Dominant Currency Paradigm

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ONLINE APPENDIX

A ONLINE APPENDIX: NOT FOR PUBLICATION

A.1 Macro Data

Here we provide further details on the Comtrade, WDI, and FRED data.

A.1.1 Data Construction

Comtrade. U.N. Comtrade (2017) provides detailed annual customs data for a large set of countries at HS 6-digit product level with information about the destination country, USD value, quantity, and weight of imports and exports. This dataset makes it possible to compute volume changes over time for each product, and use the value data to infer unit values. Once unit values are calculated, we compute chained Fisher price indices to aggregate up from the product level to the bilateral country level.[1] We focus entirely on data for non-commodity goods, except noted otherwise. Given the inherent difficulty in drawing a line between commodities and non-commodities, we define commodities fairly broadly as HS chapters 1–27 and 72–83, which comprise animal, vegetable, food, mineral, and metal products.

Coverage of Comtrade at annual frequency over time and across countries is good. The longest time span of the data is 1989–2015, although the coverage varies by dyad. Appendix A.1.2 lists the coverage by country. In 2015, the 55 countries in our sample were responsible for 91.2% and 91.5% of the value of world goods imports and exports, respectively, as recorded in Comtrade. We exclusively use Comtrade data reported by the importing country, as importer-reported data is regarded as being more reliable since imports generate tariff revenues (Feenstra et al., 2005; World Bank, 2010).

The biggest challenge for constructing price and volume indices using customs data is the so-called unit value bias, as argued by Silver (2007). Unit values, calculated simply by dividing observed values by quantities, are not actual prices. Even at the narrowly defined product categories at 6-digit product level, there is likely to be a wide range of products whose prices may not be moving proportionately. The implication is that if there are shifts in quantities traded within the narrowly defined product categories, unit values would be influenced even when there is no price movement. This creates a bias that the employed methodology takes a stab at correcting for by eliminating products whose unit values have a variance higher than a threshold and are more likely to be biased.

The second challenge that arises from using Comtrade data is related to the use of different HS vintages over time. HS classification is updated about every five years to ensure that the available codings accurately reflect the variety of products being traded. This involves introducing codes for new products, eliminating the old ones, and often regrouping existing products. While concordances are readily available to facilitate the matching of HS codes across different HS vintages, this process inevitably leads to a loss of information, especially in the case of data on quantities, because the mapping of products across vintages is rarely one-to-one. To get around this problem, for the years in which there is a transition to a new HS vintage, we compute the indices twice, once under the old vintage (using concordances) and once under the new one. This way, only these transition years would be effected by the loss of information due to matching across vintages. After that year, we switch to working with the new vintage. This method not only minimizes the loss of information but also allows us to include new products in the construction of the indices. Boz et al. (2019) provide further details of this method, including the strategy for dealing with outliers and missing values.

The third potential challenge is associated with the conversion of trade values into and out of dollars. Exchange rate conversion can be made by data compilers at the country level and by Comtrade. United Nation's 2006 Survey of National Compilation and Reporting Practices suggests that almost all countries in our sample use an exchange rate from an official source and most countries use a daily exchange rate at the date of exporting or importing. Those that declare not using daily rates report using monthly exchange rates. All in all, results of this survey suggest exchange rate conversion at the country level to be pretty accurate. As for Comtrade, for those countries reporting in local currency, Comtrade uses an annual exchange rate that weighs monthly exchange rates from the International Financial Statistics of the IMF by monthly trade flows. According to the Explanatory Notes provided by Comtrade, most emerging markets report in dollars and advanced economies report in local

[1] The Fisher price index satisfies a number of tests laid out in index number theory and is flexible enough to provide a good proxy for a large set of functional forms (Gaulier et al., 2008; IMF, 2009).

currency. Because our regressions for different country groups in online appendix A.2.1 show similar results for advanced and emerging country flows, any discrepancies in how annual exchange rate conversions are done by different countries appear to not substantially influence our qualitative findings.

In the final stage, we compare our unit value indices to those provided by the Bureau of Labor Statistics (BLS) for the U.S., the only country, to our knowledge, that collects import price indices based on price surveys by origin. As shown in online appendix A.1.3, this comparison for the U.S. suggests that working with unit values is acceptable, as the growth rates of the two series are broadly aligned for most trading partners. Further, the results on pass-through into U.S. import and export prices using our constructed unit value indices are wholly consistent with the estimates in Casas et al. (2016) and Gopinath and Rigobon (2008) that are based on BLS data. Lastly, Boz et al. (2019) find favorable results when comparing country-level indices with those from the WTO and IMF World Economic Outlook.

Currency invoicing share. For currency invoicing shares we use the data set constructed by Gopinath (2015). The invoicing shares tend to be fairly stable over time so we take their simple averages over the years in which they are reported during 1999–2014. Appendix A.1.2 lists the USD and euro import invoicing share for the 39 countries in our sample with available invoicing data.

World Development Indicator data. WDI (2017). The exchange rate is the World Bank's "alternative conversion factor" series (PA.NUS.ATLS), which corrects for redenominations and currency substitution, and is measured as an annual average of daily rates. Producer prices are given by the wholesale price index (FP.WPI.TOTL). Real GDP is measured at market prices in constant U.S. dollars (NY.GDP.MKTP.KD). The GDP deflator is given by the ratio of nominal GDP (NY.GDP.MKTP.CD) and real GDP. Consumer prices are constructed from CPI inflation rates (FP.CPI.TOTL.ZG), or if inflation is not available, CPI levels (FP.CPI.TOTL). We use data for 1989–2015 only. The data was downloaded in September 2016.

FRED data. FRED (2017). We obtain the WTI oil price (POILWTIUSDA), VIX (VIXCLS), and 1-year Treasury bill rate (DTB1YR) from the St. Louis Fed's FRED database. Annual series are averages of daily indices.

Country groups. For some exercises below, we look at heterogeneity across advanced and emerging economies. We use the October 2017 IMF World Economic Outlook grouping of advanced economies, and label all other countries as emerging. This yields 31 advanced and 24 emerging economies, as listed in Appendix A.1.2.

A.1.2 Comtrade Country Summary Statistics

Table 10 lists summary statistics on the number of observations for the 55 countries in our merged Comtrade/WDI dataset. The table also lists the advanced or emerging economy classification of each country. Finally, we list the share of imports invoiced in U.S. dollars and euros for the 39 countries for which we observe these measures (cf. Gopinath, 2015).

A.1.3 Comparison of Comtrade and BLS Price Series for the U.S.

Here we compare our unit value indices to survey price indices from the U.S. Bureau of Labor Statistics. The BLS provides U.S. import price indices by locality of origin for Canada, E.U., France, Germany, U.K, Latin America, Mexico, Pacific Rim, China, Japan, ASEAN, Asia Near East, and Asian Newly Industrialized countries. As these price indices are constructed from surveys, their comparison with our unit value based indices can help gauge the effectiveness of our techniques to deal with the unit value bias and other potential mismeasurement inherent in customs data.

To arrive at comparable series, in this subsection we follow BLS in using *Laspeyres* indices of *total* (commodities and non-commodities) goods prices from our Comtrade data set. For regions with multiple countries, we aggregate country level growth rates using Comtrade import values with a two year lag. Still, the series are not fully comparable because BLS' preferred price basis is f.o.b. (free on board) while import values recorded at customs are c.i.f. (cost, insurance and freight), and not all countries included in BLS regions are in our database.

Country summary statistics

Country	Adv	As exporter #dyads	As exporter avg T	As importer #dyads	As importer avg T	As importer InvS$^{\$}$	As importer InvS$^{€}$
Africa							
Algeria		20	12.9	46	20.9		0.49
Egypt		53	20.2	50	18.0		
South Africa		51	14.8	53	14.7		
Americas							
Argentina		54	21.0	50	20.6	0.88	0.08
Brazil		54	21.7	50	23.2	0.84	0.11
Canada	✓	54	22.0	53	24.2	0.75	0.05
Chile		52	20.2	48	17.7		
Colombia		52	17.9	49	15.6	0.99	0.00
Mexico		54	21.7	51	23.0		
United States	✓	54	22.0	53	22.8	0.93	0.02
Venezuela		8	17.6	46	17.0		
Asia							
China		54	21.9	53	21.7		
Hong Kong	✓	53	22.1	51	20.7		
India		54	21.9	53	24.0	0.86	0.10
Indonesia		53	21.6	51	21.8	0.81	0.04
Israel	✓	49	22.1	50	15.0	0.73	0.21
Japan	✓	54	22.1	52	25.4	0.71	0.03
Kazakhstan		32	15.2	52	14.6		
Malaysia		53	22.0	50	23.8		
Philippines		54	21.6	47	18.0		
Saudi Arabia		50	19.7	50	15.3		
Singapore	✓	54	22.0	50	23.6		
South Korea	✓	54	22.0	51	23.7	0.81	0.05
Thailand		54	21.8	51	24.7	0.79	0.04
Turkey		54	22.0	52	24.0	0.59	0.31
Vietnam		50	19.6	46	12.1		

(continued on next page)

Country summary statistics (continued)

