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Is the Effect of Exchange Rate Volatility on Trade More Pronounced in Latin America than in Asia?

by

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ABSTRACT

This paper empirically investigates the impact of exchange rate volatility on East and Southeast Asian and Latin American exports from 1980 to 2004 by using a gravity model and panel data. The results show that exchange rate volatility negatively affects exports in both continents. However, the impact of exchange rate volatility is more pronounced in Latin America than in Asia for the whole sample period 1980-2004 and in the sub-period 1980-1996, but not in the sub-period 1997-2004. Moreover, the results also show that countries with relatively high tariffs are less vulnerable to exchange rate volatility than open economies. Finally, evidence reveals that exports from high-income countries are less affected by exchange rate volatility.

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1. Introduction

The impact of exchange rate volatility on trade has been widely studied, for instance by De Grauwe (1988), Dell'Ariccia (1999), Baccheta and Van Wincoop (2000) and Bohara and Sauer (2001). In most of these studies, gravity models are used, where exchange rate volatility is one of the explanatory variables for bilateral trade flows or exports. That approach will also be followed in this paper, in which we empirically test for the impact of real exchange rate volatility on exports. Real exchange rates are used instead of nominal exchange rates, because there are significant and persistent deviations from Purchasing Power Parity (Froot, Kim and Rogoff, 1995). This means that exporting firms are exposed to foreign exchange risk against which they may not be able to perfectly hedge.

The gravity model used in this paper is based on a model from Baak (2004), although with some minor changes to his model. Another difference between this paper and the one by Baak is the statistical methodology and the countries taken up in the data. Whereas Baak uses data for Asia Pacific countries, this paper uses data for trade between ten East and Southeast Asian countries[1] and their major trading partners[2], and trade between seventeen Latin American countries[3] and the same major trading partners as for the Asian countries.

The key question of this paper is whether exports are affected, negatively or positively, by exchange rate volatility. This issue has been largely studied, but no consensus has been reached on either the direction or the size of the effect of exchange rate volatility on trade. More specifically, we investigate whether exports from Latin American countries are more prone to exchange rate volatility than exports from Asian countries. These questions are important, since a negative effect of exchange rate volatility on exports would be one

[1] Namely China, Hong Kong, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Thailand and Vietnam.
[2] The major trading partners taken up in this paper are Australia, France, Germany, the United Kingdom and the United States.
[3] These countries are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela.

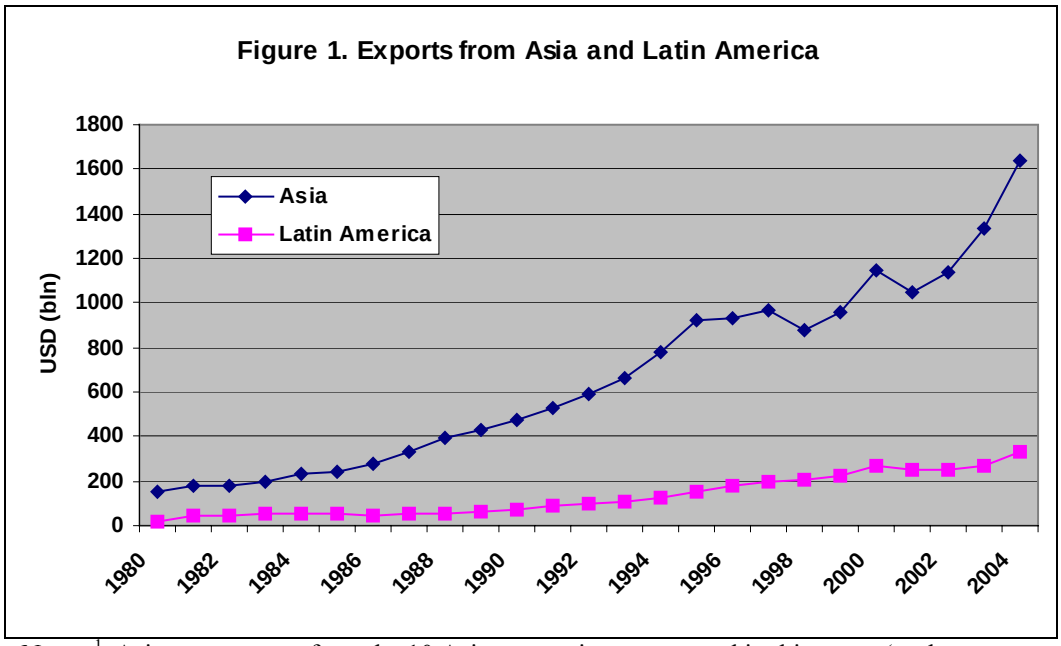
argument for pegging currencies. If exports from Latin American countries are more vulnerable to exchange rate volatility than exports from Asian countries, then Latin American countries should be more concerned about stable exchange rates than Asian countries. The difference in vulnerability of exports to exchange rate volatility between these two continents has already been studied, for instance by Bohara and Sauer (2001), who found more vulnerability in Latin America than in Asia. Their data only cover the 1973-1993 period, while this paper uses data from 1980 to 2004. Moreover, the gravity model and the statistical methodology are different.

The paper proceeds as follows: Section 2 presents a brief description of exchange rate volatility and exports in Asia and Latin America. Section 3 explains the model, the variables and their expected signs. Section 4 provides the data sources and methodology, while section 5 interprets the results. Finally, section 6 summarizes and concludes.

2. Background

During the past two decades, Asian countries have experienced rapid economic growth and a boom in their international trade, as can be seen in Figure 1. One of the main reasons is that these countries conducted export-oriented policies and were able to attract a huge amount of foreign direct investment (McKinnon, 2004). The rather poor performance of Latin American exports is mainly connected with the lack of trade openness and the presence of hyperinflation.

