How to Grow an Invoicing Currency: Micro Evidence from Argentina*

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Abstract

How can a currency gain traction for international invoicing? We investigate micro data for Argentine firms, their international trade transactions and their bank portfolios. We show that facing foreign currency shortages and following a swap line increase from the People's Bank of China in early 2023, Argentine firms rapidly switched invoicing of imports from US dollars to RMB. This switch was more pronounced for large importers. It was concentrated in imports from China but to a lesser extent also apparent in imports from other origin countries, and it led to a noticeable increase in trade volumes without diverting trade from elsewhere. We also show that the rise of RMB invoicing was associated with importers' borrowing from a major Chinese state-owned commercial bank in Argentina. Once a new Argentine president was elected on a platform of pro-market and China-critical views, RMB invoicing receded. Our evidence supports the view that the RMB swap alleviated the rationing of foreign currency. Once the new government relaxed capital controls, invoicing started to revert to US dollars as the preferred invoicing currency.

JEL Classification: E58, F14, F31, F33, G21
Keywords: Banking, Central Bank, China, Geoeconomics, Invoicing, Lending, Renminbi, Swap, Trade, US Dollar

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1 Introduction

Will the Chinese renminbi (RMB) become a global currency and eventually challenge the US dollar's dominant currency status? What are the avenues through which this could happen? Eichengreen et al. (2024) argue that while the British pound and later the US dollar became global currencies after being traded in deep and liquid financial markets, the future expansion path for the RMB might be different. The beachhead for the internationalization of the RMB, they suggest, might be its use as an invoicing currency for trade with China. For this purpose, swap lines between central banks can provide easy access to the RMB, replacing deep financial markets as the traditional gateway to foreign currency. While this is an important and timely debate, there is a paucity of empirical evidence to ground it, especially regarding the mechanisms through which global currencies might emerge.

In this paper, we explore an episode that speaks to the arguments above. Around March 2023, the RMB rapidly gained ground as an invoicing currency in Argentina for a large share of imports from China, at some point covering close to 50% of these imports. RMB use also spread, to some extent, to imports from other countries. By mid-2023, hundreds of Argentine companies had switched from US dollars to RMB as a payment currency for foreign imports. This included makers of electronics, auto parts and textiles as well as oil and mining firms. Many used RMB to pay for key production inputs sourced from abroad.[1] Later that year, after the presidential election of October/November 2023 that unexpectedly brought Javier Milei to power and ushered in changes in economic policy, the de-dollarization trend reverted and the US dollar regained prominence as an invoicing currency, with the RMB invoicing declining to less than 10%.

Our goal in this paper is to analyze firm-level invoicing currency choices to understand how the RMB rapidly made inroads as an invoicing currency at the expense of the US dollar. We aim to shed light on the mechanisms that are likely to shape this issue at a global level in the future. To this end, we consider a unique natural experiment in Argentina where a foreign currency shortage and dwindling international reserves were met with a sudden expansion of an RMB currency swap line extended by the People's Bank of China (PBOC). We combine this setting with a rich and novel dataset of Argentine firms' international trade transactions, bank-to-firm loans, and bank balance sheets.

These data allow us to make three contributions to the literature on invoicing currencies in international trade. First, we provide the first microeconomic evidence on the battle between the US dollar and the RMB based on firm-level data. This is a key emerging topic in international economics as China's rise challenges the dollar's status as the world's dominant currency. We

[1] According to June 2023 news report by Bloomberg, as the president of Whirlpool Latin America put it, "We've had to stop the factory at some points and that's not good for business, productivity nor quality. We're working to see how we can leverage this new avenue of flows to be able to continue importing materials."

describe the granular detail of the adoption of a new invoicing currency. We achieve this by providing empirical evidence with micro data based on international trade invoicing information at the firm-transaction level, matched with firm-level bank loan data. For example, this allows us to identify whether small or large firms are disproportionately switching to RMB for invoicing purposes, in which industries this is most prevalent, whether the switch is concentrated in importing or exporting activity, whether it is mainly focused on trade with China, and whether RMB use extends to other trading partners.

Our second contribution is to document mechanisms shaping firms' invoicing currency choices in a context where government policies and institutional design play an important role and in the context of foreign currency shortages and a currency crisis in an emerging economy. The literature on invoicing currencies has made much progress in documenting the market-driven determinants of invoicing currency choices in stable economies. Our findings complement this literature and offer a novel perspective. In the context of the dollar vs. RMB debate, the type of setting we explore is relevant because it is precisely through loans to emerging countries in crisis situations that China's government could promote the internationalization of the RMB. In fact, many of China's swap lines are signed with emerging economies that are typically in need of external financing.

Our third contribution is, for the first time, to show with micro evidence that firms' banking relationships (but not necessarily borrowing in particular currencies) play a quantitatively very important role in determining the invoicing currency choice.

In Section 2 we motivate our empirical setting by providing institutional and historical context for the role of foreign currency use in Argentine international trade. We briefly describe which invoicing currencies Argentine importers and exporters have traditionally used, and we also describe the institutional procedure of getting approval for international trade transactions in foreign currency. We then outline the history of capital controls, foreign reserve shortages and especially the history of Argentina's swap agreements with China since 2009, with a particular focus on the swap expansion in the run-up to our period of study starting in early 2023.

In Section 3 we describe our microeconomic data. We use transactions data at the firm level from Argentine customs for both imports and exports, and we match those to bank-to-firm loan data. We supplement those data with information from bank balance sheets.

In Section 4 we carry out our main empirical analysis. We first document that during the months following the swap agreement expansion, there was a fast, sudden and very large increase in the share of imports from China invoiced in RMB, reaching about 40% of transactions and almost 50% of value at its peak in September 2023. This was due to a combination of a gradual ongoing decline in imports in dollars and a fast increase in imports in RMB. This change in invoicing patterns was widespread, reaching many firms and products. This was also a period of a severe shortage of dollars amid a currency crisis.

We find that banks played a key role in a firms' invoicing currency choices for their imports

from China. In Argentina as in many other countries that are part of China's Belt and Road Initiative, there is a strong presence of a Chinese state-owned bank, the Industrial and Commercial Bank of China (ICBC). It was the sixth largest lender in Argentina before the swap line expansion was implemented, and it has more than 100 branches spread throughout the country. We find that firms which borrowed from ICBC prior to the swap expansion were substantially more likely to invoice in RMB after the swap line was expanded. While the swap line agreement established the ICBC as a clearinghouse, all banks in Argentina were eligible to provide RMB for imports, and indeed many of them immediately started offering that service.

Second, we find that firms having banking relationships with banks with higher US dollar loan shares were less likely to invoice in RMB. Further, we see that this effect is stronger in the very period when the dollar shortage in Argentina was most critical. Finally, we also find that large firms were more likely to invoice in RMB. The most straightforward interpretation is that operating in RMB entails a fixed cost that larger firms are more willing to pay.

Having documented changes in invoicing patterns for imports from China, we then examine firms' RMB use for imports from the rest of the world. As a starting point, before the expansion of the swap agreement, the US dollar also dominated imports from the rest of the world, with the euro having a modest market share in imports from Europe. Our first finding is that after the expansion, with the same timing as seen for imports from China, there is a sudden increase in imports from other countries that are also invoiced in RMB, with a matching decline following the presidential election. This pattern can be observed across many products and import source countries.

Our second finding is that at the firm level, firms invoicing imports from China in RMB are substantially more likely to also invoice imports from the rest of the world in RMB. This finding suggests spillovers in invoicing across countries that operate at the firm level. It implies that if China can promote the use of RMB for its own exports, spillovers will eventually spread RMB use to a certain extent for trade between other countries. Also at the firm level, we find that firms with ICBC banking relationships and with banks with lower USD loan shares are also more likely to switch to RMB.

In the last part of the empirical analysis, we document that RMB use also had an impact on trade flow volumes. Firms invoicing in RMB following the swap agreement expansion saw a substantial increase in imports from China. The timing of this volume effect coincides with the spike of RMB use. It is also temporary, declining towards the end of 2023 and during 2024.

Mechanism We find evidence of a foreign currency shortage mechanism. That is, at the beginning of our data period in early 2023, Argentina was facing a severe dollar shortage, rationing access of Argentine businesses to foreign currency. The RMB swap expansion was used to alleviate this foreign currency shortage. But unlike during previous swap agreements, this time around the

Argentine authorities did not convert RMB into dollars but rather kept RMB on the balance sheet. As long as the country was facing a dollar shortage, RMB was used as a foreign currency substitute. But once the dollar shortage was alleviated in the wake of Milei's reforms, the importance of RMB waned and businesses reverted to using dollars.

In a nutshell, we find that at least in the case of Argentina, foreign currency is necessary for invoicing but firms prefer dollars if available, otherwise they substitute RMB. Thus, we observe an uneven relationship in that RMB can act as an invoicing currency substitute for dollars but with a clear pecking order: RMB is only used when dollars are not available, but not the other way around. Reasons for RMB aversion relative to the dollar are likely to include the lack of existing RMB adoption across industries, the lack of deep and liquid global financial markets including payment infrastructure, and the lack of free RMB convertibility, and Chinese capital controls.[2]

In our view, a more general insight can be drawn from the Argentine experience. We argue that the RMB swap was necessary but not sufficient to lead to more RMB invoicing. It had to go hand in hand with a dollar shortage, generating demand for RMB as an alternative payment currency. As a final condition, this had to happen against a backdrop where domestic money (Argentine pesos) was not considered a viable invoicing currency. From the perspective of Chinese policy makers, these circumstances would have made Argentina attractive as a currency swap partner, making RMB adoption for trade invoicing more likely and thus helping China to gather valuable experience in its efforts to internationalize the RMB.[3]

Of course, here we are only able to provide empirical evidence in the specific context of Argentina. While Argentina has a special history of currency crises and sovereign default – associated with large depreciations and at times strict capital controls – Argentina is nevertheless an important country to study because it affords a unique window for research. First, while severe currency crises and foreign currency shortages are rare for the vast majority of countries, China is much more likely to agree swap lines with countries that tend to experience such crises. In fact, the countries with Chinese swap lines have had currency crisis episodes in 17% of the years since

[2]However, Eichengreen et al. (2024) argue that even in the absence of full financial liberalization, the RMB could still play a more important role as international currency. But this would require policy support, in particular convertibility of RMB into dollars on offshore markets. In contrast, Prasad (2017) highlights the long-term limits that undermine the RMB's rise towards establishing itself as a global payment and reserve currency. China would have to embark on reforms fostering a more open and transparent system of government with a reliable institutional framework including stronger rule of law and tighter property rights. One short-term argument in favor of using RMB as a payment currency might be the weakness of domestic currency against the dollar. For example, in 2023 Bangladesh agreed to make a large payment to Russia in RMB and "opted against using the US dollar because its currency has fallen sharply against it" while also noting that Russia had been largely frozen out of US dollar payment systems after its 2022 invasion of Ukraine (Source: China Southern Morning Post, 21 April 2023). Another reason against the dollar could be the potential exposure to US monetary policy cycles, in particular aggressive US tightening in the wake of Covid-19 and the associated rise in US dollar borrowing costs (Source: China Southern Morning Post, 27 April 2023).

[3]Bloomberg in an article published on 26 June 2023 quotes an economist from Buenos Aires: "The Central Bank doesn't have dollars so it needs the emergency aid China is offering. For Argentina, its currency ties to China represents an emergency, but for China it's a point of leverage to take advantage of a geopolitical opportunity."

1990.[4] From China's perspective, this makes Argentina an important test case for other countries that may potentially face similar crises in the future. Second, the Milei's surprise election victory in November 2023 led to a stark change in relations with China and the expectation of looser capital controls. We can treat this event as a quasi-natural experiment that allows us to study the impact of the rapid easing of foreign currency shortages on firms' invoicing behavior.

Bahaj and Reis (2022) argue that swap lines created by the PBOC between 2009 and 2018 have been instrumental in increasing the international use of RMB as a payment currency. As an alternative mechanism, they model the currency of working capital and the currency of invoicing as complements, and they stress the role of central banks in lowering the volatility of borrowing costs in RMB through swap lines. They provide evidence for aggregate SWIFT data on cross-border payment settlements at monthly frequency.

However, we do not find any empirical evidence in our micro data of complementarity between working capital and invoicing in the same currency. Through the lens of the model proposed by Bahaj and Reis (2022), a swap line expansion from China would lead to increased bank lending in RMB, which in turn would spur invoicing of Argentine trade in RMB. But when we compare Argentine bank balance sheets in 2002Q4 (before the swap expansion) and 2023Q4 (after the swap expansion), we see no increase in RMB lending.[5] We therefore find no evidence that the particular mechanism suggested by Bahaj and Reis (2022) is at work in the Argentine case. We stress that Bahaj and Reis (2022) did not have access to micro data on bank lending that would have allowed them to test that particular mechanism with granular detail.[6]

Related literature We contribute to various strands of the literature, in particular the literature on currency invoicing in international trade, the literature on banking and trade as well as the literature on currency swaps, central bank reserves and foreign capital controls. We also speak to the emerging literature on geoeconomics that charts the political ambitions of major economic power players, in this case China.

Our work adds a new perspective to the literature on invoicing currencies in international trade. This literature has produced several important insights that appear to be robust across several countries. These include the role of strategic complementarities, the link between invoicing currencies in exports and production costs, the widespread use of vehicle countries and the dominance of the dollar in world trade, see Goldberg and Tille (2008), Goldberg and Tille (2016), Gopinath et al. (2020), Amiti et al. (2022), Boz et al. (2022), Corsetti et al. (2022), Benguria and Wagner (2024).

[4] See data provided by the Behavioral Finance and Financial Stability Project at Harvard Business School. This extends data first discussed by Reinhart and Rogoff (2009).

[5] The "other" currency category (which includes RMB) is tiny in 2022Q4 and remains tiny afterwards. This is true even for the balance of sheet of ICBC.

[6] For identification it would also be useful to consider periods spanning an abrupt change in foreign currency availability, as was the case for Argentina with Milei's election in late 2023.

We make the following contributions to this literature. First, we provide new evidence on the emergence of the RMB as an invoicing currency and its rivalry with the US dollar. There is little or no evidence on this topic because it is a new and developing phenomenon. Second, we provide evidence on a mechanism that is novel to the literature: the role of banks in shaping the invoicing currencies used by firms. We find this mechanism is important quantitatively. We show in particular that firm relationships with an affiliate of a Chinese state-owned bank is key in explaining the shift towards the RMB.

Third, the literature has shed light on market mechanisms such as strategic complementarities and the cost channel. We complement this by showing that government policies and the macroeconomic environment can have an important impact on invoicing currencies. We observe a large shift in invoicing currencies in the context of the swap expansion with China. Georgiadis et al. (2021) find that countries with a PBOC swap line increased the RMB invoicing share of their trade compared to countries without a swap line. In this context of swap lines, the RMB drives out the dollar more than the euro. They use aggregate data for a broad sample of countries over the period from 1999 to 2019. By contrast, we use transaction-level data paired with firm and bank information.

Fourth, while the literature often assumes the importer is passive and the exporter sets the invoicing currency, our findings show that variation across importing firms explains a large share of invoicing currency patterns.

Fifth, our findings challenge the view that invoicing currency use is essentially static over time. With very few exceptions, the evidence from various countries thus far available in the literature shows that aggregate invoicing currency shares tend to be very stable and persistent, with only small and gradual changes over time (Boz et al., 2022). Our findings stand in sharp contrast to this notion. We find that in the context of a currency crisis and with significant government intervention, invoicing currency use can shift substantially and extremely quickly. We are not aware of an episode studied in the literature whereby a country switched invoicing currencies as abruptly. For example, even in the aftermath of an enormous economic shock such as the Brexit referendum, Corsetti et al. (2022) fail to find that UK exporters change invoicing shares in a meaningful way. As an exception to this pattern, Boz et al. (2022) show that invoicing currency shares can change under specific circumstances, in particular for countries such as Croatia and Poland when joining the European Union and for countries in the euro area's immediate neighborhood such as Norway (see their Figure 10). Similarly, Benguria and Wagner (2024) show that Chilean exporters to euro zone countries start to adopt the euro after its introduction. But in all those cases, the switch towards euro invoicing is gradual and takes place over several years.

