The Dollar Financing and Trade: Evidence from Chile

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Abstract

Given the rising use of the U.S. dollar as the invoicing currency in international trade, this paper examines how dollar financing affects firms' trade behaviors from the perspective of cross-currency basis (CCB), a country-specific indicator of dollar borrowing cost for firms outside the United States. Using a multi-dimensional fixed effect model and two shift share Bartik-like instrument identifications, I take advantage of the disaggregated firm level trade data from Chile between 2009 and 2022, and find that easier access to dollar liquidity increases both firms' imports and exports, highlighting the important role that dollar liquidity plays in shaping firms' trading behaviors after the global financial crisis. When probing further, I find that CCB works as a better dollar liquidity indicator than the intensively studied broad dollar index. An additional analysis with China echoes the finding from Chile and shows how this effect differentiates in different exchange rate regimes, providing further evidence on the effect of dollar liquidity on trade beyond the scope of Chile. The findings are robust to model specification and variable measurement.

KEYWORDS: dollar financing; CIP deviations; cross-currency basis; international trade

*ESSEC Business School. Xin Long, Ph.D. candidate at Economics Department, ESSEC Business Shcool, 3 Avenue Bernard Hirsch, 95000 Cergy, France. Email: xin.long@essec.edu. All errors are my own. The findings, interpretations, and conclusions expressed in this article are entirely those of the author(s). They do not necessarily represent the views of the institutions, its directors, or the clients they represent.

1 Introduction

Financing is essential to economic activities, especially for investment and trade. As the most influential currency, the U.S. dollar dominates others in trade invoicing, and is commonly used as a vehicle currency in international trade where countries involved in the transactions do not even use it domestically (Gopinath 2015). As illustrated in Figure 1, dollar invoicing in exports is not only prevalent in Americas where the United States is supposed to have a greater influence, but also common across Asia Pacific and the rest of world, with the mere exception in Europe where the euro serves as a regional currency in the area[1]. A closer examination in the trade invoicing for firms in Chile[2] further confirms the hegemony of the U.S. dollar in a non-dollar country, in which more than four-fifths of the trade activities are invoiced dollars, especially in exports where the average dollar invoicing rate mounts to over 90 percentage points during the most recent decade.

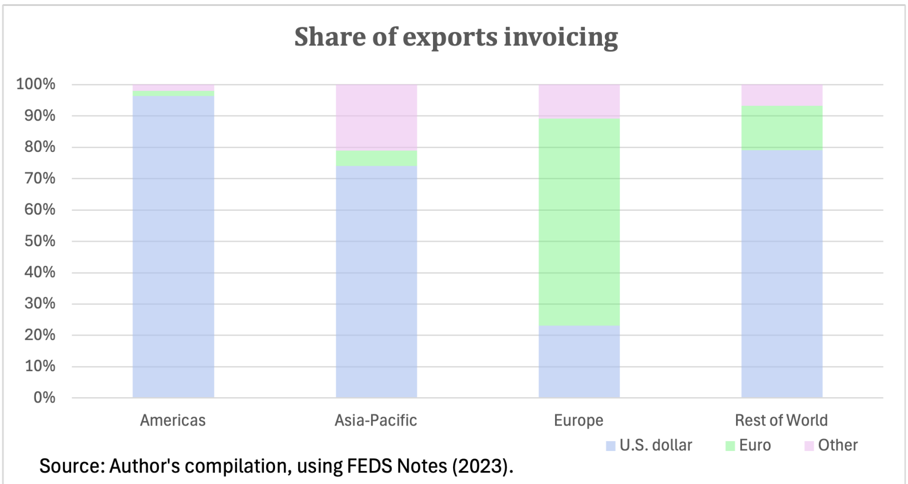


Figure 1: The U.S. dollar is ubiquitously used as the invoicing currency in exporting activities across the world, with the only exception in Europe where the euro outweighs the dollar as the most common invoicing currency. Strikingly, more than 95% exporting transactions are invoiced in U.S. dollar in Americas, reflecting its dominant position in the region, where Chile—the interest of the paper—lies in.

International trade, however, has witnessed a dramatic decline since the 2007/08 crisis (Chen and Juvenal 2018; Levchenko, Lewis, and Tesar 2010) and hasn't been recovered to the pre-crisis level. While some (Benguria and Taylor 2020) argue that a decline in the demand side drives this result, others (Bems, Johnson, and Yi 2013; Chor and Manova 2012) find evidence on how liquidity shortages contribute to the fall in trade. Given the flagging trade revolution and the popularity of dollar invoicing in trade, whether dollar liquidity matters for the trade in a non-US country seems to be an empirical question, and therefore is the focus of this paper.

The non-arbitrage condition—covered interest parity (CIP)—has been found to break down since the inception of the Global Financial Crisis (GFC). Large and persistent cross-currency

[1] Nevertheless, Maggiori, Neiman, and Schreger (2019) document a recent trend of a rise in the use of dollar while a decline in the euro in both international trade and international finance, revealing the increasing dollar hegemony in the international market.

[2] In Figure A.1, I illustrate the usage of invoicing in terms of currency for both imports and exports.

basis[3] are observed with a lot of currencies vis-à-vis the U.S. dollar (Cerutti, Obstfeld, and Zhou 2021; Du et al. 2018; Iida, Kimura, and Sudo 2018), which is regarded as a measure of dollar borrowing cost for non-US firms from the foreign exchange and swap market. This paper argues that the cross-currency basis is a better proxy of dollar liquidity condition for foreign borrowers than the commonly used dollar exchange rate (Bruno and Shin 2023; Obstfeld and Zhou 2022) since it differentiates the borrowing costs in a specific currency used in the country rather than a multilateral exchange rate that is assumed to be the same for borrowers from all over the world.

With a focus on Chile, I plot the evolution of Chilean imports[4] and cross-currency basis of Chilean Peso against the US dollar[5] at the three-month tenor, the dollar financing cost confronted by Chilean firms in Figure 2. Obviously, the two fluctuate in the same direction during the sample period. When the U.S. dollar is at a lower cost for Chilean borrowers, Chile imports more from the rest of the world, hinting that firms' trading behaviors might be affected by the dollar liquidity in Chile.

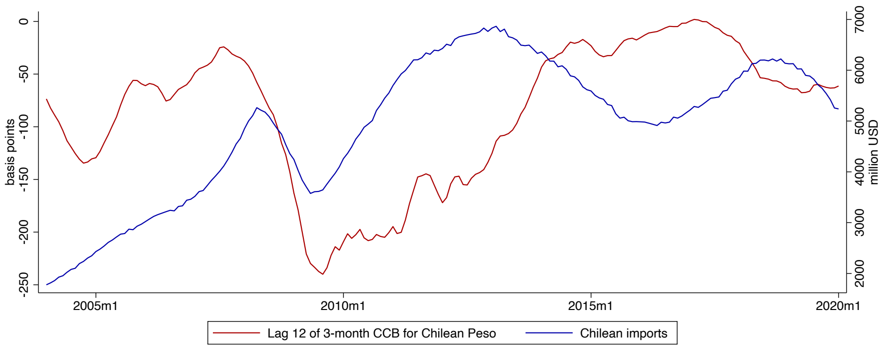


Figure 2: Chilean imports and CCB_Chile

In this paper, I look into the intersection of the U.S. dollar's role in financial globalization and international trade from the perspective of the cross-currency basis, separately using firm level imports and exports data from Chile with a multi-dimensional fixed effects model to explore how the access to dollar liquidity affects firms' trade activities.

Alternatively, I take advantage of the invoicing data at the transaction level, employing a Bartik-like shift share methodology by creating a variable of currency exposure multiplied with the cross-currency basis to identify the effect of dollar liquidity on firms' trade behaviors. While Bartik instrument identification does not always require an instrument, I further construct a firm level sector intensity multiplied with the cross-currency basis as another shift share measure, where the firm level sector intensity is instrumented with either a one-year lag sector intensity at the country level or an instrument set together with a sector currency exposure at the firm level to resolve the potential endogeneity.

The empirical results confirm the role that the U.S. dollar plays in the determination of firms' trade pattern–an easier access to the U.S. dollar improves both their imports and exports–

[3]The cross-currency basis is a measure of the deviation from CIP. For details, see Du, Tepper, and Verdelhan (2018).

[4]I also look into Chilean exports, which exhibits a similar pattern. This graph is available on request.

[5]An increase in cross-currency basis indicates an improvement of dollar financing condition or easier access to dollar liquidity.

a finding not only validates in Chile but applies to China as well. This finding persists with a battery of robustness checks.

Related literature. The trade invoicing literature has both theoretically and empirically examined how firms might make their own choice of currency for international trade. This choice might differentiate imports from exports possibly due to the dependence on imported inputs (Amador, Mehl, Schmitz, and Garcia 2024; Chung 2016), market share size (Devereux, Dong, and Tomlin 2017), and demand elasticities across industries (Goldberg and Tille 2008), affecting the exchange rate pass-through into prices and quantities (Amiti, Itskhoki, and Konings 2022). However, firms' financing considerations are normally neglected in this area. The prevalence of dominant currency paradigm[6] in international trade—where most transactions are invoiced in the U.S. dollar—has been intensively documented either at the global (Goldberg and Tille 2008; Gopinath, Boz, Casas, Díez, Gourinchas, and Plagborg-Møller 2020; Gopinath and Itskhoki 2022) or an individual country level such as Chile (De Gregorio, García, Luttini, and Rojas 2024; Giuliano and Luttini 2020)—the interest of this work. This paper, therefore, deviates from this area of research by looking at the dollar financing needs for firms and exploring how dollar liquidity access affects their trade patterns on the premise that dollar indeed dominates in invoicing in Chile's trade.

Some researchers highlight the importance of finance on trade after the GFC for both exports (Amiti and Weinstein 2011; Asmundson, Dorsey, Khachatryan, Niculcea, and Saito 2011) and imports (Schmidt-Eisenlohr 2013). Trade finance[7] has been found to be an important source of (short-term) funds for firms (Daripa and Nilsen 2011; Giannetti, Burkart, and Ellingsen 2011; Klapper, Laeven, and Rajan 2012; Wu, Firth, and Rui 2014), working as either a complement or substitute to bank credit (Burkart and Ellingsen 2004). Theoretically, a supplier may have an advantage in providing trade credit without receiving a collateral due to its technological specificity[8] that motivates the borrowers to repay (Cunat 2007), while creditors protection through improvements in collateral law does increase the amount and duration of trade credit in general (Costello 2019; Fabbri and Menichini 2010).

Theoretical analysis provides evidence on the emergence of a single dominant currency (the U.S. dollar) to finance international trade, either due to imperfect contract enforcement and financial frictions to obtain the needed collateral (Chahrour and Valchev 2022) or the complementarity of dollar's role as a unit of account to that as a safe store of value (Gopinath and Stein 2021). As the demand for collateral increases, the covered interest rate parity (CIP) breaks down (Tang and Zhu 2016), and the deviation from CIP between the local currency vis-à-vis the U.S. dollar is regarded and used as an indicator of dollar liquidity shortage (Bacchetta, Davis, and Van Wincoop 2023; Filipe, Nissinen, and Suominen 2023) in this paper given the

[6] The dominant currency paradigm refers to the phenomenon where the international trade is invoiced in a few major currencies—most often the U.S. dollar—regardless of the country involved in the transaction. The euro, sometimes, works as a regional vehicle currency in Europe and some African countries. For details, see Gopinath and Itskhoki (2022) and Amador et al. (2024).

[7] Trade finance or trade credit refers to the scenario where a supplier (an exporter) acts as a liquidity provider and allows a customer (an importer) to delay payments for goods.

[8] In this scenario, borrowers rely on the suppliers' products as intermediate inputs and cannot find a replaceable provider in a short time given the technological specificity of the latter. Consequently, they are motivated not to default even though no collateral is held by the providers.

dominance of dollar. Therefore, I contribute to the literature at the intersection of trade finance and dollar dominance in trade by providing an empirical evidence on how dollar liquidity access affects the trade performance of firms outside the United States.

Another strand of literature emphasizes the role of the U.S. dollar as a global factor in economic and financial activities (Bruno and Shin 2015; Gourinchas 2021), in which the global risk co-moves with a strengthening dollar exchange rate (Avdjiev, Bruno, Koch, and Shin 2019; Cerutti et al. 2021; Lilley, Maggiori, Neiman, and Schreger 2022). When the dollar appreciates, international dollar funding stress increases (Obstfeld and Zhou 2022) and the global financial condition tightens, contracting economic activity (Georgiadis, Müller, and Schumann 2024). In particular, banks' balance sheet shrinks and they, therefore, have to curtail their credit supply to the private sector when U.S. dollar appreciates, dragging investment and trade. Bruno and Shin (2015) term this as the financial channel of exchange rate, and researchers have empirically verified its effect on trade both at firm (Bruno and Shin 2023) and country level (Ma and Schmidt-Eisenlohr 2023). Nevertheless, these works generally center on the broad dollar index as the dollar liquidity condition, which might not be as accurate as the *currency-specific* cross-currency basis—a measure of the deviation from CIP—employed in this paper.

Last but not the least, this paper also speaks to the literature on the breakdown of CIP after 2007, focusing on exploring the causes. These explanations include heightened counterparty risk (Baba and Packer 2009; Hui, Genberg, and Chung 2011), greater illiquidity in the foreign exchange market (Fong, Valente, and Fung 2010; Pinnington and Shamloo 2016), a strengthening of the dollar (Avdjiev, Du, Koch, and Shin 2019; Cerutti et al. 2021), increases in hedging demand for dollars (Borio, McCauley, McGuire, and Sushko 2016; Liao and Zhang 2020), rising transactions costs of various kinds (Cenedese, Della Corte, and Wang 2021; Du et al. 2018; Liao 2020; Rime, Schrimpf, and Syrstad 2022), and monetary policy divergences (Fukuda and Tanaka 2017; Iida et al. 2018). This paper departs from this family of papers in not attempting to explain the *causes* of CIP deviations in Chile, but providing its *consequence* on firms' trade as a country-specific dollar liquidity condition.

The paper proceeds as follows. Section 2 provides the theoretical analysis on cross-currency basis (or CCB), arising from the deviations from CIP, and describes the data and econometric methodology. The empirical results together with the robustness analysis are documented in Section 3. Section 4 conducts some further discussions on the key finding, and Section 5 concludes.

2 Theoretical background and methodology

2.1 Cross-currency basis as a measure for dollar liquidity

Covered interest parity is a non-arbitrage condition in international finance, which states that the returns from two different cash markets for the same tenor should be equal, after hedging exchange rate risk via a forward contract. For a country i facing continuously compounded interest rates at time t with an n-period tenor, CIP may be expressed as:

$$e^{n \cdot r^*_{t,t+n}} = e^{n \cdot r_{it,i(t+n)}} \cdot \frac{S_{it}}{F_{it,i(t+n)}} \tag{1}$$

where $\mathbf{r}_{it,i(t+n)}$ ($\mathbf{r}^*_{t,t+n}$) represents the interest rate for the currency of country i (US dollar), and $\mathbf{S}_{it}$ and $\mathbf{F}_{it,i(t+n)}$ are the directly quoted[9] spot and forward exchange rates, respectively.

With perfect arbitrage, (1) will hold with equality at all times. However, deviations from CIP may emerge, and this is expressed as the cross-currency basis $\mathbf{x}_{it,i(t+n)}$,[10] which captures the difference between the dollar interest rate and the *synthetic* dollar rate. Incorporating $\mathbf{x}_{it,i(t+n)}$ into equation (1) yields:

$$e^{n \cdot r^*_{t,t+n}} = e^{n \cdot \left(r_{it,i(t+n)} + x_{it,i(t+n)}\right)} \cdot \frac{S_{it}}{F_{it,i(t+n)}} \tag{2}$$

By taking logarithms and solving (2) for $\mathbf{x}_{it,i(t+n)}$, I obtain the expression for the cross-currency basis for country i:

$$x_{it,i(t+n)} = r^*_{t,t+n} - \left[r_{it,i(t+n)} - \frac{1}{n}\left(f_{it,i(t+n)} - s_{it}\right) \right] \tag{3}$$

where $\mathbf{f}_{it,i(t+n)}$ ($\mathbf{s}_{it}$) are the log-equivalent terms for the forward (spot) exchange rate. Equation (3) expresses the CCB as the difference between the direct and synthetic dollar interest rates (the term in the square brackets), the latter of which is obtained by borrowing domestic currency first, before swapping it for dollars in the FX market with a forward contract, to hedge exchange rate risk.

From the perspective of dollar borrowers, the two rates illustrate the funding cost of borrowing dollars for American investors and foreign investors, respectively. The sign of $\mathbf{x}_{it,i(t+n)}$ indicates the direction of CIP deviations. When $\mathbf{x}_{it,i(t+n)} < 0$, it is cheaper to borrow dollars directly from the dollar cash market, as opposed to the cross-currency swap market (and *vice versa* when $\mathbf{x}_{it,i(t+n)} > 0$).

Thus, the negative basis relatively implies a dollar shortage for investor outside the United States, and an increase in the basis suggests an improvement in the dollar liquidity condition for foreign borrowers. This is the typical squeeze faced by non-US banks when they are in need of dollars to finance lending (or to hedge their other dollar liabilities such as offshore bonds) and firms when they need dollars to finance trade activities, but are unable to secure them in money markets. For Chilean firms, they generally confront with negative bases[11] across the sample period from 2009 to 2022, indicating common dollar liquidity shortages in the country.

2.2 Empirical identification

Firm level trade data from the National Customs Service of Chile allows me to study the fluctuations in trade at the country-firm-product-currency-unit level, and therefore focus on the role that dollar financing condition faced by firms in Chile plays in their trade pattern

[9] That is, the price in local currency per US dollar, such that an increase amounts to a depreciation.

[10] I follow Du et al. (2018) and measure the cross-currency basis in terms of the currency of country i against the US dollar. As such, a negative basis implies a dollar shortage for investors outside of the US, which is the opposite of other studies that measure the cross-currency basis of the dollar vis-à-vis a foreign currency (see, for example,Baba and Packer (2009); Fukuda and Tanaka (2017); Levich (2012)).

[11] This is shown in Figure 3 in Section 2.3.

determination at a disaggregated level. In particular, the baseline specification is:

$$\Delta Y_{fpciut} = \alpha \Delta CCB\_Chile_{t-1} + \beta_{fpc} + \varepsilon_{fpciut} \tag{4}$$

where ΔY_{fpciut} is the yearly logarithm change in the value or volume of firm f's imports[12] of product p from country c invoiced in currency i measured in unit u in year t, ΔCCB_{t-1} is the change of cross-currency basis of Chilean Peso against the US dollar with a lag of one year, β_{fpc} is the firm-country-product level fixed effect, and ε_{fpcit} is the error term, respectively.

As discussed in subsection 2.1, the CCB in Chile is a macro-variable determined by both interest and exchange rates, which is supposed to be exogenous to any firms since an individual firm obviously has little influence on the determination of either component and therefore the CCB itself. However, if one ambitiously perceives that the overall better trade performance in a country could in return improves its overall dollar funding condition, the simultaneity issue might exist[13]. In addition, it takes time before the dollar liquidity has an effect on real economic activities since trade has already started at the moment when firms observe the variation in their dollar liquidity access. Therefore, I regress the variations in firms' trade on the changes in CCB of Chile with a *lag* in specification (4) to mitigate the potential endogeneity problem, as is usually conducted in the literature (Amiti and Weinstein 2011; Bruno and Shin 2023; Kim, Lim, and Yun 2024).