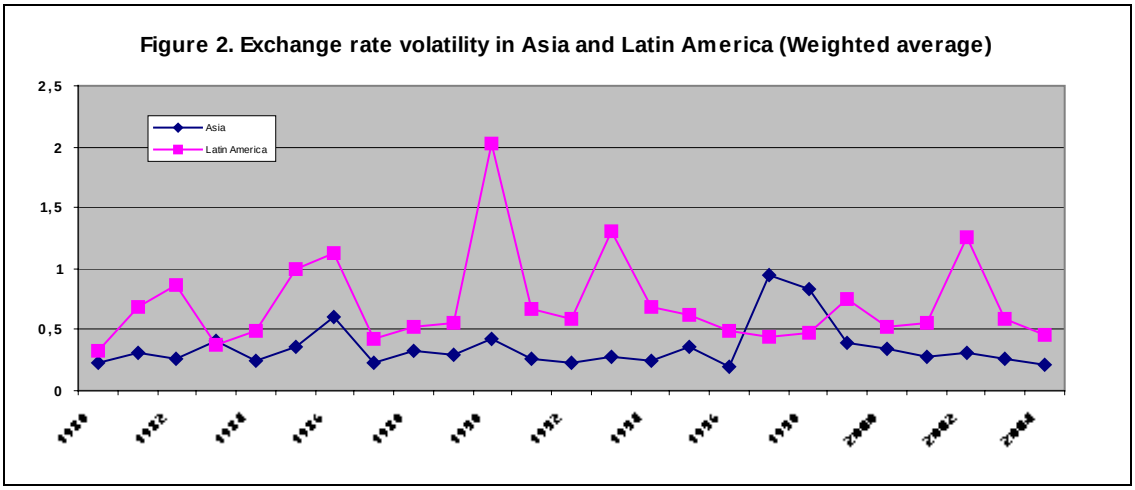
However, during the 1990s, due to liberalization process and stabilization programs that promoted economic growth in the region, major Latin American countries, such as Mexico, Brazil, Chile and Colombia, managed to expand their exports substantially (Kaminsky and Reinhart, 1998).



Notes: [1] Asian exports are from the 10 Asian countries represented in this paper (trade among each other and with Australia, France, Germany, UK and the US).
[2] Latin American exports are from the 17 Latin American countries represented in this paper (trade among each other and with Australia, France, Germany, UK and the US).

One of the factors that contributed to this discrepancy between Asian and Latin American exports may be the higher exchange rate volatility in Latin America, as can be seen in Figure 2. This hypothesis will be empirically tested in this paper.

Higher volatility of exchange rates in Latin America during the 1980s can be explained by the fact that almost all Latin American countries faced severe financial crises in that period.



Many Latin American countries, especially Guatemala, Bolivia and Peru had huge fiscal deficits that went along with an increase in their external debt and an expansion of the supply of money to service their debt (Kerremans, 2005). This led to hyperinflation that affected exchange rates. Figures A.1 and A.2, in the Appendix, show sharp fluctuations of exchange rates in individual Latin American countries during the 1980s.

Another wave of exchange rate fluctuations hit Latin America in 2002 and was connected with "the biggest default in history" (The Economist, 2002) in Argentina. It was stimulated by the prolonged recession after 1999, fiscal imbalances, freezing of bank deposits and the cancellation of the currency peg. The crisis spread to other Latin American countries.

Compared to Latin America, the Asian countries experienced relatively stable exchange rates at the end of the 1980s and the first half of the 1990s. The reason for this is that almost all Asian countries, except for Japan, pegged their currencies to the US dollar (for example, a currency board hard peg in Hong Kong or a crawling peg in Indonesia). However, this stability ended with the Asian crisis that began in 1997 and which undermined growth in the region. The first country that had to devalue its currency was Thailand. Serious capital outflows and speculative attacks that hit the country made the situation even worse. Due to contagion effects, many neighboring countries, like South Korea and Indonesia were forced to ask the IMF for financial aid (Kerremans, 2005). High exchange rate volatility can be seen in almost all Asian countries, especially in Indonesia, as they were forced to let their currencies float (see Figures A.3 and A.4). Only Hong Kong and China still continued to peg their currencies. Since 2002, most Asian countries managed to reduce exchange rate volatility and return to its pre-crisis level.

3. The Model

3.1. A Gravity Model

The gravity model, first applied to international trade theory by Tinbergen (1962) and Pöyhönen (1963), is a widely used empirical trade device and has performed remarkably well in explaining bilateral trade flows between countries. It explains the volume of bilateral trade as an increasing function of the size of the economy of both countries and a decreasing function of the distance between them. Usually, dummy variables for having a common border, language or trade agreement are also taken up in the model.

Originally, the gravity model was not founded on any theoretical model of international trade, but on the intuition that large economies trade more than small economies and that the distance between two countries depresses their bilateral trade flows. This lack of theoretical foundation was taken up by Anderson (1979) and Bergstrand (1985), who used models of monopolistic competition to derive a gravity model. Moreover, Deardoff (1998) demonstrated that the gravity model is consistent with Ricardian and Heckscher-Ohlin trade theory.

3.2. Specification of the Model

The gravity model in this paper does not use trade flows as dependent variable, but exports from one country to another. To avoid endogeneity problems, it does not include the exporting country's GDP, as exports are part of the exporting country's GDP. The model in this paper has the following specification:

$$EXP_{ijt} = \beta_0 + \beta_1 GDP_{jt} + \beta_2 BORDER_{ijt} + \beta_3 DISTANCE_{ijt} + \beta_4 LANGUAGE_{ijt} + \beta_5 FTA_{ijt} + \beta_6 DEPR_{ijt} + \beta_7 POP_{it} + \beta_8 VOL_{ijt} + \beta_9 VOL_{ijt} * DLA_{it} + \beta_{10} VOL_{ijt} * DTARIFF_{it} + \beta_{11} VOL_{ijt} * DINCOME_{it} + \delta_1 DChina + \delta_2 DHongKong + \delta_3 DIndonesia + \ldots + \delta_{26} DVenezuela + \varepsilon_{ijt}$$

The model is similar to the model used in Baak (2004). The only differences are that some slope dummies and a variable for population are added and that the dummy variable for APEC membership is replaced by a dummy variable for having a free trade agreement.

The subscripts i and j correspond with the exporting and the importing country respectively. EXP_{ijt} denotes the real exports from country i to country j in year t and GDP_{jt} is the real GDP of the importing country j in year t. $BORDER_{ijt}$ is a dummy variable with a value one if the countries i and j share a common border and zero otherwise. $DISTANCE_{ijt}$ is the distance between the capitals of countries i and j and $LANGUAGE_{ijt}$ is a dummy variable for a common official language. FTA_{ijt} is another dummy variable, which is assigned a value one if the countries i and j are part of a common free trade area. $DEPR_{ijt}$ denotes the depreciation rate of the real bilateral exchange rate of country i with respect to country j in year t. POP_{it} is a variable that stands for the population of country i in year t. VOL_{ijt} is the volatility of the real bilateral exchange rate between countries i and j in year t. DLA_{it} is a dummy variable with a value one if country i is a country in Latin America and zero otherwise. $DTARIFF_{it}$ has a value one if the country i has relatively high tariffs. $DINCOME_{it}$ is another dummy variable which is assigned a value one if country i has a high income per capita, compared to the other countries considered in this paper. Finally, DChina, DHongKong, etc. are country dummies. Japan is chosen as the reference country. In the next section, some specific variables are discussed in more detail. It should be noted that most variables used in this paper are the same as in Baak (2004) and are computed in the same way.