Sixth, we show how invoicing currency choice is linked across countries, given that firms which adopt the RMB for imports from China are also more likely to use it when importing from other countries.

2 Motivation and background

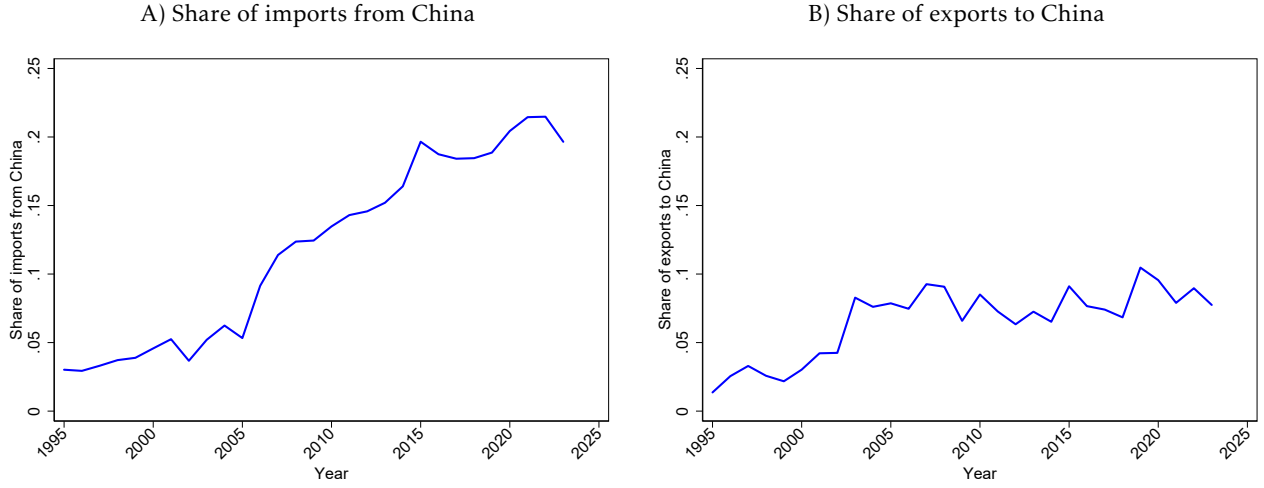
We briefly describe trade relations between Argentina and China and the history of their bilateral currency swaps. We also provide brief information about the macroeconomic and political context, in particular regarding Argentina's foreign currency shortage and China's efforts to internationalize the RMB.

2.1 Trade relations between Argentina and China

In 2023, China was Argentina's second largest trading partner after Brazil, followed by the US in third position, and Argentina ran its biggest bilateral trade deficit with China.[7] Argentine imports from China mainly comprise manufacturing products such as machinery and equipment, office and computing machinery and chemical products. Panel A of Figure 1 shows the Chinese share of Argentine imports. It rose rapidly from below 5% in the late 1990s to around 20% by 2015.

In the opposite direction, Argentine exports to China are concentrated in the primary sector, mainly consisting of agricultural products, mining, food products, beverages, and basic metals.[8] Panel B of Figure 1 plots the Chinese share of Argentine exports. It also rose since the 1990s but stabilized just below 10% since the early 2000s.

Figure 1: Share of imports from China and share of exports to China



Notes: This graphs show the share of Argentine imports from China (panel A) and the share of Argentine exports to China (panel B) at annual frequency between 1995 and 2023. The data are obtained from the United Nation's Comtrade database.

[7] In 2023, Argentina received about 20% of its total imports from China, worth over USD $14bn. Argentina exported over USD $5bn to China, corresponding to about 8% of its total exports. By comparison, Argentine GDP (in current USD) was $641bn.

[8] Bekerman et al. (2022) show that nearly 90% of Argentina's exports to China are commodities (agricultural and mining) as well as food and beverages, compared to 60% to the rest of the world.

2.2 The history of currency swaps between Argentina and China

The PBOC does not publish details on its currency swap arrangements with foreign partners. We therefore outline the history of Argentina-China currency swaps based on newspaper reports and selected references.

In 2009, China started setting up a global network of bilateral swap arrangements which eventually sprawled to dozens of partner countries. In the same year, China entered its first bilateral swap agreement with Argentina, worth USD $11bn. Initiated after Argentina's 2008/09 economic crisis, the swap was supposed to strengthen Argentina's foreign currency reserves and act as a buffer against potential international illiquidity problems. But the swap remained dormant before expiring after three years without ever having been tapped into (Horn et al., 2023).

In July 2014, in the immediate aftermath of Argentina's sovereign debt default, a new swap agreement was signed totalling USD $11bn. This time, it was fully used by October 2015, representing about 40% of Argentina's foreign currency reserves. In 2018, Argentina and China agreed to increase the swap line to USD $19bn, and by December 2018 Argentina's total outstanding swap debt was close to that limit. By December 2021, the swap line was further increased to USD $20.5bn, representing 51.6% of foreign currency reserves held by the Banco Central de la República Argentina (BCRA).[9]

Our period of study starts in January 2023 by which time the PBOC had increased the swap line by another USD $5bn. Throughout the paper we will refer to the period from January 2023 as the time when the swap agreement was 'expanded,' or the 'expansion' period. In June 2023, the swap was renewed and its flexibility increased in that a larger portion of the swap was freely usable for "any type of financial operation" against a backdrop of falling Argentine foreign currency reserves (Arnold, 2023a). In June 2024, the BCRA announced it had renewed a portion of its currency swap with China worth around USD $5bn for another two years until July 2026.

2.2.1 How does a swap work at the macro level?

Formally, the PBOC and the BCRA have a reciprocal swap agreement. That means the PBOC makes RMB available to Argentina, and the BCRA makes pesos available to China. Each central bank can draw on the currency provided by the other partner and has to pay it back at the end of the drawing period (plus interest). But in practice, China has no need for pesos other than as collateral, and the agreement is unidirectional in its execution as Argentina is the only partner drawing swap funds.[10]

In effect, the swap agreement with China is a contingent credit agreement. This means that the

[9] See Arnold (2023b) for details covering the period from 2014 to 2022.

[10] A currency swap can be seen as a repurchasement agreement between central banks, functioning as a collateralized international loan. For a survey of the history and functioning of central bank currency swap arrangements, see Wiggins et al. (2023).

swap line can be drawn down repeatedly by Argentina but only under certain conditions and in consultation with the PBOC. For example, the PBOC might condone the use of RMB from the swap agreement for short-term liquidity support in the face of dwindling foreign currency reserves, for repayment of external debt, or for international trade transactions such as paying for Chinese imports in RMB (Arnold, 2023a).

2.2.2 How can firms access swap funds?

If an Argentine firm wants to pay for imports in foreign currency, it needs to obtain import authorization from two government agencies: the government ministry administering international trade as well as the BCRA. Urien (2022) reports that if an Argentine firm has an import order invoiced in RMB, it needs to approach the BCRA which in turn reports the order to the PBOC to request permission to draw the relevant RMB funds from the swap line.

To deal with RMB payments in practice, ICBC serves as a clearinghouse. ICBC has branches across more than 100 cities in Argentina. The importer may have an account with ICBC. But even if not, other commercial banks can administer payments with ICBC on behalf of the importer.

Newspaper reports present anecdotal evidence that import authorization might be faster to obtain for RMB payments than dollar payments, even though formally this process is not supposed to depend on the invoicing currency. To the extent it happens in practice, fast-tracking RMB payments could be seen as a non-monetary subsidy of import transactions, especially those coming from China.

2.3 Macroeconomic and political background

2.3.1 Argentina background

By mid-2023, Argentina's foreign currency reserves consisted to a larger extent of RMB reserves than traditional US dollar reserves, as shown in Figure 2. Similarly, Figure 2 in McDowell (2019) shows the currency composition of BCRA foreign exchange reserves, with the non-SDR share starting to rise in 2014 after the activation of RMB swap lines.

Furthermore, Figure 3 illustrates the overall declining trend in foreign currency reserves held by the Argentine central bank since 2018. Figure 4 shows a sharp rise in the Argentine inflation rate in 2023.

Figure 5 illustrates the evolution of the official and the black market exchange rates between the Argentine peso and the dollar.[11] Panel A shows a gradual devaluation of the official rate from the start of 2021 until the presidential election of 2023. At the start of 2021 the ratio of the black market and the official rate stood at about 1.5 (i.e., the black market rate was 50% higher). It in-

[11] In Argentina, the black market exchange rate is commonly referred to as the "dólar blue" and its value is quoted alongside the official rate by all newspapers and widely discussed in the media.

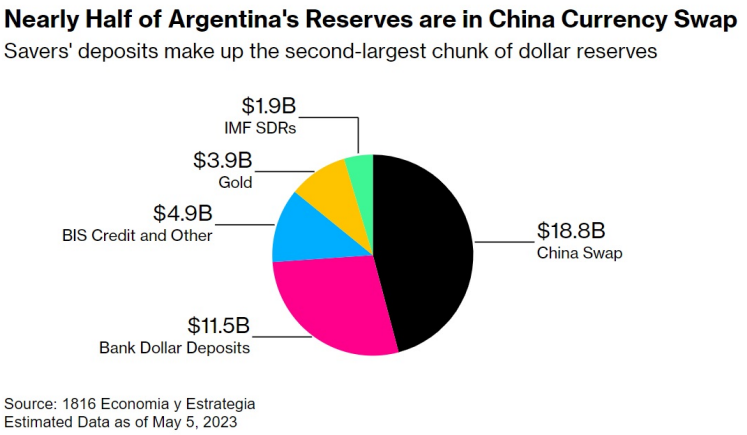


Figure 2: Argentina's foreign currency reserves, May 2023. Source: Bloomberg

creased to about 2 by the time of the election. This was a sign of the heavy restrictions on exchange rate movements imposed by Argentine authorities in combination with a growing shortage of dollars. Following the election, there was a sharp devaluation of the official rate, and the gap between the official and the black market exchange rates narrowed significantly.

2.3.2 China background

Table 1 lists the countries with which China has a bilateral swap agreement. China's bilateral swap agreements are special in that most partner countries do not have funding needs in RMB (unlike, for instance, when the Federal Reserve agrees a swap with foreign countries that have actual US dollar needs). It is therefore plausible that China's swap agreements pursue objectives that go beyond simple foreign currency liquidity needs. McDowell (2019) suggests that PBOC swap lines are a manifestation of Chinese "financial statecraft" to achieve foreign policy goals. One such goal is the reduction of China's exposure to dollar dominance in international finance, especially after the 2008/09 global financial crisis when international US dollar credit markets froze and global trade financing collapsed. This goal includes the internationalization of the RMB as a payment currency, which is hoped to bring a range of economic benefits to China, "including the reduction of exchange rate risk faced by Chinese firms, increased competitiveness of Chinese banks, and the promotion of global trade with China." McDowell (2019) states there is "very little evidence to suggest that [bilateral swap agreements] have been instrumental in promoting the use of the RMB as a currency for cross-border commercial deals." The experience of Argentina in 2023/24 is arguably novel and a departure from previous experience – albeit, as we show, a short-lived one.

It is also noteworthy that China tends to agree swap lines with countries that, compared to the average, are much more likely to experience financial and foreign exchange crises. Countries with Chinese swap lines have had currency crisis episodes in 17% of the years since 1990. Similarly, China is more likely to lend to countries that are relatively poor and that form part of the Belt

and Road Initiative. As documented by Horn et al. (2021), China is now the world's largest creditor, surpassing the World Bank and the International Monetary Fund, with a strong emphasis of "south-to-south" lending to emerging economies.

Horn et al. (2023) put forward that Chinese swap lines can also be regarded as a tool allowing China to act as an international lender of last resort. They argue that China increasingly uses its global swap line network as a financial rescue mechanism to extend liquidity support to countries in financial and macroeconomic distress, e.g., those with low reserve ratios and weak credit ratings, especially if they form part of China's Belt and Road Initiative.[12] Starting in June 2023, Argentina indeed used funds drawn from the swap line to repay debt to the IMF. China thus competes with the IMF as a key lender to emerging economies, aiming to create an alternative to the dominant Bretton Woods institutions.

2.4 Timeline

Below we provide a timeline with key dates on the history of China-Argentina currency swaps, drawn from various newspaper articles for the most recent events as well as Horn et al. (2023) and (Arnold, 2023a) for earlier events.

- April 2009: Argentina and China initiate their first a bilateral swap agreement worth RMB 70bn (USD $11bn). It remained dormant for three years without having been drawn down. Source: Bloomberg, 26 June 2023.
- July 2014: Following its sovereign debt default, Argentina extends its swap agreement for an additional three years.
- October 2014: Argentina starts drawing down swap lines and begins serial rollovers, borrowing close to USD $11bn by October 2015, representing about 40% of Argentina's foreign currency reserves.
- 2018: Argentina and China agree to increase the swap line from RMB 70bn to RMB 130bn (USD $19bn).
- December 2018: Argentina draws an additional RMB 60bn (USD $8.7bn) from the swap line, bringing its total outstanding swap debt to USD $18.9bn.
- December 2021: Argentina's total PBOC swap debt increases to USD $20.5bn, representing 51.6% of the BCRA's foreign currency reserves. See Arnold (2023b).
- November 2022: The PBOC expands its currency swap agreement with Argentina by RMB 35bn (roughly USD $5 billion) to RMB 165bn. See Arnold (2023b).

[12] Argentina joined the Belt and Road Initiative in 2022. Apart from Argentina, other countries that activated RMB swap lines for short-term liquidity needs include Mongolia, Pakistan, and Turkey.

- March 2023: Seen as a milestone in China's efforts to internationalize the use of its currency, the RMB surpasses the US dollar for the first time as the most widely used currency for cross-border transactions in China (covering both the current and capital accounts). The RMB was used in 48% of cross-border transactions, and the dollar was used in 47%. Source: Reuters 20230426

- April 2023: On a visit to China, Brazilian President Luiz Inácio Lula da Silva questions the use of "US dollars for settlements and not the yuan or other international currencies" and calls on BRICS countries (Brazil, Russia, India, China, and South Africa) to settle bilateral trade and investments in their own currencies. Source: China Southern Morning Post 20230421 and 20230427.

- May 2023: The Argentine aggregate monthly trade deficit for May reaches its largest extent (USD $1.2bn) since 2018. Source: Bloomberg 20230626.

- June 2023: The swap line was renewed, standing at RMB 130bn in total (USD $19bn). The portion that could be used freely for "any type of financial operation" was doubled to RMB 70bn. The dollar reserves of the Argentine central bank reach the lowest level since 2016. Source: Bloomberg 20230626.

- June 2023: For the first time ever, Argentina uses funds worth USD $1bn drawn down from the PBOC swap line to repay IMF debts.

- August 2023: Argentina made another payment worth USD $1.7bn to the IMF, also drawn from the PBOC swap line.

- August 2023: Argentina devalues the peso against the USD by 18%.

- October/November 2023: Javier Milei is elected president of Argentina. Sergio Massa wins the first round of the presidential election. But Milei wins 55.7% of the popular vote in the second round, which is the highest winning margin since Argentina's transition to democracy.

- December 2023: Milei devalues the official peso exchange rate by more than 50% on taking office. Source: Financial Times, 9 October 2024.

