Enjoying the Fruits of their Labor: Redirecting Exports to Asian Consumers

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Overview

- This presentation will consist of 4 parts:
- 1) An Introduction
- 2) Gravity Model – Data and Methodology
- 3) Results
- 4) Discussion and Conclusion

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.
- 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.
- This slicing up of the value chain began after the yen appreciated 60% following the Plaza Accord in 1985. Japanese multinational enterprises lost their price competitiveness and responded by shifting labor-intensive activities to the Republic of Korea (Korea) and Taipei,China.

PRC Became Final Assembly Point of Production Networks

- In the late 1980s wages and exchange rates in Korea and Taipei,China skyrocketed. The locational advantage of assembling labor-intensive goods in the NIEs declined, and Japanese firms transferred production to ASEAN.
- Surplus labor in ASEAN held wages down, and exchange rates in these countries were pegged at competitive levels.
- After the People's Republic of China (PRC) joined the WTO in 2001, there was a surge in FDI and parts and components exports from East Asia to the PRC. The PRC's WTO accession gave investors confidence that the PRC would sustain an FDI-friendly environment. The PRC became the final assembly point of intricate production and distribution networks. It imported hundreds of billions of dollars of parts and components from East Asia and exported the final assembled products throughout the world.

Final Goods Demand Primarily from Outside of the Region

- The PRC's 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.
- Athukorala documented that, while intermediate goods trade in East Asia has exploded, demand for final goods produced within production networks comes mainly from outside the region. He found that the PRC did not cushion against an export contraction during the Global Financial Crisis (GFC). He observed that the demand decrease in the ROW during the GFC caused a synchronized trade contraction in East Asia.

Demand and Supply Shocks

- 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 East Japan Earthquake or the 2001 Thai flooding.
- Figures 1a and 1b present data on Japanese exports of automobile parts and semiconductors, two key categories of Japanese parts and components exports.
- Following the GFC, exports of both categories fell by more than 70 percent and took almost two years to recover. By contrast, the falls following the earthquake and the floods were an order of magnitude smaller and the recoveries rapid.
- Ando and Kimura (2012) also noted that the GFC was a demand shock and the 2011 earthquake a supply shock. They presented evidence indicating that the GFC had a prolonged effect of Japanese exports whereas the earthquake did not.

