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How Elastic is East Asian Demand for Consumption Goods?

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Abstract

This paper investigates import demand in East Asia. Estimating exchange rate elasticities for countries in the region is difficult because many imports are used to produce goods for re-export. An exchange rate appreciation that reduces East Asian exports will also reduce the demand for imported inputs that are used to produce exports. To correct for this bias this paper examines the imports of consumption goods, since these are intended primarily for the domestic market. Results from several specifications indicate that currency appreciations and increases in income in East Asian countries would significantly increase consumption imports.

JEL Classification: F32, F41

Contents

1. INTRODUCTION

East Asia has survived the Great Recession of 2008–2009 well, and the International Monetary Fund (IMF) (2010) forecasts that it will continue growing rapidly in the future. Firms throughout the world are reorienting production towards Asia (see ADB 2010). What determines import demand in the region?

Previous studies have investigated how an appreciation of East Asian currencies or an increase in East Asian income would affect imports. For imports into the People's Republic of China (PRC) from the world, Cheung, Chinn, and Fujii (2009); Marquez and Schindler (2007); and Garcia-Herrero and Koivu (2007) find that in many specifications an appreciation of the yuan is associated with a decrease in imports (i.e., the coefficient is wrong-signed). Cheung, Chinn, and Fujii report that PRC imports respond strongly to increases in income, but Garcia-Herrero and Koivu find only a weak relationship between PRC imports and income. For imports into 10 East Asian countries, Kamada and Takagawa (2005) report that in most cases the coefficient on the real exchange rate is either of the wrong sign or of the correct sign but not statistically significant. They also find that increases in domestic demand in East Asian countries are associated with increases in imports. For imports into the PRC from the United States (US), Cheung, Chinn, and Fujii (2009) and Thorbecke (2006) report that an appreciation of the yuan and of PRC income would increase imports. For imports into Japan from the US, Thorbecke (2008) does not find evidence of a robust relationship between imports, the yen/dollar exchange rate, and Japanese income.

Kamada and Takagawa (2005) discuss the difficulties of estimating exchange rate elasticities for East Asian countries. Many of the imports into these countries are parts and components or capital goods that are used to assemble goods for re-export to the rest of the world. An exchange rate appreciation that reduces exports will also reduce the demand for imported goods that are used to produce exports. This can cause the estimated exchange rate coefficient in import equations to have the wrong sign.

To correct for this bias, this paper examines the imports of final consumption goods into East Asian countries. These goods are intended primarily for the domestic market rather than for re-export. Thus an appreciation of the currency that raises consumers' purchasing power should increase the demand for consumption imports.

The results indicate that exchange rate appreciations in East Asian countries would substantially increase consumption goods imports into the region. In addition, an increase in income in Asia would also significantly raise the volume of imports.

Many are advocating a generalized appreciation of Asian currencies and the adoption of a domestic demand-led growth strategy for countries in the region (see, e.g., IMF 2010). The results reported here indicate that these policy changes would allow Asian consumers to purchase many more consumer goods from the rest of the world.

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

2. DATA AND METHODOLOGY

Import functions in the Bickerdike-Robinson-Metzler imperfect substitutes framework can be represented as:

$$im_t = \beta_0 + \beta_1 rer_t + \beta_2 rgdp_t \quad (1)$$

where im_t represents real imports, rer_t represents the real exchange rate, $rgdp_t$ represents domestic real income, and all variables are measured in natural logs.

Exchange rate changes affect imports by changing the relative prices of domestic and foreign tradables. For expenditure switching to take place, exchange rate changes must be passed through into import prices and changes in import prices (relative to domestic prices) must affect spending. Chinn (2005) and others have argued that exchange rates are more volatile than other macroeconomic variables and disconnected from the real economy. Thus, exchange rate changes are likely to be exogenous relative to changes in relative prices and conditioning on the exchange rate in equation (1) is appropriate.