For imports[14], the multi-level firm-country-product fixed effect enables me to explore the variation within a firm's imports of the same product from a same country over time, therefore capturing its demand for a product[15] from a specific country and thereby providing a framework to examine how dollar liquidity access to Chilean firms affects their imports growth (demand) at a narrowly defined firm-product-country level. The standard error is clustered at the firm and year level.

Noticeably, neither do I control the currency or unit fixed effect. Currency fixed effect allows one to examine the effect of dollar liquidity on all the variations within the same invoicing currency over time. As a dominant currency in international trade, the U.S. dollar dominates in the invoicing currency of trade activities of Chilean firms[16], making it less necessary to control currency fixed effect. Besides, as a vehicle currency, the U.S. dollar is also extensively used in trade flows not directly involving the United States (Goldberg and Tille 2008), suggesting that the U.S. dollar could be the currency people need for emergency funding and central bank uses for intervention purpose. Put it another way, firms might still be affected by dollar liquidity shocks on top of the invoicing channel. Therefore, I decide not to control the currency fixed

[12]For simplicity, I describe this equation from the perspective of imports, which also applies to exports as well. Put it another way, there are four candidates for the dependent variable, imports value, imports volume, exports value and exports volume, all in logarithm first differenced terms.

[13]While this is less likely happening at the firm level, it could still be the case for certain period when the overall trade performance improves a lot in the country, decreasing the cost of borrowing dollars for all firms in the country given their tremendous enhancement in trade.

[14]In the case of exports, it helps to extract the demand shock for the same product from the same destination country. Comparatively, one might also regard this as the supply shock across firms at the country and product level.

[15]Without loss of generality, I look at the HS 2-digit level for the product classification.

[16]See Figure A.1for details

effect here but leave it as a robust check[17]. As for unit fixed effect, there is no evidence on how dollar liquidity differently affects a firm's trade in products in terms of different units of measurement. So I consider it as a robust check as well.

While the specification (4) examines the effects of dollar liquidity access on firms' trade behaviours as a whole, one might think that firms could be differentiated in their dollar exposure, making a difference of the effect of dollar liquidity on their trade behaviors. A straightforward impression is that firms with transactions more heavily invoiced in dollars will generally be more sensitive to variations in dollar liquidity condition. However, as the "hegemon" currency in international trade (Gourinchas 2021), the vehicle currency nature of the U.S. dollar makes it matter for trade through the medium of exchange as well on top of unit of account (invoicing). That said, other invoicing currencies used in trade could be regarded as competitors of the US dollar, and the frequency of their use for invoicing purpose reflects the corresponding exposure to the common dollar liquidity shock. Therefore, I take advantage of the invoicing currency for each individual transaction, and construct a currency exposure variable at the firm-product-year level:

$$Currency\ exposure_{fpit} \equiv CE_{fpit} = \frac{N_{fpit}}{N_{fpt}}$$

where CE_{fpit} is the measure of a firm's currency exposure in trade, which is the share of the number of transactions invoiced in currency i for product p in firm f of year t (N_{fpct}) over the number of all the transactions at the same firm-product-year level regardless of invoicing currencies (N_{fpt}). The specification below, therefore, works as an alternative baseline which takes into account a firm's currency exposure:

$$\Delta Y_{fpciut} = \alpha' CE_{fpit} \cdot \Delta CCB\_Chile_{t-1} + \beta'_{fpc} + \varepsilon'_{fpciut} \tag{5}$$

In particular, the coefficient on $CE_{fpit} \cdot \Delta CCB\_Chile_{t-1}$ captures the average sensitivity of firm f to fluctuations in the overall US dollar liquidity in the presence of various invoicing currency, a more accurate proxy of the effects of dollar financing on firms' trade behaviors[18]. Again, specification (5) applies to both imports and exports, and a positive coefficient is expected on α'.

While I hesitate to characterize this as a shift-share design—unlike a genuine Bartik instrument, the sum of the weighted shifts does not decompose into an identity in this case—the notion of using exogenous shares to weight differential exposure to common shocks as a means of identification (Goldsmith-Pinkham, Sorkin, and Swift 2020) is in the same spirit.

One could still feel unconvinced with the identifications above since the dollar liquidity condition is assumed to be the same for all the firms. The access to dollar liquidity for firms might vary depending on the risk-taking ability of banks that they rely on for external finance (Amiti and Weinstein 2011; Bruno and Shin 2023; Kim et al. 2024), however, the focus of this paper is to examine how the overall dollar liquidity condition in the country affects firms' trade when

[17]The results where the currency together with the country-firm-product fixed effects are controlled are qualitatively consistent with the baseline finding. A full set result table is available upon request.

[18]Despite dollar's vehicle currency nature, one might still argue that the US dollar exposure matters more for a firm's trade than the currency exposure when it is experiencing dollar liquidity shocks. Therefore, estimations with the US dollar exposure are considered as a robustness check.

they have to tap the FX market for liquidity needs. As another alternative, I apply one more Bartik instrument methodology where instruments are used.

Different sectors might vary in liquidity needs, and therefore has different dollar liquidity exposure[19]. For an importing firm f, its importing intensity in a certain sector[20] s relative to all sectors plausibly reflects its dollar exposure in this particular sector, and can be measured as:

$$Sector\ intensity_{fst} \equiv SI_{fst} = \frac{Y_{fst}}{Y_{ft}}$$

where Y_{fst} represents the imports value for sector s of firm f in year t, and Y_{ft} denotes the total imports value for all sectors of firm f in year t, respectively. Therefore, it measures the dollar exposure of a firm across sectors over time and sums up to 1 within each firm, constituting the component of the "share" part of a Bartik instrument. Thereby, the empirical specification follows:

$$\Delta Y_{fpciut} = \gamma SI_{fst} \cdot \Delta CCB\_Chile_{t-1} + \theta_{fpc} + \epsilon_{fpciut} \tag{6}$$

The coefficient—γ—captures the effects of the dollar liquidity shock on the firm' trade in terms of its shifting dollar exposure across different sectors. Likewise, an exporting sector intensity can be constructed and the specification above applies to exports as well.

Although the Bartik instrument identification does not necessarily require a real instrument, another concern—the endogeneity of the share variable — arises since it is directly generated from the firm's trade value. Therefore, I instrument the firm level sector intensity with a lag of one year sector intensity at the country level to resolve the endogeneity concern, in line with the spirit of Autor, Dorn, and Hanson (2013) who instrument their Bartik shift share variable—the US labor market exposure to Chinese import—with a non-US exposure to Chinese imports constructed with a decade lag in its local employment level.

The sector intensity at the sector level is an overall indicator for firm's sector intensity, which obviously indicates the two are closely associated. With a one-year lag, the overall sector intensity remains a good proxy for the contemporaneous firm level sector intensity since the former does not vary much within a short period, which satisfies the relevance condition. However, there is no evidence that Chile's sector intensity level in trade one year ago should affect its firm's current transactions with the rest of the world, validating the exclusion restriction condition.

Furthermore, I construct an instrument set comprising of the one-year lag sector intensity together with the currency exposure at the firm-currency-year level, CE_{fsit}[21], for estimation

[19]A sector that relies intensively on importing inputs either raw materials or intermediate products might be more dependent on dollar availability for working capital purpose, while a firm with a larger trade intensity in a certain sector is likely to be affected more by dollar financing due to a higher probability of its dollar exposure.

[20]The sector intensity defined here is at the intra-firm level. Alternatively, it could also be measured at the across-firm level, as $SI'_{fst} = \frac{Y_{fst}}{Y_{st}}$, where Y_{st} denotes the total imports value for the whole sector s from all firms in year t. While SI_{fst} seems to be a better proxy for sector intensity since it compares the intensity within each firm, I employ SI'_{fst} as a robust check. Sectors are categorized at a two-digit HS code according to the classification from the World Integrated Trade Solution (WITS). The detailed sector classification is reported in Table A.2 in the appendix.

[21]Similarly, $CE_{fsit} = \frac{N_{fsit}}{N_{fst}}$, which is the ratio of the number of transactions invoiced in currency i for firm f in sector s of year t (N_{fsit}) over the total number of transactions at the same level regardless of the invoicing

where I denote as the two-stage-least-square (2SLS) specification in comparison with the IV specification where the mere one-year lag sector intensity indicator is employed. The currency exposure at the firm's sector level should be related to its sector intensity. Intuitively, a more intensive sector is more likely to have a larger dollar exposure or a lower non-dollar exposure, implying the two are intimately associated. However, the currency exposure itself should not affect a firm's trade directly.

More generally, the instrument (set) constitutes the first stage regression:

$$SI_{fst} = \psi Z_{st-1} + \upsilon_{fst} \tag{7}$$

$$SI_{fst} = \psi_1 Z_{st-1} + \psi_2 CE_{fsit} + \upsilon'_{fst} \tag{8}$$

where $\upsilon_{fst} \sim IID\left(0, \sigma_{\upsilon}^2\right)$ and $\upsilon'_{fst} \sim IID\left(0, \sigma_{\upsilon'}^2\right)$ are idiosyncratic error terms. Estimates of (7) and (8) correspond to the first stage of the IV and 2SLS specifications, respectively.

2.3 Sample choice and data

I focus on Chile since it serves as an ideal country to explore the spillover effect of the U.S. dollar liquidity on its trade for several reasons. Firstly, it is a small open economy with a deep integration into international trade but a relatively limited ability to affect world prices and international interest rates, relieving the concern on potential endogeneity issue that a large country might have the ability to adjust its dollar financing cost by affecting international interest rate through trade.

Secondly, the country conducts a flexible exchange rate regime and does not restrict any capital flows, providing a perfect precondition for this analysis. Thirdly, Chile provides public access to detailed records of trade activities for both imports and exports at the firm level, providing concrete micro data to study this issue. Fourthly, both exports and imports in Chile are highly invoiced in the U.S. dollars, suggesting that dollar access should possibly have an effect on shaping firms' trade activities within the country. As illustrated in Figure A.1, almost 80% of the total importing activities is denominated in the U.S. dollar in Chile, followed by Euros accounting for around 10% in the most recent decade. This ratio, however, is even larger for exports with approximately 90% transactions invoicing in the U.S. dollar.

The firm level trade data for both imports and exports is acquired from Chile's National Customs Service, which provides records of trade activities including highly dis-aggregated product details at the eight-digit Harmonized System (HS) code with the acceptance of date, counterparty country, different units of measurement, invoicing currency, trade volumes and trade values[22]. Therefore, I can collapse it into the country-firm-product-currency-unit level at a yearly basis, as described in section 2.2. Due to the availability of data, I focus on the period from 2009 to 2022[23]. The descriptive statistics at the dis-aggregated level of the firms is shown in Table A.1 in the appendix. Generally speaking, the imports data is more compact

currency (N_{fst}).

[22] I use FOB value for exports and CIF value for imports in the analysis.

[23] While the National Customs Service provides firm's exports data since 2007, it has only records of imports data from 2009. To avoid potential biases from the Global Financial Crisis (GFC) period and conduct consistent estimations for both imports and exports, I restrict the sample period between 2009 and 2022.

than exports data, given that the number of importing firms is far larger than that of exporting firms. The product level is based on a two-digit HS code, which is a standard application in the literature (Gopinath et al. 2020; Ma and Schmidt-Eisenlohr 2023).

As for the dollar financing access indicator—the three-month tenor cross-currency basis of Chilean Peso (CLP) vis-à-vis the U.S. dollar (CCB_Chile) —I compute it according to equation (3) with relevant data[24] from Bloomberg and Chilean Benchmark Facility. The daily frequency three-month CCB_Chile between 2003 and 2022 is illustrated in Figure 3. Evidently, the basis has been fluctuating in the most recent two decades, with negative values[25] for the majority of the time including the working sample after the 07/08 financial crisis, indicating that Chilean firms in general are in disadvantage in borrowing U.S. dollars from the FX market in the post-crisis period.

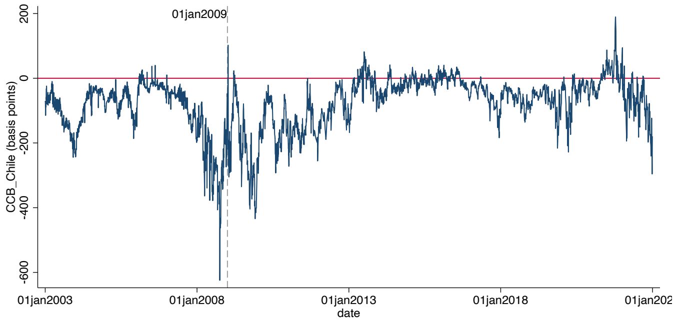


Figure 3: The cross-currency basis of CLP against USD at the 3 month tenor from 2003 to 2022 at daily frequency, during which bases are normally negative. The gray dashed line serves as a dividing line for the working sample after 2009, when the dollar shortage is a common problem to Chilean firms given the overall negative bases observed.

With regard to the firm data from China, it is collected from the Customs of the People's Republic of China. Likewise, the cross-currency basis of Chinese Yuan (CNY) against the USD is calculated based on the same equation (3) with relevant interest and exchange rates data from Bloomberg. Other macro-economic data comes from various sources. For instance, the broad U.S. dollar index is from the Bank for International Settlements (BIS) and the trade openness and GDP per capita is from the world bank.

[24]The 3-month LIBOR interest rate for the U.S. dollar, spot and 3-month forward exchange rates of CLP against USD are collected from Bloomberg, while the 3-month inter-bank interest rate for CLP comes from Chilean Benchmark Facility.

[25]One may observe that the CCB for Chile actually rose to *positive* during the pandemic crisis. This is because Treasury price movements, coupled with revised Basel III capital requirements, led to an amplification of the *in*convenience yield for holding dollars during this period (He, Nagel, and Song 2022). Seen this way, increases in CCBs remain consistent with our definition of global liquidity (discussed in Section 2.1), because there was no appreciable global dollar shortage during this episode, owing to the diminished attractiveness of dollar assets. In addition, the bases turn out unambiguously negative after being collapsed into a yearly frequency as employed in the estimation, supporting argument that Chilean firms are indeed in dollar shortages in the sample period. This is shown in Figure A.2 in the appendix.

3 Empirical results

3.1 Baseline regressions

The first baseline estimation results corresponding to (4) are reported in Table 1, with panel A for imports and panel B for exports. The sample period is between 2009 and 2022[26]. I consider three different specifications within each country sample, from all units of measurement[27] to the unit for weight and quantity, respectively.

Table 1: Effects of cross-currency basis on Chilean firm's trade†

	All counterparties			U.S. only			Excluding U.S.		
	All units	Weight	Quantity	All units	Weight	Quantity	All units	Weight	Quantity
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Imports									
Value									
ΔCCB_Chile	0.3155**	0.3193**	0.3228**	0.2776*	0.2841*	0.2731*	0.3240**	0.3271**	0.3348**
	(0.1376)	(0.1378)	(0.1437)	(0.1330)	(0.1348)	(0.1373)	(0.1391)	(0.1389)	(0.1464)
R^2	0.138	0.136	0.137	0.128	0.124	0.126	0.140	0.139	0.140
Volume									
ΔCCB_Chile	0.3086*	0.3136*	0.3147*	0.2909*	0.2966*	0.2885*	0.3126*	0.3174*	0.3211*
	(0.1573)	(0.1620)	(0.1531)	(0.1402)	(0.1442)	(0.1381)	(0.1619)	(0.1667)	(0.1580)
R^2	0.136	0.133	0.139	0.126	0.124	0.123	0.139	0.136	0.143
Observations	837,548	555,831	248,520	154,417	100,012	48,751	683,131	455,819	199,769
Panel B: Exports									
Value									
ΔCCB_Chile	0.3186**	0.3071**	0.3793**	0.2547*	0.2084	0.4096**	0.3243***	0.3157**	0.3743**
	(0.1058)	(0.1052)	(0.1243)	(0.1413)	(0.1629)	(0.1379)	(0.1038)	(0.1018)	(0.1348)
R^2	0.136	0.141	0.140	0.138	0.152	0.119	0.136	0.140	0.144
Volume									
ΔCCB_Chile	0.2863**	0.2694**	0.3415**	0.2078	0.1607	0.3560*	0.2932**	0.2789**	0.3390**
	(0.1159)	(0.1163)	(0.1373)	(0.1562)	(0.1725)	(0.1870)	(0.1131)	(0.1126)	(0.1435)
R^2	0.129	0.134	0.130	0.122	0.136	0.103	0.130	0.133	0.135
Observations	132,213	95,305	11,523	10,583	7,477	1,607	121,630	87,828	9,916
Fixed effects:									
country-firm-product	Y	Y	Y				Y	Y	Y
firm-product				Y	Y	Y			

† This table reports the regression between yearly change in imports and exports (both volume and value) from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the U.S. dollar at a tenor of three months with a one year lag. The sample starts from 2009 to 2022. Country-firm-product level fixed effect (where available) is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Strikingly, I find a positive and statistically significant coefficient on ΔCCB_Chile through all the specifications for imports with all counterparties from column (1) to (3) in panel A, with the country-firm-product multi-dimensional fixed effect controlled regardless of value, volume and unit of measurement. This result suggests that a more favourable dollar financing condition

[26] I choose this period to make most of the data available. However, I also do the estimation for the period excluding the pandemic as a robustness check, which yields qualitatively consistent results.

[27] Different goods are measured in different units of measurement, and it is necessary to differentiate, say, cubic meter from net kilo since they are not comparable. Collapsing data without considering unit of measurement might induce biases. All units specification considers transactions where all different types of unit of measurement are used, while weight (quantity) specification counts only transactions where products are measured in net kilo (piece). Clearly, weight and quantity account for more than 95% observations of the full sample in terms of unit of measurement, which is the reason why I explore these two units individually.

increases Chilean firms' imports from the rest of the world. Statistically speaking, a 1 percentage point (or more conventionally, a 100 basis points) increase in CCB of Chile is associated with 37.09% to 38.10% growth in Chilean firms' imports value[28], and 36.15% to 36.98% rise in their imports volume from the rest of world.

Similar results are found for exports as well. The positive and significant coefficient on ΔCCB_Chile between column (1) to (3) in Panel B implies that an improvement in Chile's dollar funding condition boosts its exports to the rest of the world at the firm level, with a growth between 35.95% to 46.13% and 29.89% to 40.71% in value and volume, respectively, when the dollar funding cost is relaxed by a 100 bps.

A firm trading more intensively with the U.S. could rely less on external dollar financing proxied by CCB since it might have some subsidiaries in the United States through which it can directly borrow dollar from the U.S. money market (Kim et al. 2024), which is the case for foreign parent banks to fund themselves internally from their U.S. branches during the global financial crisis (Cetorelli and Goldberg 2012). To explore this effect, I differentiate trade activities made with the U.S. only from those made with counterparties excluding the U.S. , and re-estimate the regressions with the corresponding results reported in column (4) to (6) for the former and column (7) to (9) for the latter, respectively. While the coefficient on ΔCCB_Chile remains positive for all the specifications when the trading partner is restricted to the U.S. only, the significance on balance reduces[29] for imports (panel A) and loses for exports (panel B).

