The Financial Channel of Tax Amnesty Policies

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Abstract

In the past two decades, over 30 countries have implemented tax amnesty policies to encourage the declaration and repatriation of hidden assets, with the goal of increasing government tax revenues. While previous literature has primarily focused on the fiscal impact, this paper studies a new channel: the potential expansion of the financial sector resulting from these policies. We examine the macroeconomic effects of Argentina's 2016 Tax Amnesty, one of the largest programs for disclosing hidden assets, through the *financial channel*. This amnesty led to an influx of savings into domestic banks, primarily in dollars, equivalent to 1.4% of GDP. We leverage the heterogeneous exposure of banks and firms to this amnesty-induced financial shock to identify bank responses and the spillovers to firms in the private sector. We find that more exposed banks significantly increased their lending compared to less exposed ones. Firms connected to banks with higher exposure experienced increased borrowing, along with a boost in imports, exports and employment. Our findings reveal that tax amnesty policies can stimulate economic growth by expanding the financial sector, demonstrating effects beyond their direct fiscal impact. These results are particularly relevant for countries with underdeveloped financial systems, where the potential for growth through improved access to capital is significant.

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1 Introduction

The size and depth of a country's financial system is crucial for fostering innovation, facilitating international trade, and supporting economic development. However, a large portion of domestic savings are concealed in offshore accounts or kept informally outside the banking system to evade taxes (Alstadsæter et al. (2018)). This practice not only reduces governments' tax revenues but also limits the potential development of the financial sector.[1] In response, tax amnesty policies have become increasingly popular policy tools in both developed and developing countries. These policies are designed to encourage the declaration and repatriation of hidden assets in exchange for reduced penalties. Since 2005, more than 30 countries implemented a tax amnesty policy. Notable examples, each revealing assets exceeding $50 billion, include those implemented in Brazil (2016), Italy (2009), Argentina (2016), and Indonesia (2009).

Recent literature has focused on the fiscal channel of tax amnesties, examining asset disclosure and its direct impact on governments' ability to raise current and future taxes. However, a key aspect has been overlooked: the potential of tax amnesty policies to expand the economy through the financial system. By channeling hidden assets into domestic banks, these policies can stimulate economic growth by increasing the supply of bank credit. We refer to this mechanism as the *financial channel* of tax amnesty policies. Despite its potential significance, particularly for economies with underdeveloped financial systems, there is currently no existing evidence on this channel.

This paper studies the *financial channel* of tax amnesty policies, focusing on Argentina's 2016 Tax Amnesty, one of the largest programs in history for disclosing hidden assets. The 2016 Tax Amnesty resulted in an influx of savings equivalent to 1.4% of GDP into domestic banks, with practically all of these savings being dollar-denominated. We leverage the heterogeneous exposure of domestic banks to the influx of tax amnesty dollars together with variation in the exposure of firms to these banks to identify bank and firms' responses to the amnesty-induced financial shock. Our findings show that domestic banks increased their credit supply in response to the shock, leading to positive effects on firms' financial and real performance, particularly in terms of borrowing, access to dollar credit, imports, exports, and employment. Our results suggest that the potential gains of tax amnesties through the financial system can be large, especially in underdeveloped credit markets. Additionally, we show that because the tax amnesty shock acted as a shift to the supply of dollars relative to peso credit, it provides a good opportunity to study how firms substitute debt in different currencies. We find evidence of at least weak substitution and considerable heterogeneity across firms. Our estimates have implications for understanding the real effects of relative fluctuations in domestic versus foreign currency funding at both the aggregate level and across different types of firms.

The Argentinian experience provides an ideal opportunity to study the *financial channel* of tax

[1] Alstadsæter et al. (2018) documents that approximately 10% of global GDP is held in tax havens, a figure that would likely be higher if it included cash holdings concealed outside the banking system, such as cash at home or in security boxes.

amnesty policies for several reasons. First, the policy achieved notable success, revealing assets totaling 21% of Argentina's GDP[2]. The policy allowed citizens concealing assets from the tax authority to disclose them for a small penalty to compensate for past tax evasion. Importantly, the policy included incentives to deposit disclosed holdings in bank accounts abroad into domestic banks. As a result, over 20% of all disclosed bank holdings were deposited into domestic banks, an amount equivalent to 1.4% of GDP[3]. Second, most of the repatriated savings were denominated in US dollars. In this sense, the tax amnesty shock resembles an unusual form of reverse capital flight, offering a unique opportunity to study the impact of foreign currency inflows on the domestic financial system. This includes analyzing changes in bank and firm financial behavior as well as firms' participation in international markets. Third, Argentina is a middle-income economy with an underdeveloped financial system and limited access to credit markets, making it an ideal candidate to benefit from expanding its financial sector. At the time of the shock, domestic bank credit to the private sector was only 13% of GDP, significantly below the average of 40% for Latin American countries.

Studying the financial channel of tax amnesty policies has been challenging because it is hard to combine policy variation with comprehensive data. To address this challenge, we combine firm-to-bank data from the Credit Registry of the Central Bank of Argentina with firm-level employment data from the tax authority and firm-level imports and export data from customs records. Our dataset includes the universe of firm-to-bank credit transactions, the currency composition of firm-level credit, bank balance sheets, and firm-level outcomes. A key feature of our data is that it details the amount of dollar deposits that each bank received due to the tax amnesty. This level of detail is usually unavailable to researchers and is accessible in Argentina because regulatory mandates required tax amnesty funds to be deposited into designated special bank accounts.

Our empirical analysis is structured around four steps. First, we assess the effectiveness of the tax amnesty policy in inducing citizens to deposit concealed cash holdings into domestic banks. Second, we analyze how banks responded to the inflow of tax amnesty dollars. Third, we investigate firm-level borrowing responses as well as the effect of the shock on firms' currency choices. Finally, we examine the real effects of the tax amnesty policy, focusing on how it affected firms' performance in labor and international markets.

We start by documenting the significant and unprecedented inflow of dollars into the Argentine banking system due to the tax amnesty. In a two-month window, dollar deposits in domestic banks increased by 50%, while pesos deposits remained largely unaffected by the policy. Furthermore, we show that there was considerable variation in how tax amnesty dollars flowed into banks. Banks with a higher proportion of dollar deposits in their liabilities prior to the amnesty experienced stronger inflows of dollar funds. While the median bank's deposits rose by 2% of their total private

[2]This figure includes both real (e.g. residential properties, businesses, vehicles, art, etc.) and financial (e.g. cash, bank accounts abroad, equity holdings, etc.) assets.

[3]Cash and bank account holdings accounted for 30% of total disclosed assets, making them the second most significant asset category. The first asset category in terms of disclosed values was portfolio investments.

sector deposits, some banks experienced increases over 13%, and others saw no additional deposits.

We study the response of bank lending by leveraging this variation in bank exposure to the tax amnesty. We measure bank-level exposure as the ratio of dollar deposits received during the tax amnesty to the bank's total deposits. Importantly, we show that, across exposure levels, banks were balanced in terms of both observable characteristics and pre-amnesty lending trends. To identify the effect of the tax amnesty on bank lending, we employ the within-firm approach popularized by Khwaja and Mian (2008) that leverages variation in exposure across different banks lending to the same firm. By exploiting solely within-firm variation, our estimation strategy effectively controls for any potential correlation between firm-specific credit demand shocks and the distribution of bank exposure. We find that bank exposure resulted in a relative increase in lending. On average, banks in the 75th percentile of exposure granted 11% more credit relative to those in the 25th percentile. This effect is more pronounced for credit granted to exporters, which are the firms that typically rely more on dollar-denominated debt.

Next, we study the impact of the tax amnesty on the financial and real performance of firms. For identification, we leverage the fact that not all firms were equally exposed to the increase in credit supply since they were borrowing from different banks before the tax amnesty. We construct firm-level exposure as a weighted average of bank exposure, where the weights correspond to the share of debt with each bank prior to the tax amnesty. The intuition is that there is some rigidity in firm-bank relationships, so a firm is more exposed to shock if it is already connected to those banks that receive more dollars. Our identifying assumption is that in the absence of the tax amnesty, firms connected to high-exposure banks would have followed a similar trend to firms not connected to them. We provide evidence supporting this by showing that the pre-trends between more exposed and less exposed firms are not significantly different prior to the tax amnesty. In addition, we restrict our comparisons to firms with heterogeneous exposure levels within narrowly defined industries and with the same international trade participation statuses. This approach helps to control for potential confounding effects from any post-amnesty shock that might differentially affect exposed and non-exposed firms due to their pre-existing characteristics.

We first test whether the positive effects observed in the *within-firm* analysis extend to firms' total borrowing, as it is possible that firms were mainly substituting existing debt across banks. Our findings provide evidence against such substitution. More exposed firms experienced greater credit growth compared to less exposed ones. Our estimates are of similar magnitude to those from the within-firm analysis, which we interpret as evidence of a strong firm borrowing channel rather than a reallocation of existing borrowing to more exposed banks. Specifically, we estimate that an average firm at the 75th percentile of exposure experienced a 9.7% increase in credit relative to a firm at the 25th percentile of exposure. Consistent with our within-firm results, we also find stronger effects among differentially exposed exporters, with the impact of the tax amnesty being more than twice as large as that observed for the average firm.

Next, we evaluate the performance of the dollar credit market in response to the tax amnesty

shock, which improved banks' capacity to issue dollar-denominated credit. In emerging economies, the availability of foreign currency credit, particularly in dollars, matters for firm performance. Fluctuations in dollar credit availability have been shown to lead to reduced firm investment (Kalemli-Ozcan et al. (2016),Elias (2021)), diminished export dynamism (Paravisini et al. (2015b)), and weaker employment growth (Hardy (2023)). Thus, it is important to assess how tax amnesties, when they channel foreign-currency savings towards domestic banks, contribute to smoothing and deepening access to dollar credit. Given that few firms held dollar debt at the beginning of the sample, our analysis focuses on the extensive margin, examining how changes in foreign currency funding impact firms' participation in this credit market. Our results indicate that firms more exposed to the tax amnesty were significantly more likely to borrow in dollars. Specifically, firms at the 75th percentile of exposure had a 3 percentage point higher probability of borrowing in dollars compared to those at the 25th percentile, representing a 10% increase relative to the unconditional probability of holding dollar debt at the start of the sample.

Next, we examine how the tax amnesty influenced the currency composition of firms' borrowing, shifting our focus from credit growth outcomes to the currency choices made by borrowing firms. Understanding the elasticity of substitution between peso- and dollar-denominated debt is crucial for assessing the real and aggregate consequences of fluctuations in dollar credit availability, particularly in emerging economies. Our study provides a causal estimate of this parameter by leveraging the currency-specific nature of the shock. We argue that the amnesty created a shift in the supply of dollar-denominated loans without affecting peso loans, offering a promising quasi-experimental setting to explore this substitution elasticity. We discuss how the institutional regulations of the financial system are essential for this supply shifter to work as proposed and conduct tests that show no differential movements in pesos lending rates between more and less exposed banks. We estimate this elasticity of substitution using firm-level exposure to the tax amnesty as an instrument for dollar credit growth. We find that peso- and dollar-denominated credit are at least weakly substitutable, with elasticity estimates close to -0.7 for the average firm, and not different from -1 at the 10% significance level. However, for exporting firms, the substitution is weaker, with elasticity estimates about half those of the average firm. At a two-year horizon, we cannot reject an elasticity of 0 at the 10% level. While understanding the drivers of this heterogeneity is beyond the scope of our paper, our results suggest a role for differences in productive processes and tasks in shaping firms debt portfolio decisions. We believe that investigating what shapes this heterogeneity is a promising research avenue, as it can provide insights into how these differences might affect aggregate outcomes when dollar credit fluctuates.

Lastly, we investigate how increased access to credit affected firm imports, exports, wages, and employment. Our findings suggest that credit access significantly enhances firm performance across these dimensions. Firms with greater exposure to credit were able to increase their importing activities, invest more in capital goods, and expand their exports. This demonstrates the critical role of credit in facilitating firm growth and improving their market reach. Additionally, these firms

experienced a rise in employment, indicating that credit access supports operational expansion and contributes to job creation.

More specifically, firms with increased credit access saw a significant increase in total imports, particularly in intermediates and capital goods, highlighting a direct influence on firm investment. Exports also grew significantly, with firms in the lowest export quantile experiencing a 4.04 percentage point increase for every percentage point of exposure. Overall, employment among more exposed firms rose by approximately 2 %, reflecting the ability of these firms to hire more workers and expand their operations. However, the impact on wages was not significant, suggesting that the increased labor demand was met by a relatively elastic labor supply, preventing substantial wage increases. These results emphasize the benefits of credit access for firms, contributing to their overall resilience and economic performance.

These results suggest that tax amnesty policies can expand a country's financial sector, increase access to credit, and foster firm growth in both domestic and international markets by incentivizing the flow of private savings into domestic banks. Policymakers gain two key insights: first, tax amnesty policies have benefits beyond raising government revenue; second, these policies should be designed to not only encourage asset disclosure but also actively promote the deposit of cash holdings into domestic banks. This is important as some tax amnesty laws only include incentives for disclosure and lack these incentives.

Related Literature This paper contributes to four strands of the literature.

First, the paper relates to recent literature that studies the consequences of tax amnesties. These papers focus on and the fiscal impact of these policies, such as government tax revenues, and public spending, as seen in studies such as Londoño-Vélez and Tortarolo (2022), Langenmayr (2017), and Lejour et al. (2022), Gil et al. (2023). For example, Londoño-Vélez and Tortarolo (2022) studies the same policy in Argentina and document that the tax amnesty resulted in a progressive improvement in tax compliance, increased government revenue, and expanded social transfers. Instead of focusing on the fiscal impacts of tax amnesties on government revenue, our project is the first to analyze the consequences of another key feature of tax amnesties: the repatriation of foreign assets into domestic banks. We show that tax amnesties incentivize repatriation of assets into domestic banks. Banks more exposed to the dollar influx increase their credit supply. As a result of the increased access to credit, the performance of firms connected to those banks improve. On this ground, our paper indicates that tax amnesties have the potential to affect growth through banks and the private sector, beyond there effects on government tax revenues and spending.

