The Financial Channel of the Exchange Rate and Global Trade

Sai Ma and Tim Schmidt-Eisenlohr*

May 2023

Abstract

This paper provides evidence that the U.S. dollar affects countries' exports through the financial channel of the exchange rate (Bruno and Shin (2015)). Using global data on trade between countries whose currency is not the U.S. dollar, it documents a positive relationship between the dollar and import prices. Importantly, this effect is stronger when the dollar share of the exporter's foreign borrowing is larger. Results strengthen substantially when instrumenting the dollar by U.S. domestic housing activity. Then, a dollar appreciation increases import prices and decreases import quantities, with effects being proportional to the source country's foreign dollar borrowing share.

Keywords: Dominant Currency, Financing Channel, International Trade

JEL Classification: F14, F31, G15

*Ma and Schmidt-Eisenlohr are from the Division of International Finance, Federal Reserve Board of Governors (sai.ma@frb.gov, t.schmidteisenlohr@gmail.com). We thank Ricardo Correa, Sebnem Kalemli-Ozcan, Luca Guerrieri, Linda Goldberg, and seminar participants at the Federal Reserve Board and 2023 CEA Conference for their comments. The opinions expressed are those of the authors and do not necessarily reflect the view of the Board of Governors or the staff of the Federal Reserve System. First draft: March 2023.

1 Introduction

Changes in U.S. conditions can generate strong spillovers to other countries, not only through direct economic links with the United States but also indirectly through their effects on global economic conditions.[1] For example, Di Giovanni et al. (2022), link increases in the VIX to reduced bank lending in an emerging economy, Turkey, while Kalemli-Özcan (2019) and Miranda-Agrippino and Rey (2020) document how U.S. monetary policy affects the global financial cycle (GFC).

A key factor that plays a role in the indirect transmission of U.S. shocks abroad is the U.S. dollar. For international trade flows, the literature suggests two channels through which the dollar may indirectly affect trade flows and prices. First, Gopinath et al. (2020) show that the dominant role of the dollar in trade invoicing impacts price pass-through and the trade elasticity when prices are sticky.[2] They provide evidence for their model, using both aggregate data at the country-pair year level and looking at detailed trade data from Colombia. Second, Bruno and Shin (2020) propose a financial channel of the exchange rate, which posits that dollar appreciation reduces exporters' access to finance, including funding needed for international trade transactions, because it deteriorates financial intermediaries' balance sheets. The decrease in trade-related lending then leads to a contraction in trade flows. Bruno and Shin (2020) provide evidence for this channel, using data on Mexican firms and exploiting information on the firms' links to banks that rely differently on dollar funding.

An important difference between the currency invoicing channel and the financial channel

[1] A large literature studies U.S. monetary policy spillovers. See, among others, Kim (2001), Maćkowiak (2007), Georgiadis (2016), and Fratzscher et al. (2018). For an analysis of broader spillovers, see e.g., Canova (2005).

[2] See also Corsetti and Pesenti (2005), Cook and Devereux (2006), Devereux et al. (2007), Goldberg and Tille (2008), Goldberg and Tille (2009), Canzoneri et al. (2013), and Gopinath (2015).

is that the former should be linked to the importer's dollar exchange rate, whereas the latter predominantly works through exporter finance, and should thus be driven either by the exporter's dollar exchange rate or the broad dollar. As Gopinath et al. (2020) show, the invoicing channel only affects imports because sticky prices and dollar invoicing create an asymmetry such that only import prices respond to the importer's dollar exchange rate. In contrast, most trade involves the provision of trade credit, which requires the exporter to pre-finance the transaction (see e.g., Ahn (2014), Antràs and Foley (2015), Demir and Javorcik (2018) and Garcia-Marin et al. (2019)), and therefore financial conditions in the source country should be the most relevant.[3] According to the financial channel of the exchange rate, source country's financial conditions should be affected by the broad dollar and the source country's dollar exchange rate.[4]

This paper provides evidence in support of the financial channel of the exchange rate. Similar to Gopinath et al. (2020), it focuses on trade between countries other than the United States that have flexible exchange rates against the dollar. To test the financing channel of the exchange rate, it compares countries that differ in the extent to which their foreign borrowing is denominated in U.S. dollars. The more a country borrows in U.S. dollars abroad, the more it should be affected by swings in the global supply of dollar funding. Because trade is mostly financed by exporters, the source country's dollar share of borrowing should best capture the effect of the financial channel of the exchange rate on

[3]Available customs data with payment information that cover the universe of trade transactions for Turkey, Chile, and Colombia show that trade credit represents at least 80 percent of international trade flows. Antràs and Foley (2015) who study data for one large U.S. food exporter find a more balanced split between trade credit and cash in advance for sales by that firm.

[4]Note that once we instrument the dollar in our empirical setting, the distinction between the broad dollar and country-specific dollar rate is no longer relevant, as our instrument for the dollar only varies in the time series.

trade prices and quantities. That is, exports of countries with larger U.S. dollar borrowing should be more adversely affected by a dollar appreciation than exports of other countries. Because importer finance is much less important in international trade, the importer U.S. dollar borrowing share should have a much weaker or no effect on trade flows.

When running a simple OLS regression, where we explain export prices and quantities by the dollar exchange rate and its interaction with the source country's dollar share in foreign borrowing, we find evidence for a small price effect but do not find effects for quantities. However, a key challenge in testing for the effect of the dollar on trade prices and quantities is the endogeneity of the U.S. dollar. As macroeconomic variables, trade flows, and the dollar are codetermined, it can be difficult to identify the financial channel of the exchange rate correctly in a simple OLS setting.

To tackle this issue, this paper employs a novel variable to instrument the dollar, building on recent research by Ma and Zhang (2023), who show that domestic housing activity in the United States can predict the dollar one year ahead. U.S. housing represents a particularly well-suited instrument for the question we are studying, as we are focusing our analysis on trade between third countries, whose trade flows are unlikely to be directly affected by changes to the domestic demand and supply for U.S. housing. This instrumentation strategy is also used in Ma et al. (2020) to revisit the dominant currency paradigm estimation in Gopinath et al. (2020).

When we instrument the U.S. dollar with a one-year lag of new housing permits in the United States, the estimated relationships between the dollar exchange rate, import prices, and import quantities strengthen substantially relative to the OLS results. We find highly significant effects for the interaction between the source country's dollar share in foreign borrowing and the dollar exchange rate for both import prices and import quantities. Moreover, the estimated interaction term coefficients are much larger when using our two-stage least squares (2SLS) approach. For import prices, the coefficient is slightly below one, whereas the interaction coefficient for import quantities is below minus one, which is consistent with the price effect when assuming a trade elasticity greater than one. Results are robust to controlling for source countries' trade links with the United States, macro, financial, and risk variables, using alternative proxies for U.S. housing activity, and splitting the data into subsamples. We obtain similar results when replacing the U.S. dollar share in the source country's foreign borrowing by the source country's ratio of net U.S. dollar liabilities over GDP. Finally, we show that results persist when restricting the sample to industries that are unrelated to construction.

The paper contributes to the literature that studies the link between financial conditions and trade. The general link between financial constraints and trade has been studied, for example, by Kletzer and Bardhan (1987), Manova (2013), and Chaney (2016), who show that financial constraints can affect exporting both at the extensive and intensive margin. Several papers have shown how financial shocks affect trade flows both during crisis periods and in normal times (see e.g., Amiti and Weinstein (2011), Paravisini et al. (2015), Niepmann and Schmidt-Eisenlohr (2017b)), and Ahn and Sarmiento (2019)). Finally, a set of papers has studied how financial conditions and other factors make firms choose the payment terms for international trade, that is, the choice between exporter, importer, and bank-led finance (see Schmidt-Eisenlohr (2013), Ahn (2014), Antràs and Foley (2015), Hoefele et al. (2016), Niepmann and Schmidt-Eisenlohr (2017a), Demir and Javorcik (2018), and Garcia-Marin et al. (2020)).

More specifically, our paper speaks to the role of the dollar as a driver of global trade. As discussed, our findings are very consistent with Bruno and Shin (2020), who also provide evidence for the financial channel of the exchange rate.[5] While an advantage of Bruno and Shin (2020) compared to our study is that they exploit firm-level data, our data allows us to show that the financial channel of the exchange rate matters for countries other than Mexico and address the endogeneity of the dollar by instrumenting it by U.S. housing activities. In fact, as we show, instrumenting the dollar is key to correctly estimating the financial channel of the exchange rate. As discussed, the paper also relates to the literature on the dominant currency paradigm (Gopinath et al. (2020)), and we confirm that our findings persist when controlling for this alternative channel.[6] Another related paper is Casas et al. (2022), which studies the effect of the dollar on Colombian firms' exports and imports both through the currency invoicing channel and through its effects on firms' balance sheets.

Finally, the paper also adds to the sizable literature on exchange rate pass-through, which has shown that pass-through depends on factors such as the frequency of price adjustments (Gopinath and Itskhoki (2010)), the strength of competition in final product markets (Amiti et al. (2016)), firms' export or import market shares (Feenstra et al. (1996), Berman et al. (2012), Amiti et al. (2014), Garetto (2016), Auer and Schoenle (2016), Devereux et al. (2017)), and the source of exchange rate shocks (Forbes et al. (2018)). The global nature of our exercise, which aims to capture most world trade between third countries, does not

[5] On the broader effect of the dollar exchange rate on lending in the United States and abroad, and on the link between the dollar and financial intermediary constraints, see also Avdjiev et al. (2019) and Niepmann and Schmidt-Eisenlohr (forthcoming).

[6] Recent other contributions on the dominant status of the dollar include Amiti et al. (2020) who study the invoicing choices of Belgian firms, Corsetti et al. (2020) who look at the implications of a dominant currency for the transmission of shocks across borders and optimal monetary policy, and Goldberg and Tille (2016) who analyze vehicle currency invoicing with Canadian transaction-level import data.

allow us to directly account for these factors at the micro level. We therefore see our main contribution to this literature in showing that the financial channel of the exchange rate affects export prices and in providing an estimate of this effect at the global level.

The paper proceeds as follows. Section 2 discusses the conceptual framework, the empirical specifications, and the instrumental variable approach. Section 3 explains the data. Section 4 shows our main results, and Section 5 concludes.

2 Framework, Specifications, and IV Approach

This section discusses the conceptional framework, presents our main empirical specifications on import prices and quantities, and discusses our instrumental variable approach.

2.1 Conceptional Framework

Definitions Suppose there are three countries: the United States, country i, and country j. Let $e_{ij,t}$ denote the price of currency i in units of currency j and $e_{\$j,t}$ the price of the dollar in units of currency j — that is, an increase in $e_{\$j,t}$ reflects an appreciation of the dollar.

