate goods and ship them to the People's Republic of China (PRC) for assembly by lower skilled workers. The finished products are then exported disproportionately to the US and Europe.

[11] Huang, Li, and Wang (2015) noted that, before interest rates can be liberalized, commercial bank reform is necessary to prevent the emergence of reckless competition.

[12] Researchers at Peking University have found that air pollution in China reduces people's life expectancy by 5.5 years (see Kaiman, 2013). Other have reported that pollution has contaminated between 8 and 20 percent of China's arable land and led to "cancer villages" where citizens die young because of exposure to toxins (see Chin and Spegele, 2013).

The Global Financial Crisis showed the danger of depending on the West as an engine of growth. When demand in the US and Europe plummeted after 2008Q3, Asia's exports collapsed. Thus Asia was not able to decouple from the West.

The Asian Development Bank and others have noted the importance of channeling final goods, not only to the US and Europe but also to Asian consumers. This would provide a second locomotive and reduce the exposure of Asian economies to slowdowns outside of the region. It would also allow Asian workers to enjoy more of the fruits of their own labor.

This paper investigates whether Asian countries are importing fewer final consumption goods than one would expect. To do this it uses the gravity model. This model is a workhorse for estimating bilateral trade flows.

The results indicate that China and ASEAN are now importing more final goods than predicted by the model. On the other hand China's consumption imports per person relative to GDP per person ranked the lowest out of all 84 economies that the CEPII-CHELEM database provides data for. China's per-capita imported consumption divided by per capita consumption also ranked the third lowest. China is thus an outlier.

There are several structural factors that lead to the under-importing of final goods into China. One factor is trade barriers hindering consumption imports. Another is regulatory distortions also favor investment at the expense of consumption. The Chinese government has expressed determination to promote freer trade and to allow market forces to play a decisive role in allocating resources. These changes would not only benefit Chinese consumers by allowing them to purchase more but would also help China to continue developing as an engine of growth. This would make Asian economies more resilient to shocks developing in the rest of the world.

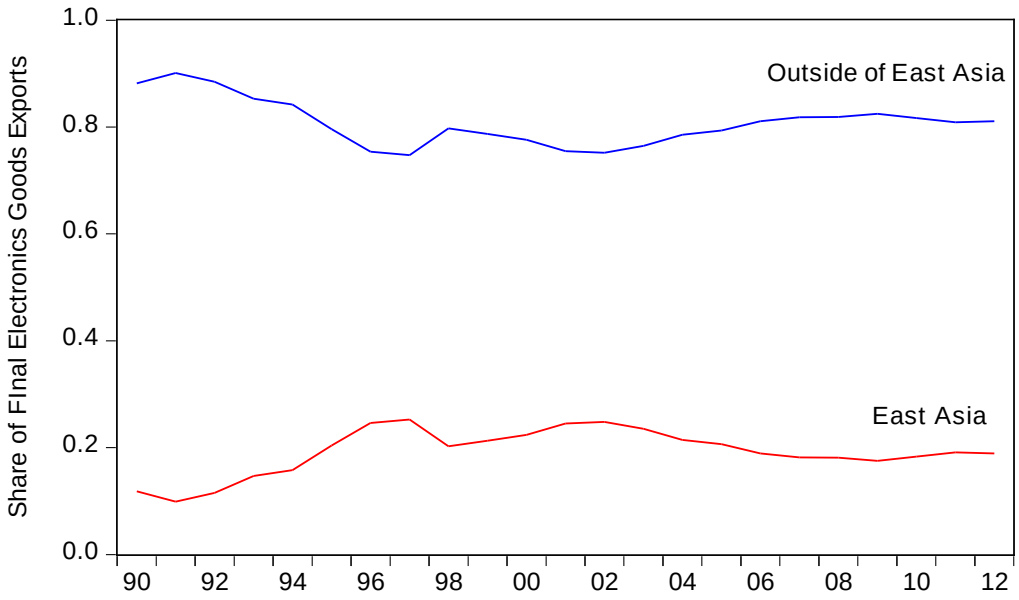

Figure 1a. The Share of China's Final Electronics Goods Exports Going to East Asia and the Rest of the World

Source: CEPII-CHELEM Database.
Note: Final electronics goods come from the following categories: consumer electronics, telecommunications equipment, and computer equipment. East Asia includes Japan, Malaysia, Indonesia, Korea, the PRC, Singapore, Taipei,China, and Thailand.