Imports into Indonesia, Japan, Malaysia, the PRC, the Philippines, the Republic of Korea (hereafter Korea), Thailand, and Taipei,China are investigated. Because of possible distortions caused by entrepôt trade, Singapore and Hong Kong, China are not included in the sample of East Asian importers.

The dependent variable is final consumption goods imports. These goods are primarily intended for the domestic market, unlike parts and components and capital goods that are often used to produce goods for re-export.

Data on final consumption goods imports (im_t) are obtained from the CEPII-CHELEM database. They are measured in US dollars and deflated using three different indices. The first is the US Bureau of Labor Statistics price index for consumption goods exports, the second is the US consumer price index (CPI), and the third is the US Bureau of Labor Statistics price index for consumption goods imports.[1] As discussed below, consumption shares are also used to test for the robustness of the results.

For each of the eight East Asian importing countries, all countries that provided at least 1% of the value of consumption imports into the country in 2008 are included in the sample. These countries are listed in Table 1.[2] Their number varies from 11 to 19.

Data on the real exchange rate (rer_t) are obtained from the CEPII-CHELEM database. The CEPII real exchange rate between countries *i* and *j* is calculated by first dividing gross domestic product (GDP) in dollars for country *i* by GDP in purchasing power parity (PPP) for country *i* and doing the same for country *j*. The resulting ratio for country *i* is then divided by the ratio for country *j*. This variable measures the units of PPP-defined GDP in country *i* needed to buy a unit of PPP-defined GDP in country *j*. The major advantage of this variable is that it can be compared both across countries and over time.

As a second measure of the real exchange rate, the CPI-deflated rer_t is used. Data on the bilateral nominal exchange rate and consumer price indices in the importing and exporting

[1] The Bureau of Labor Statistics export and import price indices exclude automobiles.

[2] In three cases consumption imports were only slightly above 1% in 2008 and were zero or close to zero in many of the previous years. These three cases were imports into Japan and the Philippines from Viet Nam and imports into Indonesia from Turkey. These three cases were excluded from the estimation.

countries that are used to calculate the CPI-deflated rer_t are obtained from the IMF *International Financial Statistics*.

Table 1: Major Exporters of Consumption Goods to East Asian Countries

Exporting Economies	Importing Economies							
	Indo-nesia	Japan	Malay-sia	PRC	Philip-pines	Korea	Taipei,China	Thai-land
Australia	○		○		○	○	○	○
Belgium	○	○	○		○	○		○
PRC	○	○	○		○	○	○	○
France	○	○	○	○	○	○	○	○
Germany	○	○	○	○	○	○	○	○
Hong Kong, China				○				
India	○		○		○			○
Indonesia			○		○	○		○
Ireland					○			
Italy	○	○		○		○	○	○
Japan	○		○	○	○	○	○	○
Korea	○	○	○	○	○		○	○
Malaysia	○	○			○		○	○
Netherlands	○		○		○	○	○	○
Philippines								○
Singapore	○		○	○	○			○
Spain					○			
Switzerland	○	○	○	○	○	○	○	○
Taipei,China	○	○	○	○	○	○		○
Thailand	○	○	○		○	○	○	
Turkey	○							
UK	○	○	○	○	○	○	○	○
US	○	○	○	○	○	○	○	○
Viet Nam		○			○			

Note: Major exporters are defined as those that supplied at least 1% of a country's total consumption imports in 2008.

Source: CEPII-CHELEM Database.

One difficulty with this measure is that bilateral exchange rates between exporting countries and importing countries vary markedly in magnitude. For instance, between January and August 2010 the yen/dollar rate averaged 90 and the yen/won rate averaged 0.08. To correct for this, bilateral exchange rates are set equal to the value given by the CEPII real exchange rate in the first year of the sample period (1977). The CPI-deflated bilateral real exchange rates are then used to calculate the rate of change in the real exchange rate for every year up to the end of the sample period (2008).

