The Dominant Currency Financing Channel of External Adjustment *

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Abstract

We provide evidence on a new channel of the functioning of exchange rate movements for external adjustment. When international trade is priced in a dominant currency, firms' dominant currency financing boosts the trade balance in response to a domestic depreciation. Using a novel identification strategy by exploiting firms' foreign currency debt maturity structure in Colombia, we show that firms experiencing a stronger debt revaluation of dominant currency debt due to a depreciation compress imports relatively more while exports are unaffected. Dominant currency financing does not alter the response of imports of firms that export, hold foreign currency assets, or are active in the foreign exchange derivatives markets, as they are all hedged against a revaluation of their debt.

JEL Codes: F31, F32, F41, G32

Keywords: Imports, Exports, Foreign Currency Exposure, Capital Structure, Exchange Rates, Debt Revaluation, Hedging

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*This version: December 3, 2020. Most recent version: here. We are thankful to Gustavo Adler, Gita Gopinath, Sebnem Kalemli-Ozcan, Sole Martinez Peria, Todd Messer, Carolina Osorio-Buitron, Ricardo Reis, Tim Schmidt-Eisenlohr for comments. The views expressed in the paper are those of the authors and do not necessarily represent the views of the IMF, its Executive Board or IMF management, or the Banco de la Republica.

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1 Introduction

The effect of exchange rate movements on trade has been one of the most discussed topics in international economics. In traditional models, a depreciation of the home currency causes firms' exports to expand and imports to shrink due to changes in relative prices (Mundell, 1963; Fleming, 1962; Obstfeld and Rogoff, 1995). Standard models, however, do not take into account that a depreciation of the domestic currency can tighten financial constraints of firms that have debt denominated in foreign currency, thus affecting trade through a different channel.

If firms borrow in foreign currency, a depreciation of the domestic currency increases the debt burden of those firms and tightens their financial constraints, with potentially contractionary effects on both exports and imports. Depending on the relative elasticity of exports and imports, the effect of foreign currency borrowing on the trade balance is ambiguous.

In this paper, we show that corporate foreign currency financing strongly amplifies the negative effect of a domestic exchange rate depreciation on imports. Firms with a larger balance sheet exposure to the depreciation reduce their imports significantly and persistently more compared to less exposed firms. In contrast, firms with larger balance sheet exposure to the depreciation do not reduce their exports more during and after the depreciation, as they are hedged through their foreign currency revenues. Overall, the results point toward a positive effect of foreign currency financing on the trade balance during a depreciation.

There is substantial heterogeneity across firms in the effect of foreign currency borrowing on imports. First, firms that both import and export do not reduce their imports due to foreign currency borrowing during or after the depreciation. This result suggests that exports can provide a hedge during a depreciation period, especially if they are also priced in foreign currency. Second, imports of firms with foreign currency asset holdings are unaffected by the debt revaluation. Third, firms that use foreign exchange derivative contracts are hedged and do not contract their imports as a result of foreign currency borrowing during the depreciation period.

To shed light on the channel through which corporate foreign currency borrowing affects imports we construct a unique comprehensive dataset covering firms in Colombia, a country where trade is almost exclusively priced in US Dollar, merging highly disaggregated firm-level trade, loan, derivatives, and balance sheet data. We then study the trade response to a sharp and unexpected depreciation of the Colombian Peso depending on firms' financial heterogeneity in terms of foreign currency borrowing. The Colombian Peso depreciated between 2014 and

2015 due to a large drop in oil prices. As the shock can be seen as an exogenous event to firms in non-commodity sectors, it provides an ideal laboratory to study how differences in foreign currency debt affect non-commodity firms' imports and exports in response to a depreciation, when trade is priced in the same currency.

Using a novel identification strategy that exploits the foreign currency debt maturity structure of firms we study the effect of foreign currency borrowing on external adjustment. The detailed loan-level data allows us to compute the increase in debt repayments due to the interaction between currency movements and the foreign currency debt maturity structure. Firms that happen to have foreign currency debt maturing at the height of the depreciation faced a large increase in their debt repayments. In contrast, for firms whose foreign currency debt matured predominantly just before the depreciation, their debt repayments remained almost unaffected. As the maturity structure can be seen as exogenous to exchange rate movements, the effect of dominant currency financing on trade can likely be interpreted as causal.

We decompose firms' financial exposure to the exchange rate depreciation into a wealth and a liquidity shock. Foreign currency leverage exposes firms to the depreciation in two ways. First, firms that have foreign currency debt maturing during the depreciation face a sudden increase in their debt repayments, forcing expenditure compression (i.e. a liquidity shock). Second, even if firms have no foreign currency debt maturing during the depreciation period, their debt burden increases due to the depreciation, unless the depreciation reverses. We call the sum of the liquidity shock and the increase in the debt burden due to later debt repayments a wealth shock.

Qualitatively, the effects of foreign currency leverage, the wealth, and the liquidity shocks are the same. Quantitatively, we estimate that a one standard deviation increase in a firm's foreign leverage ratio is associated with an additional decrease of 10.6% in imports after the depreciation. While a one standard deviation larger liquidity shock leads to a 4.7% larger decline in imports, a one standard deviation larger wealth shock is associated with a 5.9% larger decline in imports. As the wealth shock is computed as the sum of the liquidity shock and the debt revaluation not affecting debt repayments during the depreciation, the difference in the coefficient between the wealth and the liquidity shock can be interpreted as the effect of the debt revaluation. Hence, the liquidity shock explains 80% of the wealth shock while the debt revaluation only explains 20%.

To quantify the magnitude of the effects, we conduct a simple back-of-the-envelope calculation and estimate the share of the total decline in imports attributed to foreign currency borrowing. Colombia's exports and imports dropped sharply around the depreciation of the Colombian Peso. Imports dropped by 6 billion US Dollar and exports dropped by 4 billion US Dollar. We multiply the coefficient of our preferred specification with each firms' actual exposure and aggregate up. Our estimates imply that the dominant currency financing channel of external adjustment explains around 17%, or 1 billion of the drop in imports but does not explain the drop in exports.[1]

These findings can be rationalized under a model with Dominant Currency Financing (DCF) under Dominant Currency Pricing (DCP). Under dominant currency pricing, both imports and exports are invoiced in the dominant currency (Gopinath et al., 2019). Under DCP, when the domestic currency depreciates against the dominant currency imports drop but exports remain relatively stable. Under DCF, firms do not only price their trade in dominant currency but also finance their trade in dominant currency.[2] Adding DCF to DCP amplifies the effect of the depreciation on the trade balance. Exporting firms are naturally hedged through their exporting revenues in the dominant currency. However, importing firms' financial constraints tighten as their debt repayments increase while neither their domestic currency assets appreciate nor their revenues in domestic currency increase. As imports are financed in the dominant currency and firms become financially constrained, they reduce their borrowing in dominant currency and imports.

We provide more evidence supporting this channel. First, we analyze the financial frictions that are at work under the microscope by utilizing our loan-level data at hand. We show that firms with larger financial exposure to the depreciation, especially those who do not export, reduce their foreign currency borrowing more relative to other firms. Non-exporting firms that are more strongly affected by a debt revaluation through the depreciation also face higher interest rates and are more likely to become delinquent on their loans after the depreciation, even after controlling for observed and unobserved time-varying characteristics of the lending bank. This is not the case for exporting firms. Second, to confirm that our results are indeed driven by the increase in the debt due to the depreciation and not more generally due to the macroeconomic environment, we conduct a placebo test where we replace the foreign currency with domestic

[1] This number should be taken with caution as it ignores general equilibrium effects. However, we believe that this counterfactual exercise serves as a useful lower bound benchmark to understand the macroeconomic relevance of our channel as general equilibrium effects would likely strengthen the impact.

[2] Gopinath and Stein (2018) and Bahaj and Reis (2020) study the complementarities between financing and invoicing in the same currency.

currency debt measures. In these falsification tests, we do not find that financial heterogeneity in terms of domestic debt affected the import performance in response to the depreciation. Third, our results are not specific to the large depreciation that occurred in Colombia in 2014. In addition to employing an event study methodology around the large depreciation, we confirm our main results by estimating panel regression of imports and exports on the interaction between foreign currency leverage and change in the exchange rate.

While this paper focuses on one specific country which can be seen as the typical emerging market under DCP, several general implications can be drawn from our analysis. First, under producer currency pricing (PCP) where exports are priced in domestic currency and imports are priced and financed in foreign currency, exporters would not be hedged against a liquidity shock when the domestic currency depreciates. Second, the composition of non-exporting relative to exporting importers is crucial to understand the magnitude of the effect of dominant currency financing on external adjustment. In countries where the vast majority of firms are importers that do not export (e.g. countries with large wholesale or service sectors), the effect of dominant currency financing is likely to be larger than for countries with large manufacturing sectors that both import and export. Third, in countries where firms have substantial foreign currency asset holdings or where foreign currency derivative markets are well developed, the effect of foreign currency borrowing on imports during a depreciation is likely to be more muted.

Overall, these results imply that dominant currency financing has a contractionary impact on trade, but as the effect is only apparent for imports and not for exports, the effect on the trade balance is expansionary.

Related Literature

Our paper relates to the literature on the effect of exchange rate movements on the external adjustment. Recent work questions the conventional wisdom of both Producer Currency Pricing and Local Currency Pricing and shows that trade is mostly invoiced in a few vehicle currencies, and that the dollar plays a dominant role among them (Goldberg and Tille, 2008; Gopinath, 2015).[3]

[3] The adjustment process of traded quantities depends on the currency in which prices are set. Under producer currency pricing (PCP), the law of one price holds and a nominal depreciation (all else equal) increases the domestic price of imports and reduces the price of exports in the destination markets. Hence, it leads to an improvement of the trade balance. However, there is evidence that the law of one price fails to hold (Obstfeld and Rogoff, 2000).