Country	Adv	As exporter #dyads	As exporter avg T	As importer #dyads	As importer avg T	InvS$^{\$}$	InvS$^{€}$
Europe							
Austria	✓	54	22.2	52	20.7	0.06	0.70
Belgium	✓	53	15.8	53	15.9	0.14	0.82
Czech Republic	✓	53	20.2	53	21.2	0.19	0.68
Denmark	✓	54	22.0	52	24.2	0.25	0.32
Estonia	✓	46	17.0	52	18.0	0.34	0.53
Finland	✓	54	21.9	52	24.9	0.42	0.38
France	✓	54	22.2	53	20.7	0.21	0.75
Germany	✓	54	21.4	53	23.3	0.23	0.75
Greece	✓	54	21.4	51	22.0	0.40	0.58
Hungary		54	22.0	52	21.5	0.27	0.57
Ireland	✓	54	21.9	52	21.7	0.23	0.47
Italy	✓	54	22.2	52	20.7	0.29	0.67
Lithuania	✓	51	16.8	48	19.0	0.51	0.39
Luxembourg	✓	49	15.6	51	13.6	0.16	0.78
Netherlands	✓	54	22.2	53	22.2	0.37	0.46
Norway	✓	54	22.0	51	21.6	0.21	0.29
Poland		54	21.8	52	20.2	0.30	0.58
Portugal	✓	54	21.8	52	25.0	0.22	0.76
Romania		53	21.1	50	19.7	0.31	0.67
Russia		53	21.0	52	17.6		
Slovak Republic	✓	50	18.9	51	20.0	0.12	0.79
Slovenia	✓	54	19.6	52	20.0	0.20	0.75
Spain	✓	54	22.0	54	24.8	0.35	0.58
Sweden	✓	54	22.0	54	21.9	0.25	0.36
Switzerland	✓	54	22.1	54	25.1	0.13	0.53
Ukraine		51	18.8	52	17.2	0.75	0.16
United Kingdom	✓	54	22.2	54	21.6	0.47	0.15
Oceania							
Australia	✓	54	21.8	51	25.4	0.53	0.08
New Zealand	✓	53	20.7	50	23.5		

Table 10: Summary statistics for countries in the merged Comtrade/WDI sample. Adv: advanced economy (IMF WEO). #dyads: number of non-missing dyads that the country appears in. avg T: average number of years per dyad that the country appears in; a dyad-year observation is counted if at least one UVI or volume observation is reported by the importer, and exchange rate data exists for both countries. InvS: share of imports invoiced in USD/euro.

BLS COUNTRY GROUPS

BLS group	Country ISO codes
ASEAN	BRN* IDN KHM* LAO* MMR* MYS PHL SGP THA VNM*
Asia Near East	ARE* BHR* IRN* IRQ* ISR JOR* KWT* LBN* OMN* QAT* SAU SYR* YEM*
European Union	AUT BEL BGR* CYP* CZE DEU DNK ESP EST FIN FRA GBR GRC HRV* HUN IRL ITA LTU LUX LVA* MLT* NLD POL PRT ROU SVK SVN SWE
Latin America	ARG BRA CHL COL MEX VEN (plus other unspecified Central American, South American, and Caribbean countries*)
Asian New. Ind.	HKG KOR SGP TWN
Pacific Rim	AUS BRN* CHN HKG IDN JPN KOR MAC* MYS NZL PHL PNG* SGP TWN

Table 11: Definition of BLS country groups in Figure 1. Countries marked with an asterisk (*) are not available in the Comtrade sample.

Our indices constructed from Comtrade unit values track the BLS import price indices fairly well, as shown in Figures 1 and 2. These figures compare the linearly detrended logged indices, since our regressions use log growth rates and absorb any disparity in average growth rates in the intercept. The growth rates of our indices for Canada, Japan, Mexico, and the aggregated Latin America and Asia Near East match those of BLS remarkably well. The comparison with some Asian countries suggests that a unit value bias may still be present, causing the unit value series to be somewhat more volatile than the BLS price series. Nevertheless, for every country group and individual country except Germany, the correlation coefficient between the Comtrade and BLS growth rates is high. Finally, the match for European countries seems acceptable, with the year 2008 being an exception. A closer inspection of the case of Germany reveals that a couple of products (transport vehicles) with large import shares experienced substantial unit value decreases that year according to Comtrade, leading our indices to decline while the BLS index shows an increase.

COMTRADE AND BLS IMPORT PRICE INDICES FOR U.S.: COUNTRY GROUPS

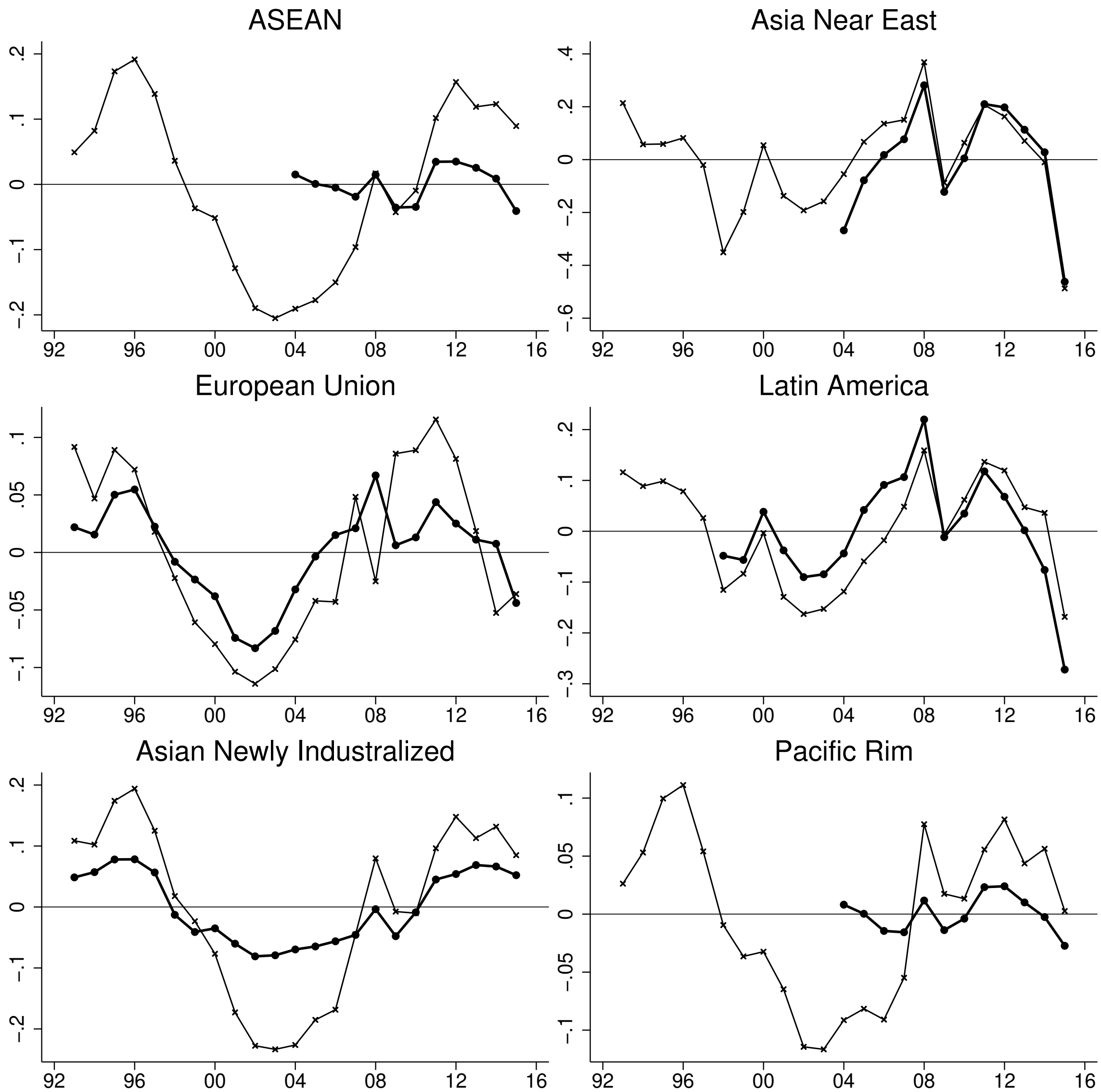

Figure 1: Comparison of BLS Locality of Origin import price indices (thick lines, circles) with our constructed Comtrade analogues (thin lines, crosses). Plotted indices are logged and linearly detrended. The Comtrade sample does not cover all countries in the BLS country groups, cf. Table 11.