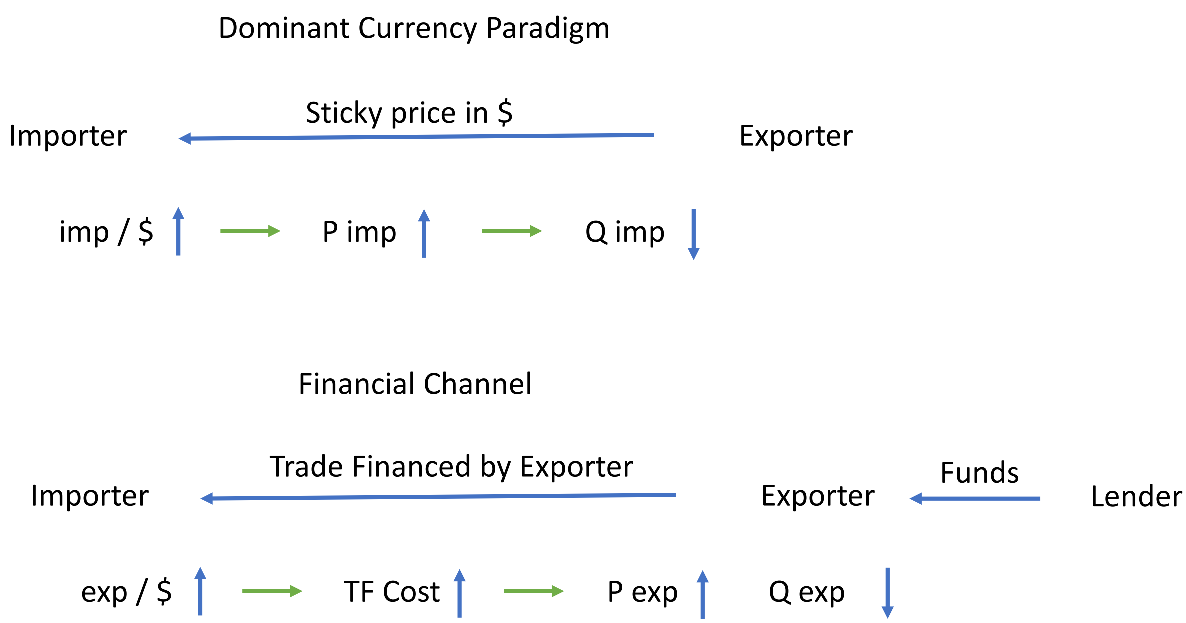
The financial channel of the exchange rate. The key prediction of the financial channel is that dollar appreciation reduces the risk-taking capacity of the financial sector and thereby lending. Bruno and Shin (2015) derive this prediction in a model where banks have value-at-risk constraints that limit their lending. A dollar appreciation raises the risk of dollar loans to borrowers with non-dollar income, which makes the value-at-risk constraints of banks more binding. As international trade requires large amounts of bank lending, both for working capital loans or more specific trade finance products like letters of credit, a contraction in lending capacity lowers trade quantities and increases trade prices. As most trade is financed by exporters, this channel should mainly operate through constraints in the exporting country.

Importantly, the transmission of the dollar to tighter credit conditions in the exporting country does not have to go through mismatched bank balance sheets alone. It can also operate through the mismatches on the balance sheets of global financial intermediaries or institutional investors, whose balanced sheets might become more constrained when the dollar appreciates, thereby tightening global financial conditions and bank lending (Niepmann and Schmidt-Eisenlohr (forthcoming)).

Comparison to the dominant currency paradigm Figure 1 compares the dominant currency mechanism with the financial channel. Under the dominant currency paradigm, prices are sticky in U.S. dollar. Then, an appreciation of the dollar against the importer's currency raises import prices in local currency and thereby leads to a decline in import quantities. Under the financial channel, exporters need to finance trade transactions by borrowing from external lenders. The financing cost of these lenders increases when the dollar appreciates against the exporter's currency. This generates an increase in trade finance costs for exporters, which raises export prices and lowers export quantities.

Importantly, the dominant currency paradigm operates through the price effects in the destination country that only depend on the importer's dollar exchange rate, while the financial channel should mostly operate through the exporter's financial conditions. We can therefore fully control for the effects from the dominant currency paradigm in our empirical specification through importer-time fixed effects, while still estimating the main effects of the financial channel.

Figure 1. Effect of Dollar Appreciation



Classic channels generate opposite prediction There are two classic channels that also link exchange rate movements to trade. First, the expenditure-switching channel (Mundell (1968)) implies that if exporters price exports in their own currency (producer currency pricing), a depreciation against the other country's currency should shift demand towards domestic goods, decreasing imports and increasing exports. However, as we are only looking at countries that do not have the dollar as their currency, the expenditure-switching channel is muted in our setting.[7] Second, if a country has a negative net asset position in dollars,

[7]Specifically, the expenditure-switching channel is driven by the bilateral rate between the exporter and the importer, but unaffected by the exchange rate between the dollar and the exporter's currency.

a depreciation of the local currency against the dollar will generate a negative wealth effect (Ghironi et al. (2007), Tille (2008)). This lowers domestic consumption and thereby decreases imports and increases exports.

To sum, in our setting that focuses on third-country trade, the classic channels either predict no response to the dollar (expenditure-switching channel) or a response with the opposite sign (wealth effect) from the financial channel of the exchange rate.

2.2 Main Specifications

This section presents the main OLS specifications for import prices and import quantities.

Import Prices. We investigate the relationship between the dollar and import prices, estimating the following equation:

$$\begin{aligned}\Delta p_{ij,t} \quad &= \quad \beta\Delta e_{ij,t} + \beta^{\$}\Delta e_{\$j,t} + \eta\Delta e_{ij,t} \times S^{Fin}_{j,t-1} + \eta^{\$}\Delta e_{\$j,t} \times S^{Fin}_{j,t-1} \\ &+\theta X_{j,t} + \lambda_{ij} + \delta_t + \varepsilon_{ij,t} \qquad (1)\end{aligned}$$

where $\Delta p_{ij,t}$ is the log difference of the price of goods exported from country j to country i measured in importer currency i, and $S^{Fin}_{j,t}$ is the dollar share of exporting country j's foreign borrowing in country j's total foreign borrowing in year t. We include dyadic and time fixed effects λ_{ij} and δ_t for all specifications, and controls $X_{j,t}$ include changes in the (log) producer price index in the exporting country j.[8]

[8] Results are very similar if we implement the dynamic specification in Gopinath et al. (2020) and include two lags of the (log) producer price index as well as two lags of the bilateral exchange rate, as shown in Table 11.

Import quantities. For import quantities, we estimate:

$$\Delta y_{ij,t} = \beta \Delta e_{ij,t} + \beta^{\$} \Delta e_{\$j,t} + \eta \Delta e_{ij,t} \times S^{Fin}_{j,t-1} + \eta^{\$} \Delta e_{\$j,t} \times S^{Fin}_{j,t-1}$$
$$+\theta X_{i,t} + \lambda_{ij} + \delta_t + \varepsilon_{ij,t}, \qquad (2)$$

where $\Delta y_{ij,t}$ is the log difference in bilateral import quantities. Import quantity regressions also include dyadic and time fixed effects λ_{ij} and δ_t. Controls $X_{j,t}$ include the growth rate of the real GDP of the importing country i.[9] As in the pass-through specification, country j's dollar exchange rate, $\Delta e_{\$j,t}$, drops out in the 2SLS estimation with time fixed effects.

2.3 IV Approach

The key challenge in testing for the effect of the dollar on trade prices and quantities is that the exchange rates are co-determined with other macroeconomic factors that also move trade prices and quantities. To test for the causal relationship of the dollar on trade hence requires a shock that moves the exchange rate but does not directly affect trade prices and quantities between two countries other than through the exchange rate. In the following, we show that U.S. domestic housing activity represents such a shock. U.S. housing activity can forecast moves in the dollar one year ahead while being plausibly exogenous to the bilateral trade between two countries other than the United States.

U.S. housing cycles and the dollar. Ma and Zhang (2023) uncover that U.S. housing activity, such as residential investment and building permits, is a strong in-sample and out-

[9] Again, results are very similar if we implement the dynamic specification in Gopinath et al. (2020) and include two lags of the growth rate of the real GDP of the importing country as well as two lags of the bilateral exchange rate, as shown in Table 11.

of-sample predictor for the dollar up to three years. Table 1 reflects this central finding from Ma and Zhang (2023), showing regressions of the one-year-ahead dollar on different measures of U.S. housing activity. The coefficient in column (1) implies that a one standard deviation increase in building permits is associated with a three percent decline in the value of the dollar the next year. This result is robust to the inclusion of variables that capture financial conditions and U.S. monetary policy (columns (2) and (3)) and works with alternative measures of U.S. housing activity (columns (4) and (5)).

Figure 2 illustrates this result graphically. It shows the time series of the total number of building permits authorized in the United States and the one-year-ahead log change in an average dollar index. The two series exhibit a negative 33 percent correlation, confirming that stronger U.S. housing activity predicts persistent future dollar depreciation. Ma and Zhang (2023) show that U.S. housing variables also predict the dollar out of sample and outperform the random walk model.

One plausible explanation for why U.S. housing activity affects the future price of the dollar is through its effect on the relative supply of traded and non-traded goods, as housing is one of the most important non-traded goods. Ma and Zhang (2023) propose a model where the price of the traded good is determined globally, but the domestic price of the non-traded good is mostly determined by domestic supply and demand. In that setting, output fluctuations in the domestic non-traded good can generate strong adjustments in the relative price between the non-traded and the traded good, and, hence, affect the value of the dollar. This mechanism is known as the relative price adjustment channel. They show empirically that increases in U.S. domestic housing investment indeed predict persistent declines in the relative price of the non-traded price measure from Betts and Kehoe (2008).

One concern for the documented predictability is that because the U.S. housing cycle is often considered to be co-moved with macro and financial conditions, it hence reflects general business and credit cycles. Panel B of Table 1 reports results from the dollar forecasting regression with additional macro and financial controls. We first include two business cycle predictors: the excess bond premium from Gilchrist and Zakrajšek (2012), which is based on credit spreads, and the slope of the Treasury yield curve, measured by the term spread. Second, we include the credit-to-GDP ratio and the broker-dealer leverage to capture credit cycles. We further follow Dahlquist and Pénasse (2022) and control for the level of real exchange rate to capture its potential mean reversion. We finally conduct a "kitchen sink" specification that includes all control variables considered. Consistent with Ma and Zhang (2023), results in Table 1 show that the dollar predictability remains strong even after controlling for all these variables jointly.