In addition to the bilateral exchange rate between importing and exporting countries, the relative price of competing goods sourced from third countries should matter.[3] To control for this, a weighted exchange rate including all countries that provided at least 1% of the value of consumption imports is employed.

To understand how this variable is constructed, consider the case of Indonesia. Panel A of Table 3 states that there are 17 countries that are leading suppliers of consumption goods to Indonesia. When explaining Indonesia's imports from country *i*, a weighted exchange rate of the other 16 countries that compete with country *i* in exporting consumption goods is included in the regression along with the bilateral exchange rate between country *i* and Indonesia.

To calculate the weighted exchange rate, the value of consumption goods imports (CGI) coming from each of the 16 countries in 2008 is divided by the value of CGI coming from all 16 together in 2008. For each country *j* that is one of the 16 countries that compete with country *i*, its share of consumption imports ($w_{j,2008} = CGI_j / \sum_{k=1}^{16} CGI_k$) is multiplied by its bilateral exchange rate with Indonesia in 2008 ($rer_{j,Indonesia,2008}$). The weighted exchange rate for countries that compete with country *i* is then calculated according to the formula:

$$crer_{i,Indonesia,2008} = \sum_{j=1}^{16} w_{j,2008} * rer_{j,Indonesia,2008} \quad (2)$$

This procedure is repeated to calculate competitors' exchange rates for all of the 17 major exporters to Indonesia. It is also repeated for every year going back to 1977, with weights being recalculated every year. The same approach is also used to calculate *crer* for the other 7 East Asian importers.

To calculate *crer* in this way it is necessary to use exchange rates that can be compared across countries. The CEPII exchange rates are thus used.

Data on real income in the importing country ($rgdp_t$) are also obtained from the CEPII-CHELEM database. Real income is measured in constant US dollars (base year 2005).

The East Asian Crisis was associated with a marked drop in consumption goods imports in 1998 and 1999. To control for this, a dummy variable is included for crisis-hit economies (Indonesia, Korea, Malaysia, the Philippines, and Thailand) that equals one in 1998 and 1999 and zero otherwise.

The PRC joined the World Trade Organization (WTO) in 2001. This may have led to an increase in imports. To control for this, a dummy variable is included for PRC imports that equals one beginning in 2001 and zero before 2001.

To specify the econometric model, a battery of panel unit root tests are performed on the levels and first differences of the variables im_t , rer_t $rgdp_t$, and $crer_t$.[4] The results, available on request, indicate that in the vast majority of cases the variables are integrated of order 1 (I(1)).

Kao residual cointegration tests are then performed for the four variables.[5] The results, presented in Table 2, indicate that the null hypothesis of no cointegration can be rejected for

[3] I am indebted to an anonymous referee for this point.

[4] These tests include the Im, Peseran, and Shin test; the augmented Dickey-Fuller Fisher Chi-square test; the Phillips-Perron Fisher Chi-square test; the Levin, Lin, and Chu test; and the Hadiri test. These tests are discussed by Barbieri (2005).

[5] This test is discussed in Kao (1999).

all countries except Taipei,China.[6] Panel dynamic ordinary least squares (DOLS) estimation, a technique for estimating co-integrating relations, is thus employed.

Table 2: Kao Residual Cointegration Tests for Import Equations

Economies	
Indonesia	-1.38*
Japan	-2.51**
Malaysia	-1.68**
People's Republic of China	-2.75**
Philippines	-2.68**
Republic of Korea	-5.17**
Taipei,China	-0.31
Thailand	-1.79**

Notes: (1) t-statistic from Kao Residual Cointegration test of the null hypothesis of no cointegration..

Lag selection is based on the Schwartz Information Criterion.

** and * denote significance at the 5% and 10% levels.

Source: Author's calculations.