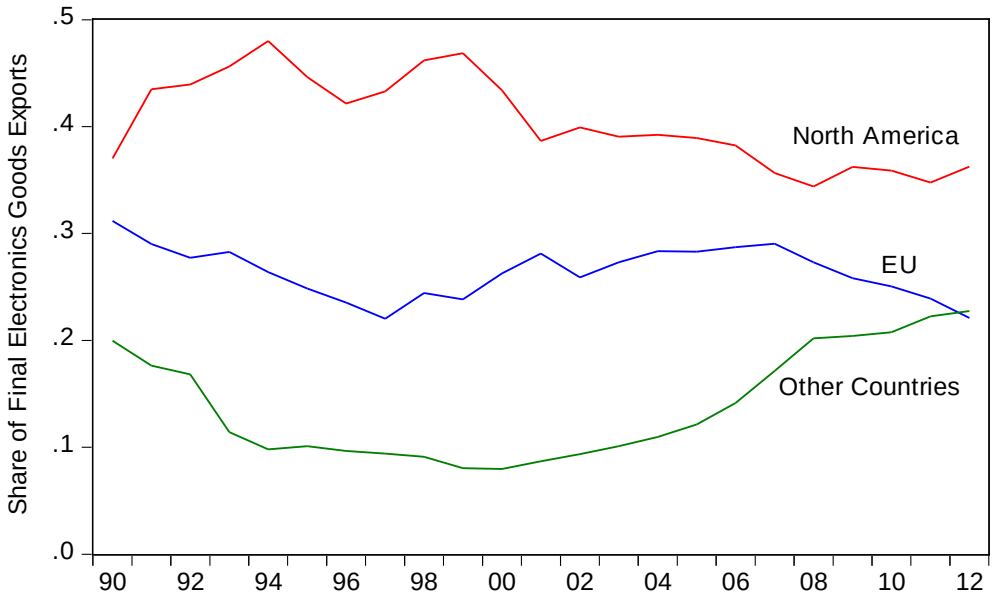

Figure 1b. The Share of China's Final Electronics Goods Exports Going to Regions outside of East Asia.

Source: CEPII-CHELEM Database.
Note: Final electronics goods come from the following categories: consumer electronics, telecommunications equipment, and computer equipment. East Asia includes Japan, Malaysia, Indonesia, Korea, the PRC, Singapore, Taipei,China, and Thailand. EU includes the 28 countries that are members of the European Union.

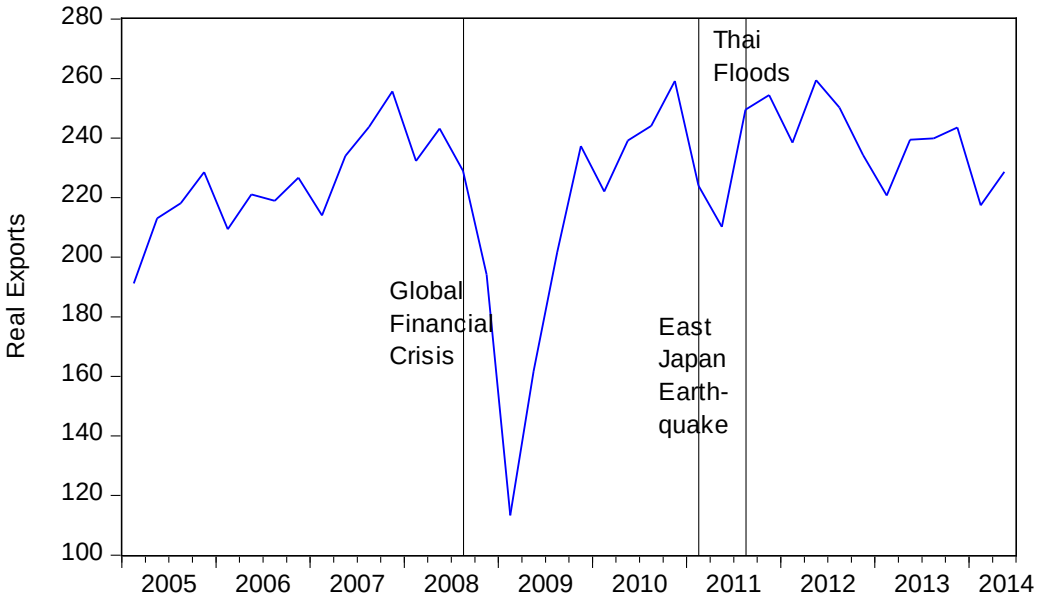

Figure 2a. Japanese Automobile Parts and Components Exports to the World

Source: CEIC Database.