3.3. The Variables

3.3.1. Real Exports (EXP_{ijt})

Real exports are measured as follows:

$$EXP_{ijt} = \ln\left(\frac{EX_{ijt}}{USGDP_t} * 100\right)$$

where EX_{ijt} denotes the annual nominal exports in US Dollars (corrected for PPP) from country i to country j in year t. $USGDP_t$ is the GDP deflator for the United States in year t.

3.3.2. Real GDP (GDP_{jt})

Real GDP of the importing country j is defined as follows:

$$GDP_{jt} = \ln\left(\frac{GDPN_{jt}}{USGDP_t}\right) * 100$$

where $GDPN_{jt}$ is the nominal GDP of country j in year t measured in Purchasing Power Parity. $USGDP_t$ is again the GDP deflator for the United States in year t.

3.3.3. Depreciation Rate of the Real Bilateral Exchange Rate ($DEPR_{ijt}$)

The depreciation rate of the real bilateral exchange rate is computed as follows:

$$DEPR_{ijt} = \ln\left(EXR_{ijt}\right) - \ln\left(EXR_{ijt-1}\right)$$

where EXR_{ijt} is the real bilateral exchange rate, which is measured as:

$$EXR_{ijt} = E_{ijt} * \frac{CPI_{jt}}{CPI_{it}} \ .$$

E_{ijt} is the average nominal exchange rate between country i and country j in year t and CPI_{it} and CPI_{jt} denote the consumer price index of country i and country j respectively in year t.

3.3.4. Volatility of the Real Exchange Rate (VOL_{ijt})

The volatility of the real exchange rate is computed as:

$$VOL_{ijt} = \ln\left(\sqrt{\frac{1}{11}\sum_{k=1}^{12}\left(LEXR_{ijkt} - \overline{LEXR_{ijt}}\right)^2}\right)$$

where $LEXR_{ijkt}$ is the natural logarithm of the real monthly bilateral exchange rate between countries i and j for month k in year t. $\overline{LEXR_{ijt}}$ is the annual average of the natural logarithm of the average real monthly bilateral exchange rates between countries i and j in year t. According to this definition, the volatility of the real exchange rate between country i and country j is the same as the volatility of the real exchange rate between country j and country i.

3.3.5. Tariff Dummy ($DTARIFF_{it}$)

For the tariff dummy, the indicator 'Trade' from the Index of Economic Freedom, constructed by the Heritage Foundation, was used. Since there is no data available for the period before 1995, the average value over the period 1995-2005 is used.

A high score on the indicator 'Trade' corresponds with a high weighted average tariff rate. Again, the score is measured on a scale from one to five. In our model, the dummy variable $DTARIFF_{it}$ is given a value of one if the indicator 'Trade' is above the average of the Asian and Latin American countries represented in this paper[4]. This means that the country has relatively high tariffs. If, however, the score for the indicator 'Trade' is below or equal to the average, then the value of DTARIFFit is zero, which means that the country has relatively low tariffs.

[4] Countries with a value of one for $DTARIFF_{it}$ are China, Malaysia, Philippines, Vietnam, Argentina, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Nicaragua, Panama, Peru and Venezuela.

3.3.6. Income Dummy ($DINCOME_{it}$)

The dummy variable $DINCOME_{it}$ is constructed as follows: if GDP per capita, measured in constant US Dollar prices (of the year 2000), of country i is lower than or equal to the average of all the Asian and Latin American countries represented in this paper in year t, then the value of $DINCOME_{it}$ is zero. If GDP per capita in country i is above the average in year t, then the value of $DINCOME_{it}$ is one[5].

3.4. Expected Signs of the Variables

The real GDP of the country of destination is expected to have a positive effect on exports, as a larger economy means a larger demand, including for foreign products. A common border should also enhance exports. Distance, however, should depress exports: the further the distance between two countries, the higher the transportation costs and thus the lower the exports. A common language means less transaction costs and thus higher exports. Also, being part of the same free trade area should enhance exports. The intuition is that tariff and non-tariff trade barriers are reduced in a free trade area and therefore stimulate trade. All these assumptions are supported by many empirical studies, like Bergstrand (1985), Dell'Ariccia (1999) and Taglioni (2002) among others.

Depreciation should stimulate exports, since a lower value of the home currency with respect to the foreign currency means that home products become cheaper abroad, which will lead to an increase in exports. Baak (2004) found a significant positive relationship between depreciation and exports.

The effect of population of the country of origin on exports of this country should also be positive: countries with a large population are expected to export more. This result is

[5] For instance, for 2003 the countries with a value of one for $DINCOME_{it}$ are Hong Kong, Japan, Singapore, South Korea and Argentina.

found in Fitzsimons, Hogan & Neary (1999). However, some papers find negative coefficients for population, for instance Dell'Ariccia (1999).

The impact of exchange rate volatility on exports is not clear-cut. Several papers treat high exchange rate volatility as leading to more uncertainty and risk for firms. The reason is that there are significant and persistent deviations from Purchasing Power Parity (Froot, Kim and Rogoff, 1995). Therefore, exports are expected to be depressed by higher exchange rate volatility. This negative relationship can be found in Koray and Lastrapes (1989 and 1990), Bini-Smaghi (1991), Feenstra and Kendall (1991), Dell'Ariccia (1999) and Baak (2004). However, Sercu and Uppal (2000) note that "most empirical work fails to find a strong negative relation between exchange rate volatility and the volume of international trade". Indeed, if a negative relationship is found, it is often a weak one. Some theoretical papers (De Grauwe, 1988; Sercu and Uppal, 2000) have also presented models that allow for positive and negative effects of exchange rate volatility on trade. De Grauwe (2003) mentions that changes in the exchange rate do not only represent a risk, they also create opportunities to make profits. He compares exporting to using an option: when the exchange rate becomes favorable, the firm uses the option to export. If the exchange rate is not favorable, the firm will not use the option to export. With a more volatile exchange rate, the value of the option will rise and the firm is better off. A positive relationship between exchange rate volatility and trade is empirically found in Brada and Mendez (1988) and Asseery and Peel (1991). Finally, Baccheta and van Wincoop (2000) have constructed a model in which exchange rate volatility has no effect on trade volumes. Bailey and Tavlas (1988), Belanger et al. (1992) and Gagnon (1993) present empirical results where the effect of exchange rate volatility on trade is insignificant.

The expected sign of the slope dummy for Latin America is negative, meaning that the effect of exchange rate volatility on exports is more pronounced in Latin America than in

Asia. The reasoning behind this hypothesis is that the financial environment in Latin America is less advanced than in Asia. Latin American firms may also have less hedging opportunities than Asian firms. Bohara and Sauer (2001) compare the effects of exchange rate volatility between different continents and find a more negative effect for Latin America than for Asia.

