DCP and impact of exchange rates on trade

Nino Kodua and Tung-Sheng Hsieh

Johns Hopkins University

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Trade Volume Elasticity

- The paper has shown the stable bilateral terms-of-trade and an outsized effect of the dollar on trade prices.
- Now we explore if the country-level data is aligned with the model's implications on dollar's effect on trade volume.

Trade Volume Elasticity

- *For non-US countries, import quantities should be driven by the dollar exchange rate as opposed to the bilateral exchange rate.*
- *US import quantities should be less responsive to dollar exchange rate movements as compared to non-US countries.*

Trade Volume Elasticity

- Panel regression function

$$\Delta y_{ij,t} = \lambda_{ij} + \delta_t + \sum_{k=0}^{2} \beta_k \Delta e_{ij,t-k} + \sum_{k=0}^{2} \beta_k^{\$} \Delta e_{\$j,t-k}$$
$$+ \sum_{k=0}^{2} \eta_k \Delta e_{ij,t-k} \times S_j + \sum_{k=0}^{2} \eta_k^{\$} \Delta e_{\$j,t-k} \times S_j + \theta' X_{j,t} + \varepsilon_{ij,t}$$

- $\Delta y_{ij,t}$ denotes the log volume of goods exported from country i to country j. $\Delta e_{ij,t-k}$ is the change in the (log) bilateral exchange rate between country i and country j at time $t-k$, expressed as the price of currency i in terms of currency j; S_j is the importing country's dollar invoicing share.
- λ_{ij} and δ_t are dydadic and time fixed effects; $X_{j,t}$ consist of the log growth rate of real GDP (and two lags) for the importing country j.

Trade Volume Elasticity

TABLE 4—TRADE ELASTICITY WITH RESPECT TO EXCHANGE RATE

	Unweighted			Trade-weighted		
	$\Delta y_{ij,t}$ (1)	$\Delta y_{ij,t}$ (2)	$\Delta y_{ij,t}$ (3)	$\Delta y_{ij,t}$ (4)	$\Delta y_{ij,t}$ (5)	$\Delta y_{ij,t}$ (6)
$\Delta e_{ij,t}$	−0.119	−0.0310	−0.0765	−0.0901	−0.0163	−0.0971
	(0.0139)	(0.0160)	(0.0403)	(0.0182)	(0.0236)	(0.0380)
$\Delta e_{ij,t} \times S_j$			0.118			0.124
			(0.0684)			(0.0519)
$\Delta e_{\$j,t}$		−0.186	−0.140		−0.155	−0.131
		(0.0250)	(0.0600)		(0.0277)	(0.0658)
$\Delta e_{\$j,t} \times S_j$			−0.0903			−0.00581
			(0.0871)			(0.0846)
R^2	0.069	0.071	0.074	0.172	0.179	0.215
Observations	52,272	52,272	38,582	52,272	52,272	38,582
Dyads	2,807	2,807	2,014	2,807	2,807	2,014

Notes: The first (last) three columns use unweighted (trade-weighted) regressions. All regressions include two ΔER lags, lags 0–2 of importer ΔGDP, and time fixed effects. Standard errors clustered by dyad.

