

Export Responses to Real Exchange Rate Fluctuations: Development Status and Exported Good Effects*

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Abstract

Do exports expand or contract after depreciations or appreciations? If so, by how much? And do they react differently to such fluctuations depending on the development status of the traders or the type of the exported good? This paper estimates the export response to real fluctuations in exchange rates using a bilateral sample of 136 countries (34 high-income and 102 developing) for the period 1981-1997. Exploiting yearly country-pair variation of the real exchange rate and sectoral bilateral export flows, beyond country-pair and time specific factors, I estimate the distribution of real exchange rate elasticities of exports by exporter and by sector. My findings are broadly consistent with existing estimates of unity elasticities for high-income countries and well below unity for developing countries. Notably, though, the elasticity for high-income countries exporting to the world is lower than the consensus of one at only 0.13. Novel to the literature, I find a sectoral differential in elasticities where differentiated sectors have a larger elasticity than homogeneous sectors. The differential holds true as long as high-income countries are included in the sample and is larger when high-income countries are exporters as opposed to importers in the sample. Moreover this empirical test provides evidence consistent with credit constraints for developing countries and with theories including intensive and extensive margins of trade especially for high-income countries.

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1 Introduction

Despite the predictions of purchasing power parity theory, it is a well documented fact that the real exchange rate between countries fluctuates over time.¹ Real fluctuations in relative prices of countries have various impacts on their economies and their trade flows. Ex ante the overall effect of these fluctuations is not obvious, and the empirical literature is not conclusive on the overall impact of real exchange rate fluctuations. A positive effect of a real depreciation has been found at the firm and sectoral level but the effect at the aggregate level has been found to be positive and negative in different countries.²

In this paper we focus on the *export* response to real exchange rate fluctuations. The gravity model of trade frames this study where real exchange rate fluctuations are interpreted as changes in trade barriers between trading partners. In particular the focus will be on the disaggregated export effect by development status of the trading partners and by type of sector involved in trade. Given the rise of some developing countries in world trade and the change in the composition of world trade during the last decades it is important to understand how export responses to shocks vary by trading partners and by sectors to explain aggregate responses.³ Moreover the disaggregated export responses will be used to inform us on which theories best capture the behavior of trading partners and sectors (Section 2 of this paper details such theories).

¹For comprehensive work on this matter see Rogoff (1996).

²For a sectoral level study see Krueger and Tornell (1999). For firm level studies see Aguiar (2002), Forbes (2002a, 2002b), and Desai, Foley, and Forbes (2004). For the aggregate effect on output see Agenor and Montiel (1996), Gupta, Mishra, and Sahay (2000), and Calvo and Reinhart (2000).

³For example Mann and Pluck (2007) point out that the share of US imports from China increased from 0 to 13 percent between 1980 and 2004. Krugman and Obstfeld (2005) illustrate how agricultural exports from developing countries decreased from 60 to 10 percent between 1960 and 2000 while manufactures increased from 10 to over 60 percent.

This study estimates the export response to real fluctuations in exchange rates using a sample of 136 countries (34 high-income and 102 developing) for the period 1981-1997 for 440 sectors. The long term panel allows for an identification strategy which exploits variation within country pairs in the real bilateral exchange rate and (sectoral) trade flows over the sampled period. Four samples will be studied depending on the development status of the exporter and importer country: “HI” sample includes exporter and importer countries from the high-income group, “HI&MIX” sample includes exporters from the high-income group but importers from the high-income and developing country groups, and “DC” and “DC&MIX” samples are built similarly for developing countries.⁴ Sectoral trade is classified in three main categories: homogeneous, reference-price and differentiated.⁵

For developed countries (within samples contained in our HI&MIX sample) Hooper and Marquez (1995) present a comprehensive review of existing estimates from studies using a version of the conventional imperfect-substitutes model standard in this literature.⁶ Overall, the consensus estimate of long-run price elasticities for exports and imports is around one for the US, Japan and Germany (see their Table 4.2 for details), with substantial variation across studies. Hooper and Marquez determine that certain characteristics within the US studies affect the estimates. The use of data for the pre-floating exchange rate period (before 1973) delivers larger elasticities (significant for imports and not for exports). Yearly versus semiannual or quarterly data delivers significantly larger elasticities for exports. The exclusion of lags delivers insignificantly larger export elasticities and significantly smaller import elasticities. On the other hand, the use of OLS versus simultaneous equations that treat prices endogenously or accounting for cointegration (like Clarida, 1994) or not deliver similar results in the studies of the US price elasticities.

For developing countries (within samples contained in our DC&MIX sample) Reinhart (1994) explains how literature from the 1970s and 1980s provided evidence that relative prices, affected by devaluations, have a significant impact on trade flows from typically static

⁴Section 4.4 provides details on these four samples.

⁵Sections 4.2 and 4.3 describe this classification and provide statistics on its trade flows.

⁶Note that I will mostly highlight estimates of price elasticities of exports from the literature, even though the literature also studies price elasticities for imports and income elasticities for exports and imports. The elasticities are presented here with positive signs to allow direct comparison with my estimates.

or long-run specifications where imports and exports are determined within an imperfect-substitutes model. Reinhart mentions that during the early 1990s time-series issues were considered, and studies then found no significant effects of relative prices on trade balance or export growth. Then Reinhart herself, using a cointegration approach and an intertemporal optimizing version of a standard trade flow model, estimates mostly significant long-run price elasticities of imports and exports but "well below unity." Her findings seem to agree with the pessimistic view from the 1950s and 1960s on the export response of developing countries.⁷

Similar to our study in its bilateral nature, Bayoumi (1999) conducts a bilateral trade study using a reduced sample of 21 industrialized economies (contained in our HI sample) for the period 1965-1992 and estimates significant export response elasticities ranging from 0.31 contemporaneously to 0.79 after four years. Closer to our study in its sectoral and country grouping, Mann and Pluck (2007) perform a sectoral analysis of trade elasticities using US bilateral trade with 31 countries in four commodity groups (sectors) for 1980-2003. Mann and Pluck adapt the imperfect-substitutes model to the sectoral level with sectoral measures of trade prices and expenditure together with a proxy for supply and varieties for country-sector. A dynamic panel specification with country and sector fixed effects is estimated delivering both short-term and long-term effects (similar to error correction model in time-series estimations). For example, different relative price elasticities for exports from the US to industrial countries (part of our HI sample) are found for the four sectors (between 0 and 1.6 in the long-run and between 0 and 0.9 in the short-run) while estimates for developing countries (part of our HI&MIX sample) are mostly close to zero and insignificant for all four sectors.⁸

⁷Ghei and Pritchett (1999) summarize the pessimistic view of the 1950s and 1960s. They explain how some economists, based on the work of Myrdal, Prebisch, and Singer, were pessimistic about the ability of changes in the real exchange rate to improve the trade balance. Orcutt (1950) surveys and critiques the estimation of the elasticities performed during the 1940s. He explains that the estimated price elasticities of exports were between zero and 0.5.

⁸Within the literature presented here, most of the export elasticities are estimated with respect to relative price of exports while this paper uses the real exchange rate. One advantage of using real exchange rate is its availability for the large sample of countries and years used in this study. Moreover the employed measure indicates the bilateral level of competitiveness between exporter and importer which is argued to largely avoid endogeneity issues with respect to sectoral bilateral trade.

This study delivers two main findings. First, the export response to real exchange rate fluctuations of an average exporter in the HI sample is 0.67, in HI&MIX sample is 0.13, in DC sample is 0.18 and in DC&MIX sample is 0.15, all significantly different from zero. Findings seem broadly consistent with existing estimates (of elasticities around one for High Income countries and well below unity for Developing countries) and have the advantage of being derived under a uniform methodology for all four samples. Note though that our estimate for the HI&MIX sample is lower than estimates reported by Hooper and Marquez (1995) and is more aligned with estimates from Mann and Pluck (2007) who find nil responses of US exports going to developing countries.

Our second main finding refers to sectoral differences in export responses. Overall, exports of differentiated sectors are found to respond more to real exchange rate fluctuations than those of homogeneous sectors, with the differential between sectors varying by country group. For the HI sample the average differentiated sector export response is 0.56 while average homogeneous sector response is 0.02, and for the HI&MIX sample the respective responses are 0.20 and 0.05. Alternatively for the DC sample we find respectively 0.04 and 0.03, and for the DC&MIX sample we find 0.05 and 0.03. The export responses in differentiated sectors are significantly larger than those of homogeneous sectors in all samples except DC. In other words, as long as High Income countries are included in the sample, we observe a sectoral differential, which is larger when High Income countries are exporters as opposed to importers in the sample. While the literature presents some work on sectoral trade responses, the sectoral classification in this paper is different and more detailed which makes comparisons difficult except for the fact that both the literature and this study find large differences in export responses to real exchange rate fluctuations between sectors.

2 Related Theories

The analysis in this paper provides empirical evidence to two groups of theories that offer predictions for export fluctuations. First, we focus on theories related to the development status of the exporting country, and second we focus on theories with alternative predictions

on sectoral exports.

2.1 On High Income and Developing Countries

The literature on the importance of the development status of a country for export expansions discusses credit constraints of exporter developing countries. For example, Calvo and Reinhart (2000) propose a simple model where a devaluation in an emerging market implies limited international credit access, which can lead to a contraction in output rather than an export-led boom. Manova (2006), by adding credit constraints at the country and sector level to a Melitz-trade model with heterogeneous firms, predicts, among other things, that financially developed countries will export larger volumes of trade.

Developing countries show larger fluctuations in bilateral real exchange rates than high income countries. Orcutt (1950) argues that small fluctuations in real exchange rates may be ignored which implies that high income countries should have smaller export responses than developing countries. Along similar lines, large real exchange rate fluctuations may be accompanied by large shocks that speed up the process of creative-destruction in the economy described by Schumpeter (1942). Such shocks may push the economy to a higher production frontier as new technologies may be adopted (and old technologies may be scratched). These events would predict a large export response of developing countries to their large real exchange rate fluctuations.

This paper provides additional evidence to such models with opposite predictions by studying the bilateral export fluctuations by country groups.

2.2 On Homogeneous and Differentiated Sectors

Krugman (1980) develops a benchmark model to predict trade patterns. He builds a model where trade responses to changes in trade barriers come from the intensive margin of trade as product differentiation and scale economies are present. This model predicts that exports of sectors with high elasticity of substitution between varieties respond more to changes in trade barriers than exports of sectors with low elasticity of substitution between its varieties. With opposite results, Chaney (2006) builds a gravity theory of trade with firm

heterogeneity and varying market structure of sectors. This theory, contrary to Krugman's, predicts that exports of sectors with high elasticity of substitution between varieties would respond less to changes in trade barriers than exports of sectors with low elasticity of substitution between its varieties. Chaney's theory also predicts that exports of sectors populated with homogenous firms (sector output uniformly spread across firms) will respond more to changes in trade barriers than exports of sectors populated with heterogeneous firms. Chaney arrives to these predictions by considering not only the intensive margin of trade (like Krugman did) but also the extensive margin of trade which he predicts dominates the export response to changes in trade barriers. Chaney provides empirical support for his theory. This paper offers additional evidence on the trade response of homogeneous versus differentiated sectors to changes in trade barriers that Krugman (1980) and Chaney (2006) model with opposite predictions.