Gopinath et al. (2019) show that trade in Colombia is almost exclusively invoiced is US Dollar and therefore can be seen as a perfect laboratory to study the effects Dominant Currency Pricing (DCP). Under DCP prices are set in a dominant currency regardless of the origin or destination of trade flows, and a nominal depreciation leads to an increase in import prices, as under PCP, but prices faced by trading partners are not changed. Hence, the expenditure switching effect is milder than under PCP because the depreciation affects net exports only through a contraction on imports while it has a muted effect on exports. Following Gopinath et al. (2019) we use Colombia as a laboratory to study Dominant Currency Financing (DCF) under Dominant Currency Pricing (DCP). Compared to Gopinath et al. (2019) we empirically show that when firms not only price imports and exports in US Dollar but also borrow in foreign currency, the contractionary impact of exchange rate movements on imports is even stronger while exports are not affected.

We also contribute to the large empirical literature on the negative effects of foreign currency borrowing. Several studies have found negative effects of foreign currency borrowing of firms on investment when the domestic currency depreciates (Aguiar, 2005; Kalemli-Ozcan et al., 2016; Hardy, 2018) or sales Alfaro et al. (2019). Other studies have not been able to confirm these results and find no effect on investment (Bleakley and Cowan, 2008).[4] Niepmann and Schmidt-Eisenlohr (2017a) show that firms with more foreign currency loans are more likely to default. Verner and Gyongyosi (2018) find negative consequences in response to household foreign currency borrowing after a depreciation.[5] While all of these papers study the real effects of foreign currency borrowing, they entirely ignore their external adjustment effects. Studying the response of imports and exports jointly is crucial to understand the external adjustment process of a country in response to currency movements.

Most closely we relate to the literature on the trade effects of financial shocks. Amiti and Weinstein (2011) and Niepmann and Schmidt-Eisenlohr (2017c) provide evidence in favor of contractionary export effects of trade finance shocks.[6] Paravisini et al. (2014) and Bruno and

As an alternative Betts and Devereux (2000) and Devereux and Engel (2003) proposed that prices are instead sticky in the currency of the buyer (local currency pricing, LCP). Under LCP a nominal depreciation has no effect on the price of traded goods in the destination markets. Therefore, although it worsens the competitiveness, it has a muted effect on the trade balance. See Lane (2001) for a survey.

[4]See Galindo et al. (2003) for a survey. See Barajas et al. (2017), Restrepo et al. (2014) and Echeverry et al. (2003) for the case of Colombia.

[5]For the theoretical dimension see for example Céspedes et al. (2004), Krugman (1999) or Devereux et al. (2006).

[6]See Niepmann and Schmidt-Eisenlohr (2017b); Love et al. (2007); Schmidt-Eisenlohr (2013) for more details on trade finance shocks. Muûls (2015) shows that firms with credit ratings are more likely to be exporters and importers.

Shin (2019) show the that firms' exposed to bank credit shocks reduced their exports.[7] We differ relative to this literature in two dimensions. First, all papers focus solely on the export response of a tightening in financial constraints while we study imports and exports jointly. Second, none of these papers study shocks affecting firms directly through their borrowing in foreign currency. Our results show that currency-related shocks that increase firms' debt through the depreciation of the currency do not have export effects and are therefore very different from shocks that propagate through banks.

On the theoretical front, our work is most closely related to Akinci and Queralto (2018) and Kohn et al. (2020). Akinci and Queralto (2018) show that foreign currency borrowing induces imports to drop more but exports to drop less in response to a tightening of US monetary policy. Kohn et al. (2020) more explicitly model a large devaluation and confirm that financial frictions do not contribute largely to export dynamics.

The rest of the paper is structured as follows. In section 2 we describe the data and the construction of the variables. In section 3 we discuss the empirical specification. In section 4 we present the results. In section 5 we conclude.

2 Data

2.1 Sources

We compiled data from several sources.

Commercial loans granted by Colombian banks and other financial institutions to firms come from the credit registry from *Superintendecia Financiera*, the agency in charge of supervising the financial sector.[8] Every quarter Colombian banks report the amount outstanding and maturity date for each loan they issue to firms. Importantly, the amounts are allocated between loans in foreign and domestic currencies. Using firm tax ID, we construct the amount of outstanding loans in foreign and domestic currencies for each firm and quarter. These data are available between 2005 and 2017. Since this dataset covers the universe of loans, we replace missing amounts with zeros when matching with other datasets.

The trade data come from *DANE*, the Colombian statistical agency. This dataset contains information on imports and exports at a very disaggregated level (by firm, country of origin/destination,

[7] Berman and Berthou (2009) and Berman and Berthou (2009) provide cross-country evidence.

[8] By Colombian banks we mean banks operating in Colombia, regardless of nationality of ownership.

product, and month of the year). Public data is available for 2008-2018. We construct total imports and exports by each firm and quarter and replace missing amounts with zeros when matching with other datasets since this dataset also covers a universe of trade transactions for the period of interest.

Balance sheet data comes from the Orbis global database.[9] Originally, the data come from Colombian chambers of commerce and has standard variables from the balance sheets and income statements of Colombian firms (e.g. assets, liabilities, sales). We have data for 2004-2018.

2.2 Measures of exposure and shocks

In this section we describe the measures of foreign currency exposure that we construct by merging the balance sheet and loans data. As foreign currency liabilities are the main driver of foreign currency mismatches on Colombian firms' balance sheets, we focus on foreign currency loans to construct our measures of exposure.In subsection 3.1 we outline the framework for the regression analysis.

We construct several measures of firm-level exposure to the exchange rate shock through their indebtedness in US dollars. First, we construct a measure of foreign currency leverage, which is given by total loans in foreign currency divided by firm-level assets:

$$FCL_{ft} = \frac{\sum_{i \in \Lambda^F_{ft}} L_i}{A_{ft}} \tag{1}$$

where Λ^F_{ft} is the set of firm's f loans with Colombian banks denominated in foreign currency in period t, L_i is the outstanding amount of the loans, and A_{ft} is the book value of assets of firm f at time t. This measure reflects the importance of foreign currency debt relative to total assets of the firm. However, it does not distinguish between the loans of different maturity. We observe firms having foreign currency loans with quite heterogeneous future maturity dates in the data. We can leverage this information to study whether firms with debt that is disproportionately due over shorter horizons were relatively more affected due to the liquidity shock that they face due to much higher than anticipated debt service payments in the near run in comparison to firms with longer debt maturity, who face a wealth shock.[10] In addition, firms having

[9]The Orbis global database is provided by Bureau van Dijk, a Moody's Analytics company.

[10]This identification strategy bears similarities with Duval et al. (2020) who exploit firms' debt maturity structure

different maturity dates face different shocks due to the difference in the Peso exchange rate between those dates. To draw the distinction between the measures of liquidity vis-a-vis the wealth shock and to take into account depreciation of Colombian currency over time, we use information about the maturity date of each loan reported by Colombian banks and construct the following following variables:

$$LS_{ft,t'} = \frac{\sum_{i\in\Lambda^F_{f,t}} 1_{T(i)\le t'} L_i \Delta e_{t,T(i)}}{A_{ft}} \tag{2}$$

$$WS_{ft,t'} = \frac{\sum_{i\in\Lambda^F_{f,t}} 1_{T(i)>t'} L_i \Delta e_{t,t'} + \sum_{i\in\Lambda^F_{f,t}} 1_{T(i)\le t'} L_i \Delta e_{t,T(i)}}{A_{ft}} \tag{3}$$

where $T(i)$ is the maturity day of loan i, $\Delta e_{t,T(i)}$ is the depreciation of Peso between t and $T(i)$, $1_{T(i)\le t'}$ is an indicator that is equal to 1 if the loan is maturing before t' and zero otherwise, and $1_{T(i)>t'}$ is an indicator that is equal to 1 if the loan matures after t'. The first measure, LS ('liquidity shock'), measures by how much the value of the debt repayments as of t increases due to depreciation between times t and t' given the actual depreciation as of their maturity date that falls between t and t'. The second measure, WS ('wealth shock'), adds the increase in debt that matures past t' using the exchange rate in t'. In our baseline empirical strategy we set t to 2014 Q1, as the depreciation started in 2014 Q3 (see Figure 1). This allows us to capture firms' debt that matures right before and right after the depreciation. t' is set to 2015 Q3, as it captured the height of the sudden depreciation. [11]

2.3 Descriptive statistics

Figure 1 plots imports, exports and the Colombian Peso between 2008 and 2018. The Colombian Peso officially switched to a floating status in 1999. Since then, the Peso can be considered a commodity currency, as fluctuations in the Peso are strongly correlated with fluctuations in commodity prices. Moreover, commodity price fluctuations are exogenous to the economy; while mining products (mainly oil, coal and nickel alloys) represent a large share of total exports, output is small relative to world markets. For example, in 2014 Colombia's oil production was 1.1% of world oil production but oil and oil products accounted for 52.8% of Colombian exports. Hence, the exchange rate depends heavily on oil prices but Colombia acts as a price

before the financial crisis.

[11] Results are not sensitive to the choice of t and t'.

taker in the oil world market.