This project also contributes to the literature in macroeconomics that identifies the economic effects of credit supply shocks by isolating the bank lending channel. Papers in this strand include Amiti and Weinstein (2011); Chodorow-Reich (2014); Federico et al. (2023); Herreño (2020); Kashyap and Stein (2000); Khwaja and Mian (2008); Mora (2013); Paravisini (2008); Schnabl (2012); Villacorta et al. (2023), among others. We contribute to this literature by uncovering a

new dimension to understand the bank lending channel: the currency of the credit supply shock. Specifically, we exploit the regulatory framework of the tax amnesty policy in Argentina to identify a credit supply shock that was induced by an inflow of deposits in foreign currency and study the lending decisions of the banks after the shock, both in pesos and dollars.

Third, this paper relates to the literature on financial development, credit constraints, and firms' performance (Caggese and Cuñat (2013); Chor and Manova (2012); Federico et al. (2023); Kohn et al. (2016, 2023); Leibovici (2021); Levchenko et al. (2010); Manova (2008, 2012); Paravisini et al. (2015a,b)). While most of these studies focus on the role of access to credit in facilitating exporting, our paper extends the analysis to the causal impact on importing. In this context, Kohn et al. (2023) empirically document that financially underdeveloped economies exhibit a slower aggregate response following trade liberalization, attributing this to credit constraints affecting importing possibilities. Additionally, Muûls (2015) documents the relationship between importing and access to credit. We contribute to this literature in two dimensions. First, we combine exposure of banks to the tax amnesty with firm-to-bank data to empirically estimate the causal effect of credit availability, especially in dollars, on firms' importing activities and investment in imported capital. Second, most of these papers do not have access to data on the currency denomination of the credit. We are able to study how access to dollar credit differentially affects firms' participation in international markets.

Finally, the paper is also related to the literature exploring the drivers of firms' foreign currency debt choices in emerging economies (such as Allayannis et al. (2003); Brown et al. (2011, 2014); Calvo (2002); Degryse et al. (2012); Galindo et al. (2003); Hardy (2018); Kamil (2012)). The richness of our data and the regulatory environment of the tax amnesty provides an ideal scenario to show novel patterns about the relationship between dollars and pesos debt. In addition, the dollar-specific shock to banks allow us to identify the firm borrowing elasticity between pesos and dollar debt.

The rest of the paper is structured as follows. Section 2 discusses the role of tax amnesty policies and the specifics of the Argentinian experience. Section 3 describes the main sources of information used for the empirical analysis. Section 4 outlines the empirical approach and presents our main findings. Lastly, section 5 concludes.

2 Tax Amnesties and Argentina's Experience

In this section we define tax amnesty policies and describe Argentina's experience.

Tax Amnesties A tax amnesty, as defined by Le Borgne and Baer (2008), is a limited-time offer by the government allowing taxpayers to settle their tax liabilities for a defined amount, often including a reduction or forgiveness of interest and penalties. This settlement pertains to previous tax periods and grants taxpayers freedom from legal prosecution related to the disclosed tax

liabilities. Le Borgne and Baer (2008) highlight three goals of these programs: (1) raise government revenue quickly, (2) increase future tax compliance, and (3) incentivize asset repatriation of flight capital for reasons that go beyond immediate revenue and tax compliance motives. However, the literature has mainly focused on the first two objectives, neglecting the potential impacts of asset repatriations. In this project we focus on a broader definition of the third objective which includes funds that flow into domestic banks both from (a) bank accounts outside of the country, and (b) cash holdings in the country, but kept informally outside the banking system (e.g: money under the mattress or in bank vaults).[4]

Tax amnesty programs are increasingly used by governments as policy tools, a trend expected to grow due to enhanced measures against cross-border tax evasion, making these programs more likely to succeed.[5] In the past twenty years, over 40 countries have launched tax amnesty programs with varying levels of success. Notable examples of succesful tax amnesty programs include Brazil (2016) with $50 billion disclosed, Chile (2015) with $18.7 billions, Italy (2009) with $102 billion, Indonesia (2016) with $346 billion, Argentina (2016) with $116 billion, Pakistan with $21 billion, and the United Kingdom (2019) with $685 billion. Regarding asset repatriation, some of these programs included incentives for repatriation, while others did not. Unfortunately, data on the exact amount of repatriated cash holdings for most of the programs is typically not available.

Argentina's Tax Amnesty In July 2016, Argentina passed a tax amnesty law which allowed citizens that had been concealing assets from the tax authority to disclose them and pay a small penalty for their past tax evasion. The tax amnesty was part of a broader government effort to achieve budget balance. The policy was instrumental to this goal because it had the immediate effect of increasing tax revenue through the collection of one-time penalties and an effect on future expected tax revenues by increasing the tax base.

Argentina's 2016 tax amnesty stands out as one of the largest tax amnesties of the world. The amount of assets disclosed was equivalent to 19% of GDP and it implied a doubling of the wealth tax base. Londoño-Vélez et al. (2022) provide a detailed analysis of the fiscal side of this episode. Below we provide details on the aspects that are relevant to the present study.

Citizens could disclose any kind of asset subject to wealth taxes, regardless of the geographical location where this were held (*i.e.* Argentina or abroad). Concretely, the type of assets disclosed included: stocks, portfolio investments, residential property, cars, foreign currency checking accounts and foreign currency cash holdings, among others. A large portion of these assets was held abroad,in particular, foreign currency checking accounts, housing and other financial investments. Foreign currency cash holdings were mostly held either at peoples home or in bank vaults, therefore, outside of the domestic financial system.

[4]Although cash holdings kept informally within the country are already domestically located, their effects for the purpose of the project are similar to the effects of repatriated cash holdings that were kept outside of the country.

[5]Examples of such measures include the US Foreign Account Tax Compliance Act (FATCA) and the global Common Reporting Standard (CRS) for the automatic exchange of financial account data.

In this paper we are interested in the specifics of disclosing and repatriation of currency holdings, either kept in bank accounts abroad or at home. Importantly, citizens who chose to declare holdings in bank accounts abroad were given the option to keep those funds abroad or repatriate them to a domestic bank. The latter option was subject to a smaller penalty to incentivize asset repatriation. On the other hand, foreign currency cash holdings (i.e. US dollars stored at home or in bank vaults) could only be disclosed by making a deposit at a domestic bank. Lastly, the time window to deposit cash holdings or repatriate funds from a foreign bank account into the domestic financial system was from August 2016 to December 2016.

Citizens that opted to declare cash or repatriate foreign currency had to open a special foreign currency bank account at a bank of their choice to deposit the money. This is convenient because it allows us to observe the exact amount of dollars that entered the bank system because of the tax amnesty. We will refer to the specially created bank accounts as *Tax Amnesty Accounts*. Additionally, they were required to park declared funds in those same accounts for six months[6]. The amount of foreign currency deposits (mostly, US dollars) that flowed into domestic banks was equivalent to 1.4% of GDP and implied almost a doubling of the stock of private dollar deposits in domestic banks. This occurred within a very short window of around three months as most funds were effectively declared between October 2016 and December 2016. This inflow of, mostly dollar, deposits into domestic banks is what we refer to as the tax amnesty shock throughout the paper.[7]

Figure 1a shows the aggregate stock of dollar deposits held in *Tax Amnesty Accounts*. The inflow of tax amnesty funds was concentrated in the last quarter of 2016 even though the tax amnesty window opened in August 2016. After the 6-month parking period, depositors could transfer their holdings to their standard dollar checking accounts which explains the gradual decline in deposits in Figure 1a. Figure 1b contextualizes the relevance of the tax amnesty shock. It plots the evolution of total private sector dollar deposits. Tax amnesty funds explain over 80% of the increase in dollar deposits during the last semester of 2016.

Institutional Background The tax amnesty resulted in an increase in dollar deposits at domestic banks. Pesos deposits were largely unaffected by the policy given that a large portion of household's savings is denominated in dollars for historical and institutional reasons. Therefore, the policy under analysis increased bank funding by raising its dollar liabilities. Two features of the institutional and regulatory arrangement of Argentina's financial system are key to understanding how domestic banks can intermediate these funds and will, thus, guide our empirical exercise. We briefly outline them below.

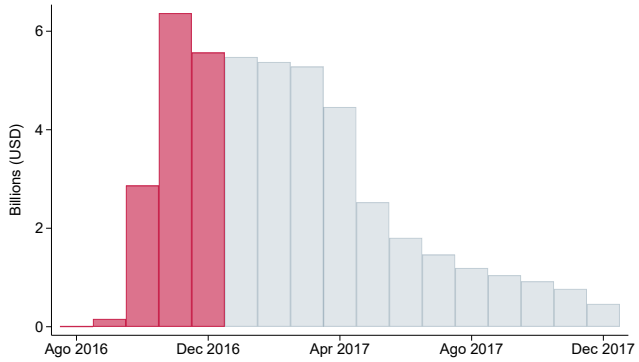
The first of these features is that banks are subject to strict regulations in terms of currency-risk exposure, which prevents banks from using these dollar funds to finance positions in pesos, at

[6]There were a number of exceptions to the parking requirement. For example, the requirement could be lifted if the funds were applied to purchase government debt securities

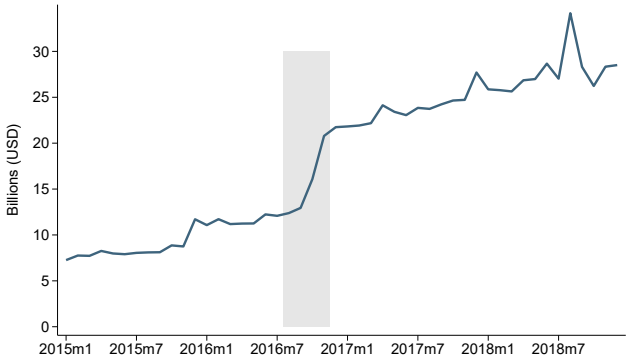
[7]Note that this excludes from the analysis any foreign currency holdings at bank accounts abroad that citizens did not choose to repatriate.

Figure 1: Tracking Tax Amnesty Dollars

(a) Deposits in *Special Accounts*



(b) Dollar Deposits



Data are in billions of US dollars. Panel (a) shows the evolution of dollar deposits in the specially created bank accounts. The red bars correspond to the months of the tax amnesty window. Each bar corresponds to the aggregate stock of dollar deposits at the end of each month. After the 6-month parking period, funds gradually flow out of the special accounts into traditional dollar checking accounts. Panel (b) shows the evolution of dollar deposits held by the private sector. The shaded region corresponds to the tax amnesty window.

least on a large scale basis. It precludes a scenario in which the inflow of dollar deposits *directly* triggers an expansion in pesos lending. Similarly, currency mismatch regulations restrict the use of pesos funding to finance dollar positions. In sum, these regulations create a close link between dollar deposits and a bank's ability to extend dollar credit. This link becomes even more relevant when we take into account the relative underdevelopment of domestic dollar equity markets, future markets and bank-level regulations in terms of exposure to dollar-denominated sovereign debt. The lack of alternative dollar assets in which to take position reinforces the link mentioned above.

Secondly, only a subset of domestic firms are allowed to borrow in dollars from domestic banks. The main recipients of dollar credit are exporters. These firms take up an average of 70% of dollar credit to private non-financial firms during the time period under analysis[8]. In addition to them, a few other firms are allowed to borrow in dollars from domestic banks, namely: firms that regularly supply exporters, firms importing capital goods, firms with securities backed by foreign banks or firms investing abroad. This regulation makes it likely that if banks responded to the increase in dollar funds by extending more dollar credit, then the most likely recipients of such expansion are exporting firms. Put together, these two regulations create strong incentives for banks to intermediate the increase in dollar funding by extending dollar credit. The latter, in turn, can only be granted to a reduced subset of firms comprised mainly by exporting firms.

[8]This participation is even higher if we restrict the analysis to properly productive dollar-denominated credit lines (i.e. excluding mainly corporate credit card spending abroad).

3 Data

We combine four datasets: i) bank-level balance sheet data obtained from the Central Bank of Argentina (BCRA); ii) firm-level data on exports and imports from the Argentinian Customs Office; iii) firm-to-bank data on domestic credit compiled by the Central Bank of Argentina (BCRA); and iv) administrative records on firm-level employment and average wages from the Social Security Office (ANSES). All datasets are collected at monthly frequency and cover the years from 2014 to 2018.

We employ bank-level balance sheets to recover information on banks' assets, liabilities, core capital, and profits. We complement balance sheets with bank-level performance indicators (e.g. leverage ratios, return on assets and average interest rates) which are published by the Central Bank. Importantly, the balance sheet registers the amount of dollar deposits that each bank received during the tax amnesty. Banks were required to inform the outstanding stock of deposits in the checking accounts which were specially created for the tax amnesty. Section 4 provides more detail on how we employ this information to construct the exposure of banks to the tax amnesty shock. We restrict the analysis to banking institutions that had a participation in total deposits of at least 0.05% during our sample period. This leaves us with 28 domestic banks that take up over 97% of aggregate deposits.

We use Credit Registry data to obtain firm-level credit indicators. We employ two datasets within the Credit Registry. Our primary source of information contains detailed firm-bank level data on monthly total outstanding loans. This dataset covers all private non-financial firms that have debt with domestic banks between 2014 and 2018. We complement this information with a second dataset that started being recorded in August 2015. This additional dataset contains disaggregated information on the currency composition of firm-level debt. For each firm we observe the level of pesos and dollar debt over time. We drop firms for which total credit never exceeds 50 US dollars and winsorize the top and bottom 1% of observations to limit the influence of outliers.

Lastly, we gather information from several sources to obtain a comprehensive picture of the consequences of the tax amnesty on firms real performance. We use comprehensive customs data encompassing the universe of firm-level exports and imports transactions. This dataset covers the period from 2014 to 2018. It provides monthly information on the value (in US dollars) of exports and imports for each firm, categorized by country (origin/destination) and product at the 6-digit level. We link this dataset to fiscal files generated by the Fiscal Administration of Public Revenue (AFIP) using unique firm identifiers to enrich our analysis. This allows us to obtain additional information on formal employment, average wages, and firms' main sector of activity. Consequently, we are able to construct firm-level measures of employment, exports, imports, and payroll for the years spanning from 2014 to 2018.