3 Real Exchange Rate as a Measure of Trade Resistance

Tinbergen (1962) first estimated gravity equations of international bilateral trade flows, and since then the literature developed theoretical foundations and improved the estimation techniques of this model.⁹ In essence the gravity formulation specifies that the volume of trade between two countries is proportional to their economic scale conditioning on measures of trade resistance between the countries. The equation for the bilateral trade flows T_{ijt} delivers the estimating equation:

$$\ln(T_{ijt}) = \beta_1 \ln(Y_{jt}) + \beta_2 \ln(Y_{it}) + \gamma \ln(D_{ijt}) + \theta_{ij} + \tau_t + \varepsilon_{ijt} \quad (1)$$

where Y_{jt} is the GDP of the importer at time t , Y_{it} is the GDP of the exporter at time t , D_{ijt} is a time-variable measure of trade resistance or distance between the exporter and the importer, θ_{ij} represents country-pair specific measures of trade resistance that affect bilateral trade, τ_t represents a time specific effect on trade, and ε_{ijt} represents country-pair-

⁹For some examples of these developments see Anderson (1979), Helpman and Krugman (1985), Helpman (1987), Feenstra (2002), Anderson and van Wincoop (2003), and Helpman, Melitz, and Rubinstein (2004).

year specific error. As additional measures of time-varying exporter and importer activity we add GDP per capita of the exporter and the importer represented as y_{it} and y_{jt} . As mentioned this paper interprets the real exchange rate between a pair of countries, $REER_{ijt}$, as a measure of trade resistance or distance between them.¹⁰ Therefore the gravity equation becomes:

$$\begin{aligned} \ln(T_{ijt}) = & \beta_1 \ln(Y_{jt}) + \beta_2 \ln(Y_{it}) + \beta_3 \ln(y_{jt}) + \beta_4 \ln(y_{it}) \\ & + \eta \ln(REER_{ijt}) + \mu \ln(d_{ijt}) + \theta_{ij} + \tau_t + \varepsilon_{ijt} \end{aligned} \quad (2)$$

where d_{ijt} measures the traditional forms of distance between exporter and importer such as the presence of a Free Trade Agreement (FTA).¹¹ η , the real exchange rate elasticity of exports, is the parameter of interest in our estimation which captures the export response (from country i to j) to fluctuations in the bilateral real exchange rate.

Alternatively, we may consider that the underlying data generating process may be dynamic, where current exports evolve depending on the difference between the equilibrium level of exports and their previous year's level. Such dynamic process calls for the lags of the dependent variable to be used as explanatory variables as well. Section 5.7 discusses the estimation of such model in this context and it shows that our coefficient of interest, η , is not significantly affected by such modelling choice.

In addition to estimating the real exchange rate elasticity of exports at the country-pair level from (2), we exploit sector level data (4-digit SITC) for the estimation as follows:

$$\begin{aligned} \ln(T_{sijt}) = & \beta_1 \ln(Y_{jt}) + \beta_2 \ln(Y_{it}) + \beta_3 \ln(y_{jt}) + \beta_4 \ln(y_{it}) \\ & + \eta \ln(REER_{ijt}) + \mu \ln(d_{ijt}) + \theta_{sij} + \tau_{st} + \varepsilon_{sijt} \end{aligned} \quad (3)$$

¹⁰Bayoumi (1999) follows a similar procedure to obtain the real exchange rate elasticity. Feenstra (1989) finds supporting evidence for the symmetric pass-through of tariffs and exchange rates on US import prices of Japanese cars, trucks and motorcycles. Even though this paper looks into fluctuations in *real* exchange rates, Feenstra's study serves as a motivation for our interpretation of the real exchange rate as another measure of trade resistance.

¹¹Note that for reasons of data availability for the studied sample of countries we will not incorporate measures of d_{ijt} in the main empirical analysis. Some robustness checks will use some though.

where s indicates sectors (440 sectors)¹² and the country-pair and time fixed effects are sector specific (θ_{sij} and τ_{st}).¹³ The trade variation used in the identification of η is that coming from the yearly sector level fluctuations of exports within country-pair beyond sector-year fixed effects. Potential endogeneity concerns of the real exchange rate are dissipated in such sector analysis as it is unlikely that omitted factors could systematically drive both sector level exports to importers and the overall bilateral real exchange rate. Note that a biased estimate of η with equation (3) is possible when exports for a given country pair are highly concentrated in few sectors. On average, a country pair in our sample trades on 51.7 different sectors during one year. 50% of the country pairs trade on 12 different sectors or more per year. Only 10% of the country pairs trade only on one sector during one year.

4 Trade and Exchange Rate Data

In order to estimate (2) we employ data on bilateral trade flows compiled by Feenstra (2000).¹⁴ Exchange rate data, income variables, and GDP deflators are obtained from the World Development Indicators (2001). Combining both databases we build a country-pair level sample including 136 countries for the period 1981-1997. A country-pair is included in the sample if the trade flow between the countries in the pair is positive and if real exchange rate data is available for the countries in the pair. The sample includes 13,917 country-pairs and 140,627 bilateral-level observations.¹⁵ Tables 15, 16, and 17 list the countries in the sample and indicate the number of times in which a country is an exporter in a country-pair and is an importer in a country-pair in the sample.¹⁶

¹²We are left with this number of sectors once we exclude those sectors for which the 4-digit code ends with X or A. As Feenstra (2000) explains the sector codes that end with an A are really 3-digit SITC codes or combinations of them. Those codes that end with X result from incomplete reporting at the 4, 3, or 2-digit level.

¹³Note that the assumption of balanced trade built into the gravity formulation is less appealing at the sector level.

¹⁴The raw bilateral trade data is in thousands of US dollars. I obtain the 1995 dollar measure using the US GDP deflator from the World Development Indicators.

¹⁵55% of the trade flows for the country pairs formed by the 136 countries are equal to zero. (The total number of country-pair-years equals $136 \times 135 \times 17 \text{ years} = 312,120$.) On average, each country-pair shows positive trade flows for 10.1 out of the 17 years in the sample.

¹⁶The observations with zero trade flows are not included in the estimations as the estimating equations are specified in logs following standard practice in the trade literature. This omission could potentially bias the results as Santos Silva and Tenreyro (2006) argue. A robustness check with a zero-one probit will inform

4.1 Real Exchange Rate Data

Direct measures of real exchange rates are not widely available for the sample of countries and years studied. Therefore the real exchange rate is measured by the nominal exchange rate for each country in the pair and GDP deflators as follows:

$$\widehat{RER}_{ijt} = \frac{NominalE_{it}}{NominalE_{jt}} * \frac{GDP\ Deflator_{jt}}{GDP\ Deflator_{it}} \quad (4)$$

where i represents the exporter country in the pair, and j represents the importer country in the pair. $NominalE_{it}$ ($NominalE_{jt}$) is the nominal exchange rate for the exporter (importer) measured in local currency per US dollar.¹⁷ An increase in \widehat{RER}_{ijt} represents a real depreciation of the exporter country i with respect to the importer country j .

Noticeably the GDP deflators for the exporter and importer equal one hundred in 1995 for every country, as opposed to measuring actual price levels. Therefore we are *not* able to pin down the true real exchange rate (RER_{ijt}). It is important to note that the obtained measure of the real exchange rate (\widehat{RER}_{ijt}) is incorrect up to a constant for each country pair. This constant, A_{ij} , is the price level ratio between importer and exporter in 1995 such that:

$$RER_{ijt} = \widehat{RER}_{ijt} * A_{ij} \quad (5)$$

To study the consequences of using \widehat{RER}_{ijt} instead of RER_{ijt} in the estimation of (2), we re-write (2) in terms of \widehat{RER}_{ijt} . The main concern is avoiding a bias introduced by the comparison of incomparable units in \widehat{RER}_{ijt} . Re writing (2) we obtain the equation:

$$\begin{aligned} \ln(T_{ijt}) = & \beta_1 \ln(Y_{jt}) + \beta_2 \ln(Y_{it}) + \beta_3 \ln(y_{jt}) + \beta_4 \ln(y_{it}) + \eta \ln(\widehat{RER}_{ijt} * A_{ij}) \quad (6) \\ & + \mu \ln(d_{ijt}) + \theta_{ij} + \tau_t + \varepsilon_{ijt} \end{aligned}$$

By simply incorporating the natural logarithm of the price level ratio A_{ij} into the country-

us on the importance of the exclusion of the zero trade pairs on the export elasticity estimation.

¹⁷This is the year average official exchange rate reported in the World Development Indicators.

specific terms θ_{ij} we obtain an equation that we can directly estimate:

$$\begin{aligned} \ln(T_{ijt}) = & \beta_1 \ln(Y_{jt}) + \beta_2 \ln(Y_{it}) + \beta_3 \ln(y_{jt}) + \beta_4 \ln(y_{it}) + \eta \ln(\widehat{RE R}_{ijt}) \\ & + \mu \ln(d_{ijt}) + \delta_{ij} + \tau_t + \varepsilon_{ijt} \end{aligned} \quad (7)$$

where the new country-pair fixed effects δ_{ij} capture $\eta \ln(A_{ij})$. Therefore η , the real exchange rate elasticity of exports, will be consistently estimated as long as we include a set of country-pair fixed effects in the econometric model.

A parallel modification to the sector analysis from equation (3) delivers the following consistent estimating equation:

$$\begin{aligned} \ln(T_{sijt}) = & \beta_1 \ln(Y_{jt}) + \beta_2 \ln(Y_{it}) + \beta_3 \ln(y_{jt}) + \beta_4 \ln(y_{it}) \\ & + \eta \ln(\widehat{RE R}_{ijt}) + \mu \ln(d_{ijt}) + \delta_{sij} + \tau_{st} + \varepsilon_{sijt} \end{aligned} \quad (8)$$

where country-pair fixed effects δ_{sij} again capture A_{ij} .

4.2 Bilateral Volume of Exports: Overall and By Type of Good

Table 1 provides summary statistics for bilateral trade flows and our measure of bilateral real exchange rate $\widehat{RE R}_{ijt}$ in the sample to be used to estimate (7). Note that measured bilateral real exchange rate has higher variability than bilateral trade flows.

Table 2 presents summary statistics for bilateral trade flows classified by the type of exported goods following Rauch (1999). Rauch (1999) classifies export goods by the availability of information on their price: “Possession of a reference price distinguishes homogeneous from differentiated products. Homogeneous commodities can be further divided into those whose reference prices are quoted on organized exchanges and those whose reference prices are quoted only in trade publications.” Therefore differentiated products are defined as those without a reference price or “branded” – i.e. their price can be quoted once mentioning the manufacturer. Homogeneous products are those traded on organized exchanges where reference prices are quoted (for example in the London Metal Exchange).

Homogeneous products are not “branded” and they have specialized traders who centralize price information. Reference-price products are not “branded,” have prices listed only in trade publications, and may have specialized traders who centralize price information.

As with overall trade flows, we observe in Table 2 that measured bilateral real exchange rate is significantly more volatile than bilateral trade flows by type of exported goods. It is interesting to note in Table 2 that the average bilateral flow for a country pair in differentiated goods is two to three times the size of a non-differentiated flow. Also note that twenty to thirty percent more country pairs trade in differentiated goods compared with the number of country pairs which trade in reference price and homogeneous goods.

4.3 Bilateral Volume of Exports at the Sector Level

Using the aforementioned data from Feenstra (2000) and World Development Indicators (2001) we estimate (8). For this purpose we build a sector-country-pair level sample including 136 countries and 440 sectors for the period 1981-1997. A sector-country-pair is included in the sample if the trade flow between the countries in the pair in a given sector in a given year is positive and if exchange rate data is available for the countries in the pair. The sample includes 13,917 country-pairs and around 8 million observations at the sector level.¹⁸ 20% of the 440 sectors are classified as homogeneous, 28% are reference-price, and 52% are differentiated sectors.