For the slope dummy for high-tariff countries, a positive sign is expected: exports of closed economies are less vulnerable to exchange rate volatility than open economies. The same holds for high-income countries. It is expected that low-income countries have less developed financial markets and that firms in these countries are therefore less protected against exchange rate volatility. This assumption is supported by Bohara and Sauer (2001), who find that exports of less-developed countries are more prone to exchange rate volatility than developed countries.

Table 1 gives an overview of the expected signs of the different variables in the model.

Table 1: Summary of the Expected signs of the Variables

Variable	Expected Sign
GDP (Real GDP)	+
BORDER	+
DISTANCE	-
LANGUAGE	+
FTA (Free Trade Area)	+
DEPR (Real Depreciation)	+
POPULATION	+
VOL (Volatility)	+/-
VOL*DLA (Slope Dummy for Latin America)	-
VOL*DTARIFF (Slope Dummy for High-tariff Countries)	+
VOL*DINCOME (Slope Dummy for High-income countries)	+

4. Data and Methodology

The paper compiles annual data from 1980 to 2004. Exports data were gathered from IMF's DOTS (Direction of Trade Statistics). Population, nominal GDP, in international dollars, corrected for PPP, and GDP per capita, in constant 2000 US Dollars, were obtained from World Bank Development Indicators. Exchange rates, U.S. GDP deflator and consumer

price indices were taken from IMF International Financial Statistics. Distance data were gathered from the Meridian World Data. Data for the tariff slope dummy were derived from the Heritage Foundation website and data for the free trade agreements were gathered from the World Trade Organization website.

Given the nature of the data, the Prais-Winsten regression for unbalanced panels[6] is used to estimate the parameters in the model where the disturbances are assumed to be heteroscedastic and correlated across panels, and where the autocorrelation of the disturbances are specific to each panel. Specifically, the errors are assumed to follow a first-order autoregressive process[7].

A panel-corrected standard error model is used to solve the problem of heteroscedasticity and correlated disturbances. Since the lagged endogenous variable appeared significant, an AR(1) process exists in the model. Hence, the need to use Prais-Winsten regression.

5. Empirical Results

The model was estimated using bilateral exports from 1980 to 2004 among the 10 Southeast Asian countries and among 17 Latin American countries. Exports from the Asian and Latin American countries to Australia, France, Germany, UK, and the US were also included in the data. Due to the nature of the data, the estimated parameters are corrected for first-order panel-level autocorrelation, and panel-level and temporal heteroscedasticity[8].

The regression results of the gravity model are reported in Table 2. The table is divided into three sections. The first section shows the results for the entire sample period from 1980 to 2004, the second section from 1980 to 1996 and the third one from 1997 to

[6] Since there are more pairs of countries than sample time-periods, panels are unbalanced.
[7] Refer to Stata Cross-Section Time Series Reference Manual for a thorough discussion of Prais-Winsten regression.
[8]The error terms are assumed to be heteroscedastic and contemporaneously correlated across panels, i.e. each panel has its own variance and each pair of panels has their own variance.

2004. A dummy variable for each country except Japan is included in the regression to control for specific country peculiarities.

Table 2: Prais-Winsten Regression Results

Dependent Variable: Real Exports

Explanatory Variables	Complete Period		1980 - 1996		1997 - 2004	
	Coefficient	Z Stat	Coefficient	Z Stat	Coefficient	Z Stat
Real GDP	1.2221	14.56**	1.2684	13.52**	1.1340	17.55**
Border	1.4908	4.76**	2.1779	5.05**	1.2464	6.74**
Distance	-0.0009	-10.65**	-0.0008	-9.63**	-0.0006	-9.06**
Language	-1.8607	-3.87**	-1.7859	-3.81**	-0.2326	-0.75
FTA	0.4879	2.64**	0.5388	2.43**	1.1597	5.29**
Real Depreciation	-0.0000	-0.03	0.0005	0.26	0.2737	1.63
Population	0.0000	5.40**	0.0000	0.90	0.0000	4.12**
Volatility	-0.0981	-3.11**	-0.1076	-2.49**	-0.1491	-2.95**
Volatility*DLA	-0.1050	-2.48**	-0.1112	-1.79*	0.0047	0.09
Volatility*DTariff	0.1468	2.44**	0.1147	1.34	0.1672	1.98**
Volatility*DIncome	0.1148	2.57**	0.1577	2.56**	0.1029	2.02**
DChina	-15.0862	-6.16**	-5.9435	-1.81*	-16.1026	-4.40**
DHongKong	-1.3794	-4.22**	-2.5468	-5.06**	0.1481	0.36
DIndonesia	-3.1660	-12.26**	-3.3184	-9.66**	-3.0374	-9.53**
DMalaysia	-1.7227	-5.03**	-3.1729	-5.84**	-0.1793	-0.41
DPhilippines	-4.6776	-5.71**	-5.2963	-5.53**	-2.4911	-7.47**
DSingapore	-0.1938	-0.51	-1.6898	-2.98**	0.3384	0.82
DSouth Korea	-1.4228	-5.90**	-2.3588	-5.96**	-0.2738	-1.01
DThailand	-3.7130	-12.87**	-4.6515	-10.29**	-1.8218	-6.09**
DVietnam	-5.2885	-13.82**	-5.4171	-8.38**	-3.7820	-9.03**
DArgentina	-2.8924	-3.66**	-3.1339	-4.13**	-3.9020	-5.07**
DBolivia	-7.7550	-12.57**	-9.7561	-12.68**	-6.9439	-11.49**
DBrazil	-3.5896	-11.33**	-3.0994	-7.76**	-3.1855	-9.03**
DChile	-2.6872	-5.23**	-4.3400	-6.26**	-2.2388	-4.88**
DColombia	-3.0697	-9.07**	-4.0935	-9.14**	-2.9875	-7.05**
DCosta Rica	-5.4944	-10.62**	-6.7620	-10.94**	-4.0285	-7.31**
DEcuador	-4.1559	-9.07**	-5.8877	-9.12**	-3.5619	-7.12**
DEl Salvador	-8.7047	-13.07**	-10.7316	-12.35**	-7.1419	-10.20**
DGuatemala	-5.7022	-11.30**	-7.4133	-11.80**	-4.6064	-7.44**
DHonduras	-9.7650	-12.22**	-11.2472	-12.45**	-10.0305	-8.86**
DMexico	-2.0004	-6.52**	-2.5538	-7.02**	-2.8322	-9.23**
DNicaragua	-11.8377	-12.09**	-13.7225	-11.61**	-11.0842	-8.90**
DPanama	-6.4733	-11.70**	-8.4091	-10.88**	-6.5001	-10.15**
DParaguay	-6.6525	-11.59**	-6.7940	-10.31**	-6.8302	-12.42**
DPeru	-3.4984	-8.79**	-4.7778	-8.56**	-3.3869	-6.84**
DUruguay	-4.2158	-8.43**	-5.5658	-8.36**	-4.3836	-8.40**
DVenezuela	-2.3548	-3.94**	-3.7082	-5.67**	-3.1587	-4.26**
Constant	-7.7056	-3.34**	-8.1668	-3.19**	-7.2774	-4.18**
Number of Observation	9237		5765		3472	
R-squared	0.7824		0.8148		0.9419	
Wald Chi-squared	6448.25		3275.30		10724.86	

Note: (*) and (**) means that the parameter estimates are significant at α=0.1 and α=0.05, respectively.