Another concern is that international capital flows might jointly affect the U.S. current account balance and the U.S. housing cycle, as remarked in Bernanke (2005). As a result, U.S. housing activity could be a proxy for international capital flows into the United States. However, Lilley et al. (2019) find that international capital flows were disconnected from exchange rate fluctuations in the period before 2007. Our sample starts in 1988, and the housing-dollar relationship also holds in the pre-crisis sample. In addition, Ma and Zhang (2023) find that various measures of international capital flows cannot explain the ability of housing investments to predict the dollar.

While we use U.S. building permits as the main measure of housing investment, we also consider two alternative measures. The first one is housing starts obtained from the Survey of Construction (SOC). Housing construction is a lengthy process and obtaining a building permit is the first step in this process.[10] Building permits are a measure of potential home construction starts, as not all permits lead to a construction start. Housing starts, in contrast, directly count new home constructions that are started in each period. The second alternative measure is private residential fixed investment (PRFI). In contrast to permits and housing starts, which are count variables, PRFI measures investment expenditures in dollar terms. While the advantage of count measures is that they are insulated from housing price fluctuations, they cannot capture quality improvements in real estate. To normalize the variable over time, we further scale PRFI by concurrent gross domestic private investment (GDPI). Ma and Zhang (2023) show that both alternative measures, housing starts and PRFI/GDPI, can robustly predict the dollar in sample and out of sample for up to 12 quarters (see also columns (4) and (5) of Table 1).

While U.S. *domestic* housing capital investment is highly correlated with future dollar movement, one would not expect domestic U.S. housing activity to directly affect trade between other countries. The two-country model proposed by Ma and Zhang (2023) implies that a change in the relative price between the traded and the non-traded goods in the United States affects U.S. trade with the other country. If a third country is added to this framework, changes in U.S. trade could indirectly affect bilateral trade between the other two countries. Importantly, this indirect effect should be stronger for countries that have stronger trade links with the United States. To address this concern, the robustness analysis directly controls for this by including source countries' trade shares with the United States and the interaction of this variable with the dollar in the regression. Adding this control

[10] According to the 2016 Survey of Construction, the average time for the construction of a new single-family home is six months.

does not affect our findings.

Implementation We estimate a 2SLS specification, where we instrument the exchange rate, $\Delta e_{\$j,t}$, by the lagged number of U.S. housing permits issued, both for the direct effect as well as for interaction terms between the dollar and the dollar borrowing share and the dollar invoicing share, respectively. For all regressions, unless otherwise noted, we include time and dyad fixed effects. We also consider importer-year fixed effects for robustness checks and find quantitatively similar results. Because we focus on the dollar borrowing share on the exporter side, the importer-year fixed effect further teases out potential channels from the importer side, such as the dominant currency paradigm in Gopinath et al. (2020). We also consider a battery of additional robustness checks, including alternative housing instruments and various subperiods.

3 Data

We obtain trade data from two separate sources. The data for aggregate bilateral trade are from Gopinath et al. (2020). They construct annual panel data on bilateral trade volumes from UN Comtrade. The data set provides detailed customs data for a large set of countries at the Harmonized System (HS) six-digit product level, with information about the destination country, dollar value, quantity, and weight of imports and exports. For the baseline estimates at the dyad level, following Gopinath et al. (2020), the trade data exclude commodities that are broadly defined as HS chapters 1 to 27 and 72 to 83, which comprise animal, vegetable, food, mineral, and metal products. For results at the product level and for robustness checks, we investigate estimation samples including all products categorized as commodities. We also employ data from CEPII at the HS6-digit product level to test the robustness of the results in less aggregate data.

The data on US housing activity, including building permits, are from the Building Permits Survey conducted by the Census Bureau. We further supplement the housing activity data with U.S. private residential fixed investment from the national income and product accounts Table 1.1.5 (line 13). Housing starts are obtained from the Survey of Construction conducted by the Census Bureau.

Data on the dollar share of foreign borrowing is from Bénétrix et al. (2019), which provides the currency composition of the international investment position for a group of 50 countries for the periods 1990 to 2018. We use the share of external debt liabilities in US dollars for each country. Additionally, using the same data source, we construct the ratio of net dollar liabilities over GDP for each country. To control for the currency invoicing shares in table 10, we also obtain data on the dollar invoicing share for each importer from Boz et al. (2020).

Our final sample includes 43 exporter countries, over 2,400 dyads that cover more than 90 percent of world trade.[11] The aggregate data has about 40 thousand dyad-year level observations and the product level data has about 30 million HS6-level observations. The sample is annual and spans the years 1988 to 2018. The average dollar share in foreign borrowing in our sample is 0.44. The five countries with the highest dollar borrowing shares are (in descending order) Spain, Switzerland, Sweden, the UK, and Austria, while the five countries with the lowest dollar borrowing shares are (in ascending order) Luxembourg,

[11] We dropped several dollar pegging and managed exchange rate economies, including China, Hong Kong, Saudi Arabia, Singapore, and Vietnam in the final sample. However, our results are similar when including these economies.

Kazakhstan, Lithuania, Algeria, and Ukraine.

4 Empirical Analysis

This section presents our main results and discusses their robustness.

4.1 Aggregate Results

We begin with our main results from regressions at the dyad-year level for import prices and quantities. Then, we show that results are similar when employing net dollar liabilities over GDP as an alternative measure of dollar funding reliance.

Results on import prices. Columns (1) and (4) of Panel A of Table 2 report the OLS estimates based on equation (1), while columns (2) and (5) report the first stage estimates and columns (3) and (6) report the second stage estimates from the IV analysis. To conserve space, for each column, we only report the coefficients of $\Delta e_{ij,t}$ (changes in the bilateral exchange rate at time t) and $\Delta e_{\$j,t}$ (changes in prices of the dollar in currency j at t), as well as interaction terms between the lagged source country's dollar share in foreign borrowing, $S^{Fin}_{j,t-1}$, and the exchange rate changes, $\Delta e_{ij,t}$ and $\Delta e_{\$j,t}$, respectively.

The results indicate that the dollar share in foreign borrowing plays an important role in the dollar pass-through: Column (4) reports that a 10 percent dollar appreciation is associated with a 1.6 percent increase in import prices if the source country only borrows abroad in dollars. However, our 2SLS estimates show that the effect of the dollar borrowing share on the dollar pass-through is even larger. Column (6) shows that, once the dollar is instrumented by U.S. housing activity, a 10 percent increase in the dollar is associated with a 6.8 percent increase in import prices, more than four times larger than what the OLS estimate implies. The large change in the coefficient sizes when moving from OLS to the 2SLS suggests that the endogeneity of the dollar biases the estimated OLS coefficients strongly toward zero.

Of note, while the OLS specification in column (4) allows estimating the effect of changes to country j's dollar exchange rate, $\Delta e_{\$j,t}$, this variable drops out in the IV estimation in column (6). This is the case because our instrument for the dollar, U.S. housing permits, only varies at the time level. The predicted exchange rate therefore gets absorbed by the time fixed effects. In contrast, the coefficient for the interaction between the dollar and the source country's lagged dollar share in foreign borrowing can be estimated in column (6), as it varies at the country-year level. Column (7) reports results when we include importer times year fixed-effects in place of year fixed effects. Including importer $\times$ year fixed effects fully controls for the dominant currency channel and any other channels that operate at the importer-year level. The interaction term between the dollar and the exporter's dollar borrowing share remains statistically significant and quantitatively similar to the estimate with time fixed-effects only.

To detect the strength of the instrument, columns (2) and (5) also report the F-statistics from the first-stage regression. As the first-stage regressions only exploit variation at exporter-time level, we report F-statistics clustered at that level. The large F-statistics in all specifications are consistent with the strong predictive power of U.S. housing activity for the dollar uncovered in Ma and Zhang (2023).

Results on import quantities. Columns (1) and (4) of Panel B of Table 2 report the OLS estimates based on equation (2), while columns (2) and (5) report the first-stage estimates and columns (3) to (6) report the second stage estimates from the IV analysis. Our OLS estimates have a negative interaction term between the dollar and the dollar borrowing share S_j^{Fin} in column (4), suggesting that a dollar appreciation has a more negative effect on the trade volume for importers with a larger dollar borrowing share. However, this relationship is not precisely estimated, as the coefficient is insignificant at conventional levels.

Once we instrument for the dollar in column (6), this relationship becomes highly statistically significant, and the coefficient becomes much larger, with an estimated value of negative 1.1. That is, we find that, after instrumenting the dollar, an increase in the value of the dollar against the exporter's currency implies a much larger decline in trade quantities. Column (7) shows quantitatively similar results when we include importer times year fixed-effects in place of year fixed effects to control for the dominant currency channel.

Size of the borrowing In the baseline estimation, we use each exporter's dollar borrowing share to capture a country's reliance on foreign dollar funding. However, this share does not take the size of borrowing into account. For example, some countries could have high dollar borrowing shares but small or even positive net dollar liability positions (relative to their GDP). To address this concern, we extend equations (1) and (2) as follows,

$$
\begin{aligned}
\Delta Y_{ij,t} &= \beta \Delta e_{ij,t} + \beta^{\$} \Delta e_{\$j,t} + \eta \Delta e_{ij,t} \times \frac{L^{USD}_{j,t-1} - A^{USD}_{j,t-1}}{GDP_{j,t-1}} + \eta^{\$} \Delta e_{\$j,t} \times \frac{L^{USD}_{j,t-1} - A^{USD}_{j,t-1}}{GDP_{j,t-1}} \\
&\quad + \eta^{OTH} \Delta e_{ij,t} \times \frac{L^{OTH}_{j,t-1} - A^{OTH}_{j,t-1}}{GDP_{j,t-1}} + \eta^{OTH} \Delta e_{\$j,t} \times \frac{L^{OTH}_{j,t-1} - A^{OTH}_{j,t-1}}{GDP_{j,t-1}} \\
&\quad + \theta X_{j,t} + \lambda_{ij} + \delta_t + \varepsilon_{ij,t} \qquad (3)
\end{aligned}
$$

where $\Delta Y_{ij,t}$ is either the log difference of the price of goods exported from country j to country i measured in importer currency i or the log difference in bilateral import quantities.[12] $L^{USD}_{j,t-1} - A^{USD}_{j,t-1}$ is country j's net liability positions denominated in the US dollar and $L^{OTH}_{j,t-1} - A^{OTH}_{j,t-1}$ are net positions denominated in all other currencies other than the dollar.