Table 3 provides summary statistics for bilateral trade flows at the sector level. Again, note that measured bilateral real exchange rate also has higher variability than sector bilateral trade flows. Moreover sector bilateral trade has more variability than bilateral trade flows.

4.4 High Income and Developing Countries

Following the World Bank 2006 classification of countries based on 2004 GNI per capita, we classify 34 of our countries as high income (denoted “HI”) and 102 countries as developing

¹⁸94% of the sector trade flows for the country pairs formed by the 136 countries are equal to zero. (The total number of sector-country-pair-years equals $440 \times 136 \times 135 \times 17 \text{ years} = 137,332,800$.)

countries (denoted “DC”). Table 18 lists the 34 high income countries in the sample.¹⁹

The bilateral nature of this paper, requires that we specify the export destination countries for both groups of countries under study, HI and DC. We use two alternative definitions for destination countries. First, we simply include in a given sample those country pairs formed by the exporters countries in the sample. (For example, for the HI sample we include 1,122 (34×33) country pairs. 1,096 of those pairs have positive trade and real exchange data for at least one year.) Second, we add to this sample country pairs formed by the countries in the sample exporting to the countries outside the original sample. (For example, for the HI sample we include 4,590 ($34 \times 33 + 34 \times 102$) country pairs, where there are $34 \times 102 = 3,468$ country pairs where HI countries export to DC countries. 4,217 of those pairs have positive trade and real exchange data for at least one year.) We denote “HI&MIX” the sample that incorporates export destinations outside the HI sample, and we denote “DC&MIX” the sample that incorporates export destinations outside the DC sample.

Table 4 summarizes bilateral trade flows and measured real exchange rate for the four defined samples. Average bilateral trade flows are significantly higher in the HI and HI&MIX samples compared to those in the DC and DC&MIX samples. Measured bilateral real exchange rate has similar variability to that of bilateral trade flows only in the HI sample and is higher in the other three samples. Note that 90% of country-pair-years have positive trade and are included in HI while only 27% are included in the DC sample.

Table 5 summarizes bilateral trade flows by type of good for the four defined samples. Not surprisingly, again, trade flows are always higher when HI countries are exporters. HI countries trade with each other (conditional on positive bilateral trade) on average only 13% of homogeneous goods while 50% of their trade is in differentiated goods. On the other hand DC countries trade with each other 39% in homogeneous goods and 26% in differentiated goods. HI&MIX sample exports 13% in homogeneous goods and 49% in differentiated goods. DC&MIX sample exports 39% in homogeneous goods and 31% in differentiated

¹⁹In our sample high income countries include 22 OECD countries and 12 non-OECD countries. Developing countries include 46 low income, 33 lower middle income, and 23 upper middle income countries. 2004 GNI per capita cutoffs for the four World Bank categories (low income, lower middle income, upper middle income, and high income) are 825US\$, 3,255US\$, and 10,065US\$ respectively.

goods.²⁰

Table 6 details the sector bilateral trade flows, for different country groups and type of goods. As with overall bilateral trade, sector bilateral trade is in general larger when HI are exporters.

5 Empirical Results

5.1 World Patterns

As a benchmark we first present the bilateral export response to fluctuations in the real exchange rate for the world bilateral sample estimated with equation (7). The variation used in the identification of η is that within country-pairs over time, beyond year specific factors and controlling for exporter and importer GDP measures. The first column of Table 7 shows a significant overall bilateral real exchange rate elasticity of exports of 0.055.²¹ As a first cut into the data, we calculate the export response at the bilateral level by type of exported good. Columns two, three and four of Table 7 present these estimates where we observe that homogeneous bilateral exports respond less than non-homogeneous ones to fluctuations in the bilateral exchange rate.

Additionally we estimate equation (7) for each exporter i at a time. Such estimation by exporter allows for a more flexible specification with exporter-year fixed effects, τ_{it} , as opposed to year fixed effects. The estimation of these 136 regressions is summarized in the bottom panel of Figure 1, which presents the distribution of the 136 estimated η 's with a mean of 0.22 (different from zero at 5% significance level). This exercise allows us to learn about the variation in the export response at the exporter level. Importantly, the estimation results presented in this Figure allow us to identify outlier countries and cross-country patterns. Outlier export responses η are defined as those below $(Q(25) - 3 * IQR)$ and those above $(Q(75) + 3 * IQR)$, where $Q(25)$ is the 25th percentile, $Q(75)$ is the 75th

²⁰In order to calculate these proportions we take into account the fraction of country pairs with zero trade in exports for different types of sectors given that a country-pair has positive trade flow. For example, to calculate the percentage of trade in homogeneous goods for HI (conditional on positive trade for the country-pairs) the total number of observations for the estimated percentage is 17,252, reported in Table 4.

²¹Note that in this Table, as in the rest of the analysis, we use robust standard errors as data is clustered by country-pair.

percentile, and IQR is the interquartile range ($Q(75) - Q(25)$) of the distribution of η .²² Seven outliers are identified in the overall sample (all Developing Countries).

Figure 2 and Table 8 present estimates and descriptive statistics of the 129 estimated η 's (136 minus 7 outliers). The average export response excluding outliers is 0.14 (different from zero at 5% significance level).

5.2 High Income and Developing Countries

To learn about export responses by country group we start with Figure 2 and Table 8 where we observe the distribution and properties of the 129 estimated η 's for Developing and High Income countries. These samples correspond to DC&MIX and HI&MIX as they include as export destinations all the countries in the overall sample. Statistics indicate that the average export response for HI&MIX sample is 0.13 and for DC&MIX is 0.15, both different from zero at 5% significance level but not significantly different from each other.²³

As export destinations can certainly affect export responses to bilateral real exchange rate fluctuations, we study next such responses in samples HI and DC. Remember that in these samples exporter and importer countries belong to the same country group. Figure 3 presents the distribution of the estimated η 's for HI and DC samples obtained with the estimating equation (7) for each exporter i at a time.²⁴ Again, this estimation by exporter allows for a more flexible specification with exporter-year fixed effects, τ_{it} , as opposed to year fixed effects. The histogram for DC countries presents the distribution of 95 η 's for DC countries and the histogram for HI countries presents the distribution of its 34 η 's. Table 9 shows descriptive statistics of these 129 estimated η 's. The average response for an exporter is 0.67 for HI countries and 0.18 for DC countries (both different from zero at the 5% significance level). The mean for DC is significantly different from the mean for HI countries at the 1% significance level.²⁵

²²These outliers are labeled as "severe outliers" by Hamilton (1992), who points out that severe outliers comprise about .0002% of the normal population.

²³If we do not exclude outlier exporters the mean for Developing Countries is 0.25, significantly different from the mean for High Income countries only at the 10% significance level.

²⁴Note that this Figure excludes severe outliers of HI and DC distributions identified with the Hamilton definition stated above.

²⁵If we do not exclude outliers the mean for DC is 0.30, significantly different from the mean for HI

Overall results indicate that when Developing Countries are included in the sample, either as exporters or importers, the export response to real exchange rate fluctuations significantly decreases. We showed earlier that High Income countries export proportionally more differentiated than homogeneous goods to other High Income countries and to Developing countries when compared with exports from Developing Countries. One story, consistent with the findings so far, is that given that exports of differentiated goods seem to respond more to real exchange rate fluctuations (Table 7), and given that Developing countries as exporters or importers may face more constraints than High Income countries, it is possible that the observed differences in export response between HI, DC, HI&MIX and DC&MIX samples simply reflect their different export composition and exporter/importer constraints. To further investigate this hypothesis we focus on the export response by sector of all country groups.

5.3 Export Response by Type of Good for High Income Exporters

Figure 4 and the top panel of Table 10 present the histograms and statistics of export responses to real exchange rate fluctuations by sector for the sample HI&MIX. The sectoral export responses (η) are obtained from the estimation of equation (8) for each sector s , where 224 sectors are differentiated and 86 are homogeneous.²⁶ The average export response to real bilateral exchange rate movements is 0.20 for differentiated sectors and 0.05 for homogeneous sectors. Both responses are significantly different from zero at 5% significance level and significantly different from each other at 1% level.

Parallel results for the HI sample are included in Figure 5 and the bottom panel of Table 10 where stats are reported for 227 differentiated and 88 homogeneous sectors. In this sample of High Income countries we observe an even higher average response of differentiated sectors's exports than homogeneous sectors's exports, with average values of 0.56 and 0.02 respectively, significantly different from each other at 1% level (only 0.56 is significantly

countries at the 6% significance level.

²⁶For clarity, in what follows, we exclude Reference Price sectors's results as they tend to lie in between the Homogeneous and Differentiated ones. Also, all Figures and Tables exclude severe outliers of Homogeneous and Differentiated distributions identified with the Hamilton definition stated above.

different from zero at the 5% level).

Therefore for High Income countries exports of differentiated sectors respond more than those of homogeneous sectors to bilateral real exchange rate fluctuations. This finding is accentuated when we restrict export destinations to other High Income countries (0.20 versus 0.05 for HI&MIX and 0.56 versus 0.02 for HI).

5.4 Export Response by Type of Good for Developing Exporters

To study the behavior of Developing countries, we focus on Figure 6 and the top panel of Table 11 which show histograms and statistics of export responses to real exchange rate fluctuations by sector for the sample DC&MIX. As for HI&MIX, the sectoral export responses (η) are obtained from the estimation of equation (8) for each sector s , where 221 sectors are differentiated and 87 are homogeneous. In this sample, the average export response to real bilateral exchange rate fluctuations is 0.05 for differentiated sectors and 0.03 for homogeneous sectors. The elasticities are significantly different from zero at 5% significance level and the response of differentiated sectors is significantly larger than that of homogeneous sectors, but only at 10% level.

Limiting export destinations of Developing countries to other Developing countries only delivers results for the DC sample in Figure 7 and the bottom panel of Table 11. In this sample of Developing countries, where 220 sectors are differentiated and 81 are homogeneous, we observe a more even average response of differentiated sectors's exports and homogeneous sectors's exports with average values of 0.04 and 0.03 respectively, not significantly different from each other (only 0.04 is significantly different from zero at the 5% level).

Therefore for Developing countries exports of differentiated sectors seem to respond slightly more on average than those of homogeneous sectors to bilateral real exchange rate fluctuations. The larger response of differentiated over homogeneous sectors is only significantly so (at 10% level) in the DC&MIX sample and not in the DC sample (where the values are 0.05 versus 0.03 for DC&MIX and 0.04 versus 0.03 for DC).

Overall, the findings indicate that differentiated sectors respond more than homogeneous sectors, which explains the large overall response of High Income countries as they

export proportionally more on differentiated sectors. Moreover for the samples that include Developing countries this differentiated/homogeneous pattern is weaker (in particular when Developing countries are included as exporters) which is consistent with hypothesis of credit constraints in Developing countries.