In 2014, the price of oil plummeted. The spot price of WTI oil halved from over 100 US Dollar per barrel in July 2014, to 53.45 US Dollar by the end of the year and reached its lowest value, less than 30 US Dollar, in January and February 2016. The Peso/YS Dollar exchange rate increased from roughly 1850 at the end of July 2014 to 3435 by mid-February 2016. Importantly, the Peso depreciation was not the result of a macroeconomic crisis. According to the World Bank's WDI, annual GDP growth in 2014-16 was 4.7%, 3% and 2.1%, lower than during the boom of commodity prices but well above the region's average, unemployment reached its 10-year minimum, and indicators of the financial system health such as the rate of capital to assets and the rate of liquid reserves to assets remained relatively unchanged.

The depreciation of the exchange rate coincided with a drop in both exports and imports of Colombian firms. Between 2012 and 2014 imports and exports were remarkably stable. Colombian quarterly exports and imports equaled roughly 14 billion US Dollars, around 39% of GDP. With the depreciation, trade dropped. While imports dropped from 16 billion US Dollar to around 10 billion US Dollar between 2014 and 2018, exports dropped from 14 billion US Dollar to 6 billion US Dollar in 2016 but then recovering back to 10 billion in 2018.[12]

Table 1 shows summary statistics of firms in terms of their assets, exports and imports.[13] We split between non-exporters, exporters and all firms. There are 14,618 firms in our sample which do not export but import, and 7,232 export and import. The average size of a firm in our dataset is 12 million US Dollar. Average firm-level exports before the depreciation are 127,000 US Dollar but drop to 108,000 US Dollar after the depreciation. Firm-level imports drop from 132,000 US Dollar to 118,000 US Dollar between before and after the depreciation.

The measures of exposure to depreciation due to indebtedness in dollars are computed as of the end of the first quarter of 2014, as described in subsection 2.2. Table 2 shows that foreign currency leverage is 4.4% for the average firm ranging between 0.2% to 11.6% between the 10th and 90th percentile. The average liquidity shock is close to zero as there are many firms that have short-dated liabilities that mature before the depreciation started. A firm at the 10th percentile of the liquidity shock distribution even faces a negative liquidity shock. A negative shock reflects a decrease in the debt repayments due to the small appreciation before the large depreciation. A firm at the 90th percentile of the liquidity shock sees an increase of their debt

[12]Notably, exports also decreased if measured in Colombian Pesos or in volumes (net kilograms).

[13]Since import regressions are the main focus of our empirical exercise, we only focus on firms that ever imported in our sample.

repayments purely due to the depreciation that is 0.6% of total assets.

The wealth shock, which equals the liquidity shock plus the debt revaluation after 2015 Q3 equals 0.8% of total assets. Even for the wealth shock we see some firms with negative values, which benefit from the exchange rate movements before the depreciation started. For the comparison purposes, all measures of foreign currency exposure entering the regressions were standardized to be mean-zero and have a unit standard deviation.

3 Empirical Strategy

3.1 Baseline specification

We use the unanticipated depreciation of the Colombian Peso in 2014Q3 as a natural experiment to study the dominant currency financing channel of a foreign exchange rate depreciation on trade.[14] For our baseline specification we estimate the equation of the form:

$$\ln\left(1+Y_{ft}\right) = \beta \times FCE_f \times 1(t \geq t_0) + controls_{ft} + \epsilon_{ft}, \tag{4}$$

where Y is either the firm-level exports or imports of firm f at time t.[15] FCE_f is either FCL_{ft} in $t = 2014Q1$, $LS_{ft,t'}$ with $t = 2014Q1$ and $t' = 2015Q3$, or $WS_{ft,t'}$ with $t = 2014Q1$ and $t' = 2015Q3$. $1(t \geq t_0)$ is a dummy that equals one in any quarter during or after the depreciation ($t \geq 2014Q3$). Standard errors are double clustered at the firm and quarter level. The set of controls is given by firm and time fixed effects, hence we interpret the β coefficient as a differential effect of the financial exposure to exchange rate shocks on imports or exports, with time fixed effects absorbing the level effect on imports (exports) of all firms. The firm fixed effects control for the time-invariant characteristics of the firm, for example, the average reliance on imported inputs, size, etc.

It is worth mentioning that dominant currency financing is a choice for firms–that is, firms'

[14]Rodnyansky (2019) uses the depreciation of the Russian ruble due to the exogenous collapse in oil prices in 2014 to show that more productive exporters shrank relative to nonexporting firms in terms of domestic revenue, employment and profitability following the depreciation.

[15]Note that given the above logarithmic transformation of the dependent variable can introduce biases through the constant, we re-estimate all regressions with an inverse hyperbolic sine transformation of Y. Except for small values of Y, this transformation approximately equals $\log(2Y)$, or $\log(2) + \log(Y)$, which can be interpreted in the same way as a standard logarithmic dependent variable, see Burbidge et al. (1988) or for an application Chen (2013), and find qualitatively and quantitatively almost identical results.

foreign currency debt and its maturity structure can respond to their expectations regarding exchange rate movements. Although these shocks are notoriously hard to predict, this potential endogeneity could bias our results. We address this concern by studying the specific case of an unanticipated, sudden depreciation that was unrelated to the economic situation in Colombia. Given the nature of this shock, it is unlikely that firms scheduled their debt in anticipation to the depreciation.

3.2 Dynamic response

Equation 4 estimates the average effect of an additional unit of foreign currency exposure on firm-level imports after the depreciation. However, one might expect the effect to build up and/or decline over time. Hence, in our second set of empirical exercises, instead of interacting the measure of dominant currency financing with a post-depreciation dummy, we interact the measure with a dummy for each quarter:

$$\ln\left(1+Y_{ft}\right)=\sum_{t'}\beta_{t'}\times FCE_{f}\times 1(t=t')+controls_{ft}+\epsilon_{ft}, \tag{5}$$

where Y is either the firm-level exports or imports of firm f at time t. This helps us to pin down the timing of the response of exports and imports in response to the interaction between the depreciation and the firms' debt dollarization. In addition, we examine the trade activities of firms as a function of their debt dollarization just before the depreciation. This pre-trend analysis helps us to shed light on the question whether firms with more financial exposure to the exchange rate depreciation are fundamentally different from other firms. For example, if firms with more foreign currency debt before the depreciation already started reducing their imports, the interaction term in Equation 4 could just reflect a downward trend in the imports of these firms.

4 Results

4.1 Baseline Regression

Table 3 presents the results for Equation 4 for imports. Columns (1)-(3) use foreign currency leverage as the financial exposure to the exchange rate depreciation. When considering all 21,850 firms, we see a strong negative impact of the interaction between foreign currency leverage in 2014 Q1, just before the depreciation started, and the depreciation dummy. Hence, firms that had a larger share of foreign currency debt before the depreciation imported less after the depreciation than before. Quantitatively, a one standard deviation larger share of foreign currency debt[16] is associated with a 10% stronger decline in imports. However, this effect masks large heterogeneity across different firms. Around two thirds of all firms do solely import and do not export. We show the regression for only these firms in column (2). The regression coefficient roughly doubles. For non-exporters a one standard deviation larger share of foreign currency debt is associated with a 20% stronger decline in imports. For firms that import and export, the effect is only 1.8% and not statistically significant.

Hence, columns (4)-(9) repeat the same exercise but decomposes the increase in leverage due to the depreciation into a liquidity and a wealth shock. Columns (4)-(6) report the coefficients for the liquidity shock which captures the increase in debt repayments due to the movements in the exchange rate. The liquidity shock is defined such that the liquidity shock is positive when the firm sees an increase in their debt repayments due to the depreciation and negative if the debt repayments fall. The debt repayments can fall for the firm if it has very short-term maturity debt that matures before the depreciation happened.

The effect of the liquidity shock on imports is around one half of the foreign currency leverage. In particular, a one standard deviation larger liquidity shock leads to a decline in imports relative to the pre-depreciation period by around 5%. As for foreign leverage, the effect is solely driven by non-exporters for which the response is around 7% and statistically signifanct. Exporters reduce their imports by 2.5% more if they face a one standard deviation larger liquidity shock but the coefficient is not statistically significant.

Lastly, columns (7)-(9) show the average response of imports in the depreciation period as a function of a wealth shock, which combines the liquidity shock during the sharp depreciation with the shock to wealth that occurs due to debt revaluation for later periods. As above, firms that are financially more exposed to the depreciation of the exchange rate due to a wealth shock compress imports relatively more compared to other firms. This pattern is significantly stronger

[16] One standard deviation of foreign currency leverage is 3.2%

for firms which import and do not export, rather than firms that participate in both activities.[17]

In terms of economic significance, a one standard deviation larger exposure to the exchange rate depreciation through their debt dollarization is associated with a 12% larger compression of imports if measured by the wealth shock for non-exporters. The number shrinks to around 1% for exporters and is not statistically significant.

Table 4 repeats the same exercise as Table 3 but for the drop in exports. The number of observations significantly drops as many more firms import than export. In our sample only around 7,200 firms export. The results for exports differ starkly from the results shown in Table 3. While the coefficients are mostly negative, the estimates are much smaller and not statistically significant. Neither foreign leverage nor the wealth or liquidity shock indicates that firms with larger dominant currency financing face a larger drop in exports.

This result is different from evidence in Paravisini et al. (2014) or Amiti and Weinstein (2011) who show that firms that face financial shocks reduce their exports. Why is the evidence different? Paravisini et al. (2014) and Amiti and Weinstein (2011) study shocks to banks that are unrelated to exchange rate movements to which firms are likely not hedged against. In contrast, in our case firms that have dollarized debt face a negative shock when the domestic currency depreciates, but this negative shock is offset by an increase in their export revenues as they are almost exclusively priced in US Dollar (Gopinath et al., 2019).

4.2 Dynamics Response

In this subsection we shed light on the dynamics of the response in imports and exports over time.