4 Empirical Approach

4.1 Bank and Firm Exposure

Bank-level Exposure The balance sheet of domestic banks records the stock of deposits held in the special accounts created during the tax amnesty. For each bank b, we compute the average deposits reported in these special accounts between October 2016 and December 2016. We refer to this object as the *tax amnesty funds* received by bank b. Next, we compute the ratio between this object and total private sector deposits (i.e. both pesos and dollar denominated deposits) of bank b in the quarter preceding the tax amnesty. Formally,

$$S_b = \frac{Tax\ Amnesty\ Funds_b}{D_{b,0}^{Total}} \times 100 \tag{1}$$

where $D_{b,0}^{Total}$ are average total deposits in 2016q2. S_b measures the importance of the inflow of dollar funds relative to the existing liquidity of each bank. Average bank exposure was 10% with a standard deviation of 10 p.p.. For the most exposed banks, the liquidity shock accounted for close to 20% of their previous deposit liabilities.

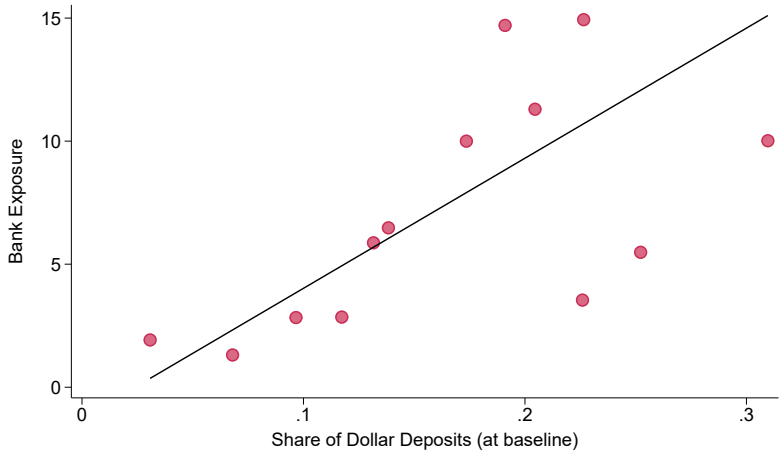
We find that variation in bank exposure correlates well with the share of dollar deposits that a bank had before the tax amnesty. In particular, banks that had higher shares of dollar deposits, which we denote with $s_{b,pre}^{usd}$, received more tax amnesty funds, measured as a share of their total deposits. The most likely explanation for this is that citizens were more likely to deposit their funds on banks where they already had an existing dollar checking account. Figure 2 shows a binscatter plot of bank exposure against the share (%) of dollar deposits before the shock. The advantage of our bank exposure measure, relative to $s_{b,pre}^{usd}$, is that it directly captures the increase in loanable funds attributable to the tax amnesty. For this reason, we employ S_b as our preferred measure of bank-level exposure to the shock.

While our primary identification strategy relies on a difference-in-differences approach, which does not require similar baseline characteristics, we examine the presence of systematic differences across banks with different levels of exposure. We conduct a balance test, wherein we regress a comprehensive set of baseline individual bank characteristics against bank's exposure to the tax amnesty program. We measure baseline characteristics X_{b0} as the yearly average for the year before the tax amnesty and weight regressions according to each bank's share in total lending to firms. Formally, we run the following regressions:

$$X_{b0} = \alpha_0 + \alpha_1 S_b + \epsilon_b$$

where X_{b0} includes characteristics such as public ownership, share of business lending, leverage, liquidity, bank size, and loans to assets ratio, among others. Figure 3 plots estimates for α_1. Reassuringly, banks are balanced across almost all characteristics considered. This suggests that

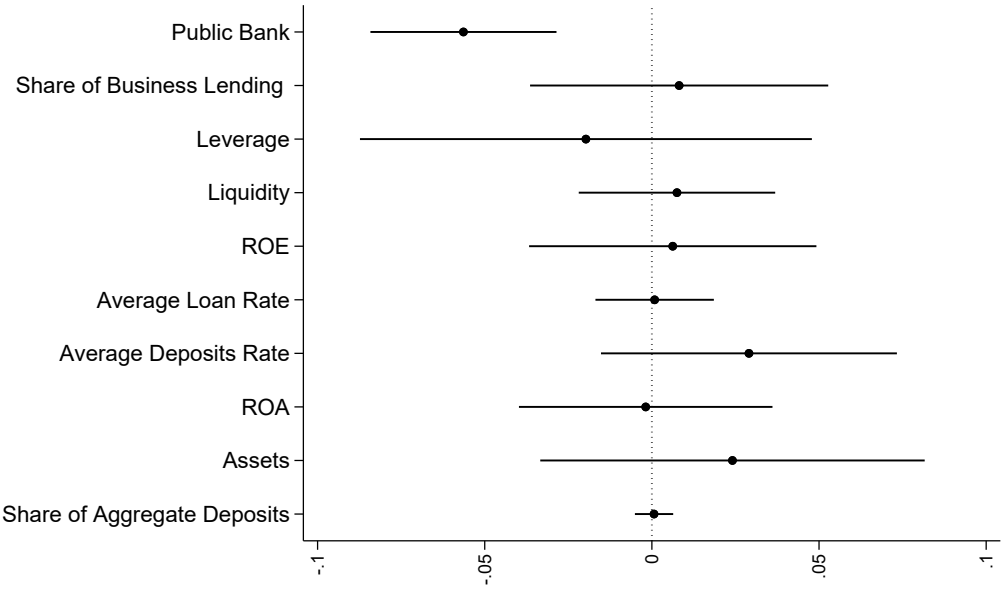
Figure 2: Bank Exposure and Dollar Deposit Share



The share of dollar deposits in the $x - axis$ is the average share for $2016Q2$.

the inflow of dollars after the tax amnesty was not targeted to specific banks. The exception is public ownership which is negatively correlated with bank exposure. Later on, we control for public ownership interacted with time in all our specifications.

Figure 3: Banks Characteristics - Balance Test



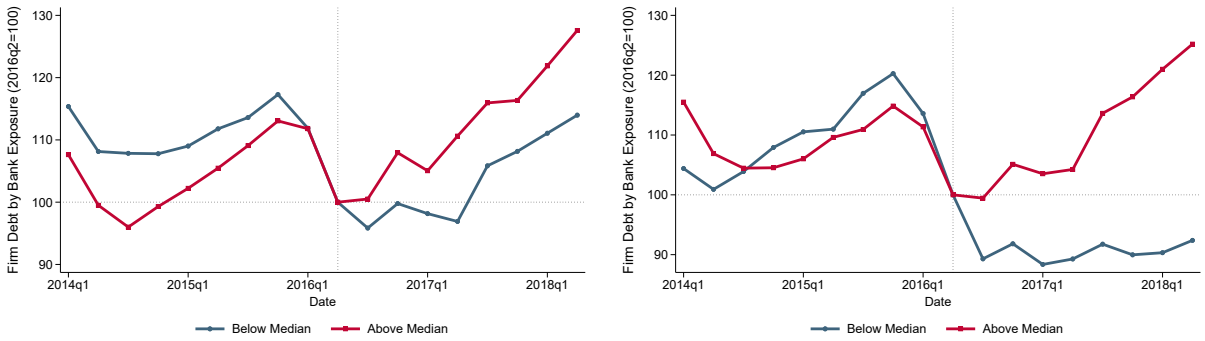
We report 95% confidence bands. Bank characteristics are averages of the year before the tax amnesty. All variables were standardized with the exception of the participation of each bank in aggregate deposits (our *proxy* for bank size). Regressions are weighted by the share of each bank in total private sector lending. *Public Bank*: $= 1$ if bank is publicly owned. *Share of Business Lending*: weight of lending to firms in total lending. *Leverage*: assets over equity. *Liquidity*: ratio of liquid assets over total assets. *ROE*: return on equity. *Average Loan Rate*: average interest rate on local currency loans. *Average Deposit Rate*: average interest rate on local currency deposits. *ROA*: return on assets. *Assets*: total assets. *Share of Aggregate Deposits*: participation of each bank in aggregate deposits.

As a first pass, we use our raw data to evaluate whether banks with different levels of exposure

to the tax amnesty performed differently in terms of total lending to private non-financial firms. Figure 4 compares lending of banks below and above median exposure. In Panel (a) we plot the evolution of total lending[9] for each bank group, taking the quarter before the start of the amnesty as base period. Importantly, both groups of banks seem to be experiencing similar debt dynamics during the two years preceding the tax amnesty, indicating that even in the raw data we do not observe pre-trends.In addition, during the *post* amnesty period we observe that more exposed banks lent more than less exposed ones. These dynamics illustrate that the tax amnesty shock is capturing some differential access to loanable funds by banks during this period. To strengthen this point we restrict the sample to firms that were borrowing from banks *both* above and below median exposure in 2016Q2 and we compute how their debt with each of these banks evolved. Panel (b) of Figure 4 shows the results. Importantly, since every firm in this sample appears in both the red and blue lines it follows that the higher debt growth for banks with higher exposure cannot be attributed to changes in individual firms' credit demand.

We will revisit these results in greater detail in Section 4.2, where we conduct a formal analysis of the bank lending channel.

Figure 4: Above *vs* Below Median Bank Exposure
Total Credit



(a) Across Banks (b) Within Firms & Across Banks

In Panel (a) firm level debt is added up for each exposure quantile. Panel (b) restricts the sample to firms that had debt with banks both above and below median exposure in $2016Q2$. We construct the evolution of their real debt from each of these group of banks. In other words, firms appear in both the red and blue lines. In both cases the base period is $2016q2$ and total credit is expressed in Dec-2016 constant pesos.

Firm-level Exposure We measure firm-level exposure as:

$$S_i = \sum_b \omega_{ib}^{Start} S_b$$

where S_i is firm's i exposure to the tax amnesty shock and ω_{ib}^{Start} is the weight of bank b on firm's i total borrowing at the start of the amnesty. The exposure of firm i is a weighted average of

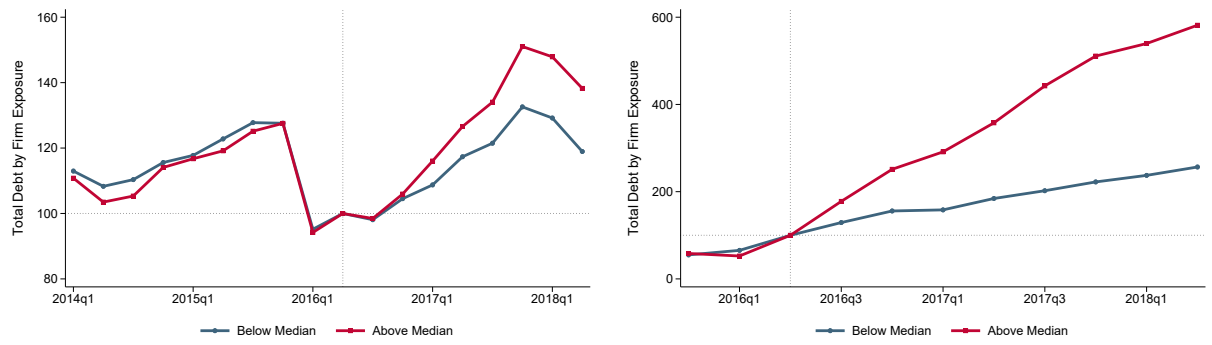
[9]Nominal values are deflated using the CPI.

the exposure of the banks from which firm i was borrowing from at the onset of the tax amnesty. We argue that the fact that different firms are connected to banks with different degrees of exposure provides a source of plausibly exogenous variation in the credit supply faced by individual firms.

As an initial overview of the results, which we will present in a more detailed in section 4.3, Figure 5 provides an insight into the debt dynamics of firms with different levels of exposure over time, as observed in the raw data. The left-hand side panel shows the evolution of total credit for firms with exposure below and above median. The right-hand side shows the evolution of dollar debt. We express both total and dollar debt in current US dollars to facilitate comparison. We observe that high exposure firms outperformed their low exposure counterparts in terms of total debt growth and, particularly, dollar debt growth. It is important to highlight that our analysis of the raw data reveals no significant pre-trends, which is the first indicative evidence supporting the assumption of parallel trends.

We will revisit these results in Section 4.3 when we analyze the impact of the tax amnesty on firm credit outcomes.

Figure 5: Below *vs.* Above Median Firm Exposure



(a) Total Debt (in US Dollars)

(b) Dollar Debt (in US Dollars)

Panel (a) shows the evolution of total debt, expressed in current US dollars, for firms below and above median exposure. The period covered is $2014Q1 - 2018Q2$. Panel (b) plots the evolution of dollar debt, expressed in current US dollars, for each group of firms. Panel (b) covers the period $2015Q4 - 2018Q2$ for which dis-aggregated data by firm-currency is available.

4.2 Bank Lending Channel

We first study for the presence of a bank lending channel in response to the funding shock experienced by domestic banks. We want to test whether following the liquidity shock, banks that were more exposed to it increase their lending relatively more. For identification, we follow the *within-firm* approach proposed by Khwaja and Mian (2008). Assume there are only two time periods $t = 0, 1$, before and after the tax amnesty shock. Then, we can express the the level of debt of firm

i with bank b in period t as:

$$Y_{ib0} = \alpha_{i0} + \nu_{ib0} + \Gamma \mathbb{X}_{b0} + \epsilon_{ib0} \tag{2}$$

$$Y_{ib1} = \alpha_{i1} + \nu_{ib1} + \Gamma \mathbb{X}_{b1} + \beta S_b + \epsilon_{ib1} \tag{3}$$

The realization of Y_{ibt} depends on a number of objects. First, α_{it} captures firm-time credit demand shocks that a firm spreads homogeneously across all its lenders. Second, ν_{ibt} are firm credit demand shocks specific to a certain bank-firm relationship. For example, a firm that needs a type of credit line which is offered only by a specific bank. $\mathbb{X}_{bt}$ captures all other bank-specific liquidity shocks except for the tax amnesty shock. Finally, S_b is our measure of bank-level exposure to the tax amnesty shock and ϵ_{ibt} is an idiosyncratic shock. Taking first differences yields

$$\Delta Y_{ib} = \Delta \alpha_i + \Delta \nu_{ib} + \Gamma \Delta \mathbb{X}_b + \beta S_b + \tilde{e}_{ib} \tag{4}$$

We are interested in estimating β, which captures the marginal effect of an increase in the exposure of bank b on its lending to firm i. β has a causal interpretation under the condition that bank exposure is uncorrelated with other factors that affect changes in credit demand and bank liquidity. We take equation 4 to the data as follows:

$$\log L_{ibt} = \alpha_{it} + \nu_{ib} + \beta \; S_b \times Post + \Gamma \mathbb{X}_{b,pre} \times Post + e_{ibt} \tag{5}$$

In order to make *within-firm* comparisons we restrict the analysis to multi-bank firms. This allows us to incorporate firm-time fixed effects, α_{it}, which absorb time-varying firm-specific credit demand shocks that firms spread equally across all their lenders. We also include *firm-bank* fixed effects to control for aspects specific to each firm-bank match. *Post* is a dummy equal to one after the start of the tax amnesty. Lastly, we incorporate as bank-level controls a set of bank characteristics, measured at the quarter prior to the shock, and we interact them with our *Post* dummy. Based on the balance tests from Section 4.1, we include bank ownership status (private vs. public) and bank size as controls in our preferred specification.