DOLS involves regressing the left-hand variable on a constant, the right-hand variables, and lags and leads of the first difference of the right-hand variables. The individual import equations have the form:

$$im_{i,t} = \beta_0 + \beta_1 rer_{i,t} + \beta_2 rgdp_t + \beta_3 crer_{i,t} + \beta_4 Time + \beta_5 Crisis + \beta_6 WTO + \sum_{j=-p}^{p} \alpha_{1,j} \Delta rer_{i,t-j} + \sum_{j=-p}^{p} \alpha_{2,j} \Delta rgdp_{t-j} + \sum_{j=-p}^{p} \alpha_{3,j} \Delta crer_{i,t-j} + \mu_i + u_{i,t}, \quad (3)$$

Here $im_{i,t}$ represents real consumption goods imports into an East Asian country from country *i*, $rer_{i,t}$ represents the bilateral real exchange rate between exporting country *i* and the East Asian importing country, $rgdp_t$ equals real income in the importing country, $crer_{i,t}$ represents the weighted real exchange rate among exporting countries that compete with country *i*, $Time$ is a time trend, $Crisis$ is a dummy variable for East Asian Crisis- hit economies that takes on a value of one in 1998 and 1999 and zero otherwise, WTO is a dummy variable for the PRC that takes on a value of one beginning in 2001 and zero before

[6] In the case of Indonesia the test statistic has a *p*-value of 0.08.

2001, μ_i is a country i fixed effect, and p represents the number of leads and lags. $im_{i,t}$, $rer_{i,t}$, and $rgdp_t$ are measured in natural logs.

The data set extends from 1977 to 2008. Since one lead and one lag of the first difference of the right hand side variables are used in the DOLS estimation, the actual sample period extends from 1979 to 2007. In the case of China, data from the 1970s and much of the 1980s are probably not useful for estimating trade elasticities. Following Thorbecke (2006), the estimation for China begins in 1989.

As a cross-check on the robustness of the results, trade shares rather than trade volumes are used as the dependent variable. Following Marquez and Schindler (2007), this approach avoids the need to employ proxy variables to deflate the value of imports. To calculate trade shares in this paper, total consumption imports going into an individual country are divided by total world consumption imports minus consumption imports going into the individual country.

In the numerator, the value of consumption imports flowing from the world into each Asian country is used rather than the value of consumption imports flowing from individual countries into each Asian country. When consumption imports coming from individual countries into each Asian country are divided by total rest of the world consumption imports, the ratio is often of the order of magnitude of 10^{-6}. In this case there is a risk that the information content of consumption imports from individual countries in the numerator is swamped by the much larger value of rest of the world consumption imports in the denominator.

Thus, the value of consumption goods imports coming from the world into each East Asian country is divided by the value of consumption goods imports coming from the world into all countries except the East Asian country in the numerator. A panel data set is constructed using trade shares for the eight East Asian countries. Because of the presence of the PRC in the sample, the estimation begins in 1989. It extends to 2008. The share of consumption goods imports is explained using the real effective exchange rate and real income in the importing country, an Asian Crisis dummy, and a time trend. The data are obtained from the CEPII-CHELEM database and the model is estimated by DOLS.

3. RESULTS

Table 3 presents the results from estimating equation (2). The results are presented without trend, because in almost all cases the Schwarz Criterion selected this specification. For each country there are three columns. The first column presents the results using CEPII real exchange rates and consumption imports deflated by the US consumer price index. The second column presents results using CEPII real exchange rates and consumption imports deflated using the Bureau of Labor Statistics price index for consumer goods exports. The third column presents results using the CPI-deflated real exchange rate and consumption imports deflated using the US consumer price index.