As in Table 3, we split the firms into importers that do not export and firms that import and export. Figure 2 shows the evolution of imports as a function of a one standard deviation larger financial exposure to the depreciation and the Peso/US Dollar exchange rate. The behavior of imports is not statistically different between 2012 Q3 and 2014 Q2. At the same time the Peso/US Dollar exchange rate was relatively stable at around 2000 Pesos per US Dollar. The fact that imports did not behave differently as a function of dominant currency financing in the period before the depreciation serves as a useful placebo test. Once the Peso starts to depreciate in 2014 Q3, firms with a larger financial exposure to the exchange rate depreciation contract their imports significantly more as the Peso depreciates. The effect of dominant currency fi-

[17] We test formally for the statistical difference between non-exporters and exporters in unreported results.

nancing on imports for non-exporters cumulates over time, which stresses the importance of studying the effect in a dynamic setting that allows firms to respond with a lag. Three years after the depreciation the effect reaches a coefficient of -0.4. This coefficient implies that firms with a one standard deviation larger financial exposure to the exchange rate depreciation contract imports by 40% more relative to before the depreciation period.

Figure 3 shows the evolution of imports for exporters in response to a one standard deviation larger dominant currency financing. The estimated coefficient is close to zero both before and after the depreciation period and is not statistically significant. This result suggests that firms that export and import were insulated from the dominant currency financing channel due to higher revenues in local currency since exports are priced in US Dollars.

Figure 4 plots the estimated coefficient for the interaction between financial exposure to the exchange rate depreciation and quarter dummies for the export response. As in the case of imports by exporters the line for exports is entirely flat. The logic is the same as for importers that export. While it may be the case that exports decline in response to a financial shock as exporters face difficulties to finance their working capital, this channel is not at work here as firms that export are hedged due to their higher domestic currency revenues given the appreciation of the US Dollar in which their exports are priced.

4.3 Hedging

Firms which borrow in foreign currency cannot only be hedged naturally through their export revenues in US Dollar, but also through other sources, such as foreign exchange derivatives and through the accumulation of US Dollar assets. When firms experience a debt revaluation in domestic currency due to a depreciation of the domestic exchange rate due to liabilities in foreign currency, the value of foreign currency assets appreciates at the same time in domestic currency terms. Hence, the assets held in foreign currency can serve as a hedge to dampen the negative effects of the increase in the debt burden. Firms that accumulated foreign currency assets before the sharp depreciation of the Peso could have drawn down their foreign currency assets to either repay their revalued debt or pay for US Dollar invoiced imports, dampening the negative effect of foreign currency borrowing on imports during and after the depreciation.

Similarly, firms can tap the derivatives markets to hedge their exposure to exchange rate fluctuation by engaging in a forward contract that locks in the exchange rate for the purchase or sale of a currency on a future date. For example, if a firm is expecting to repay debt in US

Dollar at a certain date, it can lock in the current forward exchange rate for the repayment date to hedge against a US Dollar appreciation. On the agreed date the counterparties exchange the amounts they had committed to. In case of an unexpected Peso depreciation, the firm pays a smaller amount of Pesos to obtain the pre-committed amount of US Dollar than it would in a spot transaction. The firm can then use the gains from the forward contract to repay the increased debt burden or pay the higher Peso price for US Dollar invoiced imports. For more details on the functioning of over-the-counter foreign exchange derivative markets see Hau et al. (2020).

Table 5 shows the percentage of firms that had accumulated US Dollar assets and the share of firms that have outstanding foreign exchange derivative positions in 2013. Around 13% of all firms are hedged either through US Dollar assets or are active in the derivative markets. Derivative markets are relatively infrequently used among Colombian non-financial corporates with only 2.9% of all firms having a foreign exchange derivative contract outstanding in 2013.[18] 11.6% of all firms have outstanding assets in foreign currency. These statistics differ largely between exporters and non-exporters. While almost 30% of exporting firms hedge, only 5% of non-exporters do so. Both foreign exchange derivative markets and foreign assets are more likely to be used as hedging devices for exporters than for non-exporters.

We complement our baseline regression equation to test whether the usage of foreign exchange derivatives markets or the accumulation of assets in US Dollar cushions the negative impact of foreign currency borrowing.

We estimate the following equation:

$$\ln\left(1+Y_{ft}\right)=\beta\times FCE_f\times 1(t\geq t_0)+\gamma\times FCE_f\times Hedge_f\times 1(t\geq t_0)+controls_{ft}+\epsilon_{ft}, \tag{6}$$

where Y are firm-level imports of firm f at time t. FCE_f is the foreign currency exposure. $1(t\geq t_0)$ is a dummy that equals one in any quarter during or after the depreciation ($t\geq 2014Q3$). $Hedge_f$ is defined as a dummy that equals one if the firm (i) had FX derivative markets positions outstanding in 2013 (ii) held foreign currency assets in 2013 or (iii) either (i) or (ii). The set of controls is given by firm and time fixed effects as well as $Hedge_f\times 1(t\geq t_0)$.

[18] The vast majority of the foreign exchange rate derivative positions are net forward purchases of US Dollars, implying firms hedging against a depreciation of the Colombian Peso. Due to frequent misreporting issues of the sign of the forward position, we only define a dummy that takes the value one if the firm reports outstanding position in any direction.

We interpret the β coefficient as the effect of foreign currency borrowing on imports during and after the depreciation for firms that do not hedge ($Hedge_f = 0$). The coefficient on the triple interaction ($FCE_f \times Hedge_f \times 1(t \geq t_0)$), γ, reflects the differential effect of firms that do hedge ($Hedge_f = 1$). A negative coefficient for β shows that firms that do not hedge and have more foreign currency liabilities reduce their imports more relative to firms with fewer foreign currency liabilities. This confirms our baseline result shown in Table 3. The coefficient β is larger in absolute values than in the baseline result, which already suggests a cushioning effect of hedging on import compression due to debt revaluation.

A positive coefficient γ shows the effect is weaker (smaller import contraction) for firms that hedge. The sum of the two coefficients reflects the estimated effect of the post-depreciation import contraction due to foreign currency borrowing for hedging firms.

Table 6 shows the results for either type of hedging. The coefficient on the triple interaction between $FCE_f \times Hedge_f \times 1(t \geq t_0)$ is consistently positive across specifications and are close to the double interaction in absolute values. This result shows that once a firm hedges its foreign currency liabilities through either foreign exchange derivatives or foreign currency assets, the effect of dominant currency financing on imports during the depreciation period is absent. This result can be confirmed (in unreported tables) that re-estimate the regression for only firms that hedge. In these results, the double interaction between foreign currency borrowing and the post dummy is statistically insignificant.

In Table 6 the triple interaction is positive across all specifications, but the magnitude is largest for firms that do not export. As non-exporting firms are driving the negative impact of foreign currency borrowing on imports during the depreciation, the result suggests that non-exporting firms benefit most from hedging compared to firms that are already hedged through their export revenues in US Dollars. Indeed, column (3), (6), and (9) show that the triple interaction is not statistically significant, and neither is the double interaction. Exporting firms, which do not hedge, either through foreign currency assets or foreign exchange derivatives, do not see a contraction of their imports due to foreign currency borrowing during the depreciation, as they are already naturally hedged through their US Dollar export revenues. The additional hedging has a non-significant positive effect on imports.

Next, we analyze whether both types of hedging, either through derivatives or through foreign currency assets can protect firms from the adverse effect of foreign currency borrowing on imports during a depreciation. Table 7 shows the results for firms that do borrow through foreign currency assets but not necessarily through the derivative markets. The dummy $Hedge$ is redefined as one if the firm has foreign currency assets outstanding before the depreciation (in 2013). The results closely resemble the results presented in Table 6. Firms that have assets in foreign currency but do not export do not contract their imports due to foreign currency borrowing during the depreciation period.

This is also true for firms that hedge their foreign currency exposure through the foreign exchange derivative markets (Table 8). We redefine the $Hedge$ dummy to one if the firm has outstanding foreign currency derivative positions outstanding before the depreciation (in 2013). For firms that have derivative positions outstanding the triple interaction offsets the effect of foreign currency borrowing, which is consistent with the idea that firms hedge the foreign currency borrowing with their outstanding derivative positions. Indeed, while the dummy variable does not indicate whether the firm speculates or hedges, or whether the firm bought or sold US Dollars forward, in unreported results we show that the pattern is only existent for firms which are net purchasers of US Dollar forward positions.

4.4 Quantification

This section aims to quantify the effect of dominant currency financing on the trade adjustment. Our estimates allow us to calculate the counterfactual trade flows in the absence of foreign currency borrowing, ignoring general equilibrium effects.[19]

Using our estimates from Table 3 we calculate the response in imports and the trade balance due to foreign currency borrowing. The estimated effects can then be used to infer the counterfactual response of trade flows to exchange rate movements for other levels of foreign-currency financing. We show the results of our counterfactual exercise in Figure 5 and Figure 6. In the case of Colombia, foreign-currency financing was substantial for *many* importing firms, even though the *average* level of dependence on foreign currency loans is moderate. If all firms had no foreign-currency borrowing, the peak-to-trough import contraction is estimated to have been 17% percent smaller.

[19]See Nakamura and Steinsson (2018) for a discussion of extrapolating aggregate effects from cross-sectional regressions.

