Cross-Border Spillovers of Bank Regulations: Evidence of a Trade Channel*

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Abstract

We document a novel channel through which domestic bank regulations generate cross-border real effects via international trade. Our setting is a one-time, unexpected increase in loan loss provisions in Spain in 2012. Using comprehensive administrative data from the Spanish credit register matched with the quasi-universe of firm-level trade flows from 2009 to 2013, we show that importers and exporters relying on the most affected banks experienced sharp reductions in credit supply, leading to contractions in their trade flows–especially for importers. Leveraging bilateral trade data at the country-product level, we find that Spanish imports declined overall, with little evidence of reallocation across importers. This decline in Spain's import demand spilled over internationally, reducing the total exports of Spain's trading partners, driven entirely by lower sales to Spain. The effect was stronger for countries with less developed financial systems, for exporters facing higher bilateral trade costs vis-á-vis Spain, and for products that are harder to reallocate across markets. Finally, we show that this trade channel is not explained by the foreign operations of Spanish banks. Our findings highlight international trade as a key transmission mechanism of banking regulation, with implications for the cross-border coordination of prudential policy.

Keywords: Bank regulations, spillovers, international trade
JEL Codes: F14, F36, F42, G21, G28.

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1 Introduction

In the aftermath of the Global Financial Crisis, a wave of regulatory reforms was introduced to mitigate systemic risk, leading to a significant tightening of banking regulations worldwide.[1] While these reforms were designed to strengthen financial stability, they may also generate unintended cross-border spillovers. Existing research has primarily examined financial channels of such spillovers, focusing on cross-border capital flows (Bahaj and Malherbe, 2024) and the bank-lending activities of global banks' foreign subsidiaries (Aiyar et al. 2014; Buch and Goldberg 2017; Tripathy 2020). This paper provides new evidence on a *trade channel* through which domestic banking regulations propagate internationally by contracting import demand.

We show that tighter regulations reduce the credit available to importing firms, lowering their demand for foreign goods and causing a decline in trade partners' total exports to the regulated country. These effects are mitigated when trade partners are based in financially developed economies and face lower trade costs, which enable them to extend more favorable terms–such as trade credit–to financially constrained importers. Reallocation to alternative destinations also serves as an adjustment margin, particularly for more homogeneous products that can be redirected across markets with relative ease. Importantly, we demonstrate that this trade channel is not driven by the international operations of Spanish global banks.

Whether bank regulations spill over through international trade flows is, at first glance, unclear. On the one hand, tighter credit conditions may disproportionately affect firms engaged in international trade–relative to those serving only domestic markets–because of their greater working capital needs and the higher default risk associated with cross-border transactions (e.g., Amiti and Weinstein, 2011). On the other hand, firms engaged in international trade are typically larger (e.g., Eaton et al., 2011) and often have access to multiple sources of external finance, which could mitigate the impact of domestic banking regulations. Moreover, for a bank regulation to meaningfully affect international trade, the decline in activity among highly exposed firms must not be offset by less affected competitors capturing their market share. And even if domestic trade flows contract, foreign trade partners might still adjust by reallocating exports or imports across other

[1] See Basel Committee on Banking Supervision (2011)

destinations, potentially neutralizing the effect (Almunia et al., 2021). Consequently, it remains an open empirical question whether domestic bank regulations generate cross-border spillovers through international trade.

To address this question, we study a 2012 Spanish banking regulation that required a sharp increase in loan loss provisions for real estate and construction loans–a non-tradable sector plausibly exogenous to global trade. Our empirical strategy proceeds in three steps. First, we exploit this sudden and sizable increase in required provisions–amounting to roughly 8.5% of Spain's GDP–to estimate its effect on firm-level credit, using variation in banks' pre-policy exposure to the construction and real estate sectors and granular credit registry data. Second, we assess how this credit supply shock affected firm-level trade outcomes, using administrative data that covers nearly the entire universe of Spanish exporters and importers. Third, we construct a country-product-level exposure measure and use detailed bilateral trade data from BACI to estimate the regulation's spillover effects on trade partners' exports and examine the extent to which these effects were mitigated.