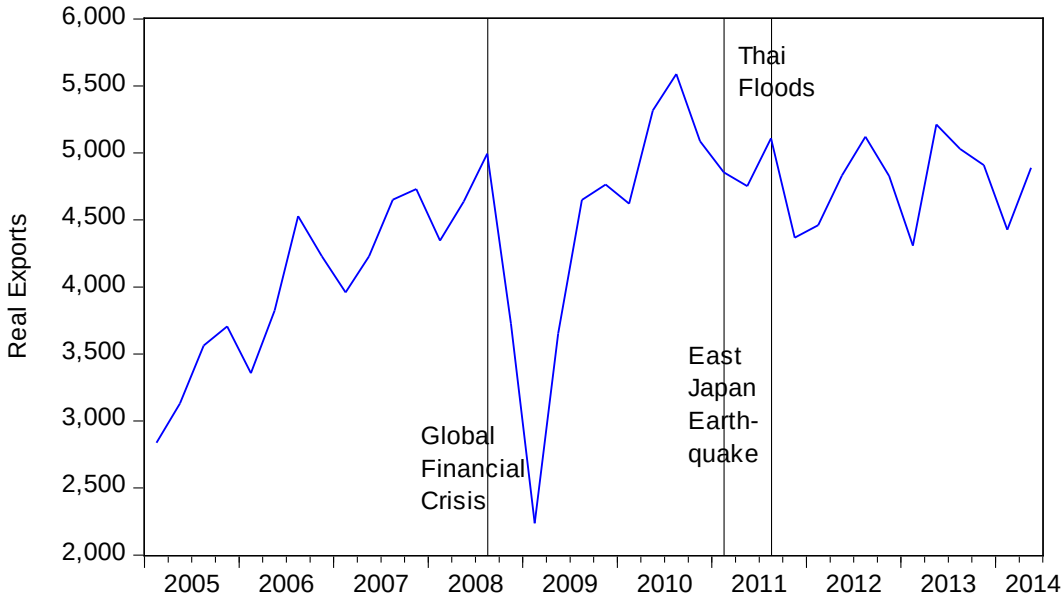

Figure 2b. Japanese Electronics Parts and Components Exports to the World

Source: CEIC Database.

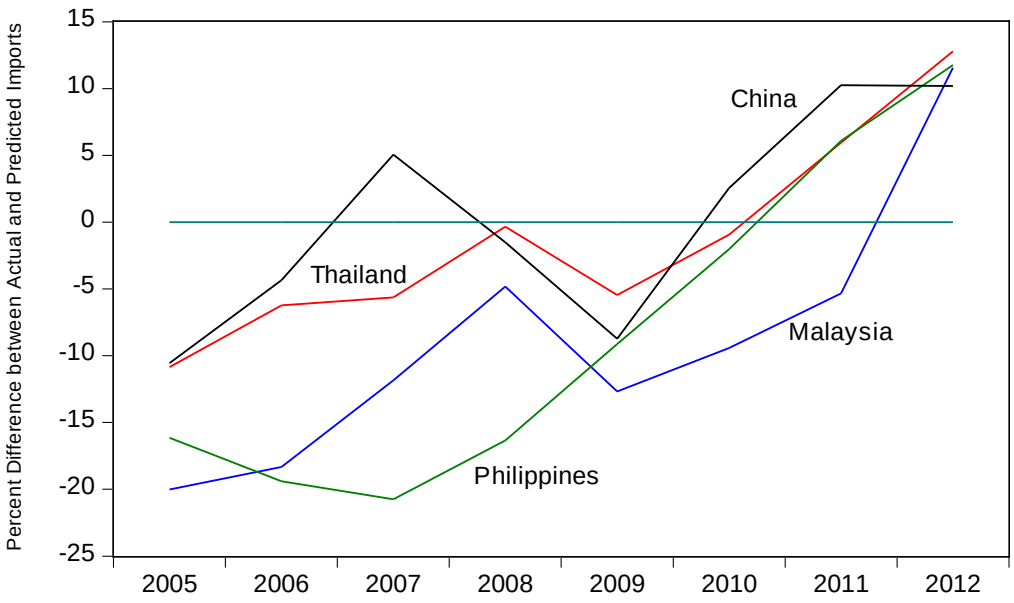

Figure 3a. Percent Difference between Actual Consumption Imports (excluding Cars) and the Values Predicted by a Gravity Model

Source: CEPII-CHELEM Database and calculations by the author.
Note: Consumption goods come from the following categories: beverages, cars, carpets, cereal products, cinematographic equipment, clocks, clothing, consumer electronics, domestic electrical appliances, knitwear, miscellaneous manufactured articles, pharmaceuticals, photographic equipment, preserved fruit and vegetable products, preserved meat and fish products, soaps and perfumes (including chemical preparations), sports equipment, toiletries, toys, and watches.