4.5 Lending

In this section we reestimate Equation 4, replacing exports and imports with the amount borrowed in domestic and foreign currency. This exercise allows us to test whether firms that faced larger dominant currency financing indeed had to delever as they faced borrowing constraints. Table 9 shows that firms with larger corporate dollarization strongly contract their foreign currency borrowing. This result holds when we use either foreign currency leverage, the wealth shock or the liquidity shock as an independent variable. In contrast, local currency borrowing increases for firms with larger dominant currency financing as they seem to substitute foreign currency loans with domestic currency loans, consistent with evidence in Hardy (2018). Overall, an average firm with non-zero foreign currency borrowing, had roughly 20% of its debt denominated in foreign currency. As a result, this firm would see a 3% decline in total borrowing after the shock, taking into account foreign and domestic loans, and abstracting from the valuation effects of exchange rate movements.

4.6 Financial Frictions under the Microscope

In this section we explore the richness of the loan-level dataset to shed light on the exact mechanism through which the revaluation of debt feeds into financial frictions and leads to a contraction in imports.

First we focus on the interest rates of the loans (l) that have been issued to firm (i) at day (d) by bank (b). We regress the interest rate at which the loan is issued on the different measure of foreign currency exposure, as discussed above. The loan-level data allows us to control for bank-supply, by including bank-time(month) fixed effects. If firms that are financially more exposed to the depreciation borrow more from banks that are more negatively affected by the depreciation, the negative sign in our baseline results could be driven by a spurious correlation between banks' credit supply and firms' foreign currency exposure. The bank-time fixed effect allows us to compare firms with differential foreign currency exposure with each other that borrow from the same bank in the same month.

In particular, we estimate the following regression:

$$r_{i,f,d(t),b} = \alpha + \beta_1 FCE_f * Post_t + \alpha_{b,t} + \alpha_i + \epsilon_{f,d(t),b} \tag{7}$$

where r is the interest rate that is charged for loan (i) to firm (f) at issuance date (d) by bank (b). FCE are the different measures of foreign currency exposure. Post is a dummy that equals 1 after the depreciation and 0 otherwise. $\alpha_{b,t}$ are bank-month fixed effect and α_f are firm fixed effects. As before, standard errors are clustered at the firm level.

Table 10 shows the results. On average, firms that are more exposed to the depreciation financially face higher interest rates after the depreciation started compared to before, reflected in the positive coefficient. However, consistently with our results on imports, this result is entirely driven by firms that do not export. For exporters, the coefficient is statistically insignificant for all types of exposure measures and even negative for the simple foreign currency leverage measure as well as the wealth shock.

These results indicate that non-exporting firms that experience a larger appreciation of their debt values are charged higher interest rates, shedding light on the financial frictions that these firms face and providing evidence on a potential channel for why they contract imports.

The higher interest rates that are charged by banks are potentially due to higher probabilities of defaults of the non-exporting firms that face a debt revaluation. This is not the case for exporting firms, as they are hedged against the revaluation of their debt due to their appreciation of export revenues.

Next, we test whether the higher default risk of non-exporting firms with a larger appreciation of their debt due to the depreciation also feeds actually into delays in their payment of loans.

We create a balanced panel for each bank-firm-date combination and define a dummy that equals 1 if firm f is behind payment in their loans to bank b at time t and estimate the following linear probability model:

$$Delinquent_{f,t,b} = \alpha + \beta_1 FCE_f * Post_t + \alpha_{b,t} + \alpha_f + \epsilon_{f,t,b} \tag{8}$$

where $Deliquent_{f,b,t}$ is equal to one if firm f is delinquent on a loan to bank b at time t and zero otherwise. FCE_f is either the foreign currency leverage just before the depreciation, the liquidity shock, or the wealth shock, as described above. $\alpha_{b,t}$ are bank-time fixed effects and α_f are firm fixed effects. The bank-time fixed effects can again control for time-varying bank-specific factors that could lead to a spurious correlation between our foreign currency exposure measures and whether the firm is delinquent on their loans after the depreciation. For instance, certain banks may be better at screening and monitoring borrowers, which leads to lower nonperforming loans during the depreciation.[20] If the better screening and monitoring ability is correlated with the average foreign currency exposure of their borrowers, this could introduce a bias in the estimates. After absorbing for bank-time fixed effects, we control for this potential correlation between the error term and the treatment variable.

Table 11 shows the results. On average, firms with larger financial exposure to the exchange rate depreciation are more likely to fall behind their loan payments than their counterparts. This can be seen in Columns (1), (4), and (7). However, this effect is exclusively driven by non-exporting firms. For exporting firms the effect of larger debt appreciation due to foreign currency debt is not significantly affecting the probability of falling behind in debt payments.

These results confirm our baseline result and suggest that since exporters are hedged through higher US Dollar revenues, they are still able to repay their loans.

4.7 Placebo

In this section we conduct a placebo exercise where we replace the *foreign* currency leverage with *domestic* currency leverage. This exercise helps us to rule out that our measures of financial exposure to the depreciation are not simply measures of financial vulnerabilities in general. If our measures captured financial constraints which are not related to foreign currency borrowing, our results would still be indicative of a financial channel of external adjustment but not a debt dollarization channel. Table 12 indeed shows that if we replace our measures of debt dollarization with domestic leverage, we do not find significant negative effects on neither imports nor exports. This evidence is strongly suggesting that foreign currency borrowing rather than domestic financial heterogeneity across firms is driving the import response.

4.8 Panel Regression

In this section we aim to generalize our results to a larger time window. While the advantage of the event-study approach is its more credible causal identification, our results may not be externally valid outside of large devaluation episodes. We use date between 2008 and 2018 to construct an annual panel dataset with log imports, log exports, foreign currency leverage and the Colombian Peso/US Dollar exchange rate. Although quarterly data is available, we move

[20]See for example Pierri and Timmer (2020) show that banks that invest more in information technology are more resilient to financial shocks.

to an annual panel, as we have seen in Figure 2 that the dominant currency financing channel works with a lag to the exchange rate movement. We regress log imports and exports on the lagged foreign currency leverage and the movement in the Peso/ US Dollar exchange rate between $t-2$ and $t-1$ controlling for firm and year fixed effects.

Table 13 shows the results. The first row shows that firms that had higher foreign currency leverage in the previous year export and import more in the current year in the absence of exchange rate movements. However, once we see a depreciation of the Peso relative to the US Dollar, only non-exporters (column (2)) shrink their imports significantly in the following year. This is a confirmation of our baseline results shown in Table 3. As in the event-study approach, imports of firms that both export and import do not respond to the interaction between foreign currency leverage and the exchange rate. In contrast to the event-study approach, once we bundle non-exporters and exporters together we do not find a significant import response.

5 Conclusions

In this paper we have analyze the dominant currency financing channel of external adjustment. We study whether firms with more foreign currency borrowing are affected differently in terms of their trade response compared to firms that borrow mainly in domestic currency. As foreign currency borrowing is an endogenous choice, we implement a novel identification strategy that helps us shed light on the causal impact of debt dollarization on external adjustment. We compute the increase in foreign currency debt payments that is solely due to the depreciation of the currency as firms have their debt maturing at different points in time.

Firms that have the majority of their debt maturing before the start of the depreciation are not affected by the depreciation through their balance sheet. In contrast, firms which have debt repayments scheduled at the height of the depreciation face a large increase in their debt repayment. This foreign currency liquidity shock strongly predicts a contraction in imports. However, this effect is solely present for firms that do not export. Exporters do not only not shrink their imports in response to the shock, they also do not see their exports respond.

We conclude that foreign currency mismatches increases the potency of the external adjustment. This channel can be seen as an unintended side effect from borrowing in foreign currency from the perspective of external adjustment, however, the sharp decline in imports can have real effects on firms who are reliant on imported capital goods or intermediate inputs.[21]

[21] See also Alfaro et al. (2018).

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Table 1: Descriptive statistics, firm characteristics

	Non-exporters		Exporters		All firms	
	mean	sd	mean	sd	mean	sd
Assets	8,810	154,309	19,655	208,475	12,400	174,183
Exports before 2014Q2	0	0	385	6,959	127	4,007
Exports after 2014Q2	0	0	326	4,584	108	2,646
Imports before 2014Q2	55	229	288	642	132	429
Imports after 2014Q2	48	219	260	615	118	410
Number of firms	14,618		7,232		21,850	

Notes: All variables reported in thousands of US dollars. Assets refer to total assets of firms as reported in Orbis database at the end of 2013. Trade data is taken from DANE and is calculated at the quarterly level. The sample is limited to firms that ever reported in our data. Exporters are defined as firms that ever exported in our data.

Table 2: Descriptive statistics, independent variables

	mean	Percentiles				
		10	25	50	75	90
Foreign leverage	4.4%	0.2%	0.4%	2.0%	6.3%	11.6%
Liquidity shock	0.1%	-0.2%	0.0%	0.0%	0.0%	0.6%
Wealth shock	0.8%	-0.1%	0.0%	0.2%	0.9%	2.6%

Notes: See Section 2.2 for the definition of the variables.

Table 3: Imports

	ln (imports)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post × FCL	-0.106***	-0.215***	-0.018						
	(0.025)	(0.047)	(0.023)						
Post × LS				-0.046**	-0.069*	-0.024			
				(0.020)	(0.034)	(0.021)			
Post × WS							-0.059***	-0.120***	-0.009
							(0.020)	(0.032)	(0.024)
Sample	All	Non-X	X	All	Non-X	X	All	Non-X	X
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	524,943	350,934	174,009	524,943	350,934	174,009	524,943	350,934	174,009

Notes: The table reports the estimated β coefficient from Equation 4 with $\ln(1 + imports)$ on the left-hand side at the quarterly level. Columns (1)-(3) report the estimated coefficient of the interaction of a *Post* with foreign currency leverage (FCL). In columns (4)-(6) and (7)-(9) *Post* is interacted with liquidity (LS) and wealth shocks (WS) respectively. FCL, WS, and LS were normalized to have zero mean and a standard deviation of 1. *Post* is defined as a binary variable equal to 1 for the period after 2014Q2. The sample is limited to the firms that ever imported. Columns (1), (4), (7) report the results for all importers, columns (2), (5), (8) report the results for non-exporters, and columns (3), (6), and (9) report the results estimated on the sample of exporters. Exporters are firms that ever exported in our data. See Section 2.2 for the definition of the independent variables. Standard errors are clustered at the firm and quarter level. ***,**, and * indicate significance at 10%, 5%, and 1% levels respectively.