Our analysis using data from the Spanish Central Credit Register (CIR) shows that firms engaged in international trade–both importers and exporters–faced a contraction in credit supply following the increase in provisions imposed on banks in 2012. Following Jiménez et al. (2017), we measure bank exposure as the pre-policy share of bank's credit to construction and real estate firms. We then apply a difference-in-differences strategy, comparing firm's outstanding debt across banks with varying exposure before and after the policy, while controlling for firm-level credit demand shocks, in line with Khwaja and Mian (2008). Our results in this first step are statistically significant and indicate that a one standard deviation increase in bank exposure (approximately 16 percentage points) reduces credit supply to exporting and importing firms by 3.1%, relative to less exposed banks lending to the same firm. Effects are also present at the extensive margin, with more exposed banks more likely to terminate lending relationships–particularly with importers.

Our identification relies on the assumption that, absent the policy, credit supply across banks with different exposure levels would have followed parallel trends. We validate this by showing no pre-trends in credit supply and showing that covariates are balanced across banks.

To test whether firms mitigated the credit supply shock by reallocating debt across banks, we estimate the effect of the policy on total firm-level bank debt. We construct a weighted measure of firm exposure based on bank shares in total debt and control for time-varying firm demand shocks using estimated firm-time fixed effects from our bank-firm regressions, as in Abowd et al. (1999) and Bonaccorsi di Patti and Sette (2016). We find that a one standard deviation increase in exposure reduces total debt by 2.8% for importers and 1.6% for exporters, indicating limited credit substitution across banks and suggesting potential effects on firm's real outcomes.

Since larger firms may access funding sources beyond those captured in the credit registry, we complement our analysis with firm-level financial statements to assess the policy's effect on total financing, including bank debt, non-bank debt, and equity. We find that exporters' overall debt remains unaffected, suggesting they offset the credit shock by leveraging alternative funding sources. In contrast, importers do not fully adjust: a one standard deviation increase in exposure reduces their total debt by 1.5%, even after accounting for non-bank financing and equity. This aligns with our descriptive statistics showing that the average exporter in our sample is larger, more established, and financially stronger than the average importer.

We also provide evidence that the credit contraction is driven by the domestic regulatory shock rather than by foreign factors. First, we account for bank specialization in foreign markets, following Paravisini et al. (2023), and show that it does not affect our main estimates of the credit channel of bank regulation. Second, the credit effects are similar for tradable and non-tradable firms, reinforcing the validity of our identification strategy. Third, we find that more exposed importers reduced employment and investment after the policy change, whereas exporters did not–consistent with our estimates for total funding sources.

In the second step, we estimate the policy's effect on firm-level trade flows using granular data that combine CIR credit records with transaction-level Balance of Payments data–disaggregated by firm, product (2-digit HS), country, and year. Using a difference-in-differences approach with rich fixed effects–following Paravisini et al. 2014–we find that a one standard deviation increase in bank exposure leads to a 3.6% decline in firm's imports and a 2% decline in exports. We also document effects at the extensive margin: more exposed firms were more likely to exit both export and import

markets and, in the case of importers, less likely to enter new markets. Additional firm-level results show that trade diversification declined–exporters reduced the number of destinations and products shipped, while importers sourced from fewer countries.

Moreover, we find that effects on trade flows are stronger for firms with non-concentrated bank relationships, highlighting the role of lending ties in insulating borrowers from adverse shocks (Bolton et al., 2016). We also find that riskier importers, with limited access to credit lines, are more strongly affected by the regulation. As well, importers that relied more heavily on supplier-provided trade credit prior to the policy were better able to smooth the negative effects of the subsequent contraction in bank credit on trade flows. This suggests that foreign suppliers may have helped alleviate the financial shock for importers. These patterns are consistent with a trade finance channel of domestic bank shocks, as documented by Amiti and Weinstein (2011); Paravisini et al. (2014); Xu (2022); or Kabir et al. (2024).

Overall, we find that the policy's impact on credit and trade outcomes was markedly more severe for importers than for exporters. Further analyses show that the decline in export flows is concentrated among smaller exporters with limited implications at the aggregate country-product level, whereas the impact on import flows appears to be homogeneous across firms. These findings suggest that the contraction in Spanish import demand was the primary cross-border transmission channel of the policy, as Spanish exports were mostly sustained by large exporters. Accordingly, we focus the remainder of the analysis on the policy-induced contraction in Spanish import demand and its cross-border spillovers.