Figure 1a. Japanese Automobile Parts and Components Exports to the World

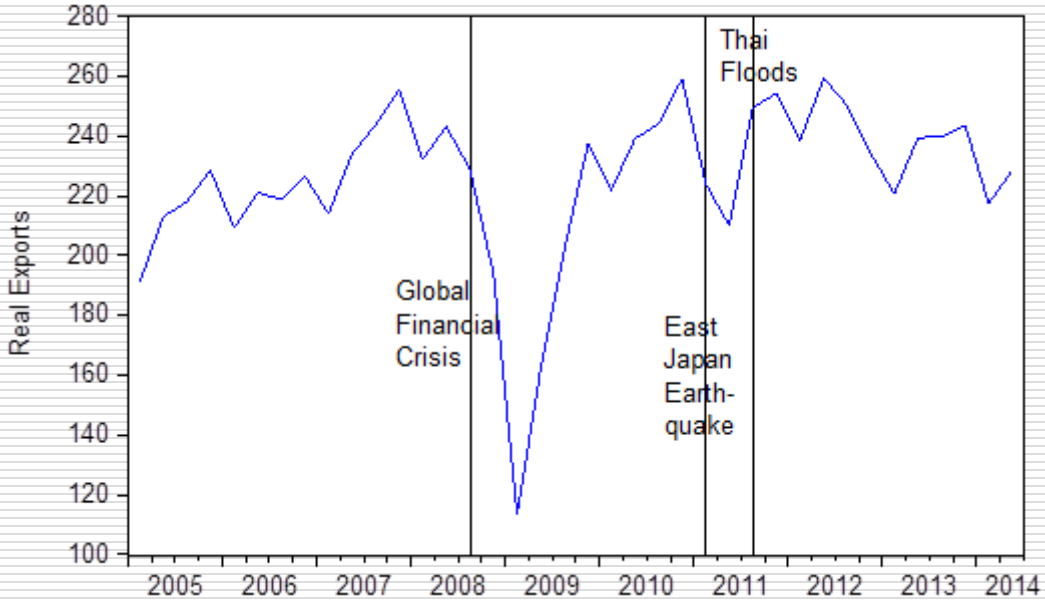
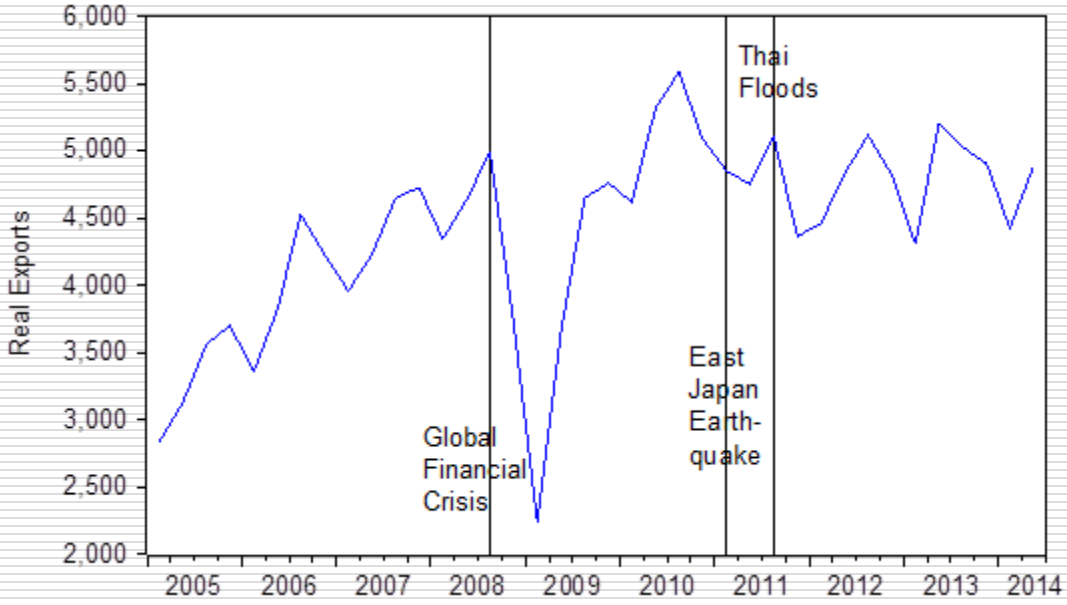


Figure 1b. Japanese Electronics Parts and Components Exports to the World



Channeling Final Goods to Asia

- One lesson of the GFC is that regional production networks should be less reliant on final demand in the West.
- METI 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.

Preview of Results

- 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.
- 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 growth and development in the region can continue.

2. Gravity Model – Data and Methodology

- Traditional 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 (Tinbergen, 1962). In addition, these models typically include other factors affecting bilateral trade costs such as whether trading partners share a common language.
- 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.

Equation for Traditional Gravity Models

Traditional gravity models take the form:

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

where Ex_{ijt} represents real exports from country *i* to country *j*, *t* represents time, Y represents GDP, DIST represents the geodesic distance between two countries, LANG is a dummy variables equaling 1 if the countries share a common language and 0 otherwise, and ∂i , Ωj , and π_t are country i, country j, and time fixed effects.

Theoretical Gravity Models

- Anderson and Van Wincoop (2003) have derived theoretical foundations for the gravity model.
- They showed 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*.