Table 4: Exports

	ln (exports)		
	(1)	(2)	(3)
Post × FCL	-0.010		
	(0.025)		
Post × LS		-0.025	
		(0.023)	
Post × WS			-0.024
			(0.026)
Firm FE	Y	Y	Y
Time FE	Y	Y	Y
N	169,232	169,232	169,232

Notes: The table reports the estimated β coefficient from Equation 4 with $\ln(1 + exports)$ on the left-hand side at the quarterly level. Column (1) reports the estimated coefficient of the interaction of a *Post* with foreign currency leverage (FCL). In columns (2) and (3) *Post* is interacted with liquidity (LS) and wealth shocks (WS) respectively. FCL, WS, and LS were normalized to have zero mean and a standard deviation of 1. *Post* is defined as a binary variable equal to 1 for the period after 2014Q2. See Section 2.2 for the definition of the independent variables. Standard errors are clustered at the firm and quarter level. ***,**, and * indicate significance at 10%, 5%, and 1% levels respectively. The sample is limited to the firms that ever exported in our data.

Table 5: Descriptive statistics, hedging

	Non-exporters	Exporters	All firms
	Share of Firms (2013)		
Hedge Foreign Assets	4.0%	26.9%	11.6%
Hedge FX Derivatives	1.6%	5.6%	2.9%
Hedge (Foreign Assets or FX Derivatives)	5.1%	28.7%	12.9%
Number of firms	14,618	7,232	21,850

Notes: Hedge Foreign Assets is the share of firms that have outstanding foreign assets in 2013. Hedge FX Derivatives is the share of firms that have outstanding foreign exchange derivatives in 2013. Hedge (Foreign Assets or FX Derivatives) is the share of firms that have either outstanding foreign assets in 2013 or outstanding foreign exchange derivatives in 2013. The sample is limited to firms that ever reported in our data. Exporters are defined as firms that ever exported in our data.

Table 6: Hedging and Imports

	ln (imports)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post × FCL	-0.150***	-0.270***	0.001						
	(0.045)	(0.062)	(0.046)						
Post × FCL × Hedge	0.141**	0.246***	0.001						
	(0.052)	(0.079)	(0.054)						
Post × LS				-0.072**	-0.084**	-0.054			
				(0.030)	(0.039)	(0.038)			
Post × LS × Hedge				0.088**	0.105	0.064			
				(0.040)	(0.071)	(0.046)			
Post × WS							-0.084***	-0.131***	-0.021
							(0.029)	(0.036)	(0.042)
Post × WS × Hedge							0.107***	0.140*	0.045
							(0.038)	(0.071)	(0.050)
Sample	All	Non-X	X	All	Non-X	X	All	Non-X	X
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	524,943	350,934	174,009	524,943	350,934	174,009	524,943	350,934	174,009

Notes: The table reports the estimated β and γ from Equation 6 with $\ln(1+imports)$ on the left-hand side at the quarterly level. Columns (1)-(3) report the estimated coefficient of the interaction of *Post* with foreign currency leverage (FCL) and the interaction of *Post*×FCL×Hedge. In columns (4)-(6) and (7)-(9) *Post* is interacted with liquidity (LS) and wealth shocks (WS) and the hedging dummy respectively. FCL, WS, and LS were normalized to have zero mean and a standard deviation of 1. *Hedge* is a dummy that equals one if the firm has either foreign currency assets outstanding or has foreign currency derivative positions outstanding in 2013 and zero if not. *Post* is defined as a binary variable equal to 1 for the period after 2014Q2. The sample is limited to the firms that ever imported. Columns (1), (4), (7) report the results for all importers, columns (2), (5), (8) report the results for non-exporters, and columns (3), (6), and (9) report the results estimated on the sample of exporters. Exporters are firms that ever exported in our data. See Section 2.2 for the definition of the independent variables. Standard errors are clustered at the firm and quarter level. ***,**, and * indicate significance at 10%, 5%, and 1% levels respectively.

Table 7: Foreign Currency Assets Hedging and Imports

	ln (imports)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post × FCL	-0.150***	-0.270***	0.001						
	(0.045)	(0.062)	(0.046)						
Post × FCL × Hedge	0.141**	0.246***	0.001						
	(0.052)	(0.079)	(0.054)						
Post × LS				-0.072**	-0.084**	-0.054			
				(0.030)	(0.039)	(0.038)			
Post × LS × Hedge				0.088**	0.105	0.064			
				(0.040)	(0.071)	(0.046)			
Post × WS							-0.084***	-0.131***	-0.021
							(0.029)	(0.036)	(0.042)
Post × WS × Hedge							0.107***	0.140*	0.045
							(0.038)	(0.071)	(0.050)
Sample	All	Non-X	X	All	Non-X	X	All	Non-X	X
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	524,943	350,934	174,009	524,943	350,934	174,009	524,943	350,934	174,009

Notes: The table reports the estimated β and γ from Equation 6 with $\ln(1 + imports)$ on the left-hand side at the quarterly level. Columns (1)-(3) report the estimated coefficient of the interaction of *Post* with foreign currency leverage (FCL) and the interaction of *Post*×FCL×Hedge. In columns (4)-(6) and (7)-(9) *Post* is interacted with liquidity (LS) and wealth shocks (WS) and the hedging dummy respectively. FCL, WS, and LS were normalized to have zero mean and a standard deviation of 1. *Hedge* is a dummy that equals one if the firm has foreign currency assets outstanding in 2013 and zero if not. *Post* is defined as a binary variable equal to 1 for the period after 2014Q2. The sample is limited to the firms that ever imported. Columns (1), (4), (7) report the results for all importers, columns (2), (5), (8) report the results for non-exporters, and columns (3), (6), and (9) report the results estimated on the sample of exporters. Exporters are firms that ever exported in our data. See Section 2.2 for the definition of the independent variables. Standard errors are clustered at the firm and quarter level. ***,**, and * indicate significance at 10%, 5%, and 1% levels respectively.

Table 8: Foreign Exchange Derivative Markets Hedging and Imports

	ln (imports)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post × FCL	-0.124***	-0.251***	-0.004						
	(0.033)	(0.054)	(0.029)						
Post × FCL × Hedge	0.128*	0.388***	-0.060						
	(0.062)	(0.114)	(0.058)						
Post × LS				-0.051**	-0.074*	-0.025			
				(0.023)	(0.036)	(0.025)			
Post × LS × Hedge				0.040	0.081	-0.002			
				(0.050)	(0.114)	(0.051)			
Post × WS							-0.066***	-0.134***	-0.004
							(0.023)	(0.034)	(0.028)
Post × WS × Hedge							0.088*	0.226**	-0.020
							(0.048)	(0.103)	(0.049)
Sample	All	Non-X	X	All	Non-X	X	All	Non-X	X
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	524,943	350,934	174,009	524,943	350,934	174,009	524,943	350,934	174,009

Notes: The table reports the estimated β and γ from Equation 6 with $\ln(1+imports)$ on the left-hand side at the quarterly level. Columns (1)-(3) report the estimated coefficient of the interaction of *Post* with foreign currency leverage (FCL) and the interaction of *Post*×FCL×Hedge. In columns (4)-(6) and (7)-(9) *Post* is interacted with liquidity (LS) and wealth shocks (WS) and the hedging dummy respectively. FCL, WS, and LS were normalized to have zero mean and a standard deviation of 1. *Hedge* is a dummy that equals one if the firm has foreign currency derivative positions outstanding in 2013 and zero if not. *Post* is defined as a binary variable equal to 1 for the period after 2014Q2. The sample is limited to the firms that ever imported. Columns (1), (4), (7) report the results for all importers, columns (2), (5), (8) report the results for non-exporters, and columns (3), (6), and (9) report the results estimated on the sample of exporters. Exporters are firms that ever exported in our data. See Section 2.2 for the definition of the independent variables. Standard errors are clustered at the firm and quarter level. ***,**, and * indicate significance at 10%, 5%, and 1% levels respectively.

Table 9: Borrowing

	ln (FC borrowing)			ln (LC borrowing)		
	(1)	(2)	(3)	(4)	(5)	(6)
Post × FCL	-0.587***			0.104***		
	(0.117)			(0.026)		
Post × LS		-0.207***			0.029	
		(0.059)			(0.017)	
Post × WS			-0.391***			0.068***
			(0.097)			(0.020)
Firm FE	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y
N	524,943	524,943	524,943	524,943	524,943	524,943

Notes: The table reports the estimated β coefficient from Equation 4 with $\ln\left(1+borrowing\right)$ on the left-hand side at the quarterly level. Columns (1)-(3) report the results for borrowing in foreign currency and columns (4)-(6) use borrowing in local currency on the left-hand side. Columns (1) and (4) report the estimated coefficient of the interaction of a *Post* with foreign currency leverage (FCL). In columns (2), (5) and (3), (6) *Post* is interacted with liquidity (LS) and wealth shocks (WS) respectively. FCL, WS, and LS were normalized to have zero mean and a standard deviation of 1. *Post* is defined as a binary variable equal to 1 for the period after 2014Q2. See subsection 2.2 for the definition of the independent variables. Standard errors are clustered at the firm and quarter level. ***,**, and * indicate significance at 10%, 5%, and 1% levels respectively. The sample is limited to the firms that ever imported in our data. Exporters are firms that ever exported in our data.