- April 2024: The Milei government achieves a first-quarter primary fiscal surplus, the first of its kind in 16 years. Source: Reuters, 17 May 2024.

- June 2024: The BCRA announces it has renewed a portion of its currency swap with China, worth around USD $5bn, for another two years until July 2026. The funds are meant to be used to make payments owed to the IMF and to finance imports. Argentina is scheduled

to begin paying down the active portion of the swap starting in mid-2025 over a 12-month period. Source: Bloomberg, 12 June 2024.

- October 2024: Milei says Argentina is not ready to lift its currency controls. The controls were imposed by a previous government in 2019 amid an economic crisis. They "fix the peso at an official rate and limit individual and company purchases of foreign currency, creating a black market for the US currency." Source: Financial Times, 9 October 2024.

3 Data sources

To assess the determinants of invoicing currency choices of Argentine firms, we assemble a novel dataset. It is based on three main data sources: import and export transactions, bank-to-firm loans, and bank balance sheets.

Import and export transactions We use data on the universe of import transactions by Argentine firms over the period from January 2022 to June 2024. Each transaction reports the name of the importing firm, the value imported, the origin country, the 8-digit HS code, the exact date, and the value and quantity of the transaction. Additionally and key for this project, each transaction reports the invoicing currency used. These data are obtained from Argentina's customs agency. While we mainly focus on import transactions, in some specifications we also use data on the universe of export transactions of Argentine firms, including the identity of the exporting firms, the 8-digit HS product codes, the destination countries, the values and quantities exported, and the invoicing currencies used. As far as we are aware, our paper is the first to study the invoicing currencies of Argentine trade with micro data at the transactions level.

Bank-to-firm loans We also use bank-to-firm loan data. These data report all the outstanding loans that firms have with banks in Argentina in each month. We collect the data from the BCRA.[13] On its website, we have to look up and download a report for each borrowing firm individually. Given this constraint, we focus on the largest 4,000 importing firms measured in terms of total imports from the world in 2022. These 4,000 firms account for 73.2% of Argentine import transactions and 81.1% of import value from China in 2022. They account for 86.8% of import transactions and 73.1% of import value from the rest of the world. The data is reported on an ongoing basis for the last 24 months from the time it is collected. We primarily use data for the period from January to December 2022. In some cases, we also use data for 2023. Loans are reported in Argentine pesos, and there is no breakdown by the currency in which loans are made. Consequently, we will note in our analysis below when the results are based on all importing firms, and when they are restricted to the largest 4,000 importers (i.e., when the bank-to-firm data is used).

[13] The BCRA assembles this data from mandatory reports submitted by each agent of the financial system.

Bank balance sheet data We obtain balance sheet data for each bank in Argentina from the BCRA. The data reports loans in total as well as split by currency. The data distinguishes between loans in Argentine pesos, US dollars, euros, Brazilian reais, and a category grouping all other currencies. We use data for 2022Q4.

Table 2 reports the list of the largest banks in our sample, measured in terms of outstanding loans in 2022. The largest lenders are the Banco de Galicia y Buenos Aires (accounting for 15.13% of outstanding loans in 2022), the Banco Santander Argentina (13.86%) and the Banco BBVA Argentina (11.28%). The Industrial and Commercial Bank of China (ICBC) also stands out as an important lender, ranking sixth with a 5.92% market share.

Table 3 illustrates the variation in loans denominated in different currencies across banks. Bank lending is dominated by peso loans. The mean across banks of the share of peso loans is 92.25%, ranging from 83.94% at the 10th percentile to 99.69% at the 90th percentile. The mean share of US dollar loans is 7.71%, with 0.31% and 15.89% at the 10th and 90th percentiles. The table indicates that euros and Brazilian reais account for a much smaller, almost negligible share of loans. Finally, in this period the "other" currency category is also very small with a mean of 0.01%.

Additional datasets We use a number of supplementary datasets. The national registry of companies (Registro Nacional de Sociedades) lists all firms including their "official names" and their tax IDs. This is used to merge the customs data to the bank-to-firm loans data. The customs data reports firms' "official names," which exactly match those reported in the registry of companies. Using the registry we assign tax IDs to each firm in the customs data, and we use tax IDs to merge all datasets.

We also use data on the locations of all bank branches in Argentina. These data are obtained from the BCRA.[14] In addition, we collect the locations of all firms from the national registry of companies. Thus, we can observe whether firms have access to branches of any given bank in their city or not. Finally, we also use data on official exchange rates.

4 Empirical analysis of Argentine trade, RMB invoicing, and bank loans

4.1 Aggregate patterns for Argentine imports from China

We start by describing the aggregate patterns in the invoicing currencies used in Argentina's imports from China. Figure 6 plots the share of transactions invoiced in RMB, the share of imported value in RMB, the share of firms using the RMB (i.e., with at least one transaction in RMB), and the share of products for which RMB has been used. We observe a very large and fast transformation

[14] The data for one out of Argentina's 24 provinces (Mendoza) is not reported in this database.

in the invoicing currency shares for imports from China during the months after the swap agreement with China was expanded (panel A). Between January and September 2023, the RMB share of transactions increased from 1% to 38%. Similarly, the RMB share of value grew from 0.4% to 48%. This pattern occurred across the board and was driven not solely by a few firms or a few products: by September 2023, 32% of firms and 62% of HS 8-digit products had at least some transactions invoiced in RMB.

The steep rise in RMB adoption lasted until the presidential election of 2023 (carried out in two rounds, in October and November). As we discussed in Section 2, the election ushered in important changes in exchange rate policy and in US dollar availability. The subsequent decline in RMB invoicing was similarly steep and slowed down by March 2024, at which point the RMB accounted for 9% of transactions and 13% of the import value. At the same time, there was a decline in the number of firms and products associated with RMB invoicing.

With very few exceptions, the evidence from various countries thus far available in the literature shows that aggregate invoicing currency shares tend to be persistent and very stable, with only small and gradual changes over time (Boz et al., 2022). Our findings stand in sharp contrast to this notion. We find here that in the context of a currency crisis and with significant government intervention, invoicing currency use can shift extremely quickly and substantially.

We are not aware of an episode studied in the literature whereby a country switched invoicing currencies as abruptly. For example, even in the aftermath of an enormous economic shock such as the Brexit referendum, Corsetti et al. (2022) fail to find that UK exporters change invoicing shares in a meaningful way. As an exception to this pattern, Boz et al. (2022) show that invoicing currency shares can change under specific circumstances, in particular for countries such as Croatia and Poland when joining the European Union and for countries in the euro area's immediate neighborhood such as Norway (see their Figure 10). Similarly, Benguria and Wagner (2024) show that Chilean exporters to euro zone countries start to adopt the euro after its introduction. But in all those cases, the switch towards euro invoicing is gradual and takes place over several years.

For further context, Table 4 reports the frequency of each invoicing currency for imports from China. In 2022 before the expansion of the swap agreement, the US dollar accounts for 95.8% of transactions, followed by the euro (2.6%) and the Argentine peso (0.8%), and with the RMB accounting for only 0.2%. Shares in terms of values are similar, and even more tilted toward the dollar.

Figure 7 complements the previous figure by plotting the number of transactions and the total value of imports by currency. It shows that the share of imports invoiced in RMB is the result of a both slow and gradual decline in imports invoiced in dollars as well as a fast and sudden rise in imports in RMB following the expanded swap agreement.

Next, we show that this pattern is not simply a result of changes in the composition of products or importers over time. To this end, in panel B of Figure 6 we plot the probability of invoicing in

RMB over time after removing firm × HS8 product fixed effects. We find the same pattern as discussed earlier.

Figure 8 shows that this overall trend is common across all sectors of the economy. In turn, Table 5 tabulates the HS 2-digit chapters with the highest and lowest shares of transactions invoiced in RMB at the peak in September 2023.

We also ask to what extent this pattern was driven by new or existing importers. Table 6 shows that almost all exports in September 2023 (at the peak of RMB use) are accounted for by existing firms (defined as firms that were already importing in 2022). Among transactions in RMB, 93.4% of value and 98.1% of transactions in imports from China correspond to existing firms. Among transactions in other currencies (US dollars), 95.3% of value and 95.6% of transactions in imports from China correspond to existing firms. Further, Figure 9 shows that the growth and later decline in invoicing in RMB holds both for existing firms and for new firms. Among existing firms (panel A), RMB invoicing reaches 38.7% of transactions and 47.0% of value at its peak. Among new firms (panel B), RMB invoicing reaches peaks of 28.3% of transactions and 56.1% of value.

4.2 Firms, banks and RMB invoicing for import transactions from China

Next, we establish that importing firms' relationships with banks are key to understanding their decisions to start using the RMB as an invoicing currency.

We have two key findings. First, firms which had a bank lending relationship with the Industrial and Commercial Bank of China (ICBC) prior to the expansion of the swap agreement (i.e., in 2022) are substantially more likely to invoice in RMB subsequently. Second, firms were less likely to engage in RMB invoicing if prior to the swap expansion, they had a lending relationship with banks that had a higher dollar share in their loan portfolio. Quantitatively, we find that these two elements explain a meaningful share of the variation in invoicing currency use across firms. We first present some descriptive evidence and then proceed sequentially to discuss each of these findings.

To start, Figure 10 presents descriptive evidence on the variation of invoicing patterns across firms. Panels A and B distinguish between small and large importers (where we use their total imports as a proxy for their size). The sample is split based on firms' total (worldwide) imports in 2022 (i.e., before the swap agreement was expanded) such that half the import transactions belong to each subsample.[15] Panel A plots raw data, and panel B removes firm × HS8 product fixed effects. In both cases, there is a large difference in RMB adoption in favor of large importers. By September 2023, the share of transactions invoiced in RMB is 50.3% for large importers and 24.4% for small ones, based on panel A. By the end of our sample, large importers are still more likely to invoice in RMB (14.1% vs. 2.0%). A straightforward interpretation of this result is that

[15] Similar results are obtained when we split the sample such that half the firms are in each subsample. See Appendix Figure 17.

there is a fixed cost associated with adopting RMB as an invoicing currency, and large firms are more likely to afford this cost. Amiti et al. (2022) discuss the extension of the baseline invoicing model with this type of fixed cost. This fixed cost could be associated with using RMB specifically (perhaps due to macroeconomic and political risk or a historical preference against RMB). This fixed cost could also be associated with adding any new currency: firms could benefit from using the same currency across markets.

Panel C and D in the same figure split firms into those with and without a banking relationship with ICBC in the period before the expansion of the swap agreement (i.e., in 2022). Again, panel C plots the raw share of transactions in RMB and panel D removes fixed effects. Both figures indicate that firms with loans from ICBC before the agreement are substantially more likely to switch to RMB after the expansion was signed. By September 2023, the share of transactions invoiced in RMB stood at 56.0% for firms with an ICBC banking relationship in 2022 compared to less than half (23.3%) for the rest. Recall from the discussion in Section 2 that all banks in Argentina – not just ICBC – were eligible to provide firms with RMB after the swap agreement was expanded, without any extra cost. This finding, which we establish more formally below, speaks to the persistence of banking relationships. It may also suggest that ICBC had more detailed information on the practicalities of RMB invoicing or an incentive, political or otherwise, to encourage their clients to adopt the new invoicing currency.

Next, we more formally assess the ICBC role in shaping firms' invoicing choices after the swap expansion. We estimate the following probability model:

$$RMB_{mfpct} = \beta_1 \ln Size_f + \beta_2 ICBC_f + \delta_p + \delta_t + \epsilon_{mfpct}, \tag{1}$$

where the dependent variable RMB_{mfpct} is equal to one if import transaction m by firm f in product p from country c at time t is invoiced in RMB, and zero otherwise.[16] The time period is a month, with the sample running from January 2022 to June 2024. At this point, the sample is still restricted to import transactions from China only such that c=*China* for all observations. The term $\ln Size_f$ captures the size of the importing firm measured by its total worldwide imports in 2022 (in logs). The term $ICBC_f$ is a dummy variable equal to one for a firm with a loan from ICBC in 2022 (i.e., before the agreement was expanded). The regression also includes product fixed effects (δ_p) at the HS 8-digit level and time (year-month) fixed effects (δ_t). Standard errors are clustered by firm and HS8 product using multiway clustering. Given the various fixed effects, we estimate this regression as a linear probability model with OLS.

The results are shown in Table 7. In columns 1 through 3, the estimation is based on the period from January 2023 to June 2024. Column 1 only includes firm size, column 2 only includes the $ICBC_f$ dummy variable, and column 3 includes both. The results indicate that first, larger

[16] Recall that all transactions not invoiced in RMB are almost always invoiced in US dollars.

importers are more likely to invoice in RMB. Based on column 3, the difference between the 10th and 90th percentiles of firm size is associated with a 23.9 percentage point higher probability of invoicing imports in RMB.[17] Second, firms with an ICBC relationship before the swap expansion are substantially (8.8 percentage points) more likely to invoice in RMB. This is equivalent to 40% of the unconditional probability of invoicing in RMB during the sample period, which is 0.2. In column 4, we repeat the estimation focusing on the shorter period from January 2023 to September 2023, which is the period witnessing a surge in RMB use. We find essentially the same pattern.

As a robustness check, we use spatial data on the location of all firms and ICBC branches. Instead of using a dummy variable as above capturing whether a banking relationship with ICBC existed, we construct a dummy variable equal to one for firms in the same city as an ICBC branch, and zero otherwise. It is worth noting that ICBC branches are widespread across Argentina with over 100 branches in total. We then estimate a specification equivalent to (1) but replace the ICBC dummy with this new dummy variable. For tighter identification, we include province fixed effects to compare firms across cities within provinces. The results are shown in Table [TBC] and indicate that the coefficient for having an ICBC branch is positive and statistically significant, with a similar magnitude to the coefficient for having a banking relationship with ICBC. This robustness check provides further evidence of the association between firms' having a banking relationship with ICBC in 2022 and using RMB for invoicing in 2023.

Next, we show how importing firms' invoicing currency choices are also shaped by the availability of dollars, or lack thereof. Specifically, we establish that firms were less likely to use the RMB as an invoicing currency when they had a pre-expansion relationship with banks with a higher US dollar share in their loan portfolio. Recall from the discussion in Section 2.3 that during 2023, and especially in the second half of the year, the currency crisis and the dollar shortage worsened as evidenced by the increasing gap between the official and black market exchange rates. To this end, we use the bank balance sheet data corresponding to the last quarter of 2022. For each bank in the sample, we define the US dollar share of loans as the ratio of dollar loans over total loans. We then compute, for each importing firm, a weighted average of these bank-level shares across the banks the firm has relationships with. If we define weights ω_{bf} as as the ratio of the loans of firm f with bank b over the total loans of firm f with all banks, both measured in 2022 [or measured in 2022Q4], then we obtain

$$USD\ loan\ share_f = \sum_{b \in f} \omega_{bf} USD\ loan\ share_b, \tag{2}$$

where $b \in f$ indicates summing over the set of banks b which have an outstanding loan to firm f. Note that because we do not observe the currencies of individual loan agreements between banks and firms, the implicit assumption in this measure is that the bank-level dollar loan share

[17] The 10th and 90th percentiles of (log) firm size are 13.8 and 18.8.

is applied proportionally across firms.