Trade Volume Elasticity

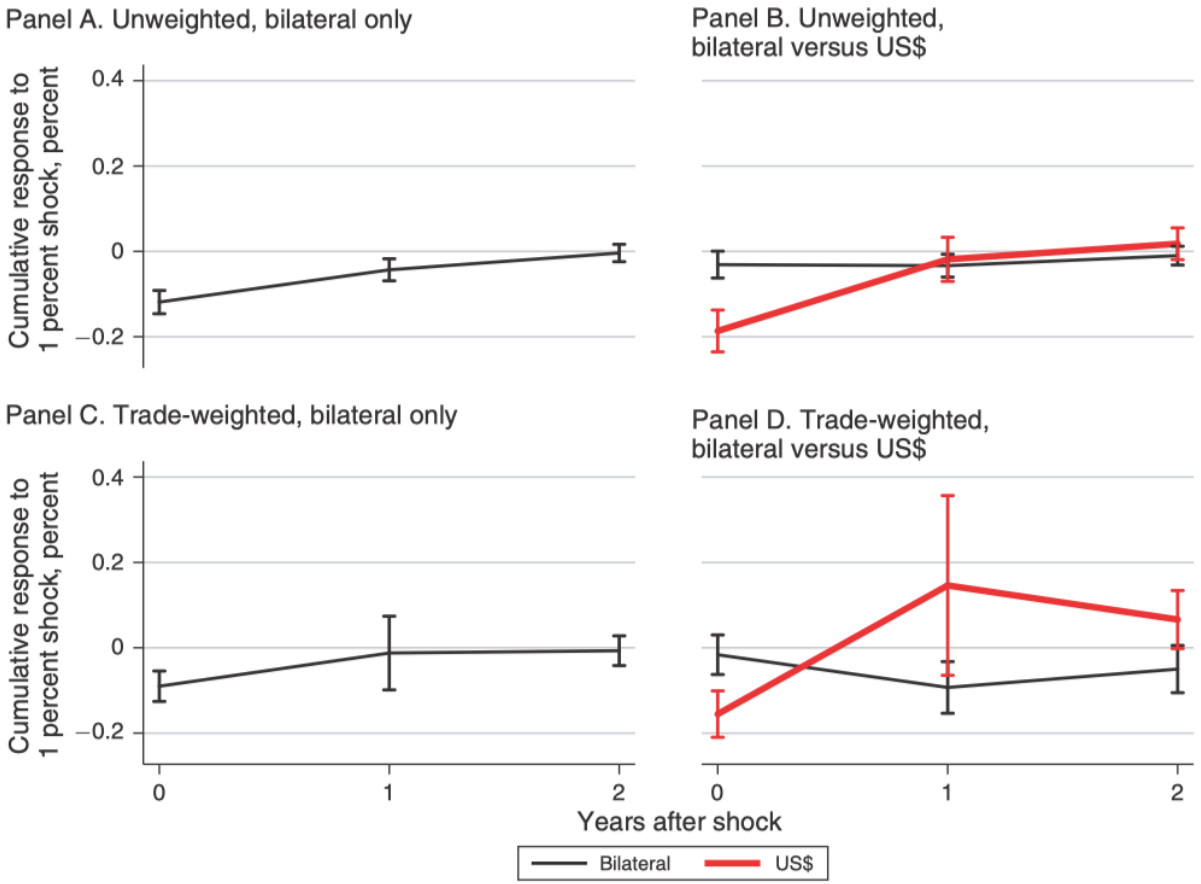


FIGURE 6. AVERAGE TRADE ELASTICITY

Notes: Impulse responses of bilateral volume to bilateral $e_{ij,t}$ and US$ $e_{\$j,t}$ exchange rates. Based on regressions in Table 4 without interactions. Top row: unweighted regression; bottom row: trade-weighted. Left column: specifications (1) and (4); right column: specifications (2) and (5). Error bars: 95 percent confidence intervals, clustering by dyad.

Trade Volume Elasticity

TABLE 5—TRADE ELASTICITY: UNITED STATES VERSUS NON-UNITED STATES IMPORTS

	Unweighted $\Delta y_{ij,t}$ (1)	Trade-weighted $\Delta y_{ij,t}$ (2)
$\Delta e_{ij,t}$	−0.121	−0.107
	(0.0141)	(0.0194)
$\Delta e_{ij,t} \times$ ImpUS	0.124	0.117
	(0.0329)	(0.0318)
R^2	0.069	0.180
Observations	52,272	52,272
Dyads	2,807	2,807

Notes: ImpUS is in indicator for whether importing country is the United States. Both regressions include two ΔER lags, lags 0–2 of importer ΔGDP, and time fixed effects, as well as interactions of these variables with *ImpUS*. Standard errors clustered by dyad.