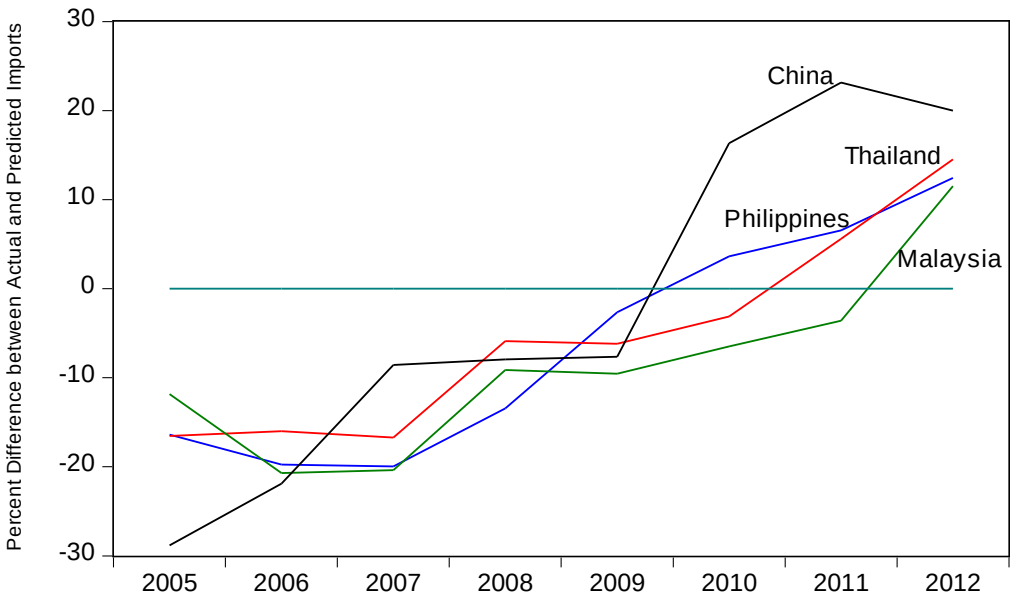

Figure 3b. Percent Difference between Actual Consumption Imports and the Values Predicted by a Gravity Model

Source: CEPII-CHELEM Database and calculations by the author.
Note: Consumption goods come from the following categories: beverages, cars, carpets, cereal products, cinematographic equipment, clocks, clothing, consumer electronics, domestic electrical appliances, knitwear, miscellaneous manufactured articles, pharmaceuticals, photographic equipment, preserved fruit and vegetable products, preserved meat and fish products, soaps and perfumes (including chemical preparations), sports equipment, toiletries, toys, and watches.