Table 10: Interest rate

	Interest Rate								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FCL × Post	0.038	0.135***	-0.004						
	(0.029)	(0.049)	(0.037)						
LS × Post				0.049*	0.078*	0.036			
				(0.029)	(0.040)	(0.040)			
WS × Post							0.025	0.093*	-0.017
							(0.032)	(0.050)	(0.041)
Sample	All	Non-X	X	All	Non-X	X	All	Non-X	X
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank × Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	364,915	220,722	143,776	364,915	220,722	143,776	365,271	220,722	143,776

Notes: The table reports the estimated β from Equation 7 with r the interest rate charged by bank b at day d to firm f on the left-hand side. Columns (1)-(3) report the estimated coefficient of the interaction of *Post* with foreign currency leverage (FCL). In columns (4)-(6) and (7)-(9) *Post* is interacted with liquidity (LS) and wealth shocks (WS). FCL, WS, and LS were normalized to have zero mean and a standard deviation of 1. *Post* is defined as a binary variable equal to 1 for the period after 2014Q2. The sample is limited to the firms that ever imported. Columns (1), (4), (7) report the results for all importers, columns (2), (5), (8) report the results for non-exporters, and columns (3), (6), and (9) report the results estimated on the sample of exporters. Exporters are firms that ever exported in our data. See Section 2.2 for the definition of the independent variables. Standard errors are clustered at the firm and quarter level. ***,**, and * indicate significance at 10%, 5%, and 1% levels respectively.

Table 11: Delinquency

	Delinquent								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post × FCL	0.002***	0.006***	0.001						
	(0.001)	(0.002)	(0.001)						
Post × LS				0.001*	0.003**	0.000			
				(0.001)	(0.001)	(0.001)			
Post × WS							0.001**	0.004***	0.001
							(0.001)	(0.001)	(0.001)
Sample	All	Non-X	X	All	Non-X	X	All	Non-X	X
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank × Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	3,635,780	2,165,253	1,470,378	3,635,780	2,165,253	1,470,378	3,635,780	2,165,253	1,470,378

Notes: The table reports the estimated β from Equation 8 with $Delinquent$ as a dummy variable on the left-hand side at the quarterly level that is equal to 1 if the firm is delinquent on a loan at quarter t to bank b. Columns (1)-(3) report the estimated coefficient of the interaction of *Post* with foreign currency leverage (FCL). In columns (4)-(6) and (7)-(9) *Post* is interacted with liquidity (LS) and wealth shocks (WS). FCL, WS, and LS were normalized to have zero mean and a standard deviation of 1. *Post* is defined as a binary variable equal to 1 for the period after 2014Q2. The sample is limited to the firms that ever imported. Columns (1), (4), (7) report the results for all importers, columns (2), (5), (8) report the results for non-exporters, and columns (3), (6), and (9) report the results estimated on the sample of exporters. Exporters are firms that ever exported in our data. See Section 2.2 for the definition of the independent variables. Standard errors are clustered at the firm and quarter level. ***,**, and * indicate significance at 10%, 5%, and 1% levels respectively.

Table 12: Placebo Domestic Leverage

	ln (imports)			ln (exports)
	(1)	(2)	(3)	(4)
Post × DCL	-0.029	-0.032	-0.006	0.003
	(0.019)	(0.022)	(0.030)	(0.014)
Sample	All	Non-X	X	X
Firm FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
N	523,719	350,094	173,625	168,848

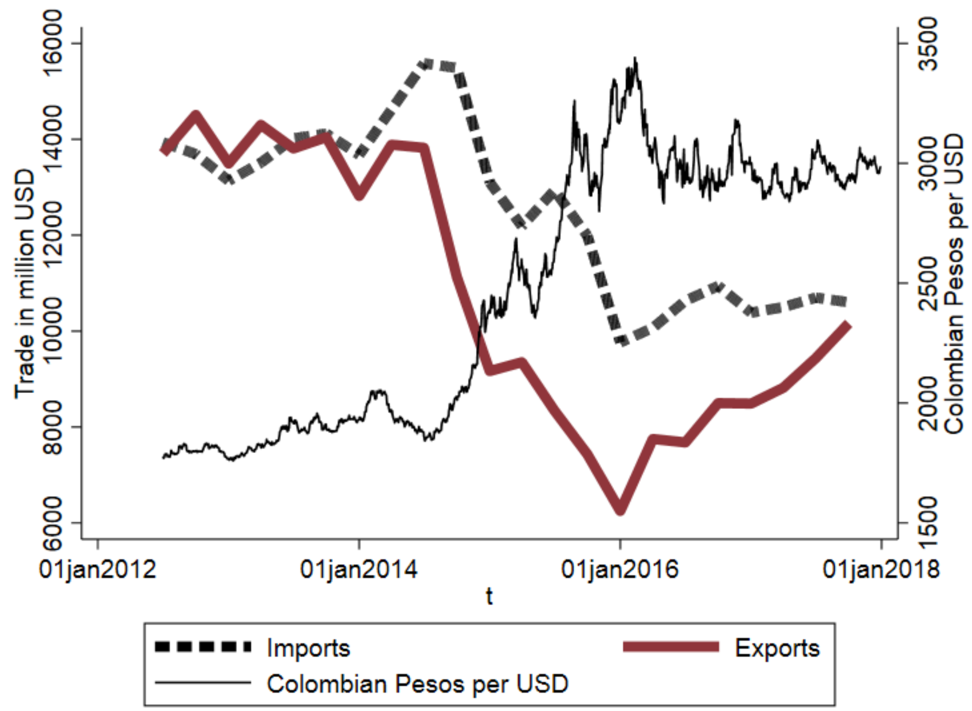
Notes: The table reports the estimated β coefficient from Equation 4 with $\ln(1 + imports)$ on the left-hand side in columns (1)-(3) report and $\ln(1 + exports)$ in column (4) at the quarterly level. Column (1) reports the estimated coefficient of the interaction of a *Post* with domestic currency leverage (DCL). DCL was normalized to have zero mean and a standard deviation of 1. Column (1) reports the results for all firms, column (2) focuses on non-exporters, while the sample in columns (3) and (4) is limited to only exporters. Standard errors are clustered at the firm and quarter level. ***,**, and * indicate significance at 10%, 5%, and 1% levels respectively. The sample is limited to the firms that ever imported in our data. Exporters are firms that ever exported in our data.

Table 13: Panel regression

	ln (imports)			ln (exports)
	(1)	(2)	(3)	(4)
L.FCL	5.418***	7.212***	3.927***	2.306***
	(0.416)	(0.704)	(0.475)	(0.353)
L.FCL × L.Δ ER	-0.823	-5.396**	-0.597	-2.106
	(1.348)	(2.399)	(1.561)	(1.404)
Sample	All	Non-X	X	All
Firm FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
N	231,602	149,337	82,265	231,602

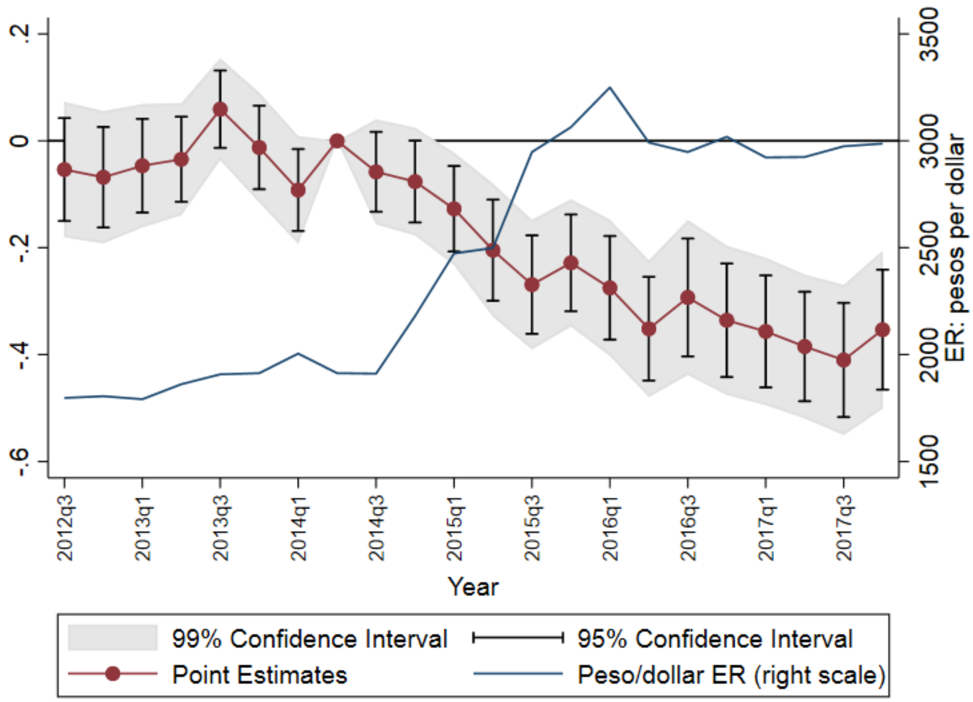
Notes: The table reports the estimated β coefficient from panel regression discussed in subsection 4.8 with $\ln(1+imports)$ on the left-hand side in columns (1)-(3) report and $\ln(1+exports)$ in column (4) at the annual level. See subsection 2.2 for the definition of FCL, which was normalized to have zero mean and a standard deviation of 1. Column (1) reports the results for all firms, column (2) focuses on non-exporters, while the sample in columns (3) and (4) is limited to only exporters. Standard errors are clustered at the firm and quarter level. ***,**, and * indicate significance at 10%, 5%, and 1% levels respectively. The sample is limited to the firms that ever imported in our data. Exporters are firms that ever exported in our data.