In terms of imports, it seems to contradict with the conventional thinking that a firm importing more from the U.S. might be more dependent on dollar availability if it needs dollar credit to finance its trade activity given a higher probability of the U.S. dollar being settlement currency. However, both the lower significance level and the smaller magnitude of the coefficient compared to those found in the last three columns indicate that dollar liquidity becomes less important for imports in Chile when the counterparty is the United States. One possible explanation is that firms with a tighter connection with the United States might have some additional source for raising dollars, impairing the role that cross-currency basis plays in affecting their imports.

With regard to exports, it is more reasonable to witness an insignificant coefficient with a smaller magnitude on ΔCCB_Chile—except for the quantity specifications[30] in column (6) of panel B—when constraining the counterparty to the U.S. sample only. Intuitively, exporting to the United States is likely to reduce a firm's reliance on dollar financing since it has easier access to dollars from its counterparty directly through exports[31]. More importantly, exporters

[28]For log-level specifications, the interpretation of α is that a 1 unit (1 percentage point) hike in the CCB of Chile is related to $e^{\alpha} - 1$, therefore $e^{0.3155} - 1 = 37.09\%$ and $e^{0.3228} - 1 = 38.10\%$ increase in imports value. The same interpretation applies to imports volume, exports value and exports volume.

[29]The significance of the coefficient merely reduces for specifications estimated with imports value, while it loses for exports specifications estimated from all units of measure and weight. For quantity specifications with exports, the significance of the coefficient does not lose and we avoid over-interpreting this result given its relatively smaller sample size.

[30]We do see a positive and significant coefficient for the two quantity specifications. However, we avoid over-interpreting this result given its small sample.

[31]One might argue that exporters could also acquire dollars through sales even when the trade partner is not the United States, given that U.S. dollar dominates as the invoicing currency. However, counterparties from the United States can make the payment more easily than those from elsewhere especially when global dollar liquidity tightens since the former can either get dollars more easily and normally at a lower cost.

could have affiliates or subsidiaries in the U.S. if they trade more with the country, providing them with additional sources to access dollars directly from the money market and weakening their dependence on the FX market for dollars. Hence, the dollar financing condition measured as cross-currency basis becomes less relevant to firms' exports when scrutinizing merely trade activities with the United States. Conversely, a positive and significant effect of dollar liquidity is found on exports after excluding the U.S. sample, as shown between column (7) to (9) in panel B.

The results for the alternative baseline—equivalent to specification (5)—are reported in Table 2 with panel A for imports and panel B for exports, respectively. Obviously, these echo what is found in Table 1, working as further evidence on the previous finding. Furthermore, it also suggests that Chilean firms with higher exposure to the U.S. dollar do trade more when the dollar funding condition relaxes.

Table 2: The effects of dollar liquidity with firms' currency exposure on trade in Chile†

	All counterparties			U.S. only			Excluding U.S.		
	(1) All units	(2) Weight	(3) Quantity	(4) All units	(5) Weight	(6) Quantity	(7) All units	(8) Weight	(9) Quantity
Panel A: Imports									
Value									
CE · ΔCCB_Chile	0.3664**	0.3662**	0.3859**	0.3220**	0.3262**	0.3245*	0.3772**	0.3757**	0.4020**
	(0.1486)	(0.1486)	(0.1556)	(0.1408)	(0.1416)	(0.1484)	(0.1510)	(0.1507)	(0.1587)
R^2	0.138	0.136	0.138	0.129	0.124	0.126	0.140	0.139	0.141
Volume									
CE · ΔCCB_Chile	0.3624*	0.3627*	0.3815**	0.3393**	0.3444**	0.3371*	0.3680*	0.3671*	0.3932**
	(0.1664)	(0.1698)	(0.1650)	(0.1501)	(0.1503)	(0.1552)	(0.1712)	(0.1754)	(0.1690)
R^2	0.137	0.133	0.140	0.126	0.124	0.124	0.139	0.136	0.143
Observations	837,548	555,831	248,520	154,417	100,012	48,751	683,131	455,819	199,769
Panel B: Exports									
Value									
CE · ΔCCB_Chile	0.3368**	0.3198**	0.3943**	0.2646*	0.2202	0.4098**	0.3437**	0.3286**	0.3917**
	(0.1151)	(0.1097)	(0.1321)	(0.1457)	(0.1648)	(0.1455)	(0.1135)	(0.1065)	(0.1434)
R^2	0.136	0.141	0.140	0.138	0.152	0.118	0.135	0.140	0.144
Volume									
CE · ΔCCB_Chile	0.3038**	0.2829**	0.3516**	0.2162	0.1785	0.3271	0.3122**	0.2922**	0.3558**
	(0.1248)	(0.1206)	(0.1464)	(0.1610)	(0.1746)	(0.1927)	(0.1223)	(0.1171)	(0.1529)
R^2	0.129	0.134	0.130	0.122	0.136	0.102	0.129	0.134	0.135
Observations	132,193	95,294	11,523	10,574	7,472	1,607	121,619	87,822	9,916
Fixed effects:									
country-firm-product	Y	Y	Y				Y	Y	Y
firm-product				Y	Y	Y			

† This table reports the regression between yearly change in imports, exports and trade (both volume and value) from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the U.S. dollar at a tenor of three months with a one year lag. The sample starts from 2009 to 2022. Country-firm-product level fixed effect (where available) is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

As discussed, firms with a larger trade intensity in a certain sector is likely to be more affected by dollar financing due to a higher probability of dollar exposure within this sector. When I probe further, looking at whether dollar financing affects a firm's trade pattern through its sector intensity corresponding to the shift-share Bartik instrument specification (6) in section

Table 3: The effects of dollar liquidity with firm sector intensity on trade values in Chile†

	All counterparties			U.S. only			Excluding U.S.		
	(1) OLS	(2) IV	(3) 2SLS	(4) OLS	(5) IV	(6) 2SLS	(7) OLS	(8) IV	(9) 2SLS
Imports value									
$SI \times \Delta CCB\_Chile$	0.4800**	0.5716**	0.6096*	0.4432**	0.4793*	0.5461*	0.4879**	0.5951**	0.6260**
	(0.1631)	(0.2503)	(0.2749)	(0.1530)	(0.2442)	(0.2756)	(0.1664)	(0.2528)	(0.2757)
Observations	837,548	801,276	801,276	154,417	148,031	148,031	683,131	653,245	653,245
F	8.66	5.22	4.92	8.40	3.85	3.93	8.60	5.54	5.15
Cragg-Donald F		793580.98	565073.16		174678.63	110359.17		624718.95	462824.85
Kleibergen-Paap *rk LM*		4.58**	5.77*		4.69**	5.61*		4.55**	5.78*
Hansen J			0.94			1.91			0.65
Exports value									
$SI \times \Delta CCB\_Chile$	0.4499**	0.7008**	0.6451**	0.3606	0.2081	0.4579	0.4580**	0.7258**	0.6645**
	(0.1617)	(0.2513)	(0.2296)	(0.1975)	(0.5121)	(0.2605)	(0.1608)	(0.2419)	(0.2293)
Observations	65,002	65,001	65,001	4,478	4,478	4,478	60,524	60,523	60,523
F	7.75	7.77	7.89	3.33	0.17	3.09	8.12	9.00	8.40
Cragg-Donald F		15,472.42	54,232.94		540.46	5,850.23		15,123.75	49,062.83
Kleibergen-Paap *rk LM*		4.73**	4.78*		4.70**	4.72*		4.73**	4.77*
Hansen J			0.69			0.71			0.93

† This table reports the regression between yearly change in imports and exports value from firms in Chile and their trade in sector intensity's exposure to the dollar liquidity condition, measured as the yearly change in cross-currency basis of Chilean Peso against the U.S. dollar at a tenor of three months with a one year lag. SI is a ratio of the trade value of a certain sector from a firm to the total trade value of this firm, which is instrumented with the sector intensity at the country level with a one year lag (IV specification) and both the sector currency exposure at the firm level and sector intensity at the country level with a one year lag (2SLS specification). Test statistics for instrument quality are the Kleibergen-Paap *rk LM* statistic, Cragg-Donald Wald F statistic, and Hansen J statistic, corresponding to tests for underidentification test, weak identification, and overidentification, respectively. The 10% maximal IV size critical value of weak identification is 19.9 for 2SLS specifications, and 16.4 for IV specifications. The sample starts from 2009 to 2022. Country-firm-product level fixed effect (where available) is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

2.2, I obtain the results for value specifications[32] in Table 3. Specifically, I run the regressions for the three different specifications, the OLS, IV and 2SLS within each counterparty sample.

Basically, I find positive and significant coefficients on $SI \cdot \Delta CCB\_Chile$ throughout almost all the OLS specifications. This signals that Chilean firms tend to trade more in their intensive sectors when the dollar liquidity condition improves. Given the potential endogeneity between the firm sector intensity and trade, the IV and 2SLS estimations provide consistent results, where the coefficients are uniformly positive and significant except for the U.S. only specifications in exports, as shown in columns (5) and (6) in the bottom panel.

Similarly, a smaller coefficient on $SI \cdot \Delta CCB\_Chile$ for the U.S. only sample in imports value (upper panel) compared to the rest two samples corroborate with the previous finding that dollar liquidity from the FX market might have a smaller effect on a firm's importing activities when it imports directly from the United States, possibly through other dollar sources. Whereas for exporters, this coefficient goes insignificant for all the three specifications when the counterparty is confined to the U.S. only, as shown between columns (4) and (6) in the bottom panel. This result strengthens the previous finding regarding exporters that dollar financing from the FX market becomes less relevant for Chilean exporters when they export more to the country that issues the currency.

The tests for the instruments do not raise red flags. Significant Kleibergen-Paap *rk LM* statistics point to the instruments' relevance, while insignificant Hansen J for support the

[32] For the interest of space, the results for volume specifications are presented in Table A.3 in the appendix, qualitatively consistent with the findings here.

overall coherence of the instrument set. Meanwhile, the Cragg-Donald Fs consistently cross the threshold for acceptable bias at the 10 percent level, validating the overall strength of the instrument set. The larger coefficient in magnitude on either IV or 2SLS specification compared to the OLS one, in reality, further indicates that the OLS estimation is downward biased possibly due to unobserved common variables that might affect both a firm's trade intensity and total trade.

Overall, I find that an improvement in the dollar financing condition in Chile—measured as the cross-currency basis of Chilean Peso vis-à-vis the U.S. dollar—tends to foster Chilean firms' trade activities. Put it another way, when firms in Chile can borrow dollars at a lower cost from the swap market, they trade more with the rest of the world. This collaborates with Boz, Gopinath, and Plagborg-Møller (2017) and Ma and Schmidt-Eisenlohr (2023)—who find that the U.S. dollar appreciation against other currencies and therefore a more stringent dollar financing condition induces a decline in global trade volume at the country level—while this work provides firm level evidence for the effect of dollar liquidity on trade. This finding is also consistent with the financial channel put forward by Bruno and Shin (2015) that real activities are negatively affected when the U.S. dollar strengthens and subsequently reduces local banks' risk-taking ability.

3.2 Robustness

I test the sensitivity of the baseline results along several lines. First, I consider using CCB at different tenors. Then I allow for changes in the coverage of the sample, along two dimensions: in terms of sectors included, and the choice of sample period by excluding the COVID-19 when CIP deviations are driven by unexpected shocks. Next, I examine several estimation methods by exploring various fixed effects and standard errors, respectively.

For the interest of space, while I run the three baseline specifications discussed in Section 3.1 for both volume and value, I constrain to report only the value specifications with the all unit of measurement sample, for both imports and exports, and leave the volume results in appendix[33]. These are shown in Table 4.

I focus on the 3-month tenor of CCB as the dollar liquidity condition for Chilean firms in the baseline not only because it is the the most used tenor in the literature (Cerutti et al. 2021; Du et al. 2018), but also an appropriate tenor that firms might rely on for external financing. However, there is no evidence to exclude the potential effects of dollar liquidity at other tenors on trade. In this case, I run the estimation with both the 1-month and 1-year CCB, reporting the corresponding results from column (1a) to (2c).

As an open economy, Chile has a very different trade structure in terms of imports and exports. On the one hand, the nation imports a large amount of fuels and machinery including electrical equipment from other countries, accounting for around two-fifths of its total imports in recent years. On the other hand, it is abundant in metal resources such as copper ores and other copper-related products, making metals and minerals its largest exporting sectors amounting to more than half of its total exports. As the largest producer and exporter of copper, Chile

[33]These prove to be qualitatively consistent to the findings with the value specifications, which are reported in Table A.4.

might be less affected by dollar liquidity in terms of its exports of copper as long as there is a large external demand. Instead, it might still have to purchase products and goods from abroad even if there is a dollar shortage since products from these high intensive importing sectors are necessary to support its economic activities. Put it another way, the trading behaviour of dominant sectors is likely not to be influenced by liquidity factors. To rule out the potential biased result from dominant sectors, I rerun the the baseline regressions by dropping the fuel and machinery products sectors for imports, and metal and mineral products for exports. There results are reported from column (3a) to (3c).

One objection some may have to including the COVID-19 pandemic period is that the unusual nature of the episode—where the shock emanated from a health, rather than financial, source, and further exacerbated by government policies—may affect the results. As another robustness check of the baseline, I therefore consider restricting the sample period to between 2009 and 2019 by excluding the COVID period. This is to rule out possible effects of government-imposed pandemic control measures on trade, and the corresponding results are presented in columns (4a)–(4c). As a further check, I conduct a more disaggregated estimation at the quarterly level instead of the yearly as in the baseline, and report these results between column (5a) and (5c).

As discussed in section 2.3, the dependent variable is at the country-product-firm-currency-unit level and I control the country-product-firm fixed effect across all the baselines. While the variation within either the invoicing currency or the unit of measurement seems to matter less[34], one might still argue that the effect of dollar liquidity on transactions in U.S. dollars should be different from those in other currencies despite of being a vehicle currency. To reassure these doubts, I further control the currency, unit fixed effect and both the two, respectively, on top of the country-firm-product fixed effect. These results are displayed in columns (6a)–(8c).

Another concern could be the spatial correlation in the sample firms. However, I have no information of firms' location (state in the country). It is still possible that firms' trade might be spatial dependent on their location. To rule out this possibility, I run regressions that take into account of spatial dependence by following Driscoll and Kraay (1998), which are reported in columns (9a)–(9c). A few literature has already discussed the two-way cluster robust estimates of variance matrix, both in theoretical (Cameron, Gelbach, and Miller 2011; Miglioretti and Heagerty 2007; Thompson 2011) and empirical (Hebb 2021) context. While it is reasonable to cluster the standard error at the two-way firm and year level, it is still plausible to check the multi-level clustering given that the data is not nested in any dimension. In particular, one might believe that there can be standard error correlation within the country or product level. Therefore, in addition to the original firm-year clustering, I further cluster the standard error at the country and product level, respectively and both[35]. These results are shown through column (10a) to (12c).

For the Bartik currency share specification (5), one might argue that trade invoiced in the

[34]On one hand, the U.S. dollar accounts for the majority percentage of the invoicing currency in both imports and exports, which erodes the importance of currency effect when examining the effect of dollar liquidity on trade. On the other hand, there seems to be little evidence on how liquidity could differently affect trade via different unit of measurement.

[35]In reality, the trade data is at the country-firm-product-currency-unit level. Although I only additionally cluster the standard errors at the country and product level, similar attempts are done for currency and unit as well and I find qualitatively consistent results. These are reported in Table A.14 in the appendix.

U.S. dollar should be more affected by the dollar liquidity since it reflects directly a firm's dollar exposure regardless of the vehicle nature of currency. Thus, I create a pure dollar exposure variable in estimation by recoding the currency exposure to 0 whenever a transaction is not invoiced in the U.S. dollar, negating the potential effect of dollar liquidity on trade without direct dollar exposure. More stringently, if one believes that dollar exposure should only be counted when the trade activities are invoiced in the U.S. dollar, a U.S. dollar dummy[36] works better than the dollar exposure measure. Moreover, from the perspective of liquidity for different currencies, the U.S. dollar indisputably ranks first, followed by other G10 currencies[37]. In general, more liquid currencies are more likely to be traded either in the international financial market or trade market, and therefore more exposed to the dollar liquidity shock. One simple way to capture this is to code a currency indicator, equaling to 1, 0.5, and 0 when the invoicing currency is the dollar, G10 currencies, and the rest, respectively. As robustness checks, I run regressions by replacing the currency exposure, CE_{fpit}, in specification (5) with the above mentioned three different measures, and find qualitatively consistent results to the baseline[38].

A firm's sector intensity could be defined differently. Instead of calculating it at the intra-firm level as shown in Section 2.2, one can measure it in a relative way to other firms in the same sector. In particular, for an importing firm f, its importing intensity SI'_{fst} in a certain sector s relative to all firms in the sector can be measured as:

$$SI'_{fst} = \frac{Y_{fst}}{Y_{st}}$$

where Y_{fst} represents the imports value for sector s of firm f in year t, and Y_{st} denotes the total imports value for the whole sector s from all firms in year t, respectively. Alternatively, I estimate the specification (6) with SI'_{fst} defined above, and find qualitatively consistent results[39].

I find, across these broad range of estimates for coefficients on ΔCCB_Chile, $CE{\cdot}\Delta CCB\_Chile$, $SI \cdot \Delta CCB\_Chile$ that they remain, in the main, both positive and significant for either imports and exports value, consistent with the baseline. The notable exception applies to the case when the tenor of CCB in Chile is restricted to one year. This is not unexpected, since the exchange rate in Chile freely adjusts whenever it deviates its long-run equilibrium, negating the importance of a relatively longer tenor of dollar liquidity on its trade. I discuss this in Section 4.3 with details. On balance, the checks in this section provide additional support to the finding that an easier access to dollar liquidity positively affects Chile's trade at the firm level.

[36]Let me denote it as USD_{cfput}. Theoretically, it is 1 when a transaction from firm f in product p measured in unit u with country c is invoiced in the U.S, dollar in year t, and 0 otherwise. While not exactly the same, this specification is similar to the one put forward by Rajan and Zingales (1998), who identify the effects of financial development on industrial growth by looking at the interaction of firms' external finance dependence of a particular industry in the United States with an exogenous measure of the financial development in a foreign country. In my setting, the dollar liquidity condition faced by Chilean firms is plausibly exogenous if one believes that the choice of invoicing currency in trade might be relatively endogenous.

[37]The other G10 are the most heavily traded and liquid currencies, and comprise the Australian, Canadian, and New Zealand dollars, the euro, the Japanese yen, British pound, Swiss franc, Norwegian krone, Danish krone, and Swedish krona.

[38]For the interest of space, these results are reported in Tables A.5, A.6 and A.7, respectively.

[39]Despite weaker results due to failure of under-identification tests for the 2SLS estimations, the positive and significant coefficient found on $SI'_{fst} \cdot \Delta CCB\ Chile$ for all specifications stay consistent with the baseline. These results are reported in Table A.8 in the appendix.