In the third step, we account for cross-border spillovers using BACI data, which provides trade flows by country of origin, destination, and 2-digit product level. First, we examine the extent to which imports are reallocated across Spanish firms. We then explore whether Spain's trade partners mitigate the contraction in Spanish imports either by providing better financial terms to Spanish firms or by reallocating their exports to other destinations.

We define markets as product–country-of-origin pairs, and construct a measure of exposure to the policy at this level. This measure reflects the extent to which Spanish importers in a given market rely on funding from exposed banks. For instance, if Spanish importers of textiles from

India depend heavily on financing from highly exposed banks, then textile imports from India are considered highly exposed to the regulation. To estimate the regulation's impact on total Spanish imports, we employ a triple difference-in-differences approach, comparing the evolution of Spanish imports from highly versus less exposed markets relative to other countries' imports from the same markets, before and after the policy. This approach allows us to saturate the specification with market-time fixed effects, controlling for unobserved time-varying shocks at the market level and mitigating concerns that our exposure measure is influenced by supply-side shocks in foreign markets. Moreover, we can include time-varying importer fixed effects to absorb any country-specific demand shock coinciding with the Spanish regulation.

Our findings indicate that import reallocation across Spanish firms is limited. Specifically, a one standard deviation increase in market exposure results in a significant 2.1% decline in Spanish imports relative to other countries' imports from the same markets after the policy's implementation, with no evidence of pre-trends. These estimates remain robust when restricting the counterfactual set of importers in the triple-difference to European and other high-income countries comparable to Spain. They are also unchanged when excluding GIIP exporters to address potential identification concerns related to the sovereign debt crisis.[2] Additionally, to address concerns that our results may be driven by small destination markets, we aggregate the data to the market level and estimate a standard difference-in-differences specification on samples of destination countries (Spain and the rest of the world). The results remain consistent with our baseline triple-difference estimates.

Since we find no evidence of complete reallocation of trade flows within Spain, we next examine how Spain's trade partners responded to the import demand contraction. Exporters can mitigate a credit supply shock affecting their clients–Spanish importers–by providing financial support through more favorable trade terms, such as longer payment periods. To test this mechanism, we study the role of financial development in origin countries and assess whether exporters operating in countries with more developed financial sectors–proxied by private credit to GDP–are better equipped to offer favorable trade finance terms.[3] Our results show that exporters operating in

[2] We use GIIP to denote Greece, Ireland, Italy, and Portugal.

[3] See, for example, Manova (2013) and Chan and Manova (2015), who study the role of financial development in international trade.

highly developed financial systems fully offset the Spanish credit contraction, leaving their exports to Spain unaffected. By contrast, for partners in countries with weaker financial development, a one standard deviation increase in regulatory exposure reduces exports to Spain by 3.3 percent.

We next exploit variation in exporters' trade costs to Spain to examine how these costs shape the ability of exporters in low-financially developed countries to attenuate the shock. Higher trade costs raise exporters' reliance on external financing, limiting their capacity to extend trade credit.[4] To test this mechanism, we divide the sample of low-financially developed countries by geographic distance to Spain and common language, and assess where the shock generates stronger contractions in exports to Spain. We find no significant effects for countries geographically close to Spain or for Spanish-speaking countries. By contrast, a one standard deviation increase in exposure leads to a 3.6% decline in exports from distant countries, and a 3.9% decline from countries that are both distant and non-Spanish-speaking. These findings indicate that higher trade costs exacerbate exporters' difficulties in attenuating the contraction in Spanish import demand.

Since Spanish banks operate abroad and finance firms engaged in international trade, a potential concern is that our results could be confounded by their international lending activities. For example, if Spanish banks are particularly specialized in financing firms that export to Spain (Paravisini et al., 2023), the impact of the policy could be amplified. To test this channel, we use BankFocus data and estimate the effect of the regulation on exports from countries without a Spanish bank presence, finding no meaningful differences from our baseline results. In particular, exports from both high- and low-financially developed countries respond similarly to the regulatory shock regardless of Spanish bank operations, and we find no evidence that these operations interact with trade costs. These findings indicate that the cross-border effects we document operate primarily through trade linkages and financial development in origin countries, rather than through the internal capital markets of Spanish global banks.