Table 3 reports the estimates of equation (3) for trade prices and quantities. The IV estimates reported in columns (2) and (8) are quantitatively similar to those in column (6) of Table 2 that uses the dollar share. A ten percent increase in the dollar is associated with a 6.6 percent increase in import prices, and 11.7 percent drop in import quantities. These relations are statistically significant in the IV specifications, whereas the OLS (column (7)) does not show a significant negative effect on trade quantities. Columns (3) and (9) further show that the results remain statistically significant, with similar magnitude, when importer-year fixed effects are included.

Columns (5) and (11) report estimates for trade price and quantities after we include interactions between the dollar and liabilities denominated in other currencies in the same regression. We find that the size of net liability positions in other currencies play no role

[12] All regressions also include dyadic and time fixed effects λ_{ij} and δ_t, and same controls $X_{j,t}$ as specified in equations (1) and (2).

in the dollar pass-through in trade price: columns (5) and (6) show that the coefficients of interaction terms with net positions in other currencies are small in magnitude and not statistically significant. For trade quantities, similarly, columns (11) and (12) show that net positions in non-dollar currencies play little role. Although being statistically significant, the coefficients are about 80 percent smaller than those with net positions in the dollar. The results are robust to including importer-year fixed effects.

To sum, we find comparable results when using net dollar liabilities over GDP instead of the dollar share of foreign borrowing in our regressions. Our findings on the financing channel of the exchange rate are hence robust to the specific way in which we measure countries' reliance on global dollar funding.

4.2 Product-level evidence

We now move to evidence that exploits data at the HS6-digit product-dyad-year level. Results are presented in Table 4. Similar to the analysis at the dyad-year level, we run both OLS and IV estimations. In addition, we include HS6-product fixed effects and in some specifications, year $\times$ HS6-product fixed effects. The results indicate that, in line with the evidence at the dyad level, the dollar share in foreign borrowing plays a significant role in the dollar pass-through: Column (5) reports that a 10 percent dollar appreciation is associated with a 5 percent increase in import prices if the source country only borrows abroad in dollars, which is close to the estimate reported in Table 2. This positive relation is statistically significant at any conventional level. Similarly, Panel B shows that a 10 percent dollar appreciation is associated with a 14 percent decrease in trade quantity, and this negative relation is statistically significant with year and HS6 fixed effects. Column (6) shows that these findings hold when including year times product fixed effects for both quantity and price regressions. These findings, at a more granular level, reinforce our evidence for the financial channel of the dollar on global trade.

Instrument exogeneity check: non-housing products. One potential concern is that our housing instrument might reflect the demand for housing-related products, such as construction materials or home innovation products, which could directly affect the trade quantities and prices of these products between third countries. To alleviate this concern, we re-estimate equations (1) and (2) at the product level and focus on non-housing products. The non-housing products include food such as dairy products, cereals, and sugars, pharmaceutical products, and agriculture products such as cotton. U.S. housing investment should not directly affect trade prices or quantities of these unrelated products between third countries. Table 5 reports the results from both OLS and IV estimations. Similar to the product-level estimation discussed in the previous subsection, we include year and HS6 fixed effects. The results indicate that, in line with the baseline evidence, the dollar share in foreign borrowing plays a significant role in the dollar pass-through in trade prices and quantities. Column (4) in both panels show that a 10 percent dollar appreciation is associated with a 7 percent increase in import prices and a 39 percent decrease in trade quantity. These relations are statistically significant at conventional levels. The results on non-housing products show that our IV results are not driven by products whose demand or supply is driven by U.S. housing investment.

4.3 Additional Robustness Checks

In this section, we discuss several additional robustness checks. First, we document that results are robust to controlling for source countries' trade links with the United States. Second, we show that the instrumental variable approach continues to work when controlling for U.S. monetary, financial, and risk conditions. Third, we discuss additional robustness checks that look at different subperiods and alternative proxies for U.S. housing activity. In all robustness tables, Panel A presents results on import prices, and Panel B presents results on import quantities. In all cases, we report results with and without interaction terms with the dollar share in foreign borrowing. For the latter case, like in Table 2, the dollar term $\Delta e_{\$j,t}$ drops out in the 2SLS estimation with time fixed effects.

U.S. trade links. U.S. housing activity could, through its effects on U.S. trade, indirectly affect trade between third countries. Such indirect effects should be stronger for countries with tighter trade links with the United States. To address this issue, we calculate the ratio of a source country's imports and exports from the United States over its total imports and exports. We then add interaction terms of this variable with the dollar and bilateral exchange rates in our OLS and IV regressions.[13] As shown in Table 6, for both import quantities and import prices, results are very similar to the estimates without controlling for the trade links with the United States.

Controlling for monetary conditions and financial & risk factors. One may be concerned that the housing instrument predicts the dollar because it reflects U.S. monetary

[13]For some countries, like Chile and Colombia, U.S. trade represents a large fraction of total trade, with shares above 12 percent. In contrast, for other countries like the Euro area countries Germany, France, and Italy, trade with the United States is less important, with shares below 6 percent.

conditions or financial and risk factors. While housing market activity is certainly associated with U.S. monetary and financial conditions, Ma and Zhang (2023) show that neither can explain the *predictability* of the dollar.

To provide robustness in our context, we directly control for financial and risk factors as well as U.S. monetary policy in the regressions. To capture financial and risk factors, we consider an extensive list of related variables studied in the literature, including the implied volatility for the S&P 500 index (VIX); the corporate bond credit spread, measured as the difference between Moody's Baa and triple A corporate bond rates; the effective broad Japanese yen exchange rate; the global dollar factor from Verdelhan (2018); the world recession probability from Cuba-Borda et al. (2018); the intermediary capital ratio factor from He et al. (2017); and macro uncertainty from Jurado et al. (2015). We capture monetary conditions with the 2-year Treasury rate, the Treasury spread, the difference between the 10-year and 2-year Treasury rates, and the median forecast of the 3-month T-bill rate from the Survey of Professional Forecasters.

Table 7 reports the results. All columns in the table report the second-stage results of our 2SLS estimation. In columns (1) and (2), we control for the financial and risk factors; in columns (3) and (4), for the monetary variables; and in the last two columns, for all financial, risk, and monetary variables. We find that in all cases, the interaction terms between the dollar and the dollar share in foreign borrowing remain statistically significant and quantitatively similar to the baseline estimates. This finding implies that the 2SLS results are not driven by any relationship between U.S. housing activity and U.S. monetary conditions nor by financial and risk factors.

Subperiods. The 2007–09 Global Financial Crisis (GFC) ended a great boom and bust cycle for the U.S. housing market. As depicted in Figure 2, U.S. building permits rose sharply before the GFC and then dropped to a historical low in 2009. Are our results driven by the boom-and-bust cycle of the U.S. housing market around the GFC? To answer this question, Table 8 reports 2SLS results that are estimated over several subperiods of our sample. The first two columns report the estimates when we exclude the GFC years 2007 to 2009 from our sample, columns (3) and (4) present results for the pre-2007 sub-sample, and columns (5) and (6) report estimates for the post-2009 subsample. Results differ the most for the samples that look only at the pre-GFC or only at the post-GFC period, where the interaction term coefficients decline to around 0.4 for import prices and negative 0.5 for import quantities and are significant only at the 5 percent or 10 percent levels. Importantly, as shown in columns (1) to (2), the results are very strong for the sample that excludes the GFC. Thus, the link between the dollar and import quantities we identify is not driven by observations during the GFC.

Alternative housing instruments. We also check the robustness to using different measures of housing activity, with results reported in Table 9. The first two columns show that results remain robust when we include up to three-year lags of building permits as instruments for the dollar exchange rate. Columns (3) to (4) present results when the dollar is instrumented by residential investment (PRFI) scaled by gross investment (GDPI), while columns (5) to (6) report results when the dollar is instrumented by housing starts. We find that both alternative instruments generate results similar to our baseline.

Controlling for the destination country's dollar invoicing share. Next, we check if our results persist when controlling for the dollar invoicing channel in Gopinath et al. (2020). To this purpose, we add an additional interaction term between the dollar invoicing share of the destination country and the destination-country dollar exchange rate to the regression (the exact variable used in Gopinath et al. (2020)). Results are presented in table 10. Coefficient estimates are very similar to those in table 2. Columns (3) and (6) of table 10 confirm our baseline findings on the financial channel of the exchange rate, namely that import prices rise and import quantities decline with the dollar in proportion to the source country's dollar share in foreign borrowing.

Commodities In the baseline estimation, our sample only includes non-commodities following Gopinath et al. (2020). However, commodities could be particularly sensitive to shortages in global dollar funding. To test this hypothesis, columns (1) - (4) of Table 11 report results when including commodities in the sample. Specifically, columns (1) and (2) report IV estimates using commodities that are defined as HS chapters 1 to 27 and 72 to 83. Columns (3) and (4) show results when we include both commodities and non-commodities. Columns (1) - (4) of Table 11 show that our findings are robust to the sample that includes commodities. The interaction terms between the dollar and financing share are positive (negative) and statistically significant for the price (quantity) regressions at any conventional level. In addition, compared to non-commodities, the magnitudes of the dollar interaction coefficients are larger (in absolute value) for commodities.

Broad dollar index and dynamic specifications Columns (5) and (6) of Table 11 show that our IV results are robust to the use of the broad dollar index in place of the bilateral exchange rate between the dollar and exporter currency. While OLS estimates are not statistically significant when the dollar index is used, the IV estimates reported in Column (7) show that the IV estimates are robust when the broad dollar is used. A ten percent appreciation in broad dollar is associated with a 17 percent increase in import price and a 22 percent fall in trade quantities. And These relations are highly significant. Columns (7) and (8) report results when we follow the dynamic specification in Gopinath et al. (2020) by additionally including two lags of independent variables. More specifically, the price regression becomes equation (4), and the quantity regression is analogous:

$$\begin{aligned}\Delta p_{ij,t} \quad = \quad & \lambda_{ij} + \delta_t + \sum_{k=0}^{2} \beta_k \Delta e_{ij,t-k} + \sum_{k=0}^{2} \beta_k^{\$} \Delta e_{\$j,t-k} \\ & + \sum_{k=0}^{2} \eta_k \Delta e_{ij,t-k} \times S_{j,t-1}^{Fin} + \sum_{k=0}^{2} \eta_k^{\$} \Delta e_{\$j,t-k}^{IV} \times S_{j,t-1}^{Fin} + \theta' X_{j,t} + \varepsilon_{ij,t}, \end{aligned} \tag{4}$$

Comparing results in columns (7) and (8) of Table 11 to those in Table 2, the dynamic specification from Gopinath et al. (2020) delivers quantitatively similar results for both price and quantity regressions.