We then extend the earlier equation (1) to include this new variable:

$$RMB_{mfpct} = \beta_1 \ln Size_f + \beta_2 ICBC_f + \beta_3 USD\ loan\ share_f + \gamma_p + \delta_t + \epsilon_{mfpct}. \quad (3)$$

The results are reported in Table 8. In column 1, the sample goes from January 2023 to June 2024. The coefficients on $\ln Size_f$ and the $ICBC_f$ dummy variable are similar to those in the previous table. The negative coefficient on $USD\ loan\ share_f$ indicates that firms with pre-expansion relationships with banks with high dollar loan shares are less likely to use RMB. The interpretation is that during this period of currency crisis and dollar shortage, relationships with banks that lend more in dollars allow firms to access dollars for importing, reducing the need for RMB. The magnitude of the coefficient is such that moving from the 10th to the 90th percentile of the $USD\ loan\ share_f$ measure is associated with a decline of 6.1 percentage points in the probability of invoicing in RMB.[18] In column 2, we replace the $USD\ loan\ share_f$ measure by another version using the combined share of US dollars, euros and Brazilian reais.[19] The coefficients are very close to those in column 1.[20] Columns 3 and 4 are equivalent, but with the difference that the sample goes from January 2023 to September 2023 (i.e., the period during which the use of the RMB grows rapidly). The coefficient on $USD\ loan\ share_f$ is in the same ballpark as the one based on the longer sample, albeit somewhat smaller.

Since there was variation over time in the shortage of dollars (as implied by the gap between the official and black market exchange rates), we examine how the above coefficients vary over time. To refresh our discussion of the economic context, recall that the currency crisis worsened in the second half of 2023 and eased to some extent in 2024. We revisit the estimation of equation (3) augmenting it by including the interaction of each of the three terms with dummy variables for each quarter between 2023Q1 and 2024Q2.

The results are shown in Table 9. The effect of the $USD\ loan\ share_f$ variable is most negative and statistically significant in the last two quarters of 2023 when the currency crisis was at its most profound. This effect is U-shaped, with a negative but smaller effect before and after those two quarters. This is consistent with the timing of the crisis and provides further evidence of a link between the dollar shortage and the invoicing decisions of firms. For the last quarter of 2023, the magnitude of the coefficient is roughly twice as large than that found in Table 8 for the average of the entire period. We find a very similar pattern in column 2, in which the measure of dollar shortage is constructed with the combined loan share of dollars, euros and Brazilian reais.

We also see in this table that the dummy capturing pre-swap expansion relationships with

[18] The 10th and 90th percentiles of the $USD\ loan\ share_f$ measure are 0.051 and 0.139.

[19] Apart from US dollars, euros and Brazilian reais are traditionally the only quantitatively relevant foreign currencies for invoicing.

[20] Recall from the summary statistics in Table 3 that euros and Brazilian reais account for a very small fraction of loans in our sample.

ICBC is close to zero in the first quarter of 2023 and becomes larger and statistically significant starting in the third quarter of that year, remaining relatively constant afterwards. This is consistent with the timing of the implementation of the RMB invoicing system following the swap agreement expansion.

4.3 RMB invoicing for import transactions from the rest of the world

We now examine the use of the RMB in imports from the rest of the world. We find that at the same time that RMB use increases for imports from China, the RMB starts being used in imports from the rest of the world.

Figure 11 reports the transaction share and value share invoiced in RMB for imports from all countries except China. We find that concurrently with the increase in RMB use for imports from China, there is an increase in its adoption for imports from the rest of the world. The RMB transaction and value shares go from 0% for both in January 2023 to 1.7% and 2.9%, respectively, in September 2023.[21] Like for imports from China, there is a decline in RMB use after the presidential election in the last months of 2023 and in 2024. To provide more context, Table 10 tabulates the frequency of each invoicing currency in imports from the rest of the world. In 2022, before the swap agreement, the US dollar accounts for 84.4% of transactions, followed by the euro (9.4%), the Argentine peso (3.5%), and the Brazilian real (1.2%). Table 11 lists the countries that reach the highest transaction and value shares invoiced in RMB at its peak in September 2023. Most countries in the list are in Africa and Asia. For example, 23% of transactions and 15% of value imported from South Korea are invoiced in RMB at this point.

We find a link at the firm level between RMB use in imports from China and the rest of the world. This is seen in Figure 12 by plotting the RMB transaction share and the RMB value share among imports from the rest of the world, and by splitting the sample between firms that import any positive amount from China invoicing in RMB in the current month versus firms that do not. At its peak, the RMB transaction share reaches 5% for firms that also import any amount from China. In contrast, this share reaches less than 2% for the rest of firms. In terms of value, firms that import from China reach a 9% RMB share in imports from the rest of the world, while for firms that do not import from China this share is about 3%.

This insight can be shown more formally with the following regression:

$$RMB_{mfpct} = \beta_1 \ln Size_f + \beta_2 Importer\ in\ RMB\ from\ China_{ft} + \gamma_{pc} + \delta_t + \epsilon_{mfpct}. \quad (4)$$

The sample is imports from the rest of the world, and the dependent variable is a dummy equal to one for transactions invoiced in RMB. The regressor of interest, $Importer\ in\ RMB\ from\ China_{ft}$, is

[21] The gap between the RMB share in terms of transactions and value suggests that larger transactions are more likely to be invoiced in RMB.

equal to one for firms that import any amount from China invoiced in RMB in the current month, and zero otherwise. The regression also includes country × HS8 product fixed effects, and standard errors are clustered by firm, HS8 product and country using multiway clustering.

The results are reported in Table 12. Column 1 considers the period from January 2023 to June 2024, while column 2 restricts the sample to the period January 2023 to September 2023. In both cases, the coefficients are very similar. Based on column 1, the probability of invoicing in RMB from the rest of the world is 4.4 percentage points higher for firms that import any positive amount from China invoicing in RMB during the same month. This difference is six times larger than the unconditional mean of the dependent variable during this period (0.007).

In the case of imports from the rest of the world, we also find a link between the probability of invoicing in RMB and firms' relationships with ICBC in 2022 (prior to the swap expansion). We also associate it with the dollar loan share of the firms' banking relationships in 2022. To this end, we estimate the below regression akin to equation (3) using the rest of the world sample. The only difference is that the HS8 product fixed effects are replaced by HS8 product × country fixed effects and the standard errors are now clustered by firm, HS8 product, and country using multiway clustering:

$$RMB_{mfpct} = \beta_1 \ln Size_f + \beta_2 ICBC_f + \beta_3 USD\ loan\ share_f + \gamma_{pc} + \delta_t + \epsilon_{mfpct}. \tag{5}$$

The results are shown in Table 13. Columns 1 and 2 correspond to the period from January 2023 to June 2024, while columns 3 and 4 restrict the sample to the period January 2023 to September 2023. In the longer period, we find that a pre-swap expansion relationship with ICBC is associated with a 0.5 percentage point higher probability of invoicing in RMB. This is a large effect, comparable to the 0.007 (0.7 percentage point) unconditional probability of invoicing in RMB during the period. We also find that firms with pre-expansion relationships with banks with higher dollar loan shares are less likely to invoice in RMB. Specifically, moving from the 10th to the 90th percentile of the $USD\ loan\ share_f$ measure is associated with a decline of 0.17 percentage points in the probability of invoicing in RMB, based on column 2 or 4.[22] This is a large effect, as it is roughly half the average probability of invoicing in RMB in the regression sample in column 2. In columns 5 and 6, we add the dummy variable for firms that also import in RMB from China. We still see the higher likelihood of importing in RMB from the rest of the world for firms that import in RMB from China. We also see that banking relationships, captured by the $USD\ loan\ share_f$ variable, have a statistically significant effect beyond that.

Another point to consider is that China has signed similar swap agreements with many, typically developing, countries. One could hypothesize that RMB use more frequent for imports from these countries. However, we do not find evidence in favor of this idea. We split the rest-of-the-

[22] This coefficient is statistically significant during the January 2023 - September 2023 period, and marginally not so during the longer period.

world sample into countries with and without swap agreements with China.[23] Figure 13 plots the shares of import transactions and values invoiced in RMB for each group. There is no clear difference between them.

4.4 The role of exports

Next, we show that RMB use does not spread to Argentine firms' exports. As described in Section 3, we have export data up to December 2023. We find absolutely no use of RMB in Argentine firms' exports. Table [TBC] describes the frequency of invoicing currencies in Argentine exports, which are largely dominated by the US dollar. This result is to be expected. Amid the dollar shortage experienced by the Argentine economy, export revenue is the main source of new dollars, so the incentive is to keep invoicing in dollars.

We also show that exporting activity has an impact on the invoicing currency used for imports from China. For this purpose, we first augment equation (3) by adding a dummy variable for firms that are exporters to China and a separate dummy for firms that export to the rest of the world. Just like with earlier variables, we measure export status in 2022 before the swap expansion.

The results are shown in Table 14. In column 3, we include firms' total imports (the measure $\ln Size_f$ used previously), a dummy variable for exporters to China, and a dummy variable for exporters to the rest of the world. We find, like before, that larger firms (measured in terms of total imports) are more likely to use RMB.[24] The new result here is that firms that export the rest of the world are less likely to invoice imports from China in RMB. In contrast, exporting to China is not associated with a lower probability of invoicing in RMB. Columns 1 and 2 introduce these exporting dummy variables sequentially, with similar results. Specifically, a firm that exports to the rest of the world (but not to China) has a 13 percentage point lower probability of invoicing the RMB.[25]

In column 4, we add the variables that capture firms banking relationships, explored earlier. We still find that the measures capturing the pre-swap agreement banking relationships with ICBC and the dollar loan shares of firms' banks are statistically significant and have similar magnitudes to the results reported earlier in Table 8. Thus, the export mechanism does not reduce the importance of the banking mechanism.

Finally, in column 5 we restrict the sample to firms that export (anywhere) and use measures of export intensity instead of dummy variables for exporting activity. Specifically, we include (log) total exports and the share of exports to China. The results point in a similar direction as before. The coefficient on (log) total exports is negative, while the coefficient on the share of exports to China is positive.

[23] The list of countries with swap agreements with China is provided in Appendix Table 1.

[24] The magnitude of this coefficient is similar to that found earlier in Table 8.

[25] A firm that also exports both to the rest of the world and to China has an 11 percentage point lower probability of invoicing imports from China in RMB.

4.5 RMB use and trade volumes

To what extent did the switch to RMB impact the volume of imports from China? The anecdotal evidence indicates that the shortage of dollars was limiting the ability of firms to import, so we would expect the availability of RMB to ease this constraint and increase trade volumes.

To this end, we estimate the following regression in which the dependent variable is the log of imports from China by firm f at time (year-month) t:

$$\ln(ImportValue)_{ft} = \sum_s \beta_s RMB_f + \delta_t + \delta_f + \epsilon_{ft}. \tag{6}$$

The indicator variable RMB_f is equal to one for firms using the RMB at any point after January 2023. The term $\sum_s \beta_s RMB_f$ corresponds to the interaction between the RMB dummy variable and time dummies. Thus, the coefficients of interest (β_s) capture the differential path of Chinese imports by Argentine firms that did or did not use the RMB. The regression includes firm fixed effects δ_f and time fixed effects δ_t. In some specifications, we also control for the interaction between the firm's sector (measured as the the main HS2 category imported) and time dummies (not shown in the equation above).

The estimated coefficients on the interaction term are plotted in Figure 14. Panel A corresponds to the baseline specification. We see a clear increase in imports from China starting around mid-2023. As discussed earlier, this is the time when RMB invoicing becomes popular for imports from China. This increase in imports from China deviates clearly from the trend seen in the previous months. We also see that imports from China fall back to the previous trend in early 2024. It is the start of the new administration when we see RMB invoicing decline and the dollar shortage starts easing. The magnitude of the coefficients indicates roughly a 20% increase in imports from China during this period. Overall, the figure suggests a clear correspondence between RMB invoicing and the volume of imports from China.

As a robustness check, panel B repeats the estimation incorporating additional fixed effects. In this case, we control for the interaction of sector fixed effects (corresponding to each firm's main HS2 category imported) and time dummies. This means we compare firms with and without RMB invoicing but within the same sector. The results are very similar to those in panel A. As an additional robustness check, in panel C we use a higher cutoff to classify a firm as invoicing in RMB. In this case, the RMB indicator variable is equal to one for firms that have at least 30% of their transactions invoiced in RMB after January 2023. We again see a temporary increase in imports from China associated with RMB use, with similar timing and magnitude as before.

Next, we ask whether the increase in imports from China for firms invoicing in RMB is associated with a change in their imports from the rest of the world. On one hand, there could be a redirection of imports toward China as the availability of RMB makes importing from China easier. On the other hand, these firms might also be using the RMB in imports from the rest of

the world as we saw earlier, making it easier to import more from everywhere. To assess this, we estimate equation (6) using the sample of imports from the rest of the world (and excluding imports from China). The RMB_f dummy variable on the right-hand side is defined in the same way as before, i.e., it is equal to one for firms using the RMB to any extent in their imports from China at any point after January 2023.

The results are shown graphically in Figure 15. In this case, there is less evidence of a statistically significant pattern. If anything, the figures show an increase in imports from the rest of the world during the period when RMB use is higher, in particular in the specifications of panels A and B. This implies that the increased imports from China for firms using RMB shown earlier are not the result of diversion away from the rest of the world. Combining both pieces of evidence, RMB use is associated with an increase in total imports, which is consistent with the notion that RMB provision eases the lack of availability of foreign currency for invoicing purposes, and that this shortage was restricting imports.

5 Conclusion

A substantial fraction of transactions in international trade is invoiced in a vehicle currency. The vast majority of such transactions is invoiced in US dollars, and a few in euros. At the same time, China has announced the objective of the internationalization of the RMB, including for international trade invoicing. But how can these efforts gain traction?

We examine micro data for import and export transactions of Argentine firms over the period from 2022 to 2024. Argentine trade has traditionally been invoiced almost exclusively in US dollars. But starting in early 2023 we observe a sharp rise of RMB invoicing for trade transactions with China, and to a lesser extent also with third countries such as Egypt and Vietnam. The rise in RMB invoicing is associated with a noticeable increase in trade volumes, with no apparent diversion of trade from other partners. We argue that such a sharp rise of a new invoicing currency is highly unusual in both speed and magnitude.

We use bank-firm lending data to link the rise of RMB invoicing to a swap expansion by the Chinese central bank to the Argentine central bank. We find that RMB invoicing is associated with borrowing from a major Chinese state-owned commercial bank active in Argentina. Our results support the notion that the RMB swap expansion alleviated the rationing of foreign currency in the context of dwindling US dollar reserves held by the Argentine central bank. Once Javier Milei was elected as the new president of Argentina in the fall of 2023, exchange rate controls were loosened, and RMB invoicing quickly receded.

Our results shed new light on firms' choice of invoicing currencies. We show that in contrast to the conventional view, invoicing currency patterns can shift rapidly. But they are contingent on the macroeconomic context in general and foreign currency shortages in particular. Chinese

efforts to internationalize the RMB have been partly successful in Argentina but they have not persisted. Nevertheless, our results support the view that internationalization of the RMB is possible if backed up by appropriate institutional arrangements, especially central bank liquidity and commercial bank lending.