Effect of US Dollar on Rest-of-World Trade and Inflation

- The last implication is about the dollar's impact on trade volume among countries in the rest of the world.
- *When all countries' currencies uniformly depreciate relative to the dollar, it should lead to a decline in trade between the rest of the world (i.e., excluding the United States).*

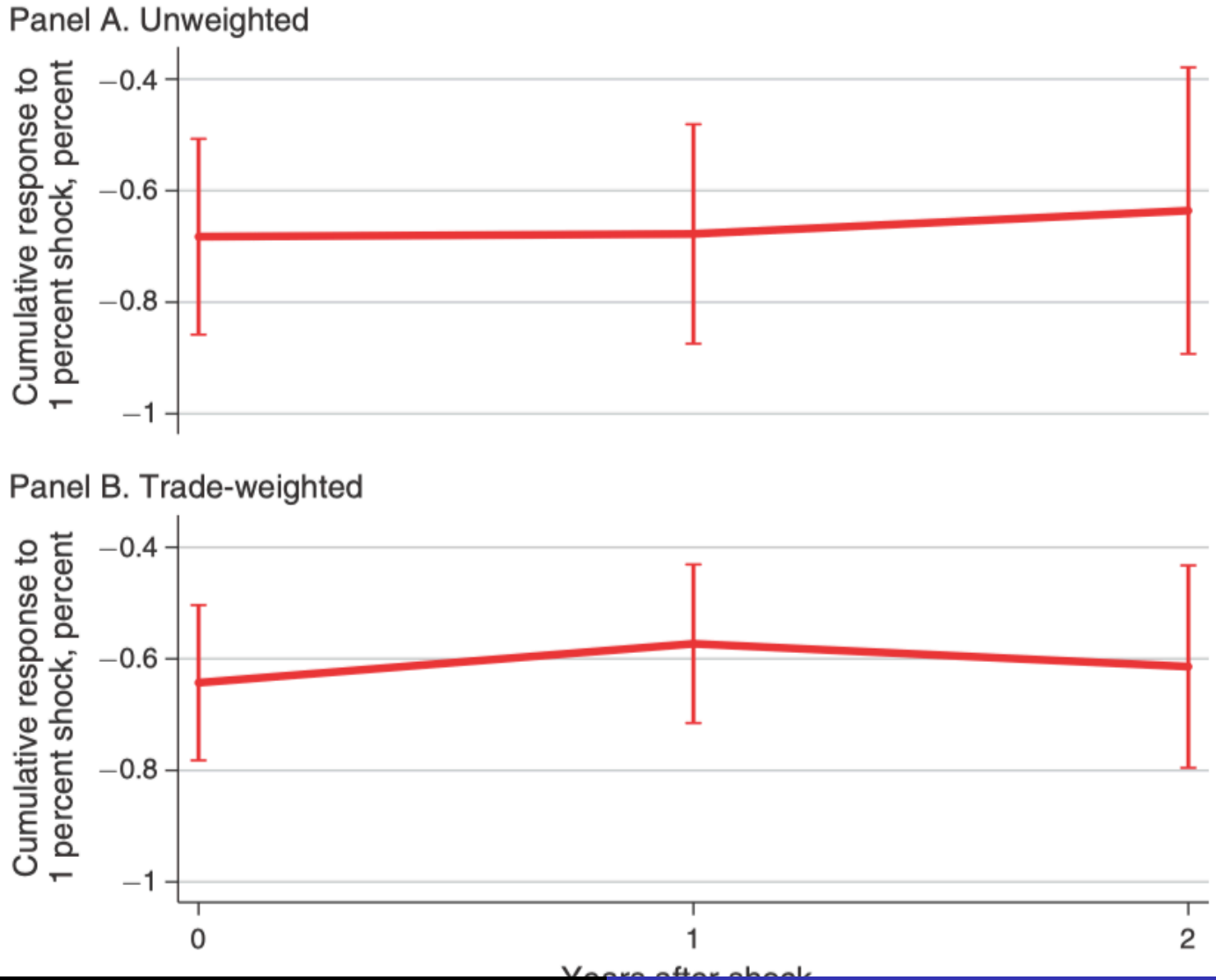
Effect of US Dollar on Rest-of-World Trade and Inflation

- Panel regression function

$$\Delta y_{ij,t} = \sum_{k=0}^{2} \left(\beta_k + \eta_k \left(1 - S_j - S_j^{euro}\right)\right) \Delta e_{ij,t-k} + \sum_{k=0}^{2} \left(\beta_k^{\$} + \eta_k^{\$} S_j\right) \Delta e_{\$j,t-k} + \sum_{k=0}^{2} \left(\beta_k^{euro} + \eta_k^{euro} S_j^{euro}\right) \Delta e_{euroj,t-k} + \lambda_{ij} + \theta' X_{ij,t} + \varepsilon_{ij,t}$$

- S_j and S_j^{euro} are the importer's country-level dollar and euro invoicing shares.
- Notice that to measure the effect of dollar appreciation against all other currencies, the time fixed effects are not controlled; several proxies for the global business cycle are controlled.