Table 4: Sensitivity of cross-currency basis and trade values to variations in sample coverage, variable construction, and estimation methodologies†

	CCB tenor: 1-month			CCB tenor: 1-year			Sub: no dom secs			Sub: excluding Covid			Est: quarterly			Est: currency FE		
	(1a§)	(1b§)	(1c§)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)	(4a)	(4b)	(4c)	(5a)	(5b)	(5c)	(6a)	(6b)	(6c)
Imports																		
Dollar liquidity	0.3441***	0.3507***	0.6616***	0.0878	0.0895	0.1594	0.3242**	0.3273**	0.7744**	0.3199*	0.3249*	0.6149*	0.0435*	0.0465*	0.1021*	0.3216**	0.3251**	0.6199*
	(0.0749)	(0.0773)	(0.1520)	(0.2211)	(0.2248)	(0.4347)	(0.1410)	(0.1444)	(0.3394)	(0.1404)	(0.1442)	(0.2786)	(0.0245)	(0.0249)	(0.0573)	(0.1403)	(0.1435)	(0.2795)
R^2	0.141	0.141	0.007	0.133	0.133	0.000	0.139	0.139	0.004	0.115	0.114	0.005	0.045	0.045	0.000	0.142	0.142	0.005
Observations	837,548	837,548	801,276	837,548	837,548	801,276	558,408	558,408	542,770	767,906	767,906	767,906	1,464,895	1,464,895	1,464,895	833,359	833,359	797,140
Exports																		
Dollar liquidity	0.3279***	0.3307***	0.4022***	0.0240	0.0252	0.0299	0.3105**	0.3123**	0.3731**	0.3188**	0.3205**	0.3868**	0.0468	0.0478	0.0562	0.3216**	0.3251**	0.6199*
	(0.0445)	(0.0453)	(0.0532)	(0.1976)	(0.1998)	(0.2442)	(0.1044)	(0.1061)	(0.1284)	(0.1075)	(0.1093)	(0.1329)	(0.0319)	(0.0329)	(0.0383)	(0.1403)	(0.1435)	(0.2795)
R^2	0.141	0.141	0.016	0.125	0.125	0.000	0.141	0.141	0.013	0.136	0.136	0.012	0.057	0.057	0.000	0.142	0.142	0.005
Observations	132,212	132,212	132,193	132,212	132,212	132,193	118,994	118,994	118,975	132,169	132,169	132,169	283,720	283,720	283,720	833,359	833,359	797,140

	Est: unit FE			Est: currency-unit FE			Est: Driscoll-Kraay			Cluster: country			Cluster: product			Cluster: country product		
	(7a)	(7b)	(7c)	(8a)	(8b)	(8c)	(9a)	(9b)	(9c)	(10a)	(10b)	(10c)	(11a)	(11b)	(11c)	(12a)	(12b)	(12c)
Imports																		
Dollar liquidity	0.3205**	0.3254**	0.6238*	0.3266**	0.3303**	0.6345*	0.3266*	0.3303*	0.4979**	0.3155**	0.3201**	0.6096*	0.3155**	0.3201**	0.6096*	0.3155**	0.3201**	0.6096*
	(0.1403)	(0.1439)	(0.2818)	(0.1431)	(0.1462)	(0.2868)	(0.1571)	(0.1606)	(0.1844)	(0.1288)	(0.1320)	(0.2749)	(0.1332)	(0.1368)	(0.2749)	(0.1245)	(0.1277)	(0.2749)
R^2	0.137	0.137	0.005	0.140	0.140	0.005				0.138	0.138	0.005	0.138	0.138	0.005	0.138	0.138	0.005
Observations	817,249	817,249	782,344	812,030	812,030	777,162	837,548	837,548	837,548	837,548	837,548	801,276	837,548	837,548	801,276	837,548	837,548	801,276
Exports																		
Dollar liquidity	0.3191**	0.3209**	0.3875**	0.3229**	0.3240**	0.3893**	0.3229**	0.3240**	0.3574***	0.3186**	0.3203**	0.3867**	0.3186**	0.3203**	0.3867**	0.3186***	0.3203***	0.3867**
	(0.1055)	(0.1072)	(0.1309)	(0.1077)	(0.1093)	(0.1329)	(0.1064)	(0.1084)	(0.1015)	(0.1031)	(0.1047)	(0.1314)	(0.1034)	(0.1052)	(0.1314)	(0.1007)	(0.1024)	(0.1314)
R^2	0.141	0.141	0.012	0.143	0.143	0.013				0.136	0.136	0.012	0.136	0.136	0.012	0.136	0.136	0.012
Observations	131,294	131,294	131,275	130,862	130,862	130,843	132,212	132,212	132,212	132,212	132,212	132,193	132,212	132,212	132,193	132,212	132,212	132,193

† This table reports the regression between yearly (except where specified) change in imports and exports value from firms in Chile and yearly (except where specified) change in cross-currency basis of Chilean Peso against the U.S. dollar at a tenor of three months (except where specified) with a lag. The sample starts from 2009 to 2022. Country-firm-product level fixed effect is controlled, and robust standard errors clustered at firm and year level (except specified) are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

§ For simplicity, a, b and c in each column denotes ΔCCB_Chile, $CE \cdot \Delta CCB$ and $SI \cdot \Delta CCB$, respectively, corresponding to the three baselines described in section 2.2.

4 Discussion

4.1 Further analysis

4.1.1 A pre-crisis falsification test

Global trade hasn't been increasing steadily until 2008, when the global financial crisis broke out (Hoekman 2015) and credit tightening was one factor attributed to the collapse of international trade flows (Chor and Manova 2012). While the focus of this paper is the effect of dollar credit on Chile's trade during the post-crisis period in which global trade suffers a decline, it is worthwhile to examine whether dollar finance mattered prior to the crisis when the overall economic conditions were more favourable. Therefore, I repeat estimations as the baseline (4) with the sample period from 2003 to 2007[40], and report the corresponding results in Table 5[41].

Table 5: Effects of cross-currency basis on Chile's trade values, pre-crisis period†

	All counterparties			U.S. only			Excluding U.S.		
	All units	Weight	Quantity	All units	Weight	Quantity	All units	Weight	Quantity
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Imports Value									
ΔCCB_Chile	-0.1055	-0.0985	-0.1074	-0.0109	-0.0144	0.0057	-0.1337	-0.1230	-0.1442
	(0.1561)	(0.1427)	(0.1847)	(0.1237)	(0.1078)	(0.1647)	(0.1674)	(0.1553)	(0.1946)
R^2	0.230	0.229	0.233	0.208	0.211	0.208	0.237	0.236	0.243
Observations	231,387	154,208	72,231	53,621	35,128	17,934	177,766	119,080	54,297
Exports Value									
ΔCCB_Chile	-0.1232	-0.2072	0.1979	-0.0656	-0.1647	0.7716	-0.1300	-0.2121	0.0667
	(0.1055)	(0.1121)	(0.1853)	(0.2196)	(0.1980)	(0.4920)	(0.0972)	(0.1076)	(0.1539)
R^2	0.255	0.263	0.219	0.249	0.276	0.199	0.256	0.261	0.227
Observations	41,678	31,613	3,903	4,524	3,336	752	37,154	28,277	3,151
Fixed effects:									
country-firm-product	Y	Y	Y				Y	Y	Y
firm-product				Y	Y	Y			

† This table reports the regression between yearly change in imports and exports from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the U.S. dollar at a tenor of three months with a one year lag. The sample period is restricted between 2003 and 2007. Country-firm-product level fixed effect (where available) is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Surprisingly, the coefficients on dollar financing condition are uniformly negative for either the imports or exports specifications, different from the baseline results. However, none of them is statistically significant, implying that dollar financing played little role in affecting Chile's trade before the crisis. Overall, it messages that dollar liquidity does not become important to trade activities in Chile at least until the post-crisis period, when the CIP deviations for G10 currencies against the U.S. dollar have persistently enlarged as well (Amador, Bianchi, Bocola, and Perri 2020; Cerutti et al. 2021; Du et al. 2018).

[40] We constrain the sample between 2003 and 2007 as the pre-crisis period due to data availability. In fact, there is no records of trade before crisis in Chile's Custom Service. The data I use is a database spreading in the academia for the purpose of research.

[41] For the interest of space, I only report the results for imports and exports values here. However, those results for volumes are qualitatively similar and shown in Table A.9 in the appendix

4.1.2 Trade intensity with U.S. alleviates firms' dependence on CCB

An interesting previous finding is that the dollar liquidity plays a larger role on firms' trade when scrutinizing only their trade activities with countries other than the United States. While it sounds reasonable that firms trading with the United States might have affiliations or subsidiaries in the country and therefore depend less on the FX market for borrowing dollars, examining transactions with non-US countries only does not really mean that the firms involved have no trade relation the United States[42]. To explore this, I compute a measure of a firm's trade intensity with the U.S.—defined as the share of its trade value with U.S. to its total trade value—and impose an interaction term between it and ΔCCB_Chile. I run the regression for both imports and exports, with three different country samples as the baseline. These results are displayed in Table 6 [43].

Table 6: Effects of dollar liquidity on Chilean firm's trade values, conditional on firms' trade intensity with the United States†

	Imports			Exports		
	(1) All counterparties	(2) U.S. only	(3) Excluding U.S.	(4) All counterparties	(5) U.S. only	(6) Excluding U.S.
$US\ intensity \times \Delta CCB\_Chile$	-0.1018**	0.0230	-0.1379*	-0.0471	0.1449	-0.1213**
	(0.0343)	(0.0830)	(0.0634)	(0.0433)	(0.1063)	(0.0540)
$US\ intensity$	0.2650**	1.3024***	-0.7158***	-0.0895	1.3102***	-0.9226***
	(0.0862)	(0.1563)	(0.1003)	(0.0909)	(0.2058)	(0.1024)
ΔCCB_Chile	0.3285**	0.2039*	0.3517**	0.3095**	0.1803	0.3258***
	(0.1228)	(0.1017)	(0.1301)	(0.1025)	(0.1489)	(0.1047)
Fixed effects:						
country-firm-product	Y		Y	Y		Y
firm-product		Y			Y	
R^2	0.145	0.141	0.151	0.154	0.161	0.161
Observations	604,803	154,417	450,386	85,521	10,583	74,938

† This table reports the regression between yearly change in trade (both imports and exports) values from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the U.S. dollar at a tenor of three months. US intensity is a yearly varying ratio of a firm's trade value with the U.S. to its total trade value. The sample starts from 2009 to 2022. Country-firm-product level fixed effect (where available) is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Strikingly, the coefficient on the interaction term is uniformly negative and significant for both imports (left panel) and exports (right panel) regardless of the all countries sample or the sample excluding the United States. It surprisingly signals that a firm with a deeper trade relation with the U.S. reduces its overall trade when the dollar liquidity condition in the FX market improves. By contrast, a positive and insignificant coefficient is found on the same coefficient for the U.S. only sample. Overall, these suggest that the dollar access from the FX market becomes less relevant to firms' trade when they hold a tighter trade relationship with the United States possibly due to overseas affiliations or subsidiaries there, reconciling with the finding of Kim et al. (2024) that overseas banks could support their headquarters by taking advantage of foreign access to funding. It also gives further evidence on the less significant role

[42]For instance, a firm could trade intensively with the United States, say 50% of its exports is to the country and the other half goes to the rest of the world. A significant coefficient on ΔCCB_Chile from an estimation with only firms' transactions to countries other than the United States does not strictly imply that dollar liquidity matters for trade when firms do not trade with the United States since they might still have a large trade share (50% in this case) with the country.

[43]For the interest of space, I report only the results for values in the table and leave the volumes in the appendix. On balance, the volume specifications suggest consistent results. See Table A.10 for details.

of the cross-currency basis in affecting trade with the United States sample in the baseline.

4.1.3 The broad dollar or cross-currency basis?

After the GFC, the broad dollar index has been regarded as an indicator for global financial conditions. The dollar exchange rate appreciation is related to the international dollar funding stress (Obstfeld and Zhou 2022) and global risks(Georgiadis et al. 2024), which goes to the opposite direction of the traditional trade channel and negatively affects the real investments in emerging market economies (Avdjiev et al. 2019; Hofmann and Park 2020) by dragging lending banks' risk-taking capacity (Bruno and Shin 2015, 2023).

As a multilateral exchange rate, the broad dollar works as an overall dollar funding condition for all its trading partners. However, the cross-currency basis accurately measures the cost of borrowing dollars for Chilean firms via the FX market, possibly better capturing the dollar funding condition for the local firms than the dollar exchange rate itself. To examine this, I run the regressions of trade values on the broad dollar, $\Delta Dollar$ [44] or $\Delta Dollar\_Orth$ [45], with and without the currency specific dollar liquidity condition in Chile (ΔCCB_Chile), respectively. Both GDP per capita and the trade openness at the country level[46] are controlled. I report these results[47] in Table 7.

Table 7: The effects of dollar liquidity on trade value in Chile: broad dollar versus 3-month CCB†

	Imports			Exports		
	(1)	(2)	(3)	(4)	(5)	(6)
ΔCCB_Chile		0.3867***	0.4009***		0.3090***	0.3265***
		(0.0571)	(0.0411)		(0.0694)	(0.0549)
$\Delta Dollar$	-0.6324			-0.8643*		
	(0.4369)			(0.3978)		
$\Delta Dollar\_Orth$			-1.4801***			-1.6269***
			(0.2607)			(0.4065)
Fixed effects:						
country-firm-product	Y	Y	Y	Y	Y	Y
R^2	0.133	0.142	0.144	0.131	0.140	0.143
Observations	801,720	801,720	801,720	128,203	128,203	128,203

† This table reports the regression between yearly change in trade (both imports and exports) value of firms in Chile and yearly change of the U.S. dollar index with a lag, or the yearly change in cross-currency basis of Chilean Peso against the US dollar at a tenor of three months with a lag, and both. Both GDP per capita in Chile for exports (or GDP per capita in the destination country for imports) and trade openness are controlled. The sample starts from 2009 to 2022. Fixed effect at country-firm-product level is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

[44] Consistent with the CCB, $\Delta Dollar$ is a one-year lag logarithm change in the broad dollar index.

[45] $\Delta Dollar\_Orth$ is the component of the dollar index orthogonal to the CCB of Chile, obtained as the residuals by regressing $\Delta Dollar$ on ΔCCB.

[46] GDP per capita for Chile is controlled for imports specifications, while that for the counterparty country is controlled in in the exports estimations.

[47] I also run the trade volume regressions and find qualitatively consistent results, reported in Table A.11 in the appendix.

Interestingly, the negative sign of the coefficient on $\Delta Dollar$ in columns (1) and (4) is as expected, indicating that appreciations in the dollar exchange rate itself tend to impair firm's trade in Chile. However, this effect is statistically insignificant for imports and only marginal significant for exports. This result possibly reflects the fact that the broad dollar index could be a less accurate dollar funding condition for Chilean firms compared to the country specific cross-currency basis, supported by the positive and statistically significant coefficient on ΔCCB_Chile at the one percent confidence interval in columns (2) and (5).

Avdjiev et al. (2019) find that the cross-currency basis enlarges (more negative) when the dollar strengthens, therefore I extract the orthogonal part of the broad dollar to avoid any possible endogenous problem in the estimation. $\Delta Dollar\_Orth$, to some extent, represents the non-liquidity component of the dollar [48]. Strikingly, a negative and statistically significant coefficient is found on $\Delta Dollar\_Orth$ after the ΔCCB_Chile is incorporated in the regressions as reported in columns (3) and (6), suggesting that the dollar appreciation negatively affects trade in addition to the liquidity channel. Noticeably, the coefficient on ΔCCB_Chile remains positive and significant, stressing how the currency-specific dollar liquidity matters for trade. Overall, it signals that the cross-currency basis is a better indicator for dollar liquidity in Chile than the broad dollar index.

4.2 Heterogeneity

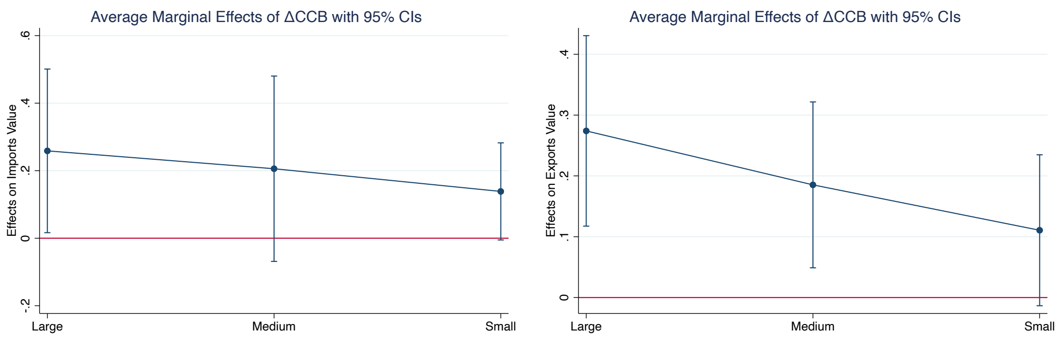
While it is found that dollar liquidity positively affects trade in Chile as a whole, it does not suggest that dollar financing works in the same way for all firms and industries. In this section, I examine the heterogeneous effect of dollar liquidity on Chilean firms' trade from two dimensions, firm size and industry.

It is easy to think that large firms might react differently to liquidity shocks compared to small firms given their differences in capital structure, risk-bearing capability and dependence on external financing. To explore this effect, I impose an interaction term of the dollar liquidity (ΔCCB_Chile) with a firm size dummy, in three different specifications where the firm size dummy represents large, medium and small size, respectively. Consistent with the baseline, I run the same regressions for both imports and exports in value and volume, and report the result in the appendix for the interest of space[49].

Interestingly, I find the coefficient on the interaction term for large size firm and dollar liquidity condition is positive and significant for all the specifications, suggesting that large firms will trade more when dollar becomes more accessible. In contrast, a negative effect is found for small firms. Alternatively, I plot the marginal effects of dollar liquidity on firm's trade in Chile based on firm sizes, which is shown in Figure 4. Consistently, the average effect of dollar liquidity is both larger and more significant for large firms, while smaller and less significant for small firms. These results reconcile with the finding of Beck, Demirgüç-Kunt, and Maksimovic (2008) that small firms use less external bank financing than large firms, attenuating the effect of dollar liquidity on the former.

[48] In this case, the liquidity component of the broad dollar is the part explained by the cross-currency basis as the cross-currency basis is considered as the dollar liquidity condition.

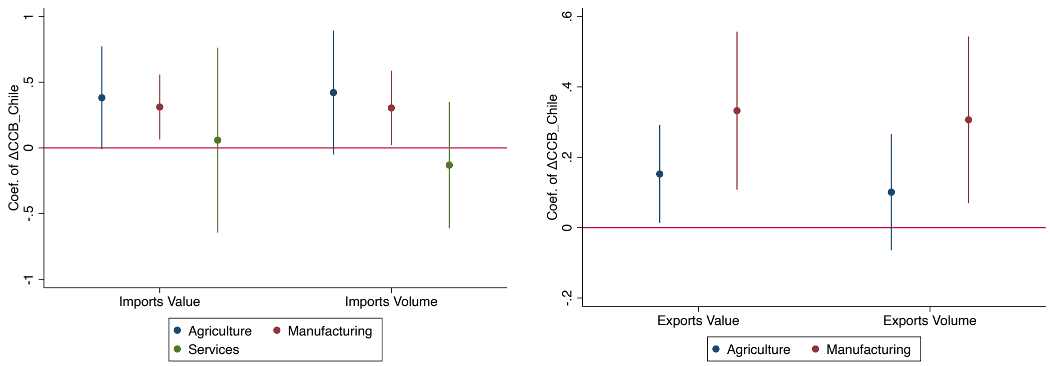
[49] See Table A.12 for details



(a) Imports (b) Exports

Figure 4: Heterogeneity for the effects of dollar liquidity on trade across firm sizes. Obviously, the average effect is both larger and significant for large firms, while smaller and less significant for small firms.