Our parameter of interest, β, is identified under two assumptions. First, it must be that firm-bank credit demand shocks that vary over time aren't systematically correlated with bank exposure. Formally, $E[S_b \nu_{ibt}] = 0$. Second, any remaining bank-level credit supply shocks not accounted for by our bank controls should be uncorrelated with bank exposure to the tax amnesty shock. Under these two assumptions, β measures the marginal effect of bank exposure on credit supply to firm i.

Table 1 presents our results. Points estimates measure the percent increase in lending to firm i by bank b for every p.p. increase in bank exposure. Results in column (1) include only firm-time fixed effects. Column (2) adds bank-firm fixed effects and bank ownership controls. Our preferred specification, in column (3), adds bank size controls. Comparing between banks in the 75^{th} *versus* 25^{th} percentile of exposure, we find an increase in lending of 10.7% .

In column (4) we allow for the effect of exposure to differ across exporters and non-exporters, where the exporting status of a firm is defined at baseline. Exporters are arguably the main recipients of dollar bank credit and we would expect a higher impact on credit supplied to them. The coefficient on the interaction term is positive and statistically significant. If we compare between banks in the 75^{th} *versus* 25^{th} percentile of exposure, we find an increase in lending to the *same* exporting firm of 18.4%. The same comparison for non-exporting firms yields a 7% increase in lending. Overall, we find evidence of a bank lending channel in response to the tax amnesty shock. Banks that were more exposed to the tax amnesty granted more credit relative to their less exposed counterparts. The effect was heterogeneous across lending to different types of firms. The impact on exporters was larger and more than double than that on non-exporters.

Table 1: Bank Lending Channel

	(1)	(2)	(3)	(4)
Bank Exposure × Post	0.21**	1.17***	1.07***	0.71***
	(0.097)	(0.125)	(0.130)	(0.141)
... × Exporter				1.13***
				(0.395)
N	1655983	1655981	1655981	1655981
Firm-Time FE	Yes	Yes	Yes	Yes
Bank-Firm FE	No	Yes	Yes	Yes
Public Bank-Time FE	No	Yes	Yes	Yes
Bank Size - Time FE	No	No	Yes	Yes
R-squared	0.61	0.87	0.87	0.87

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses and clustered at the bank-firm level. Point estimates measure the percent increase in L_{ibt} for every $1p.p.$ increase in bank exposure, S_b. *Post* is equal to one between $(2016Q3, 2018Q2)$. The sample consists of all firms that have debt with two or more banks. We winsorize the top and bottom 1% of observations to limit the influence of outliers. Bank size is measured as the participation of each bank in total deposits at baseline and public bank is an indicator for a bank being publicly owned.

4.3 Firm-level Outcomes

In the previous section we established that firms borrowed relatively more from banks that were more exposed to the tax amnesty shock. But, did this relative shift towards more exposed banks result in more total borrowing by firms? Or did firms simply reallocate their debt portfolio towards more exposed banks? This section tackles this question which is in turn key to understanding the potential effects of the tax amnesty shock on firms real performance. We begin by outlining our estimation strategy.

For the remainder of this section, we will be interested in measuring the effect that firm-level exposure, S_i, had on a series of firm-level outcomes Y_{it} that allow us to characterize the consequences for firms (e.g. total debt, imports, etc.). For simplicity, suppose there were only two periods $t = 0, 1$

which correspond to before and after the tax amnesty, respectively. We can think of outcome Y_{it} as follows:

$$Y_{i0} = \alpha_i + \eta_{i0} + \Gamma \mathbb{X}_{b(i)0} + \epsilon_{i0}$$
$$Y_{i1} = \alpha_i + \eta_{i1} + \Gamma \mathbb{X}_{b(i)1} + \beta_2 S_i + \epsilon_{i1}$$

The realization of outcome Y_i in period $t = 0$ is the result of (i) a time-invariant firm shifter, α_i; (ii) a time-varying firm-level shifter, η_{i0}; (iii) a credit supply shifter, $\mathbb{X}_{b(i)0}$, coming from the banks from which firm i sources its debt (other than the tax amnesty); plus, (iv) an idiosyncratic component ϵ_{i0}. In period $t = 1$, we add the credit supply shock stemming from the tax amnesty, S_i. Taking first differences yields:

$$\Delta Y_i = \Delta \eta_i + \beta_2 S_i + \Gamma \Delta \mathbb{X}_{b(i)} + \tilde{e} \tag{6}$$

Our main object of interest is β_2. It captures the causal effect of firm exposure on outcome Y_i. To identify β_2 two conditions need to be satisfied. First, there should be no systematic correlation between changes in firm-level shifters and firm exposure to the shock. Formally, we need $E[\Delta \eta_i S_i] = 0$. For example, if Y_{it} is firm-level credit, then credit demand shocks hitting specific firms over time should be unrelated to their exposure to the shock through banks. The second condition speaks to the correlation between firm exposure and, what can be thought of as, all other liquidity shocks hitting the banks from which firm i borrows. Formally, we need $E[\mathbb{X}_{b(i),t} S_i] = 0$. This would be challenged if more exposed banks were also more likely to be hit by other funding shocks than less exposed banks over time.

We take Equation 6 to the data using the following difference-in-difference specification:

$$\log Y_{it} = \beta_2 \; S_i \times Post + \Gamma \mathbb{X}_{b(i)} \times Post + \gamma_i + \gamma_{jt} + e_t \tag{7}$$

where the dependent variable is the logarithm of the outcome of interest (unless otherwise noted) in period t, *Post* is a dummy equal to 1 after the start of the tax amnesty, $\mathbb{X}_{b(i)}$ is a vector of firm-level weighted average bank controls, γ_i are firm fixed effects and γ_{jt} capture industry-time fixed effects. Firm-level bank controls are computed as weighted averages of baseline bank characteristics, where the weight is the share of each bank b in firms i debt at baseline. We study the time period between 2014-2018. The frequency of analysis is either quarterly or annual, depending on the outcome variable.

We address the concern that firm exposure could potentially be correlated with time-changing firm-level shifters by adding time-industry fixed effects. These take care of any trends in firm-level shifters that are shared within narrowly defined industries (6-digit level). While our balance tests show no substantial differences in observable characteristics across banks with different levels of exposure, we take a conservative stance and include the same two bank controls as in our *within-*

firm regressions and interact them with the *Post* dummy. These bank controls are ownership status (privately or publicly owned bank) and bank size which we measure as a bank's participation in total deposits.

Lastly, we estimate the event-study analogue of Equation 7 to check for pre-trends and study the dynamic impact of the shock. Our baseline dynamic difference-in-difference specification is:

$$\log Y_{it} = \sum_{s \in (\pm h)} \Big(\beta_s S_i + \Gamma_s \mathbb{X}_{b(i)} \Big) \times \mathbb{1}(t = s) + \gamma_i + \gamma_{jt} + e_{it} \tag{8}$$

where $\mathbb{1}(t = s)$ are quarterly or yearly time dummies and h is the horizon of analysis (e.g. eight quarters before and after the shock). The coefficient β_s measures the s-period cumulative effect of firm exposure on outcome Y. Absence of pre-trends requires $\hat{\beta}_s = 0 \ \ \forall \ \ s \leq 0$.

Below we present our main findings that characterize how the tax amnesty affected the real economy through affecting firm credit, imports, exports and labor demand.

4.3.1 Firm Borrowing

In this section we explore the impact of the tax amnesty shock on credit growth and credit access through three different avenues. First, we study whether the positive effects identified in the within-firm regression extend to the overall borrowing behavior of firms. This aims to determine if firms that were more exposed to the shock experienced higher credit growth - a mechanism often referred to as the *firm borrowing channel*. Second, we evaluate the performance of the dollar credit market, as the tax amnesty shock significantly enhanced banks' capacity to issue dollar-denominated credit. The well-functioning of foreign-currency, in particular dollars, credit markets has been pointed out as an important driver of firm performance, specially in emerging economies. Thus, we evaluate the tax amnesty's effectiveness in broadening and deepening the domestic market for dollar credit. Finally, we examine how the tax amnesty influenced the currency composition of firms' borrowing, shifting our focus from aggregate credit growth to the currency choices made by borrowing firms. By leveraging the currency-specific nature of the shock, we estimate the elasticity of substitution between peso- and dollar-denominated debt at the firm level. To our knowledge, this paper provides the first causal estimate of this parameter.

Total Credit Table 2 shows the results from running specification (7) with total firm credit as dependent variable. We employ quarterly data for single and multi-bank firms[10], winsorize the dependent variable at the 1% level and cluster standard errors at the firm level. Reported coefficients measure the percent increase in total credit for every additional percentage point in firm exposure. For reference, the standard deviation of firm exposure is 10 percentage points.

[10]The *bank-lending* regressions restrict the sample to multi-bank firms and pre-existing bank relations. Firm-level regressions consider both single and multi-bank firms, plus all credit available to the firm at each point of time. Thus, total credit incorporates both pre-existing bank relations and newly formed ones.

Column (1) only includes firm fixed effects and column (2) adds (6-digit)industry-time fixed effects. Both specifications show positive and statistically significant results. Column (3) shows the results from our preferred specification which includes firm fixed effects, (6-digit) industry-time fixed effects and the firm-level bank controls mentioned in the preceding section. For the average firm, the effect of an additional percentage point in exposure is .97%. Comparing across firms in the 75^{th} *versus* 25^{th} percentiles of exposure, our estimates imply an increase of 9.7% in total credit. The magnitude of this effect is almost the same as the one we found for the *within-firm* exercise. We interpret this finding as evidence that exposure to the tax amnesty shock primarily influenced total firm credit, rather than reallocating existing borrowing across differentially exposed banks. In column (4) we add an interaction term with a firm's exporting status. We find that the effect of exposure was stronger among exporting firms which is consistent with our *within-firm* findings. Comparing between exporters in the 75^{th} *versus* 25^{th} percentiles of exposure, we find an increase of 30% in total credit.

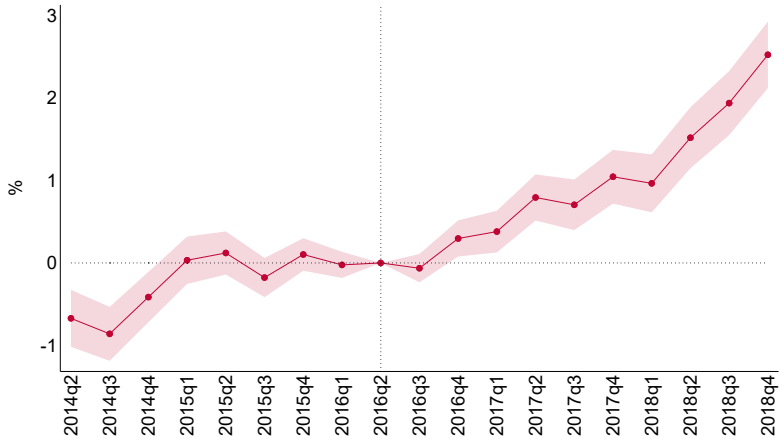
Table 2: Firm Borrowing - Total Credit

	(1)	(2)	(3)	(4)
Firm Exposure × Post	1.39***	1.21***	0.97***	0.86***
	(0.093)	(0.105)	(0.141)	(0.144)
... × Exporter				2.17***
				(0.613)
N	1362654	1355733	1355733	1358139
Firm FE	Yes	Yes	Yes	Yes
Industry-Time FE	No	Yes	Yes	Yes
Public Bank-Time FE	No	No	Yes	Yes
Bank Size - Time FE	No	No	Yes	Yes
Number of Firms	75879	75494	75494	75628
R-squared	0.85	0.85	0.85	0.85

Standard errors in parentheses and clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. (6-digit) Industry-time fixed effects are allowed to differ across exporters and non-exporters. Bank size and bank ownership controls are firm-level averages. Nominal variables are winsorized at the top and bottom 1% to limit the influence of outliers. The time period spans between $2014Q2 - 2018Q2$ and the frequency of the data is quarterly. *Post* indicates the period $(2016q3, 2018q2)$. Point estimates measure the percent increase in total credit for every percentage point of firm exposure. The standard deviation of firm exposure is 10 percentage points. In column 4, the exporting status of a firm is defined at baseline.

We complement the above results by estimating the dynamic difference-in-difference specification outlined in equation (8). We set the base period to 2016q2 which corresponds to the quarter preceding the launch of the tax amnesty. The event study plot in Figure 6 shows no significant evidence of pre-trends for at least a year and a half prior to the shock. The plot shows that the positive effects of firm exposure build gradually over time with a peak effect of around 2% at the 2-year horizon. To summarize, the above results establish that firms that were more exposed to the tax amnesty shock, due to their pre-existing bank relations, experienced higher credit growth.

Figure 6: Total Credit



We report 95% confidence intervals. Standard errors are clustered at the firm level. We include firm fixed effects, (6-digit) industry-time fixed effects and firm level averages of bank size and bank ownership interacted with time dummies as additional controls. The base period corresponds to 2016q2. Nominal variables are winsorized at the top and bottom 1% to limit the influence of outliers. The plot shows the estimated coefficients on firm exposure for each quarter. Point estimates measure the percentage increase in total debt for every 1 percentage point increase in firm exposure relative to baseline. The standard deviation of firm exposure is 10 percentage points.