Figure 1: Imports, exports and the exchange rate in Colombia



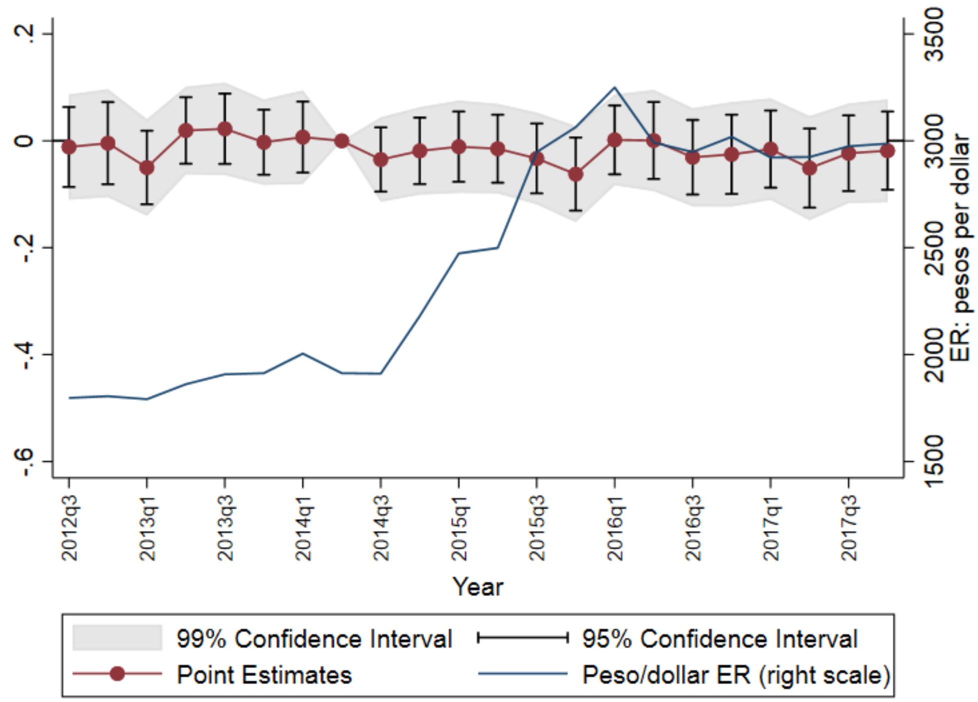
The thick red line represents aggregate exports and the dashed black line represents aggregate imports in Colombia in million dollars. Trade variables are plotted on the left vertical axis. The thin black line represents exchange rate (Colombian Pesos per US dollar, right axis).

Figure 2: Estimated Impact of Imports by Non-Exporters as a function of larger dominant currency financing



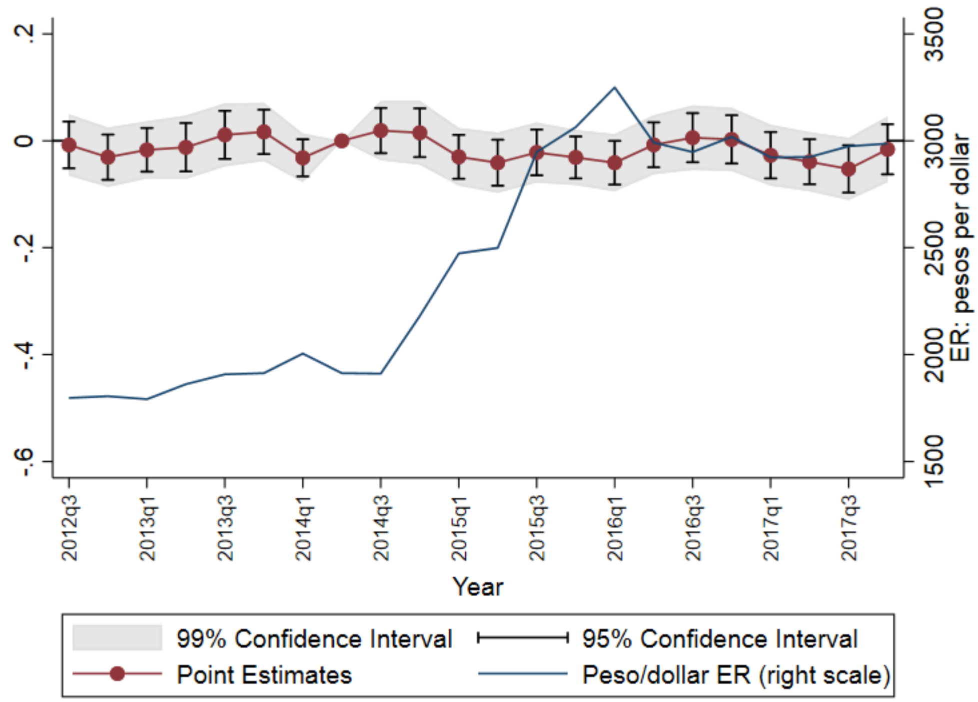
The figure plots point estimates (red dots), 90% (navy vertical bars) and 95% (grey shade) confidence bands of the effect of foreign currency leverage on imports (left vertical axis). See Equation 5 for specification. The thin blue line represents average Colombian Peso/US dollar exchange rate (right axis). Standard errors are clustered at the firm and quarter levels. The sample is limited to firms that imported at least once and never exported in our data.

Figure 3: Estimated Impact of Imports by Exporters as a function of larger dominant currency financing



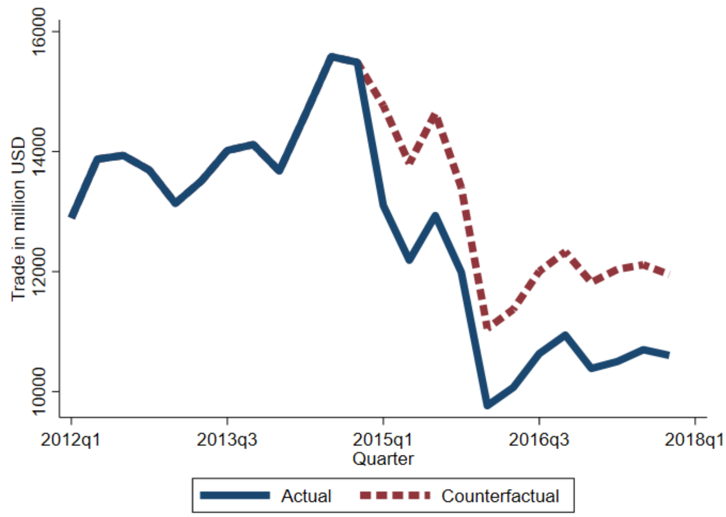
The figure plots point estimates (red dots), 95% (black vertical bars) and 99% (grey shade) confidence bands of the effect of foreign currency leverage on imports (left vertical axis). See Equation 5 for specification. The thin blue line represents average Colombian Peso/US dollar exchange rate (right axis). Standard errors are clustered at the firm and quarter levels. The sample is limited to firms that imported and exported at least once in our data.

Figure 4: Estimated Impact of Exports as a function of larger dominant currency financing



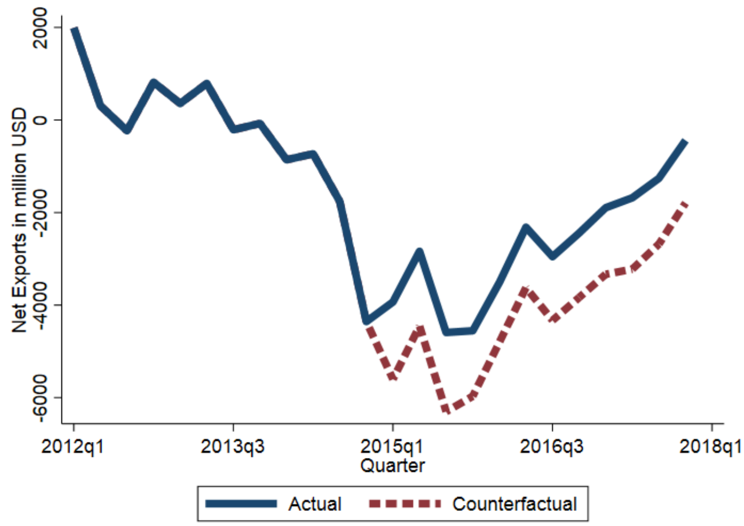
The figure plots point estimates (red dots), 95% (black vertical bars) and 99% (grey shade) confidence bands of the effect of foreign currency leverage on exports (left vertical axis). See Equation 5 for specification. The thin blue line represents average Colombian Peso/US dollar exchange rate (right axis). Standard errors are clustered at the firm and quarter levels. The sample is limited to firms that imported and exported at least once in our data.

Figure 5: Counterfactual Imports without Foreign Currency Debt



The figure plots the actual (thick blue line) and counterfactual (dashed red line) imports to Colombia. The counterfactual imports are computed assuming firms in 2014Q2 had zero foreign currency leverage. See subsection 4.4 for the details of the counterfactual exercise.

Figure 6: Counterfactual Net Exports without Foreign Currency Debt



The figure plots the actual (thick blue line) and counterfactual (dashed red line) Colombia's net exports. The counterfactual net exports are computed assuming firms in 2014Q2 had zero foreign currency leverage. See subsection 4.4 for the details of the counterfactual exercise.