Comtrade and BLS import price indices for U.S.: individual countries

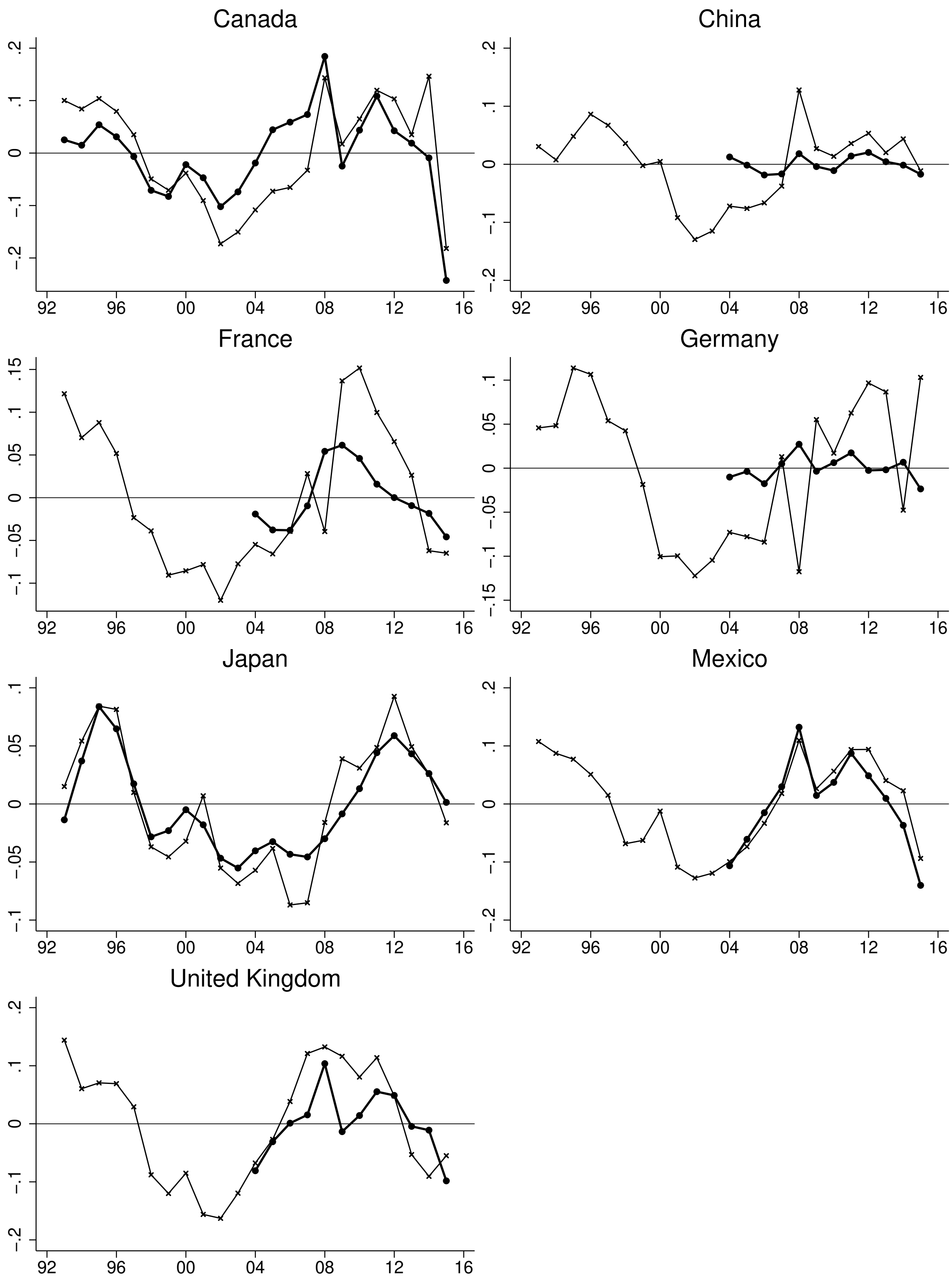

Figure 2: Comparison of BLS Locality of Origin import price indices (thick lines, circles) with our constructed Comtrade analogues (thin lines, crosses). Plotted indices are logged and linearly detrended.

Terms of trade and exchange rates: Country group heterogeneity

	unweighted			trade-weighted		
	(1)	(2)	(3)	(4)	(5)	(6)
	E↔E	E↔A	A↔A	E↔E	E↔A	A↔A
	$\Delta tot_{ij,t}$	$\Delta tot_{ij,t}$	$\Delta tot_{ij,t}$	$\Delta tot_{ij,t}$	$\Delta tot_{ij,t}$	$\Delta tot_{ij,t}$
$\Delta e_{ij,t}$	0.0189	0.0480***	0.0182	0.0508***	0.111***	0.0220
	(0.0173)	(0.0110)	(0.0256)	(0.0176)	(0.0310)	(0.0473)
PPI	no	no	no	no	no	no
R-squared	0.028	0.011	0.008	0.051	0.078	0.025
Observations	3,527	11,857	8,886	3,527	11,857	8,886
Dyads	217	670	460	217	670	460

Table 12: "E↔A", say, denotes goods flows between Emerging and Advanced economies. The first (resp., last) three columns use unweighted (resp. trade-weighted) regressions, as in specifications (1) and (3) of Table 2 in the paper. All regressions include two ΔER lags and time FE. S.e. clustered by dyad. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

A.2 Macro Regressions: Supplementary Results

This section provides supplementary macro regression results, including robustness checks.

A.2.1 Country Group Heterogeneity

Tables 12 to 14 display the heterogeneity in estimates when we apply our terms of trade regressions, exchange rate pass-through regressions and trade elasticity regressions from Sections 3.2 to 3.4 in the paper to separate subsamples of advanced and emerging country trade flows. The results are discussed in the main text.

A.2.2 Spillovers From U.S. Dollar to Foreign Inflation

Our results imply that fluctuations in the strength of the dollar, for example those caused by U.S. monetary policy actions, have spillover effects on foreign inflation. We have shown that the dollar exchange rate passes strongly through to bilateral import prices measured in the importer's currency, especially for countries whose imports are heavily invoiced in dollars. Given a non-negligible import content in consumption, this implies that dollar movements will directly affect foreign consumer price index (CPI) inflation, as discussed by Gopinath (2015). If foreign firms behave in a monopolistically competitive way, foreign producer prices will react to changes in foreign import prices, although perhaps with a lag. Hence, the direct effect of dollar movements on foreign CPI inflation may be amplified by endogenous producer responses.

We now provide direct country-level regression evidence on the effects of the U.S. dollar exchange rate on foreign consumer and producer prices. Gopinath (2015) computes back-of-the-envelope estimates of these spillovers based on estimated country-level import price pass-through and the import content of consumption. We instead directly regress countries' CPI or PPI on the dollar exchange rate. Additionally, we investigate the interaction of the dollar exchange rate and the dollar import invoicing share.

Specifically, we consider the country-level panel regression

$$\Delta cpi_{j,t} = \lambda_j + \delta_t + \sum_{k=0}^{2} \beta_k^{\$} \Delta e_{\$j,t-k} + \sum_{k=0}^{2} \eta_k^{\$} \Delta e_{\$j,t-k} \times S_j + \varepsilon_{j,t}, \tag{A.1}$$

Exchange rate pass-through into prices: Country group heterogeneity

	unweighted				trade-weighted			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	E→E	E→A	A→E	A→A	E→E	E→A	A→E	A→A
	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$
$\Delta e_{ij,t}$	0.0980***	0.0514**	0.265***	0.332***	0.150***	0.150***	0.433***	0.373***
	(0.0329)	(0.0225)	(0.0379)	(0.0195)	(0.0391)	(0.0269)	(0.132)	(0.0504)
$\Delta e_{\$j,t}$	0.858***	0.766***	0.710***	0.409***	0.820***	0.498***	0.608***	0.287***
	(0.0353)	(0.0364)	(0.0382)	(0.0284)	(0.0487)	(0.0533)	(0.122)	(0.0487)
R-squared	0.470	0.152	0.530	0.142	0.572	0.252	0.467	0.264
Observations	6,763	10,589	12,318	17,150	6,763	10,589	12,318	17,150
Dyads	435	618	700	894	435	618	700	894

Table 13: "E→A", say, denotes goods flows from Emerging to Advanced economies. The first (resp., last) four columns use unweighted (resp. trade-weighted) regressions as in specifications (2) and (5) of Table 3 in the paper. All regressions include two ΔER lags, lags 0–2 of exporter ΔPPI, and time FE. S.e. clustered by dyad. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Trade elasticity with respect to exchange rate: Country group heterogeneity

	unweighted				trade-weighted			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	E→E	E→A	A→E	A→A	E→E	E→A	A→E	A→A
	$\Delta y_{ij,t}$	$\Delta y_{ij,t}$	$\Delta y_{ij,t}$	$\Delta y_{ij,t}$	$\Delta y_{ij,t}$	$\Delta y_{ij,t}$	$\Delta y_{ij,t}$	$\Delta y_{ij,t}$
$\Delta e_{ij,t}$	-0.0488	-0.0145	-0.182***	-0.0737	-0.0471	-0.0441**	-0.0377	0.0228
	(0.0333)	(0.0212)	(0.0700)	(0.0481)	(0.0357)	(0.0225)	(0.117)	(0.0518)
$\Delta e_{\$j,t}$	-0.163***	-0.435***	0.00868	-0.340***	-0.208***	-0.251***	-0.0995	-0.302***
	(0.0588)	(0.0749)	(0.0704)	(0.0607)	(0.0641)	(0.0622)	(0.118)	(0.0548)
R-squared	0.093	0.049	0.100	0.082	0.237	0.301	0.218	0.214
Observations	8,239	12,967	12,932	18,134	8,239	12,967	12,932	18,134
Dyads	485	679	719	924	485	679	719	924

Table 14: "E→A", say, denotes goods flows from Emerging to Advanced economies. The first (resp., last) four columns use unweighted (resp. trade-weighted) regressions as in specifications (2) and (5) of Table 4 in the paper. All regressions include two ΔER lags, lags 0–2 of importer ΔGDP, and time FE. S.e. clustered by dyad. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Dollar pass-through into CPI and PPI, 2002–2015

	(1) $\Delta cpi_{j,t}$	(2) $\Delta cpi_{j,t}$	(3) $\Delta ppi_{j,t}$	(4) $\Delta ppi_{j,t}$
$\Delta e_{\$j,t}$	0.106***	0.0221	0.284***	0.182***
	[0.04, 0.18]	[-0.05, 0.09]	[0.14, 0.43]	[0.05, 0.32]
$\Delta e_{\$j,t} \times S_j$		0.181**		0.237*
		[0.04, 0.33]		[-0.03, 0.51]
R-squared	0.283	0.453	0.532	0.675
Observations	766	544	697	525
Countries	55	39	52	38

Table 15: The first (resp., last) two columns use CPI (resp., PPI) growth as dependent variable. All regressions include two ΔER lags and time FE. 95% confidence intervals clustered by country and corrected for small number of clusters using "LZ2-BM" method of Imbens and Kolesár (2016). *** p<0.01, ** p<0.05, * p<0.1 (only 95% interval shown).

where $\Delta cpi_{j,t}$ is the change in the log CPI in the currency of country j, and λ_j and δ_t are country and year fixed effects, respectively. We also consider specifications with $\Delta ppi_{j,t}$ on the left-hand side, as well as specifications restricting $\psi_k = 0$ for all k. We focus attention on the post-2002 (post-euro) sample, since full-sample regression results are unduly influenced by a handful of countries' high-inflation/high-depreciation episodes in the 1990s.[2]

Table 15 displays the contemporaneous dollar pass-through into CPI and PPI. The first two columns shows results for CPI pass-through, and the second two show those for PPI pass-through. Columns (1) and (3) do not interact exchange rate changes with the dollar invoicing share, while columns (2) and (4) do. The table displays 95% confidence intervals rather than standard errors because the small number of countries (clusters) necessitates the use of small-sample corrections (Imbens and Kolesár, 2016). The average pass-through of the dollar into CPI (resp., PPI) is 11% (resp., 28%) within the year. The dollar pass-through is larger for countries that have a substantial fraction of imports invoiced in dollars. The contemporaneous interaction term is statistically significant at the 10% level for both the CPI and PPI specifications, and also at the 5% level for the CPI specification. Hence, it appears that countries which invoice more in dollars experience higher dollar pass-through into consumer and producer prices. We caution, though, that the *magnitude* of the pass-through is imprecisely estimated when controlling for country and time fixed effects.