5.5 Interpretation of the Evidence in Light of the Theory

We relate the findings of Sections 5.2, 5.3 and 5.4 with theories from Section 2 as follows:

- Table 9 and Figure 3 show that the average export response to real exchange rate fluctuations of a high-income country in the HI sample is significantly larger than that of the average developing country in the DC sample (0.67 versus 0.18). Such estimates in the HI&MIX and DC&MIX sample are not significantly different from each other though (0.13 versus 0.15) as Table 8 and Figure 2 show. Therefore, on average, exports of high-income countries respond more to real exchange rate fluctuations than those of developing countries, as long as high-income countries are not exporting to developing countries. This finding is consistent with the presence of *credit constraints for developing countries* both as exporters and importers.
- The average export response to real exchange rate fluctuations of a differentiated sector is significantly larger than that of the average homogeneous sector as long as high-income countries are in the sample.²⁷ Table 10 and Figures 5 and 4 show results for HI and HI&MIX samples with respective elasticities of 0.56 versus 0.02 and 0.20 versus 0.05 for differentiated versus homogeneous sectors. Table 11 and Figures 7 and 6 show results for DC and DC&MIX samples with respective elasticities of 0.04 versus 0.03 and 0.05 versus 0.03 for differentiated versus homogeneous sectors. As shown, the sectoral differential of elasticities is pronounced when high-income countries are exporters in the sample. This evidence is consistent with the *extensive/intensive margin* theory of trade (Chaney, 2006) for all samples except DC and is not consistent with the trade theory of product differentiation and scale economies (Krugman, 1980).

²⁷These differences are significant at the 1% level for the HI and HI&MIX samples, and at the 10% level for the DC&MIX sample.

- The evidence provided is not consistent with theories of larger positive effects associated with large shocks to an economy which are suffered by developing countries during the studied period as their elasticities are smaller than those of high-income countries.

5.6 Robustness Checks

5.6.1 Persistent Estimates

Timing issues may be relevant in the estimation of the export responses to real exchange rate fluctuations. In particular, some fluctuations in the real exchange rate are sharp but quickly reversed and some are more stable. Both of these types of fluctuations may affect the dynamics of the export growth very differently. Moreover domestic producers may take several periods to adjust their production and exports when facing a favorable depreciation.

Some studies in the literature address the dynamics by including a number of lags in the exchange rate in the estimating equation. For example Bayoumi (1999) includes up to a fourth yearly lag in his estimations and describes the overall response of exports as the combined response over the specified lags. Alternatively in this paper we opt for a longer horizon specification for the estimating equation to obtain the overall persistent response of exports. In particular we collapse the data into four periods of time (as opposed to 17 years) to obtain persistent measures of real exchange rate and trade flows. We build averages of the variables in the estimating equations for the periods 1981-1982, 1983-1987, 1988-1992 and 1992-1997.²⁸ Below we present results for the collapsed estimation of estimating equation (7) at the bilateral level, and estimating equation (8) for each sector.

Table 12 presents the estimates of the elasticities η with the bilateral *collapsed* data for the world sample with estimating equation (7). These results show slightly larger elasticities when compared with the yearly estimation results from Table 7. The first column of Table 12 shows a significant overall bilateral real exchange rate elasticity of exports of 0.072. Columns two, three and four of Table 12 show that homogeneous bilateral exports respond

²⁸Note that we collapsed the data for every 5 years, except for the first collapsed period in which we use the first two years.

less than non-homogeneous ones to persistent fluctuations in the bilateral exchange rate, and again, these responses are slightly larger than those obtained with the yearly estimation.

When estimating persistent sectoral export responses for High Income countries we obtain very similar results to those estimated with yearly data. Table 13 presents the statistics of the estimates of η with *collapsed* data from equation (8) for each sector s (Table 10 shows yearly results). The average persistent export response for differentiated and homogeneous sectors is 0.17 and 0.05 for HI&MIX sample (and 0.56 and 0.002 for HI sample), both significantly different from each other at the 1% level. The study of the persistent sectoral export responses of Developing countries also delivers similar results to the previous yearly estimates. Table 14 presents the statistics of the estimates of η with *collapsed* data from equation (8) for Developing countries for each sector s (and Table 11 shows yearly results). The average persistent export response for differentiated and homogeneous sectors is 0.08 and 0.05 for DC&MIX sample (and also 0.08 and 0.05 for DC sample), both significantly different from each other at the 5-6% level.

Therefore, persistent fluctuations in the real exchange rate, captured by the collapsed measures, have a slightly higher impact on bilateral exports than yearly fluctuations. In the sector level analysis results with yearly and collapsed data are very similar.

5.6.2 Estimating a Dynamic Panel

As mentioned in Section 3, we consider a dynamic panel model of exports, where the lag of the dependent variable is used as an explanatory variable to account for potential importance of past realizations of exports on current exports as follows:

$$\begin{aligned} \ln(T_{ijt}) = & \alpha \ln(T_{ijt-1}) + \beta_1 \ln(Y_{jt}) + \beta_2 \ln(Y_{it}) + \beta_3 \ln(y_{jt}) + \beta_4 \ln(y_{it}) \\ & + \eta \ln(\widehat{RE}R_{ijt}) + \mu \ln(d_{ijt}) + \delta_{ij} + \tau_t + \varepsilon_{ijt} \end{aligned} \quad (9)$$

The estimation of (9) delivers an estimated η of 0.040 significant at the 1% level (very similar to the 0.055 shown in Table 7 estimated with equation (7)).

As Roodman (2006) and others in the dynamic panel literature explain, the model

from (9) suffers from "dynamic panel bias" as the lagged dependent variable, $\ln(T_{ijt-1})$, is correlated with the country-pair fixed effects. This correlation is a more relevant problem for the estimation when the number of years in the sample, P , is "small" (we have a maximum of 17 years of data for each country-pair).²⁹ To avoid this endogeneity we first-difference (9) to remove the country-pair fixed effects:

$$\begin{aligned}
\ln(T_{ijt}) - \ln(T_{ijt-1}) &= \alpha(\ln(T_{ijt-1}) - \ln(T_{ijt-2})) \\
&+ \beta_1(\ln(Y_{jt}) - \ln(Y_{jt-1})) + \beta_2(\ln(Y_{it}) - \ln(Y_{it-1})) \\
&+ \beta_3(\ln(y_{jt}) - \ln(y_{jt-1})) + \beta_4(\ln(y_{it}) - \ln(y_{it-1})) \\
&+ \eta(\ln(\widehat{RE}R_{ijt}) - \ln(\widehat{RE}R_{ijt-1})) + \mu(\ln(d_{ijt}) - \ln(d_{ijt-1})) \\
&+ (\tau_t - \tau_{t-1}) + (\varepsilon_{ijt} - \varepsilon_{ijt-1})
\end{aligned} \tag{10}$$

The problem with such transformation is that it creates a correlation between the first-differenced lagged dependent variable and the first-differenced errors. To deal with this created endogeneity in (10) we apply the "Difference GMM" method suggested by Arellano and Bond (1991), where $(\ln(T_{ijt-1}) - \ln(T_{ijt-2}))$ is instrumented with lags of exports (starting with $\ln(T_{ijt-2})$) and with all other exogenous regressors.

When implementing "Difference GMM" we make several choices. In order to maximize sample size we use forward orthogonal deviations instead of first differences given that there are gaps in our panels. One-step estimation of variance is done with standard errors, robust to heteroskedasticity and arbitrary patterns of autocorrelation within country-pairs (note that the method imposes no correlation across country-pairs which is likely to hold true as we include time fixed effects). Given that we detect first order serial correlation in levels in the data with the Arellano-Bond test (and no serial correlation of higher order), we limit the use of instruments for the lagged dependent variable in (10) to those dated $t - 2$ or earlier.

²⁹Roodman (2006) cites work by Judson and Owen (1999) who, with simulations, find a bias of 20% in the coefficient of the lagged dependent variable even when $P=30$ in models with individual fixed-effects.

Our benchmark "Difference GMM" estimation uses 125 instruments and 105,360 observations in the transformed sample with 10,575 country-pairs. Our coefficient of interest, η , is 0.021 significant at the 1% level (of the same order of magnitude, but smaller, than the 0.055 estimated with (7) shown in Table 7). The validity of the estimates though depends on the exogeneity of the instruments which is tested with the Sargan/Hansen tests. These tests for the benchmark specification indicate that the instruments are not exogenous. Additional estimations were tried where extra regressors were instrumented with this method (those on Y_{jt} , Y_{it} and $\widehat{RE}R_{ijt}$) but results still failed the exogeneity tests for instruments.

Overall the Arellano-Bond method of estimation under-performs in our framework and is therefore not further pursued.³⁰ Reassuringly however, the estimation of the dynamic panel model from (9) delivers similar results to those in our main specification in the paper.

6 Conclusion

TBA – THANK YOU

³⁰Mann and Pluck (2007) also report poor results with this method and opt for a fixed-effects estimation of their dynamic specification.

References

- [1] Agenor, Pierre-Richard and Peter Montiel, "Development Macroeconomics," Princeton University Press, 1996.
- [2] Aguiar, Mark, "Investment, Devaluation, and Foreign Currency Exposure: The Case of Mexico," University of Chicago, Working Paper, 2002.
- [3] Anderson, James E., "A Theoretical Foundation for the Gravity Equation," American Economic Review, March, 1979.
- [4] Anderson, James E. and Eric van Wincoop, "Gravity with Gravitas: A Solution to the Border Puzzle," American Economic Review, March, 2003.
- [5] Arellano, Manuel and Stephen Bond, "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations," Review of Economic Studies, 58, 1991.
- [6] Barth, Marvin and Trevor Dinmore, "Trade Prices and Volumes in East Asia Through the Crisis," Board of Governors of the Federal Reserve System, International Finance Discussion Papers No. 643, 1999.
- [7] Baum, Christopher F., Mark E. Schaffer and Steven Stillman, "ivreg2: Stata module for extended instrumental variables/2SLS, GMM and AC/HAC, LIML and k-class regression," 2007.
- [8] Bayoumi, Tamim, "Estimating Trade Equations from Aggregate Bilateral Data," IMF Working Paper No. 74, May, 1999.
- [9] Calvo, Guillermo and Carmen Reinhart, "Fixing for your Life," NBER Working Paper No. 8006, 2000.
- [10] Chaney, Thomas, "Distorted Gravity: Heterogeneous Firms, Market Structure and the Geography of International Trade," University of Chicago mimeo, 2006.

- [11] Clarida, Richard H., "Cointegration, Aggregate Consumption, and the Demand for Imports: A Structural Econometric Investigation," AER, March, 1994.
- [12] Desai, Mihir A., C. Fritz Foley, and Kristin J. Forbes, "Financial Constraints and Growth: Multinational and Local Firm Responses to Currency Crises," NBER Working Paper No. 10545, 2004.
- [13] Feenstra, Robert C., "Symmetric Pass-Through of Tariffs and Exchange Rates Under Imperfect Competition: An Empirical Test," Journal of International Economics, August, 1989.
- [14] Feenstra, Robert C., "World Trade Flows, 1980-1997," Center for International Data, UC Davis, March, 2000.
- [15] Feenstra, Robert C., "Border Effects and the Gravity Equation: Consistent Methods for Estimation," Scottish Journal of Political Economy, November, 2002.
- [16] Forbes, Kristin J., "Cheap Labor Meets Costly Capital: The Impact of Devaluations on Commodity Firms," Journal of Development Economics, December, 2002a.
- [17] Forbes, Kristin J., "How do Large Depreciations Affect Firm Performance?," IMF Staff Papers, 2002b.
- [18] Ghei, Nita and Lant Pritchett, "The Three Pessimisms: Real Exchange Rates and Trade Flows in Developing Countries," in Exchange Rate Misalignment: Concepts and Measurement for Developing Countries By Peter J. Montiel and Lawrence E. Hinkle, Chapter 11, Oxford University Press US, 1999.
- [19] Goldberg, Linda S. and Cedric Tille, "Vehicle Currency Use in International Trade," Federal Reserve Bank of New York Staff Report 200, 2006.
- [20] Gopinath, Gita, Oleg Itskhoki, and Roberto Rigobon, "Pass-through at the Dock: Pricing to Currency and to Market," Harvard University mimeo, 2006.
- [21] Gupta, Poonam, Deepak Mishra, and Ratna Sahay, "Output Response During Currency Crises," IMF Working Paper, 2000.