Table 3: Panel DOLS Estimates of Consumption Goods Imports (Panel A)

	Countries							
	(1) Indo-nesia	(2) Indo-nesia	(3) Indo-nesia	(4) Japan	(5) Japan	(6) Japan	(7) Malaysia	(8) Malaysia
Bilateral RER (CEPII)	0.81***	0.71***		1.45***	1.25***		0.37***	0.25*
	(0.23)	(0.23)		(0.18)	(0.19)		(0.09)	(0.14)
Bilateral RER (CPI-Deflated)			1.73***			1.45***		
			(0.27)			(0.22)		
Real GDP	1.33***	1.91***	2.11***	2.88***	4.60***	2.82***	1.16***	1.50***
	(0.11)	(0.11)	(0.17)	(0.28)	(0.27)	(0.26)	(0.04)	(0.04)
Competitor's RER	-0.21	-0.20	-0.56***	-0.61***	-1.13***	-0.59***	0.04	0.25**
	(0.19)	(0.14)	(0.16)	(0.22)	(0.27)	(0.24)	(0.13)	(0.12)
Asia Crisis Dummy	-0.63***	-0.84**	-1.15***				0.14***	0.02
	(0.23)	(0.22)	(0.32)				(0.05)	(0.04)
Adjusted R-squared	0.80	0.84	0.83	0.89	0.89	0.90	0.88	0.90
Sample Period	1979–2007	1984–2007	1979–2007	1979–2007	1984–2007	1979–2007	1979–2007	1984–2007
No. of Exporting Countries	17	17	17	12	12	12	16	16
No. of Observations	493	408	484	348	288	339	464	384

Notes: DOLS(1,1) estimates. Heteroskedasticity-consistent standard errors are in parentheses. The Bilateral RER variable is defined so that an increase represents an appreciation in the importing country relative to the exporting country. The coefficient on the Bilateral RER should thus be positive. The Competitor's RER variable is defined so that an increase represents an appreciation in the importing country relative to other countries providing consumption imports. The coefficient on the Competitor's RER should thus be negative. There are three columns for each country. In the first and third columns, consumption imports are deflated using the US consumer price index. In the second column, consumption exports are deflated using the Bureau of Labor Statistics price index for consumer goods exports. The Asia Crisis Dummy takes on a value of one in 1998 and 1999 and zero otherwise. The WTO Dummy variable for the PRC takes on a value of one beginning in 2001 and zero before zero. *** (**) [*] denotes significance at the 1% (5%) [10%] level.

Source: Author's calculations.

Columns (1) through (3) in Panel A of Table 3 present results for Indonesia. The real exchange rate elasticities are of the expected sign and statistically significant in every specification. For the CEPII real exchange rate the elasticity equals about 0.75 and for the CPI-deflated real exchange rate the elasticity equals 1.73. The differing values may reflect a spike in the Indonesian CPI in 1997 and 1998 associated with the Asian Crisis. The income

elasticities are also of the expected sign and statistically significant in every specification. The values range from 1.33 to 2.11. The coefficients on the exchange rates from other importers are of the expected sign in every case, but only statistically significant in one case.

Columns (4) through (6) in Panel A of Table 3 present results for Japan. The real exchange rate elasticities are of the expected sign and statistically significant in every specification. The elasticities vary between 1.25 and 1.45. The income elasticities are also of the expected sign and statistically significant in every specification. The values range from 2.82 to 4.60. The coefficients on the exchange rates from other exporting countries are also of the expected sign and statistically significant in every case.

Japan is a front-runner among East Asian countries. It was the first to adopt an export-led growth strategy and the first to reach the technological frontier. It has attained higher per-capita income levels and experienced more exchange rate appreciation than other countries in the region. It is also the leading importer of consumption goods in Asia. The high income and exchange rate elasticities for Japan may indicate that other East Asian countries, if they continue to develop, will also significantly increase consumption imports.

Columns (7) and (8) in Panel A of Table 3 and column (1) in Panel B of Table 3 present results for Malaysia. The real exchange rate elasticities are of the expected sign and statistically significant in every specification. (In one specification it is significant at the 10% level.) The elasticities vary between 0.25 and 0.79. The income elasticities are also of the expected sign and statistically significant in every specification. The values range from 1.16 to 1.50. The coefficients on the exchange rates from other exporting countries are not of the expected sign.