A.2.3 The Dollar Versus the Euro

We now compare the explanatory power of the dollar exchange rate with that of the euro. We show that the dollar dominates both the bilateral exchange rate and the euro in regression specifications that include all three exchange rates.

The panel regressions in Section 3 in the paper do not directly imply that the U.S. dollar is a uniquely important vehicle currency. In our regression specifications *without* interactions, we would have obtained exactly the same coefficient estimates if we had used the euro exchange rate, say, in place of the dollar exchange rate, since we control for time fixed effects.[3] Nevertheless, our specifications *with* interactions indicated that the dol-

[2] The results are very similar if we use the full 1992–2015 sample but drop country-year observations for which the arithmetic CPI inflation rate exceeds 30% annually (0.26 log inflation rate).

[3] To see this formally, note that one can rewrite the (log) change in the euro exchange rate as $\Delta e_{€j,t} = \Delta e_{€\$,t} + \Delta e_{\$j,t}$ and the first term is absorbed by the time fixed effects.

lar plays a special role. Now we directly compare the explanatory power of the dollar against that of the euro in panel regressions that do not control for time fixed effects but instead control for observed global real and financial variables.

To measure bilateral price pass-through from the dollar and the euro, we run panel regressions of the form

$$\Delta p_{ij,t} = \lambda_{ij} + \sum_{k=0}^{2} \beta_k \Delta e_{ij,t-k} + \sum_{k=0}^{2} \beta_k^{\$} \Delta e_{\$j,t-k} + \sum_{k=0}^{2} \beta_k^{€} \Delta e_{€j,t-k} + \theta' X_{ij,t} + \varepsilon_{ij,t}, \tag{A.2}$$

where $e_{€j,t}$ denotes the log euro exchange rate in units of currency j per euro. Notice that we omit time fixed effects, as is necessary to identify $\beta_k^{\$}$ and $\beta_k^{€}$ separately. In addition to lags 0–2 of exporter PPI log growth, the controls $X_{ij,t}$ consist of the contemporaneous values of global real GDP growth, global GDP deflator inflation, global export volume growth, growth in the WTI oil price deflated by the global GDP deflator, and the log VIX. The time sample for regressions in this subsection is 2002–2015 due to the introduction of the euro in 1999 and our use of lagged exchange rate changes.

Fig. 3 shows that the euro pass-through into prices is negligible on average, while the dollar pass-through remains high when we control for the euro. The figure displays the regression results in the form of impulse responses of the bilateral price level; corresponding regression tables are available in online appendix A.2.5.

Similarly, the dollar exchange rate has the largest predictive power for trade volumes. We run panel regressions similar to Eq. (A.2), except with volume growth $\Delta y_{ij,t}$ on the left-hand side, and we replace exporter PPI with lags 0–2 of importer real GDP growth in the list of controls $X_{ij,t}$. Fig. 4 shows impulse responses of the level of bilateral trade volume to the bilateral, dollar, and euro exchange rates. The dollar exchange rate is the only one of the three that has a quantitatively large negative association with trade volumes.[4]

Tables 16 and 17 display the euro regression results in table form. Specifications (1) and (4) focus on the bilateral and euro exchange rates, specifications (2) and (5) add the dollar exchange rate, and specifications (3) and (6) include interactions with the dollar and euro import invoicing shares. $S_j^{€}$ is the importing country's share of imports invoiced in euros from Gopinath (2015). The interactions are statistically and economically significant and mostly have the expected signs in the price pass-through regressions: A higher share of euro (resp., dollar) invoicing implies a higher pass-through from the euro (resp., dollar) exchange rate.

A.2.4 Trade Elasticity of Dollar Versus Other Major Currencies

The large negative predictive effect of a uniform dollar appreciation on world trade documented in Section 3.6 in the paper is robust to controlling for other major exchange rates. Table 18 shows trade elasticity regressions as in Eq. (22) in the paper, except that we drop interaction terms but add the exchange rates of the importer versus the Swiss franc and versus the Japanese yen. We drop interaction terms here because we do not have extensive data on the currency invoicing shares of the franc and the yen. The first and third columns in the table show the contemporaneous trade elasticity coefficients of the bilateral, dollar, and euro exchange rates, without controlling for the franc and the yen exchange rates. The second and fourth columns then add the franc and the yen exchange rates. The sample is the post-euro period of 2002–2015. Evidently, adding the franc and the yen exchange rates as controls does nothing to diminish the large negative effect of the dollar on bilateral trade volumes. In fact, the trade-weighted specification exhibits an even more negative dollar elasticity when the franc and the yen are added as controls, although the standard error on the dollar coefficient is substantially larger in this specification (the coefficient remains highly significant). Moreover, according to the regression results, it is only a uniform U.S. dollar appreciation that has a large negative effect on world trade, whereas uniform appreciations of the other major currencies do not predict substantial drops in trade volumes. Finally, note that the R-squared of the regression hardly increases when the franc and yen are added as controls.

[4]The different long-run level effect of the dollar in Figure 6 in the paper and Fig. 4 in this appendix is due to the difference in time sample, as discussed in online appendix A.2.5.

Price pass-through from dollar and euro exchange rates

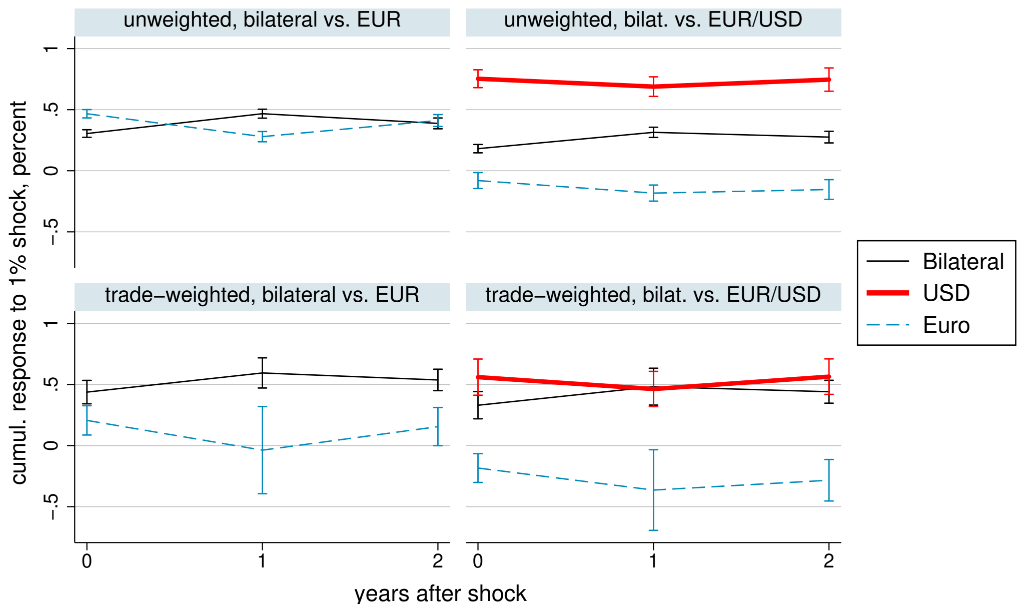

Figure 3: Impulse responses of bilateral price level to bilateral $e_{ij,t}$, USD $e_{\$j,t}$, and euro $e_{€j,t}$ exchange rates. Based on regressions in Table 16, on-line appendix A.2.5. Top row: unweighted regression, bottom row: trade-weighted. Left column: specifications with only bilateral and euro ER, right column: specifications adding USD. Error bars: 95% confidence intervals, clustering by dyad.

Trade elasticity for dollar and euro exchange rates

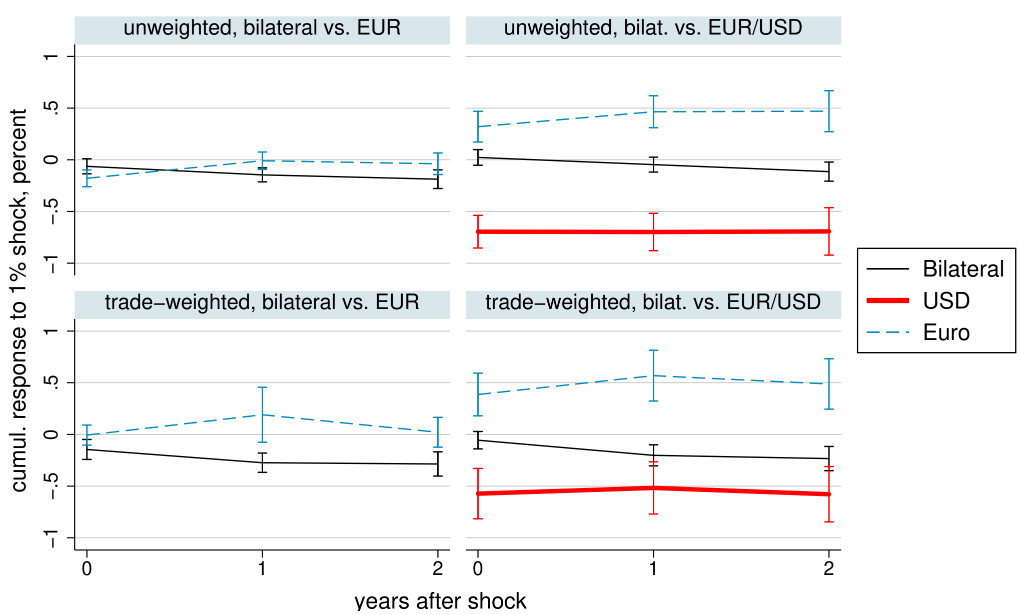

Figure 4: Impulse responses of bilateral volume to bilateral $e_{ij,t}$, USD $e_{\$j,t}$, and euro $e_{€j,t}$ exchange rates. Based on regressions in Table 17, on-line appendix A.2.5. Top row: unweighted regression, bottom row: trade-weighted. Left column: specifications with bilateral and euro ER, right column: specifications adding USD. Error bars: 95% confidence intervals, clustering by dyad.