Equation for Theoretically Based Gravity Models

Theoretically based gravity models can be estimated by the equation:

$$\ln Ex_{ijt} = \beta_0 + \beta_3 \ln DIST_{ij} + \beta_4 LANG + \partial_i + \Omega_j + \varepsilon_{ijt} \qquad (2)$$

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.

Estimation Techniques

- Equations (1) and (2) are log-linear models and are often estimated using panel least squares methods.
- Santos Silva and Tenreyro (2006) have shown 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.
- Since the goal in this paper is to try to predict imports, a variety of specifications are employed. These include the models in equation (1) and (2).

Exchange Rate and Data Sources

- Anderson, Vesselovsky, and Yotov (2013) have shown that exchange rates can exert real effects in the context of structural gravity models when there is incomplete pass-through or scale effects. The exchange rate is thus included as another explanatory variable.
- Data on exports, GDP, and real exchange rates are obtained from the CEPII-CHELEM data base. Exports are measured in current dollars. 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. Common language is a dummy variable equaling 1 if two countries share a common language and 0 otherwise.

3) Results

- Table 1 presents gravity estimates.
- The coefficients on exporter and importer 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.
- 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 trade. The coefficient on the real exchange rate is negative in four cases and positive in two. Overall the gravity models perform well.

PPML Gravity Estimates

	(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%) level.

Focus on Results with Importer and Exporter GDP

- The focus is on the estimation in columns (1) and (2) that includes exporter and importer GDPs since the relation between the size of GDP and the amount of consumption imports is something that will be discussed in the next section. 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).

Actual and Predicted Imports: PRC and ASEAN

- Figures 2a and 2b 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 2a presents results for consumption imports excluding cars and Figure 2b 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.

Actual vs. Predicted Consumption Imports (excluding cars)

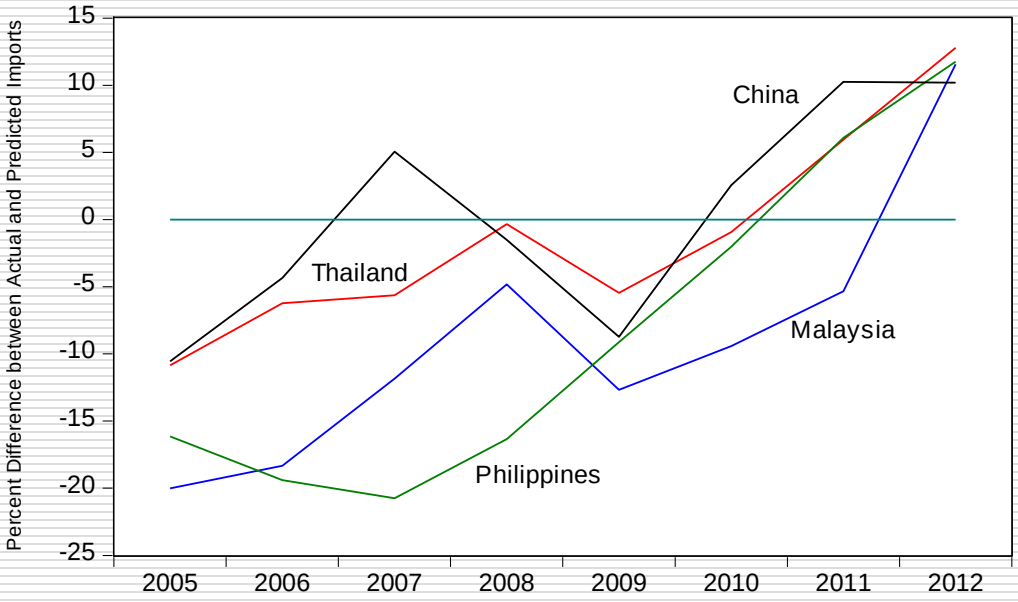


Figure 2a. Percent Difference between Actual Consumption Imports (excluding Cars) and the Values Predicted by a Gravity Model

Actual vs. Predicted Consumption Imports (including cars)