Effect of US Dollar on Rest-of-World Trade and Inflation



Calibration with Colombian Firm-level Data

- The authors then calibrate their model using the firm-level customs data on exports and imports for a small open economy, Colombia.
- They use the noncommodity terms-of-trade and only focus on manufactured goods.

Calibration with Colombian Firm-level Data

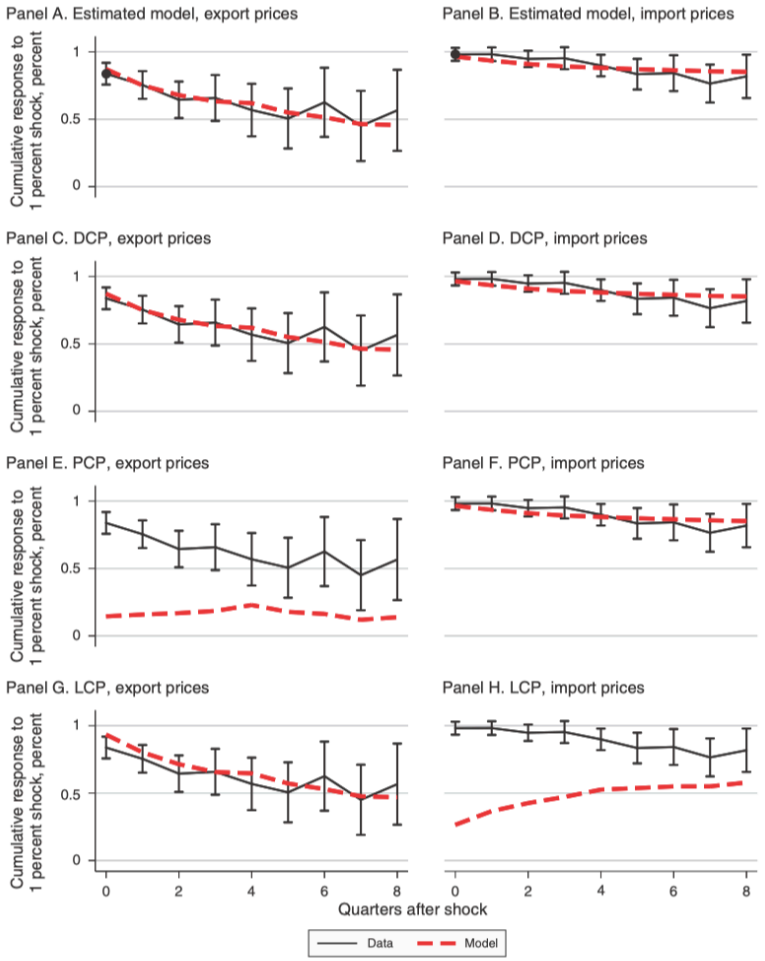


FIGURE 11. EXCHANGE RATE PASS-THROUGH FOR DOLLAR ORIGIN/DESTINATION: DATA VERSUS MODEL

Note: Exchange rate pass-through into export and import prices for Colombia with respect to dollar economies.