Having established that exporters face frictions in attenuating the contraction in Spanish import demand, we next examine how Spain's trade partners adjust their total exports, focusing on reallocation toward other destinations as an alternative margin of adjustment. Exposure of total

[4]For example, exporters located farther from Spain face higher variable costs due to longer shipping times, while exporters from non-Spanish-speaking countries incur higher fixed costs from overcoming language barriers.

exports depends not only on our market-level measure but also on the share of Spanish purchases within each market. To isolate the policy effect, we therefore compare markets with similar levels of dependence on Spain, as measured by the Spanish import share. On average, we find no evidence of reallocation. Moreover, in markets where Spain is a major buyer, total exports in more exposed markets decline significantly by 2.8%–a contraction driven entirely by exports to Spain, as exports to other destinations remain largely unchanged.

We next examine whether product-specific attributes shape the reallocation of trade flows. Exporters may find it harder to redirect sales of highly heterogeneous products–those characterized by greater variety–away from Spain. To measure product heterogeneity, we compute the price at which each HS 6-digit product is sold by each country and calculate the variance of these prices at the HS 2-digit product level. Products in the top three quartiles of price dispersion are classified as heterogeneous. Our results show that for these products, total exports fall by 9%, entirely driven by a 16% contraction in exports to Spain. By contrast, total exports of relatively homogeneous products remain unaffected, as the decline in sales to Spain is fully offset by a significant increase in exports to other destinations. These findings highlight that product differentiation frictions constrain exporters' ability to reallocate trade flows following a demand shock.

Overall, our findings show that financial regulations, even when targeting domestic vulnerabilities, can propagate internationally by contracting import demand. Spain's trade partners face two types of frictions in responding to demand shocks: attenuation frictions, which arise in financially less developed countries and are exacerbated by high trade costs vis-á-vis Spain, and reallocation frictions, which stem from product differentiation and limit the redirection of heterogeneous products to other markets. These results highlight international trade as a key channel of regulatory spillovers and underscore the need for cross-border coordination in the design of prudential banking policies to mitigate unintended disruptions to global trade.

Contribution to the literature. This paper contributes to the literature on the cross-border transmission of financial shocks by identifying a novel mechanism through which domestic banking regulations propagate internationally. Traditional channels in the literature emphasize asset prices and portfolio effects as key drivers of financial shock transmission, particularly in

globally integrated markets. Theoretical work has largely focused on the international spillovers of capital requirements and macroprudential policies on cross-border capital flows (Bahaj and Malherbe, 2024), as well as the strategic interactions between national regulators and the potential welfare gains from cooperation (Korinek, 2016; Faia and Weder di Mauro, 2016; Bolton and Oehmke, 2018; Segura and Vicente, 2019). Empirically, most studies document these effects using aggregate country-level or bank-level data, often focusing on global banks or their subsidiaries (Aiyar et al., 2014; Reinhardt and Sowerbutts, 2015; Buch and Goldberg, 2017; Baskaya et al., 2017).

Within this branch of the literature, our paper complements Tripathy (2020), who studies how Spanish macroprudential regulation affected household credit and economic activity in Mexico's non-tradable sector through the lending behavior of Spanish banks' foreign subsidiaries. While Tripathy (2020) focuses on cross-border transmission via global banks' capital markets, our paper emphasizes a domestic trade-finance mechanism. Moreover, we show that the estimated trade channel is not driven by the presence of Spanish global banks. Taken together, our findings are complementary and reinforce the broader point that domestic financial regulation can propagate internationally through multiple transmission mechanisms.