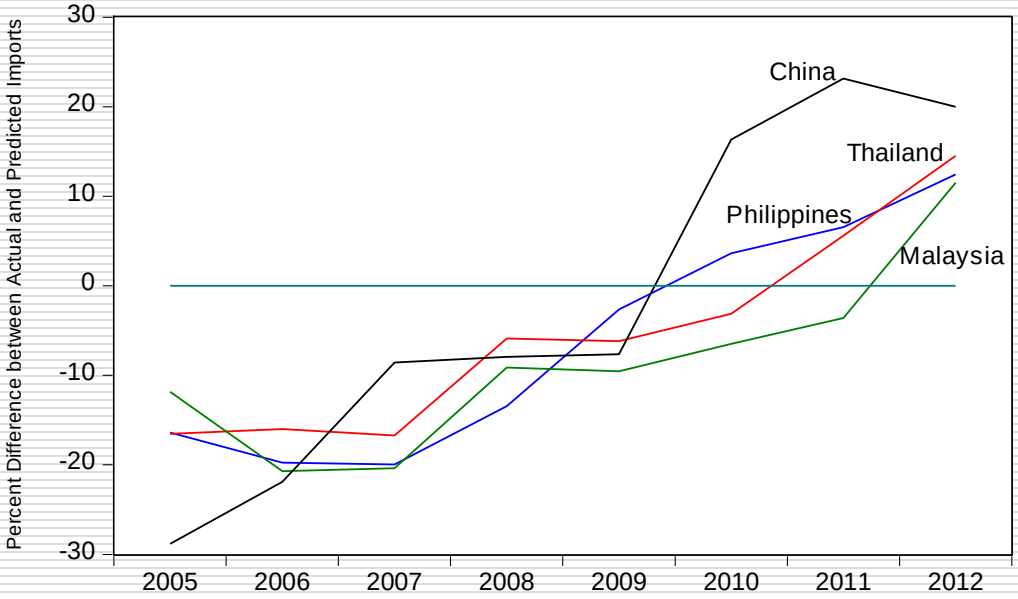


Figure 2b. Percent Difference between Actual Consumption Imports and the Values Predicted by a Gravity Model

Actual and Predicted Imports: PRC, ASEAN, Japan, Korea, Taipei,China

- Figures 3a and 3b present the percent difference between actual and predicted imports for ASEAN, the PRC, Japan, Korea, and Taipei,China. Figure 3a presents results excluding car imports and Figure 3b 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 3a they are 18 percent below their predicted value and in Figure 3b 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.

Actual vs. Predicted Consumption Imports (excluding cars)