Calibration with Colombian Firm-level Data

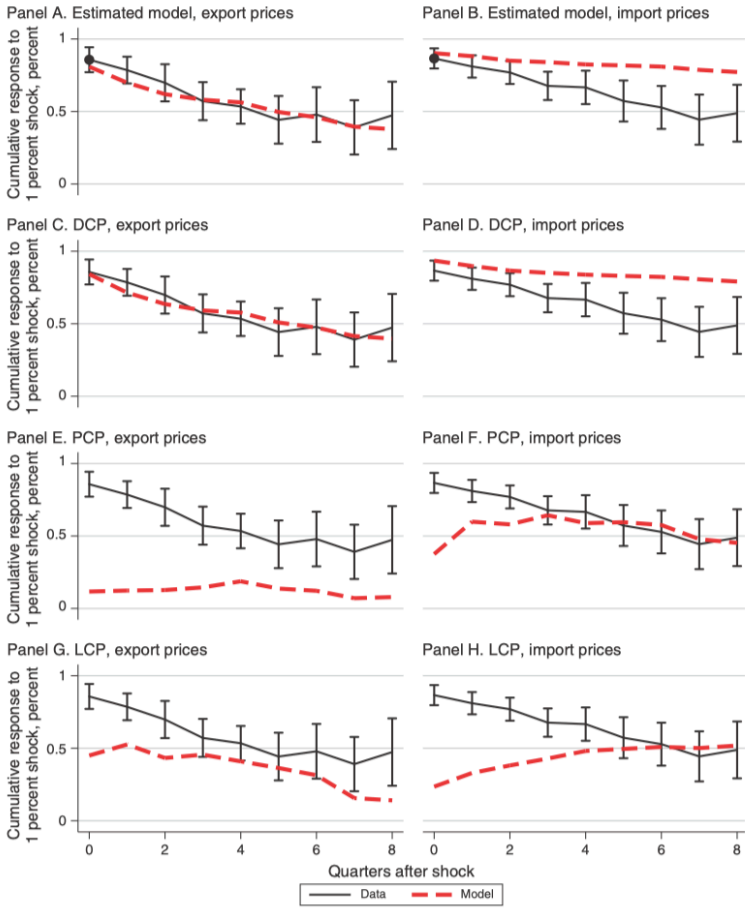


FIGURE 12. EXCHANGE RATE PASS-THROUGH FOR NON-DOLLAR ORIGIN/DESTINATION: DATA VERSUS MODEL

Note: Exchange rate pass-through into export and import prices for Colombia with respect to non-dollar economies.

Calibration with Colombian Firm-level Data

TABLE 8—EXCHANGE RATE PASS-THROUGH INTO PRICES: ESTIMATED MODEL

	$\Delta p_{HR,t}$ (1)	$\Delta p_{HR,t}$ (2)	$\Delta p_{RH,t}$ (3)	$\Delta p_{RH,t}$ (4)
$\Delta e_{RH,t}$	0.70	0.27	0.67	0.22
$\Delta e_{\$H,t}$		0.67		0.70

Notes: Exchange rate pass-through into export and import prices to/from non-dollarized economies using model simulated data. Regressions have the bilateral exchange rate and the dollar exchange rate as controls.