The estimated coefficient values for real GDP, border, distance, and bilateral free trade agreement are highly significant. They all exhibit the expected signs and are consistent across the two sub-periods.

However, the coefficient for language in the complete period and in the first sub-period is negative and significant, contrary to what was expected. The reason might be that most pairs of countries with the same language are found in Latin America. It is therefore possible that the negative coefficient for the language dummy can be explained by a lower level of exports in Latin America than in the other countries considered in this paper, even when we control for other variables.

The depreciation coefficient is not significant in the complete period and in the two subperiods. The coefficient for population is significant for the whole period and for the second subperiod. However, the coefficient is very small.

On average, the volatility of exchange rates has a negative and significant impact on exports, and the estimated coefficient value is more negative in period 1997-2004 than the period 1980-1996. However, the impact is relatively small.

To capture the difference in impact of exchange rate volatility on exports between Asia and Latin America, a slope dummy variable was used. Interestingly, the result varies in the three sample periods. The regression using the whole sample period shows that the impact is more pronounced in Latin America (coefficient value of -0.2031) than in Asia (-0.0981). The coefficient of the slope dummy for Latin America is negative and highly significant for the whole period[9]. For the period 1980-1996, volatility becomes more deterrent on exports, both in Latin America and in Asia, and is still more pronounced in Latin America. But note that the interaction dummy in this period is not as significant as for the

[9] Coefficient values are interpreted as elasticities since exports and volatility are expressed in natural logarithm.

whole period. Surprisingly, in 1997-2004, there is no significant difference between Latin America and Asia concerning the impact of volatility on exports.

A plausible explanation is that for the period 1980-1996, Latin America suffered severely from crises, which increased exchange rate volatility. Exports from Latin America remained sluggish during this period. Asia, however, did not experience high exchange rate volatility and saw their exports rise dramatically. This can explain why Latin American exports were more negatively affected by exchange rate volatility than Asian exports. From 1997 to 2001, however, exchange rate volatility in Asia increased, while exports did not rise as fast as before. This might explain why Asian exports became more vulnerable to exchange rate volatility in the period 1997-2004 than before and that the difference with Latin America became insignificant.

Exports of countries with low tariffs are more affected by exchange rate volatility than closed economies. However, this effect is not significant from period 1980 to 1996. Note that in the whole period and in the period 1997-2004 countries with high tariffs are actually positively affected by exchange rate volatility.

As expected, exports of high income countries are less affected by exchange rate volatility relative to low income countries. This result is consistent in the three sample periods. Of particular interest is the positive and significant effect of exchange rate volatility on exports from high-income countries for the whole sample period and for the two sub-periods.

6. Conclusion

This paper analyses the impact of exchange rate volatility on exports by using a gravity model for 10 Southeast Asian and 17 Latin American countries from 1980 to 2004,

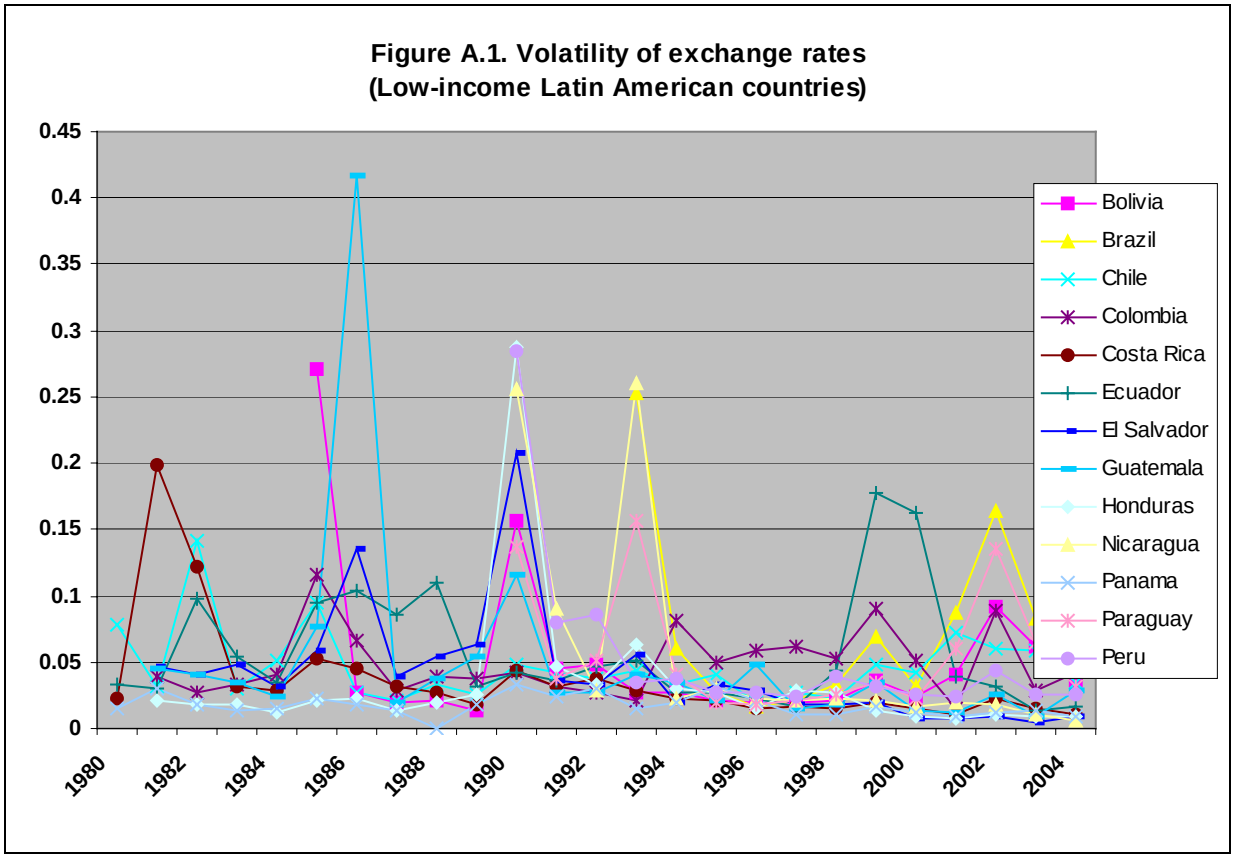
including exports to their major trading partners. More specifically, the key question was whether Latin American exports are more prone to exchange rate volatility.