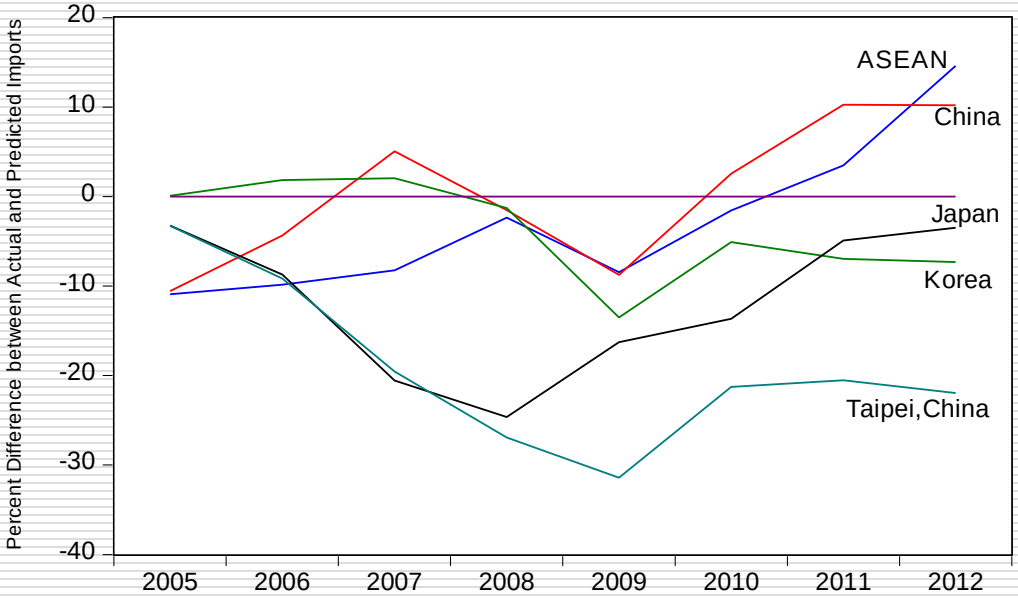


Figure 3a. Percent Difference between Actual Consumption Imports (excluding Cars) and the Values Predicted by a Gravity Model

Actual vs. Predicted Consumption Imports (including cars)

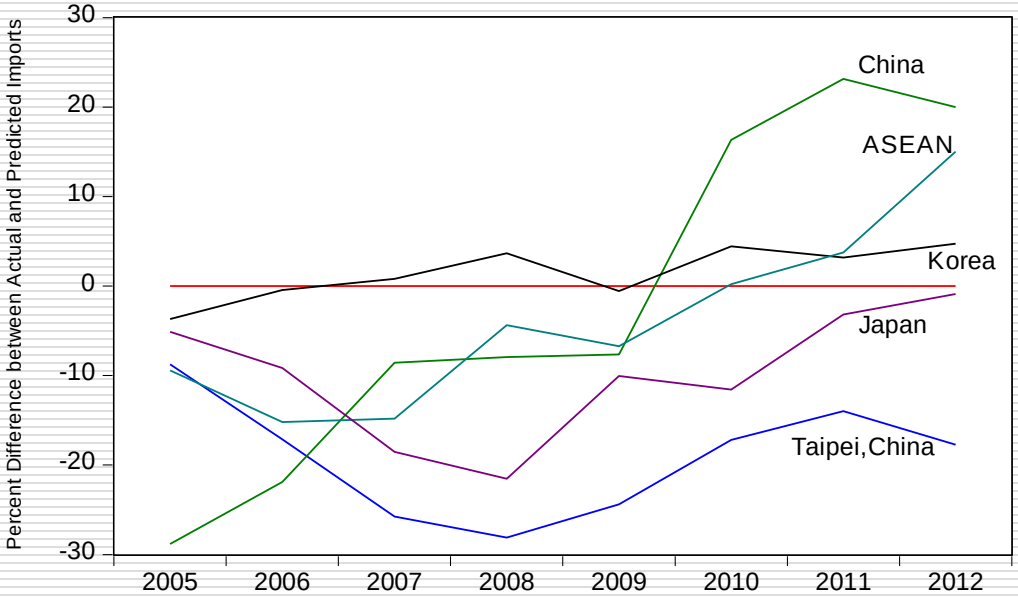


Figure 3b. Percent Difference between Actual Consumption Imports and the Values Predicted by a Gravity Model