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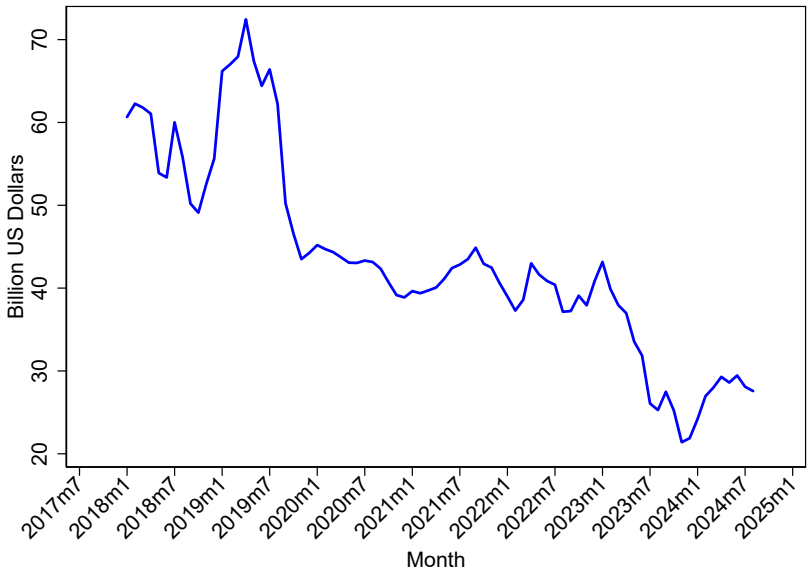
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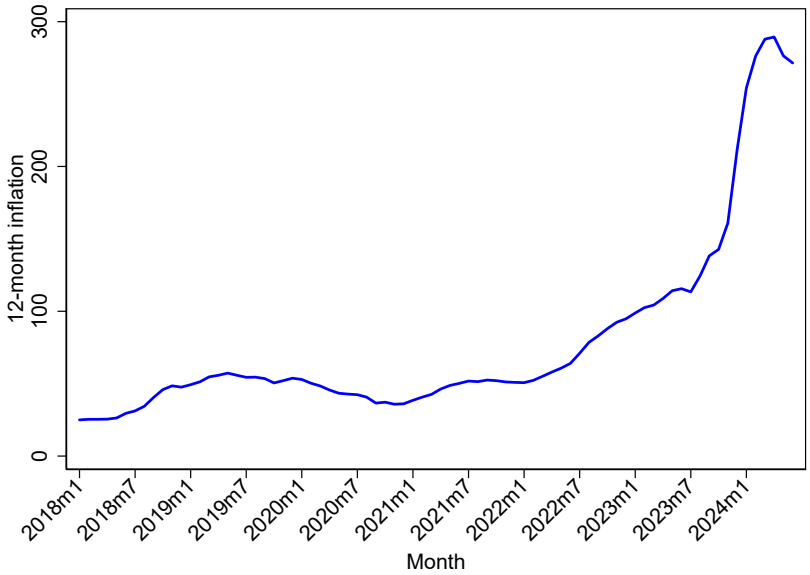
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Figure 3: Argentina's international reserves



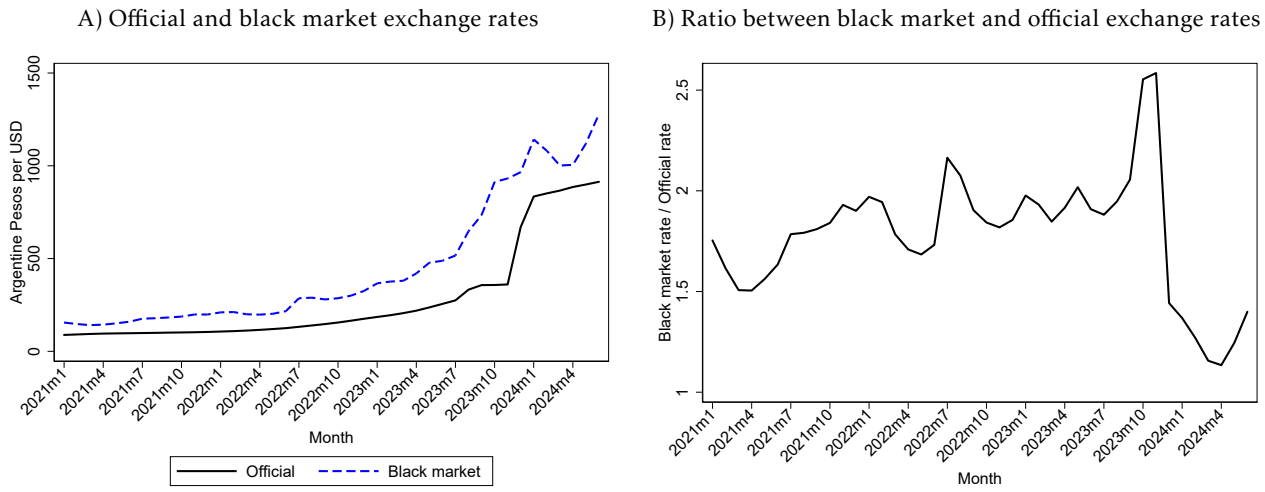
Notes: These are international reserves from the central bank of Argentina (downloaded directly from their website).

Figure 4: Inflation in Argentina



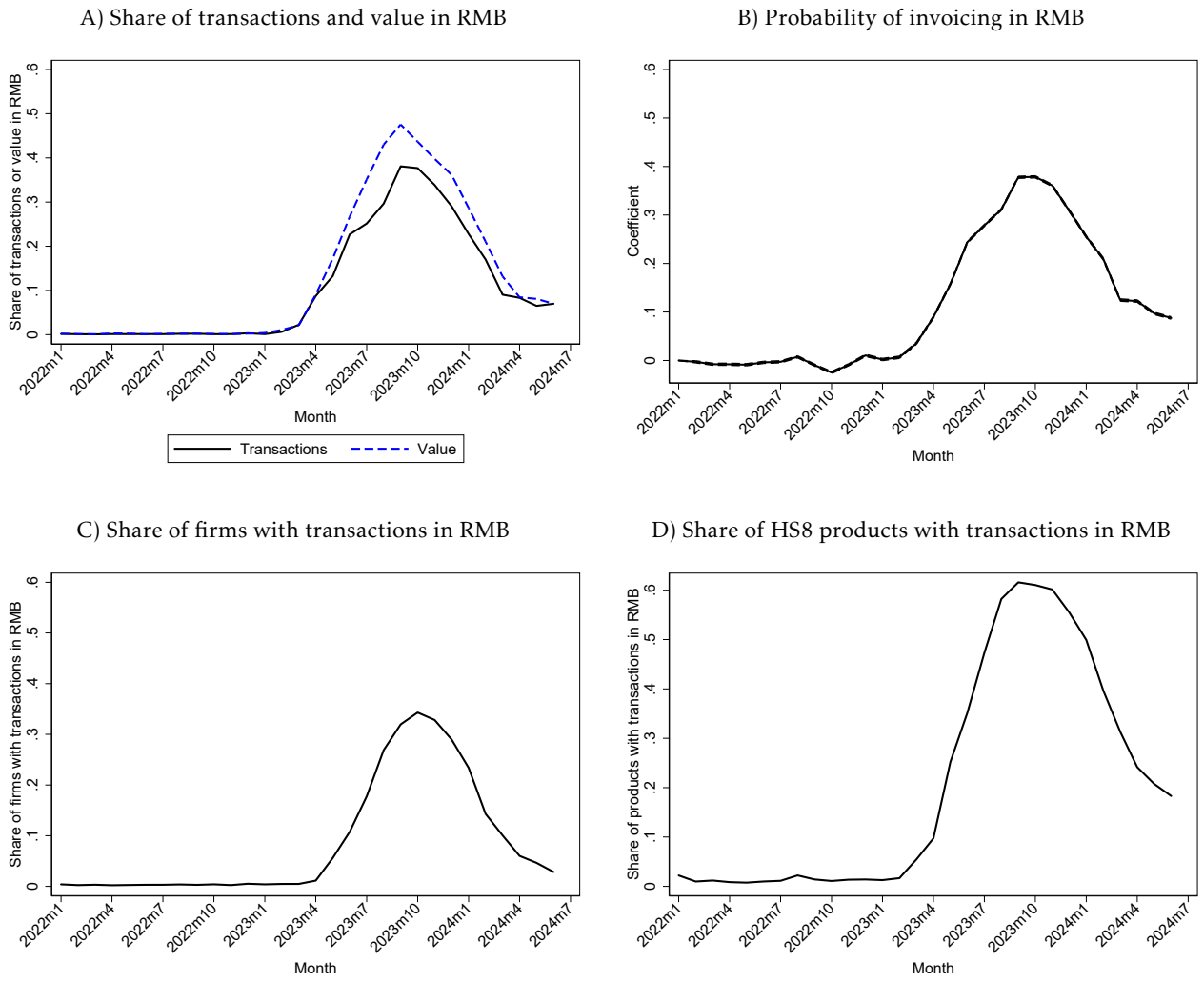
Notes: This figure shows the 12-month percent change in the consumer price index as reported by Argentina's statistical institute (INDEC).

Figure 5: Official and black market exchange rates against the US dollar



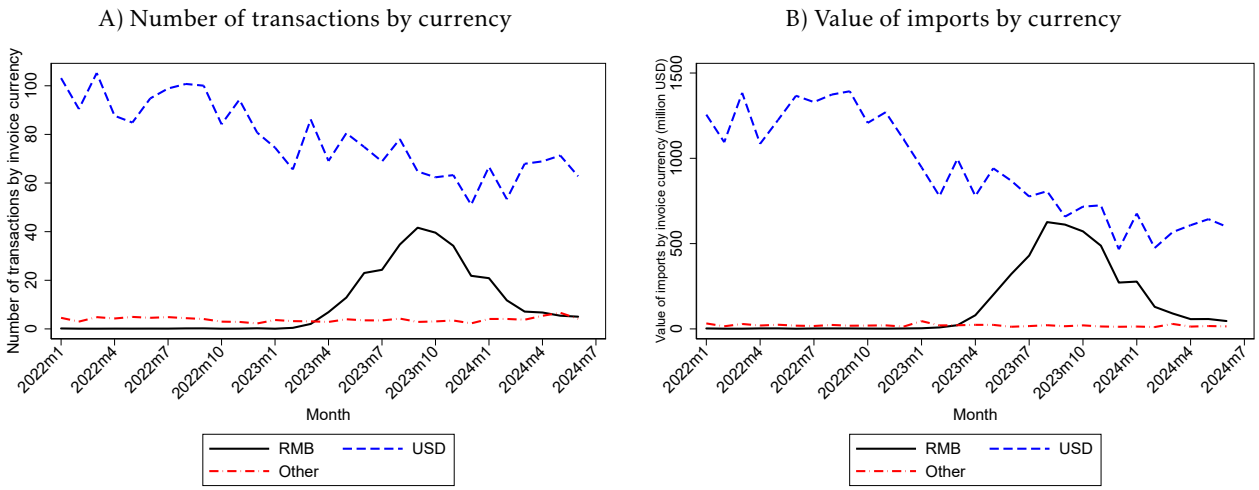
Notes: Panel A shows the official and black market exchange rates between the Argentine peso and the US dollar. Panel B shows the difference between the black market and the official exchange rate. The black market exchange rate is widely called "dólar blue."

Figure 6: RMB invoicing for imports from China



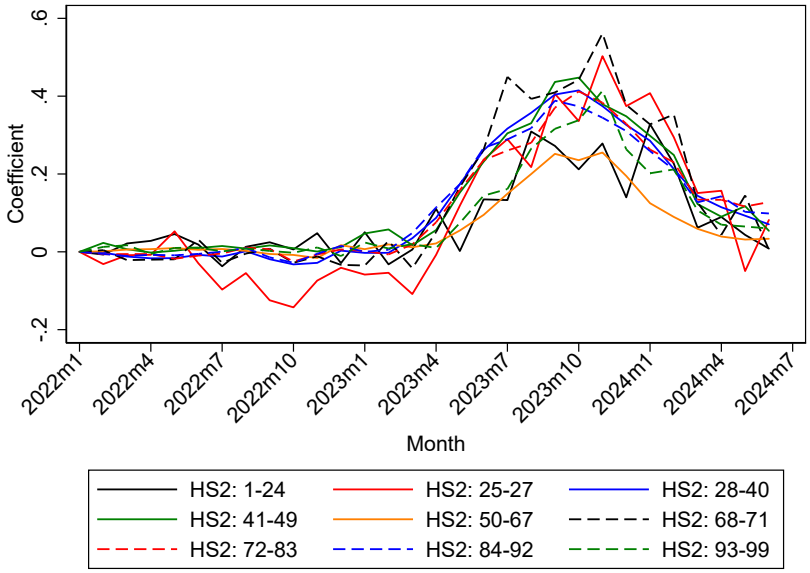
Notes: Panel A shows the share of transactions and the share of value invoiced in RMB in imports from China. Panel B shows estimated time dummies from a regression using transaction-level data on imports from China in which the dependent variable is a dummy variable for transactions invoiced in RMB and including time dummies and firm × HS8 product fixed effects. Panel C shows the share of firms with at least one transaction in RMB. Panel D shows the share of HS 8-digit products with at least one transaction in RMB.

Figure 7: RMB invoicing for imports from China



Notes: Panel A shows the number of transactions (in thousands) invoiced in RMB, US dollars, and other currencies. Panel B shows the value of imports (in million USD) invoiced in RMB, US dollars, and other currencies.

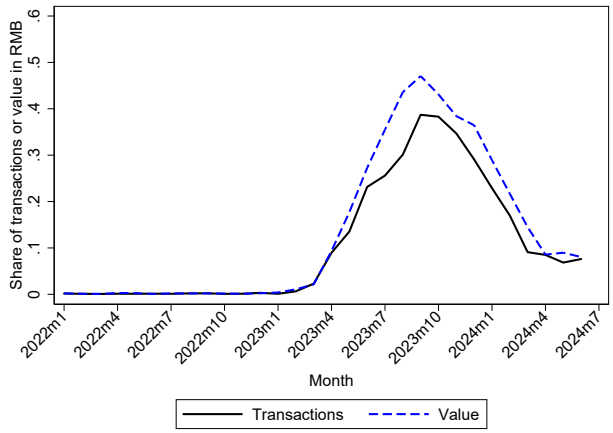
Figure 8: RMB invoicing for imports from China: Breakdown by sectors



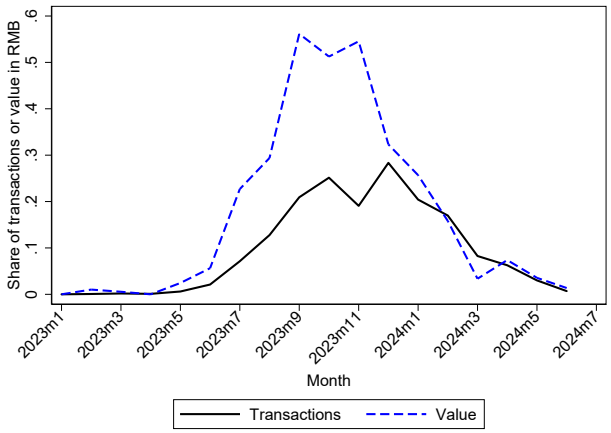
Notes: This figure shows estimated time dummies from a regression using transaction-level data on imports from China in which the dependent variable is a dummy variable for transactions invoiced in RMB and including time dummies and product fixed effects. The legend indicates the HS 2-digit chapters in each sector.

Figure 9: RMB invoicing for imports from China

A) Share of transactions and value in RMB: Existing firms



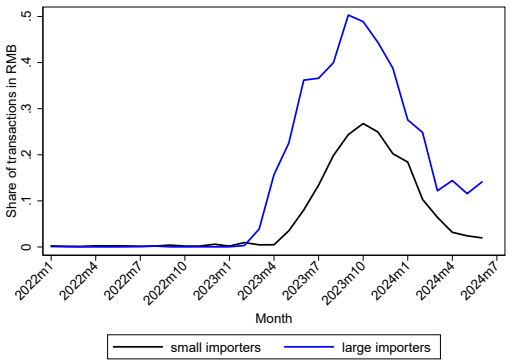
B) Share of transactions and value in RMB: New firms



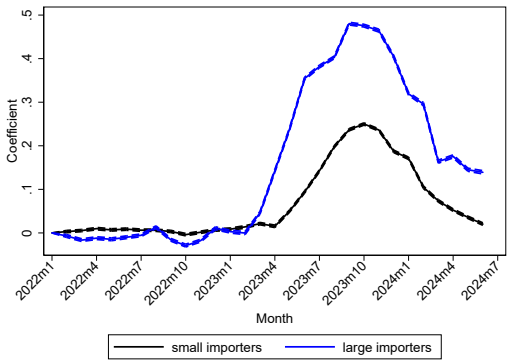
Notes: Both panels shows the share of transactions and the share of value invoiced in RMB in imports from China. Panel A corresponds to existing firms, defined as those exporting in 2022. Panel B corresponds to new firms, defined as those with no exports in 2022.