Time series cross-section evidence revealed that exchange rate volatility has a negative impact on exports, in Asia as well as in Latin America. However, the impact is found to be stronger in Latin America when considering the whole period 1980-2004 and the sub-period 1980-1996. From 1997 to 2004, however, there is no evidence of a significant difference between the effect of exchange rate volatility on exports in Asia and Latin America. The reason is that Asia did not experience high exchange rate volatility from 1980 to 1996, while exports rose dramatically. Latin America, however, was characterized by high exchange rate volatility and relatively low exports growth. For the period 1997 to 2004, Asia was severely hit by higher exchange rate volatility, due to financial crises. Also, export growth was lower during this period than before. This explains why the impact of exchange rate volatility in Asia is not significantly different than the effect in Latin America, which was hit by the Argentinean crisis, in the period 1997-2004.

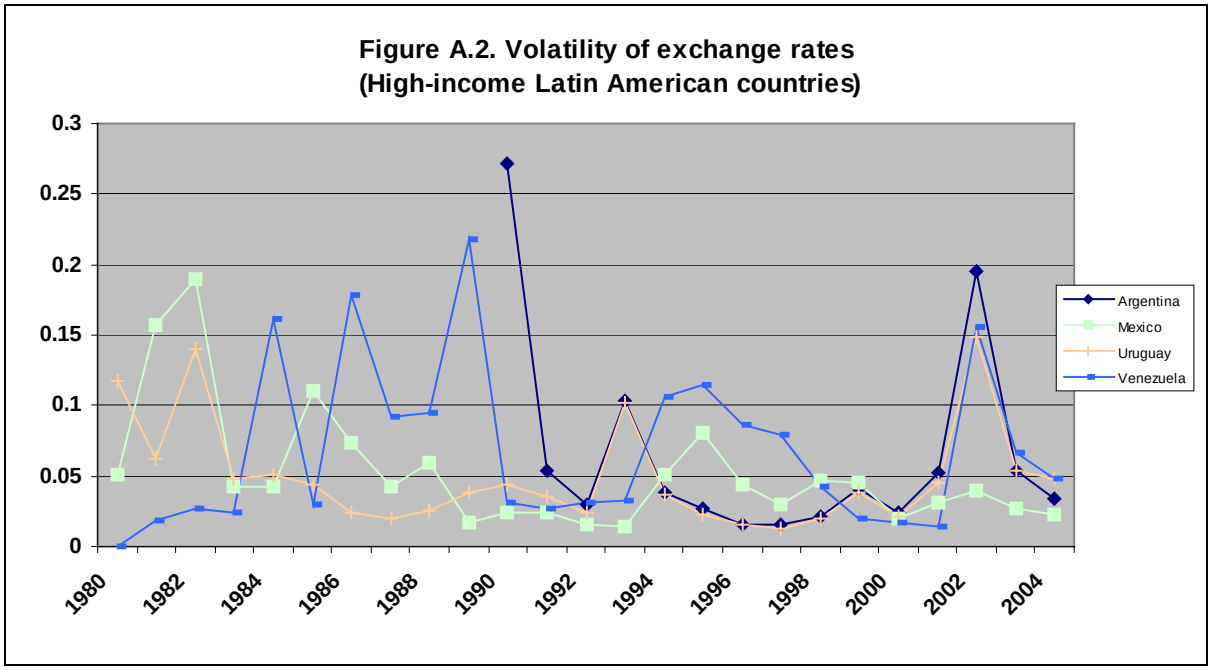
The results also show that countries with relatively high tariffs are less vulnerable to exchange rate volatility than open economies. In fact, for the whole period and for the subperiod 1997-2004, exports from closed economies are positively affected by exchange rate volatility. Finally, evidence showed that the impact of exchange rate volatility on exports from high-income countries is positive.

Further work in this area may concentrate on disaggregated data of exports. As Dell'Ariccia (1999) noted, the ability to hedge against exchange rate risk may vary from sector to sector. More specifically, in sectors where export activity requires large investments, the vulnerability to exchange rate volatility may be higher.

Appendix



Note: These countries have a GDP per capita that is below the average of Latin America and Asia for most years during the period 1980-2004.



Note: These countries have a GDP per capita that is above the average of Latin America and Asia for most years during the period 1980-2004.

Figure A.3. Volatiliy of exchange rates
(Low-income Asian countries)

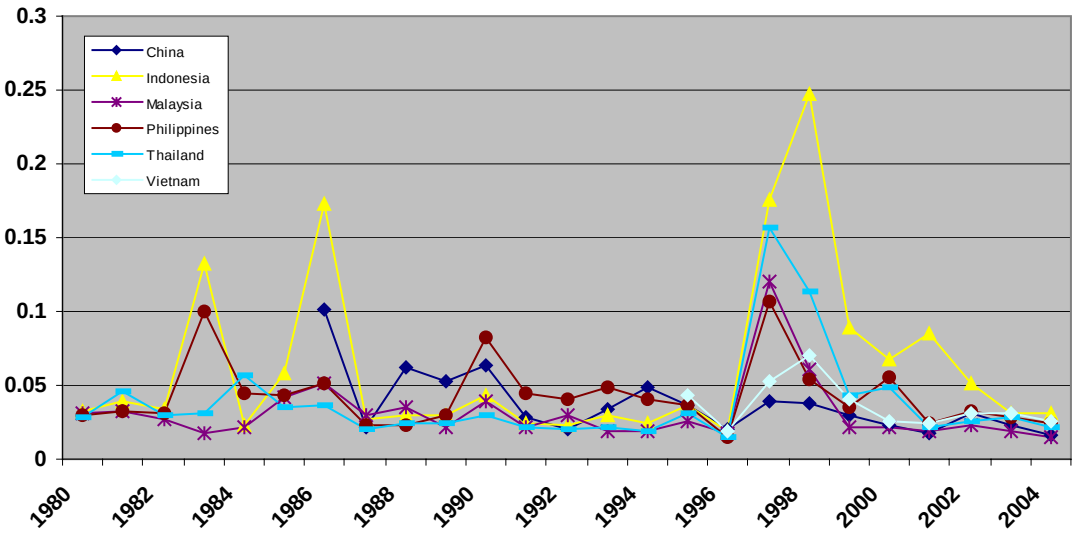


Figure A.4. Volatiliy of exchange rates
(High-income Asian countries)