Euro vs. dollar exchange rate pass-through into prices

	unweighted			trade-weighted		
	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$
$\Delta e_{ij,t}$	0.305***	0.181***	0.207***	0.438***	0.331***	0.551***
	(0.0159)	(0.0174)	(0.0695)	(0.0490)	(0.0567)	(0.156)
$\Delta e_{ij,t} \times (S_j + S_j^{€})$			-0.0357			-0.361**
			(0.0784)			(0.174)
$\Delta e_{\$j,t}$		0.754***	0.614***		0.561***	0.379***
		(0.0373)	(0.0405)		(0.0755)	(0.0672)
$\Delta e_{\$j,t} \times S_j$			0.510***			0.769***
			(0.0439)			(0.151)
$\Delta e_{€j,t}$	0.467***	-0.0800**	-0.347***	0.207***	-0.184***	-0.384***
	(0.0175)	(0.0332)	(0.0430)	(0.0612)	(0.0601)	(0.0726)
$\Delta e_{€j,t} \times S_j^{€}$			0.694***			0.709***
			(0.0821)			(0.122)
R-squared	0.131	0.143	0.210	0.102	0.112	0.293
Observations	33,802	33,802	24,463	33,802	33,802	24,463
Dyads	2,647	2,647	1,900	2,647	2,647	1,900

Table 16: The first (resp., last) three columns use unweighted (resp. trade-weighted) regressions. All regressions include two ΔER lags, lags 0–2 of exporter ΔPPI, and global controls as described in the text. S.e. clustered by dyad. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

A.2.5 Regression Details and Robustness Checks

Post-2002 results. Exchange rate pass-through into prices has been stable over our sample period, while trade elasticities may have become larger in absolute value in the latter part of the sample. We compute results for the subsample 2002–2015, roughly corresponding to the second half of our data set, and also corresponding to the sample used for the euro regressions in Section A.2.3. Figures 5 and 6 show price and volume impulse responses for the 2002–2015 subsample that correspond to the full-sample results in Figures 4 and 6 in Section 3 in the paper. The price pass-through impulse responses of bilateral and dollar exchange rates are similar to the full-sample results. However, the post-2002 USD cumulative trade elasticity (unweighted) is substantially negative at lags of 1 and 2 years, whereas the level effect is close to zero at lags 1 and 2 on the full sample.

Pre-2007 results. Our headline results are not driven by the global financial crisis starting in 2008. Figures 7 and 8 show the average exchange rate pass-through and trade elasticity computed on the 1992–2007 sample. The results are almost identical to our baseline Figures 4 and 6 in the paper. Figure 9 shows the effect of rest-of-world trade of a uniform USD appreciation, using only 2002–2007 data. Here the results are even stronger than in the baseline Figure 8 in the paper.

Weighted average dollar invoicing share. Figure 10 depicts the weighted average dollar import invoicing share $\sum_{j \neq \text{US}} w_j S_j$ used in Section 3.6 in the paper, where the ex-U.S. non-commodity import value weights w_j have been computed for each year in our sample. Notice that the weighted average fluctuates tightly around a mean of 0.40.

Additional controls. Table 19 shows that our pass-through regressions results are qualitatively robust to adding importer PPI growth and importer real GDP growth as additional controls. We use two lags of the log changes of each of these indices. Although our baseline specification in Section 3.3 in the paper is common in the literature, the addition of importer PPI and GDP controls can be justified by models with strategic complementarity in pricing and country-specific demand shifts. While the overall level of both bilateral and USD pass-through is somewhat lower when the controls are added, our qualitative conclusions regarding the dominance of the USD exchange rate and the relationship with dollar invoicing are as pronounced in Table 19 as in Table 3 in the paper.

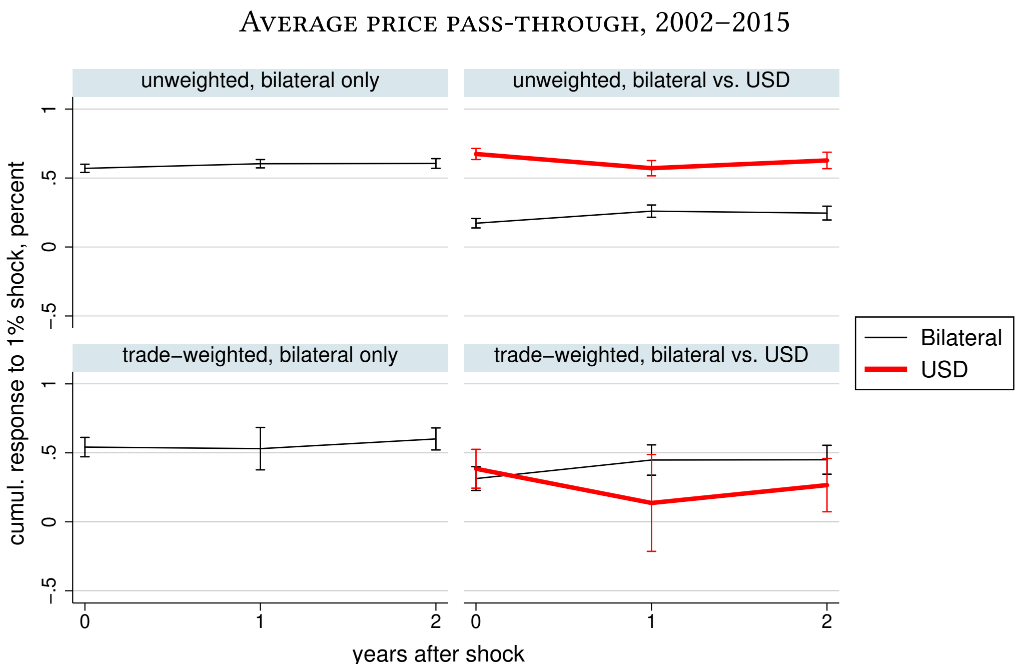

Figure 5: Figure 4 in the paper computed on post-2002 data, but with same weights.

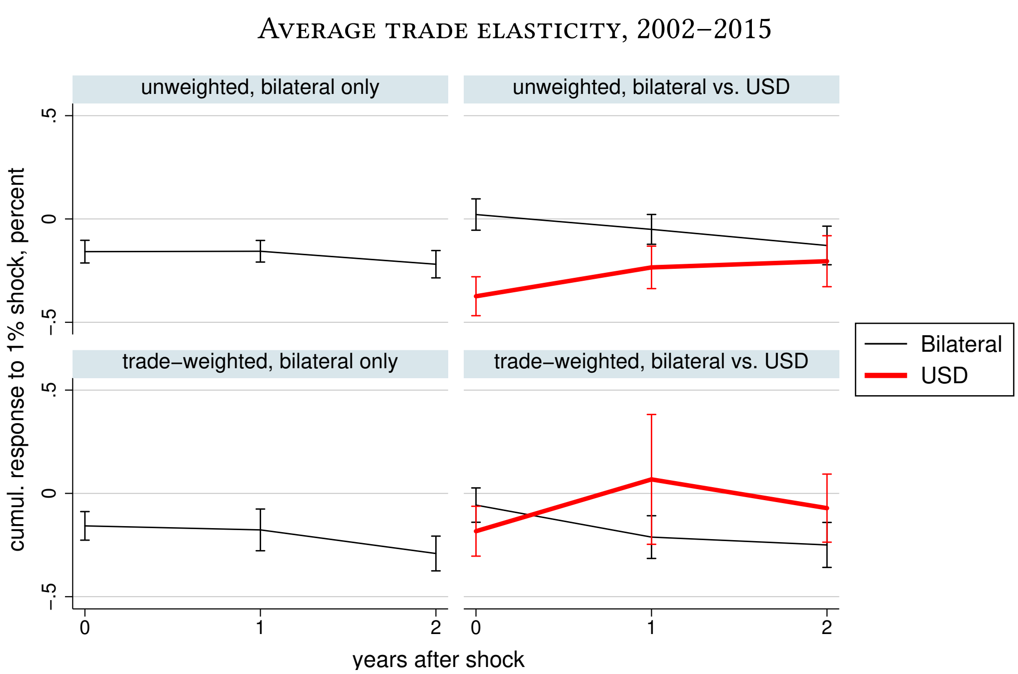

Figure 6: Figure Figure 6 in the paper computed on post-2002 data, but with same weights.

Average price pass-through, 1992–2007

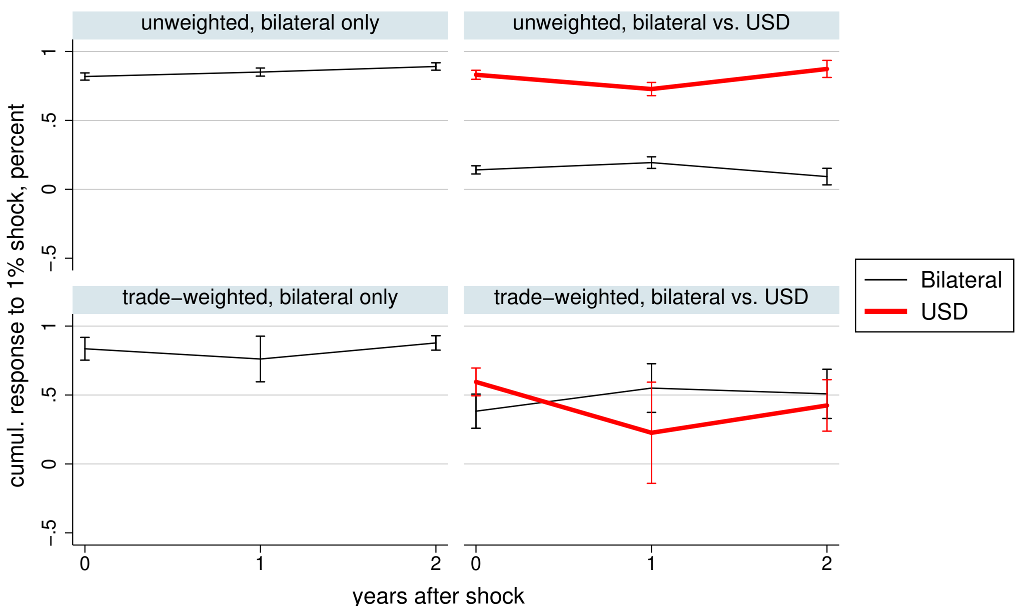

Figure 7: Figure 4 in the paper computed on pre-2007 data, but with same weights.