TABLE 9—EXCHANGE RATE PASS-THROUGH INTO QUANTITIES: ESTIMATED MODEL

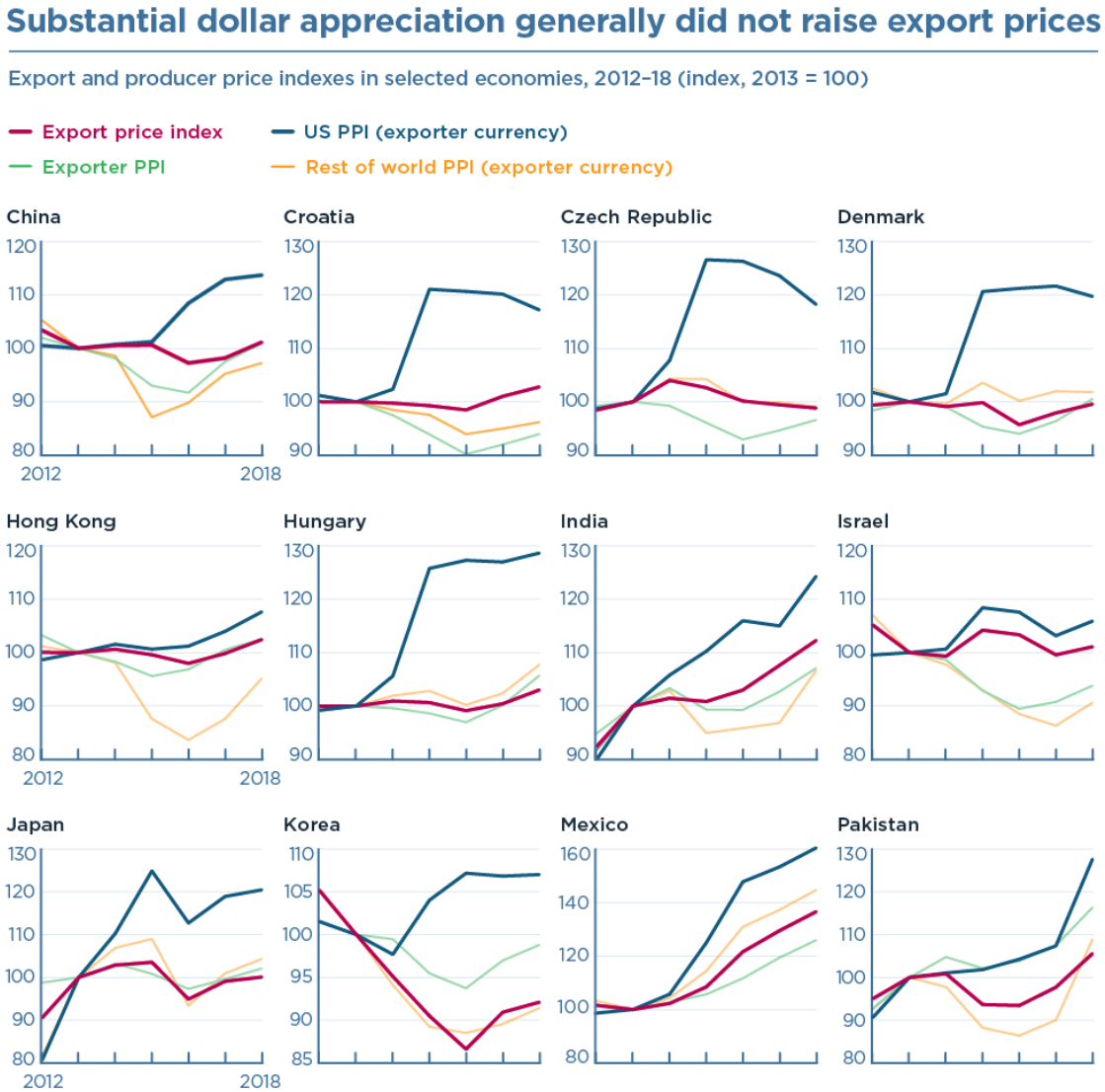
	$\Delta y_{H\$,t}$ (1)	$\Delta y_{\$H,t}$ (2)	$\Delta y_{HR,t}$ (3)	$\Delta y_{RH,t}$ (4)
$\Delta e_{\$H,t}$	0.25	−1.52	−1.34	−1.07
$\Delta e_{RH,t}$	−0.16	0.01	1.45	−0.38

Notes: Exchange rate pass-through into export and import quantities to/from dollarized and non-dollarized economies. Regressions have the bilateral exchange rate, the dollar exchange rate, and the level of demand as controls.