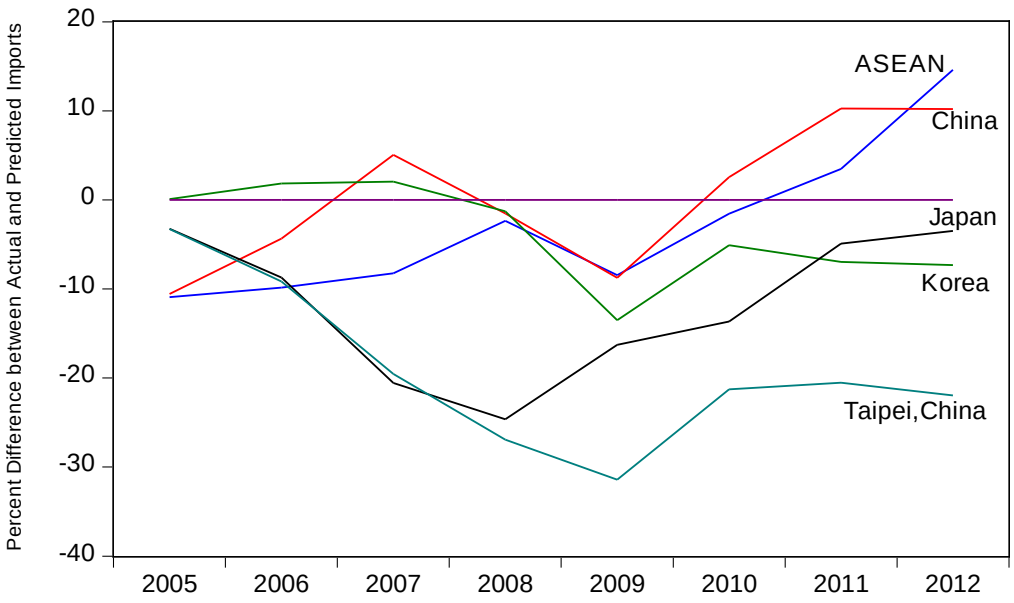

Figure 4a. Percent Difference between Actual Consumption Imports (excluding Cars) and the Values Predicted by a Gravity Model

Source: CEPII-CHELEM Database and calculations by the author.
Note: Consumption goods come from the following categories: beverages, cars, carpets, cereal products, cinematographic equipment, clocks, clothing, consumer electronics, domestic electrical appliances, knitwear, miscellaneous manufactured articles, pharmaceuticals, photographic equipment, preserved fruit and vegetable products, preserved meat and fish products, soaps and perfumes (including chemical preparations), sports equipment, toiletries, toys, and watches. ASEAN here represents ASEAN-4.

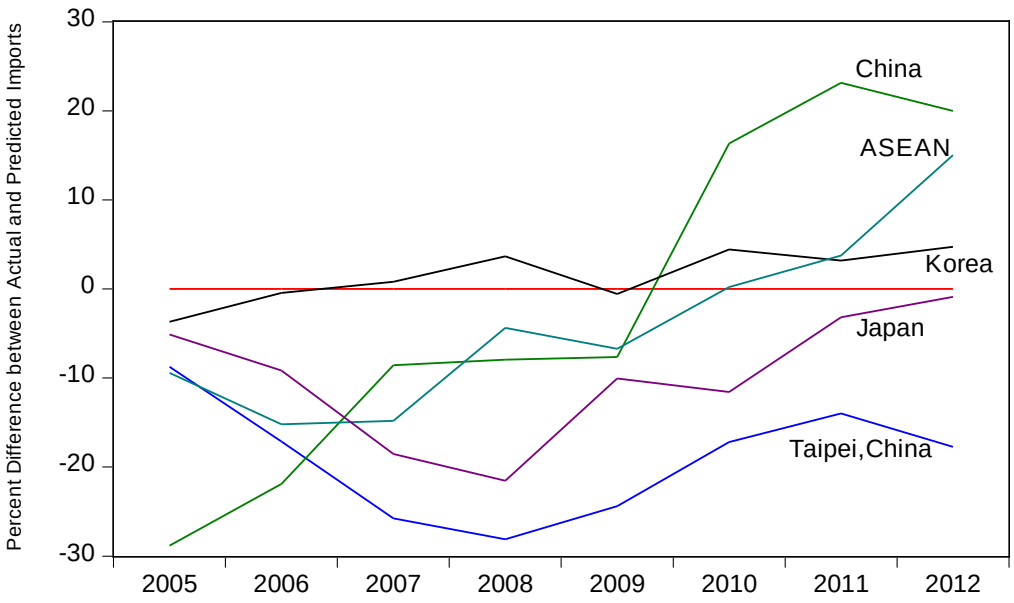

Figure 4b. Percent Difference between Actual Consumption Imports and the Values Predicted by a Gravity Model

Source: CEPII-CHELEM Database and calculations by the author.
Note: Consumption goods come from the following categories: beverages, cars, carpets, cereal products, cinematographic equipment, clocks, clothing, consumer electronics, domestic electrical appliances, knitwear, miscellaneous manufactured articles, pharmaceuticals, photographic equipment, preserved fruit and vegetable products, preserved meat and fish products, soaps and perfumes (including chemical preparations), sports equipment, toiletries, toys, and watches. ASEAN here represents ASEAN-4.