Figure 10: RMB invoicing for imports from China

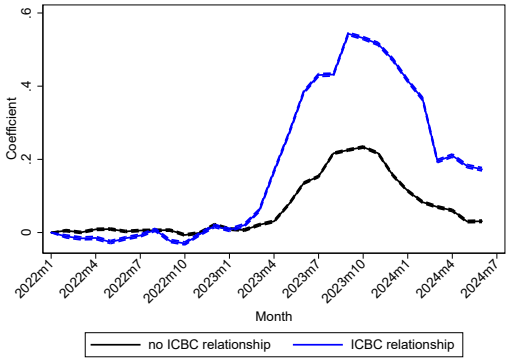
A) By importer size: Share of transactions in RMB



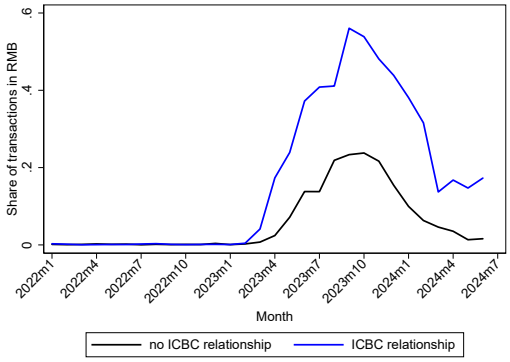
B) By importer size: Probability of invoicing in RMB



C) By banking relationship with ICBC

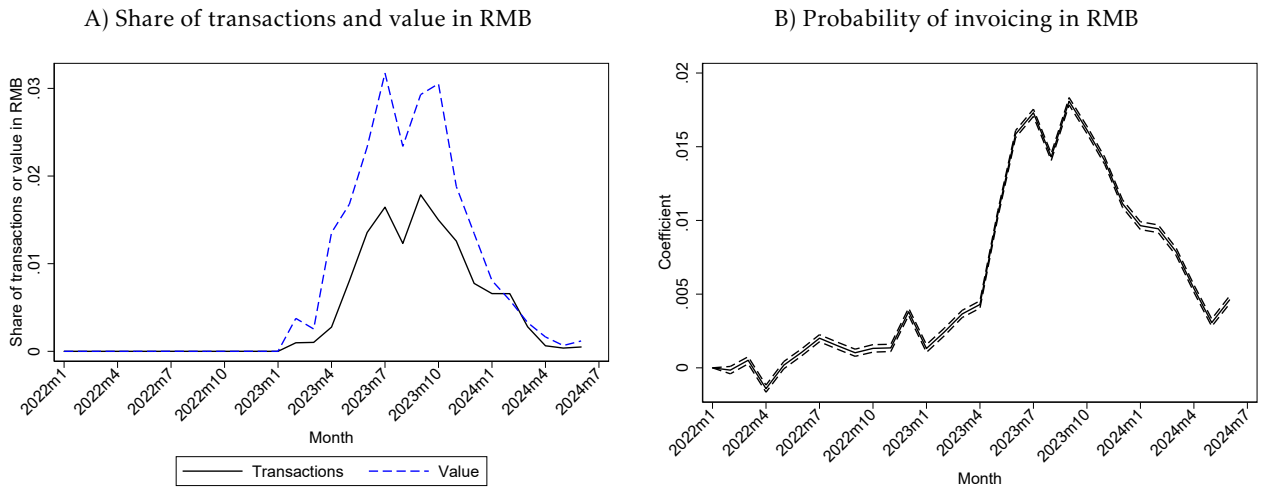


D) By banking relationship with ICBC



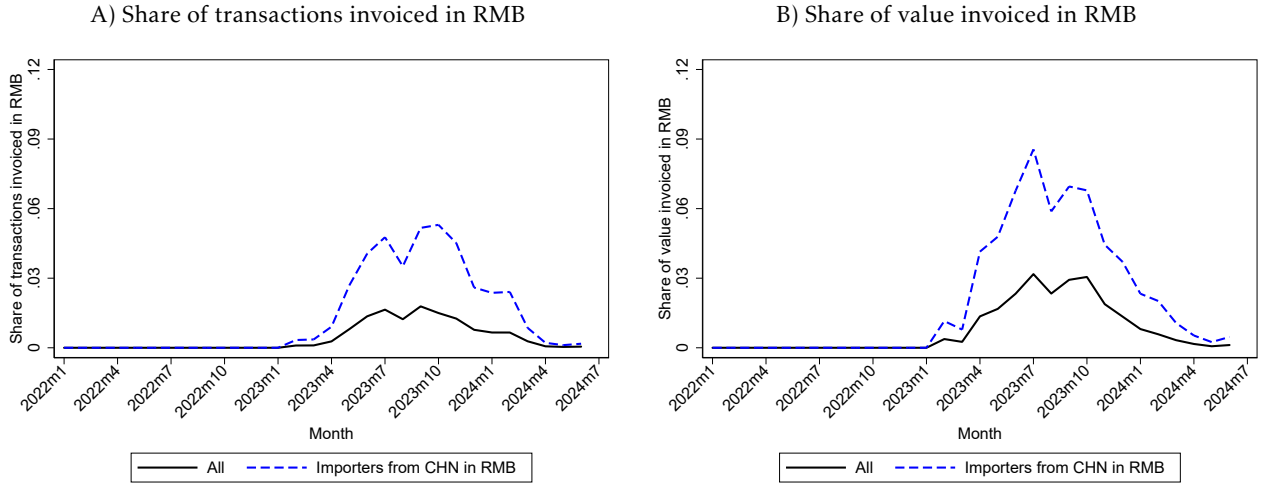
Notes: Panel A shows the share of import transactions from China invoiced in RMB for small and large importers. Importer size is measured as total imports from the world in 2022. These categories are defined such that half the transactions belong to each one. Panel B shows estimated time dummies from a regression using transaction-level data on imports from China in which the dependent variable is a dummy variable for transactions invoiced in RMB and including time dummies and firm × HS8 product fixed effects. This regression is estimated separately for small and large importers. Panel C shows the share of import transactions from China invoiced in RMB for importers with and without a banking relationship with ICBC in 2022. Panel D shows estimated time dummies from a regression using transaction-level data on imports from China in which the dependent variable is a dummy variable for transactions invoiced in RMB and including time dummies and firm × HS8 product fixed effects. This regression is estimated separately for importers with and without a banking relationship with ICBC. In panels C and D, the sample is restricted to firms in the bank-to-firm loans data.

Figure 11: RMB invoicing for imports from the rest of the world



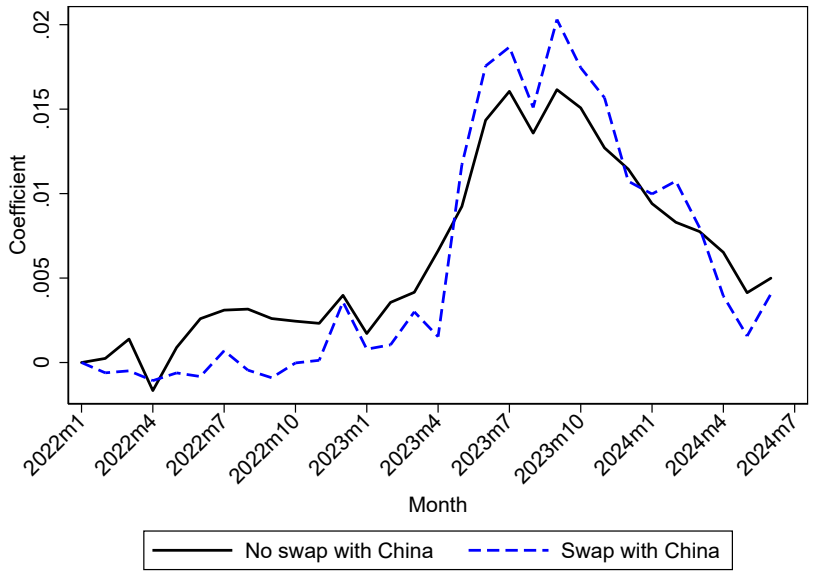
Notes: Panel A shows the share of transactions and the share of value invoiced in RMB. Panel B shows estimated time dummies from a regression using transaction-level data on imports from China in which the dependent variable is a dummy variable for transactions invoiced in RMB and including time dummies and product fixed effects.

Figure 12: RMB invoicing for imports from the rest of the world



Notes: Panel A shows the share of transactions invoiced in RMB for imports from the rest of the world (i.e., all countries excluding China). Panel B shows the share of value invoiced in RMB for imports from the rest of the world. In both panels, the solid black line corresponds to all firms. The dashed blue line corresponds to firms with imports from China invoiced in RMB in the same month.

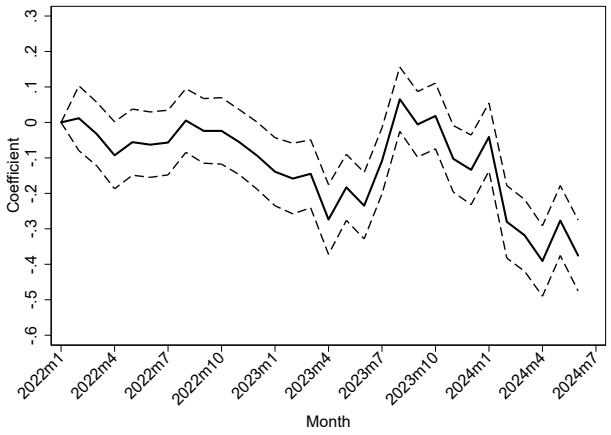
Figure 13: RMB invoicing for imports from the rest of the world: The role of swap agreements with China



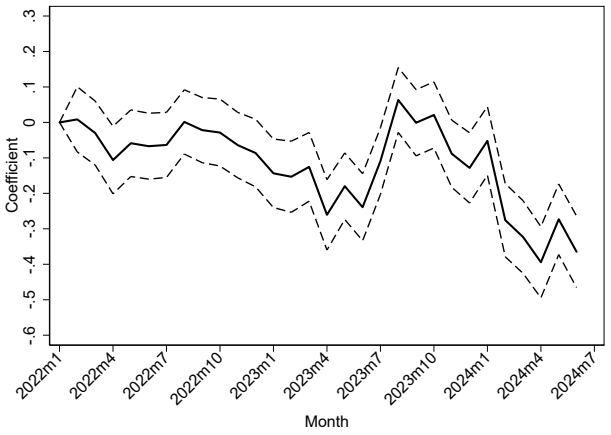
Notes: This figure shows estimated time dummies from a regression using transaction-level data on imports from the rest of the world in which the dependent variable is a dummy variable for transactions invoiced in RMB and including time dummies and firm × HS8 product × country fixed effects. The sample is split between source countries with and without swap agreements with China.

Figure 14: RMB invoicing and volume of imports from China

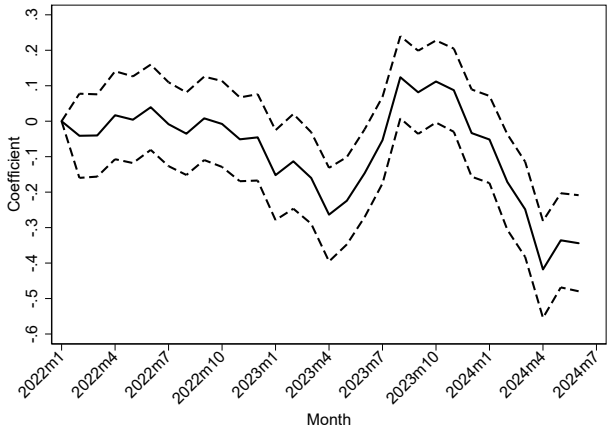
A) Baseline



B) With sector × time fixed effects

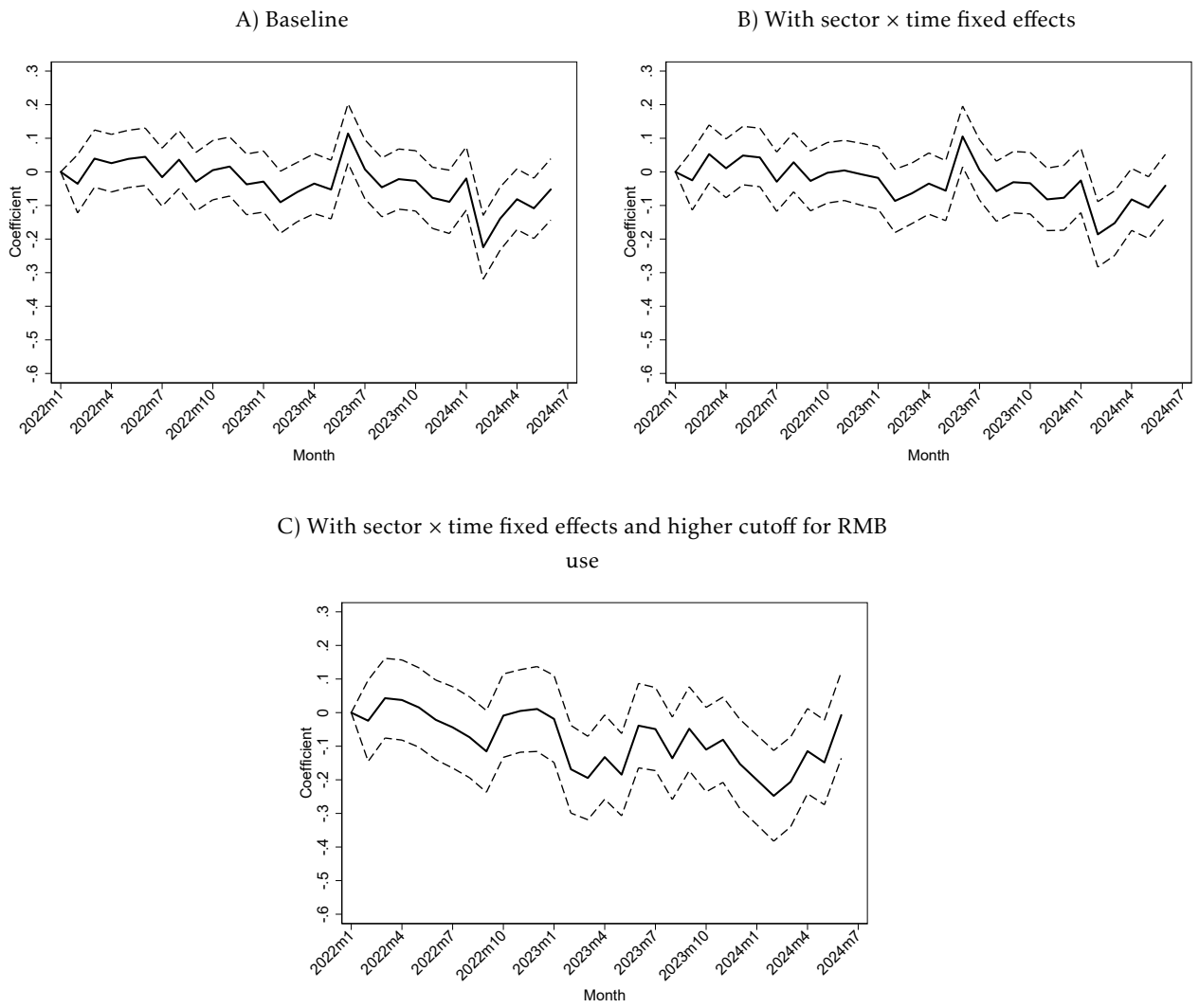


C) With sector × time fixed effects and higher cutoff for RMB use



Notes: Each panel shows estimated time dummies from equation (6) using the sample of imports from China. Panel A corresponds to the baseline specification described in the main text. Panel B adds sector × time fixed effects, with the sector defined as the main HS2 imported by the firm. Panel C also includes these additional fixed effects, and the RMB dummy variable is equal to one for firms with more than 30% of transactions in RMB after January 2023.