Columns (2) through (4) in Panel B of Table 3 present results for the PRC. The real exchange rate elasticities are not statistically significant. The income elasticities are of the expected sign and statistically significant in every specification. The values range from 1.75 to 1.98. The coefficients on the exchange rates from other exporting countries are also of the expected sign and statistically significant in every case.

One reason why the PRC's bilateral exchange rate elasticity may not be statistically significant is that only 11 countries are included in the sample. These include the US and several Asian countries whose currencies were closely linked with the dollar for many years. Since the yuan was pegged to the dollar for most of the sample period, there might not have been enough exchange rate variation in the data to give the tests sufficient discriminatory power. Using a larger sample (27 countries), Thorbecke (2009) reports that an appreciation of the yuan significantly increases consumption imports into the PRC.

Columns (5) through (7) in Panel B of Table 3 present results for the Philippines. The real exchange rate elasticities are of the expected sign and statistically significant in every specification. The elasticities vary between 1.06 and 2.03. The income elasticities are also of the expected sign and statistically significant in every specification. The values range from 3.60 to 4.19. The coefficients on the exchange rates from other exporting countries are also of the expected sign and statistically significant in every specification.

Table 3: Panel DOLS Estimates of Consumption Goods Imports (Panel B)

	Country							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Malaysia	PRC	PRC	PRC	Philip-pines	Philip-pines	Philip-pines	Korea
Bilateral RER (CEPII)		0.16	0.17		2.03***	1.70***		0.61**
		(0.18)	(0.18)		(0.16)	(0.26)		(0.26)
Bilateral RER (CPI-Deflated)	0.79***			-0.01			1.06***	
	(0.09)			(0.32)			(0.12)	
Real GDP	1.29***	1.80***	1.98***	1.75***	3.93***	4.19***	3.60***	1.78***
	(0.05)	(0.23)	(0.24)	(0.22)	(0.19)	(0.42)	(0.21)	(0.08)
Competitor's RER	0.08	-0.66***	-0.65***	-0.59***	-3.03***	-1.91***	-2.54***	-0.16
	(0.15)	(0.11)	(0.11)	(0.12)	(0.30)	(0.41)	(0.33)	(0.30)
Asia Crisis Dummy	0.11				0.33***	0.36***	0.38***	-0.27**
	(0.07)				(0.09)	(0.08)	(0.09)	(0.11)
WTO Dummy		0.19	0.22	0.21				
		(0.29)	(0.30)	(0.27)				
Adjusted R-squared	0.89	0.92	0.93	0.92	0.85	0.86	0.84	0.93
Sample Period	1979–2007	1989–2007	1989–2007	1989–2007	1979–2007	1984–2007	1979–2007	1979–-2007
No. of Exporting Countries	16	11	11	11	19	19	19	14
No. of Observations	455	209	209	209	551	432	542	396

Notes: DOLS(1,1) estimates. Heteroskedasticity-consistent standard errors are in parentheses. The Bilateral RER variable is defined so that an increase represents an appreciation in the importing country relative to the exporting country. The coefficient on the Bilateral RER should thus be positive. The Competitor's RER variable is defined so that an increase represents an appreciation in the importing country relative to other countries providing consumption imports. The coefficient on the Competitor's RER should thus be negative. There are three columns for each country. In the first and third columns, consumption imports are deflated using the US consumer price index. In the second column, consumption exports are deflated using the Bureau of Labor Statistics price index for consumer goods exports. The Asia Crisis Dummy takes on a value of one in 1998 and 1999 and zero otherwise. The WTO Dummy variable for the PRC takes on a value of one beginning in 2001 and zero before zero.*** (**) [*] denotes significance at the 1% (5%) [10%] level.

Source: Author's calculations.

Column (8) in Panel B of Table 3 and Columns (1) and (2) in Panel C of the Table present results for Korea. The real exchange rate elasticities are of the expected sign, statistically significant in two of the three specifications, and insignificant in the third specification. In the two cases where the elasticities are significant they equal 0.61 and 0.86. The income elasticities are also of the expected sign and statistically significant in every specification.