Average trade elasticity, 1992–2007

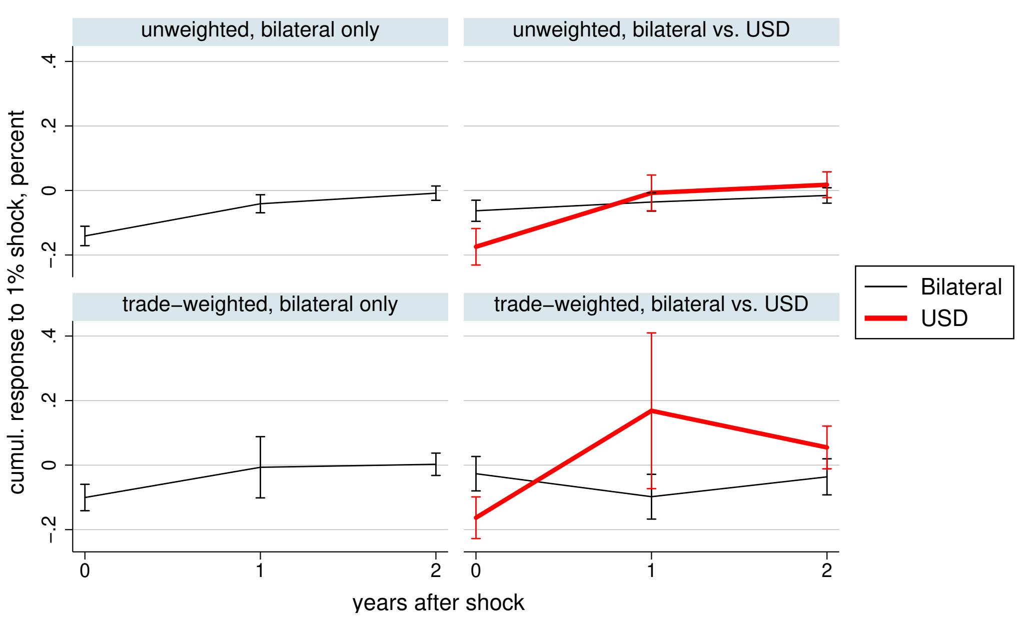

Figure 8: Figure 6 in the paper computed on pre-2007 data, but with same weights.

Euro vs. dollar trade elasticity

	unweighted		trade-weighted	
	(1)	(2)	(3)	(4)
	$\Delta y_{ij,t}$	$\Delta y_{ij,t}$	$\Delta y_{ij,t}$	$\Delta y_{ij,t}$
$\Delta e_{ij,t}$	-0.0631*	0.0229	-0.146***	-0.0560
	(0.0371)	(0.0386)	(0.0493)	(0.0429)
$\Delta e_{\$j,t}$		-0.695***		-0.573***
		(0.0806)		(0.124)
$\Delta e_{€j,t}$	-0.179***	0.320***	-0.00647	0.386***
	(0.0413)	(0.0759)	(0.0494)	(0.105)
R-squared	0.068	0.071	0.197	0.203
Observations	37,437	37,437	37,437	37,437
Dyads	2,807	2,807	2,807	2,807

Table 17: The first (resp., last) two columns use unweighted (resp. trade-weighted) regressions. All regressions include two ΔER lags, lags 0–2 of importer ΔGDP, and global controls as described in the text. S.e. clustered by dyad. *** p<0.01, ** p<0.05, * p<0.1.

Response of rest-of-world aggregate trade to USD appreciation, 2002–2007

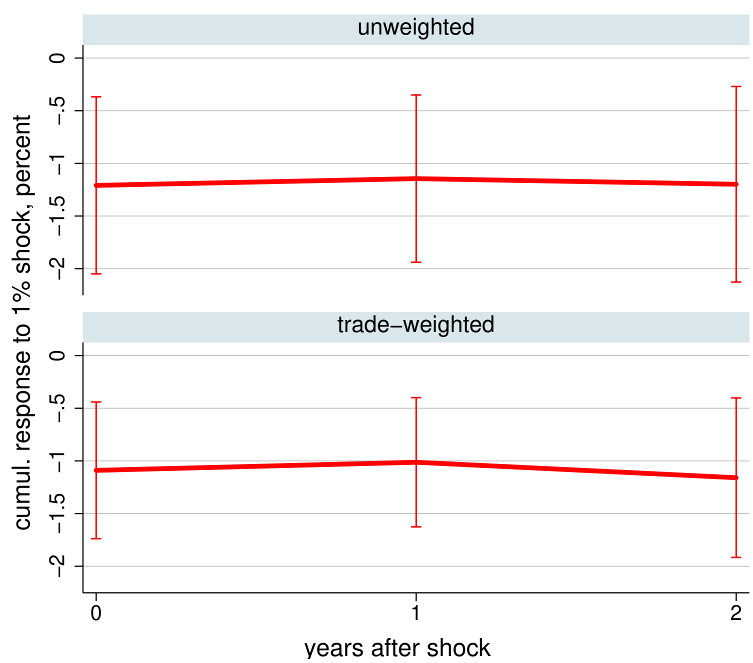

Figure 9: Figure 8 in the paper computed on pre-2007 data, but with same weights.

Trade elasticity for dollar and other major currencies

	unweighted		trade-weighted	
	(1)	(2)	(3)	(4)
	$\Delta y_{ij,t}$	$\Delta y_{ij,t}$	$\Delta y_{ij,t}$	$\Delta y_{ij,t}$
$\Delta e_{ij,t}$	0.0177	0.0215	-0.0595	-0.0566
	(0.0385)	(0.0387)	(0.0422)	(0.0424)
$\Delta e_{\$j,t}$	-0.765***	-0.880***	-0.719***	-1.988***
	(0.0805)	(0.287)	(0.0795)	(0.566)
$\Delta e_{€j,t}$	0.393***	0.331*	0.529***	1.146***
	(0.0755)	(0.191)	(0.0856)	(0.349)
$\Delta e_{\text{CHF}j,t}$		-0.0277		-0.127
		(0.134)		(0.169)
$\Delta e_{\text{YEN}j,t}$		0.203		0.786*
		(0.195)		(0.418)
R-squared	0.070	0.071	0.200	0.206
Observations	37,437	37,437	37,437	37,437
Dyads	2,807	2,807	2,807	2,807

Table 18: $e_{\text{CHF}j,t}$ and $e_{\text{YEN}j,t}$ denote the log price of the Swiss franc and Japanese yen, resp., in the importer's currency. The first (resp., last) two columns use unweighted (resp., trade-weighted) regressions. All regressions include two ΔER lags, lags 0–2 of importer ΔGDP, and the same global controls as in Appendix A.2.3. S.e. clustered by dyad. *** p<0.01, ** p<0.05, * p<0.1.

Weighted average dollar invoicing share over time

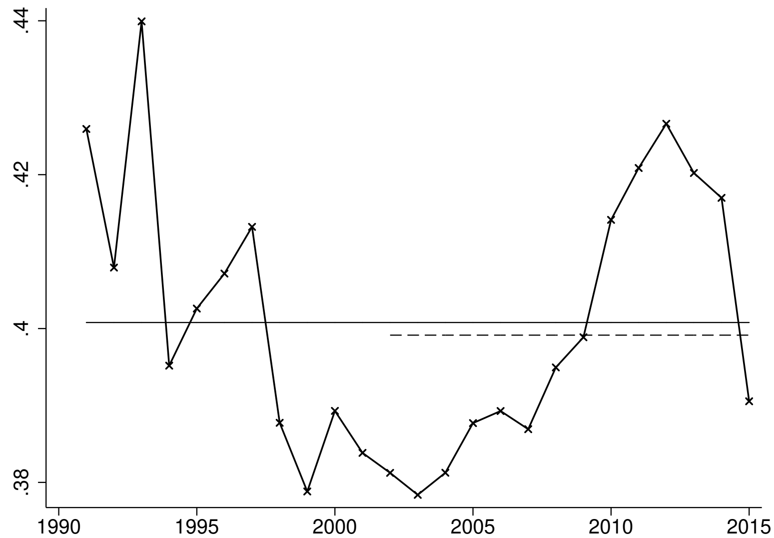

Figure 10: Weighted average dollar import invoicing share $\sum_{j \neq \text{US}} w_j S_j$, using import value weights w_j computed in different reference years (along horizontal axis). Horizontal lines show the mean on the 1992–2015 and 2002–2015 samples.