- [22] Hamilton, Lawrence C., "Resistant normality check and outlier determination," STB Reprints Vol 1, 1992.
- [23] Helpman, Elhanan, "Imperfect Competition and International Trade: Evidence from Fourteen Industrial Countries," *Journal of the Japanese and International Economies*, March, 1987.
- [24] Helpman, Elhanan, Marc Melitz, and Yona Rubinstein, "Trading Partners and Trading Volumes," Harvard University mimeo, August, 2004.
- [25] Helpman, Elhanan and Paul R. Krugman, "Market Structure and Foreign Trade," The MIT Press, Cambridge, MA, 1985.
- [26] Hooper, Peter and Jaime Marquez, "Exchange Rates, Prices, and External Adjustment in the United States and Japan," in *Understanding Interdependence* edited by P.B. Kenen, Princeton University Press, 1995.
- [27] Judson, Ruth A. and Ann L. Owen, "Estimating Dynamic Panel Models: A Practical Guide for Macroeconomists," *Economics Letters* 65, 1999.
- [28] Krueger, Anne and Aaron Tornell, "The Role of Bank Restructuring in Recovering from Crises: Mexico 1995-1998," NBER Working Paper No. 7042, 1999.
- [29] Krugman, Paul, "Scale Economies, Product Differentiation, and the Pattern of Trade," *American Economic Review*, 1980.
- [30] Krugman, Paul and Maurice Obstfeld, "International Economics - Theory & Policy," 7th edition, Pearson, Boston, MA, 2005.
- [31] Mann, Catherine L. and Katharina Pluck, "Understanding the US Trade Deficit - A Disaggregated Perspective," in *G7 Current Account Imbalances* edited by R.H. Clarida, NBER, 2007.
- [32] Manova, Kalina, "Credit Constraints, Heterogeneous Firms, and International Trade," Harvard University mimeo, 2006.

- [33] Orcutt, Guy H., "Measurement of Price Elasticities in International Trade," *The Review of Economics and Statistics*, May, 1950.
- [34] Rauch, James "Networks Versus Markets in International Trade," *Journal of International Economics*, 1999.
- [35] Reinhart, Carmen M., "Devaluation, Relative Prices, and International Trade: Evidence from Developing Countries," IMF Working Paper No. 94, November, 1994.
- [36] Rogoff, Kenneth, "The Purchasing Power Parity Puzzle," *Journal of Economic Literature*, June, 1996.
- [37] Roodman, David, "How to Do xtabond2: An Introduction to "Difference" and "System" GMM in Stata," Working Paper 103, Center for Global Development, December, 2006.
- [38] Santos Silva, J.M.C. and Silvana Tenreyro, "The Log of Gravity," *The Review of Economics and Statistics*, September, 2006.
- [39] Schumpeter, Joseph A., "Capitalism, Socialism and Democracy ," New York, Harper and Brothers, 1942.
- [40] The World Bank, "World Development Indicators," CD-ROM, 2001.
- [41] Tinbergen, Jan, "Shaping the World Economy," The Twentieth Century Fund, New York, 1962.
- [42] Wooldridge, Jeffrey M., "Econometric Analysis of Cross Section and Panel Data," The MIT Press, Cambridge, Massachusetts, 2002.

A Tables and Figures

Table 1: Bilateral Trade Flows and Measured RER, Summary Statistics. 136 countries, 1981-1997.

	Bilateral Trade Flows (1,000 of 1995 US dollars)	Measured Bilateral RER
Mean	368,826	3,437
Median	6,887	0.9862
St. Dev.	2,895,763	275,247
St. Dev./Mean	8	80
St. Dev./Median	420	279,109
Observations	140,627	140,627

Table 2: Bilateral Trade Flows by Type of Good, Summary Statistics. 136 countries, 1981-1997.

	Bilateral Trade Flows (1,000 of 1995 US dollars)		
	Homogeneous	Reference Price	Differentiated
Mean	94,265	63,177	189,343
Median	3,079	1,958	1,967
St. Dev.	576,698	408,914	1,731,817
St. Dev./Mean	6	6	9
St. Dev./Median	187	209	881
Observations	95,299	104,220	126,127

Table 3: Sector Level Bilateral Trade Flows by Type of Good, Summary Statistics. 136 countries, 1981-1997.

	Sector Level Bilateral Trade Flows (1,000 of 1995 US dollars)			
	All Trade Flows	Homogeneous	Reference Price	Differentiated
Mean	5,110	12,673	3,673	4,545
Median	155	282	177	138
St. Dev.	79,447	140,751	28,351	79,453
St. Dev./Mean	16	11	8	17
St. Dev./Median	511	498	160	575
Observations	7,977,399	754,424	1,858,663	5,364,312

Table 4: Bilateral Trade Flows and Measured RER by Country Group, Summary Statistics.
34 High Income and 102 Developing Countries, 1981-1997.

Bilateral Trade Flows		Measured Bilateral RER	
(1,000 of 1995 US dollars)			
HI	Mean	2,040,783	41
	Median	178,940	1
	St. Dev.	7,542,183	263
	St. Dev./Mean	4	6
	St. Dev./Median	42	263
	Observations	17,252	17,252
HI & MIX	Mean	759,103	164
	Median	23,379	0
	St. Dev.	4,389,205	8,994
	St. Dev./Mean	6	55
	St. Dev./Median	188	51,143
	Observations	56,759	56,759
DC	Mean	32,115	9,137
	Median	1,493	1
	St. Dev.	156,390	473,937
	St. Dev./Mean	5	52
	St. Dev./Median	105	450,412
	Observations	47,391	47,391
DC & MIX	Mean	104,700	5,653
	Median	2,936	4
	St. Dev.	921,817	356,325
	St. Dev./Mean	9	63
	St. Dev./Median	314	82,854
	Observations	83,868	83,868

Table 5: Bilateral Trade Flows by Type of Good for Country Groups, Summary Statistics.
34 High Income and 102 Developing Countries, 1981-1997.

Bilateral Trade Flows (1,000 of 1995 US dollars)				
		Homogeneous	Reference Price	Differentiated
HI	Mean	307,822	275,615	1,030,652
	Median	18,779	25,202	62,737
	St. Dev.	1,228,589	939,296	4,392,642
	St. Dev./Mean	4	3	4
	St. Dev./Median	65	37	70
	Observations	15,045	15,998	16,953
HI & MIX	Mean	133,654	108,788	384,839
	Median	3,979	4,281	8,552
	St. Dev.	764,007	569,374	2,546,269
	St. Dev./Mean	6	5	7
	St. Dev./Median	192	133	298
	Observations	41,453	49,551	54,871
DC	Mean	22,688	9,013	10,292
	Median	1,405	619	385
	St. Dev.	92,876	39,995	64,700
	St. Dev./Mean	4	4	6
	St. Dev./Median	66	65	168
	Observations	26,251	28,386	39,052
DC & MIX	Mean	63,942	21,836	38,801
	Median	2,544	942	658
	St. Dev.	370,333	146,077	513,862
	St. Dev./Mean	6	7	13
	St. Dev./Median	146	155	781
	Observations	53,846	54,669	71,256

Table 6: Sector Level Bilateral Trade Flows by Type of Good for Country Groups, Summary Statistics. 34 High Income and 102 Developing Countries, 1981-1997.

Sector Level Bilateral Trade Flows (1,000 of 1995 US dollars)					
		All Trade Flows	Homogeneous	Reference Price	Differentiated
HI	Mean	10,072	17,384	6,950	10,090
	Median	401	390	378	412
	St. Dev.	127,334	190,492	43,494	135,491
	St. Dev./Mean	13	11	6	13
	St. Dev./Median	317	489	115	329
	Observations	2,633,831	266,737	634,596	1,732,498
HI & MIX	Mean	5,831	11,679	4,204	5,643
	Median	186	249	194	178
	St. Dev.	88,921	143,997	31,986	92,895
	St. Dev./Mean	15	12	8	16
	St. Dev./Median	478	579	165	523
	Observations	5,580,814	485,166	1,304,986	3,790,662
DC	Mean	1,499	6,838	1,287	761
	Median	78	249	109	61
	St. Dev.	17,016	48,324	8,290	7,212
	St. Dev./Mean	11	7	6	9
	St. Dev./Median	219	194	76	117
	Observations	1,064,704	107,407	253,220	704,077
DC & MIX	Mean	3,432	14,463	2,420	1,901
	Median	105	354	144	81
	St. Dev.	50,928	134,685	16,870	26,879
	St. Dev./Mean	15	9	7	14
	St. Dev./Median	484	380	117	331
	Observations	2,396,585	269,258	553,677	1,573,650

Table 7: Bilateral Export Response to Real Exchange Rate Fluctuations for 136 Sample, 1981-1997.

	Dep Var is Log of Bilateral Trade Flows			
	All Flows	Homogeneous	Reference Price	Differentiated
Ln(RER)	0.055*** [0.008]	0.031*** [0.011]	0.104*** [0.010]	0.080*** [0.008]
Observations	140,627	95,299	104,220	126,127
# country-pairs	13,917	10,737	11,151	13,021
R-squared	0.09	0.02	0.08	0.16

1. Robust standard errors in brackets

2. * significant at 10%; ** significant at 5%; *** significant at 1%

3. GDP and GDPpc for the exporter and the importer included. Fixed Effects for country-pairs and years included.

Table 8: Summary Stats of Bilateral Export Responses to Real Exchange Rate Fluctuations for Overall Sample, By Exporter, 1981-1997.

	Sample		
	Overall	HI&MIX	DC&MIX
Avg. Estimate	0.14*	0.13*	0.15*
% of Significant	45	74	35
Avg. R ²	0.85	0.90	0.83
Avg. # Observations	1,076	1,669	864
Max	Togo Gambia Yemen	Greece New Zealand Portugal	Togo Gambia Yemen
Min	Oman Albania Brunei	Kuwait United Arab Em. Brunei	Gabon Oman Albania

1.* Indicates different from zero at 5% level

2. 129 estimates included

3. 7 outliers excluded: Djibouti (-0.90), Burkina Faso (1.14), Seychelles (1.15), Rwanda (1.73), Eq. Guinea (2.53), Maldives (2.86), Cambodia (3.27)

Table 9: Summary Stats of Bilateral Export Responses to Real Exchange Rate Fluctuations for HI and DC Samples, By Exporter, 1981-1997.