Access to Dollar Credit Markets The tax amnesty led to an increase in the foreign currency liquidity of banks, thus, potentially allowing them to grant more dollar credit to domestic borrowers. The role of access to foreign currency credit markets for firm performance has received significant attention in corporate finance and international economics literature, particularly following the freezing of international markets during the Great Recession. Fluctuations in dollar credit availability are linked to reduced firm investment (e.g. Kalemli-Ozcan et al. (2016),Elias (2021)), diminished export dynamism (e.g. Paravisini et al. (2015b)), and weaker employment growth performance (e.g. Hardy (2023)). The tax amnesty shock resembles the opposite of a reversal in international capital flows, providing a unique opportunity to study how changes in foreign currency funding affect firms' participation in foreign-currency credit markets.

To examine the impact of the tax amnesty on firms' access to domestic dollar-denominated credit, we leverage that our dataset includes the loan's currency denomination from 2015q4 onwards. The currency denomination of a bank liquidity shock theoretically increases loanable funds in both foreign and domestic currencies. However, due to currency mismatch regulations, domestic banks are restricted in how they can utilize dollar-denominated liabilities. Specifically, they must match dollar liabilities with dollar assets. This requirement creates a direct link between the currency denomination of the shock and the supply of dollar credit. In addition, access to domestic dollar credit is restricted to firms whose revenues are, at least partially, linked to the evolution of the dollar exchange rate. These firms are primarily exporters, suppliers of exporters, or producers of

highly tradable goods whose prices are set internationally. At the beginning of 2016, 27% of firms in our sample had some amount of dollar-denominated bank credit. This percentage drops to 13% when considering only firms with an outstanding balance of at least 500[11] and increases to 50% when conditioned on the firm being an exporter and/or importer. Regarding the distribution of dollar credit, exporting firms held around 80% of total dollar credit at the start of the sample, while exporters and importers combined accounted for nearly 90%. Appendix D provides further details on the distribution of domestic dollar credit before and after the tax amnesty.

As pointed out above, a small number of firms had dollar debt before the tax amnesty which restricts the power of intensive margin analysis. For this reason, we focus our analysis on the extensive margin effects of the tax amnesty. This allows us to study changes in access to dollar credit for a larger sample of firms. We define two outcomes related to the ability of firms to borrow in dollars. First, we construct an indicator variable that equals one if firm i has positive dollar credit in period t, and zero otherwise. This variable allows us to estimate the effect of the tax amnesty on the probability of having access to dollar credit for the average firm. Second, we construct an indicator equal to one in every quarter in which firm i experienced an increase in dollar credit, and zero otherwise. This outcome variable allows us to study a combination of intensive and extensive margin results without dropping firms with zero outstanding balances, giving a more general picture of the response of dollar credit growth for the average firm.

Table 3 summarizes our results. Columns (1) and (2) use the probability of having dollar credit as the dependent variable. Our results indicate that firm exposure had a positive and significant effect on this probability. Our preferred specification in column (2) finds that an additional percentage point of exposure increased it by .3 percentage points. Comparing between firms in the 75^{th} *versus* 25^{th} percentiles of exposure, we find an increase of 3 percentage points in the probability of borrowing in dollars. This represents a 10% increase relative to the unconditional probability of holding dollar debt at the start of the sample. In columns (3) and (4) we show results for our dollar credit growth indicator. We estimate that an additional percentage point of exposure increased the probability of dollar credit growth by .22 percentage points. Comparing between firms in the 75^{th} *versus* 25^{th} percentiles of exposure, this is an increase of 2.2 percentage points in our outcome variable.

[11] This restriction excludes firms that use, for example, credit cards abroad, etc.

Table 3: Access to Dollar Credit Market

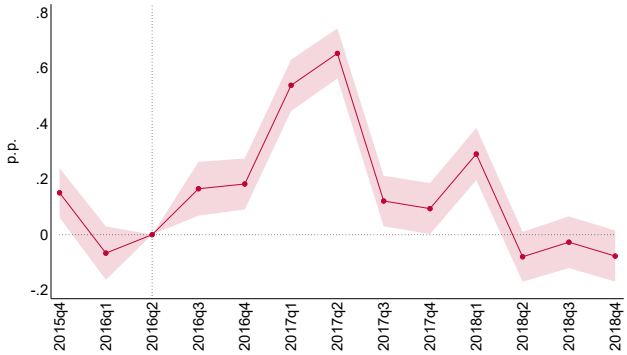
	(1) Dollar Debt	(2) Dollar Debt	(3) Dollar Debt Growth	(4) Dollar Debt Growth
Firm Exposure × Post	0.13***	0.31***	0.09***	0.22***
	(0.021)	(0.028)	(0.017)	(0.023)
N	832009	832009	832009	832009
Firm FE	Yes	Yes	Yes	Yes
Industry-Time FE	Yes	Yes	Yes	Yes
Public Bank-Time FE	No	Yes	No	Yes
Bank Size - Time FE	No	Yes	No	Yes
Number of Firms	75649	75649	75649	75649
R-squared	0.65	0.65	0.34	0.34

Standard errors in parentheses and clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. (6-digit) Industry-time fixed effects are allowed to differ across exporters and non-exporters. Bank size and bank ownership controls are firm-level averages. The time period spans between $2015Q4 - 2018Q2$. *Post* indicates the period $(2016q3, 2018q2)$. Point estimates measure the *p.p.* increase in the dependent variable for every 1 *p.p.* of firm exposure.

Figure 7: Access of Dollar Credit Market

(a) Probability of Having Dollar Credit

(b) Probability of Dollar Credit Growth



We report 95% confidence intervals. Standard errors are clustered at the firm level. Point estimates measure the p.p. increase in the likelihood of having (a) dollar credit and (b) an increase in dollar debt for every 1 p.p. increase in firm exposure.

Firm-level Currency Choices Next, we study how the tax amnesty shock affected the currency choices made by borrowing firms. Specifically, we exploit the currency-specific nature of the shock plus institutional features of Argentina's financial system to provide a causal estimate of firms' elasticity of substitution between pesos and dollar-denominated loans. Let κ_i denote this firm-level elasticity:

$$\kappa_i = \frac{\partial \ln \ell_i^{Pesos}}{\partial \ln \ell_i^*} \tag{9}$$

where the subscript i identifies a firm and a variable with the superscript $*$ denotes a dollar-denominated quantity.

Emerging markets are recurrently subject to fluctuations in the availability and access to foreign-currency credit markets. For instance, the global financial cycle is well-documented in papers such as Obstfeld and Zhou (2022), Bruno and Shin (2023), Rey (2014), Miranda-Agrippino and Rey (2022), Boyarchenko and Elias (2024), among others. The real and aggregate effects of relative fluctuations in domestic versus foreign currency funding will partly depend on firms' ability to substitute one source of funds for the other. If both types of financing serve the same purposes or can be used to finance the same types of activities, then we would expect peso and dollar credit to act as substitutes for each other. However, different forms of financing may be better suited for different productive tasks based on the maturity of the project, the source of revenues, etc. This can lead to complementarities between both types of currencies, thereby limiting the ability of firms to hedge against fluctuations in dollar credit by turning to peso markets. While there is little evidence on how these dynamic portfolio choices take place, knowledge of the substitution parameter is crucial for comprehending the aggregate effects of fluctuations in the availability of foreign currency debt.

In order to identify κ_i in expression 9, we need an exogenous shift in the supply schedule of dollar-denominated loans that leaves the supply schedule of peso-denominated loans unchanged. We think that the tax amnesty shock provides a good quasi-experimental setting for this type of supply shifter. Concretely, this is equivalent to saying that domestic banks responded to the inflow of dollar funding mostly by increasing their willingness to supply dollar loans. The regulatory requirements that were in place at the time of the shock tightly limited domestic banks' on and off-balance sheet currency exposure. In practice, this imposes a restriction on the type of positions that could be funded via the inflow of tax amnesty dollars. Therefore, the regulatory framework rules out a scenario in which domestic banks could directly use the increase in dollar liquidity to grant more pesos-denominated credit to firms and households. This brings us closer to the type of supply shifter needed to identify κ. However, there is still the possibility that the increase in dollar funding leads to an *indirect* change in the bank-level supply of pesos credit through other channels. For example, when firms move towards dollar credit they may free-up pesos-denominated lending capacity, which could cause banks to increase the supply of pesos loans and crowd-in firms that cannot access dollar-denominated loans. First, for this mechanism to pose a threat to our identification strategy it should be the case that firms reduce their pesos borrowing with the same bank with which they now borrow more in dollars. Otherwise, if the firm reduces its demand for pesos loans uniformly across its lenders then this would result in an increase in pesos-denominated loan supply at the system-wide level but is not correlated with individual bank-level exposure. Second, this mechanism has the testable implication that more exposed banks should decrease their pesos lending rates by *relatively* more in response to the the shock to accommodate an increase in pesos lending. Additionally, other potential mechanisms that indirectly affect pesos lending decisions at the bank level would generally also manifest in differential price dynamics. In appendix E, we show that bank-level exposure has no detectable effect on the evolution of the average pesos

lending rate[12]. In light of this, we argue that it is plausible to assume that the tax amnesty shock operated mainly as a shifter to the supply schedule of dollar loans and we propose firm-level exposure, S_i, as an instrument for firm-level dollar credit-growth.

Formally, consider the following reduced-form equation linking the evolution of pesos-denominated loans to the evolution of dollar-denominated loans:

$$\Delta \ell^{Pesos}_{i,t,t+h} = \alpha_h + \kappa \Delta \ell^{*}_{i,t,t+h} + \epsilon_{i,t+h} \tag{10}$$

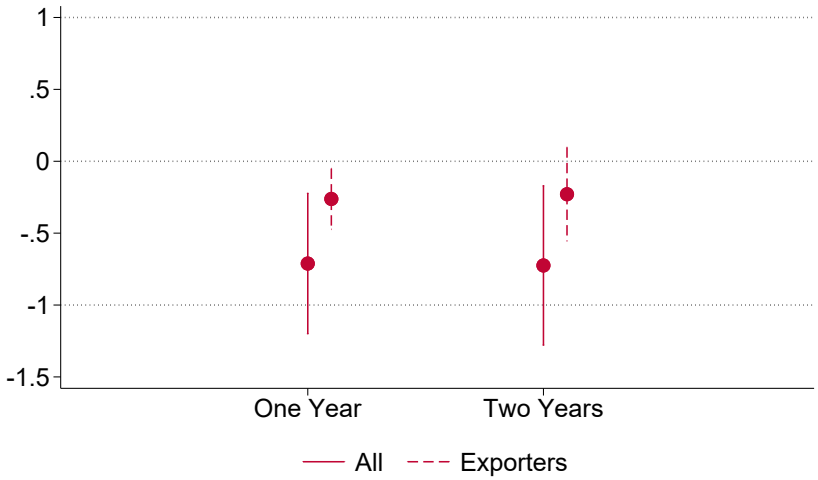
where $\Delta \ell^{Pesos}_{i,t,t+h}$ is the growth rate of pesos debt of firm i between t and $t+h$, and similarly for dollars loans which are denoted by $\ell^{*}_{i,t,t+h}$. The error term, $\epsilon_{i,t+h}$ condenses all other supply and demand factors that affect firm-level demand for pesos credit. We estimate the parameter κ in equation 10 through two-stage least-squares using firm-exposure, S_i, as an instrument for the growth rate of dollar credit between the start of the tax amnesty, $t = 0$, and horizon h. On top of requiring S_i to capture solely a shift in the supply of dollar credit, we require it to be uncorrelated with firm-specific credit demand shocks just as in the previous exercise. Therefore, the exclusion restriction for this specific exercise is stronger than before.

We take the panel-local projection in 10 to the data by including: i) (6-digit) industry fixed effects, ii) firm-weighted bank controls, and (iii) a one-period lag of the dependent variable. Industry fixed effects are a useful proxy for firm-specific credit demand shocks to the extent that this are explained by industry-wide trends. We include the same two firm-weighted bank variables to control for other potential changes in bank-level funding conditions and we lag-augment the local projection (Montiel Olea and Plagborg-Møller (2021), Dube et al. (2023)). All standard errors are clustered at the firm-level.

Figure 8 presents our estimation results. We consider two sets of firms: i) any firm with dollar debt in $t = 0$, ii) exporters with dollar debt in $t = 0$. We present estimates for the elasticity of substitution at the one and two-year horizons for each type of firm. We find evidence in favor of both types of debt being at least weakly substitutes. When considering the broader set of firms our point estimates are close to $-.7$, regardless of the horizon, and we cannot reject that $\kappa = -1$ at the 10% level. Interestingly, we find evidence of weaker substitution among exporting firms, with point estimates that are half of those for all firms. In fact, at the two-year horizon, we cannot reject $\kappa = 0$ at the 10% level. Understanding the factors that drive this heterogeneity is beyond the scope of this paper. However, we think it could suggest that the nature of the productive process influences how easily firms can substitute between funding in different currencies.

[12]We lack information on loan-level interest rates and average bank-level dollar lending rates which is why we have to limit ourselves to studying the evolution of bank-level pesos rates.

Figure 8: Elasticity of Substitution between Pesos and Dollar Debt



We report 90% confidence bands. Standard errors are clustered at the firm level. The solid line corresponds to the sample of all firms holding dollar debt at baseline while the dotted line restricts the sample to exporting firms with dollar debt at baseline. First-stage F-statistics (Kleibergen-Paap rk Wald F statistic) are 8.92 (17.65) and 8.94 (11.19) at the one and two year horizons for all firms (exporters), respectively.

4.3.2 Imports

We examine the impact of of the tax amnesty shock on importing behavior. We hypothesize that better credit access, in particular, to dollar-denominated bank loans, may affect firms' import decisions by reducing borrowing costs and increasing the availability of funds for importing goods. In particular, the bank's liquidity boom can reduce the firm's constraints to access foreign currency, allowing them to reduce their costs by importing intermediate goods and investing in capital goods from abroad. Additionally, access to credit can allow firms to overcome the sunk costs of discovering suppliers in new markets.