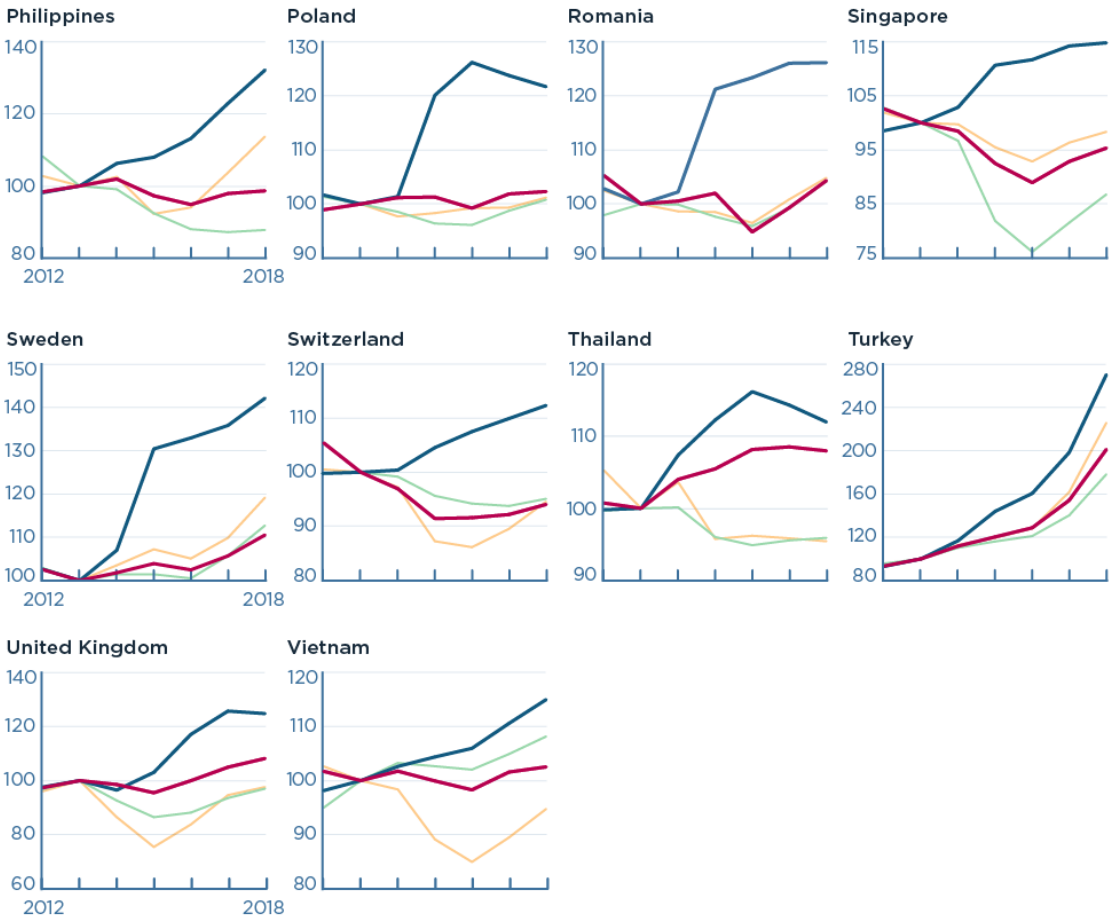
Counter-evidence against DCP

- Sarsenbayev and Gagnon (2021) counters the DCP hypothesis using the substantial uniform dollar appreciation of 2014-15 as a natural experiment.
- Only 2 out of 22 economies they examined experienced an increase in export prices, while the rest followed domestic prices or a trade-weighted average of prices in foreign currencies.
- They further categorized different economies into different currency paradigms based on the pattern of their export price movements.

Counter-evidence against DCP



Counter-evidence against DCP



PIIE

PPI = producer price index

Note: The export price index is the goods and services export deflator. For Poland, a price deflator of exports of goods and services relative to a group of 37 industrial countries is used. The wholesale price index is used for PPI in India, Pakistan, and Singapore. PPI data for the euro area since 2000 are based on total output price index; unadjusted data for industry (except construction

Counter-evidence against DCP

Economies grouped by change in export price compared to changes in producer price indexes (PPI) converted into exporter currency, 2013-16

PPI most closely correlated with change in export price

Exporter	Rest of world (foreign weighted average)	Dollar	Euro
China	Czech Republic	Israel	Croatia
Hong Kong	Japan	Thailand	Denmark
India	Korea		Hungary
Romania	Mexico*		Sweden
Switzerland	Pakistan		United Kingdom
Vietnam	Philippines		
	Poland		
	Singapore*		
	Turkey		

Note: This table groups economies based on the change in export price from 2013 to 2016 compared to changes in various PPIs converted into exporter currency. The first column includes economies in which the change in export price is closest in value to the change in exporter PPI. The second column includes economies in which the change in export price is closest in value to the change in ROW PPI. The third column includes economies in which the change in export price is closest in value to the change in US PPI. The fourth column includes economies in which the change in export price is closest in value to the change in euro area PPI.

* The changes in export prices in these economies were closest to the change in the euro, but they were only slightly farther (less than 4 percentage points in each economy) from the change in foreign weighted average prices. For comparison, the distance between the maximum and minimum PPI change in each economy was more than 35 percentage points. We put these economies in the second column because we suspect the correlation with the euro is mostly spurious.

Sources: International Monetary Fund's International Financial Statistics database, Eurostat, and J.P. Morgan (accessed via Bloomberg). The following additional sources were accessed via Macrobond: national sources, Asian Development Bank, European Commission, and Organization for Economic Cooperation and

Closing Comments

- If DCP is the case, then the rest of the world outside the country that issues the dominant-currency is unable to influence the relation between export and import prices with their monetary policies.
- Recall that the IRF analysis showed that the inflation-output trade-off in response to a monetary policy shock for a small open economy worsens under DCP relative to PCP.
- This relates to the broader discussion of optimal monetary policy in open economy and the trilemma in international finance.