	Sample	
	HI	DC
Avg. Estimate	0.67*	0.18*
% of Significant	53	36
Avg. R²	0.93	0.78
Avg. # Observations	507	493
Max	Bahamas Cyprus Korea Rp (S)	Gambia Mali Burkina Faso
Min	Brunei Kuwait Saudi Arabia	Gabon Oman Djibouti

1.* Indicates different from zero at 5% level

2. 129 estimates included

3. 7 outliers excluded: Comoros (-2.31), Solomon Islds (-1.80), Albania (-1.33), Cambodia (2.65), Rwanda (3.58), Mongolia (3.97), Maldives (8.69)

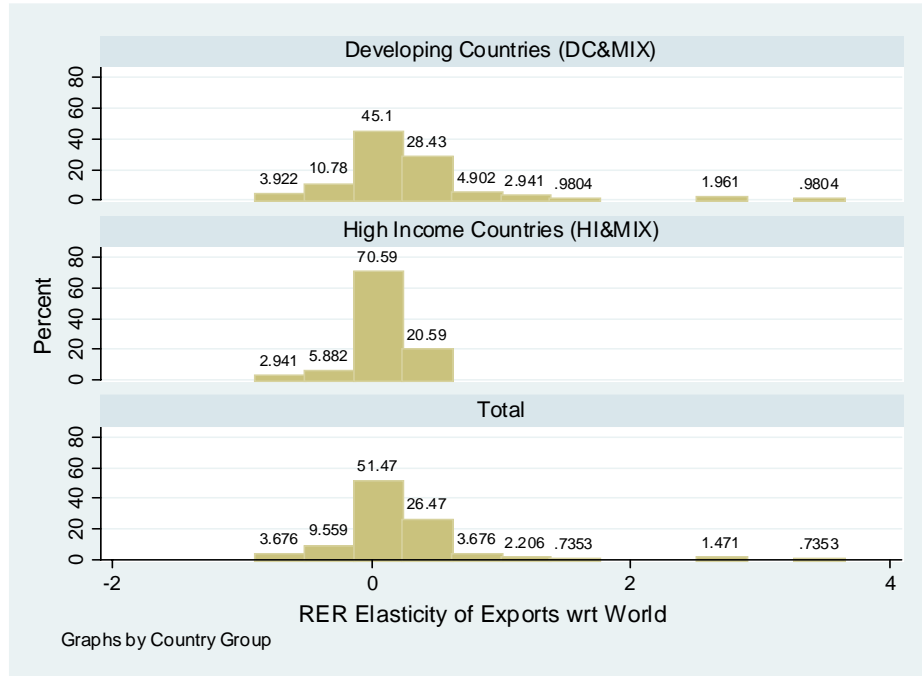


Figure 1: Distribution of Bilateral Export Responses to Real Exchange Rate Fluctuations for Overall Sample, By Exporter, 1981-1997.

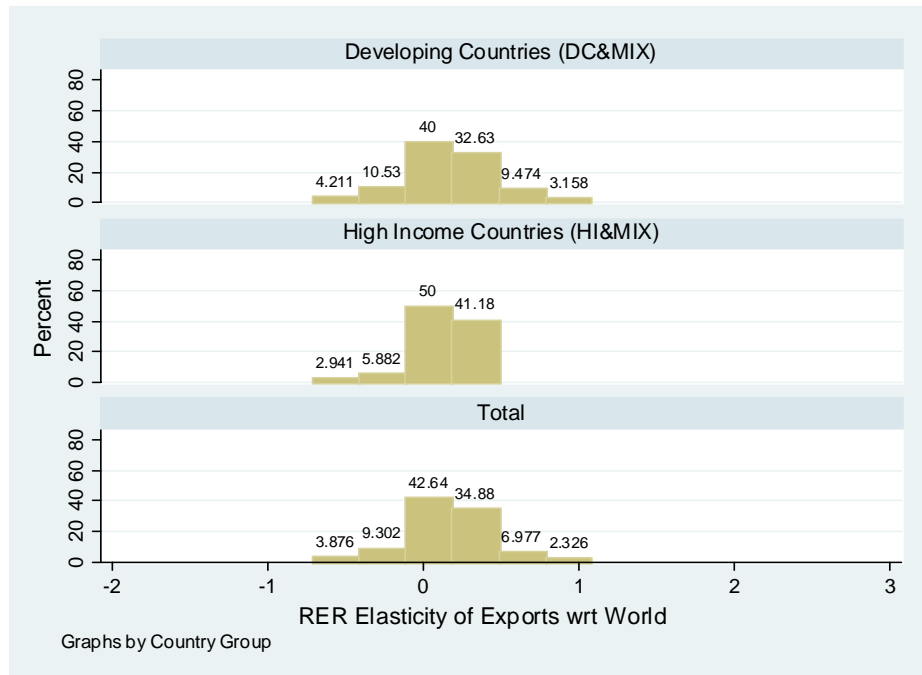


Figure 2: Distribution of Bilateral Export Responses to Real Exchange Rate Fluctuations for 129 Sample, By Exporter, 1981-1997.

Table 10: Summary Stats of Bilateral Export Responses for High Income Countries, By Sector, 1981-1997.

Estimated Coefficients for Bilateral RER for Sectors (HI&MIX Sample):		
	Homogeneous	Differentiated
Avg. Estimate	0.05*	0.20*
% of Significant	31	89
Avg. R ²	0.07	0.11
Avg. # Obs.	5,408	16,194
Max	Ores & Concentrates of Uranium and Thorium Sugars, Beet and Cane, Raw, Solid Zinc, Ores and Concentrates	Knitted/Crocheted Fabrics of Fibres Oth. Than Synth. Parts of the machines of 726.31, 726.4-, 726.7- Mach., Appar., Access. For Type Founding or Setting
Min	Sawlogs and Veneer Logs, of Non Coniferous Species Ores & Concentrates of Precious Metal; Waste, Scra. Rice in the husk or husked, but not further prepar.	Furskins, Tanned/Dressed, Pieces/Cutting of Furskin Industrial Diamonds Sorted, Whether or not Worked Tobacco Refuse

1.* Indicates different from zero at 5% level

2. 86 (224) estimates for Homogeneous (Differentiated) sectors included

3. 7 outlier sectors excluded: Roasted Iron Pyrites, Whether or Not Agglomerated (-0.75, Hom), Sesame (sesamum) seeds (1.26, Hom), Sheep and Lamb Skins Without the Wool, Raw (Fresh etc) (-0.43, Diff), Under Garments, Knitted, of Synthetic Fibers (0.91,Diff), Castor Oil Seeds (0.95,Diff), Maps, Greeting Cards Music, Printed (1.23,Diff) and Petroleum Oil Prep & Residues NES (1.47, Diff)

Estimated Coefficients for Bilateral RER for Sectors (HI Sample):		
	Homogeneous	Differentiated
Avg. Estimate	0.02	0.56*
% of Significant	31	76
Avg. R ²	0.09	0.15
Avg. # Obs.	3,024	7,602
Max	Sesame (sesamum) seeds Sheep and Goats, Live Plywood consisting of Sheets of Wood	Builderscarpentry and Joinery Maps, Greeting Cards Music, Printed Tubes and Pipes, of Cast Iron
Min	Tobacco, Not Stripped Durum Wheat, Unmilled Tin Ores and Concentrates	Asbestos Sheep and Lamb Skins Without the Wool, Raw (Fresh etc) Tobacco Refuse

1.* Indicates different from zero at 5% level

2. 88 (227) estimates for Homogeneous (Differentiated) sectors included

3. 2 outlier sectors excluded: Under Garments, Knitted, of Synthetic Fibers (2.33, Dif) and Petroleum Oil Prep & Residues NES (7.49, Diff)

Table 11: Summary Stats of Bilateral Export Responses for Developing Countries, By Sector, 1981-1997.

Estimated Coefficients for Bilateral RER for Sectors (DC&MIX Sample):			
Homogeneous		Differentiated	
Avg. Estimate	0.03*	0.05*	
% of Significant	31	51	
Avg. R ²	0.09	0.12	
Avg. # Obs.	2,802	6,433	
Max	Sheep and Goats, Live Rye, Unmilled Cotton Seeds	Building and Monumental Stone not Further Worked Peat, whether or not Compres. Into Bales not agglomera Coats and Jackets of Textile Fabrics	
Min	Animal Oils, Fats and Greases, NES Gold, Non-Monetary Pulpwood (Including chips and wood waste)	Castor Oil Seeds Briouet. Ovoids & Sim.Solid Fuels, of Coal Peat Lig. Sheep & Lamb Skins Without the Wool, Raw (Fresh etc)	

1.* Indicates different from zero at 5% level

2. 87 (221) estimates for Homogeneous (Differentiated) sectors included

3. 9 outlier sectors excluded: Roasted Iron Pyrites, Whether or Not Agglomerated (-0.58, Hom), Maps, Greeting Cards Music, Printed (-0.58, Diff), Shavers and Hair Clippers with motor and parts (-0.46, Diff), Petroleum Oil Prep & Residues NES (0.43, Diff), Industrial Diamonds Sorted, Whether or not Worked (0.45, Diff), Knitted/Crocheted Fabrics of Fibres Oth. Than Synth. (0.53, Diff), Mach., Appar., Access. For Type Founding or Setting (0.81, Diff), Parts of the machines of 726.31, 726.4-, 726.7- (0.92, Diff), Under Garments, Knitted, of Synthetic Fibers (1.35, Diff).

Estimated Coefficients for Bilateral RER for Sectors (DC Sample):			
Homogeneous		Differentiated	
Avg. Estimate	0.03	0.04*	
% of Significant	28	35	
Avg. R ²	0.13	0.12	
Avg. # Obs.	1,175	2,876	
Max	Raw Silk (Not Thrown) Sheep and Goats, Live Butter	Knitted/Crocheted Fabrics of Fibres Oth. Than Synth. Work Trucks, Mechanically Propelled, For Short Distance Suits & Costumes, Womens, of Textile Fabrics	
Min	Animal Oils, Fats and Greases, NES Rape and Colza Seeds Ores & Concentrates of Precious Metal; Waste, Scra.	Castor Oil Seeds Sheep & Lamb Skins Without the Wool, Raw (Fresh etc) Briouet. Ovoids & Sim.Solid Fuels, of Coal Peat Lig.	

1.* Indicates different from zero at 5% level

2. 81 (220) estimates for Homogeneous (Differentiated) sectors included

3. 14 outlier sectors excluded (5 Hom. and 9 Diff.)

Table 12: Persistent Bilateral Export Response to Real Exchange Rate Fluctuations for 136 Sample, 1981-1997.

Dep Var is Log of Bilateral Trade Flows				
	All Flows	Homogeneous	Reference Price	Differentiated
Ln(RER)	0.072*** [0.016]	0.057*** [0.019]	0.144*** [0.017]	0.093*** [0.014]
Observations	40,719	29,554	30,931	37,051
# country-pairs	13,917	10,737	11,151	13,021
R-squared	0.09	0.02	0.10	0.19

1. Robust standard errors in brackets

2. * significant at 10%; ** significant at 5%; *** significant at 1%

3. GDP and GDPpc for the exporter and the importer included. Fixed Effects for country-pairs and periods included.

Table 13: Summary Stats of Persistent Bilateral Export Responses for HI Sample, By Sector, 1981-1997.

Estimated Coefficients for Bilateral RER for Sectors (HI&MIX Sample):		
	Homogeneous	Differentiated
Avg. Estimate	0.05*	0.17*
% of Significant	35	83
Avg. R ²	0.07	0.14
Avg. # Obs.	1,959	5,056

- 1.* Indicates different from zero at 5% level
2. 84 (224) estimates for Homogeneous (Differentiated) sectors included
3. 9 outlier sectors excluded (4 Hom. and 5 Diff.)

Estimated Coefficients for Bilateral RER for Sectors (HI Sample):		
	Homogeneous	Differentiated
Avg. Estimate	0.002	0.56*
% of Significant	20	71
Avg. R ²	0.10	0.19
Avg. # Obs.	1,003	2,152

- 1.* Indicates different from zero at 5% level
2. 86 (226) estimates for Homogeneous (Differentiated) sectors included
3. 4 outlier sectors excluded (2 Hom. and 2 Diff.)