To comprehensively understand the impact of access to dollar-denominated loans on a firm's import behavior, we need to explore several different aspects. First, we examine the intensive margin of imports, also distinguishing between the types of goods that are being imported. Secondly, we study the extensive margin, which focuses on the number of products and origins from which the firm imports, as well as, on the probability of importing.

The results of our static difference-in-difference are presented in Table 4 and complemented with a dynamic difference-in-difference estimation, shown in figures 9 and 10. Just as in the analysis of firm credit outcomes we include firm fixed effects, industry-time fixed effects and the same set of firm-level weighted average bank controls. We construct our dependent variables as yearly averages for all import values. We measure the number of imported products as the number of distinct products imported by a firm during each year. The number of origins is computed analogously.

We find that higher firm exposure resulted in an increase in their total imports relative to less exposed firms. If we compare between firms in the 75^{th} *versus* 25^{th} percentile of exposure, we find

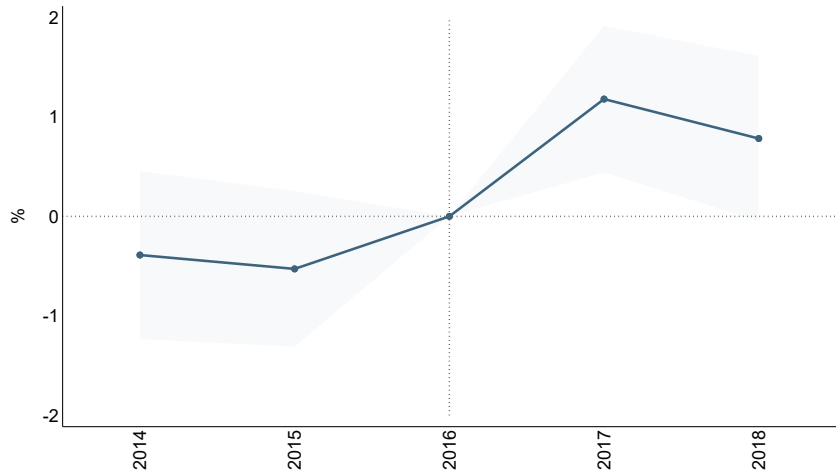
Table 4: Effect on Imports

	(1) Total Imports	(2) Intermediates	(3) Capital Goods	(4) Origins	(5) Products
Firm Exposure × Post	1.27***	1.23***	0.44	0.10	0.11
	(0.315)	(0.357)	(0.488)	(0.088)	(0.142)
N	57079	48875	33023	57079	57079
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes
Public Bank-Year FE	Yes	Yes	Yes	Yes	Yes
Bank Size-Year FE	Yes	Yes	Yes	Yes	Yes
Number of Firms	13489	11850	8660	13489	13489
R-squared	0.81	0.84	0.73	0.88	0.85

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses and clustered at the firm level. Point estimates in columns $1 - 3$ measure the percent increase in the outcome of interest for every 1 *p.p.* increase in firm exposure. Point estimates in columns $4 - 5$ are expressed in *p.p.*. The sample consists of all firms that were importing at the start of the tax amnesty. Nominal variables are winsorized the top and bottom 1% to limit the influence of outliers.

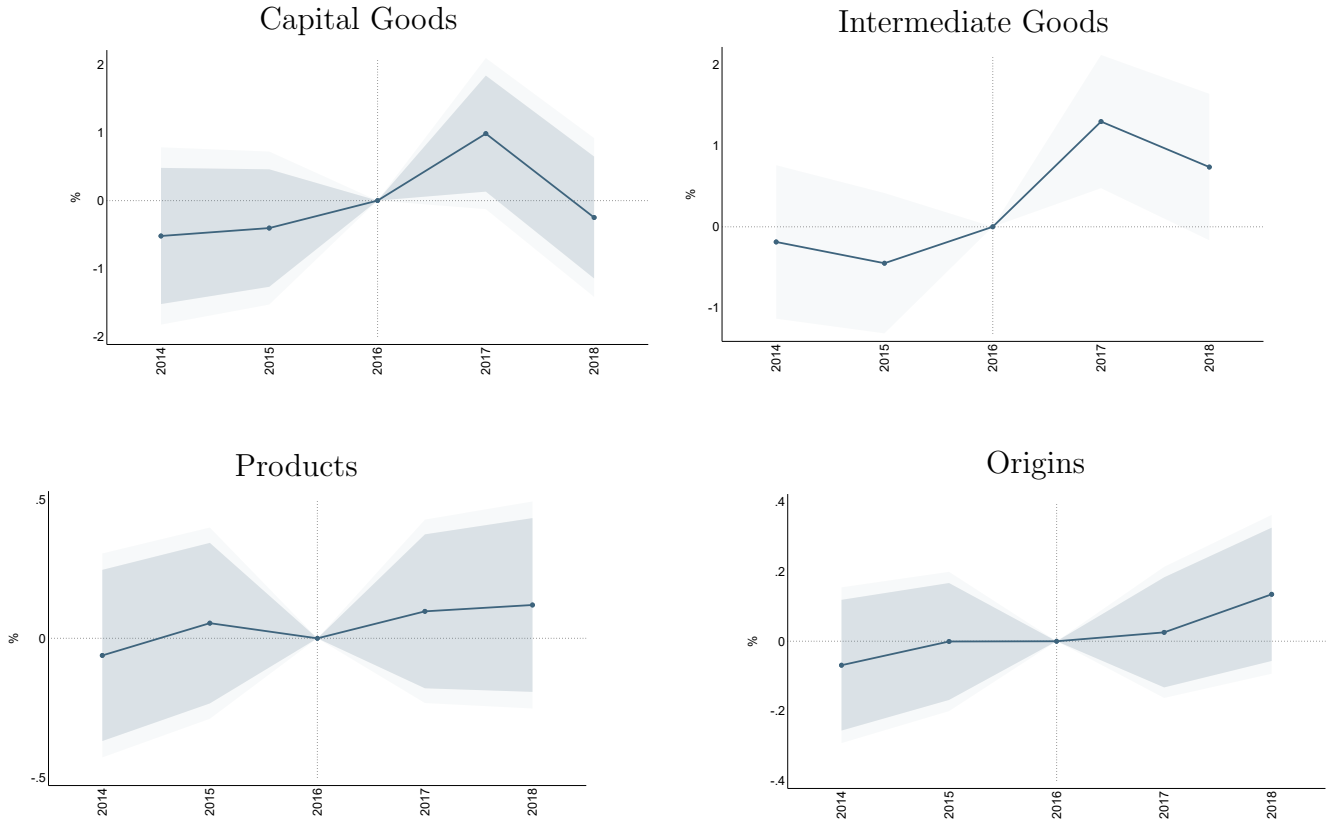
an increase of 12.7% in total imports. We then look at different types of imported products and find evidence of an increase in both intermediate and capital goods, though for the latter the estimation is less precise. While the coefficient on Column (3) is positive but statistically insignificant, we find a positive and significant effect on imported capital goods during the year after the tax amnesty. This relatively short lived expansion is consistent with the lumpiness of investment decisions and suggests that firms utilize newly available dollar-denominated loans to increase their investments in foreign machinery. Lastly, we find no evidence of firm exposure having an impact neither on the number of imported products nor the number of origin countries.

Figure 9: Total Imports



We report 95% confidence intervals. Standard errors are clustered at the firm level. Point estimates measure the percent increase in total imports for every 1 *p.p.* increase in firm exposure. The sample consists of all firms that were importing at the start of the tax amnesty. We winsorize the top and bottom 1% of observations to limit the influence of outliers.

Figure 10: Import Performance



We report 90% and 95% confidence intervals. Standard errors are clustered at the firm level. The plot shows the estimated coefficients on firm exposure for each year. Point estimates measure the percentage increase in the outcome variable for every 1 p.p. increase in firm exposure, with the exception of the extensive margin results which are expressed in p.p.. The sample consists of all firms that were importing at the start of the tax amnesty. Nominal variables are winsorized at the top and bottom 1% to limit the influence of outliers.

4.3.3 Exports

We then study the impact of increased access to credit on export performance. Exporting is known to be a finance-intensive activity and previous studies have shown that easier access to credit is beneficial to export dynamics (Paravisini et al. (2015b), Manova (2008), Manova (2012), among others). We argue that a relaxation of dollar-credit conditions may affect exporting decisions by helping firms overcome borrowing constraints and achieve a better cash flow management. Our main findings are in Table 5 and Figure 11. As in previous exercises, we include firm fixed effects and the same set of firm-level weighted average bank controls. We replace industry-time fixed effects with main exported product (8-digit HS) - time fixed effects to better account for time-varying demand shocks specific to the good being sold. We consider all firms that were exporting before the start of the tax amnesty. Columns (1) through (3) add different sets of fixed effects and controls. Our preferred specification, column (3), shows a positive and significant effect of firm exposure on their total exports. Comparing between firms in the 75^{th} *versus* 25^{th} percentile of exposure, we find an increase of 13.7% in export values.

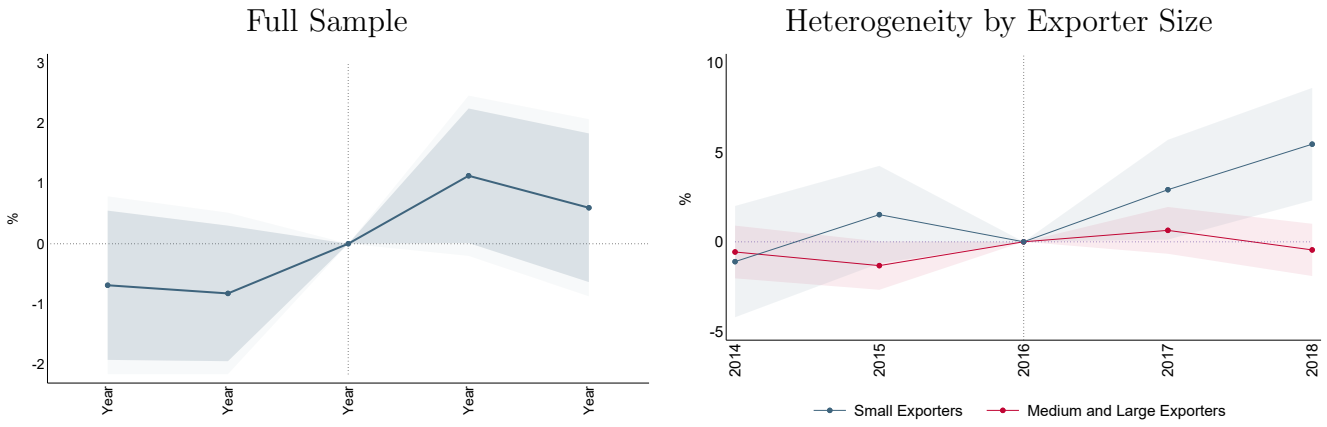
We then study whether the effect of firm exposure was homogeneous across exporters of different size. If the increase in credit supply operates through a relaxation in firm's borrowing constraints, then we should see a greater impact for firms closer to this constraint or with less access to credit markets, in general. To evaluate whether this is the case we estimate the impact of firm exposure for each quartile of the exporting distribution. We report our findings in column (4). Indeed, we find strong evidence that the increase in exports was concentrated among smaller exporters (in terms of their exported values). If we compare between a highly and a low exposed exporter in the bottom quartile of the export distribution, we find an increase of 40% in total exports. The estimated coefficients are positive and smaller for the two middle quartiles but statistically insignificant. Our event study plots complement these findings.

Table 5: Effect on Exports

	(1)	(2)	(3)	(4)
Firm Exposure × Post	0.99**	1.10**	1.37**	
	(0.41)	(0.43)	(0.58)	
... × Exports Quantile = 1				4.04***
				(1.19)
... × Exports Quantile = 2				1.02
				(0.95)
... × Exports Quantile = 3				1.02
				(0.92)
... × Exports Quantile = 4				-0.09
				(0.87)
N	19075	19075	19075	19075
Firm FE	Yes	Yes	Yes	Yes
Product×Year FE	Yes	No	No	No
Product×Year×Importer FE	No	Yes	Yes	Yes
Bank Controls	No	No	Yes	Yes
Number of Firms	4,925	4,925	4,925	4,925
R-squared	0.92	0.92	0.93	0.93

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses and clustered at the firm level. Point estimates measure the percent increase in export values for every 1 p.p. increase in firm exposure. We restrict the sample to all firms that were exporting at the start of the tax amnesty. We winsorize the top and bottom 1% of observations to limit the influence of outliers.

Figure 11: Exports



We report 95% confidence intervals. Standard errors are clustered at the firm level. The plot shows the estimated coefficients on firm exposure for each year. Point estimates measure the percentage increase in export values for every 1 p.p. increase in firm exposure. We restrict the sample to all firms that were exporting at the start of the tax amnesty and winsorize the top and bottom 1% of observations to limit the influence of outliers.

4.3.4 Labor Outcomes

Tax amnesties and inflows of capital have been studied for their potential effects on government revenue and capital flows, but a lesser-known potential outcome is the indirect benefits they may offer to employers and workers of firms connected with banks exposed to these capitals. Through overcoming liquidity constraints, firms are able to increase investment and productivity, which can lead to an increase in the number of employees or wages paid. In other words, the benefits of liquidity shocks stemming from tax amnesties can trickle down to workers. While this effect is often overlooked, we shed light on this potential outcome and provide an analysis of the impact of tax amnesties on labor outcomes.