Our paper also contributes to research on the impact of global macroeconomic shocks on tradable firms via the international exposure of domestic banking systems. Existing studies have explored transmission mechanisms through capital flow reversals (Paravisini et al., 2014), multinational banks (Xu, 2022), and correspondent banks that facilitate trade (Borchert et al., 2023). Our setting differs from this literature in several ways. First, unlike Paravisini et al. (2014), who study a middle-income country (Peru), we examine a high-income country with mature and more globally integrated financial institutions. Second, compared to Xu (2022), who analyze the global banking crisis originated in London in 1866, our period of analysis is more recent and captures a different global macro-financial environment, characterized by highly interconnected economies through both trade and global banking networks. Third, while much of the literature focuses solely on exports, we analyze both exports and imports, and find that contractions in import demand play a central role in cross-border spillovers.

Additionally, we contribute to the well-established literature on the role of banks in facilitating

trade finance (Amiti and Weinstein, 2011; Chor and Manova, 2012; Manova, 2013; Del Prete and Federico, 2014; Paravisini et al., 2014; Demir et al., 2017; Niepmann and Schmidt-Eisenlohr, 2017; Ahn and Sarmiento, 2019; Moreira and Monteiro, 2023; Dogan and Hjortso, 2024; Kabir et al., 2024). In particular, this article builds on Paravisini et al. (2014), who document how global funding shocks to Peruvian banks affect exports via a trade finance channel, by extending the analysis in two key directions. First, we examine not only exports but also imports, showing that credit supply shocks affect both sides of trade activity. Second, we uncover a novel spillover effect: the contraction in Spanish import demand, triggered by tighter credit conditions, leads to reduced exports from foreign trade partners, especially when they operate in low financially developed economies, when trade costs are high or products are less substitutable and difficult to reallocate. This highlights a novel mechanism through which domestic bank shocks can generate real effects beyond national borders.[5]

Our findings show that buyer-supplier linkages–known to propagate credit supply shocks internally (Costello 2020; Alfaro et al. 2021)–are also pivotal in their cross-border transmission. This aligns with the broader importance of production networks, highlighted by Adelino et al. 2022, who show they transmit unconventional monetary policy from core to periphery countries. Similarly, we demonstrate that shocks stemming from bank regulations transmit through the production networks formed by international trade linkages, and we further uncover multiple facilitators of this transmission.

The rest of the paper is organized as follows: Section 2 provides institutional details of the policy intervention. Section 3 outlines the conceptual mechanism linking the regulatory shock to international trade flows. Section 4 describes the data. Section 5 presents the empirical strategy and main results. Finally, Section 6 concludes.

[5]See Table A.1 in the appendix for a summary comparison with the two most directly related studies, Paravisini et al., 2014 and Tripathy, 2020.

2 Institutional background

In early 2012, the Spanish government imposed a one-time, two-phase increase in provisioning requirements for banks' exposures to the construction and real estate sectors, based on outstanding loans as of late 2011. The policy aimed to reduce uncertainty around asset valuations still distressed after the 2008 Global Financial Crisis.

In the first phase (February), banks were required to provision 7% for all performing loans in the targeted sectors. In the second phase (May), provisioning was differentiated by loan type: an additional 45% for land, 7% for completed properties, and 22% for real estate projects in progress. Provisions for non-performing loans were also raised, and all requirements had to be met by year-end 2012.

This ad hoc policy represented a substantial shock. Banks' provision buffers had already been depleted by the global crisis, leaving them unable to meet the new requirements without sharply increasing provisions–by approximately $85 billion (8.5% of GDP), as documented by Jiménez et al. (2017). This severely affected bank profitability in 2012.

Following Jiménez et al. (2017), we measure banks' exposure to the policy using the share of their corporate lending to construction and real estate firms before the reform. While their analysis documents reduced credit supply among highly exposed banks, we focus on the implications for non-financial firms engaged in international trade, and the resulting effects on trade flows and cross-border spillovers.

Among the 83 banking groups lending to trading firms, exposure to the affected sectors varied widely. At the 25th, 50th, and 75th percentiles, banks allocated 26.5%, 34.9%, and 47.0% of corporate credit to these sectors, respectively (see Panel C of Table 1). Figure 2 illustrates the distribution of bank exposure.

3 Conceptual Framework

In this section, we outline the theoretical mechanism through which the regulatory shock generates cross-border effects via international trade (see Figure 1).