Trade activities from different industries have different characteristics and could respond to dollar liquidity differently. In this regard, I split the products into three categories, agriculture, manufacturing and services according to the International Standard Industrial Classification (ISIC). Subsequently, I estimate the specification (4) for these three industries for both imports and exports[50], and plot the corresponding coefficient on ΔCCB_Chile in Figure 5.



(a) Imports (b) Exports

Figure 5: The coefficient on ΔCCB_Chile for agriculture, manufacturing and service industries. Due to data availability, I can only report agriculture and manufacturing industries for exports. While no effect of dollar liquidity is found on the service industry for imports, it hardly matters on the agriculture industry for both imports and exports. Only manufacturing industry is indisputably affected by dollar liquidity in Chile.

Evidently, the coefficient witnesses smaller magnitudes but larger error bands in importing services (left panel) for both value and volume despite being negative for the later. However, none of them is statistically significant, suggesting the little role dollar liquidity plays in service industry. This is not surprising given the difficulty nature of trading in services[51] compared

[50] Due to the small sample in service industry for exports, I could only run the regressions for agriculture and manufacturing industries.

[51] Aguiar and Gopinath (2005) treat only manufacturing sectors as tradable, and the rest including service sectors are non-tradable.

to traditional manufacturing products, making it less affected by the dollar liquidity condition. With regard to the rest, I find that dollar liquidity hardly affects trade in agriculture industries while positively impacts manufacturing industries in Chile.

4.3 How exchange rate regime shapes trade via dollar financing

Chile has adopted a flexible exchange rate regime with a inflation target since late 1990s, allowing the exchange rate to be adjusted by the market. China, by contrast, performs a relatively fixed exchange rate regime[52]. One might wonder whether exchange rate regime affects trade differently through the channel of dollar financing, and I take advantage of the firm level data from China's customs by looking at the effect of dollar liquidity on Chinese firms' trade.

Instead of examining the three-month tenor, I focus on the one-year tenor of cross-currency basis of Chinese Yuan (CNY) vis-à-vis the U.S. dollar, and estimate the regression for China as the baseline (4) for the period between 2009 and 2012 when the exchange rate remains less flexible.[53]. The corresponding estimation results for trade value[54] are shown in the right panel of Table 8, with the right panel for the same specifications with Chile.

Table 8: How tenor of cross-currency basis matters on trade value: Chile versus China†

	Chile			China		
	(1) All counterparties	(2) U.S. only	(3) Excluding U.S.	(4) All counterparties	(5) U.S. only	(6) Excluding U.S.
Panel A: Imports						
ΔCCB_1y	0.0878	0.0578	0.0948	0.0615**	0.0680***	0.0608**
	(0.2211)	(0.2077)	(0.2243)	(0.0073)	(0.0062)	(0.0074)
R^2	0.133	0.125	0.135	0.281	0.272	0.282
Observations	837,548	154,417	683,131	426,823	44,406	382,417
Panel B: Exports						
ΔCCB_1y	0.0240	0.0643	0.0204	0.0383**	0.0403***	0.0381**
	(0.1976)	(0.1855)	(0.1990)	(0.0081)	(0.0022)	(0.0088)
R^2	0.125	0.133	0.124	0.293	0.296	0.293
Observations	132,212	10,583	121,629	717,338	64,735	652,603
Fixed effects:						
country-firm-product	Y	Y	Y	Y	Y	Y

† This table reports the results for Chile and China, where the one-year tenor cross-currency basis is used for the respective local currency against the U.S. dollar. The sample period is between 2009 and 2022 for Chile, while between 2009 and 2012 for China due to availability of the data. Country-firm-product level fixed effect is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Surprisingly, the coefficient on ΔCCB_1y is both positive and statistically significant throughout all the specifications for Chinese firms, whereas it is insignificant (although positive) for Chile. These contrasting results between the two countries indicates how exchange rate regime affects trade through dollar funding at the FX market. To show this, I plot the volatility of

[52] Das (2019) discusses China's exchange rate regime evolution in details.

[53] I focus on CCB of CNY against the USD at the 1-year tenor. China conducts a regime in between flexible and fixed, implying the spot and forward exchange rates for CNY do not vary too much in the short run. Alternatively, I also check the 3-month tenor CCB for China and find qualitatively consistent results. This result is available on request.

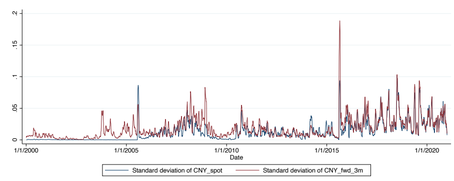
[54] The trade volume results are reported in the appendix for the interest of space, which echoes the findings here. See Table A.13 for details.

the spot and forward exchange rates for both Chinese Yuan and Chilean Peso, as illustrated in Figure 6.

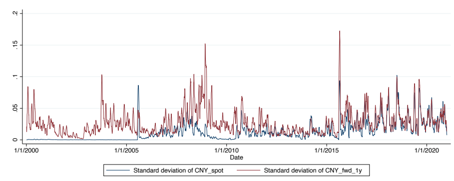
In theory, the emergence of cross-currency basis could be considered as the disequilibrium of the exchange rate. If the exchange rate is at its long-term equilibrium, the covered interest rate parity holds and CCB vanishes. In Chile, the flexible regime allows its exchange rate to adjust more quickly to its equilibrium as the forward rate adjusts with similar magnitude with the spot rate, as shown in (c) and (d) of Figure 6. This explains why the shorter tenor[55] CCB matters to trade. In China, however, the less flexibility in its exchange rate takes longer time to adjust itself to the long-term equilibrium, as demonstrated in (a) and (b) of Figure 6, where the one-year forward rate adjusts with a larger magnitude compared to the three-month one.

As a further evidence, I also calculate the half-life PPP exchange rate convergence[56] for the real bilateral exchange rate between CLP and USD, CNY and USD, respectively. Consistently, I find that the convergence is approximately three and a half years for the former and more than doubles (seven and a half years) for the latter, implying that the CNY has a far slower convergence in its PPP exchange rate than the CLP exchange rate.

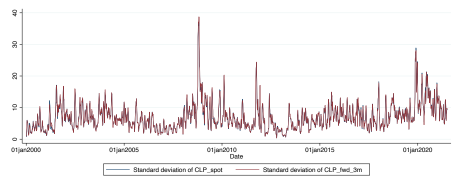
Taken together, the less flexibility of the exchange rate in CNY makes it adjust more slowly to its long-term equilibrium and therefore the longer tenor (one-year) dollar liquidity indicator in China matters for trade in the country[57], contrasting with the insignificant effect of dollar liquidity with the same tenor in Chile whose exchange rate regime is more flexible. To sum, this exercise suggests that an easier dollar liquidity access from the FX market increases firms' trade in China as well, providing further evidence to the effect of CCB on firms' trade beyond the scope of Chile and how this effect could differ across exchange rate regimes.



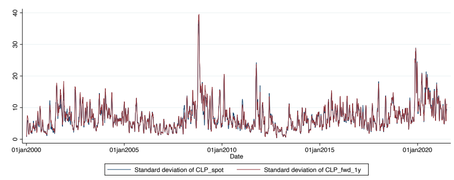
(a) CNY: spot versus 3-month forward ER



(b) CNY: spot versus 1-year forward ER



(c) CLP: spot versus 3-month forward ER



(d) CLP: spot versus 1-year forward ER

Figure 6: The (30-day rolling window) volatility for the spot and forward exchange rates, CNY and CLP. Each is the bilateral rate between the indicated currency in the subcaption against the USD.

[55]Both the three-month and one-month tenor CCB positively affects trade, as shown in Section 3.2.

[56]Following Chortareas and Kapetanios (2013), I use a AR(1) model $y_t = \rho y_{t-1} + \epsilon_t$ to estimate the half-life convergence for the two PPP real exchange rate, $h = \frac{\ln(1/2)}{\ln(\hat{\rho})}$.

[57]Another potential explanation is that the cost of borrowing is lower at the one-year tenor than the three-month one during the working sample period from 2009 to 2012 in China, as depicted in Figure A.4.

5 Conclusion

With its hegemony in the global financial market, the U.S. dollar has the potential to affect real output, investment and trade activities not only in the United States, but beyond the border of the country. This paper sheds light on examining the spillover effects of dollar liquidity access in a non-US country with a macro variable—cross-currency basis—on the micro firm level trade activities in Chile after the global financial crisis.

I find that an easier access to dollar liquidity gives rises to both imports and exports in Chile. This effect persists either when firms' dollar exposure is identified through an invoicing currency Bartik share at the transaction level or another Bartik instrument methodology where the firm level sector intensity is instrumented with a plausible exogenous sector intensity at the country level with a one year lag or with an instrument set comprising the sector currency exposure at the firm level as well. This result stays robust to variations in model specification and variable measurement.

When delving deeper, I notice that firms trading more intensively with the United States are less affected by the dollar liquidity access, especially for exporting firms. It reconciles with the fact that exporters could obtain dollar liquidity directly from sales and therefore weakens the role that dollar access from the FX market plays. Further analysis shows that the country specific dollar liquidity measure —the cross-currency basis of Chilean Peso against the U.S. dollar—better explains firms' trade variations in Chile than a more general indicator, the broad dollar index. However, the latter has another component that affects Chile's trade besides the scope of the liquidity. Another exercise with Chinese firms finds consistent result, providing further evidence on how the dollar liquidity affects trade in the rest of the world by showing that the effects of cross-currency basis applies not only in Chile but in China as well.

This work looks into the role that the U.S. dollar plays at the intersection of international finance and international trade, and finds that trade is materially affected by the dollar liquidity access during the post-crisis period, partly reconciling with the weak trade performance observed after the GFC (Ollivaud and Schwellnus 2015). Future study might take a look at how the dollar exchange rate might affect trade through the component orthogonal to the liquidity channel.

References

Aguiar, M. and G. Gopinath (2005). Fire-sale foreign direct investment and liquidity crises. *Review of Economics and Statistics 87*(3), 439–452.

Amador, J., A. Mehl, M. Schmitz, and J. Garcia (2024). Dominant currency pricing in international trade of services.

Amador, M., J. Bianchi, L. Bocola, and F. Perri (2020). Exchange rate policies at the zero lower bound. *The Review of Economic Studies 87*(4), 1605–1645.

Amiti, M., O. Itskhoki, and J. Konings (2022). Dominant currencies: How firms choose currency invoicing and why it matters. *The Quarterly Journal of Economics 137*(3), 1435–1493.

Amiti, M. and D. E. Weinstein (2011). Exports and financial shocks. *The Quarterly Journal of Economics 126*(4), 1841–1877.

Asmundson, I., T. W. Dorsey, A. Khachatryan, I. Niculcea, and M. Saito (2011). Trade and trade finance in the 2008-09 financial crisis.

Autor, D. H., D. Dorn, and G. H. Hanson (2013). The china syndrome: Local labor market effects of import competition in the united states. *American economic review 103*(6), 2121–2168.

Avdjiev, S., V. Bruno, C. Koch, and H. S. Shin (2019). The dollar exchange rate as a global risk factor: evidence from investment. *IMF Economic Review 67*, 151–173.

Avdjiev, S., W. Du, C. Koch, and H. S. Shin (2019). The dollar, bank leverage, and deviations from covered interest parity. *American Economic Review: Insights 1*(2), 193–208.

Baba, N. and F. Packer (2009). Interpreting deviations from covered interest parity during the financial market turmoil of 2007–08. *Journal of Banking & Finance 33*(11), 1953–1962.

Bacchetta, P., J. S. Davis, and E. Van Wincoop (2023). Dollar shortages, cip deviations, and the safe haven role of the dollar. Technical report, National Bureau of Economic Research.

Beck, T., A. Demirgüç-Kunt, and V. Maksimovic (2008). Financing patterns around the world: Are small firms different? *Journal of financial economics 89*(3), 467–487.

Bems, R., R. C. Johnson, and K.-M. Yi (2013). The great trade collapse. *Annu. Rev. Econ. 5*(1), 375–400.

Benguria, F. and A. M. Taylor (2020). After the panic: Are financial crises demand or supply shocks? evidence from international trade. *American Economic Review: Insights 2*(4), 509–526.

Borio, C. E., R. N. McCauley, P. McGuire, and V. Sushko (2016). Covered interest parity lost: understanding the cross-currency basis. *BIS Quarterly Review September*.

Boz, E., G. Gopinath, and M. Plagborg-Møller (2017). Global trade and the dollar. Technical report, National Bureau of Economic Research.

Bruno, V. and H. S. Shin (2015). Capital flows and the risk-taking channel of monetary policy. *Journal of monetary economics 71*, 119–132.

Bruno, V. and H. S. Shin (2023). Dollar and exports. *The Review of Financial Studies 36*(8), 2963–2996.

Burkart, M. and T. Ellingsen (2004). In-kind finance: A theory of trade credit. *American economic review 94*(3), 569–590.

Cameron, A. C., J. B. Gelbach, and D. L. Miller (2011). Robust inference with multiway clustering. *Journal of Business & Economic Statistics 29*(2), 238–249.

Cenedese, G., P. Della Corte, and T. Wang (2021). Currency mispricing and dealer balance sheets. *The Journal of Finance 76*(6), 2763–2803.

Cerutti, E. M., M. Obstfeld, and H. Zhou (2021). Covered interest parity deviations: Macrofinancial determinants. *Journal of International Economics 130*, 103447.

Cetorelli, N. and L. S. Goldberg (2012). Follow the money: Quantifying domestic effects of foreign bank shocks in the great recession. *American Economic Review 102*(3), 213–218.

Chahrour, R. and R. Valchev (2022). Trade finance and the durability of the dollar. *The Review of Economic Studies 89*(4), 1873–1910.

Chen, N. and L. Juvenal (2018). Quality and the great trade collapse. *Journal of Development Economics 135*, 59–76.

Chor, D. and K. Manova (2012). Off the cliff and back? credit conditions and international trade during the global financial crisis. *Journal of international economics 87*(1), 117–133.

Chortareas, G. and G. Kapetanios (2013). How puzzling is the ppp puzzle? an alternative half-life measure of convergence to ppp. *Journal of Applied Econometrics 28*(3), 435–457.

Chung, W. (2016). Imported inputs and invoicing currency choice: Theory and evidence from uk transaction data. *Journal of International Economics 99*, 237–250.

Costello, A. M. (2019). The value of collateral in trade finance. *Journal of Financial Economics 134*(1), 70–90.

Cunat, V. (2007). Trade credit: suppliers as debt collectors and insurance providers. *The Review of Financial Studies 20*(2), 491–527.

Daripa, A. and J. Nilsen (2011). Ensuring sales: A theory of inter-firm credit. *American Economic Journal: Microeconomics 3*(1), 245–279.

Das, M. S. (2019). *China's evolving exchange rate regime.* International Monetary Fund.

De Gregorio, J., P. García, E. Luttini, and M. Rojas (2024). From dominant to producer currency pricing: Dynamics of chilean exports. *Journal of International Economics 149*, 103934.

Devereux, M. B., W. Dong, and B. Tomlin (2017). Importers and exporters in exchange rate pass-through and currency invoicing. *Journal of International Economics 105*, 187–204.

Driscoll, J. C. and A. C. Kraay (1998). Consistent covariance matrix estimation with spatially dependent panel data. *Review of economics and statistics 80*(4), 549–560.

Du, W., A. Tepper, and A. Verdelhan (2018). Deviations from covered interest rate parity. *The Journal of Finance 73*(3), 915–957.

Fabbri, D. and A. M. C. Menichini (2010). Trade credit, collateral liquidation, and borrowing constraints. *Journal of Financial Economics 96*(3), 413–432.

Filipe, S. F., J. Nissinen, and M. Suominen (2023). Currency carry trades and global funding risk. *Journal of Banking & Finance 149*, 106800.

Fong, W.-M., G. Valente, and J. K. Fung (2010). Covered interest arbitrage profits: The role of liquidity and credit risk. *Journal of banking & finance 34*(5), 1098–1107.

Fukuda, S.-i. and M. Tanaka (2017). Monetary policy and covered interest parity in the post gfc period: Evidence from the australian dollar and the nz dollar. *Journal of International Money and Finance 74*, 301–317.

Georgiadis, G., G. J. Müller, and B. Schumann (2024). Global risk and the dollar. *Journal of Monetary Economics 144*, 103549.

Giannetti, M., M. Burkart, and T. Ellingsen (2011). What you sell is what you lend? explaining trade credit contracts. *The Review of Financial Studies 24*(4), 1261–1298.

Giuliano, F. and E. Luttini (2020). Import prices and invoice currency: Evidence from chile. *Journal of International Money and Finance 106*, 102183.

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

Goldsmith-Pinkham, P., I. Sorkin, and H. Swift (2020). Bartik instruments: What, when, why, and how. *American Economic Review 110*(8), 2586–2624.

Gopinath, G. (2015). The international price system. Technical report, National Bureau of Economic Research.

Gopinath, G., E. Boz, C. Casas, F. J. Díez, P.-O. Gourinchas, and M. Plagborg-Møller (2020). Dominant currency paradigm. *American Economic Review 110*(3), 677–719.

Gopinath, G. and O. Itskhoki (2022). Dominant currency paradigm: A review. *Handbook of international economics 6*, 45–90.

Gopinath, G. and J. C. Stein (2021). Banking, trade, and the making of a dominant currency. *The Quarterly Journal of Economics 136*(2), 783–830.

Gourinchas, P.-O. (2021). The dollar hegemon? evidence and implications for policymakers. In *The Asian monetary policy forum: Insights for central banking*, pp. 264–300. World Scientific.

He, Z., S. Nagel, and Z. Song (2022). Treasury inconvenience yields during the covid-19 crisis. *Journal of Financial Economics 143*(1), 57–79.

Hebb, G. (2021). On the performance of bank-managed mutual funds: Canadian evidence. *Journal of Economics and Finance 45*(1), 22–48.

Hoekman, B. M. (2015). *The global trade slowdown: A new normal?* Centre for Economic Policy Research (CEPR).

Hofmann, B. and T. Park (2020). The broad dollar exchange rate as an eme risk factor. *BIS Quarterly Review December*, 13–26.

Hui, C.-H., H. Genberg, and T.-K. Chung (2011). Funding liquidity risk and deviations from interest-rate parity during the financial crisis of 2007–2009. *International Journal of Finance & Economics 16*(4), 307–323.

Iida, T., T. Kimura, and N. Sudo (2018). Deviations from covered interest rate parity and the dollar funding of global banks. *55th issue (September 2018) of the International Journal of Central Banking*.

Kim, Y., H. Lim, and Y. Yun (2024). International transmission of the us dollar liquidity shock: The channel of fx borrowing and lending. *Journal of International Economics 150*, 103907.

Klapper, L., L. Laeven, and R. Rajan (2012). Trade credit contracts. *The Review of Financial Studies 25*(3), 838–867.