Table 14: Summary Stats of Persistent Bilateral Export Responses for DC Sample, By Sector, 1981-1997.

Estimated Coefficients for Bilateral RER for Sectors (DC&MIX Sample):		
	Homogeneous	Differentiated
Avg. Estimate	0.05*	0.08*
% of Significant	23	49
Avg. R ²	0.09	0.15
Avg. # Obs.	1,251	2,546

- 1.* Indicates different from zero at 5% level
2. 83 (222) estimates for Homogeneous (Differentiated) sectors included
3. 12 outlier sectors excluded (5 Hom. and 7 Diff.)

Estimated Coefficients for Bilateral RER for Sectors (DC Sample):		
	Homogeneous	Differentiated
Avg. Estimate	0.05*	0.08*
% of Significant	28	41
Avg. R ²	0.14	0.14
Avg. # Obs.	555	1,233

- 1.* Indicates different from zero at 5% level
2. 82 (221) estimates for Homogeneous (Differentiated) sectors included
3. 8 outlier sectors excluded (2 Hom. and 6 Diff.)

Table 15: 136 Countries in the Sample, Period 1981-1997. Part 1.

Country Name	Code (from Feenstra)	Exporter		Importer	
		Frequency	%	Frequency	%
1 ALBANIA	580080	178	0.13	238	0.17
2 ALGERIA	130120	758	0.54	1,245	0.89
3 ANGOLA	160240	305	0.22	535	0.38
4 ARGENTINA	330320	1,719	1.22	1,249	0.89
5 AUSTRALIA	710360	1,949	1.39	1,664	1.18
6 AUSTRIA	550400	2,018	1.44	1,806	1.28
7 BAHAMAS	350440	852	0.61	889	0.63
8 BAHRAIN	440480	864	0.61	959	0.68
9 BANGLADESH	450500	1,343	0.96	935	0.66
10 BARBADOS	350520	684	0.49	947	0.67
11 BELIZE	360840	423	0.3	729	0.52
12 BENIN	162040	382	0.27	687	0.49
13 BHUTAN	450640	233	0.17	322	0.23
14 BOLIVIA	330680	680	0.48	902	0.64
15 BRAZIL	330760	1,880	1.34	1,367	0.97
16 BRUNEI	450960	381	0.27	629	0.45
17 BULGARIA	581000	802	0.57	680	0.48
18 BURKINA FASO	168540	390	0.28	610	0.43
19 BURUNDI	161080	454	0.32	562	0.4
20 CAMBODIA	451160	201	0.14	183	0.13
21 CAMEROON	141200	825	0.59	980	0.7
22 CANADA	211240	2,087	1.48	1,937	1.38
23 CENTRAL AFR. REP.	141400	384	0.27	604	0.43
24 CHAD	141480	298	0.21	481	0.34
25 CHILE	331520	1,507	1.07	1,298	0.92
26 CHINA	481560	1,815	1.29	1,392	0.99
27 COLOMBIA	331700	1,427	1.01	1,298	0.92
28 COMOROS	161740	233	0.17	454	0.32
29 CONGO	141780	574	0.41	769	0.55
30 COSTA RICA	341880	1,141	0.81	985	0.7
31 COTE D'IVOIRE	163840	1,051	0.75	995	0.71
32 CYPRUS	441960	1,330	0.95	1,296	0.92
33 CZECHOSLOVAKIA	582000	501	0.36	437	0.31
34 DENMARK	532080	2,121	1.51	1,898	1.35
35 DJIBOUTI	162620	252	0.18	494	0.35
36 DOMINICAN RP	352140	798	0.57	886	0.63
37 ECUADOR	332180	1,024	0.73	1,042	0.74
38 EGYPT	138180	1,294	0.92	1,326	0.94
39 EL SALVADOR	342220	719	0.51	915	0.65
40 EQ. GUINEA	162260	183	0.13	317	0.23
41 ETHIOPIA	162300	580	0.41	871	0.62
42 FIJI	722420	540	0.38	761	0.54
43 FINLAND	552460	1,998	1.42	1,634	1.16
44 FM USSR	688100	389	0.28	411	0.29
45 FRANCE	532500	2,130	1.51	2,097	1.49
46 GABON	142660	663	0.47	803	0.57
47 GAMBIA	162700	411	0.29	603	0.43
48 GERMANY	532800	2,135	1.52	2,117	1.51
49 GHANA	162880	844	0.6	877	0.62
50 GREECE	533000	1,820	1.29	1,739	1.24

Table 16: 136 Countries in the Sample, Period 1981-1997. Part 2.

Country Name	Code (from Feenstra)	Exporter		Importer	
		Frequency	%	Frequency	%
51 GUATEMALA	343200	1,020	0.73	1,004	0.71
52 GUINEA	163240	384	0.27	499	0.35
53 GUINEA-BISSAU	166240	432	0.31	606	0.43
54 GUYANA	363280	660	0.47	679	0.48
55 HAITI	353320	557	0.4	788	0.56
56 HONDURAS	343400	815	0.58	965	0.69
57 HONG KONG	453440	2,108	1.5	1,758	1.25
58 HUNGARY	583480	1,372	0.98	1,117	0.79
59 ICELAND	553520	859	0.61	1,004	0.71
60 INDIA	453560	1,925	1.37	1,517	1.08
61 INDONESIA	453600	1,634	1.16	1,347	0.96
62 IRAN	443640	992	0.71	853	0.61
63 IRELAND	533720	2,057	1.46	1,684	1.2
64 ISRAEL	413760	1,460	1.04	1,146	0.81
65 ITALY	533800	2,132	1.52	2,068	1.47
66 JAMAICA	353880	793	0.56	1,039	0.74
67 JAPAN	413920	2,133	1.52	2,097	1.49
68 JORDAN	444000	920	0.65	1,163	0.83
69 KENYA	164040	1,228	0.87	1,126	0.8
70 KIRIBATI	722960	328	0.23	515	0.37
71 KOREA RP (SOUTH)	454100	1,969	1.4	1,563	1.11
72 KUWAIT	444140	798	0.57	933	0.66
73 LAOS P.DEM.R	454180	378	0.27	355	0.25
74 LEBANON	444220	507	0.36	537	0.38
75 LIBERIA	164300	600	0.43	821	0.58
76 MADAGASCAR	164500	744	0.53	818	0.58
77 MALAWI	164540	853	0.61	678	0.48
78 MALAYSIA	454580	1,829	1.3	1,464	1.04
79 MALDIVES	454620	54	0.04	68	0.05
80 MALI	164660	497	0.35	646	0.46
81 MALTA	574700	997	0.71	1,077	0.77
82 MAURITANIA	164780	478	0.34	649	0.46
83 MAURITIUS	164800	894	0.64	993	0.71
84 MEXICO	334840	1,627	1.16	1,515	1.08
85 MONGOLIA	484960	174	0.12	199	0.14
86 MOROCCO	135040	1,468	1.04	1,389	0.99
87 MOZAMBIQUE	165080	666	0.47	698	0.5
88 NEPAL	455240	524	0.37	643	0.46
89 NETHERLANDS	535280	2,129	1.51	2,065	1.47
90 NEW CALEDONIA	725400	564	0.4	741	0.53
91 NEW ZEALAND	715540	1,734	1.23	1,409	1
92 NICARAGUA	345580	536	0.38	774	0.55
93 NIGER	165620	430	0.31	670	0.48
94 NIGERIA	165660	922	0.66	1,100	0.78
95 NORWAY	555780	2,062	1.47	1,675	1.19
96 OMAN	445120	832	0.59	1,060	0.75
97 PAKISTAN	455860	1,874	1.33	1,431	1.02
98 PANAMA	365900	831	0.59	1,080	0.77
99 PAPUA N.GUINEA	725980	620	0.44	682	0.48
100 PARAGUAY	336000	669	0.48	838	0.6

Table 17: 136 Countries in the Sample, Period 1981-1997. Part 3.

Country Name	Code (from Feenstra)	Exporter		Importer	
		Frequency	%	Frequency	%
101 PERU	336040	1,358	0.97	1,141	0.81
102 PHILIPPINES	456080	1,581	1.12	1,275	0.91
103 POLAND	586160	785	0.56	705	0.5
104 PORTUGAL	536200	1,964	1.4	1,779	1.27
105 ROMANIA	586420	1,394	0.99	1,038	0.74
106 RWANDA	166460	388	0.28	548	0.39
107 SAUDI ARABIA	446820	997	0.71	1,272	0.9
108 SENEGAL	166860	788	0.56	1,015	0.72
109 SEYCHELLES	166900	307	0.22	684	0.49
110 SIERRA LEONE	166940	511	0.36	687	0.49
111 SINGAPORE	457020	1,712	1.22	1,583	1.13
112 SOLOMON ISLANDS	720900	356	0.25	432	0.31
113 SOUTH AFRICA	117100	1,440	1.02	1,263	0.9
114 SPAIN	537240	2,018	1.44	1,978	1.41
115 SRI LANKA	451440	1,410	1	1,101	0.78
116 SUDAN	137360	774	0.55	860	0.61
117 SURINAM	367400	463	0.33	664	0.47
118 SWEDEN	557520	2,123	1.51	1,918	1.36
119 SWITZERLAND	557560	2,113	1.5	2,001	1.42
120 SYRIAN ARAB REP	447600	740	0.53	1,013	0.72
121 THAILAND	457640	1,962	1.4	1,515	1.08
122 TOGO	167680	573	0.41	871	0.62
123 TRINIDAD-TOBAGO	357800	1,097	0.78	1,112	0.79
124 TUNISIA	137880	1,278	0.91	1,266	0.9
125 TURKEY	447920	1,628	1.16	1,448	1.03
126 UGANDA	168000	532	0.38	613	0.44
127 UNITED KINGDOM	538260	2,134	1.52	2,109	1.5
128 UNTD ARAB EM	447840	883	0.63	1,096	0.78
129 UNTD RP TANZANIA	168340	454	0.32	458	0.33
130 URUGUAY	338580	1,222	0.87	1,070	0.76
131 USA	218400	2,128	1.51	2,108	1.5
132 VENEZUELA	338620	1,084	0.77	1,161	0.83
133 VIETNAM	487040	618	0.44	477	0.34
134 YEMEN	448870	257	0.18	319	0.23
135 ZAMBIA	168940	692	0.49	697	0.5
136 ZIMBABWE	167160	1,224	0.87	949	0.67

Table 18: 34 High Income Countries in the Sample, Period 1981-1997.