Exchange rate pass-through into prices: Additional controls

	unweighted			trade-weighted		
	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$	$\Delta p_{ij,t}$
$\Delta e_{ij,t}$	0.519***	0.163***	0.214***	0.550***	0.328***	0.456***
	(0.0117)	(0.0133)	(0.0177)	(0.0471)	(0.0480)	(0.0352)
$\Delta e_{ij,t} \times S_j$			-0.0869***			-0.272***
			(0.0252)			(0.0495)
$\Delta e_{\$j,t}$		0.706***	0.524***		0.464***	0.103
		(0.0183)	(0.0298)		(0.0347)	(0.0639)
$\Delta e_{\$j,t} \times S_j$			0.303***			0.643***
			(0.0360)			(0.0951)
R-squared	0.388	0.411	0.528	0.361	0.382	0.650
Observations	42,243	42,243	32,916	42,243	42,243	32,916
Dyads	2,502	2,502	1,853	2,502	2,502	1,853

Table 19: The first (resp., last) three columns use unweighted (resp. trade-weighted) regressions. All regressions include two ΔER lags, lags 0–2 of exporter ΔPPI, lags 0–2 of importer ΔPPI, lags 0–2 of importer ΔGDP, and time FE. S.e. clustered by dyad. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

A.3 Firm level data for Colombia

The data are from the customs agency (DIAN, 2015), and the department of statistics (DANE, 2015), and include information on the universe of Colombian importers and exporters . We have access to the data through the Banco de la República. The data include the trading firm's tax identification number, the 10-digit product code (according to the Nandina classification system, based on the Harmonized System), the FOB value (in U.S. dollars) and volume (net kilograms) of exports (imports), and the country of destination (origin), among other details.[5] The data are available on a monthly basis, and for our analysis we aggregate exports and imports at the annual or quarterly level. As in Section 3 in the paper, macroeconomic country controls are from the World Development Indicators. Our estimations cover the period between 2005 and 2015. We define prices and quantities at the firm,10-digit product, country (origin or destination), year (or quarter) level. Prices are given by the FOB value per net kilogram, and quantities are given by total net kilograms. Exchange rates are the annual or quarterly average.

Further, starting in 2007, our exports data include information on the invoicing currency of each transaction. In Table 20 we present the distribution of currencies, broken down by destination groups. It is evident that the vast majority of Colombian exports are priced in dollars. Even for exports to the euro zone, the overwhelming invoicing currency is the dollar. Although some transactions are negotiated in euros, Colombian pesos, or Venezuelan bolívares among other currencies, the U.S. dollar accounts for over 98% of all exports. Moreover, the distribution is very similar if we look at the value of exports negotiated in each currency instead of the number of transactions. In this regard the Colombian economy is representative of a large number of economies that rely extensively on dollar invoicing.

[5] In the case of imports, there are cases where the imported good was produced in one country but actually arrived to Colombia from a third country. This case is most commonly seen for goods produced in China arriving to Colombia from either the United States or Panama. To avoid introducing unnecessary noise in our empirical work, we only use for our regressions those observations where the country of origin and purchase are the same.

Currency distribution by destination

Destination	Currency	All Exports	Manufactures
US	US Dollar	99.71%	99.93%
	Euro	0.02%	0.03%
	Colombian Peso	0.27%	0.03%
Dollar economies	US Dollar	99.73%	99.91%
	Euro	0.03%	0.04%
	Colombian Peso	0.23%	0.03%
CAN	US Dollar	99.75%	99.90%
	Euro	0.07%	0.07%
	Colombian Peso	0.18%	0.03%
Latin America	US Dollar	99.18%	99.34%
	Euro	0.13%	0.13%
	Colombian Peso	0.22%	0.03%
	Bolívar (Ven)	0.44%	0.45%
	Mexican Peso	0.02%	0.02%
	Colón (CR)	0.01%	0.01%
European Union	US Dollar	90.73%	86.19%
	Euro	8.64%	13.28%
	Colombian Peso	0.31%	0.21%
	Sterling Pound	0.28%	0.26%
Euro zone	US Dollar	88.78%	84.48%
	Euro	10.80%	15.22%
	Colombian Peso	0.39%	0.25%
	Sterling Pound	0.01%	0.01%
All destinations	US Dollar	98.28%	98.39%
	Euro	0.72%	0.70%
	Colombian Peso	0.67%	0.52%
	Venezuelan Bolívar	0.27%	0.33%
	Sterling Pound	0.02%	0.01%

Table 20: Data from DIAN/DANE. Exports of coke, refined petroleum products, and nuclear fuel (ISIC 23), and basic metals (ISIC 27) excluded from "Manufactures". Distribution calculated as number of invoices in each currency.

Exchange rate pass-through into prices, annual data (dollarized economies)

	(1) $\Delta p_{H,t}$	(2) $\Delta p_{H,t}$	(3) $\Delta p_{H,t}$	(4) $\Delta p_{H,t}$	(5) $\Delta p_{H,t}$	(6) $\Delta p_{H,t}$
Exports						
$\Delta e_{\$H,t}$	0.696***	0.828***	0.859***	0.823***	0.798***	0.819***
	(0.0331)	(0.0355)	(0.0414)	(0.0373)	(0.0450)	(0.0606)
PPI	no	yes	yes	yes	yes	yes
Euro ER	no	no	yes	no	no	yes
ΔER lags	no	no	no	yes	no	no
Sample	M	M	M	M	D	D
R-squared	0.288	0.290	0.290	0.290	0.303	0.303
Observations	169,792	159,041	159,041	159,041	98,831	98,831
Imports						
$\Delta e_{\$H,t}$	0.977***	1.007***	1.035***	1.016***	0.969***	0.971***
	(0.0177)	(0.0309)	(0.0430)	(0.0192)	(0.0352)	(0.0357)
PPI	no	yes	yes	yes	yes	yes
Euro ER	no	no	yes	no	no	yes
ΔER lags	no	no	no	yes	no	no
Sample	M	M	M	M	D	D
R-squared	0.225	0.225	0.225	0.225	0.250	0.250
Observations	529,584	529,260	529,260	529,260	275,968	275,968

Table 21: All regressions include Firm-Industry-Country fixed effects. S.e. clustered at the year level. The sample includes all manufactured (M) products excluding petrochemicals and metal industries in columns (1)-(4) and only differentiated (D) products in columns (5)-(6). *** p<0.01, ** p<0.05, * p<0.1.

A.4 Micro Regressions: Supplementary Results

This section provides supplementary regression results using the Colombian firm-level data, including robustness checks.

Tables 21-24 display the results of the price pass-through and trade elasticity regressions presented in Section 4.1 in the paper, including PPI, the peso/euro exchange rate, and two ΔER annual lags as additional controls. All regressions include Firm-Industry-Country fixed effects. Our pass-through regressions results are robust to the inclusion of these controls, and qualitative results are unchanged when we use the subsample of differentiated products only (instead of the full set of manufactures) constructed using the classification of goods by Rauch (1999).[6]

[6] In our reported estimates, we follow Rauch's conservative classification, although the results are virtually unchanged if we use the liberal definition instead.

Exchange rate pass-through into prices, annual data (non-dollarized economies)

	(1) $\Delta p_{H,t}$	(2) $\Delta p_{H,t}$	(3) $\Delta p_{H,t}$	(4) $\Delta p_{H,t}$	(5) $\Delta p_{H,t}$	(6) $\Delta p_{H,t}$	(7) $\Delta p_{H,t}$	(8) $\Delta p_{H,t}$
Exports								
$\Delta e_{iH,t}$	0.673***	0.0616	0.523***	0.0726	0.0737	0.0576	0.0634	0.0510
	(0.0937)	(0.0474)	(0.120)	(0.0452)	(0.0510)	(0.0370)	(0.0832)	(0.115)
$\Delta e_{\$H,t}$		0.667***		0.633***	0.672***	0.652***	0.644***	0.655***
		(0.0507)		(0.0602)	(0.0667)	(0.0603)	(0.0860)	(0.104)
PPI	no	no	yes	yes	yes	yes	yes	yes
Euro ER	no	no	no	no	yes	no	no	yes
ΔER lags	no	no	no	no	no	yes	no	no
Sample	M	M	M	M	M	M	D	D
R-squared	0.303	0.305	0.308	0.310	0.300	0.310	0.324	0.315
Observations	206,226	206,226	139,318	139,318	120,316	139,318	85,659	74,090
Imports								
$\Delta e_{iH,t}$	0.750***	0.315***	0.506***	0.275***	0.238**	0.255***	0.293**	0.248**
	(0.116)	(0.0777)	(0.127)	(0.0837)	(0.0889)	(0.0777)	(0.103)	(0.0954)
$\Delta e_{\$H,t}$		0.528***		0.534***	0.607***	0.572***	0.535***	0.601***
		(0.0650)		(0.0510)	(0.0707)	(0.0365)	(0.0647)	(0.0822)
PPI	no	no	yes	yes	yes	yes	yes	yes
Euro ER	no	no	no	no	yes	no	no	yes
ΔER lags	no	no	no	no	no	yes	no	no
Sample	M	M	M	M	M	M	D	D
R-squared	0.287	0.290	0.291	0.293	0.320	0.293	0.312	0.337
Observations	931,993	931,993	808,304	808,304	518,898	808,304	419,717	272,060

Table 22: All regressions include Firm-Industry-Country fixed effects. S.e. clustered at the year level. The sample includes all manufactured (M) products excluding petrochemicals and metal industries in columns (1)-(6) and only differentiated (D) products in columns (7)-(8). *** p<0.01, ** p<0.05, * p<0.1.