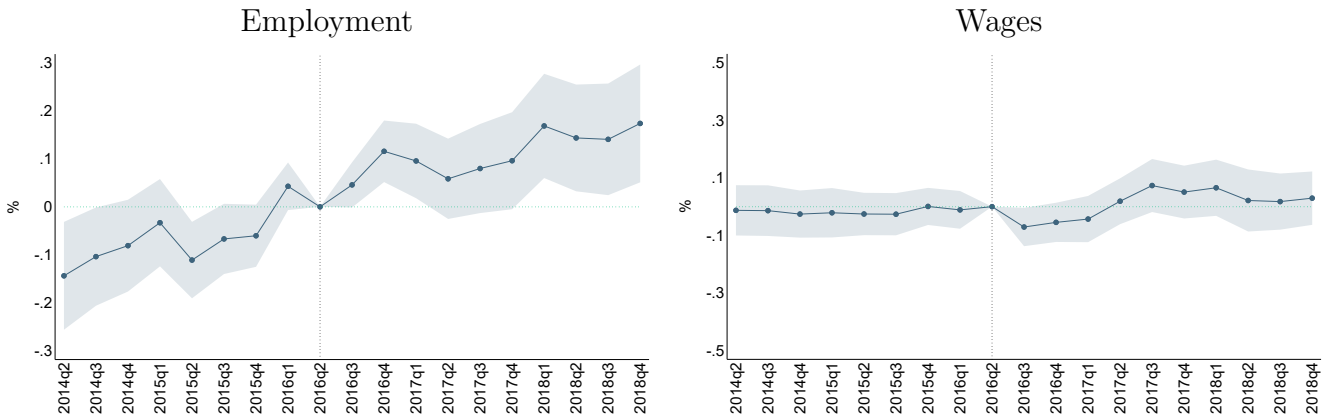
Table 6: Employment and wages

	(1) Employment	(2) Employment	(3) Employment	(4) Wages	(5) Wages	(6) Wages
Firm Exposure × Post	0.20***	0.17***	0.17***	0.01	0.02	0.02
	(0.03)	(0.04)	(0.05)	(0.02)	(0.03)	(0.03)
... × Post			0.08			0.06
			(0.15)			(0.09)
N	1258952	1258952	1258952	1258260	1258260	1258260
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Time-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Public Bank-Time FE	No	Yes	Yes	No	Yes	Yes
Bank Size - Time FE	No	Yes	Yes	No	Yes	Yes
Number of Firms	69828	69828	69828	69812	69812	69812
R-squared	0.96	0.96	0.96	0.85	0.85	0.85

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Standard errors in parentheses and clustered at the firm level. Point estimates measure the percent increase in the outcome of interest for every 1 p.p. increase in firm exposure. Employment refers to the total number of formal employees in each quarter t. Wages refers to the average nominal wage paid by each firm in quarter t. Bank controls include bank size and bank ownership status interacted with the *Post* indicators as in previous regressions.

Table 6 reports the results for our difference-in-difference specification. The first two columns show results on employment without and with bank controls, respectively. The third column incorporates an interaction term for exporting status. Columns (4)-(5) show results for firm-level average wages without and with bank controls, respectively, and column (6) adds an interaction term for exporting status. We find positive and significant effects of firm exposure on employment but no clear effects on average wages. The exporting status terms is not statisticallt significant. Lastly, Figure 12 shows the event study for firms' employment and average wages. Reassuringly, we observe no pre-trends for these firms in the years before the event and a substantial and persistence increase in employment after the tax amnesty. Our findings imply that an average firm in the 75^{th} percentile of exposure experienced an average increase of 2.1% in employment relative to the average firm in the 25^{th} percentile, during the aftermath of the tax amnesty.

Figure 12: Labor Outcomes



We report 95% confidence intervals. Standard errors are clustered at the firm level. The plot shows the estimated coefficients on firm exposure. Point estimates measure the percent increase in employment (wages) for every 1 p.p. increase in firm exposure. Employment is defined as the total number of formal employees in each quarter t. Wages are average formal wages during quarter t.

5 Conclusion

This paper highlights how tax amnesties designed to encourage asset repatriation can promote the expansion of the financial sector, particularly in underdeveloped credit markets. By examining Argentina's 2016 Tax Amnesty, one of the largest programs of its kind, we demonstrate how the flow of hidden assets into domestic banks can lead to increased credit availability. Our analysis shows that banks with greater exposure to these tax amnesty funds expanded their lending capacity, directly improving firms' borrowing opportunities. This access to credit facilitated firm growth, as more exposed firms experienced increased imports, exports and employment. The findings in this paper underscore the dual benefits of tax amnesty policies—not only do they enhance government revenues, but, if adequately design, they can also promote financial sector expansion, thereby supporting broader economic objectives. This is relevant as some tax amnesty laws only include incentives for asset disclosure but lack adequate measures to encourage domestic savings to flow back into the local financial system.

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A Data Cleaning

A.1 Bank Balance Sheet Data

Our initial dataset consisted of raw data from 64 banks operating domestically To ensure the reliability and relevance of our analysis, we applied a series of filters which narrowed down the dataset to a final sample of 46 banks.

We exclude: i) seven banks that were not operational in 2016; ii) two banks with no lending activity according to the credit registry data in certain years of our sample; iii) four banks that were not actively operating in all years of our sample; and, iv) five banks that reported zero deposits in all years. These filters leave us with a balanced panel of banks that actively participate in the domestic financial system. Our sample accounts for 97% of total private sector deposits and 96% of total credit granted to the private sector.

B Data Quality

We combine two sources of micro data to construct bank credit variables. Both are collected by the Credit Registry of the Central Bank of Argentina. The first one is the core information collected at the firm-bank level with monthly frequency. This dataset contains outstanding end-of-month total credit levels for every bank-firm pair between 2013-2019. We supplement this data with an information Annex that started being recorded in 2015Q4. We source firm level data dis-aggregated by currency[13] from this Annex. Note that this information is not available at the firm-bank level, unlike the first dataset. Figure 13 compares aggregate bank credit from our two sources of micro data with the aggregate data published by the Central BankOur aggregate series, constructed with firm-bank data, accurately tracks the macro series. The aggregate series built from the Annex data performs relatively well in terms of tracking the slope of the macro data but misses its level. Importantly, Figure **??** shows that total dollar debt from the Annex closely tracks the evolution of dollar debt in the macro data. In Figure 17 we plot both aggregate dollar debt series in first differences against each other. Most data points lie at the 45 degree line[14].

The aggregate series for Peso debt that we construct out of the Annex data has a number of caveats. Figure 15 plots our results. First, discrepancies in the level of Peso debt account for the bulk of the difference between our total debt series and that of the macro data. Second, and most importantly, the Peso debt series from the Annex crosses the macro data during our period of analysis.

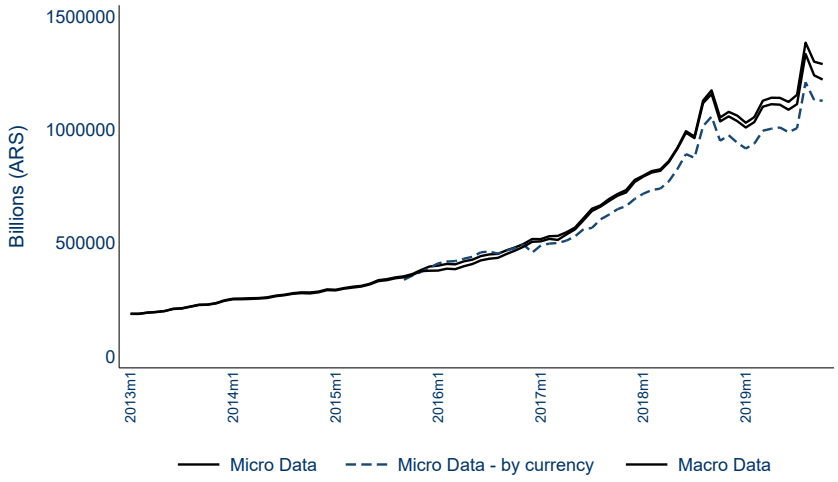
We choose a conservative approach and avoid using the pesos debt data from the Annex. Instead,

[13]Banks separately inform the outstanding end-of-month level of debt in domestic and foreign currency. The latter is informed in US dollars.

[14]Since our empirical approach differences out the level of debt, this is the relevant statistic to assess the quality of our data.

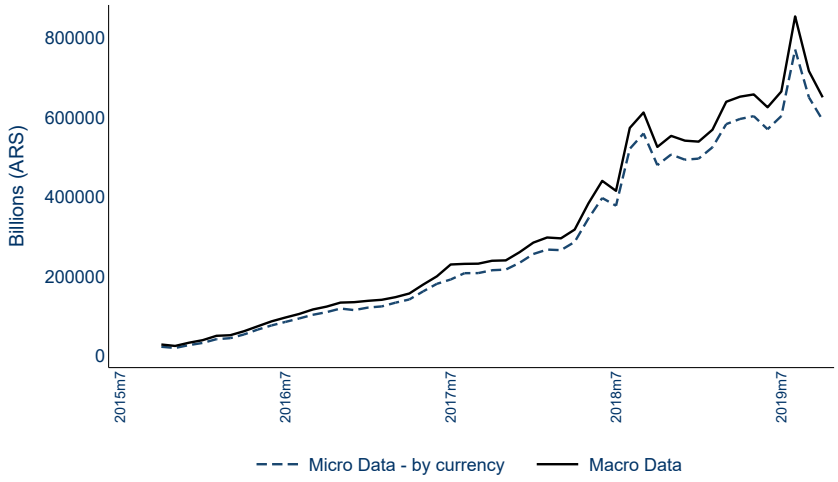
we take total firm-level debt from the core dataset, firm-level dollar debt from the Annex and combine them to get an implicit measure of firm-level pesos debt. Figure 19 shows that, despite level differences, our implicit measure of pesos debt is well-aligned with the macro data once first differenced.

Figure 13: Total Bank Credit



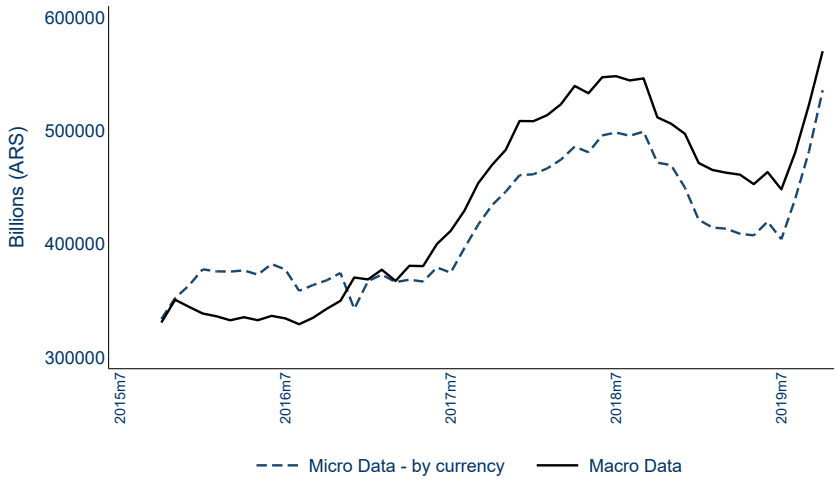
Data are expressed in billions of Argentine Pesos. Macro data corresponds to the end-of-period total credit granted to private non-financial firms published by the Central Bank of Argentina. The aggregated micro data excludes firms in the public and financial sectors to maximize comparison.

Figure 14: Dollar Bank Credit



Data are expressed in billions of Argentine Pesos. Macro data corresponds to the end-of-period total credit in foreign currency granted to private non-financial firms published by the Central Bank of Argentina. The aggregated micro data excludes firms in the public and financial sectors to maximized comparison.

Figure 15: Pesos Bank Credit (Raw)



Data are expressed in billions of Argentine Pesos. Macro data corresponds to the end-of-period total credit in domestic currency granted to private non-financial firms published by the Central Bank of Argentina. The aggregated micro data excludes firms in the public and financial sectors to maximized comparison.

Figure 16: Pesos Bank Credit (Implicit)