5 Conclusion

This paper provides evidence on the effect of the U.S. dollar on international trade prices and quantities through the financial channel of the exchange rate. It adds to earlier work by Bruno and Shin (2020), providing evidence for the financial channel across many countries and at a global scale, and addressing endogeneity concerns of the dollar through a new instrumental variable approach based on U.S. housing market activity. Importantly, it finds that the instrumental variable approach is key to uncovering the full effect of the financial channel.

As most trade is financed by the exporter through the provision of trade credit, the financial channel operates mostly through conditions in the source country. This contrasts with the invoicing channel in Gopinath et al. (2020), which passes through shocks to the dollar exchange rate of the destination country to import prices. As we show, results on the financing channel of the exchange rate are unchanged when fully controlling for effects from the DCP by either including importer-year fixed effects or the dollar invoicing share of imports and its interaction with the dollar.

References

Ahn, JaeBin, "Understanding trade finance: theory and evidence from transaction-level data," Technical Report, International Monetary Fund, Washington, DC 2014.

_ **and Miguel Sarmiento**, "Estimating the direct impact of bank liquidity shocks on the real economy: Evidence from letter-of-credit import transactions in Colombia," *Review of International Economics*, 2019, *27* (5), 1510–1536.

Amiti, Mary and David E. Weinstein, "Exports and Financial Shocks," *The Quarterly Journal of Economics*, 2011, *126* (4), 1841–1877.

_ **, Oleg Itskhoki, and Jozef Konings**, "Importers, exporters, and exchange rate disconnect," *American Economic Review*, 2014, *104* (7), 1942–78.

_ **,** _ **, and** _ , "International shocks and domestic prices: how large are strategic complementarities?," Technical Report, National Bureau of Economic Research 2016.

_ **,** _ **, and** _ , "Dominant currencies: How firms choose currency invoicing and why it matters," NBER Working Paper 27926, National Bureau of Economic Research 2020.

Antràs, Pol and C Fritz Foley, "Poultry in Motion: A Study of International Trade Finance Practices," *Journal of Political Economy*, 2015, *123* (4), 853–901.

Auer, Raphael A and Raphael S Schoenle, "Market structure and exchange rate pass-through," *Journal of International Economics*, 2016, *98*, 60–77.

Avdjiev, Stefan, Wenxin Du, Catherine Koch, and Hyun Song Shin, "The dollar, bank leverage, and deviations from covered interest parity," *American Economic Review: Insights*, 2019, *1* (2), 193–208.

Bénétrix, Agustín, Deepali Gautam, Luciana Juvenal, and Martin Schmitz, *Cross-border currency exposures*, International Monetary Fund, 2019.

Berman, Nicolas, Philippe Martin, and Thierry Mayer, "How do different exporters react to exchange rate changes?," *The Quarterly Journal of Economics*, 2012, *127* (1), 437–492.

Bernanke, Ben S, "The global saving glut and the US current account deficit," *Remarks at the Sandridge Lecture, Virginia Assoc. Econ., Richmond, March 10.*, 2005.

Betts, Caroline M and Timothy J Kehoe, "Real exchange rate movements and the relative price of non-traded goods," Technical Report, National Bureau of Economic Research 2008.

Boz, Emine, Camila Casas, Georgios Georgiadis, Gita Gopinath, Helena Le Mezo, Arnaud Mehl, and Tra Nguyen, "Patterns in Invoicing Currency in Global Trade," Technical Report, IMF Working Paper 2020.

Bruno, Valentina and Hyun Song Shin, "Cross-border banking and global liquidity," *The Review of Economic Studies*, 2015, *82* (2), 535–564.

_ **and** _ , "Dollar and Exports," 2020.

Canova, Fabio, "The transmission of US shocks to Latin America," *Journal of Applied econometrics*, 2005, *20* (2), 229–251.

Canzoneri, Matthew, Robert Cumby, Behzad Diba, and David López-Salido, "Key currency status: An exorbitant privilege and an extraordinary risk," *Journal of International Money and Finance*, 2013, *37*, 371–393.

Casas, Camila, Sergii Meleshchuk, and Yannick Timmer, "The dominant currency financing channel of external adjustment," International Finance Discussion Paper 1343 2022.

Chaney, Thomas, "Liquidity constrained exporters," *Journal of Economic Dynamics and Control*, 2016, *72*, 141–154.

Cook, David and Michael B Devereux, "External currency pricing and the East Asian crisis," *Journal of International Economics*, 2006, *69* (1), 37–63.

Corsetti, Giancarlo and Paolo Pesenti, "The simple geometry of transmission and stabilization in closed and open economies," Technical Report, National Bureau of Economic Research 2005.

_ **, Keith Kuester, Gernot Müller, and Sebastian Schmidt**, "The Exchange Rate Insulation Puzzle," Technical Report 2020.

Cuba-Borda, Pablo, Alexander Mechanick, and Andrea Raffo, "Monitoring the World Economy: A Global Conditions Index," *FRB IFDP Notes*, 2018, (2018-06), 15.

Dahlquist, Magnus and Julien Pénasse, "The missing risk premium in exchange rates," *Journal of Financial Economics*, 2022, *143* (2), 697–715.

Demir, Banu and Beata Javorcik, "Don't throw in the towel, throw in trade credit!," *Journal of International Economics*, 2018, *111*, 177–189.

Devereux, Michael B, Kang Shi, and Juanyi Xu, "Global monetary policy under a dollar standard," *Journal of International Economics*, 2007, *71* (1), 113–132.

_ **, Wei Dong, and Ben Tomlin**, "Importers and exporters in exchange rate pass-through and currency invoicing," *Journal of International Economics*, 2017, *105*, 187–204.

Feenstra, Robert C, Joseph E Gagnon, and Michael M Knetter, "Market share and exchange rate pass-through in world automobile trade," *Journal of International Economics*, 1996, *40* (1-2), 187–207.

Forbes, Kristin, Ida Hjortsoe, and Tsvetelina Nenova, "The shocks matter: improving our estimates of exchange rate pass-through," *Journal of international economics*, 2018, *114*, 255–275.

Fratzscher, Marcel, Marco Lo Duca, and Roland Straub, "On the international spillovers of US quantitative easing," *The Economic Journal*, 2018, *128* (608), 330–377.

Garcia-Marin, Alvaro, Santiago Justel, and Tim Schmidt-Eisenlohr, "Trade credit, markups, and relationships," 2019.

_ , _ , and _ , "Diversion Risk, Markups and the Financing Cost Advantage of Trade Credit," 2020.

Garetto, Stefania, "Firms' heterogeneity, incomplete information, and pass-through," *Journal of International Economics*, 2016, *101*, 168–179.

Georgiadis, Georgios, "Determinants of global spillovers from US monetary policy," *Journal of international Money and Finance*, 2016, *67*, 41–61.

Ghironi, Fabio, Jaewoo Lee, and Alessandro Rebucci, "The valuation channel of external adjustment," 2007.

Gilchrist, Simon and Egon Zakrajšek, "Credit spreads and business cycle fluctuations," *American economic review*, 2012, *102* (4), 1692–1720.

Giovanni, Julian Di, Şebnem Kalemli-Özcan, Mehmet Fatih Ulu, and Yusuf Soner Baskaya, "International spillovers and local credit cycles," *The Review of Economic Studies*, 2022, *89* (2), 733–773.

Goldberg, Linda and Cedric Tille, "Macroeconomic interdependence and the international role of the dollar," *Journal of Monetary Economics*, 2009, *56* (7), 990–1003.

Goldberg, Linda S and Cédric Tille, "Vehicle currency use in international trade," *Journal of international Economics*, 2008, *76* (2), 177–192.

_ and Cedric Tille, "Micro, macro, and strategic forces in international trade invoicing: Synthesis and novel patterns," *Journal of International Economics*, 2016, *102*, 173–187.

Gopinath, Gita, "The international price system," Technical Report, National Bureau of Economic Research 2015.

_ and Oleg Itskhoki, "Frequency of price adjustment and pass-through," *The Quarterly Journal of Economics*, 2010, *125* (2), 675–727.

_ , Emine Boz, Camila Casas, Federico J Díez, Pierre-Olivier Gourinchas, and Mikkel Plagborg-Møller, "Dominant Currency Paradigm," *American Economic Review*, 2020.

He, Zhiguo, Bryan Kelly, and Asaf Manela, "Intermediary asset pricing: New evidence from many asset classes," *Journal of Financial Economics*, 2017, *126* (1), 1–35.

Hoefele, Andreas, Tim Schmidt-Eisenlohr, and Zhihong Yu, "Payment Choice in International Trade: Theory and Evidence from Cross-country Firm Level Data," *Canadian Journal of Economics*, 2016, *49* (1), 296–319.

Jurado, Kyle, Sydney C Ludvigson, and Serena Ng, "Measuring uncertainty," *American Economic Review*, 2015, *105* (3), 1177–1216.

Kalemli-Özcan, Şebnem, "US Monetary Policy and International Risk Spillovers," 2019.

Kim, Soyoung, "International transmission of US monetary policy shocks: Evidence from VAR's," *Journal of monetary Economics*, 2001, *48* (2), 339–372.

Kletzer, Kenneth and Pranab Bardhan, "Credit Markets and Patterns of International Trade," *Journal of Development Economics*, October 1987, *27* (1-2), 57–70.

Lilley, Andrew, Matteo Maggiori, Brent Neiman, and Jesse Schreger, "Exchange rate reconnect," Technical Report, National Bureau of Economic Research 2019.

Ma, Sai and Shaojun Zhang, "Housing Cycles and Exchange Rates," *Management Science,* forthcoming, 2023.

_ , Tim Schmidt-Eisenlohr, and Shaojun Zhang, "The Causal Effect of the Dollar on Trade," *Available at SSRN 3741800*, 2020.

Maćkowiak, Bartosz, "External shocks, US monetary policy and macroeconomic fluctuations in emerging markets," *Journal of monetary economics*, 2007, *54* (8), 2512–2520.

Manova, Kalina, "Credit constraints, heterogeneous firms, and international trade," *The Review of Economic Studies*, 2013, *80* (2), 711–744.

Miranda-Agrippino, Silvia and Hélene Rey, "US monetary policy and the global financial cycle," *The Review of Economic Studies*, 2020, *87* (6), 2754–2776.

Mundell, Robert A, *International Economics*, Macmillan, 1968.

Niepmann, Friederike and Tim Schmidt-Eisenlohr, "International trade, risk and the role of banks," *Journal of International Economics*, 2017, *107*, 111–126.