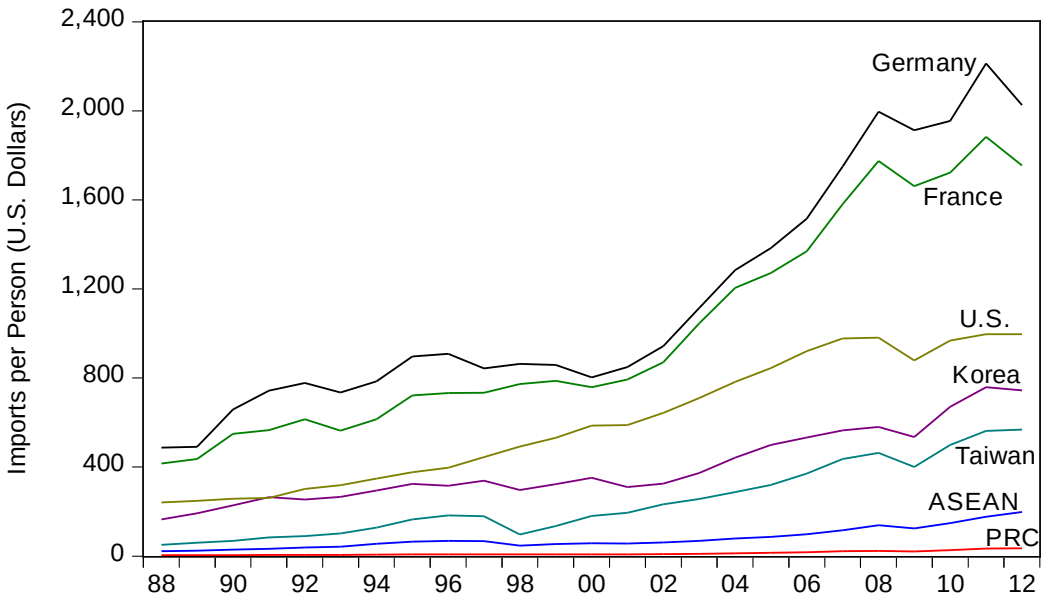

Figure 5. Consumption Imports Per Person (U.S. dollars)

Source: CEPII-CHELEM Database
Note: Consumption goods come from the following categories: beverages, carpets, cereal products, cinematographic equipment, clocks, clothing, consumer electronics, domestic electrical appliances, knitwear, miscellaneous manufactured articles, pharmaceuticals, photographic equipment, preserved fruit and vegetable products, preserved meat and fish products, soaps and perfumes (including chemical preparations), sports equipment, toiletries, toys, and watches.

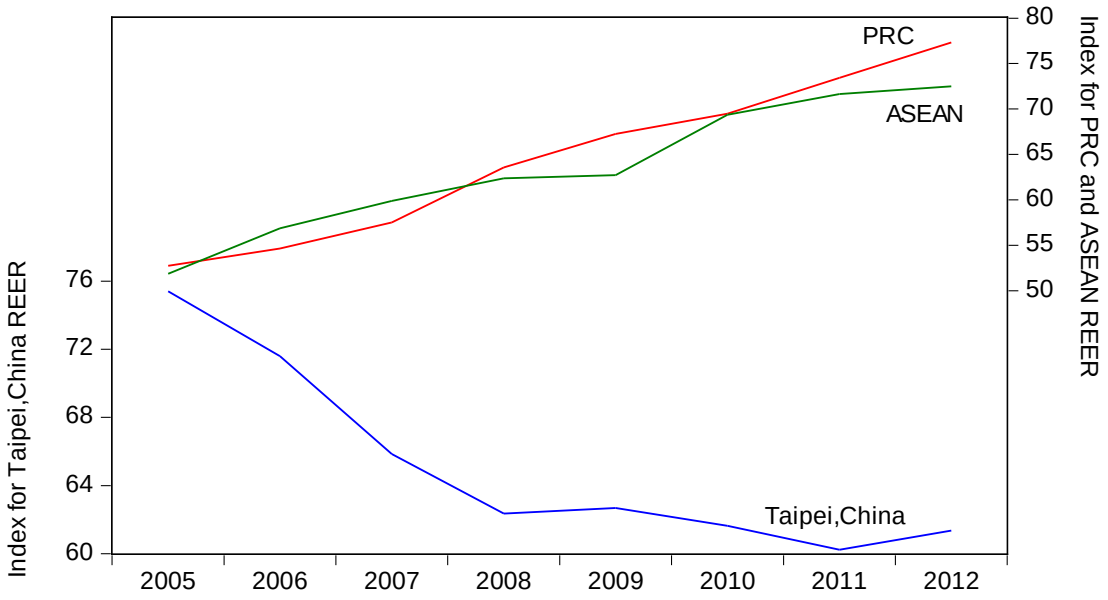

Figure 6. Real Effective Exchange Rates in ASEAN, the PRC, and Taipei,China

Source: CEPII-CHELEM Database.
Note: ASEAN includes Malaysia, the Philippines, and Thailand.