More Progress on Consumption Imports Still Necessary

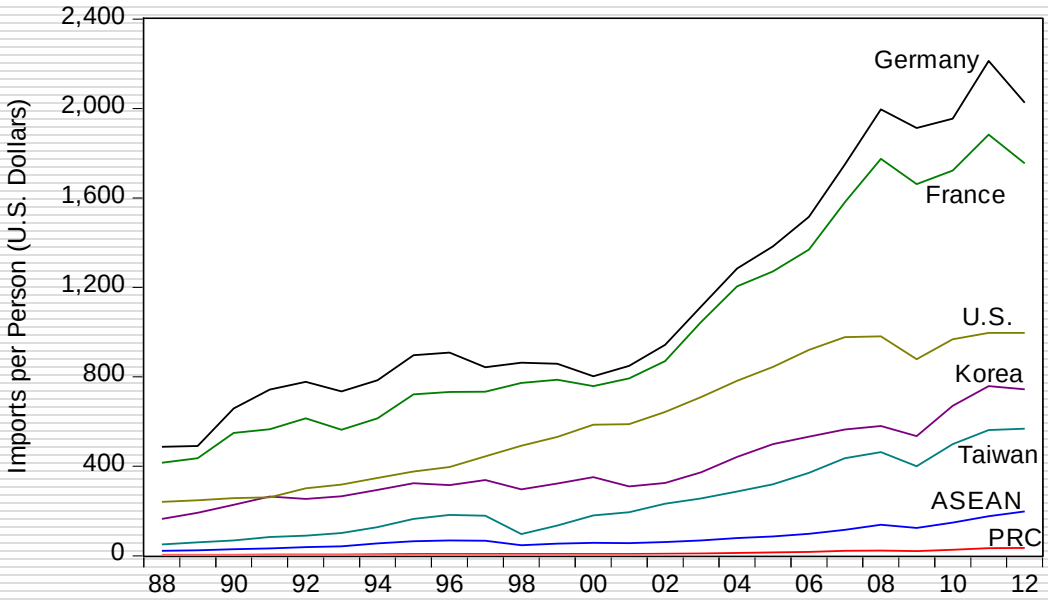


Figure 4. Consumption Imports Per Person (U.S. dollars)

4. Discussion and Conclusion

- Figure 4 indicates that emerging Asia's consumption imports are orders of magnitude smaller than consumption imports in advanced economies.
- On the other hand, the results in Section 3 indicate that, controlling for factors such as the size of their GDPs, China's and ASEAN's consumption imports are more than one would predict.
- These findings imply that, in order for citizens in China and ASEAN to consume more, their economies need to grow and develop. This section considers a few steps towards achieving this goal.

Exchange Rates and Consumption Imports

- China and ASEAN in 2012 imported much more than predicted and Taipei,China imported much less. One reason for the divergent results between China and ASEAN and Taipei,China is presented in Figure 5. The figure shows that real effective exchange rates (REER) have appreciated 34 percent in ASEAN and 38 percent in the PRC since 2005 while the REER of Taipei,China has depreciated 21 percent during this time. The exchange rate appreciations increased the purchasing power of Asian citizens and allowed them to import more consumption goods.
- The depreciation in Taipei,China occurred despite the fact that its current account surplus averaged almost 9 percent of GDP between 2005 and 2013. Foreign exchange reserve accumulation by the Taipei,China central bank kept the NT dollar from appreciating.