_ and _ , "No guarantees, no trade: How banks affect export patterns," *Journal of International Economics*, 2017, *108*, 338–350.

_ and _ , "Institutional Investors, the Dollar, and U.S. Credit Conditions," *Journal of Financial Economics*, forthcoming.

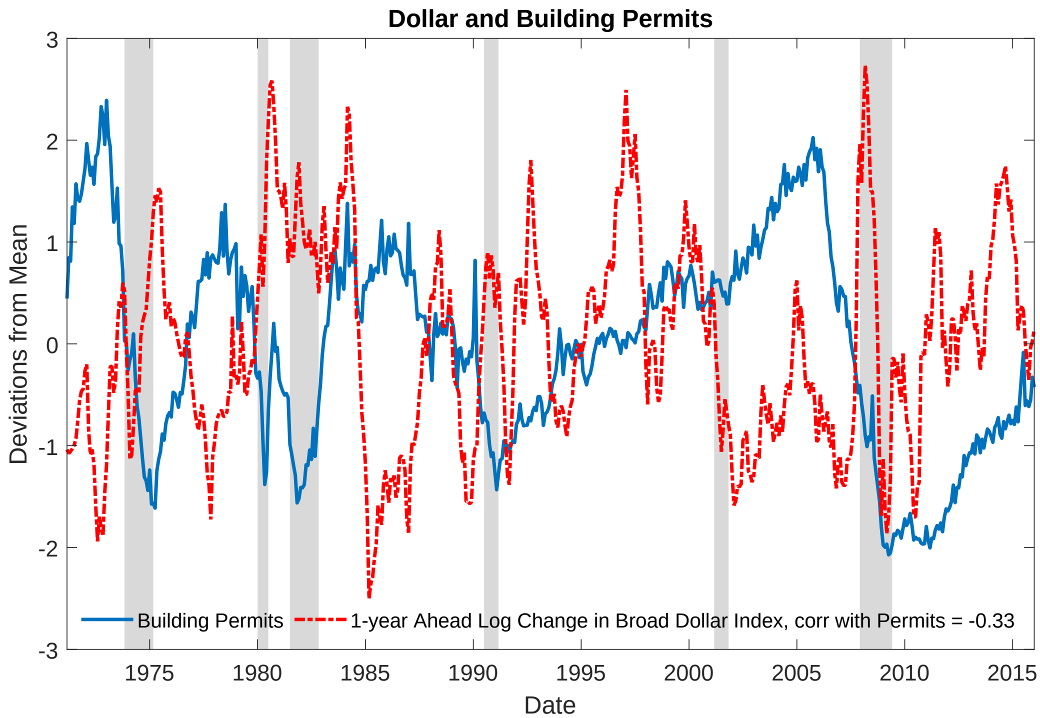
Paravisini, Daniel, Veronica Rappoport, Philipp Schnabl, and Daniel Wolfenzon, "Dissecting the effect of credit supply on trade: Evidence from matched credit-export data," *The Review of Economic Studies*, 2015, *82* (1), 333–359.

Schmidt-Eisenlohr, Tim, "Towards a theory of trade finance," *Journal of International Economics*, 2013, *91* (1), 96 – 112.

Tille, Cédric, "Financial integration and the wealth effect of exchange rate fluctuations," *Journal of International Economics*, 2008, *75* (2), 283–294.

Verdelhan, Adrien, "The share of systematic variation in bilateral exchange rates," *The Journal of Finance*, 2018, *73* (1), 375–418.

Figure 2. US Housing Investment and the Dollar



The figure plots the time-series of the standardized US building permit authorized and one-year ahead log change in average dollar index. The average dollar Index is computed as an equal-weighted average value of the U.S. dollars against a broad group of currencies which consists of 19 advanced economies and 13 emerging markets. Shaded areas correspond to NBER recession dates. The sample spans the period 1971 to 2016.

Table 1. U.S. Housing Activity Predicts the Dollar

Panel A: Time-series Evidence

Forecasting regression: $e_{\$j,t} = \alpha_j + \beta^H H_{t-1} + \epsilon_{j,t}$

	(1)	(2)	(3)	(3)	(4)	(5)
Housing Measure	Permits	Permits	Permits	Permits	PRFI/GDPI	Housing Starts
β^H	-2.98^{**}	-4.07^{***}	-3.87^{***}	-3.61^{**}	-1.81^{***}	-1.30^{**}
	(-2.21)	(-3.00)	(-2.93)	(-2.49)	(-2.33)	(-1.96)
F-stats p-value	0.027	0.003	0.003	0.003	0.026	0.036
Controls	None	Financial Cond.	Monetary Policy	All	None	None

Panel B: Additional Controls with Permits

Controls	Excess Bond	Term Spread	Credit/GDP	Broker-dealer	Real Dollar	All
β^H	-2.89^{***}	-3.08^{***}	-3.00^{***}	-2.67^{**}	-3.02^{***}	-3.28^{**}
	(-2.92)	(-3.73)	(-3.13)	(-2.76)	(-3.23)	(-2.77)
Control	-1.93^{**}	-2.36^{**}	-1.39	0.19	-1.96^{*}	
	(-2.37)	(-3.04)	(-1.40)	(0.44)	(-1.94)	

This table reports the coefficient, Newey-West t-statistic (in parenthesis), and the p-value from F-statistic from regressions that explain the dollar with different measures of housing activity. PRFI/GDPI is the ratio of private residential fixed investment to the gross investment. Column (2) and (3) of Panel A control for monetary policy variables and financial conditions. Panel B reports results with additional controls using U.S. building permits, see section 4.3 for more details. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 2. Baseline Estimates: the Financial Channel of the Exchange Rate

Panel A: Exchange Rate Pass-through into Prices							
	Specification #1			Specification #2			
	OLS	First Stage	Second Stage	OLS	First Stage	Second Stage	Second Stage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Instrumented var.		Dollar			Dollar x Share		
$\Delta e_{\$j,t}$	0.726***		0.541***	0.643***			
	(0.0156)		(0.0327)	(0.0232)			
$\Delta e_{\$j,t} \times S^{Fin}_{j,i-1}$				0.161***		0.676***	0.683***
				(0.0390)		(0.222)	(0.183)
H_t		-3.726***					
		(0.0550)					
$H_t \times S^{Fin}_{j,i-1}$					-3.716***		
					(0.1130)		
$\Delta e_{ij,t}$	0.942***	0.670***	0.914***	0.926***	0.0358	0.810***	0.461***
	(0.00703)	(0.0160)	(0.0123)	(0.0153)	(0.0266)	(0.0349)	(0.060)
$\Delta e_{ij,t} \times S^{Fin}_{j,i-1}$				0.0340	0.7359	0.0990	0.209***
				(0.0295)	(0.0463)	(0.123)	(0.075)
First-stage F-stats		99.54			40.23		
Time FE	Yes	No	No	Yes	Yes	Yes	No
Time x Importer FE	No	No	No	No	No	No	Yes
Observations	40,211	40,211	40,211	40,093	40,093	40,092	40,092
Number of dyad	2,411	2,411	2,411	2,411	2,411	2,411	2,411
Panel B: Trade Elasticity with respect to Exchange Rate							
	Specification #1			Specification #2			
	OLS	First Stage	Second Stage	OLS	First Stage	Second Stage	Second Stage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Instrumented var.		Dollar			Dollar x Share		
$\Delta e_{\$j,t}$	-0.111***		-1.103***	-0.0168			
	(0.0261)		(0.155)	(0.0502)			
$\Delta e_{\$j,t} \times S^{Fin}_{j,i-1}$				-0.130		-1.096**	-0.963**
				(0.0869)		(0.539)	(0.409)
H_t		-1.642***					
		(0.0535)					
$H_t \times S^{Fin}_{j,i-1}$					-2.078***		
					(0.629)		
$\Delta e_{ij,t}$	-0.170***	0.481***	-0.625***	-0.183***	-0.164***	0.0181	-0.485***
	(0.0223)	(0.0219)	(0.0878)	(0.0394)	(0.0324)	(0.123)	(0.167)
$\Delta e_{ij,t} \times S^{Fin}_{j,i-1}$				0.0234	0.877***	-0.865*	-0.329*
				(0.0834)	(0.1038)	(0.517)	(-0.180)
First Stage F-stats		12.23			10.87		
Time FE	Yes	No	No	Yes	Yes	Yes	No
Time x Importer FE	No	No	No	No	No	No	Yes
Observations	42,795	42,795	42,795	42,669	42,669	42,668	42,668
Number of dyad	2,807	2,807	2,807	2,558	2,558	2,558	2,558

For Panel A, all regressions include lags 0-2 of exporter log changes in PPI, and time fixed-effects (except for column 3). For Panel B, all regressions include lags 0-2 of importer real GDP growth, and time fixed-effects. The standard errors for OLS are clustered by dyads and associated standard errors are reported in parenthesis. Column (3) reports the 2SLS estimates using one-year lag of U.S. building permits as the instrument for the changes in US dollar. Column (6) reports the 2SLS estimates using one-year lag of U.S. building permits $\times$ Dollar-invoicing shares S_j as the instrument for the changes in US dollar $\times$ Dollar-invoicing Shares. The first-stage F-stats are clustered at the importer-year level. Column (7) includes year times importer fixed-effects. For column (6) and (7), the dollar term $\Delta e_{\$j,t}$ is absorbed by the time-fixed effects, because the instrument for the dollar, U.S. housing permits, only varies at the time level. The standard errors are reported in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 3. Baseline Estimates: Net Liability