Table 1 Descriptive Statistics

	(1)	(2)	(3)	(4)
Variable	Minimum Value	Maximum Value	Mean	Standard Deviation
Consumer Goods Excluding Automobiles (millions of USD)	0	91,887	714	2,626
Consumer Goods Including Automobiles (millions of USD)	0	93,389	1,004	3,678
(Log of) Real GDP	10.61	16.47	13.14	1.18
(Log of) Distance	5.75	9.84	8.59	0.93
(Log of) Bilateral Real Exchange Rate	-1.76	1.76	0	0.62
Common Language	0	1	0.10	0.30

.

Table 2 PPML gravity estimates, 1988-2012

	(1)	(2)	(3)	(4)	(5)	(6)
Exporter GDP	0.71***	0.87***				
	(0.05)	(0.04)				
Importer GDP	0.69***	0.84***				
	(0.05)	(0.03)				
Distance	-0.75***	-0.80***	-0.88***	-0.76***	-0.75***	-0.81***
	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
Common Language	0.09***	0.08***	0.27***	0.27***	0.10***	0.09***
	(0.03)	(0.03)	(0.00)	(0.00)	(0.03)	(0.03)
Bilateral Real Exchange Rate	-0.10*	-0.25***	-0.04***	-0.10***	0.16***	0.04***
	(0.06)	(0.06)	(0.00)	(0.00)	(0.06)	(0.07)
Constant	-5.68***	-9.98***	15.0***	15.0***	17.5***	18.3***
	(1.16)	(0.90)	(0.00)	(0.00)	(0.11)	(0.12)
Dependent Variable	Consumer Goods Excluding Cars	Consumer Goods	Consumer Goods Excluding Cars	Consumer Goods	Consumer Goods Excluding Cars	Consumer Goods
Fixed Effects Specification	Exporter, Importer, Time	Exporter, Importer, Time	Time-varying exporter, importer	Time-varying exporter, importer	Exporter, Importer, Time	Exporter, Importer, Time
No. of observations	23249	23249	23249	23249	23249	23249
Sample Period	1988-2012	1988-2012	1988-2012	1988-2012	1988-2012	1988-2012

Notes: The table contains Poisson Pseudo Maximum Likelihood (PPML) estimates of gravity models. Bilateral exports from 31 major exporters to each of the other 30 countries over the 1988-2012 period are included. Huber-White standard errors are in parentheses.
*** (**) [*] denotes significance at the 1% (5%) [10%] level.

Table 3 Consumption imports per capita relative to GDP per capita

Country	(Consumption imports per capita)/(GDP per capita)	Rank
Kyrgyzstan	0.461	1
Malta	0.153	2
Estonia	0.152	3
Belgium	0.150	4
Cyprus	0.134	5
Latvia	0.126	6
Slovakia	0.121	7
Bosnia and Herzegovina	0.106	8
Paraguay	0.102	9
Slovenia	0.0975	10
Lithuania	0.0975	11
Netherlands	0.0928	12
Viet Nam	0.0923	13
Czech Republic	0.0899	14
Hong Kong	0.0897	15
Hungary	0.0893	16
Macedonia	0.0866	17
Bulgaria	0.0832	18
Ireland	0.0803	19
Albania	0.0746	20
Austria	0.0744	21
Switzerland	0.0729	22
Serbia and Montenegro	0.0716	23
Ukraine	0.0713	24
Croatia	0.0667	25
Iceland	0.0625	26
Poland	0.0577	27