Trade elasticity with respect to exchange rate, annual data (dollarized economies)

	(1) $\Delta y_{H,t}$	(2) $\Delta y_{H,t}$	(3) $\Delta y_{H,t}$	(4) $\Delta y_{H,t}$	(5) $\Delta y_{H,t}$
			Exports		
$\Delta e_{\$H,t}$	-0.580*	-0.425	-0.559	-0.406	-0.00635
	(0.294)	(0.370)	(0.368)	(0.353)	(0.404)
Euro ER	no	yes	no	no	yes
ΔER lags	no	no	yes	no	no
Sample	M	M	M	D	D
R-squared	0.225	0.225	0.225	0.232	0.232
Observations	159,041	159,041	159,041	98,831	98,831
			Imports		
$\Delta e_{\$H,t}$	-1.206***	-0.959**	-1.205**	-1.235***	-0.973*
	(0.282)	(0.407)	(0.466)	(0.325)	(0.468)
Euro ER	no	yes	no	no	yes
ΔER lags	no	no	yes	no	no
Sample	M	M	M	D	D
R-squared	0.184	0.184	0.184	0.205	0.205
Observations	529,276	529,276	529,276	275,974	275,974

Table 23: All regressions control for PPI, importer GDP, and include Firm-Industry-Country fixed effects. S.e. clustered at the year level. The sample includes all manufactured (M) products excluding petrochemicals and metal industries in columns (1)-(3) and only differentiated (D) products in columns (4)-(5). *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Trade elasticity with respect to exchange rate, annual data (non-dollarized economies)

	(1) $\Delta y_{H,t}$	(2) $\Delta y_{H,t}$	(3) $\Delta y_{H,t}$	(4) $\Delta y_{H,t}$	(5) $\Delta y_{H,t}$	(6) $\Delta y_{H,t}$	(7) $\Delta y_{H,t}$
Exports							
$\Delta e_{iH,t}$	-0.763***	0.0193	-0.0553	-0.0330	-0.992***	-0.136	-0.200
	(0.212)	(0.260)	(0.314)	(0.271)	(0.261)	(0.333)	(0.390)
$\Delta e_{\$H,t}$		-1.077***	-1.007**	-1.032***		-1.152***	-0.977**
		(0.265)	(0.322)	(0.265)		(0.282)	(0.342)
Euro ER	no	no	yes	no	no	no	yes
ΔER lags	no	no	no	yes	no	no	no
Sample	M	M	M	M	D	D	D
R-squared	0.250	0.252	0.245	0.252	0.258	0.260	0.252
Observations	139,318	139,318	120,316	139,318	85,659	85,659	74,090
Imports							
$\Delta e_{iH,t}$	-0.703***	-0.212*	-0.319	-0.204	-0.763***	-0.223	-0.314
	(0.217)	(0.110)	(0.246)	(0.114)	(0.241)	(0.129)	(0.251)
$\Delta e_{\$H,t}$		-0.962***	-0.922***	-0.941***		-1.023***	-0.957***
		(0.224)	(0.245)	(0.250)		(0.281)	(0.277)
Euro ER	no	no	yes	no	no	no	yes
ΔER lags	no	no	no	yes	no	no	no
Sample	M	M	M	M	D	D	D
R-squared	0.236	0.237	0.254	0.237	0.263	0.264	0.286
Observations	808,409	808,409	519,002	808,409	419,784	419,784	272,126

Table 24: All regressions control for PPI, importer GDP, and include Firm-Industry-Country fixed effects. S.e. clustered at the year level. The sample includes all manufactured (M) products excluding petrochemicals and metal industries in columns (1)-(4) and only differentiated (D) products in columns (5)-(7). *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Parameter values

	Parameter	Value
Measured		
Export Invoicing Shares		
to U.S.	$\theta^{\$}_{H\$}$	1.00
to R	$\theta^{\$}_{HR}, \theta^{R}_{HR}$	0.93,0.07
Shocks		
commodity prices	σ_ζ, ρ_ζ	0.09, 0.74
Estimated		
Home bias	γ_{HH}	0.88
from U.S.	$\gamma_{\$H}$	0.06
from R	γ_{RH}	0.06
Exports		
to U.S.	$D_{\$}$	-2.38
to R	D_R	-0.87
Oil endowment	$\bar{\zeta}$	0.27
Import Invoicing Shares		
from U.S.	$\theta^{\$}_{\$H}$	1.00
from R	$\theta^{\$}_{RH}, \theta^{R}_{RH}$	0.93, 0.07
e_{RH} process	η, ρ_R, σ_R	0.74, 0.82,0.016
a process	$\sigma_a, \rho_a, \rho_{a,\zeta}$	0.13,0.49,-0.18

Table 25: Other parameter values as reported in the text.

A.5 Structural Estimation On Colombian Data

We use a combination of calibration and estimation to parameterize the model, reported in Table 25 while other parameter values are as reported in Table 1 in the paper. The export invoicing shares are measured in the data directly. We calibrate the process for commodity price shocks in Eq. (24) in the paper to match the autocorrelation and standard deviation of HP-filtered commodity prices.[7] The values for $\bar{\zeta}$, $D_{\$}$, D_R, γ_{HH}, are chosen such that in steady state the model matches the Colombian data for the share of oil exports in total exports of 58%, a 10% share of oil exports over GDP, and the share of manufacturing exports going to the U.S. of 18%. We also match a steady state debt to GDP of 31% for Colombia. We set the interest elasticity to real dollar debt to equal 0.001.

We estimate the remaining parameters using a minimum distance estimator that minimizes the sum of squared deviations from moments in the data. Specifically, we minimize,

$$\mathbf{m}(\vec{\tau})\Omega^{-1}\mathbf{m}^{\mathbf{T}}(\vec{\tau})$$

where $\vec{\tau} = \{\theta^{\$}_{\$H}, \theta^{\$}_{RH}, \theta^{R}_{RH}, \eta, \sigma_r, \rho_R, \sigma_a, \rho_a, \rho_{a,\zeta}\}$ is a vector of nine parameters. To estimate these parameters we use the following eleven moments $\mathbf{m}(\vec{\tau})$ that theory suggests are informative. We estimate all parameters jointly and consequently all moments matter for all parameter values. The most informative moment for each parameter is described next.

[7] Specifically, we use the IMF's price index for all primary commodities, at the quarterly frequency, from 2000Q1 to 2016Q2. We HP filter the log of the index and compute the autocorrelation and the standard deviation of the cyclical component.

Moment matching

	$\hat{\beta}^{\$}_{0,\$H}$	$\hat{\beta}^{\$}_{0,RH}$	$\hat{\beta}^{H}_{0,RH}$	$\hat{\eta}$	$\hat{\sigma}_R$	$\hat{\rho}_R$	$\hat{\rho}_{a,\zeta}$	$\hat{\sigma}_a$	$\hat{\rho}_a$	$\hat{\beta}^{\$}_{0,HR}$	$\hat{\beta}^{\$}_{0,RH}$
Data	0.97	0.89	0.18	0.54	0.018	0.78	0.84	0.023	0.64	0.85	0.87
Model	0.97	0.80	0.13	0.54	0.017	0.78	0.87	0.026	0.64	0.81	0.90

Table 26: Moments in the data and in the estimated model. The difference between the second and last column is that the former estimate is from a regression that controls for the bilateral ER alongside the dollar ER. The latter is from a regression with only the dollar ER.

- Import Invoicing Shares: To estimate the import invoicing shares,
  - $\theta^{\$}_{\$H}$: We use the contemporaneous estimate β_0 from the pass-through regression for import prices from dollar countries.
  - θ^{R}_{RH} and $\theta^{\$}_{RH}$: We use the coefficients from regressing the quarterly change in import prices from non-dollar destinations on the peso/dollar and peso/origin country exchange rates.[8] $\Delta p_{RH,t} = \beta_{\$} \cdot \Delta e_{\$H,t} + \beta_R \cdot \Delta e_{RH,t} + \epsilon_t$
- Relation between e_{RH} and $e_{\$H}$: To estimate η and σ_R we construct the real exchange rate for Colombia relative to the U.S. and the (export share weighted) real exchange rate for Colombia relative to its other trading partners. We use these series to estimate the two equations Eq. (23) and (26) in the paper which we rewrite here:

$$\begin{aligned} e_{RH,t} + p_{R,t} - p_{H,t} &= \eta \left(e_{\$H,t} + p_{\$,t} - p_{H,t} \right) + \varepsilon_{R,t} \\ \varepsilon_{R,t} &= \rho_R \varepsilon_{R,t-1} + \epsilon_{R,t} \end{aligned}$$

  We use the empirical estimate for $\hat{\eta}$, $\hat{\rho}_R$ and the standard deviation of $\epsilon_{R,t}$ to obtain η, ρ_R, σ_R.

- Process for a and ζ: We match moments for the standard deviation (0.023) and autocorrelation (0.62) of manufacturing value added. We also match the contemporaneous correlation (0.84) of value added and commodity prices. Note that a refers to productivity, so we infer the process for a from matching moments of value added in the model and data.
- Additional Moments: We match the time zero coefficient on pass-through from $\mathcal{E}_{\$H}$ into export and import prices for R goods.

The weighting matrix Ω^{-1} is a diagonal matrix where the entries are the inverse of the variance of the data moments. The estimated values from this minimization are reported in Table 25 and the moment match between the model and data are reported in Table 26. As Table 25 reports the data strongly points towards DCP with almost all of the import invoicing share in dollars.

[8] In the data we also control for the peso/euro exchange rate.

Exchange rate pass-through into prices: Data and estimated model

	(1) $\Delta p_{HR,t}$	(2) $\Delta p_{HR,t}$	(3) $\Delta p_{RH,t}$	(4) $\Delta p_{RH,t}$
		Data		
$\Delta e_{RH,t}$	0.67***	0.06	0.750***	0.32***
	(0.09)	(0.05)	(0.12)	(0.08)
$\Delta e_{\$H,t}$		0.68***		0.53***
		(0.05)		(0.07)
		Estimated model		
$\Delta e_{RH,t}$	0.70	0.27	0.67	0.22
$\Delta e_{\$H,t}$		0.67		0.70
		DCP		
$\Delta e_{RH,t}$	0.68	0.22	0.65	0.17
$\Delta e_{\$H,t}$		0.72		0.75
		PCP		
$\Delta e_{RH,t}$	0.48	0.25	0.92	0.88
$\Delta e_{\$H,t}$		0.37		0.06
		LCP		
$\Delta e_{RH,t}$	0.97	0.92	0.43	0.18
$\Delta e_{\$H,t}$		0.08		0.40

Table 27: Exchange rate pass-through into export and import prices to/from non-dollarized economies, in the data and the model. Both regressions have only the bilateral exchange rate and the dollar exchange rate as controls. Data regressions include Firm-Industry-Country fixed effects, with s.e. clustered at the year level. The last three sets of results show the model-implied pass-through coefficients for the three extreme pricing assumptions, keeping all other parameters fixed at the values in Table 26.

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