Levchenko, A. A., L. T. Lewis, and L. L. Tesar (2010). The collapse of international trade during the 2008–09 crisis: In search of the smoking gun. *IMF Economic Review 58*(2), 214–253.

Levich, R. M. (2012). Fx counterparty risk and trading activity in currency forward and futures markets. *Review of Financial Economics 21*(3), 102–110.

Liao, G. and T. Zhang (2020). The hedging channel of exchange rate determination. International Finance Discussion Papers 1283, Board of Governors of the Federal Reserve System, Washington, DC.

Liao, G. Y. (2020). Credit migration and covered interest rate parity. *Journal of Financial Economics 138*(2), 504–525.

Lilley, A., M. Maggiori, B. Neiman, and J. Schreger (2022). Exchange rate reconnect. *Review of Economics and Statistics 104*(4), 845–855.

Ma, S. and T. Schmidt-Eisenlohr (2023). The financial channel of the exchange rate and global trade.

Maggiori, M., B. Neiman, and J. Schreger (2019). The rise of the dollar and fall of the euro as international currencies. In *AEA Papers and Proceedings*, Volume 109, pp. 521–26.

Miglioretti, D. L. and P. J. Heagerty (2007). Marginal modeling of nonnested multilevel data using standard software. *American journal of epidemiology 165*(4), 453–463.

Obstfeld, M. and H. Zhou (2022). The global dollar cycle. *Brookings Papers on Economic Activity 2022*(2), 361–447.

Ollivaud, P. and C. Schwellnus (2015). Does the post-crisis weakness of global trade solely reflect weak demand?

Pinnington, J. and M. Shamloo (2016). Limits to arbitrage and deviations from covered interest rate parity. Technical report, Bank of Canada.

Rajan, R. G. and L. Zingales (1998). Financial dependence and growth. *The American Economic Review 88*(3), 559–586.

Rime, D., A. Schrimpf, and O. Syrstad (2022, November). Covered interest parity arbitrage. *Review of Financial Studies 35*(11), 5185–5227.

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

Tang, K. and H. Zhu (2016). Commodities as collateral. *The Review of Financial Studies 29*(8), 2110–2160.

Thompson, S. B. (2011). Simple formulas for standard errors that cluster by both firm and time. *Journal of financial Economics 99*(1), 1–10.

Wu, W., M. Firth, and O. M. Rui (2014). Trust and the provision of trade credit. *Journal of Banking & Finance 39*, 146–159.

Online Appendix

Contents

Online Appendix (Not for Publication)

A.1 Data appendix

This section gives some information on the data used in the paper. In particular, the descriptive statistics of the firms from Chile is reported in Table A.1, while the sector classification employed in the baseline (6) is shown in Table A.2.

Table A.1: Descriptive statistics for Chilean firms†

	Exporting firms		
	2009	2016	2022
No. of firms	7,518	8,181	11,080
No. of destinations	191	198	194
No. of measure of unit	9	9	8
Exports volume (net kg)	167,863.20	192,818.90	152,687.80
Exports value (USD)	147,030.90	148,512.40	220367.00
	Importing firms		
	2009	2016	2022
No. of firms	30,199	41,441	15,491
No. of origins	170	176	176
No. of measure of unit	11	11	11
Imports volume (net kg)	52,662.98	50,877.52	52,936.34
Imports value(USD)	34,779.28	34,046.53	57,735.93

† I report the mean of exports (imports) volume and value in this table. For volume, only those measured in kilograms are reported.

Table A.2: Sector classification correspondence to HS 2-digit products†

HS2	**Sector**
01-05	Animal & animal products
06-15	Vegetable products
16-24	Food stuffs
25-26	Mineral products
27	Fuels
28-38	Chemicals & allied industries
39-40	Plastics or rubbers
41-43	Raw hides, skins, leather and furs
44-49	Wood & wood products
50-63	Textiles
64-67	Footwear
68-71	Stone or glass
72-83	Metals
84-85	Machinery and electrical products
86-89	Transportation
90-97	Miscellaneous

† Sector classification follows the rule from WITS.

A.2 Table appendix

For the interest of space, some results are not reported in the main text and presented here instead. Firstly, the results for the volume specification correspond to the baseline (6) are shown in Table A.3, while the robustness results with variations in model specification and variable measurement for the trade volume are presented in Table A.4. Secondly, I report the results for (5) where the currency exposure is replaced by U.S. dollar exposure, U.S. dollar dummy, and the currency liquidity indicator in Tables A.5, A.6 and A.7, respectively. Subsequently, the regression results for the alternative sector intensity $SI\prime$ are reported in Table A.8, and the results for falsification test with volume estimation before the GFC for the baseline (4) are shown in Table A.9. Next comes the results for volume specifications with the interaction between firm's trade intensity with the United States and the dollar liquidity condition, and the comparison between the broad U.S. dollar index and the cross-currency basis. These are shown in Table A.10 and Table A.11, respectively. Finally, I report the estimation results for the heterogeneity of firm size in Table A.12, and the volume estimations for the dollar liquidity condition in China and Chile at one year tenor in Table A.13, respectively.

Table A.3: The effects of dollar liquidity with firm's sector intensity on trade *volume* in Chile[†]

	All counterparties			U.S. only			Excluding U.S.		
	(1) OLS	(2) IV	(3) 2SLS	(4) OLS	(5) IV	(6) 2SLS	(7) OLS	(8) IV	(9) 2SLS
Imports volume									
$SI \times \Delta CCB\_Chile$	0.4622**	0.5695*	0.6078*	0.4490**	0.5230*	0.5886*	0.4651**	0.5814*	0.6127*
	(0.1821)	(0.2767)	(0.3001)	(0.1550)	(0.2538)	(0.2882)	(0.1896)	(0.2841)	(0.3050)
Observations	837,548	801,276	801,276	154,417	148,031	148,031	683,131	653,245	653,245
F	6.44	4.24	4.10	8.39	4.25	4.17	6.02	4.19	4.04
Cragg-Donald F		793580.98	565073.16		174678.63	110359.17		624718.95	462824.85
Kleibergen-Paap $rk\ LM$		4.58**	5.77*		4.69**	5.61*		4.55**	5.78*
Hansen J			1.13			1.69			0.87
Exports volume									
$SI \times \Delta CCB\_Chile$	0.4384**	0.6920**	0.6315**	0.3235	0.3073	0.3780	0.4488**	0.7116**	0.6560**
	(0.1665)	(0.2495)	(0.2451)	(0.2055)	(0.5088)	(0.2778)	(0.1652)	(0.2405)	(0.2449)
Observations	65,002	65,001	65,001	4,478	4,478	4,478	60,524	60,523	60,523
F	6.93	7.69	6.64	2.48	0.36	1.85	7.38	8.75	7.17
Cragg-Donald F		15,472.42	54,232.94		540.46	5,850.23		15,123.75	49,062.83
Kleibergen-Paap $rk\ LM$		4.73**	4.78*		4.70**	4.72*		4.73**	4.77*
Hansen J			1.08			0.05			1.03

[†] This table reports the regression between yearly change in imports and exports *volume* from firms in Chile and their trade in sector intensity's exposure to the dollar liquidity condition, measured as the yearly change in cross-currency basis of Chilean Peso against the U.S. dollar at a tenor of three months with a one year lag. SI is a ratio of the trade value of a certain sector from a firm to the total trade value of this firm, which is instrumented with the sector intensity at the country level with a one year lag (IV specification) and both the sector currency exposure at the firm level and sector intensity at the country level with a one year lag (2SLS specification). Test statistics for instrument quality are the Kleibergen-Paap $rk\ LM$ statistic, Cragg-Donald Wald F statistic, and Hansen J statistic, corresponding to tests for underidentification test, weak identification, and overidentification, respectively. The 10% maximal IV size critical value of weak identification is 19.9 for 2SLS specifications, and 16.4 for IV specifications. The sample starts from 2009 to 2022. Country-firm-product level fixed effect (where available) is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.4: Sensitivity of cross-currency basis and trade *volumes* to variations in sample coverage, variable construction, and estimation methodologies†

	CCB tenor: 1-month			CCB tenor: 1-year			Sub: no dom secs			Sub: excluding Covid			Est: quarterly			Est: currency FE		
	(1a§)	(1b§)	(1c§)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)	(4a)	(4b)	(4c)	(5a)	(5b)	(5c)	(6a)	(6b)	(6c)
Imports																		
Dollar liquidity	0.3343***	0.3399***	0.6396***	0.1266	0.1272	0.2315	0.3238*	0.3269*	0.7839*	0.3198*	0.3236*	0.6178*	0.0546**	0.0543**	0.1273**	0.3148*	0.3169*	0.6190*
	(0.0999)	(0.1026)	(0.1886)	(0.2238)	(0.2273)	(0.4358)	(0.1649)	(0.1683)	(0.3875)	(0.1604)	(0.1645)	(0.3052)	(0.0244)	(0.0253)	(0.0572)	(0.1598)	(0.1633)	(0.3041)
R^2	0.138	0.138	0.004	0.134	0.134	0.000	0.135	0.135	0.003	0.110	0.110	0.004	0.046	0.046	0.000	0.140	0.140	0.003
Observations	837,548	837,548	801,276	837,548	837,548	801,276	558,408	558,408	542,770	767,906	767,906	767,906	1,464,895	1,464,895	1,464,895	833,359	833,359	797,140
Exports																		
Dollar liquidity	0.2942***	0.2969***	0.3631***	0.0557	0.0562	0.0621	0.2784**	0.2802**	0.3383**	0.2866**	0.2885**	0.3503**	0.0511	0.0506	0.0616	0.3148*	0.3169*	0.6190*
	(0.0617)	(0.0627)	(0.0707)	(0.1872)	(0.1896)	(0.2319)	(0.1138)	(0.1155)	(0.1379)	(0.1177)	(0.1197)	(0.1434)	(0.0310)	(0.0310)	(0.0372)	(0.1598)	(0.1633)	(0.3041)
R^2	0.132	0.132	0.010	0.122	0.122	0.000	0.133	0.132	0.009	0.129	0.129	0.008	0.053	0.053	0.000	0.140	0.140	0.003
Observations	132,212	132,212	132,193	132,212	132,212	132,193	118,994	118,994	118,975	132,169	132,169	132,169	283,720	283,720	283,720	833,359	833,359	797,140

	Est: unit FE			Est: currency-unit FE			Est: Driscoll-Kraay			Cluster: country			Cluster: product			Cluster: country product		
	(7a)	(7b)	(7c)	(8a)	(8b)	(8c)	(9a)	(9b)	(9c)	(10a)	(10b)	(10c)	(11a)	(11b)	(11c)	(12a)	(12b)	(12c)
Imports																		
Dollar liquidity	0.3150*	0.3185*	0.6246*	0.3208*	0.3234*	0.6355*	0.3208	0.3234	0.4816**	0.3086*	0.3118*	0.6078*	0.3086*	0.3118*	0.6078*	0.3086*	0.3118*	0.6078*
	(0.1600)	(0.1641)	(0.3076)	(0.1626)	(0.1661)	(0.3119)	(0.1838)	(0.1877)	(0.2134)	(0.1480)	(0.1515)	(0.3001)	(0.1528)	(0.1568)	(0.3001)	(0.1436)	(0.1471)	(0.3001)
R^2	0.136	0.135	0.003	0.139	0.139	0.003				0.136	0.136	0.003	0.136	0.136	0.003	0.136	0.136	0.003
Observations	817,249	817,249	782,344	812,030	812,030	777,162	837,548	837,548	837,548	837,548	837,548	801,276	837,548	837,548	801,276	837,548	837,548	801,276
Exports																		
Dollar liquidity	0.2875**	0.2894**	0.3518**	0.2914**	0.2924**	0.3538**	0.2914**	0.2924**	0.3184**	0.2863**	0.2882**	0.3501**	0.2863**	0.2882**	0.3501**	0.2863**	0.2882**	0.3501**
	(0.1158)	(0.1177)	(0.1415)	(0.1180)	(0.1197)	(0.1430)	(0.1266)	(0.1288)	(0.1224)	(0.1129)	(0.1148)	(0.1418)	(0.1142)	(0.1163)	(0.1418)	(0.1113)	(0.1133)	(0.1418)
R^2	0.132	0.132	0.008	0.135	0.135	0.008				0.129	0.129	0.008	0.129	0.129	0.008	0.129	0.129	0.008
Observations	131,294	131,294	131,275	130,862	130,862	130,843	132,212	132,212	132,212	132,212	132,212	132,193	132,212	132,212	132,193	132,212	132,212	132,193

† This table reports the regression between yearly (except where specified) change in imports and exports volumes from firms in Chile and yearly (except where specified) change in cross-currency basis of Chilean Peso against the U.S. dollar at a tenor of three months (except where specified) with a lag. The sample starts from 2009 to 2022. Country-firm-product level fixed effect is controlled, and robust standard errors clustered at firm and year level (except specified) are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

§ For simplicity, a, b and c in each column denotes ΔCCB_Chile, $CE \cdot \Delta CCB$ and $SI \cdot \Delta CCB$, respectively, corresponding to the three baselines described in section 2.2.

Table A.5: The effects of dollar liquidity with firms' US dollar exposure and dollar liquidity to trade in Chile†

	All			US only			Excluding US		
	(1) All units	(2) Weight	(3) Quantity	(4) All units	(5) Weight	(6) Quantity	(7) All units	(8) Weight	(9) Quantity
Panel A: Imports									
Value									
Dollar exposure · ΔCCB_Chile	0.3388**	0.3370**	0.3608**	0.3203**	0.3235**	0.3253*	0.3443**	0.3410**	0.3720**
	(0.1504)	(0.1513)	(0.1548)	(0.1420)	(0.1432)	(0.1489)	(0.1538)	(0.1544)	(0.1585)
R^2	0.136	0.134	0.136	0.128	0.124	0.126	0.138	0.137	0.139
Volume									
Dollar exposure · ΔCCB_Chile	0.3383*	0.3381*	0.3588**	0.3368**	0.3403**	0.3374*	0.3387*	0.3375*	0.3656**
	(0.1601)	(0.1638)	(0.1582)	(0.1517)	(0.1525)	(0.1560)	(0.1639)	(0.1684)	(0.1607)
R^2	0.136	0.132	0.139	0.126	0.124	0.123	0.138	0.134	0.142
Observations	837,548	555,831	248,520	154,417	100,012	48,751	683,131	455,819	199,769
Panel B: Exports									
Value									
Dollar exposure · ΔCCB_Chile	0.3306**	0.3163**	0.3903**	0.2668*	0.2228	0.4173**	0.3368**	0.3248**	0.3856**
	(0.1142)	(0.1096)	(0.1264)	(0.1449)	(0.1642)	(0.1466)	(0.1124)	(0.1062)	(0.1369)
R^2	0.135	0.140	0.140	0.138	0.153	0.119	0.135	0.139	0.143
Volume									
Dollar exposure · ΔCCB_Chile	0.2995**	0.2810**	0.3506**	0.2204	0.1819	0.3432	0.3072**	0.2899**	0.3519**
	(0.1230)	(0.1203)	(0.1404)	(0.1601)	(0.1741)	(0.1966)	(0.1204)	(0.1167)	(0.1456)
R^2	0.128	0.134	0.130	0.122	0.136	0.102	0.129	0.133	0.134
Observations	132,194	95,295	11,523	10,574	7,472	1,607	121,620	87,823	9,916
Fixed effects:									
country-firm-product	Y	Y	Y				Y	Y	Y
firm-product				Y	Y	Y			

† This table reports the regression between yearly change in imports, exports and trade (both volume and value) from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the U.S. dollar at a tenor of three months with a one year lag. The sample starts from 2009 to 2022. Country-firm-product level fixed effect (where available) is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.6: The effects of dollar liquidity with firms' dollar exposure to trade in Chile†

	All			U.S. only			Excluding U.S.		
	(1) All units	(2) Weight	(3) Quantity	(4) All units	(5) Weight	(6) Quantity	(7) All units	(8) Weight	(9) Quantity
Panel A: Imports									
Value									
USD × ΔCCB_Chile	0.2989*	0.3010*	0.3102*	0.2750*	0.2807*	0.2727*	0.3063*	0.3072*	0.3227*
	(0.1438)	(0.1452)	(0.1467)	(0.1356)	(0.1379)	(0.1392)	(0.1471)	(0.1481)	(0.1510)
R^2	0.136	0.134	0.136	0.128	0.123	0.126	0.138	0.137	0.139
Volume									
USD × ΔCCB_Chile	0.2942*	0.2996*	0.3014*	0.2872*	0.2917*	0.2864*	0.2963*	0.3020*	0.3064*
	(0.1536)	(0.1585)	(0.1497)	(0.1428)	(0.1476)	(0.1395)	(0.1580)	(0.1629)	(0.1550)
R^2	0.135	0.132	0.139	0.126	0.124	0.123	0.138	0.134	0.142
Observations	837,548	555,831	248,520	154,417	100,012	48,751	683,131	455,819	199,769
Panel B: Exports									
Value									
USD × ΔCCB_Chile	0.3148**	0.3064**	0.3789**	0.2583*	0.2117	0.4169**	0.3203**	0.3151**	0.3720**
	(0.1084)	(0.1063)	(0.1226)	(0.1401)	(0.1616)	(0.1388)	(0.1064)	(0.1028)	(0.1334)
R^2	0.135	0.140	0.140	0.139	0.152	0.119	0.135	0.139	0.143
Volume									
USD × ΔCCB_Chile	0.2858**	0.2710**	0.3478**	0.2136	0.1647	0.3750*	0.2928**	0.2807**	0.3428**
	(0.1165)	(0.1167)	(0.1351)	(0.1552)	(0.1714)	(0.1911)	(0.1137)	(0.1129)	(0.1407)
R^2	0.128	0.133	0.130	0.122	0.136	0.104	0.129	0.133	0.134
Observations	132,213	95,305	11,523	10,583	7,477	1,607	121,630	87,828	9,916
Fixed effects:									
country-firm-product	Y	Y	Y				Y	Y	Y
firm-product				Y	Y	Y			

† This table reports the regression between yearly change in imports, exports and trade (both volume and value) from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the U.S. dollar at a tenor of three months with a one year lag. The sample starts from 2009 to 2022. Country-firm-product level fixed effect (where available) is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.7: Robust: The effects of dollar liquidity with currency liquidity on firms' trade in Chile†