Figure 15: RMB invoicing and volume of imports from the rest of the world



Notes: Each panel shows estimated time dummies from equation (6) using the sample of imports from the rest of the world. Panel A corresponds to the baseline specification described in the main text. Panel B adds sector × time fixed effects, with the sector defined as the main HS2 imported by the firm. Panel C also includes these additional fixed effects, and the RMB dummy variable is equal to one for firms with more than 30% of transactions in RMB after January 2023.

Table 1: List of countries with swap agreements with China

Albania	Hungary	Nigeria	Tajikistan
Argentina	Island	Pakistan	Thailand
Armenia	Japan	Qatar	Turkey
Australia	Indonesia	Russia	United Kingdom
Belarus	Kazakhstan	Serbia	Ukraine
Brazil	South Korea	Singapore	United Arab Emirates
Canada	Malaysia	South Africa	Uzbekistan
Chile	Mongolia	Sri Lanka	
Egypt	Morocco	Suriname	
Hong Kong	New Zealand	Switzerland	

Notes: This table reports the list of countries with swap agreements with China.

Table 2: List of largest banks in our sample

Bank name	Market share (2022)
Banco de Galicia y Buenos Aires S.A.U.	15.13%
Banco Santander Argentina S.A.	13.86%
Banco BBVA Argentina S.A.	11.28%
Banco de la Nación Argentina	6.70%
Banco Credicoop Cooperativo Limitado	5.97%
Industrial and Commercial Bank of China	5.92%
HSBC Bank Argentina S.A.	5.34%
Banco de la Provincia de Buenos Aires	5.01%
Banco Macro S.A.	4.30%
Banco Supervielle S.A.	3.79%
Banco Patagonia S.A.	2.87%
Citibank N.A.	2.43%
Banco BMA S.A.U.	2.40%
Banco Comafi Sociedad Anónima	1.95%
Banco de la Ciudad de Buenos Aires	1.82%

Notes: This table provides the list of the 15 largest banks in our sample measured in terms of outstanding loans in 2022. The market share in the second column is calculated as the share of outstanding loans in 2022 over the total outstanding loans in 2022 in our sample.

Table 3: Summary statistics for loan shares by currency based on bank balance sheets

	Loan shares by currency				
	Argentine Peso	US Dollar	Euro	Brazilian Real	Other
Panel A: 2022Q4					
Mean	92.25%	7.71%	0.03%	0.00%	0.01%
St. dev.	10.32%	10.30%	0.10%	0.02%	0.05%
10th pct.	83.94%	0.31%	0.00%	0.00%	0.00%
25th pct.	89.58%	1.81%	0.00%	0.00%	0.00%
50th pct.	95.24%	4.76%	0.00%	0.00%	0.00%
75th pct.	98.19%	10.42%	0.00%	0.00%	0.00%
90th pct.	99.69%	15.89%	0.02%	0.00%	0.00%
Panel B: 2023Q4					
Mean	90.25%	9.21%	0.02%	0.03%	0.03%
St. dev.	11.47%	11.31%	0.06%	0.17%	0.14%
10th pct.	73.00%	0.21%	0.00%	0.00%	0.00%
25th pct.	89.05%	2.12%	0.00%	0.00%	0.00%
50th pct.	92.90%	6.16%	0.00%	0.00%	0.00%
75th pct.	97.00%	10.75%	0.00%	0.00%	0.00%
90th pct.	99.43%	26.03%	0.07%	0.00%	0.03%

Notes: This table reports summary statistics for the distribution of loan shares by currency across banks in 2022Q4 and 2023Q4. For example, the cell in the first row, first column of panel A indicates that the mean across banks of the share of loans in Argentine pesos is 92.25%, while the cell in the fifth row in the first column indicates that the 50th percentile is 95.24%. These summary statistics are not weighted by bank size. The currencies in the first four columns are reported individually in the bank balance sheets. All other currencies in bank balance sheets are grouped.

Table 4: Summary statistics for invoicing currencies used in Argentine imports from China

	Share of transactions			Share of value		
	2022	2023	2024	2022	2023	2024
US Dollar	95.8%	74.9%	82.1%	98.2%	70.9%	82.5%
Renminbi	0.2%	21.6%	12.0%	0.2%	27.2%	15.2%
Euro	2.6%	2.5%	3.4%	0.9%	1.2%	1.7%
Argentine Peso	0.8%	0.5%	0.6%	0.7%	0.5%	0.4%
Real	0.3%	0.2%	1.2%	0.0%	0.0%	0.0%
Pound	0.1%	0.1%	0.2%	0.0%	0.0%	0.0%
Yen	0.1%	0.2%	0.3%	0.0%	0.0%	0.0%
Other	0.2%	0.2%	0.3%	0.1%	0.1%	0.1%

Notes: This table reports the share of import transactions and the share of imported value by currency and by year for imports from China.

Table 5: RMB invoicing for imports from China: Breakdown by HS 2-digit chapter in September 2023

HS2 code	HS2 name	Share of transactions in RMB	Share of value in RMB
Panel A: Top ten HS2 chapters by share of transactions in RMB			
43	Furskins and artificial fur; manufactures thereof	1.00	1.00
74	Copper and articles thereof	0.85	0.71
75	Nickel and articles thereof	0.82	0.08
35	Albuminoidal substances; etc.	0.77	0.31
8	Edible fruit and nuts; etc.	0.67	0.54
59	Impregnated, coated, etc. textile fabrics	0.66	0.54
48	Paper and paperboard; etc.	0.61	0.40
80	Tin and articles thereof	0.59	0.80
27	Mineral fuels, mineral oils; etc.	0.59	0.48
20	Preparations of vegetables, fruit, nuts; etc.	0.52	0.45
Panel B: Bottom ten HS2 chapters by share of transactions in RMB			
45	Cork and articles of cork	0.20	0.22
53	Other vegetable textile fibers; etc.	0.20	0.69
61	Articles of apparel and clothing accessories, knitted or crocheted	0.20	0.22
12	Oil seeds and oleaginous fruits; etc.	0.18	0.25
89	Ships, boats and floating structures	0.14	0.41
79	Zinc and articles thereof	0.13	0.06
57	Carpets and other textile floor coverings	0.10	0.27
64	Footwear, gaiters and the like;	0.06	0.10
13	Lac; gums, resins; etc.	0.06	0.13
30	Pharmaceutical products	0.05	0.08

Notes: This table reports the share of transactions and the share of value invoiced in RMB for imports from China by HS2 chapter. Panel A corresponds to the top ten HS2 chapters in terms of the share of transactions in RMB. Panel B corresponds to the bottom ten HS2 chapters in terms of the share of transactions in RMB.

Table 6: RMB invoicing in imports from China: Existing firms vs. new firms

	RMB	Other
Share of value by existing firms	0.934	0.953
Share of transactions by existing firms	0.981	0.956

Notes: This table reports the share of value and transactions in imports from China in September 2023 that correspond to existing firms (i.e., firms that export in 2022). These statistics are reported separately by currency, split between RMB and other currencies.

Table 7: Probability of RMB invoicing for import transactions from China: Firm-level determinants

	(1) Jan. 2023 to Jun. 2024	(2) Jan. 2023 to Jun. 2024	(3) Jan. 2023 to Jun. 2024	(4) Jan. 2023 to Sep. 2023
(log) firm size	0.055***		0.048***	0.050***
	(0.010)		(0.010)	(0.011)
ICBC relationship=1		0.146***	0.088***	0.049**
		(0.033)	(0.024)	(0.024)
HS8 fixed effects	Yes	Yes	Yes	Yes
Year-month fixed effects	Yes	Yes	Yes	Yes
Observations	1143802	1143802	1143802	614429
R^2	0.339	0.312	0.347	0.387

Notes: This table reports the results of estimating equation (1). Each observation corresponds to an import transaction from China. The dependent variable is equal to one for transactions invoiced in RMB, and zero otherwise. In columns 1 through 3, the sample consists of all transactions between January 2023 and June 2024. In column 4, the sample consists of all transactions between January 2023 and September 2023. Standard errors are clustered by firm and HS8 product using multiway clustering. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level.

Table 8: Probability of RMB invoicing for imports from China: Firm-level determinants

	(1) Jan. 2023 to Jun. 2024	(2) Jan. 2023 to Jun. 2024	(3) Jan. 2023 to Sep. 2023	(4) Jan. 2023 to Sep. 2023
(log) firm size	0.047***	0.047***	0.049***	0.049***
	(0.009)	(0.009)	(0.010)	(0.010)
ICBC relationship	0.102***	0.102***	0.057**	0.057**
	(0.026)	(0.026)	(0.025)	(0.025)
USD loan share	-0.694**		-0.540*	
	(0.322)		(0.279)	
USD/EUR/REAL loan share		-0.695**		-0.541**
		(0.318)		(0.276)
HS8 F.E.	Yes	Yes	Yes	Yes
Year-month F.E.	Yes	Yes	Yes	Yes
Observations	1,103,584	1,103,584	593,239	593,239
R^2	0.353	0.353	0.394	0.394

Notes: This table reports the results of the estimation of equation (3). Each observation corresponds to an import transaction from China. The dependent variable is equal to one for transactions invoiced in RMB and zero otherwise. In columns 1 and 2, the sample consists of all transactions between January 2023 and June 2024. In columns 3 and 4, the sample consists of all transactions between January 2023 and September 2023. Standard errors are clustered by firm and HS8 product using multiway clustering. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level.

Table 9: Probability of RMB invoicing for imports from China: Firm-level determinants with time-varying coefficients

	(1)	(2)
(log) firm size	-0.011***	-0.011***
	(0.004)	(0.004)
(log) firm size × 2023Q2	0.081***	0.081***
	(0.019)	(0.019)
(log) firm size × 2023Q3	0.089***	0.089***
	(0.015)	(0.015)
(log) firm size × 2023Q4	0.084***	0.084***
	(0.015)	(0.015)
(log) firm size × 2024Q1	0.049***	0.049***
	(0.014)	(0.014)
(log) firm size × 2024Q2	0.026	0.026
	(0.016)	(0.016)
ICBC relationship	0.003	0.003
	(0.017)	(0.017)
ICBC relationship × 2023Q2	0.037	0.038
	(0.040)	(0.040)
ICBC relationship × 2023Q3	0.105*	0.105*
	(0.058)	(0.058)
ICBC relationship × 2023Q4	0.154**	0.154**
	(0.060)	(0.060)
ICBC relationship × 2024Q1	0.158***	0.158***
	(0.050)	(0.050)
ICBC relationship × 2024Q2	0.117**	0.117**
	(0.049)	(0.049)
USD loan share	0.105	
	(0.161)	
USD loan share × 2023Q2	-0.595	
	(0.426)	
USD loan share × 2023Q3	-1.103*	
	(0.667)	
USD loan share × 2023Q4	-1.310*	
	(0.762)	
USD loan share × 2024Q1	-0.755	
	(0.553)	
USD loan share × 2024Q2	-0.786	
	(0.513)	
USD+EUR+REAL loan share		0.107
		(0.161)
USD+EUR+REAL loan share × 2023Q2		-0.599
		(0.421)
USD+EUR+REAL loan share × 2023Q3		-1.111*
		(0.663)
USD+EUR+REAL loan share × 2023Q4		-1.312*
		(0.755)
USD+EUR+REAL loan share × 2024Q1		-0.757
		(0.552)
USD+EUR+REAL loan share × 2024Q2		-0.791
		(0.513)
HS8 F.E.	Yes	Yes
Year-month F.E.	Yes	Yes
Observations	1,103,584	1,103,584
R^2	0.388	0.388

Notes: This table reports the results of equation 3 where allow the coefficients of the explanatory variables to vary by quarter (2023Q1-2024Q2). Each observation corresponds to an import transaction from China between January 2023 and June 2024. The dependent variable is equal to one for transactions invoiced in RMB and zero otherwise. Standard errors are clustered by firm and HS8 product using multiway clustering. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level.

Table 10: Summary statistics for invoicing currencies used in Argentine imports from the rest of the world

	Share of transactions			Share of value		
	2022	2023	2024	2022	2023	2024
US Dollar	84.4%	84.3%	83.4%	77.9%	74.5%	70.3%
Renminbi	0.0%	0.9%	0.3%	0.0%	1.7%	0.3%
Euro	9.4%	8.5%	10.3%	5.3%	6.7%	6.4%
Argentine Peso	3.5%	3.7%	3.3%	8.4%	8.4%	6.4%
Real	1.2%	1.4%	1.3%	7.9%	8.0%	15.9%
Pound	0.4%	0.4%	0.4%	0.1%	0.1%	0.1%
Yen	0.4%	0.4%	0.4%	0.1%	0.2%	0.1%
Other	0.5%	0.5%	0.6%	0.2%	0.3%	0.3%

Notes: This table reports the share of import transactions and the share of imported value by currency and by year for imports from the the rest of the world.

Table 11: RMB invoicing for imports from the rest of the world in September 2023

Country	Share of transactions in RMB	Share of value in RMB
Niger	1.00	1.00
Zambia	1.00	1.00
British territories in America	0.96	0.99
Egypt	0.89	0.08
Hong Kong	0.79	0.59
Vietnam	0.32	0.69
South Korea	0.23	0.15
Singapore	0.13	0.03
Taiwan	0.10	0.06
El Salvador	0.07	0.05
Indonesia	0.06	0.23
Thailand	0.05	0.07
United Arab Emirates	0.04	0.06
Ukraine	0.01	0.07
Estonia	0.01	0.09
Peru	0.01	0.11
Lithuania	0.00	0.26
Morocco	0.00	0.06

Notes: This table reports the share of transactions and the share of value invoiced in RMB for imports for countries with at least 5% of transactions or value invoiced in RMB. The data are sorted from largest to smallest share of transactions in RMB. The term "British territories in America" is the exact translation of the name used in the original data.

Table 12: Probability of RMB invoicing for imports from the rest of the world

	(1) Jan. 2023 to Jun. 2024	(2) Jan. 2023 to Sep. 2023	(3)	(4)
(log) firm size	0.001	0.001		
	(0.001)	(0.001)		
Importer from China	0.044*	0.046		
	(0.024)	(0.029)		
HS8 × Country F.E.	Yes	Yes		
Year-month F.E.	Yes	Yes		
Observations	6,906,844	3,650,798		

Notes: This table reports the results of the estimation of equation (4). Each observation corresponds to an import transaction from the rest of the world. The dependent variable is equal to one for transactions invoiced in RMB and zero otherwise. In column 1, the sample consists of all transactions between January 2023 and June 2024. In column 2, the consists of all transactions between January 2023 and September 2023. Standard errors are clustered by firm and HS8 product using multiway clustering. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level.