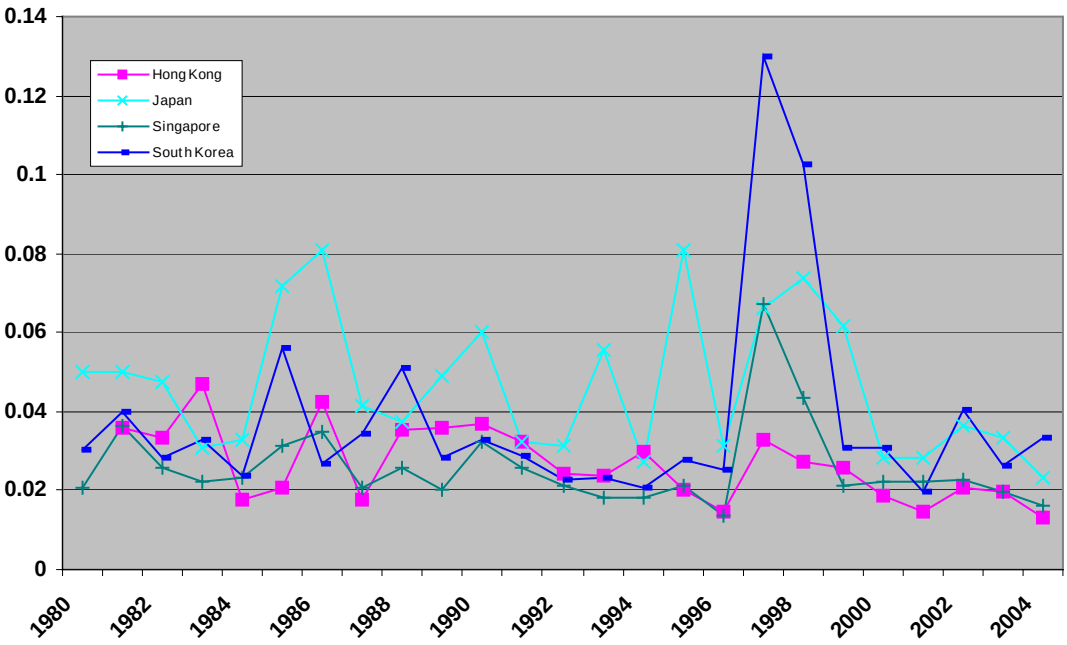


Figure A.5. Latin American exports (Low-income countries)

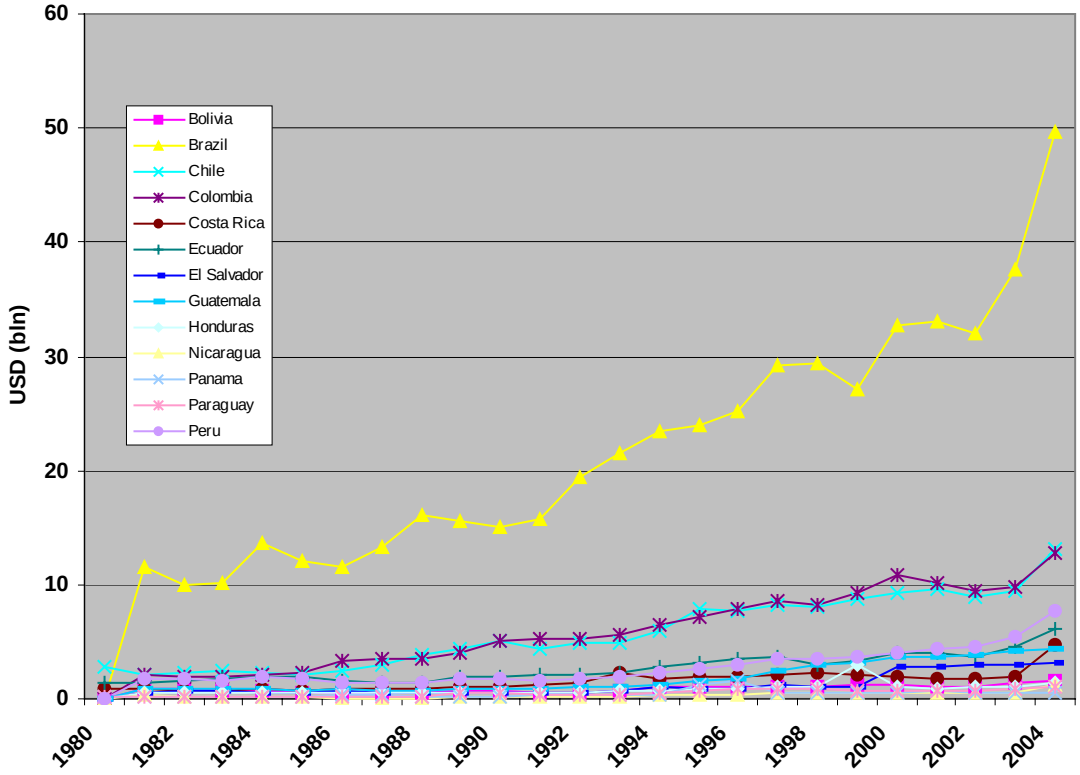


Figure A.6. Latin American exports (High-income countries)