The values range from 1.78 to 2.14. The coefficients on the exchange rates from other exporting countries are not statistically significant.

Table 3: Panel DOLS Estimates of Consumption Goods Imports (Panel C)

	Country							
	(1) Korea	(2) Korea	(3) Taipei,China	(4) Taipei,China	(5) Taipei,China	(6) Thai-land	(7) Thai-land	(8) Thai-land
Bilateral RER (CEPII)	-0.01		-2.77**	0.27*		0.94***	0.57***	
	(0.20)		(1.22)	(0.16)		(0.19)	(0.17)	
Bilateral RER (CPI-Deflated)		0.86***			-5.44***			1.50***
		(0.29)			(1.81)			(0.22)
Real GDP	2.14***	1.86***	3.91***	1.83***	3.90***	1.54***	1.85***	1.59***
	(0.14)	(0.07)	(0.30)	(0.14)	(0.21)	(0.07)	(0.09)	(0.09)
Competitor's RER	0.04	-0.15	-0.68	-2.72***	1.50	-0.11	0.26	-0.17
	(0.28)	(0.31)	(4.51)	(0.77)	(4.36)	(0.30)	(0.29)	(0.33)
Asia Crisis Dummy	-0.32**	-0.18**				-0.27*	-0.32*	-0.27*
	(0.15)	(0.11)				(0.14)	(0.17)	(0.16)
Adjusted R-squared	0.93	0.94	0.75	0.85	0.75	0.89	0.89	0.91
Sample Period	1984–2007	1979–2007	1979–2007	1984–2007	1979–2007	1979–2007	1984–2007	1979–2007
No. of Exporting Countries	14	14	13	13	13	18	18	18
No. of Observations	331	396	377	305	368	522	432	513

Notes: DOLS(1,1) estimates. Heteroskedasticity-consistent standard errors are in parentheses. The Bilateral RER variable is defined so that an increase represents an appreciation in the importing country relative to the exporting country. The coefficient on the Bilateral RER should thus be positive. The Competitor's RER variable is defined so that an increase represents an appreciation in the importing country relative to other countries providing consumption imports. The coefficient on the Competitor's RER should thus be negative. There are three columns for each country. In the first and third columns, consumption imports are deflated using the US consumer price index. In the second column, consumption exports are deflated using the Bureau of Labor Statistics price index for consumer goods exports. The Asia Crisis Dummy takes on a value of one in 1998 and 1999 and zero otherwise. The WTO Dummy variable for the PRC takes on a value of one beginning in 2001 and zero before zero.

*** (**) [*] denotes significance at the 1% (5%) [10%] level.

Source: Author's calculations.

Columns (3) through (5) in Panel C of Table 3 present results for Taipei,China. The results in columns (3) and (5) do not make sense. The exchange rate coefficients are of the wrong sign and implausibly large. The adjusted R-squared is smaller than in any other case. Perhaps these results reflect the finding in Table 1 that there is not a cointegrating relationship between these variables.

The results in column (4) are more plausible. All of the coefficients are of the expected sign and statistically significant (at least at the 10% level). The adjusted R-squared is also

comparable to the values found for the other countries. Future research should investigate import demand elasticities further for the case of Taipei,China.

Columns (6) through (8) in Panel C of Table 3 present results for Thailand. The real exchange rate elasticities are of the expected sign and statistically significant in every specification. The elasticities vary between 0.57 and 1.50. The income elasticities are also of the expected sign and statistically significant in every specification. The values range from 1.54 to 1.85. The coefficients on the exchange rates from other exporting countries are not statistically significant.