	Price Regressions						Quantity Regressions					
	OLS	IV	IV	OLS	IV	IV	OLS	IV	IV	OLS	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$\Delta e_{\$j,t}$	0.723***			0.721***			-0.102***			-0.0951***		
	(0.0156)			(0.0158)			(0.0286)			(0.0286)		
$\Delta e_{\$j,t} \times \left(L^{USD}_{j,t-1} - A^{USD}_{j,t-1}\right)/GDP_{j,t-1}$	0.0864**	0.662*	0.539**	0.0920**	0.700*	0.505**	-0.0697	-1.168**	-1.642***	-0.0271	-1.187**	-1.640***
	(0.0404)	(0.390)	(0.252)	(0.0431)	(0.397)	(0.259)	(0.0787)	(0.571)	(0.603)	(0.0843)	(0.577)	(0.610)
$\Delta e_{\$j,t} \times \left(L^{OTH}_{j,t-1} - A^{OTH}_{j,t-1}\right)/GDP_{j,t-1}$				-0.0106	0.0784	-0.0153				-0.194***	-0.376**	-0.393**
				(0.0425)	(0.135)	(0.130)				(0.0621)	(0.161)	(0.156)
$\Delta e_{ij,t}$	0.942***	0.780***	0.188***	0.936***	0.773***	0.186***	-0.170***	-0.0523	0.117*	-0.165***	-0.0505	0.106
	(0.00706)	(0.0146)	(0.0230)	(0.00795)	(0.0150)	(0.0244)	(0.0227)	(0.0357)	(0.0683)	(0.0230)	(0.0373)	(0.0699)
$\Delta e_{ij,t} \times \left(L^{USD}_{j,t-1} - A^{USD}_{j,t-1}\right)/GDP_{j,t-1}$	0.00741	0.00732	-0.0519	-0.001	-0.001	-0.054	0.00512	0.179**	0.141**	0.0110	0.186**	0.154**
	(0.0155)	(0.0416)	(0.0381)	(0.0161)	(0.0426)	(0.0390)	(0.0463)	(0.0762)	(0.0643)	(0.0475)	(0.0780)	(0.0653)
$\Delta e_{ij,t} \times \left(L^{OTH}_{j,t-1} - A^{OTH}_{j,t-1}\right)/GDP_{j,t-1}$				0.0855**	0.140**	0.0583				-0.0555	-0.161**	-0.174**
				(0.0392)	(0.0653)	(0.0521)				(0.0583)	(0.0745)	(0.0721)
Time FE	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Time × Importer FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Observations	40,211	40,211	40,210	40,211	40,211	40,210	42,795	42,795	42,794	42,795	42,795	42,794

For price regressions, all regressions include lags 0-2 of exporter log changes in PPI, and time fixed-effects. For quantity regressions, all regressions include lags 0-2 of importer real GDP growth, and time fixed-effects unless otherwise noted. The standard errors for OLS are clustered by dyads and associated standard errors are reported in parenthesis. The standard errors are reported in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 4. Baseline IV Estimates: Product-level Evidence

Panel A: Exchange Rate Pass-through into Prices						
	OLS	OLS	OLS	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta e_{\$j,t}$	0.614***	0.323***	0.381***	0.330***		
	(0.00467)	(0.00676)	(0.00946)	(0.00604)		
$\Delta e_{\$j,t} \times S^{Fin}_{j,i-1}$		0.782***	0.788***		0.504***	0.211***
		(0.0127)	(0.0179)		(0.0525)	(0.0732)
$\Delta e_{ij,t}$	0.944***	0.923***	0.941***	0.861***	0.910***	0.941***
	(0.00266)	(0.00432)	(0.00597)	(0.00309)	(0.00534)	(0.00745)
$\Delta e_{ij,t} \times S^{Fin}_{j,i-1}$		0.0777***	0.0814***		-0.236***	-0.411***
		(0.0108)	(0.0151)		(0.0280)	(0.0387)
Year FE	Yes	Yes	-	No	Yes	-
HS6 FE	Yes	Yes	-	No	Yes	-
Year × HS6 FE	-	-	Yes	No	-	Yes
Observations	29,738,165	29,738,165	29,738,165	29,738,165	29,738,165	29,738,165
Panel B: Trade Elasticity with respect to Exchange Rate						
	OLS	OLS	OLS	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta e_{\$j,t}$	-0.281***	-0.0712***	-0.166***	-1.174***		
	(0.00675)	(0.0101)	(0.0134)	(0.0144)		
$\Delta e_{\$j,t} \times S^{Fin}_{j,i-1}$		-0.657***	-0.624***		-1.405***	-0.770***
		(0.0203)	(0.0273)		(0.0973)	(0.128)
$\Delta e_{ij,t}$	-0.455***	-0.345***	-0.383***	-0.759***	-0.280***	-0.354***
	(0.00430)	(0.00736)	(0.00968)	(0.00627)	(0.0104)	(0.0137)
$\Delta e_{ij,t} \times S^{Fin}_{j,i-1}$		-0.331***	-0.376***		-0.737***	-0.356***
		(0.0183)	(0.0243)		(0.0613)	(0.0793)
Year FE	Yes	Yes	-	No	Yes	-
HS6 FE	Yes	Yes	-	No	Yes	-
Year × HS6 FE	-	-	Yes	No	-	Yes
Observations	32,572,367	32,572,367	32,572,367	32,572,367	32,572,367	32,572,367

For Panel A, all regressions include lags 0-2 of exporter log changes in PPI, and fixed-effects specified in the table. For Panel B, all regressions include lags 0-2 of importer real GDP growth, and fixed-effects specified in the table. The standard errors for OLS are clustered by products and associated standard errors are reported in parenthesis. The standard errors are reported in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 5. Non-housing Products

Panel A: Exchange Rate Pass-through into Prices				
	OLS	OLS	IV	IV
	(1)	(2)	(3)	(4)
$\Delta e_{\$j,t}$	0.705***	0.519***	0.479***	
	(0.0169)	(0.0246)	(0.0214)	
$\Delta e_{\$j,t} \times S^{Fin}_{j,i-1}$		0.507***		0.721***
		(0.0435)		(0.148)
$\Delta e_{ij,t}$	0.949***	0.901***	0.859***	0.868***
	(0.0106)	(0.0173)	(0.0120)	(0.0178)
$\Delta e_{ij,t} \times S^{Fin}_{j,i-1}$		0.142***		0.696***
		(0.0395)		(0.0775)
Year FE	Yes	Yes	No	Yes
HS6 FE	Yes	Yes	No	Yes
Observations	2,175,699	2,175,699	2,175,699	2,175,699
Panel B: Trade Elasticity with respect to Exchange Rate				
	OLS	OLS	IV	IV
	(1)	(2)	(3)	(4)
$\Delta e_{\$j,t}$	-0.511***	-0.459***	-0.596***	
	(0.0240)	(0.0362)	(0.0539)	
$\Delta e_{\$j,t} \times S^{Fin}_{j,i-1}$		-0.274***		-3.932***
		(0.0706)		(0.299)
$\Delta e_{ij,t}$	-0.595***	-0.433***	-0.603***	-0.586***
	(0.0167)	(0.0272)	(0.0254)	(0.0317)
$\Delta e_{ij,t} \times S^{Fin}_{j,i-1}$		-0.435***		-2.319***
		(0.0645)		(0.185)
Year FE	Yes	Yes	No	Yes
HS6 FE	Yes	Yes	No	Yes
Observations	2,344,681	2,344,681	2,344,681	2,344,681

For Panel A, all regressions include lags 0-2 of exporter log changes in PPI, and fixed-effects specified in the table. For Panel B, all regressions include lags 0-2 of importer real GDP growth, and fixed-effects specified in the table. The standard errors for OLS are clustered by products and associated standard errors are reported in parenthesis. The standard errors are reported in parenthesis. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 6. IV Robustness: Control for Trade Share with the US

	Price Regressions		**Quantity Regressions**	
	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)
$\Delta e_{\$j,t}$	0.634***		-0.0897	
	(0.0496)		(0.0993)	
$\Delta e_{\$j,t} \times S^{Fin}_{j,t-1}$	0.143***	0.761***	-0.153	-1.367**
	(0.0405)	(0.233)	(0.0931)	(0.560)
$\Delta e_{\$j,t} \times S^{\text{Trade}}_{j,t-1}$	0.233	6.051***	0.890	2.974
	(0.518)	(1.689)	(1.045)	(3.213)
$\Delta e_{ij,t}$	0.950***	0.780***	-0.127*	0.0631
	(0.0264)	(0.0438)	(0.0719)	(0.177)
$\Delta e_{ij,t} \times S^{Fin}_{j,t-1}$	0.0220	0.321**	0.0292	-0.883
	(0.0321)	(0.128)	(0.0908)	(0.578)
$\Delta e_{ij,t} \times S^{\text{Trade}}_{j,t-1}$	-0.220	0.767	-0.711	0.0254
	(0.309)	(0.543)	(0.830)	(1.456)
Time FE	Yes	Yes	Yes	Yes
Observations	39,025	39,025	41,622	41,622
Number of dyad	2,362	2,362	2,509	2,509

For price regressions, all regressions include lags 0-2 of exporter log changes in PPI, and time fixed-effects. For quantity regressions, all regressions include lags 0-2 of importer real GDP growth, and time fixed-effects. The standard errors for OLS are clustered by dyads and associated standard errors are reported in parenthesis. In all results, the trade with U.S. is the share of the sum of imports and exports of goods and services to or from the U.S. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 7. IV Robustness: Control for Monetary Policy and Financial & Risk Factors

Panel A: Exchange Rate Pass-through into Prices						
Controls	Financial & Risk Factors		Monetary Policy		All	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta e_{\$j,t}$	0.334***		0.427***		0.295***	
	(0.0184)		(0.0280)		(0.0205)	
$\Delta e_{\$j,t} \times S^{Fin}_{j,t-1}$		0.455**		0.441**		0.667***
		(0.225)		(0.189)		(0.207)
$\Delta e_{ij,t}$	0.865***	0.835***	0.877***	0.837***	0.847***	0.814***
	(0.0105)	(0.0370)	(0.0116)	(0.0329)	(0.0112)	(0.0341)
$\Delta e_{ij,t} \times S^{Fin}_{j,t-1}$		-0.0159		-0.0227		0.0884
		(0.129)		(0.110)		(0.117)
First-stage F-stats	138.60	62.17	92.15	55.89	171.24	52.17
Observations	40,211	40,093	40,211	40,093	40,211	40,093
Number of dyad	1,900	1,900	1,900	1,900	1,900	1,900
Panel B: Trade Elasticity with respect to Exchange Rate						
Controls	Financial & Risk Factors		Monetary Policy		All	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta e_{\$j,t}$	-0.0494		0.161**		-0.0468	
	(0.0394)		(0.0687)		(0.0439)	
$\Delta e_{\$j,t} \times S^{Fin}_{j,t-1}$		-1.236***		-0.560**		-0.930***
		(0.415)		(0.277)		(0.314)
$\Delta e_{ij,t}$	-0.140***	0.0479	-0.0407	-0.0928	-0.139***	-0.0146
	(0.0242)	(0.105)	(0.0358)	(0.0716)	(0.0256)	(0.0822)
$\Delta e_{ij,t} \times S^{Fin}_{j,t-1}$		-0.992**		-0.363		-0.708**
		(0.416)		(0.276)		(0.316)
First-stage F-stats	181.55	62.77	89.11	65.77	151.88	42.17
Observations	42,795	42,669	42,795	42,669	42,795	42,669
Number of dyad	2,014	2,014	2,014	2,014	2,014	2,014