Table 13: Probability of invoicing in RMB in imports from the rest of the world

	(1) Jan. 2023 to Jun. 2024	(2) Jan. 2023 to Jun. 2024	(3) Jan. 2023 to Sep. 2023	(4) Jan. 2023 to Sep. 2023	(5) Jan. 2023 to Jun. 2024	(6) Jan. 2023 to Sep. 2023
(log) firm size	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ICBC relationship	0.004*	0.005*	0.002	0.003	0.003	0.002
	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)
USD loan share		-0.015		-0.015*	-0.035**	-0.042**
		(0.009)		(0.009)	(0.015)	(0.020)
Importer from China					0.028**	0.027*
					(0.013)	(0.016)
HS8 × Country F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Year–Month F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5594323	5594323	2971226	2971226	5594323	2971226
R^2	0.343	0.343	0.452	0.452	0.354	0.461

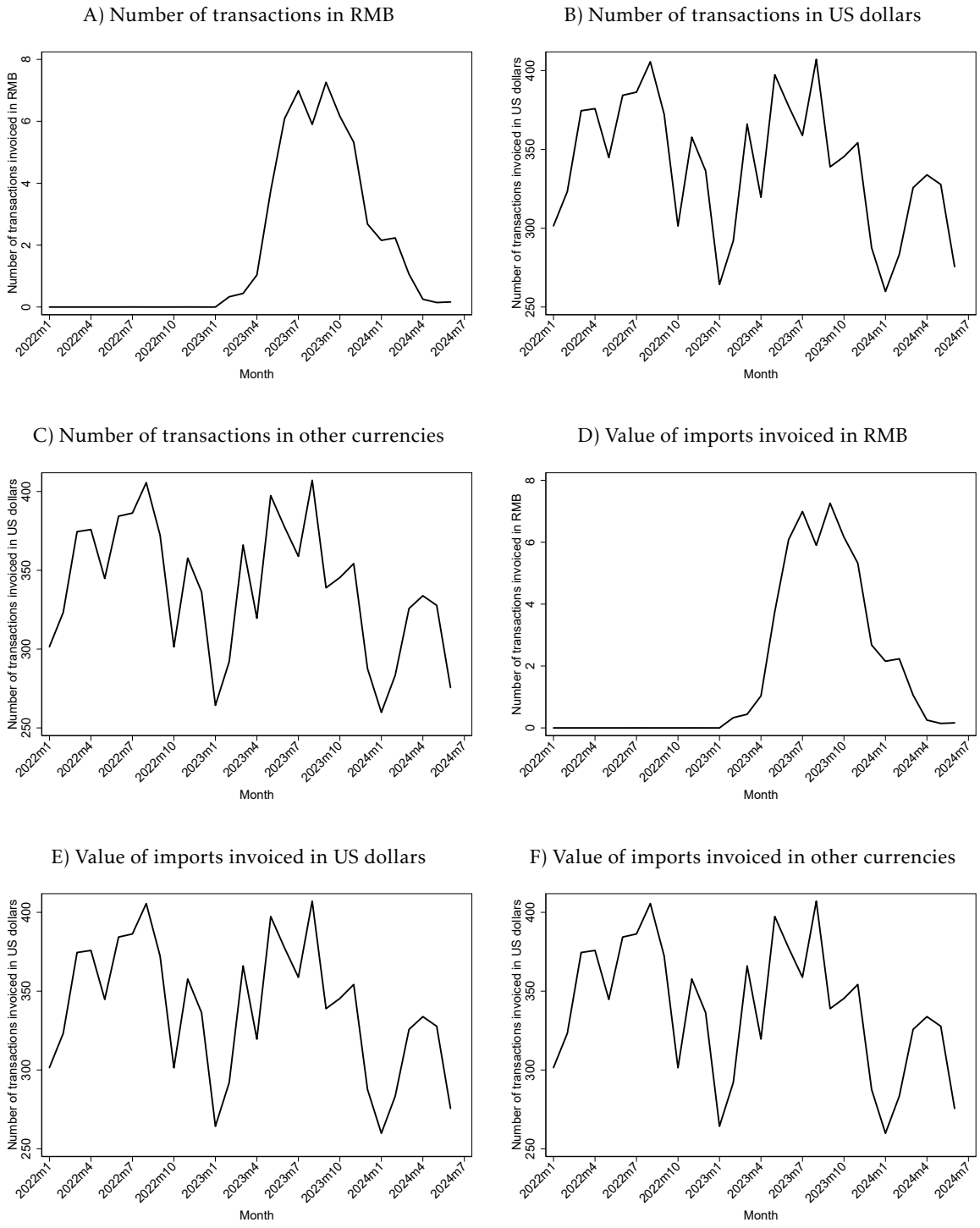
Notes: This table reports the results of the estimation of equation (3). Each observation corresponds to an import transaction from the rest of the world. The dependent variable is equal to one for transactions invoiced in RMB and zero otherwise. In columns 1, 2 and 5, the sample consists of all transactions between January 2023 and June 2024. In columns 3, 4 and 6, the sample consists of all transactions between January 2023 and September 2023. Standard errors are clustered by firm and HS8 product using multiway clustering. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level.

Table 14: Probability of RMB invoicing for imports from China: Firm-level determinants

	(1)	(2)	(3)	(4)	(5)
(log) firm size (total imports)	0.039***	0.034***	0.040***	0.047***	0.053***
	(0.006)	(0.008)	(0.007)	(0.009)	(0.011)
Exporter to rest of world	-0.127***		-0.131***	-0.138***	
	(0.026)		(0.028)	(0.030)	
Exporter to China		0.046	-0.021	-0.054	
		(0.060)	(0.058)	(0.049)	
ICBC relationship				0.101***	
				(0.024)	
USD loan share				-0.506**	
				(0.252)	
(log) total exports					-0.015***
					(0.004)
Share exports to China					0.270***
					(0.083)
HS8 F.E.	Yes	Yes	Yes	Yes	Yes
Year-month F.E.	Yes	Yes	Yes	Yes	Yes
Observations	1528438	1528438	1528438	1103584	712624
R^2	0.303	0.285	0.303	0.369	0.371

Notes: This table reports the results of the estimation of equation (3). Each observation corresponds to an import transaction from China. The dependent variable is equal to one for transactions invoiced in RMB and zero otherwise. In all columns the sample consists of transactions between January 2023 and June 2024. Standard errors are clustered by firm and HS8 product using multiway clustering. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level.

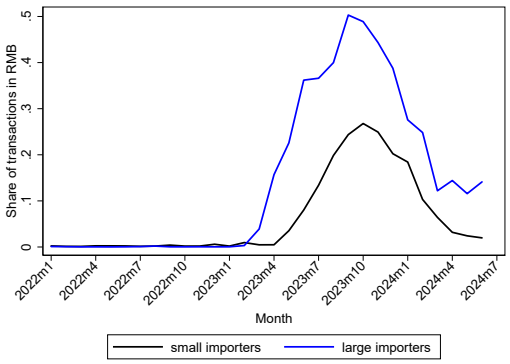
Figure 16: RMB invoicing for imports from the rest of the world



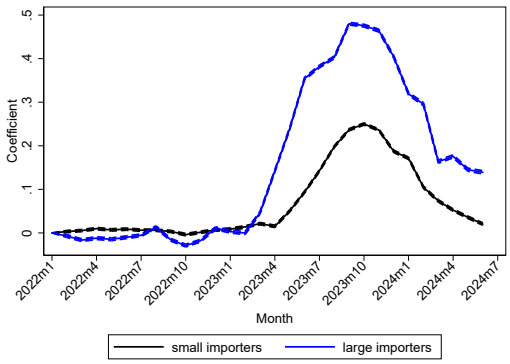
Notes: Panels A thorugh C show the number of transactions (in thousands) invoiced in RMB, US dollars, and other currencies. Panels D through F show the value of imports (in million USD) invoiced in RMB, US dollars, and other currencies.

Figure 17: RMB invoicing for imports from China: Robustness

A) By importer size: Share of transactions in RMB

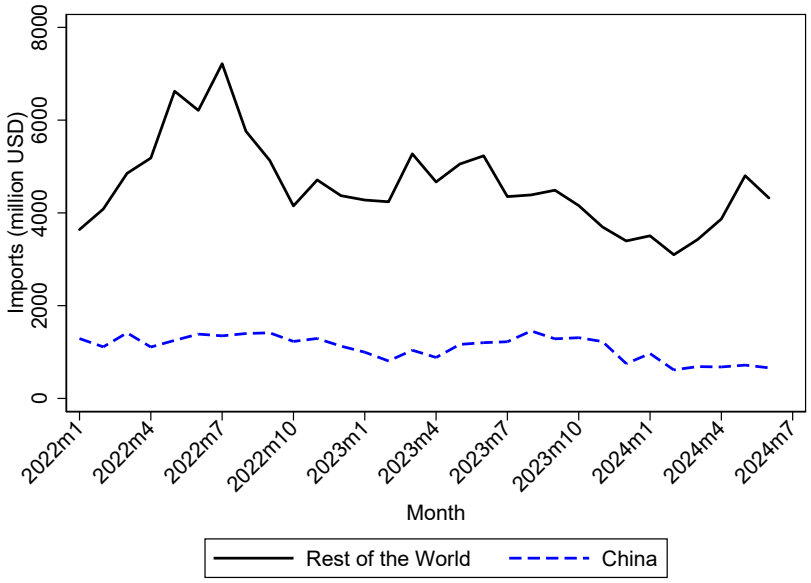


B) By importer size: Probability of invoicing in RMB



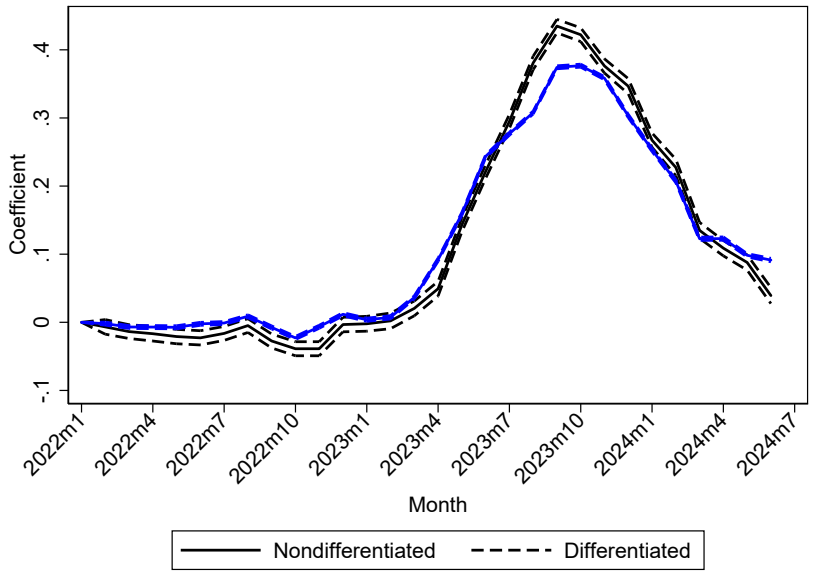
Notes: Panel A shows the share of import transactions from China invoiced in RMB for small and large importers. Importer size is measured as total imports from the world in 2022. These categories are defined such that half the firms belong to each one. Panel B shows estimated time dummies from a regression using transaction-level data on imports from China in which the dependent variable is a dummy variable for transactions invoiced in RMB and including time dummies and firm × HS8 product fixed effects. This regression is estimated separately for small and large importers.

Figure 18: Imports from China and the rest of the world



Notes: This figure shows total imports from China and the rest of the world in millions of US dollars.

Figure 19: RMB invoicing for imports from China



Notes: This figure shows estimated time dummies from a regression using transaction-level data on imports from China in which the dependent variable is a dummy variable for transactions invoiced in RMB and including time dummies and firm × HS8 product fixed effects. The regression is estimated separately for non-differentiated and differentiated products based on Rauch (1999)'s classification.

Table 15: RMB invoicing for imports from China: Variance decomposition

	R-squared
Panel A: Imports from China	
HS8 product fixed effects	0.301
Firm fixed effects	0.857
Panel B: Imports from the rest of the world	
HS8 product fixed effects	0.355
Source country fixed effects	0.245
Firm fixed effects	0.848

Notes: This table reports the R-squared from a linear regression of a dummy variable equal to one for transactions invoiced in RMB on various sets of fixed effects. Panel A corresponds to imports from China and the number of observations is 109,268. Panel B corresponds to imports from the rest of the world and the number of observations is 406,259. The data is for September 2023, which corresponds to the peak of RMB use.

Table 16: Probability of RMB invoicing for import transactions from the rest of the world: The role of swap agreements with China

	(1)	(2)	(3)	(4)	(5)	(6)
Swap	0.003	-0.004	0.000	-0.000	0.005	-0.004
	(0.005)	(0.006)	(0.001)	(0.001)	(0.007)	(0.008)
(log) GDP					-0.001	-0.003
					(0.001)	(0.002)
(log) GDP per cap.					-0.011	-0.004
					(0.009)	(0.008)
(log) Distance to Arg.					0.010***	0.003
					(0.004)	(0.003)
HS8 F.E.	Yes	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	No
HS8 × firm F.E.	No	No	No	Yes	No	No
Region F.E.	No	Yes	No	No	No	Yes
Year-month F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,037,003	6,810,423	7,034,044	6,922,185	6,710,190	6,710,190

Notes: ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level.

Table 17: Probability of RMB invoicing for import transactions from the rest of the world: The role of swap agreements with China

	(1)	(2)	(3)	(4)	(5)	(6)
Swap	0.020	-0.027	-0.006	-0.007	0.054*	-0.017
	(0.036)	(0.038)	(0.007)	(0.007)	(0.029)	(0.039)
(log) GDP					-0.011	-0.027*
					(0.012)	(0.014)
(log) GDP per cap.					-0.079**	-0.028
					(0.039)	(0.030)
(log) Distance to Arg.					0.086***	0.039*
					(0.019)	(0.021)
HS8 F.E.	Yes	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	No
HS8 × firm F.E.	No	No	No	Yes	No	No
Region F.E.	No	Yes	No	No	No	Yes
Year–Month F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	512,035	470,952	511,755	500,812	464,631	464,631

Notes: ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level.

Table 18: Probability of RMB invoicing for import transactions from the rest of the world: The role of swap agreements with China

	(1)	(2)	(3)	(4)	(5)	(6)
Swap	0.021	-0.025	-0.006	-0.005	0.069**	-0.009
	(0.038)	(0.040)	(0.008)	(0.007)	(0.028)	(0.041)
(log) GDP					-0.009	-0.026
					(0.015)	(0.016)
(log) GDP per cap.					-0.095**	-0.038
					(0.046)	(0.035)
(log) Distance to Arg.					0.100***	0.045*
					(0.025)	(0.024)
HS8 F.E.	Yes	Yes	Yes	No	Yes	Yes
Firm F.E.	No	No	Yes	No	No	No
HS8 × firm F.E.	No	No	No	Yes	No	No
Region F.E.	No	Yes	No	No	No	Yes
Year–Month F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	282,058	257,504	281,877	275,978	256,057	256,057

Notes: ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level.

Table 19: Probability of RMB invoicing for imports from China: Firm-level determinants

	(1)	(2)	(3)	(4)	(5)
(log) firm size (total imports)	0.043***	0.034***	0.040***	0.047***	0.053***
	(0.008)	(0.008)	(0.007)	(0.009)	(0.011)
Exporter	-0.112***		-0.131***	-0.138***	
	(0.028)		(0.028)	(0.030)	
Exporter to China		0.046	0.109**	0.084*	
		(0.060)	(0.055)	(0.050)	
ICBC relationship				0.101***	
				(0.024)	
USD loan share				-0.506**	
				(0.252)	
(log) total exports					-0.015***
					(0.004)
Share exports to China					0.270***
					(0.083)
HS8 F.E.	Yes	Yes	Yes	Yes	Yes
Year-month F.E.	Yes	Yes	Yes	Yes	Yes
Observations	1528438	1528438	1528438	1103584	712624

Notes: This table reports the results of the estimation of equation (3). Each observation corresponds to an import transaction from China. The dependent variable is equal to one for transactions invoiced in RMB and zero otherwise. In all columns the sample consists of transactions between January 2023 and June 2024. Standard errors are clustered by firm and HS8 product using multiway clustering. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level.