Romania	0.0570	28
Portugal	0.0567	29
Denmark	0.0556	30
Luxembourg	0.0550	31
Tunisia	0.0535	32
Uruguay	0.0529	33
Kenya	0.0516	34
Bolivia	0.0511	35
Singapore	0.0506	36
Cote d'Ivoire	0.0492	37
Malaysia	0.0490	38
Belarus	0.0486	39
Germany	0.0484	40
Finland	0.0448	41
Libya	0.0448	42
United Kingdom	0.0447	43
Kazakhstan	0.0445	44
France	0.0442	45
Spain	0.0439	46
Sweden	0.0434	47
Greece	0.0419	48
Cameroon	0.0405	49
Thailand	0.0388	50
Chile	0.0378	51
Taipei,China	0.0366	52
Canada	0.0366	53
Philippines	0.0363	54
Morocco	0.0356	55
Ecuador	0.0353	56
Italy	0.0351	57
New Zealand	0.0346	58
Brunei Darussalam	0.0339	59
Israel	0.0316	60
Saudi Arabia	0.0302	61
Gabon	0.0286	62
Sri Lanka	0.0286	63
Russian Federation	0.0284	64
Algeria	0.0280	65
Norway	0.0278	66
Egypt	0.0276	67
Venezuela	0.0274	68
South Korea	0.0252	69
Peru	0.0247	70

Australia	0.0226	71
Nigeria	0.0217	72
Mexico	0.0214	73
Turkey	0.0202	74
United States	0.0193	75
Japan	0.0192	76
Bangladesh	0.0192	77
Colombia	0.0189	78
Argentina	0.0138	79
Indonesia	0.0124	80
Pakistan	0.0120	81
Brazil	0.00951	82
India	0.00762	83
China, People's Rep.	0.00588	84

Source: CEPII-CHELEM Database

Note: The table presents data on consumption imports per capita divided by GDP per capita. Consumption imports come from the following categories: beverages, carpets, cereal products, cinematographic equipment, clocks, clothing, consumer electronics, domestic electrical appliances, knitwear, miscellaneous manufactured articles, pharmaceuticals, photographic equipment, preserved fruit and vegetable products, preserved meat and fish products, soaps and perfumes (including chemical preparations), sports equipment, toiletries, toys, and watches.

References

Anderson, J., and E. van Wincoop, (2003), 'Gravity with Gravitas: A Solution to the Border Puzzle,' *American Economic Review*, **9**, 170-192.

Anderson, J., M. Vesselovsky, and Y. Yotov, (2013), 'Gravity, Scale, and Exchange Rates,' NBER Working Paper No. 18807, (National Bureau of Economic Research, Cambridge).

Ando, M. and F. Kimura, (2012), 'How did the Japanese Exports Respond to Two Crises in the International Production Networks? The Global Financial Crisis and the Great East Japan Earthquake,' *Asian Economic Journal*, **26**, 261-287.

Baltagi, B., Egger, P., and M. Pfaffermayr, (2014), 'Panel Data Gravity Models of International Trade,' CESifo Working Paper No. 4616, (IFO Institute, Center for Economic Studies, Munich).

Chin, J. and B. Spegele, (2013), 'China's Bad Earth,' *The Wall Street Journal*, 27 July.

Gaulier, G., F. Lemoine., and D. Ünal, (2011), 'China's Foreign Trade in the Perspective of a More Balanced Economic Growth,' CEPII Working Paper No. 2011-03 (Centre D'Etudes Prospectives et D'Information Internationales, Paris).

Huang, Y., R. Li, and B. Wang, (2015), 'China and the Final Frontier of Financial Reform,' East Asian Forum Weblog [online; 19 January 2015]. Available from: http: www.eastasiaforum.org.

Kaiman, J., (2013), 'China's Reliance on Coal Reduces Life Expectancy by 5.5 Years, Says Study,' *The Guardian*, 9 July.

Kimura, F., and M. Ando, (2005), 'Two-dimensional Fragmentation in East Asia: Conceptual Framework and Empirics,' *International Review of Economics and Finance*, **14**, 317-348.

Leamer, E. and J. Levinsohn, (1995), 'International Trade Theory: The Evidence,' In G. Grossman and K. Rogoff, (eds.), *The Handbook of International Economics, vol. III.* (Amsterdam: North Holland), 1339-94.

METI, (2009), *White Paper on International Economy and Trade*, (Tokyo: METI).

Muellbauer, J., (2014), 'Liberalizing Deposit Rates Should Boost Growth,' *The Financial Times*, 14 December.

Santos Silva, J., and S. Tenreyro, (2006), 'The Log of Gravity,' *Review of Economics and Statistics*, **88**, 641-58.

Thorbecke, W. (2011), 'How Elastic is East Asian Demand for Consumption Goods?' *Review of International Economics*, **19**, 950-962.

Tinbergen, J. (1962), *Shaping the World Economy; Suggestions for an International Economic Policy*, (New York: Twentieth Century Fund).