Financial and risk factors include the VXO, the corporate bond spread (Baa-AAA), the effective broad Japanese Yen exchange rate, the global dollar factor, the world recession probability, the HKM intermediary capital ratio factor, and the JLN macro uncertainty. Monetary controls include the 2-year T-bill rate, the term spread (10yr minus 2yr rate), and the SPF one-year forecast of the 3m T-bill rate. For all regressions, the interaction terms between all controls and the dollar invoicing share are included. All import price regressions in Panel A include lags 0-2 of exporter log changes in PPI. All import quantity regressions in Panel B include lags 0-2 of importer real GDP growth. Column (2), (4), and (6) also include time fixed-effects. The first-stage F-stats are clustered at the importer-year level. For column (2), (4) and (6), the dollar term $\Delta e_{\$j,t}$ is absorbed by the time-fixed effects, because the instrument for the dollar, U.S. housing permits, only varies at the time level. The standard errors are reported in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 8. IV Robustness: Different Sub-Periods

Panel A: Exchange Rate Pass-through into Prices						
Sub-periods	Exclude GFC		Pre–GFC		Post-GFC	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta e_{\$j,t}$	0.402***		0.312***		0.789***	
	(0.0270)		(0.0310)		(0.213)	
$\Delta e_{\$j,t} \times S^{Fin}_{j,i-1}$		0.758***		0.425**		1.395***
		(0.173)		(0.186)		(0.387)
$\Delta e_{ij,t}$	0.883***	0.834***	0.900***	0.865***	0.915***	0.867***
	(0.0121)	(0.0304)	(0.0114)	(0.0344)	(0.0764)	(0.152)
$\Delta e_{ij,t} \times S^{Fin}_{j,i-1}$		0.0856		0.00609		1.212
		(0.0899)		(0.108)		(0.885)
First-stage F-stats	182.22	88.24	351.24	49.29	71.29	50.99
Observations	28,284	28,166	18,343	18,343	9,901	9,783
Number of dyad	2,411	2,411	2,284	2,284	2,354	2,354
Panel B: Trade Elasticity with respect to Exchange Rate						
Sub-periods	Exclude GFC		Pre–GFC		Post-GFC	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta e_{\$j,t}$	-0.453***		-0.417***		-0.401***	
	(0.0773)		(0.0526)		(0.0588)	
$\Delta e_{\$j,t} \times S^{Fin}_{j,i-1}$		-1.376***		-0.488**		-3.809*
		(0.303)		(0.178)		(2.278)
$\Delta e_{ij,t}$	-0.328***	0.118	-0.077**	-0.112	-0.182	-0.585*
	(0.0456)	(0.0902)	(0.030)	(0.0805)	(0.265)	(0.342)
$\Delta e_{ij,t} \times S^{Fin}_{j,i-1}$		-1.188***		-0.294		-1.327
		(0.325)		(0.289)		(2.067)
First-stage F-stats	19.25	29.04	129.25	79.02	22.77	21.19
Observations	30,313	30,187	20,044	20,044	10,226	10,100
Number of dyad	2,558	2,558	2,510	2,510	2,550	2,550

For price regressions, all regressions include lags 0-2 of exporter log changes in PPI, and time fixed-effects. For quantity regressions, all regressions lags 0-2 of importer real GDP growth, and time fixed-effects. The standard errors for OLS are clustered by dyads and associated standard errors are reported in parenthesis. The standard errors are reported in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 9. IV Robustness: Alternative Housing Instruments

Panel A: Exchange Rate Pass-through into Prices						
Instruments:	1-3 lags of permits		US PRFI/GDPI		Housing Starts	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta e_{\$ j,t}$	0.577***		0.344***		0.544***	
	(0.0402)		(0.0212)		(0.0345)	
$\Delta e_{\$ j,t} \times S^{Fin}_{j,i-1}$		0.696***		0.379**		0.713***
		(0.262)		(0.172)		(0.247)
$\Delta e_{ij,t}$	0.924***	0.807***	0.857***	0.845***	0.914***	0.805***
	(0.0139)	(0.0387)	(0.0122)	(0.0305)	(0.0128)	(0.0372)
$\Delta e_{ij,t} \times S^{Fin}_{j,i-1}$		0.109		-0.0580		0.118
		(0.144)		(0.100)		(0.136)
First-stage F-stats	116.82	41.24	138.24	51.41	116.22	45.17
Observations	40,211	40,093	40,211	40,093	40,211	40,093
Number of dyad	2,411	2,411	2,411	2,411	2,411	2,411
Panel B: Trade Elasticity with respect to Exchange Rate						
Instruments:	1-3 lags of Permits		US PRFI/GDPI		Housing Starts	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta e_{\$ j,t}$	-1.405***		-0.550***		-1.616***	
	(0.220)		(0.0694)		(0.216)	
$\Delta e_{\$ j,t} \times S^{Fin}_{j,i-1}$		-1.161*		-0.828**		-1.349**
		(0.659)		(0.396)		(0.684)
$\Delta e_{ij,t}$	-0.766***	0.0317	-0.365***	-0.0379	-0.865***	0.0710
	(0.121)	(0.146)	(0.0406)	(0.0914)	(0.123)	(0.152)
$\Delta e_{ij,t} \times S^{Fin}_{j,i-1}$		-0.926		-0.614		-1.102*
		(0.628)		(0.378)		(0.651)
First-stage F-stats	158.34	74.22	143.77	61.11	146.40	51.23
Observations	42,795	42,669	42,795	42,669	42,795	42,669
Number of dyad	2,558	2,558	2,558	2,558	2,558	2,558

All import price regressions in Panel A include lags 0-2 of exporter log changes in PPI. All import quantity regressions in Panel B include lags 0-2 of importer real GDP growth. Column (2), (4), and (6) also include time fixed-effects. PRFI/GDPI is the share of US gross domestic private investment (GDPI) attributable to the private residential fixed investment (PRFI). For column (2), (4) and (6), the dollar term $\Delta e_{\$ j,t}$ is absorbed by the time-fixed effects, because the instrument for the dollar, U.S. housing permits, only varies at the time level. The standard errors are reported in parenthesis. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 10. IV Robustness: USD Invoicing Shares

	Price Regressions		Quantity Regressions	
	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)
$\Delta e_{\$j,t}$	0.656***		-0.0111	
	(0.0314)		(0.0598)	
$\Delta e_{\$j,t} \times S^{Fin}_{j,t-1}$	-0.0612	0.501**	-0.0961	-1.068**
	(0.0396)	(0.226)	(0.0719)	(0.499)
$\Delta e_{\$j,t} \times S^{\text{Invoicing}}_{i,t-1}$	0.115***	0.105	-0.0389	0.580**
	(0.0330)	(0.183)	(0.0699)	(0.257)
$\Delta e_{ij,t}$	0.913***	0.657***	-0.276***	-0.424***
	(0.0234)	(0.0358)	(0.0576)	(0.0647)
$\Delta e_{ij,t} \times S^{Fin}_{j,t-1}$	0.0321	0.128	0.0437	-0.487
	(0.0247)	(0.123)	(0.0675)	(0.479)
$\Delta e_{ij,t} \times S^{\text{Invoicing}}_{i,t-1}$	0.0488*	0.234***	0.130*	0.603***
	(0.0291)	(0.0765)	(0.0725)	(0.183)
Time FE	Yes	Yes	Yes	Yes
Observations	38,324	38,324	40,855	40,855

For price regressions, all regressions include lags 0-2 of exporter log changes in PPI, and time fixed-effects. For quantity regressions, all regressions include lags 0-2 of importer real GDP growth, and time fixed-effects. The standard errors for OLS are clustered by dyads and associated standard errors are reported in parenthesis. The standard errors are reported in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 11. IV Robustness: Additional Checks

Panel A: Exchange Rate Pass-through into Prices

	Commodity		Commodity + Noncom.		Broad Dollar Index		Dynamic Spec.	
	(1) IV	(2) IV	(3) IV	(4) IV	(5) OLS	(6) IV	(7) IV	(8) IV
$\Delta e_{\$j,t}$	-0.220***		0.298***				0.659***	
	(0.0324)		(0.0324)				(0.0359)	
$\Delta e_{\$j,t} \times S^{Fin}_{j,i-1}$		0.879***		0.488**	-0.0413	1.734***		0.804***
		(0.238)		(0.226)	(0.0586)	(0.589)		(0.244)
$\Delta e_{ij,t}$	0.741***	0.767***	0.873***	0.803***	0.892***	0.873***	0.961***	0.783***
	(0.0195)	(0.0353)	(0.0133)	(0.0335)	(0.0245)	(0.0266)	(0.0132)	(0.0391)
$\Delta e_{ij,t} \times S^{Fin}_{j,i-1}$		0.282**		0.0978	-0.259***	-0.238***		0.201
		(0.128)		(0.120)	(0.0536)	(0.0559)		(0.143)
Observations	39,840	39,839	40,348	40,347	40,093	40,093	41,601	41,601

Panel B: Trade Elasticity with respect to Exchange Rate

Instruments:	Commodity		Commodity + Noncom.		Broad Dollar Index		Dynamic Spec.	
	(1) IV	(2) IV	(3) IV	(4) IV	(5) OLS	(6) IV	(7) IV	(8) IV
$\Delta e_{\$j,t}$	-0.296*		-0.808***				-1.193***	
	(0.173)		(0.143)				(0.160)	
$\Delta e_{\$j,t} \times S^{Fin}_{j,i-1}$		-3.284***		-1.483***	0.127	-2.207**		-1.677***
		(0.745)		(0.507)	(0.140)	(1.088)		(0.547)
$\Delta e_{ij,t}$	-0.275***	0.425**	-0.489***	0.0967	-0.212***	-0.198***	-0.704***	0.137
	(0.0856)	(0.189)	(0.0765)	(0.116)	(0.0316)	(0.0319)	(0.0870)	(0.127)
$\Delta e_{ij,t} \times S^{Fin}_{j,i-1}$		-2.849***		-1.223**	0.160***	0.163***		-1.453***
		(0.741)		(0.481)	(0.0483)	(0.0474)		(0.533)
Observations	42,599	42,473	43,171	43,045	42,669	42,669	44,419	44,419

For price regressions, all regressions include lags 0-2 of exporter log changes in PPI, and time fixed-effects. For quantity regressions, all regressions include lags 0-2 of importer real GDP growth, and time fixed-effects. "Dynamic spec." also includes 1-2 lags of the independent variables. The standard errors for OLS are clustered by dyads and associated standard errors are reported in parenthesis. The standard errors are reported in parenthesis. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.