The coefficients on the Asian Crisis dummy variable are plausible. They are negative and statistically significant in every case for Indonesia, Korea, and Thailand; positive and generally not significant for Malaysia; and positive and significant for the Philippines. The coefficients also indicate that the largest relative drop in consumption imports occurred in Indonesia, followed by Thailand and Korea. These results make sense, since Indonesia suffered the most severe economic downturn during the Asian Crisis and since Thailand and Korea also experienced serious recessions. The Philippines, on the other hand, was the least affected of the five crisis countries. No banks failed in the Philippines during the crisis, and consumption spending was sustained by strong remittances from overseas Filipino workers.

The results reported in Table 3 are similar when a time trend is included, when competitors' exchange rates are excluded, and when imports are deflated using the Bureau of Labor Statistics price deflator for consumption imports.[7] These results are available on request.

As discussed above, a further cross-check on the robustness of the findings can be obtained by using trade shares. The results obtained using this specification are:

$$CSHARE_{i,t} = -0.20 + 0.010 rer_{i,t} + 0.014 rgdp_{i,t} + -0.00060 Time - 0.00033 Crisis; \quad (4)$$

$$(0.043)\ (0.0030) \qquad (0.0036) \qquad (0.00019) \qquad (0.0012)$$

Adjusted R-squared = 0.97, Sample Period = 1989-2007, No. of Observations = 152

where $CSHARE_{i,t}$ is the value of consumption imports going into East Asian country *i* relative to the value of consumption imports going into all other countries of the world, $rer_{i,t}$ is the real effective exchange rate in country *i*, $rgdp_{i,t}$ is real income in country *i*, $Time$ is a time trend, and $Crisis$ is a dummy variable for the Asian crisis counties. A time trend is included because this specification was selected by the Schwarz Criterion, but the results without the time trend are similar.

The coefficients on the real exchange rate, real income, and the time trend are all of the expected sign and statistically significant at the 1% level. The coefficient on the real exchange rate implies that, on average across the eight countries, a 10% appreciation would increase consumption imports by 8% in 2008. The coefficient on real income implies that, on average across the eight countries, a 10% increase in income would raise consumption imports by 11% in 2008.

The results in equation (3) thus confirm the findings in Table 3. The important implication of the results presented in this section is that exchange rate appreciations in East Asian countries would increase imports into the region. Increases in income in East Asian countries would have the same effect.

[7] The real exchange rate elasticities are very similar when a trend term is included. The income elasticities are also similar, except for the cases of the PRC and the Philippines. The results using the Bureau of Labor Statistics price deflator for consumption imports are very similar to the results using the Bureau of Labor Statistics price deflator for consumption exports presented in Table 3.

4. CONCLUSION

This paper has investigated import elasticities for East Asian countries. Estimating exchange rate elasticities for East Asian countries is difficult because many of the imports into these countries are parts and components or capital goods that are used to produce goods for re-export to the rest of the world. An exchange rate appreciation that reduces exports will also reduce the demand for imported goods that are used to produce exports. This can cause the estimated exchange rate coefficients in import equations to have the wrong sign.

To correct for this bias, this paper examines final consumption goods imports into East Asian countries. These goods are intended primarily for the domestic market rather than for re-export. An appreciation of the currency that raises consumers' purchasing power should increase the demand for consumption imports.

The results indicate that exchange rate appreciations in East Asian countries would substantially increase consumption goods imports into the region. Increases in income in East Asian countries would have similar effects.

Many argue that Asia's surpluses will eventually lead to appreciations throughout Asia (see IMF 2010). The ADB (2010) reports that the Asian middle class continues to expand, even in the wake of the Great Recession of 2008–2009. The results reported here indicate that exchange rate appreciations and increased prosperity throughout Asia would significantly increase consumption imports. Future research should investigate whether Asia can function as an engine of growth for the world economy. [8]

[8] To answer this question, it is necessary to consider whether domestic income and exchange rates in Asia can rise rapidly enough and whether aggregate imports from the rest of the world can grow quickly enough to supplant the role that US demand for consumption goods played before the crisis. I am indebted to an anonymous referee for this point.

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