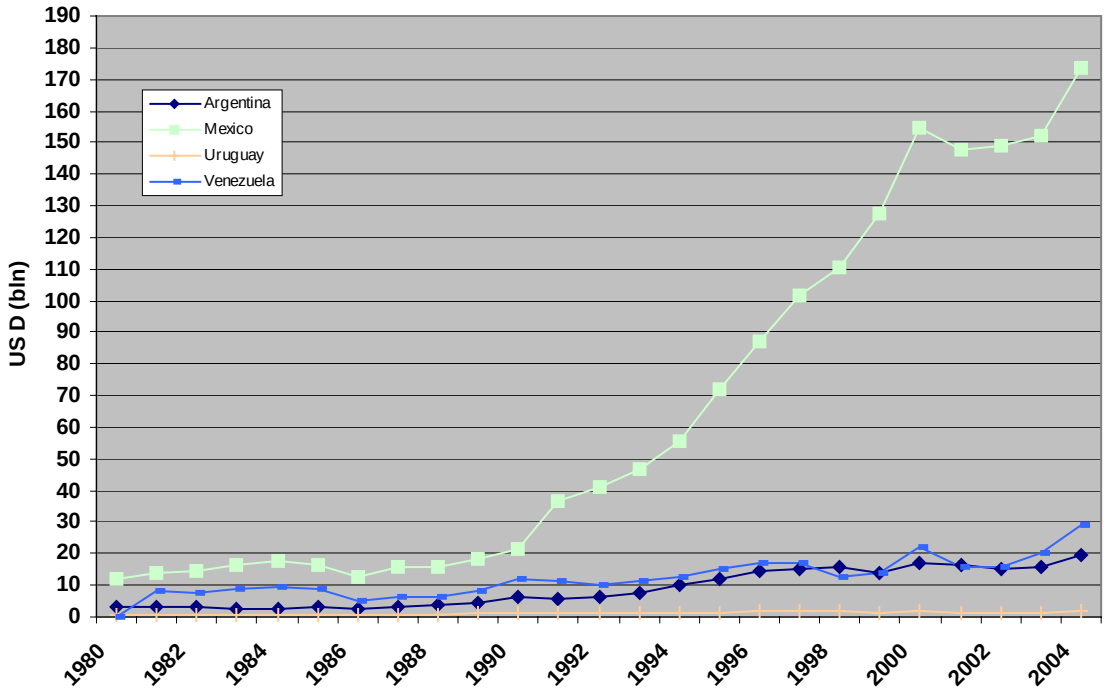


Figure A.7. Asian exports
(Low-income countries)

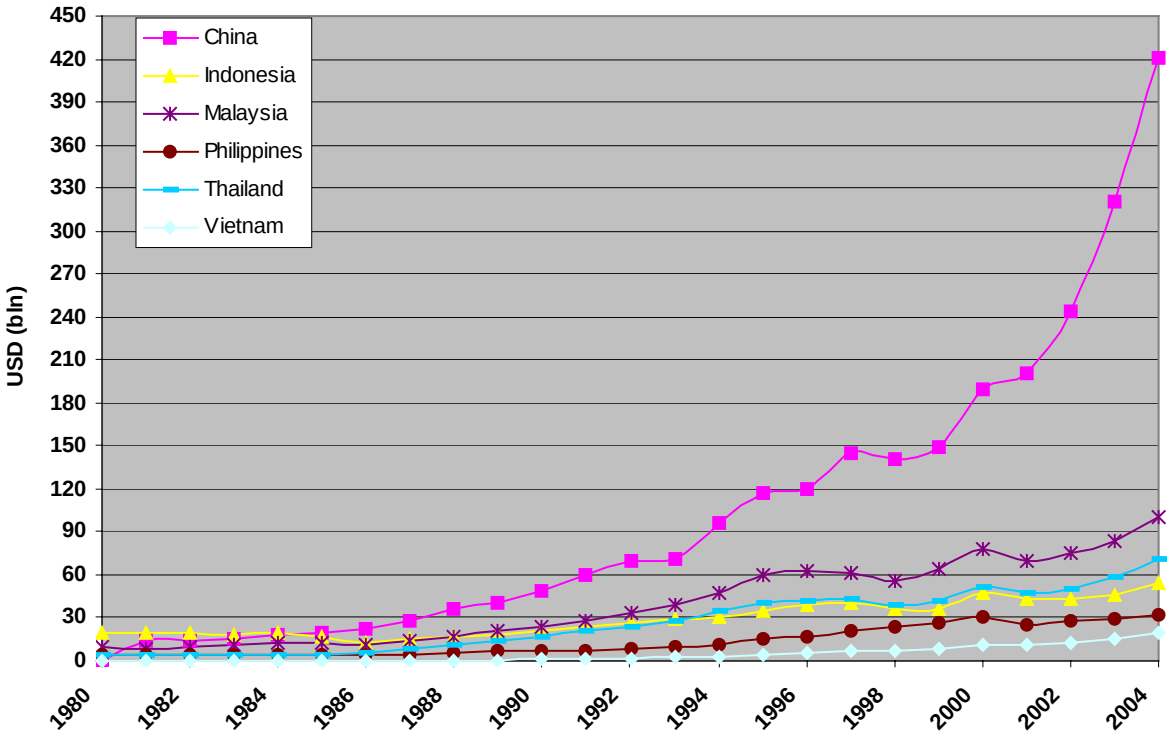
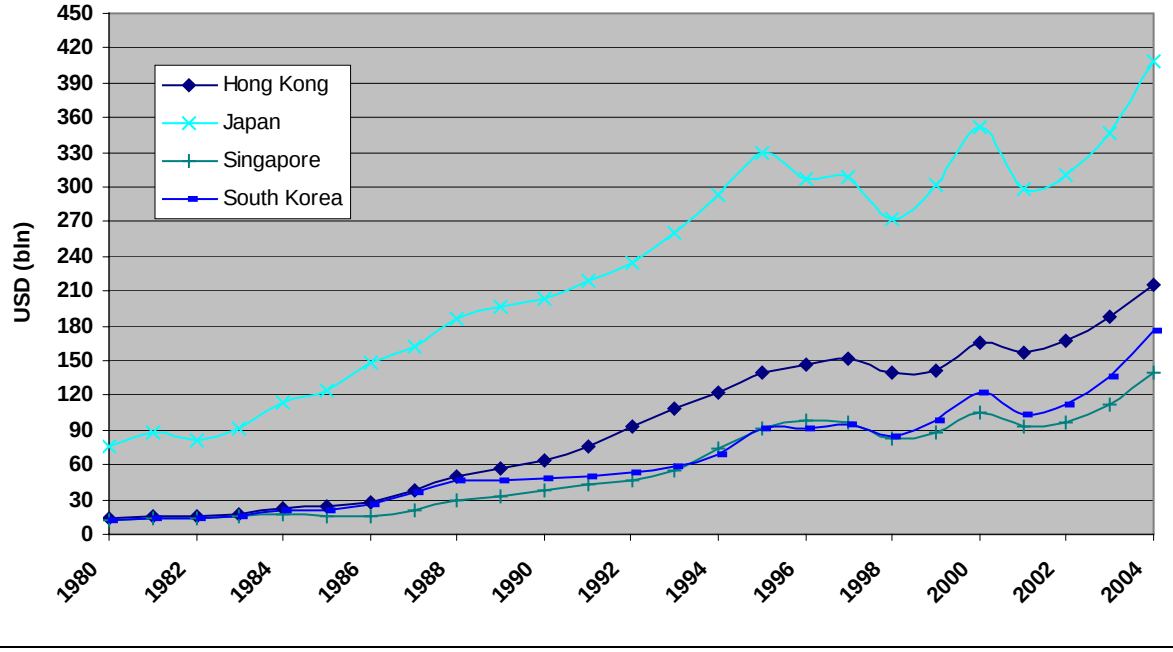


Figure A.8. Asian exports
(High-income countries)



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