Country Name	Code (from Feenstra)	Non OECD (12)	OECD (22)
1 AUSTRALIA	710360		1
2 AUSTRIA	550400		1
3 BAHAMAS	350440	1	
4 BAHRAIN	440480	1	
5 BRUNEI	450960	1	
6 CANADA	211240		1
7 CYPRUS	441960	1	
8 DENMARK	532080		1
9 FINLAND	552460		1
10 FRANCE	532500		1
11 GERMANY	532800		1
12 GREECE	533000		1
13 HONG KONG	453440	1	
14 ICELAND	553520		1
15 IRELAND	533720		1
16 ISRAEL	413760	1	
17 ITALY	533800		1
18 JAPAN	413920		1
19 KOREA RP (SOUTH)	454100		1
20 KUWAIT	444140	1	
21 MALTA	574700	1	
22 NETHERLANDS	535280		1
23 NEW CALEDONIA	725400	1	
24 NEW ZEALAND	715540		1
25 NORWAY	555780		1
26 PORTUGAL	536200		1
27 SAUDI ARABIA	446820	1	
28 SINGAPORE	457020	1	
29 SPAIN	537240		1
30 SWEDEN	557520		1
31 SWITZERLAND	557560		1
32 UNITED KINGDOM	538260		1
33 UNTD ARAB EM	447840	1	
34 USA	218400		1

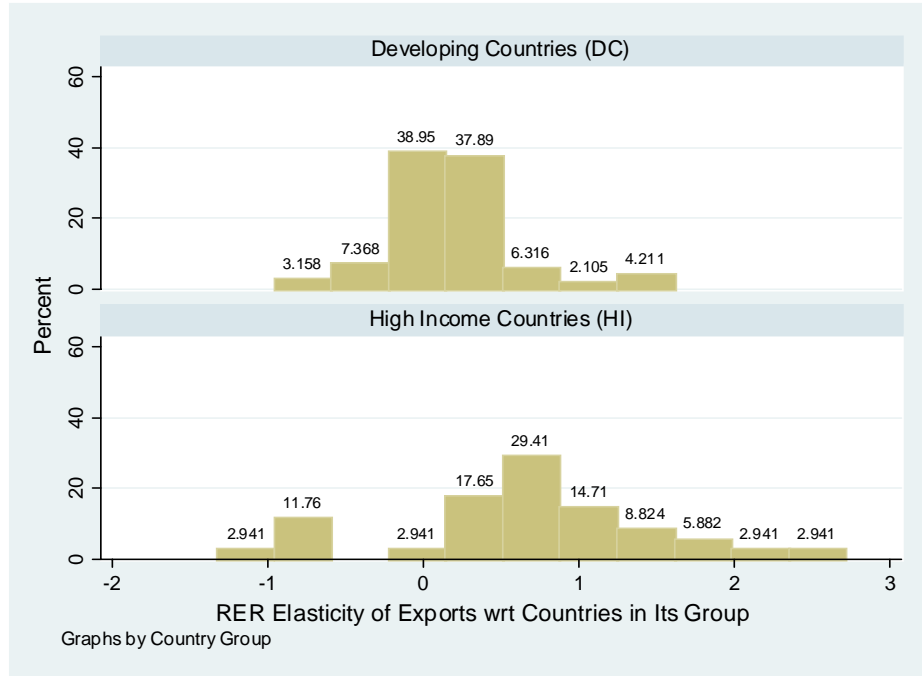


Figure 3: Distribution of Bilateral Export Responses to Real Exchange Rate Fluctuations for HI and DC Samples, By Exporter, 1981-1997.

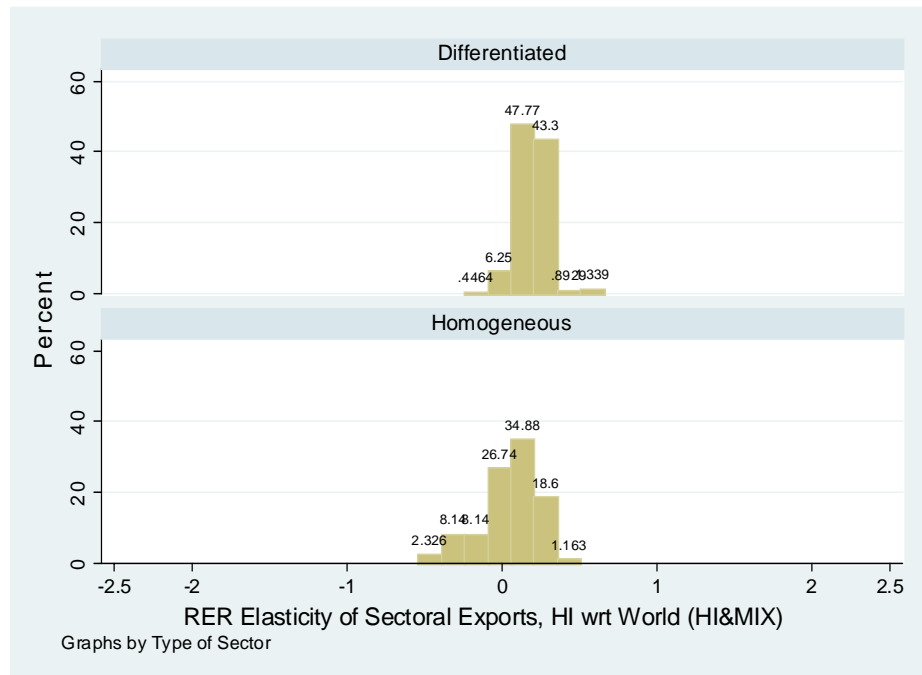


Figure 4: Distribution of Bilateral Export Responses to Real Exchange Rate Fluctuations (η) for HI&MIX Sample, By Sector, 1981-1997.

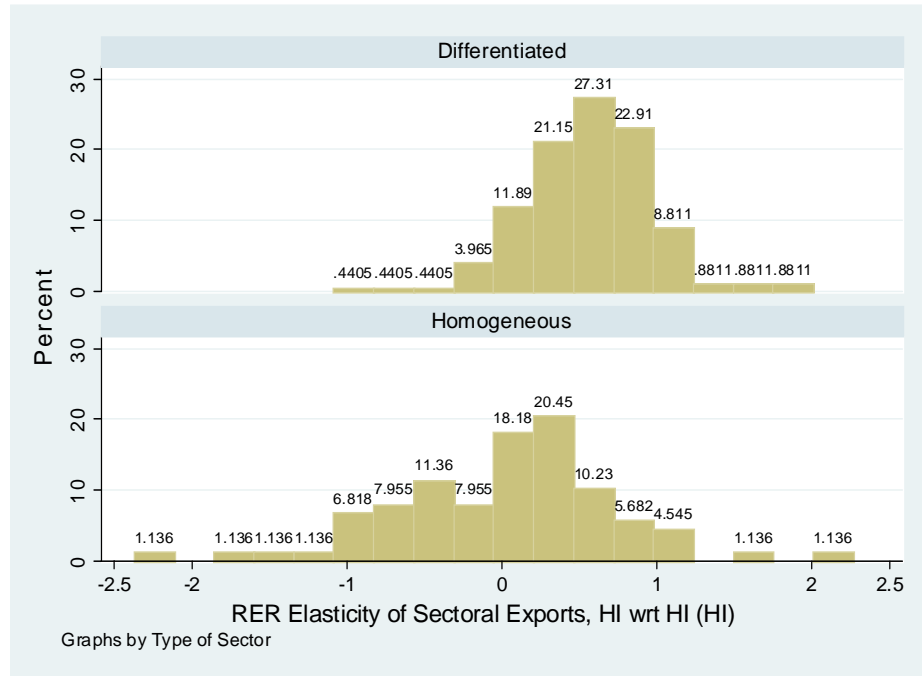


Figure 5: Distribution of Bilateral Export Responses to Real Exchange Rate Fluctuations (η) for HI Sample, By Sector, 1981-1997.

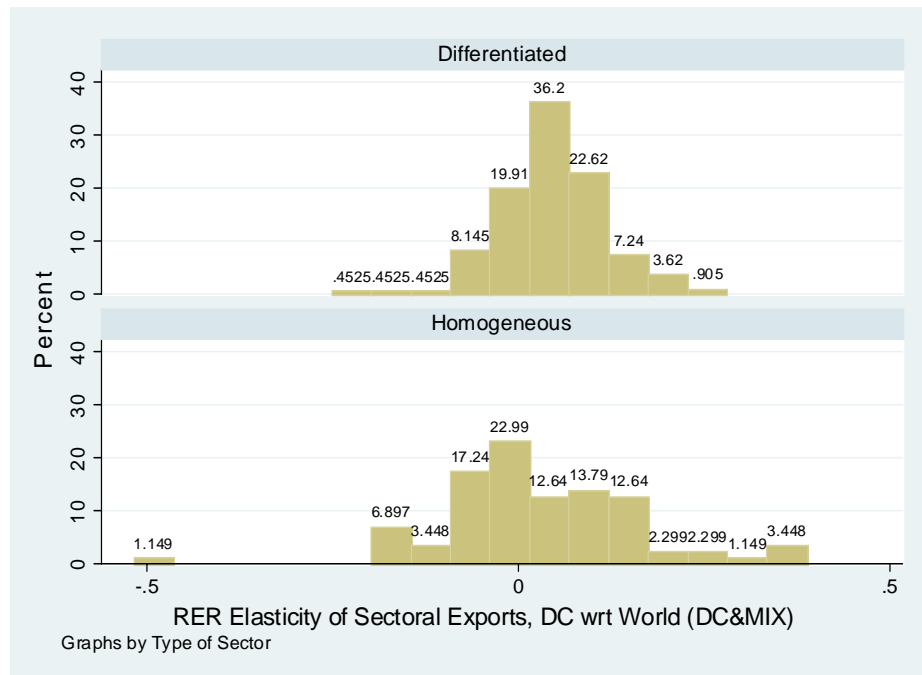


Figure 6: Distribution of Bilateral Export Responses to Real Exchange Rate Fluctuations (η) for DC&MIX Sample, By Sector, 1981-1997.

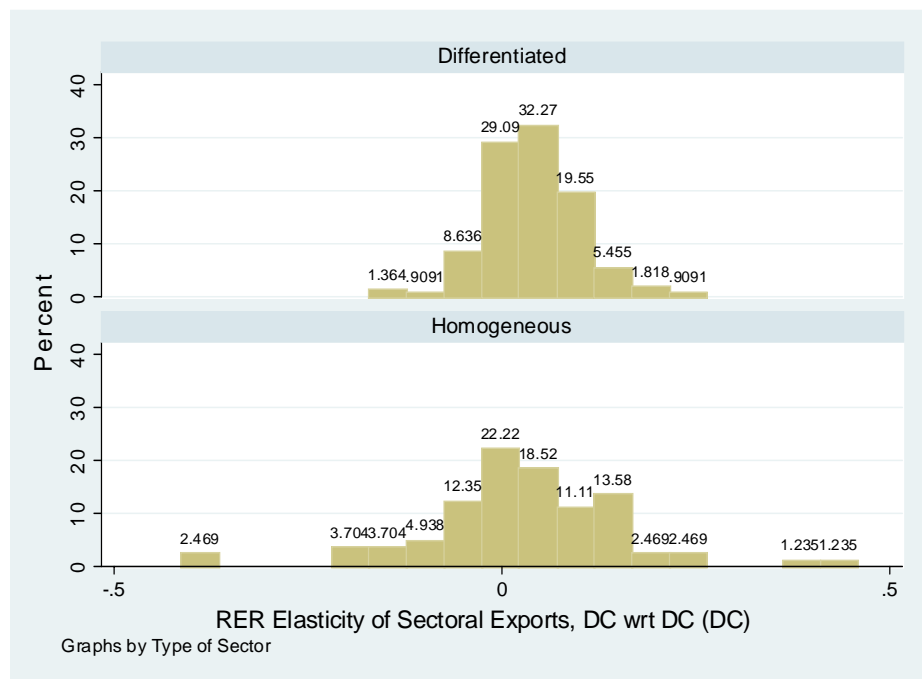


Figure 7: Distribution of Bilateral Export Responses to Real Exchange Rate Fluctuations (η) for DC Sample, By Sector, 1981-1997.