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

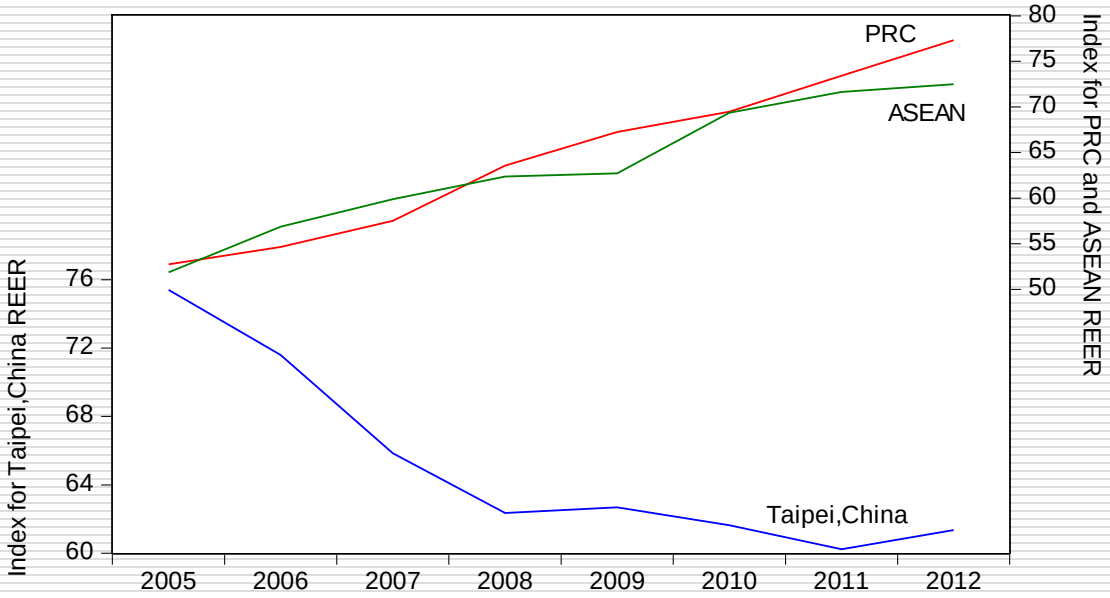


Figure 5. Real Effective Exchange Rates in ASEAN, the PRC, and Taipei,China

Reserve Accumulation

- The PRC also increased its holdings of foreign reserves by $508 billion in 2013 and by $3 trillion between 2006 and 2013.
- Rates of returns on these external reserves are low compared to the private and social rates of return available for investments in the domestic economy.
- Summers (2006) reported that the returns on U.S. Treasury securities measured in Asian currencies are close to zero. Fang et al. (2012), on the other hand, reported that the return to an additional year of education in China equaled 20 percent per year.
- Investing in education is especially crucial in the rural sector. Chinese rural sector students will be the urban workers of the future. Their families are often poor and cannot afford to send their children to school. Making education available to them would yield high returns to society.

Investing in Education

- Rozelle (2010) underscored the importance of education in promoting innovation and productivity growth. To accomplish this goal, he noted that students in China need to acquire skills in mathematics, science, English, and computers.
- Rozelle (2010) also observed that China should begin investing when the children are young. Most rural children cannot afford pre-school, and elementary school attendance is hampered by poor accessibility and long, dangerous commutes. Bad health, sanitation, nutrition, and psychology management also restricts students' ability to learn. Problems such as anemia, vitamin deficiencies, visual difficulties, and worms are prevalent and can be remedied easily.

Facilitating Education

- High school tuition in China is expensive (20 times the per capita annual income of the rural poor) and little financial aid is available. Because of this only one in four rural students finishes high school. In neighboring economies such as Japan, Korea, and Taipei,China, almost 100 percent of students finish high school. College tuition is prohibitively expensive (60 times the annual per capita income of the rural poor). Only three percent of rural students are able to attend a tier 1 or tier 2 university (Rozelle, 2010). Facilitating education would help China to keep climbing the ladder of comparative advantage.

Investing in Education in ASEAN

- Investing in human capital in ASEAN countries is also essential to foster creative industries. These countries need to progress from labor-intensive assembly operations to the engineering and design aspects of production. To achieve this it is necessary for children to receive adequate nutrition, healthcare, and primary education. It is also desirable that high school students receive a high quality education in science and math and also that university students receive scientific and engineering training. The educational system should focus on providing students with marketable skills that businesses need. ASEAN governments can help coordinate this process.
- Thus, there is a significant need to invest in education. Rather than channeling trillions of dollars into investments in U.S. securities, the returns to Asia and its people would be higher if they invested in rural education, nutrition, and healthcare.

Investing in Domestic Residents

- The Chinese character for country is a jade (a precious stone) surrounded by a boundary. We can think of the precious stone as representing the people of China and the boundary the borders of the country.
- China would receive a higher expected return and face lower risks in renminbi terms by investing in the health, education, and welfare of the people within its borders rather than by investing further in foreign exchange reserves.
- The government should focus especially on rural education and on remedying economic deficiencies in ways that benefit the non-tradable sector.

Thank You