3.1 Bank lending

Numerous studies show that shocks to bank balance sheets influence how banks supply credit to the economy (e.g. Bottero et al. 2020, Kapan and Minoiu 2018). Due to financial frictions, banks are often unable to absorb these shocks by raising capital (Hanson et al., 2011) contracting lending instead (Gropp et al., 2019). Thus, following prior research (Khwaja and Mian 2008; Jiménez et al. 2017), we compare lending to the same firm across banks with varying levels of exposure to the regulatory shock–specifically, banks with different pre-regulation exposure to the construction and real estate sectors. The differential response between more and less exposed banks enables us to isolate the regulation's impact on credit supply. In addition, firms may be able to substitute borrowing from more exposed banks with credit from less affected institutions or alternative funding sources. Therefore, we further examine whether firms with stronger ties to the most affected banks were able to mitigate the decline in lending (Jiménez et al., 2020).

3.2 Spanish trade flows

Following a reduction in funding sources, we examine whether firms that were more dependent on lending from affected banks adjusted their international sales and purchases, as suggested by previous literature indicating adverse firm outcomes following a credit crunch (e.g. Paravisini et al. 2014; Xu 2022). Particularly, using granular Balance of Payment data, we test whether more exposed firms reduce exports to–or imports from–a given country and product, relative to other firms selling or buying the same product from the same country, following the implementation of the regulation.

Before examining cross-border spillovers, we first test whether the bank regulation led to a reduction in Spain's aggregate trade flows. While firm-level comparisons of differentially exposed firms are useful for identifying credit supply effects, they may miss a key general equilibrium adjustment: less-exposed firms could expand their trade activities to compensate for the decline among highly exposed firms, leaving aggregate trade flows unchanged. To assess this, we employ a triple-difference strategy using a panel of bilateral trade flows, disaggregated by origin country, destination, and product. In particular, we compare Spanish trade flows from highly treated

markets–those composed of firms heavily reliant on financing from exposed banks–against Spanish trade flows from less-treated markets, relative to the trade flows from the same corresponding markets of other countries, before and after the implementation of the bank regulation.

A significant decline in Spanish trade flows from highly treated markets would imply that less-exposed Spanish firms failed to fully offset the contraction in trade among more affected firms caused by the regulation. Conversely, a null aggregate effect would suggest complete reallocation of trade activity across Spanish firms, leaving no scope for cross-border spillovers.

3.3 Spanish trade partners: Attenuation

In the case of a contraction in Spanish import demand due to tighter bank regulation, trade partners may mitigate the decline in Spanish importers' access to domestic bank credit by offering more favorable trade terms–such as extending repayment deadlines. The capacity of exporters to provide such trade credit depends on two key factors. First, the level of financial development in the exporting country (Beck 2002, 2003; Manova 2013; Chan and Manova 2015). Exporters based in financially developed economies are better positioned to absorb credit supply shocks in destination markets. Second, the trade costs associated with exporting to Spain. Higher trade costs–such as greater geographical distance or language barriers–increase exporters' external financing needs (Schmidt-Eisenlohr 2013; Antràs and Foley 2015), thereby limiting their ability to extend more trade credit after a demand shock in the destination country. We therefore test whether the contraction in exports to Spain was more pronounced for countries with less developed financial systems and whether higher trade costs further exacerbated this contraction.

3.4 Spanish trade partners: Reallocation

When exporters cannot attenuate the Spanish demand shock through trade credit, reallocation to alternative markets becomes a critical adjustment margin. However, this reallocation is costly, as it often requires product customization to meet the specific requirements of new destinations.

We examine two determinants of this adjustment. First, the need for reallocation. Exporters facing greater constraints in attenuating the decline in Spanish imports have stronger incentives to

reallocate. Second, the cost of reallocation. Reallocation speed depends on product heterogeneity. Homogeneous goods–such as commodities like copper–can be redirected with minimal adjustments, whereas differentiated goods–such as manufactured products–require destination-specific adaptations to comply with regulations and meet consumer preferences. Therefore, we test whether exports to non-Spanish markets increased more for countries less capable of offering favorable trade credit terms to Spanish firms, and whether exports to these alternative markets expanded more for homogeneous goods.