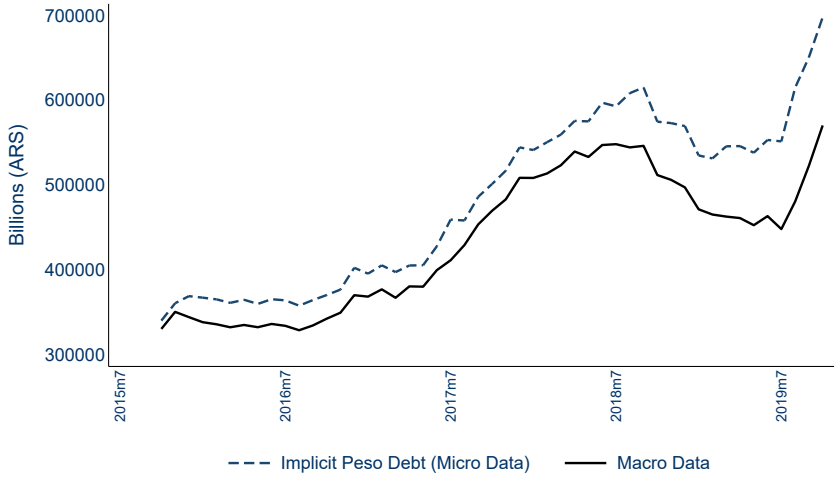


Figure 17: Dollar Bank Credit - First Differences

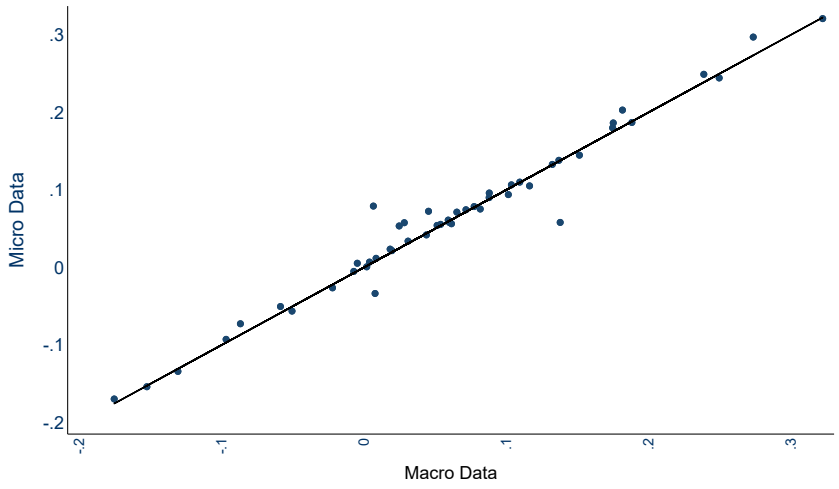
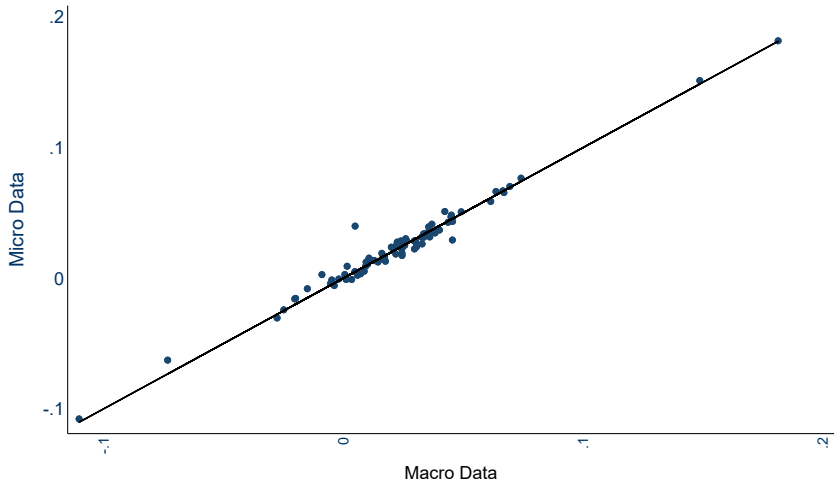
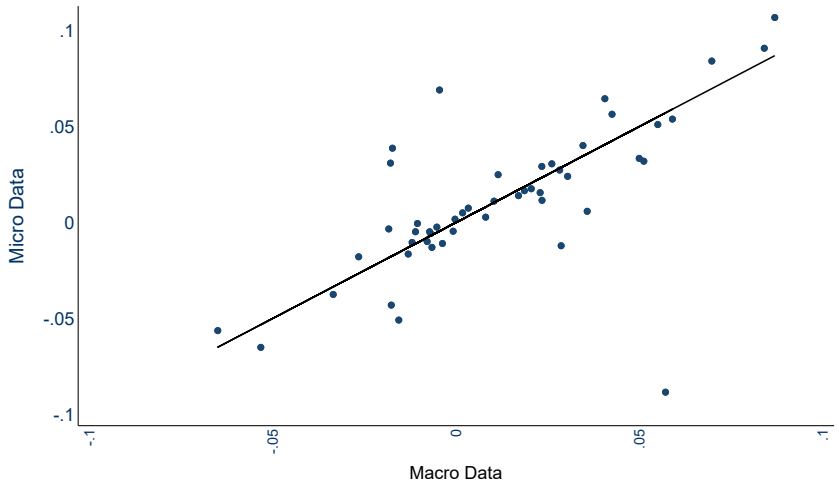


Figure 18: Total Bank Credit - First Differences



Original data was log transformed and first differenced. Micro data refers to the dollar series constructed using the Annex. Macro data corresponds to the aggregate debt series published by the Central Bank of Argentina

Figure 19: Pesos (Implicit) Bank Credit - First Differences



Original data was log transformed and first differenced. Micro data refers to the dollar series constructed using the Annex. Macro data corresponds to the aggregate dollar debt series published by the Central Bank of Argentina

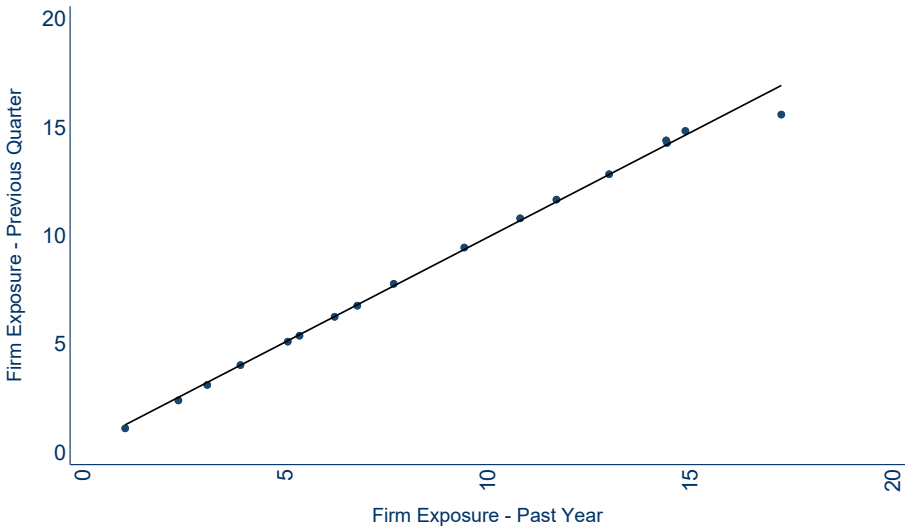
C Alternative Measure of Firm Exposure

Our baseline measure of firm exposure is:

$$S_i = \sum_b \omega_{ib}^{Start} S_b \tag{11}$$

where the weights, ω_{ib}^{Start}, correspond to the participation of bank b in firm's i total debt in the quarter before the implementation of the tax amnesty (i.e. 2016Q2). The binscatter plot below shows that our measure of firm exposure is invariant to considering the average weight during the year prior to the tax amnesty. The correlation coefficient between these two alternatives is $\approx .97$.

Figure 20: Firm Exposure
Alternative Weights



The *x-axis* computes firm exposure using year-to-date weights while the *y-axis* uses last quarter's weights. The correlation coefficient between these two alternative ways of measuring firm exposure is $\approx .97$.

D Composition of Dollar Debt

We group firms with positive dollar debt between 2015q4-2016q4 into six mutually exclusive groups: i(ii)) Exporters with dollar debt above (below) one thousand, iii(iv): Importers that do not export with dollar debt above (below) one thousand, v(vi): Firms that neither export nor import with dollar debt above (below) one thousand. Table 7 summarizes the characteristics of each group. Around two thousand exporting firmss take on the bulk of dollar debt with an average participation of 87%. They also have larger levels of average and median dollar debt per firm. Importers that do not export represent 5.5% of total dollar debt at baseline while the remainder of firms that neither export nor import take up 6.8%. The average and median dollar debt levels of both types of firms are orders of magnitudes lower than that of exporters. The industrial composition differs substantially between exporters and the other two groups of firms (regardless of their dollar debt level (above/below 1K). Among exporters, 70% belong to the industrial or agricultural sector. This share drops to 30% for non-exporting importers and to only 10% among neither exporting nor importing firms.

Table 7: Composition of Dollar Debt - At Baseline

	Average Debt	Median Debt	Participation(%)	Manufacturing(%)	Agricultural(%)	Number of Firms
Exporters (+1k)	1243541	34892	87.4	0.6	0.1	1893
Exporters(-1k)	272	171	0.0	0.7	0.0	2076
Importers(+1k)	115554	2335	5.6	0.3	0.0	1586
Importers(-1k)	260	162	0.0	0.3	0.0	3044
Non Exp./Imp.(+1k)	54666	2202	6.8	0.1	0.1	14659
Non Exp.Imp.(-1k)	190	80	0.1	0.1	0.1	17190

Nominal values are expressed in current US dollars. $1k(-1k)$ refers to firms with more(less) than one thousand dollars in total dollar credit at baseline. The participation(%) column measures the share of total dollar debt accounted for the corresponding firm category. Manufacturing and agricultural denote the share of firms in each of these two sectors. The last column is simply the number of firms in each category at baseline.

E Elasticity of Substitution Between Peso and Dollar Debt

E.1 Pesos Lending Rate and Bank Exposure

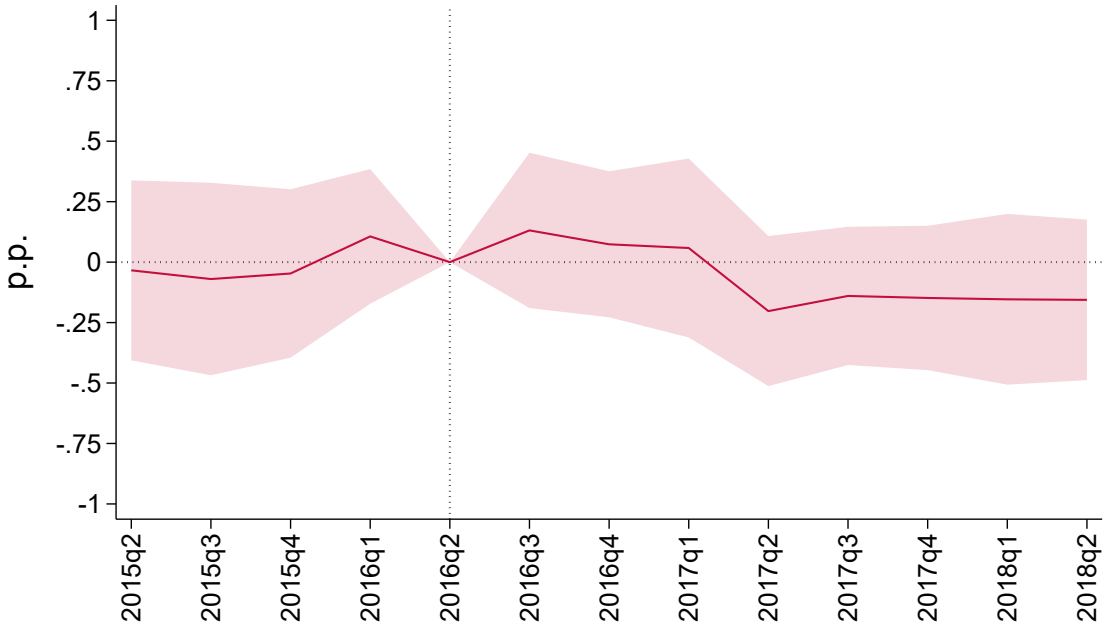
We test whether bank exposure had an impact on the average pesos lending rate set by individual banks. A differential response of the peso-lending rate across banks with different exposure would pose a threat to our identification assumption. Unfortunately, the only information that we have on interest rates is the average lending rate for the whole portfolio of peso-denominated loans granted to the private sector. This series includes both loans to households and private non-financial firms. It also reflects the specific composition of credit lines in each bank portfolio which are likely to be heterogeneous. In the exercise below, we include several controls in an attempt to reduce the influence of heterogeneity in the loan portfolio composition on our estimates.

We run the following lag-augmented panel local projection:

$$\Delta i_{bt+h}^{Pesos} = \beta_h S_b + \Gamma_h \mathbb{X}_b + \sum_{s=1}^{2} \delta_{hs} i_{bt-s}^{Pesos} + e_{bt+h} \tag{12}$$

where i_{t+h}^{Pesos} is bank's b average pesos lending rate h periods after the start of the tax amnesty and S_b is bank exposure. β_h measures the differential effect of bank exposure on the pesos lending rate at horizon h. We let $h = \{-4, 8\}$ which allows us to check for pre-trends. $\mathbb{X}_b$ is a vector of bank level controls. On top of the bank controls included in the main text (i.e. bank size and bank ownership status) we add the share of commercial loans at baseline. This additional control helps us account for differences in the composition of loan portfolios. We incorporate two lags of the dependent variable and cluster standard errors at the bank level. Figure 21 plots the estimated coefficients. We do not find significant evidence of a differential response of pesos lending rates across banks with differential exposure to the tax amnesty shock. For reference, the average lending rate was 32.3% during this time period.

Figure 21: Bank Exposure and Pesos Lending Rates



We report 95% confidence intervals. Standard errors are clustered at the firm level.Point estimates measure the percentage point increase in the pesos lending rate for every 1p.p. increase in bank exposure, relative to baseline. The time period corresponds to 2015Q2 2018Q2 and the base period is set to 2016q2. Standard errors are clustered at the bank level.

E.2 General Expression for κ

Consider a setting where firm-level demand for pesos and dollar credit satisfy:

$$L_{it}^{Pesos} = f(Y_{it}, r_{it}^{Pesos}, r_{it}^{USD}) \tag{13}$$

$$L_{it}^{USD} = h(Y_{it}, r_{it}^{Pesos}, r_{it}^{USD}) \tag{14}$$

where $f(.)$ and $h(.)$ are arbitrary functions mapping firm-level output, Y_{it}, peso and dollar lending rates,$r_{it}^{Pesos}, r_{it}^{USD}$, to credit demand in each currency. Totally differencing both expressions with respect to the dollar interest rate yields

$$\mathbf{d}L_{it}^{Pesos} = \frac{\partial f}{\partial Y_{it}}\frac{\partial Y_{it}}{\partial r_{it}^{USD}}\mathbf{d}r_{it}^{USD} + \frac{\partial f}{\partial r_{it}^{Pesos}}\frac{\partial r_{it}^{Pesos}}{\partial r_{it}^{USD}}\mathbf{d}r_{it}^{USD} + \frac{\partial f}{\partial r_{it}^{USD}}\mathbf{d}r_{it}^{USD} \tag{15}$$

$$\mathbf{d}L_{it}^{USD} = \frac{\partial h}{\partial Y_{it}}\frac{\partial Y_{it}}{\partial r_{it}^{USD}}\mathbf{d}r_{it}^{USD} + \frac{\partial h}{\partial r_{it}^{Pesos}}\frac{\partial r_{it}^{Pesos}}{\partial r_{it}^{USD}}\mathbf{d}r_{it}^{USD} + \frac{\partial h}{\partial r_{it}^{USD}}\mathbf{d}r_{it}^{USD} \tag{16}$$

Our identifying assumption implies that we have at hand a shifter to the dollar interest rate, $\mathbf{d}r_{it}^{USD}$, that leaves the supply of pesos credit unchanged, such that, $\frac{\partial r_{it}^{Pesos}}{\partial r_{it}^{USD}} \mid_{\mathbf{d}r_{it}^{USD}} = 0$. Re-arraing

yields:

$$\frac{\mathbf{d}L_{it}^{Pesos}}{\mathbf{d}L_{it}^{USD}} = \left[\frac{\frac{\partial f}{\partial Y_{it}} \frac{\partial Y_{it}}{\partial r_{it}^{USD}}}{\frac{\partial h}{\partial Y_{it}} \frac{\partial Y_{it}}{\partial r_{it}^{USD}} + \frac{\partial h}{\partial r_{it}^{USD}}} + \frac{\frac{\partial f}{\partial r_{it}^{USD}}}{\frac{\partial h}{\partial Y_{it}} \frac{\partial Y_{it}}{\partial r_{it}^{USD}} + \frac{\partial h}{\partial r_{it}^{USD}}} \right] \tag{17}$$