	All			U.S. only			Excluding U.S.		
	(1) All units	(2) Weight	(3) Quantity	(4) All units	(5) Weight	(6) Quantity	(7) All units	(8) Weight	(9) Quantity
Panel A: Imports									
Value									
Currency × ΔCCB_Chile	0.3301*	0.3333*	0.3404*	0.2770*	0.2826*	0.2751*	0.3452**	0.3475**	0.3604**
	(0.1509)	(0.1518)	(0.1556)	(0.1354)	(0.1378)	(0.1389)	(0.1559)	(0.1562)	(0.1623)
R^2	0.137	0.135	0.137	0.128	0.124	0.126	0.140	0.138	0.140
Volume									
Currency × ΔCCB_Chile	0.3228*	0.3284*	0.3299*	0.2890*	0.2941*	0.2878*	0.3324*	0.3381*	0.3427*
	(0.1674)	(0.1728)	(0.1627)	(0.1428)	(0.1476)	(0.1395)	(0.1754)	(0.1808)	(0.1714)
R^2	0.136	0.133	0.139	0.126	0.124	0.123	0.139	0.135	0.143
Observations	837,548	555,831	248,520	154,417	100,012	48,751	683,131	455,819	199,769
Panel B: Exports									
Value									
Currency × ΔCCB_Chile	0.3233**	0.3100**	0.3860**	0.2580*	0.2115	0.4146**	0.3295**	0.3189**	0.3809**
	(0.1092)	(0.1067)	(0.1256)	(0.1403)	(0.1617)	(0.1387)	(0.1073)	(0.1034)	(0.1369)
R^2	0.136	0.140	0.140	0.139	0.152	0.119	0.136	0.139	0.144
Volume									
Currency × ΔCCB_Chile	0.2923**	0.2736**	0.3505**	0.2118	0.1638	0.3667*	0.2999**	0.2836**	0.3476**
	(0.1185)	(0.1177)	(0.1386)	(0.1554)	(0.1716)	(0.1894)	(0.1158)	(0.1140)	(0.1451)
R^2	0.129	0.134	0.130	0.122	0.136	0.103	0.129	0.133	0.135
Observations	132,213	95,305	11,523	10,583	7,477	1,607	121,630	87,828	9,916
Fixed effects:									
country-firm-product	Y	Y	Y				Y	Y	Y
firm-product				Y	Y	Y			

† This table reports the regression between yearly change in imports, exports and trade (both volume and value) from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the US dollar at a tenor of three months with a one year lag. The sample starts from 2009 to 2022. Country-firm-product level fixed effect (where available) is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.8: The effects of dollar liquidity with firms' sector intensity relative to the whole sector on trade in Chile†
Independent variable: $100 \times SI' \cdot \Delta CCB\_Chile$

	All counterparties			U.S. only			Excluding U.S.		
	(1) OLS	(2) IV	(3) 2SLS	(4) OLS	(5) IV	(6) 2SLS	(7) OLS	(8) IV	(9) 2SLS
Imports value									
$SI' \cdot \Delta CCB\_Chile$	0.1000***	1.5646**	1.5851**	0.1487**	2.6766*	2.5807*	0.0944**	1.4119**	1.4542**
	(0.0317)	(0.6963)	(0.7021)	(0.0664)	(1.2394)	(1.2276)	(0.0327)	(0.6244)	(0.6334)
Observations	837,548	837,548	801,276	154,417	154,417	148,031	683,131	683,131	653,245
F	9.97	5.05	5.10	5.01	4.66	4.42	8.31	5.11	5.27
Cragg-Donald F		28,843.29	14,028.54		3,146.88	1,569.59		26,611.13	12,985.44
Kleibergen-Paap rk LM		4.33**	4.45		4.40**	4.62*		4.31**	4.42
Hansen J			2.40			1.24			2.51
Exports value									
$SI' \cdot \Delta CCB\_Chile$	0.0278***	0.2482***	0.2462**	0.0236**	0.2836*	0.2839*	0.0281***	0.2458***	0.2440***
	(0.0067)	(0.0799)	(0.0801)	(0.0079)	(0.1413)	(0.1426)	(0.0067)	(0.0768)	(0.0770)
Observations	132,212	132,212	132,193	10,583	10,583	10,572	121,629	121,629	121,621
F	17.36	9.66	9.43	8.88	4.03	3.97	17.52	10.25	10.05
Cragg-Donald F		11,521.79	5,859.82		749.84	377.41		10,818.76	5,503.50
Kleibergen-Paap rk LM		4.07**	4.14		3.77*	3.75		4.08**	4.15
Hansen J			0.18			1.30			0.13

† This table reports the regression between yearly change in imports and exports value from firms in Chile and their trade in sector intensity's exposure to the dollar liquidity condition, measured as the yearly change in cross-currency basis of Chilean Peso against the US dollar at a tenor of three months with a one year lag. SI' is a ratio of certain firm's trade value in one particular sector to the total trade value of this sector, which is instrumented with the sector currency exposure at the the firm level (IV specifications) and both the sector currency exposure and sector intensity at the country level with a one year lag (2SLS specifications). Test statistics for instrument quality are the Kleibergen-Paap rk LM statistic, Cragg-Donald Wald F statistic, and Hansen J statistic, corresponding to tests for underidentification test, weak identification, and overidentification, respectively. The 10% maximal IV size critical value of weak identification is 19.9 for 2SLS specifications, and 16.4 for IV specifications. The sample starts from 2009 to 2022. Country-firm-product level fixed effect is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.9: Effects of cross-currency basis on Chile's trade *volume*, pre-crisis period†

	All counterparties			U.S. only			Excluding U.S.		
	All units (1)	Weight (2)	Quantity (3)	All units (4)	Weight (5)	Quantity (6)	All units (7)	Weight (8)	Quantity (9)
Imports Volume									
ΔCCB_Chile	-0.1593	-0.1493	-0.1772	0.0090	0.0502	-0.0658	-0.2094	-0.2073	-0.2134
	(0.1745)	(0.1653)	(0.1919)	(0.1244)	(0.1155)	(0.1543)	(0.1920)	(0.1836)	(0.2089)
R^2	0.220	0.219	0.224	0.205	0.206	0.208	0.225	0.224	0.231
Observations	231,387	154,208	72,231	53,621	35,128	17,934	177,766	119,080	54,297
Exports Volume									
ΔCCB_Chile	-0.0997	-0.1571	0.1881	-0.0495	-0.0556	0.4328	-0.1056	-0.1688	0.1321
	(0.1121)	(0.1219)	(0.2036)	(0.2317)	(0.2469)	(0.3960)	(0.1026)	(0.1126)	(0.1974)
R^2	0.250	0.257	0.233	0.246	0.265	0.220	0.251	0.255	0.236
Observations	41,678	31,613	3,903	4,524	3,336	752	37,154	28,277	3,151
Fixed effects:									
country-firm-product	Y	Y	Y				Y	Y	Y
firm-product				Y	Y	Y			

† This table reports the regression between yearly change in imports and exports from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the US dollar at a tenor of three months with a one year lag. The sample period is restricted between 2003 and 2007. Country-firm-product level fixed effect (where available) is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.10: Effects of dollar liquidity on Chilean firm's trade *volume*, conditional on firms' trade intensity with the US†

	Imports			**Exports**		
	(1) All counterparties	(2) US only	(3) Excluding US	(4) All counterparties	(5) US only	(6) Excluding US
US intensity × ΔCCB_Chile	-0.0644	0.0277	-0.1041	-0.1372**	0.0618	-0.2212***
	(0.0438)	(0.0818)	(0.0867)	(0.0450)	(0.1193)	(0.0602)
US intensity	0.1464	1.1683***	-0.8179***	-0.1335	1.0824***	-0.8576***
	(0.0911)	(0.1370)	(0.1616)	(0.0947)	(0.1796)	(0.1094)
ΔCCB_Chile	0.3165*	0.2218*	0.3348*	0.2921**	0.1702	0.3092**
	(0.1465)	(0.1071)	(0.1580)	(0.1147)	(0.1763)	(0.1157)
Fixed effects:						
country-firm-product	Y		Y	Y		Y
firm-product		Y			Y	
R^2	0.144	0.132	0.151	0.146	0.133	0.153
Observations	604,803	154,417	450,386	85,521	10,583	74,938

† This table reports the regression between yearly change in trade (both imports and exports) volumes from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the US dollar at a tenor of three months with a one year lag. US intensity is a yearly varying ratio of a firm's trade value with the US to its total trade value. The sample starts from 2009 to 2022. Country-firm-product level fixed effect (where available) is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.11: The effects of dollar liquidity on trade *volume* in Chile: broad dollar versus 3-month CCB†

	Imports			Exports		
	(1)	(2)	(3)	(4)	(5)	(6)
ΔCCB_Chile		0.3960***	0.4095***		0.2956***	0.3107***
		(0.0593)	(0.0445)		(0.0665)	(0.0534)
$\Delta Dollar$	-0.5479			-0.6728		
	(0.4478)			(0.4370)		
$\Delta Dollar\_Orth$			-1.4104***			-1.3924**
			(0.2644)			(0.4742)
Fixed effects:						
country-firm-product	Y	Y	Y	Y	Y	Y
R^2	0.133	0.139	0.140	0.126	0.133	0.135
Observations	801,720	801,720	801,720	128,204	128,204	128,203

† This table reports the regression between yearly change in trade (both imports and exports) *volume* of firms in Chile and yearly change of the U.S. dollar index with a lag, or the yearly change in cross-currency basis of Chilean Peso against the US dollar at a tenor of three months with a lag, and both. Both GDP per capita in Chile for exports (or GDP per capita in the destination country for imports) and trade openness are controlled. The sample starts from 2009 to 2022. Fixed effect at country-firm-product level is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.12: The effects of dollar liquidity on trade, conditional on firms' size

	Value			Volume		
	(1)	(2)	(3)	(4)	(5)	(6)
			Panel A: Imports			
ΔCCB_Chile	0.1837	0.2504*	0.2513*	0.1454	0.2342	0.2331
	(0.1169)	(0.1190)	(0.1250)	(0.1354)	(0.1357)	(0.1406)
large=1	0.0199			0.0299		
	(0.0254)			(0.0207)		
large=1 × ΔCCB_Chile	0.0751*			0.0986***		
	(0.0383)			(0.0311)		
medium=1		0.0237			0.0125	
		(0.0296)			(0.0287)	
medium=1 × ΔCCB_Chile		-0.0445			-0.0680	
		(0.0454)			(0.0401)	
small=1			-0.0985**			-0.1003**
			(0.0399)			(0.0331)
small=1 × ΔCCB_Chile			-0.1128			-0.1298**
			(0.0685)			(0.0554)
R^2	0.006	0.006	0.006	0.004	0.004	0.004
Observations	909,629	909,629	909,629	909,629	909,629	909,629
			Panel B: Exports			
ΔCCB_Chile	0.1638**	0.2608***	0.2578***	0.1513**	0.2183**	0.2201**
	(0.0659)	(0.0777)	(0.0777)	(0.0637)	(0.0918)	(0.0901)
large=1	0.0301			0.0344		
	(0.0230)			(0.0275)		
large=1 × ΔCCB_Chile	0.1102***			0.0784*		
	(0.0201)			(0.0379)		
medium=1		-0.0063			-0.0130	
		(0.0150)			(0.0211)	
medium=1 × ΔCCB_Chile		-0.0755***			-0.0416	
		(0.0147)			(0.0311)	
small=1			-0.0556			-0.0535*
			(0.0313)			(0.0293)
small=1 × ΔCCB_Chile			-0.1471***			-0.1321**
			(0.0391)			(0.0492)
R^2	0.023	0.023	0.023	0.018	0.018	0.018
Observations	139,421	139,421	139,421	139,421	139,421	139,421
Fixed effects:						
country-product	Y	Y	Y	Y	Y	Y

† This table reports the regression between yearly change in imports and exports (both volume and value) from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the U.S. dollar at a tenor of three months with a lag, with an interaction term between CCB and firm size. A firm is regarded as a large importing (exporting) one if its total imports (exports) value in the sample period ranks the top 1/3. The bottom 1/3 are regarded as small firms, and the middle 1/3 are classified as medium firms. The sample starts from 2009 to 2022. Country-product level fixed effect is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.13: How tenor of cross-currency basis matters for trade volume: Chile versus China†

	Chile			China		
	(1) All counterparties	(2) U.S. only	(3) Excluding U.S.	(4) All counterparties	(5) U.S. only	(6) Excluding U.S.
Panel A: Imports						
ΔCCB_1y	0.1266	0.0795	0.1375	0.0676**	0.0724**	0.0670**
	(0.2238)	(0.2145)	(0.2261)	(0.0122)	(0.0134)	(0.0121)
R^2	0.134	0.123	0.136	0.272	0.258	0.274
Observations	837,548	154,417	683,131	426,823	44,406	382,417
Panel B: Exports						
ΔCCB_1y	0.0556	0.0855	0.0530	0.0510*	0.0573**	0.0504*
	(0.1872)	(0.1747)	(0.1888)	(0.0122)	(0.0120)	(0.0123)
R^2	0.122	0.119	0.122	0.292	0.292	0.291
Observations	132,213	10,583	121,630	717,338	64,735	652,603
Fixed effects:						
country-firm-product	Y	Y	Y	Y	Y	Y

† This table reports the results for Chile and China, where the one-year tenor cross-currency basis is used for the respective local currency against the US dollar. The sample period is between 2009 and 2022 for Chile, while between 2009 and 2012 for China due to availability of the data. Country-firm-product level fixed effect is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

A.3 Additional robustness checks

Different standard errors clustering I cluster the standard error at the firm and year level in the baseline, and additionally cluster it at the invoicing currency, unit of measurement, and both for the baseline (4) with the full sample and report these results in Table A.14. Obviously, the coefficient on ΔCCB_Chile stays positive and statistically significant despite the variations in standard errors clustering.

Full results for specification with currency fixed effects While I report some results for the specification (4) with currency fixed effects in Section 3.2, I show the full results for different samples in Table A.15. Overall, the results are consistent with the baseline and indicate that dollar liquidity has a positive impact on trade in Chile.

Sector intensity with U.S. dollar dummy As an alternative robust test, I also estimate an specification where the independent variable is the sector intensity multiplied by both the dollar liquidity condition and U.S. dollar dummy. Likewise, I run the regressions for both imports and exports, and report these results in Table A.16. Consistently, the coefficient is positive and uniformly statistically significant across all the specifications, providing further evidence to the baseline finding.

Additional robustness for firm size heterogeneity I further control the firm level fixed effect[58] and re-estimate the regressions as done for interaction with the firm size dummy reported in Section 4.2, and report the corresponding results in Table A.17. Consistently, the coefficient on the interaction of large firm with CCB of Chile is uniformly positive (although not all significant). In addition, I consider a continuous firm size measure, in which the firm size is a ratio of a firm's trade value over the sum of all firms' trade value during the whole sample period. Therefore, I impose an interaction of the firm size and the dollar liquidity condition, and run the regressions for both imports and exports as a robust check. These are reported in Table A.18. On balance, the coefficient on the interaction term is positive and statistically significant for both imports and exports, supporting the finding that larger firms tend to trade more when the dollar liquidity condition improves in Chile.

[58] Previously, I only control the country-product level fixed effect since the firm size dummy is constructed on the basis of firm's trade value, which has already captures some of firm's characteristic and can be collinear with the firm fixed effect. Here I additionally control the firm fixed effect, and do find that the coefficient on the individual firm size dummy is absorbed due to collinearity.

Table A.14: Additional sensitivity of cross-currency basis and trade to further variations in standard errors clustering besides the firm and year level†

	Value			Volume		
	(1) currency	(2) unit	(3) currency & unit	(4) currency	(5) unit	(6) currency & unit
Panel A: Imports						
ΔCCB_Chile	0.3156***	0.3156***	0.3156***	0.3088**	0.3088**	0.3088***
	(0.0829)	(0.0927)	(0.0558)	(0.1019)	(0.1033)	(0.0667)
R^2	0.138	0.138	0.138	0.136	0.136	0.136
Observations	837,991	837,991	837,991	837,991	837,991	837,991
Panel B: Exports						
ΔCCB_Chile	0.3186***	0.3186***	0.3186***	0.2863***	0.2863***	0.2863***
	(0.0352)	(0.0724)	(0.0280)	(0.0438)	(0.0793)	(0.0355)
R^2	0.136	0.136	0.136	0.129	0.129	0.129
Observations	132,213	132,213	132,213	132,213	132,213	132,213
Fixed effects:						
country-firm-product	Y	Y	Y	Y	Y	Y

† This table reports the regression between yearly change in trade value and volume from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the U.S. dollar at a tenor of three months with a one year lag. The sample starts from 2009 to 2022. Country-firm-product level fixed effect is controlled, and robust standard errors clustered at firm, year and the respective additional level listed in the column are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.15: Robust: The effects of dollar liquidity on firms' trade in Chile† (with currency FE)

	All			US only			Excluding US		
	(1) All units	(2) Weight	(3) Quantity	(4) All units	(5) Weight	(6) Quantity	(7) All units	(8) Weight	(9) Quantity
Panel A: Imports									
<u>Value</u>									
ΔCCB_Chile	0.3216**	0.3251**	0.3293**	0.2796*	0.2860*	0.2740*	0.3311**	0.3339**	0.3428**
	(0.1403)	(0.1408)	(0.1462)	(0.1341)	(0.1364)	(0.1380)	(0.1422)	(0.1422)	(0.1493)
R^2	0.142	0.140	0.141	0.130	0.125	0.127	0.145	0.144	0.144
<u>Volume</u>									
ΔCCB_Chile	0.3148*	0.3196*	0.3199*	0.2935*	0.2986*	0.2896*	0.3196*	0.3244*	0.3273*
	(0.1598)	(0.1648)	(0.1552)	(0.1417)	(0.1461)	(0.1393)	(0.1646)	(0.1698)	(0.1603)
R^2	0.140	0.137	0.142	0.127	0.126	0.124	0.144	0.140	0.146
Observations	833,359	552,342	246,858	154,163	99,761	48,653	679,196	452,581	198,205
Panel B: Exports									
<u>Value</u>									
ΔCCB_Chile_3m	0.3221**	0.3109**	0.3787**	0.2557*	0.2093	0.4060**	0.3281**	0.3199**	0.3740**
	(0.1079)	(0.1072)	(0.1257)	(0.1415)	(0.1625)	(0.1375)	(0.1060)	(0.1041)	(0.1363)
R^2	0.139	0.143	0.141	0.138	0.152	0.118	0.139	0.142	0.145
<u>Volume</u>									
ΔCCB_Chile_3m	0.2901**	0.2727**	0.3458**	0.2097	0.1616	0.3579*	0.2972**	0.2824**	0.3437**
	(0.1181)	(0.1187)	(0.1381)	(0.1574)	(0.1722)	(0.1890)	(0.1154)	(0.1152)	(0.1432)
F	2.63	2.49	0.01	2.32	1.50	5.63	2.43	2.40	0.14
R^2	0.131	0.136	0.130	0.121	0.136	0.100	0.132	0.136	0.135
Observations	131,803	95,038	11,487	10,564	7,465	1,604	121,239	87,573	9,883
Fixed effects:									
country-firm-product-currency	Y	Y	Y	Y	Y	Y	Y	Y	Y

† This table reports the regression between yearly change in imports, exports and trade (both volume and value) from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the US dollar at a tenor of three months. The sample starts from 2009 to 2022. Country-firm-product-currency level fixed effect is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.16: The effects of dollar liquidity on firms' trade on the basis of sector intensity and U.S. dollar exposure in Chile[†]

	All			US only			Excluding US		
	(1) All units	(2) Weight	(3) Quantity	(4) All units	(5) Weight	(6) Quantity	(7) All units	(8) Weight	(9) Quantity
Panel A: Imports									
Value									
Sector intensity·ΔCCB_Chile· USD	9.55**	8.80**	14.25**	14.78*	14.02*	21.45*	8.88**	8.01**	13.70**
	(3.15)	(3.02)	(5.61)	(6.79)	(7.28)	(10.29)	(3.22)	(3.09)	(5.40)
R^2	0.133	0.130	0.133	0.125	0.120	0.123	0.135	0.133	0.136
Volume									
Sector intensity·ΔCCB_Chile· USD	10.01***	9.15**	14.85**	16.34*	15.27*	24.44**	9.20**	8.23**	14.12**
	(3.17)	(3.14)	(4.88)	(7.43)	(8.00)	(9.49)	(3.32)	(3.29)	(4.78)
R^2	0.133	0.130	0.137	0.124	0.122	0.121	0.136	0.132	0.141
Observations	837,548	555,831	248,520	154,417	100,012	48,751	683,131	455,819	199,769
Panel B: Exports									
Value									
Sector intensity·ΔCCB_Chile· USD	2.70***	2.47***	3.37	2.36**	2.04**	2.86	2.72***	2.49***	3.45
	(0.68)	(0.64)	(2.20)	(0.79)	(0.88)	(1.68)	(0.68)	(0.64)	(2.32)
R^2	0.127	0.132	0.133	0.133	0.149	0.111	0.126	0.130	0.137
Volume									
Sector intensity·ΔCCB_Chile· USD	2.49***	2.28***	2.99	2.23**	1.73*	4.20	2.50***	2.31***	2.77
	(0.70)	(0.70)	(1.85)	(0.97)	(0.96)	(2.78)	(0.70)	(0.71)	(1.78)
F	2.63	2.49	0.01	2.32	1.50	5.63	2.43	2.40	0.14
R^2	0.123	0.128	0.126	0.119	0.134	0.099	0.123	0.127	0.130
Observations	132,212	95,304	11,523	10,583	7,477	1,607	121,629	87,827	9,916
Fixed effects:									
country-firm-product	Y	Y	Y	Y	Y	Y	Y	Y	Y

[†] This table reports the regression between yearly change in imports, exports and trade (both volume and value) from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the US dollar at a tenor of three months. The sample starts from 2009 to 2022. Country-firm-product level fixed effect is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.17: The effects of dollar liquidity on trade, conditional on firms' size with additional firm fixed effect

	Value			Volume		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Imports						
ΔCCB_Chile	0.2698*	0.3196**	0.3191**	0.2433	0.3144*	0.3137*
	(0.1246)	(0.1379)	(0.1394)	(0.1499)	(0.1570)	(0.1584)
large=1 $\times$ ΔCCB_Chile	0.0539			0.0769**		
	(0.0335)			(0.0294)		
medium=1 $\times$ ΔCCB_Chile		-0.0360			-0.0510	
		(0.0296)			(0.0329)	
small=1 $\times$ ΔCCB_Chile			-0.0882			-0.1268*
			(0.0743)			(0.0629)
R^2	0.138	0.138	0.138	0.136	0.136	0.136
Observations	837,991	837,991	837,991	837,991	837,991	837,991
Panel B: Exports						
ΔCCB_Chile	0.2475**	0.3258**	0.3276**	0.2431*	0.2874**	0.2946**
	(0.1042)	(0.1058)	(0.1062)	(0.1112)	(0.1176)	(0.1162)
large=1 $\times$ ΔCCB_Chile	0.0895***			0.0543		
	(0.0286)			(0.0445)		
medium=1 $\times$ ΔCCB_Chile		-0.0464			-0.0070	
		(0.0326)			(0.0473)	
small=1 $\times$ ΔCCB_Chile			-0.1784**			-0.1664**
			(0.0624)			(0.0642)
R^2	0.136	0.136	0.136	0.129	0.129	0.129
Observations	132,213	132,213	132,213	132,214	132,214	132,214
Fixed effects:						
country-firm-product	Y	Y	Y	Y	Y	Y

† This table reports the regression between yearly change in imports and exports (both volume and value) from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the US dollar at a tenor of three months, with an interaction term between CCB and firm size. A firm is regarded as a large importing (exporting) one if its total imports (exports) value in the sample period ranks the top 1/3. The bottom 1/3 are regarded as small firms, and the middle 1/3 classified as medium firms. The sample starts from 2009 to 2022. Country-firm-product level fixed effect is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.18: The effects of dollar liquidity on trade, conditional on firms' size

	Imports		**Exports**	
	(1) Value	(2) Volume	(3) Value	(4) Volume
$firm\ size$	-3.5726***	-4.2750***	0.8319***	0.8842**
	(1.1187)	(0.6386)	(0.1600)	(0.2890)
ΔCCB_Chile	0.2421*	0.2219	0.2467***	0.2090**
	(0.1210)	(0.1377)	(0.0762)	(0.0870)
$firm\ size \times \Delta CCB\_Chile$	5.0840***	6.9603***	0.8998	1.7326***
	(0.0847)	(1.3138)	(0.6139)	(0.4051)
Fixed effects:				
country-product	Y	Y	Y	Y
R^2	0.006	0.004	0.023	0.018
Observations	909,629	909,629	139,421	139,422

† This table reports the regression between yearly change in imports and exports (both volume and value) from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the US dollar at a tenor of three months, with an interaction term between CCB and firm size. Firm size is a ratio of the a firm's trade value over the sum of all firms' trade value during the sample period. The sample starts from 2009 to 2022. Country-firm-product level fixed effect is controlled, and robust standard errors clustered at firm and year level (only year level for exports specifications) are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

A.4 Dollar liquidity of the trading partners

Given the nontrivial impact of dollar finance on both imports and exports activities found in Chilean firms, one might be curious about whether the dollar liquidity access for the trading partners matters or not. Generally speaking, Chile's imports from (exports to) a country could be regarded as that particular country's exports to (imports from) Chile. However, the problem is that I have only a country's trade records with Chile, which obviously cannot reflect its overall trade flows with countries all over the world. Therefore, it is hard to predict the effect of dollar liquidity on these countries' trade with Chile since they might not have a strong tie with Chile compared to large countries such as China.

Nevertheless, I explore this effect by following the baseline (4) but looking at the dollar liquidity condition for Chile's trading partners, measured as the cross-currency basis of the currency in a particular partner country vis-à-vis the U.S. dollar[59]. In the meantime, a specification with both the dollar financing condition of Chile and its trading partner is also estimated, for both imports and exports. The corresponding results are shown in Table A.19.

Surprisingly, the coefficient on $\Delta CCB\_CountParty$ does not suggest a consistent result between imports (panel A) and exports (panel B), with little impact on the former but a negative and significant effect on the latter. One possible explanation is that Chile's counterparties' main trading partner is not Chile, and therefore an improvement in its counterparties' dollar financing condition is likely not to increase their trade with Chile but with the rest of the world or at least their main trading partners. Instead, I find that the coefficient on ΔCCB_Chile remains positive and statistically significant for both imports and exports, showing how the dollar liquidity condition in Chile matters for trade in the country.

[59]Similarly, a one-year lag of the change in CCB for the counterparties is used, denoted as $\Delta CCB\_CountParty$.

Table A.19: Effects of cross-currency basis for trading partners on Chilean trade†

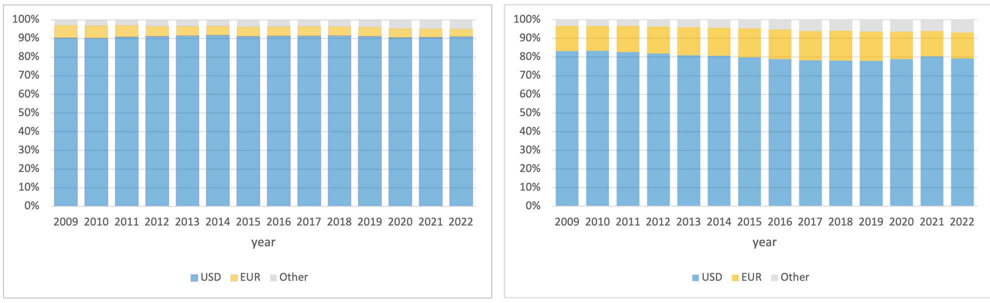
	Value		Volume	
	(1)	(2)	(3)	(4)
		Panel A: Imports		
ΔCCB_Chile		0.3518**		0.3448*
		(0.1311)		(0.1569)
$\Delta CCB\_CountParty$	0.0020	-0.0136	0.0022	-0.0131
	(0.0169)	(0.0088)	(0.0161)	(0.0074)
R^2	0.133	0.140	0.135	0.140
Observations	566,947	566,947	566,947	566,947
		Panel B: Exports		
ΔCCB_Chile		0.3190***		0.2708***
		(0.0694)		(0.0836)
$\Delta CCB\_CountParty$	-0.0213**	-0.0177***	-0.0225***	-0.0193***
	(0.0086)	(0.0040)	(0.0068)	(0.0042)
R^2	0.145	0.158	0.142	0.150
Observations	57,942	57,942	57,942	57,942
Fixed effects:				
country-firm-product	Y	Y	Y	Y

† This table reports the regression between yearly change in imports and exports from Chilean firms and yearly change in cross-currency basis of the currency for their counterparties against the U.S. dollar with a one year lag. The sample starts from 2009 to 2022 for all the specifications. Fixed effects at country-firm-product and unit level are controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

A.5 Figure appendix

I first plot the currency invoicing in Chile in the most recent decade in Figure A.1 for both exports (left panel) and imports (right panel). Obviously, U.S. dollar dominates in trade invoicing in the country, with more than 90 percentage points for the former and 80 for the latter.

The cross-currency basis of CLP against the USD with the 3-month tenor at the yearly frequency is illustrated in Figure A.2, and the cross-currency basis of CNY against the USD with the 3-month tenor at the daily frequency is shown in Figure A.3. I further plot the difference between one-year and three-month CCB for CNY and CLP in Figure A.4.



(a) Currency invoicing: Exports (b) Currency invoicing: Imports

Figure A.1: The U.S. dollar dominates as the invoicing currency in both imports and exports in Chile during the most recent decade, with the former at an average percentage points over 80 and the latter at a even larger percentage–more than 90.

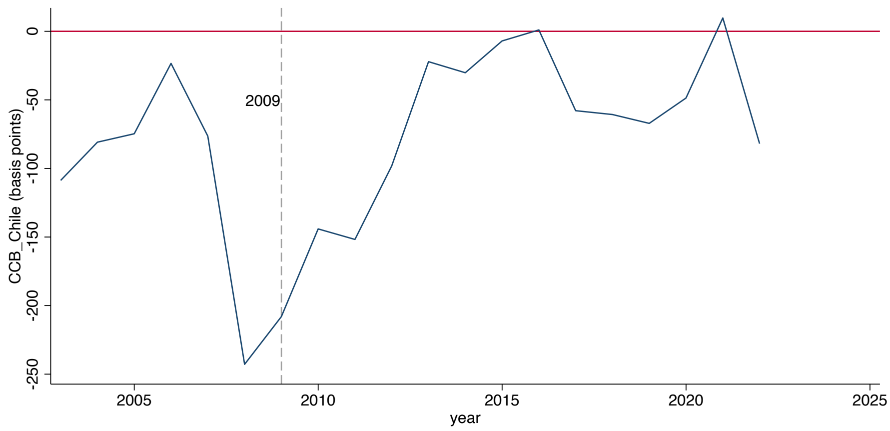


Figure A.2: The cross-currency basis of CLP against USD at the 3 month tenor from 2003 to 2022 at yearly frequency, when the bases are generally negative. The working sample period starts from 2009, as divided by the gray dashed line, witnesses unambiguous negative bases except for the pandemic due to the *in*convenience yield for holding dollars during this period, implying that Chilean firms are indeed in disadvantage of borrowing U.S. dollars from the swap and FX market.

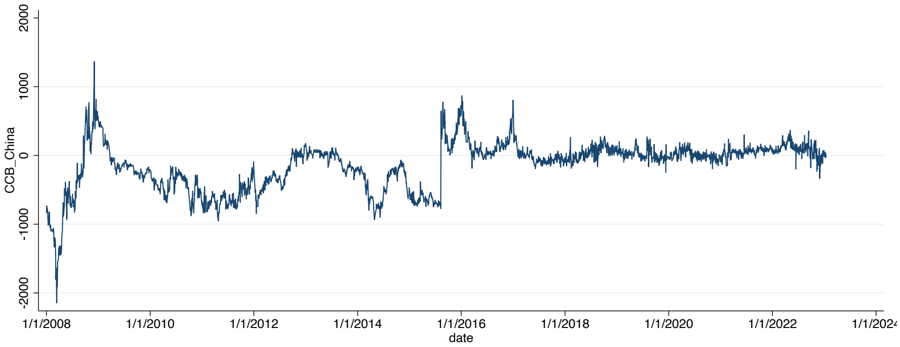


Figure A.3: Cross-currency basis of CNY against USD at the 3 month tenor at the daily frequency

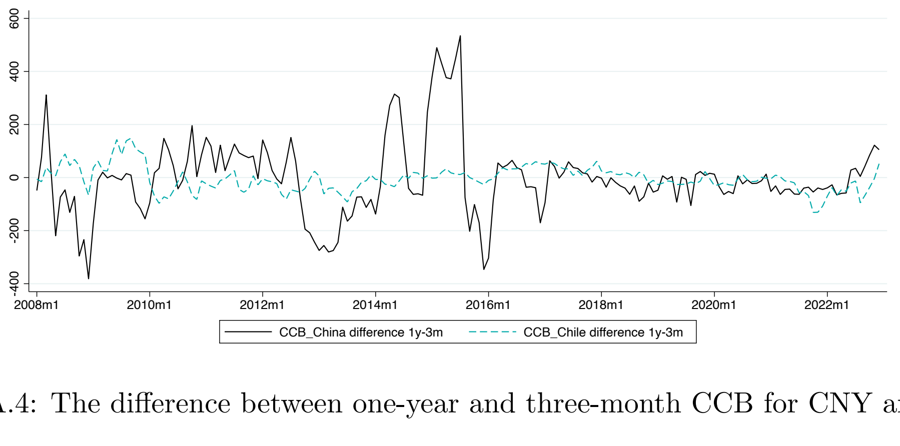


Figure A.4: The difference between one-year and three-month CCB for CNY and CLP

A.6 Full set results for the 1-year tenor estimations

I report the full estimation results tables to baseline (4) for trade and CCB at one-year tenor in Table A.20 in Chile and Table A.21 in China. Consistently, the effect of dollar liquidity on trade is positive and significant for all the specifications in China while insignificant in Chile when the tenor is at one year level, suggesting how less flexible exchange rate regime in the former allows the longer tenor dollar liquidity condition matters in the country given a longer time of adjustment to its long-run equilibrium level.

Table A.20: Financing channel for Chilean firms: trade in Chile and 1-year CCB between 2009 and 2022†

	All			U.S. only			Excluding U.S.		
	All units	Weight	Quantity	All units	Weight	Quantity	All units	Weight	Quantity
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Imports									
Value									
ΔCCB_Chile_1y	0.0877	0.0991	0.0669	0.0591	0.0735	0.0268	0.0944	0.1049	0.0769
	(0.2230)	(0.2234)	(0.2334)	(0.2077)	(0.2089)	(0.2165)	(0.2266)	(0.2267)	(0.2380)
R^2	0.136	0.133	0.136	0.127	0.120	0.124	0.138	0.136	0.139
Volume									
ΔCCB_Chile_1y	0.1282	0.1466	0.0987	0.0802	0.0838	0.0807	0.1393	0.1608	0.1031
	(0.2246)	(0.2271)	(0.2310)	(0.2142)	(0.2186)	(0.2163)	(0.2271)	(0.2288)	(0.2356)
R^2	0.137	0.133	0.139	0.126	0.123	0.122	0.140	0.136	0.143
Observations	845,871	559,556	251,829	154,911	100,115	49,001	690,960	459,441	202,828
Panel B: Exports									
Value									
ΔCCB_Chile_1y	0.0202	-0.0024	0.0809	0.0620	0.0083	0.2476	0.0165	-0.0034	0.0535
	(0.1987)	(0.1959)	(0.2228)	(0.1891)	(0.1944)	(0.1692)	(0.1999)	(0.1968)	(0.2358)
R^2	0.126	0.131	0.131	0.134	0.150	0.114	0.125	0.129	0.134
Volume									
ΔCCB_Chile_1y	0.0516	0.0326	0.0220	0.0851	0.0048	0.3157	0.0486	0.0350	-0.0263
	(0.1880)	(0.1854)	(0.2155)	(0.1787)	(0.1877)	(0.1746)	(0.1893)	(0.1860)	(0.2274)
R^2	0.123	0.128	0.127	0.120	0.135	0.100	0.123	0.127	0.132
Observations	131,828	95,134	11,700	10,594	7,479	1,616	121,234	87,655	10,084
Fixed effects:									
country-firm-product	Y	Y	Y	Y	Y	Y	Y	Y	Y

† This table reports the regression between yearly change in imports and exports (both volume and value) from firms in Chile and yearly change in cross-currency basis of Chilean Peso against the U.S. dollar at a tenor of one year with a lag. The sample starts from 2009 to 2022. Country-firm-product level fixed effect is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.21: Financing channel for Chinese firms: imports in China and 1-year CCB between 2009 and 2012†

	All			U.S. only			Excluding U.S.		
	All units	Weight	Quantity	All units	Weight	Quantity	All units	Weight	Quantity
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Imports									
Value									
ΔCCB_China_1y	0.0626***	0.0612***	0.0762***	0.0710***	0.0688***	0.0798***	0.0616***	0.0603***	0.0757***
	(0.0082)	(0.0082)	(0.0106)	(0.0086)	(0.0086)	(0.0130)	(0.0081)	(0.0082)	(0.0105)
R^2	0.251	0.263	0.285	0.235	0.245	0.261	0.253	0.265	0.288
Volume									
ΔCCB_China_1y	0.0665***	0.0687***	0.0643***	0.0726***	0.0760**	0.0604***	0.0658***	0.0678***	0.0647***
	(0.0105)	(0.0117)	(0.0040)	(0.0124)	(0.0133)	(0.0103)	(0.0103)	(0.0115)	(0.0036)
R^2	0.242	0.249	0.309	0.222	0.232	0.268	0.244	0.251	0.315
Observations	488,129	373,390	76,784	52,759	41,823	8,546	435,370	331,567	68,238
Panel B: Exports									
Value									
ΔCCB_China_1y	0.0378**	0.0374***	0.0406**	0.0402***	0.0367***	0.0526**	0.0376**	0.0375**	0.0395**
	(0.0074)	(0.0058)	(0.0093)	(0.0035)	(0.0040)	(0.0153)	(0.0078)	(0.0067)	(0.0087)
R^2	0.268	0.264	0.322	0.262	0.267	0.309	0.268	0.263	0.323
Volume									
ΔCCB_China_1y	0.0485**	0.0486**	0.0494***	0.0535***	0.0512***	0.0623**	0.0480**	0.0483**	0.0482***
	(0.0097)	(0.0099)	(0.0077)	(0.0091)	(0.0072)	(0.0134)	(0.0097)	(0.0102)	(0.0071)
R^2	0.266	0.259	0.325	0.256	0.257	0.309	0.267	0.259	0.327
Observations	811,019	524,980	232,056	79,908	53,600	21,630	731,111	471,380	210,426
Fixed effects:									
country-firm-product	Y	Y	Y	Y	Y	Y	Y	Y	Y

† This table reports the regression between yearly change in imports and exports (both volume and value) from firms in China and yearly change in cross-currency basis of Chinese Yuan against the U.S. dollar at a tenor of one year with a lag. The sample starts from 2009 to 2012. Country-firm-product level fixed effect is controlled, and robust standard errors clustered at firm and year level are reported: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$