4 Data

Our analysis relies on three primary datasets: (i) the Spanish Central Credit Register (CIR), a dataset from the Bank of Spain; (ii) Spain's Balance of Payments data, used to compile the Bank of Spain's official statistics; and (iii) international trade data from BACI (Gaulier and Zignago, 2010), which provides comprehensive bilateral trade flows at the country-product level.

4.1 Credit Register (CIR)

To examine the bank lending channel of the regulation, we use quarterly bank-firm credit data from the CIR, a comprehensive database from the Bank of Spain. The CIR provides detailed information on all loan commitments exceeding €6,000 granted to non-financial firms by any credit institution operating in Spain. It includes information on loan type, drawn and undrawn amounts, collateral status, maturity, currency, past-due status, as well as lender and borrower identities. Additionally, the dataset contains firm-specific information, such as industry classification and geographic location. To enhance our analysis, we combine CIR data with supervisory bank balance sheets and Balance of Payments data. This allows us to capture bank characteristics alongside firms' import and export activities, enabling us to focus on firms engaged in international trade. Moreover, it allows us to link the bank supplying the credit with its exposure to the policy captured by its share of credit granted to the construction and real estate industries. Our dataset includes credit information for 33,361 non-financial firms engaged in international trade, provided by 83

banking institutions from 2011Q1 to 2013Q2, yielding a total of 1,288,007 observations.[6] Descriptive statistics for the variables used in this analysis are presented in Panel A of Table 1, while variable definitions can be found in Appendix B. Specifically, the first variable–the logarithm of committed credit–captures the dependent variable used in the first-step estimates of the bank lending channel of the regulation at the intensive margin. Additionally, we use a termination dummy for our extensive margin analysis–a binary indicator that takes the value of one if a bank-firm relationship is terminated at the onset of the policy, conditional on the existence of this relationship as of the end of 2011Q4. The remaining variables serve as controls in our baseline bank-firm level specification.

4.2 Balance of payment data

Our analysis of firms' international trade outcomes relies on confidential transaction-level import and export records. This unique administrative dataset is one of the sources used by the Bank of Spain to compile Spain's official Balance of Payments. It captures the majority of trade flows in and out of Spain and provides detailed information for each importer and exporter, including the product code (based on 2-digit Harmonized System (HS) codes), the trading partner country, and the transaction year.[7]

Our analysis covers the period from 2009 to 2013, during which all transactions exceeding €50,000 were subject to mandatory reporting. Despite this reporting threshold, the dataset offers extensive coverage, capturing 91.3% of total trade flows relative to official trade statistics reported by Customs (see Almunia et al. (2021), Prades and Villegas-Sanchez (2022), and Gutiérrez and Moral-Benito (2024) for further details). We integrate this dataset with CIR information and construct a firm-level exposure measure. Specifically, we compute a firm's exposure to the policy by averaging the exposures of all banks lending to that firm, using lending amounts as of the end of 2011 as weights. This approach allows us to assess whether the increase in provisions disproportionately affected the import and export growth of firms more dependent on exposed banks.

[6] We control for bank mergers by considering the industry structure as of the end of our period of analysis. That is, we assume that new consolidated banks operate as a single entity within our period of analysis.

[7] Balance of Payments transactional data are reported either by banks on behalf of their clients or directly by firms to the Bank of Spain if they hold their own accounts.

Our trade data includes 659,910 export observations from 25,173 firms and 566,170 import observations from 23,029 firms, covering 99 different products traded with 189 export destinations and 167 import origins between 2009 and 2013. Firms in our sample frequently enter and exit trade markets. For example, among firms already participating in a market, the exit rate was approximately 35%, while firms not initially in a market had an entry rate of around 35% over the same period (see Panel C of Table 1).

4.3 BACI data

To assess international spillover effects, we use international trade data from BACI (Gaulier and Zignago, 2010), an annual panel of bilateral trade flows at the origin-destination-product level, which we merge with a measure of market exposure to the policy, constructed using Balance of Payments and CIR data.[8] To enrich our dataset, we incorporate information from Moody's Analytics BankFocus, which provides annual balance sheet information on over 38,000 banks worldwide, allowing us to assess the participation of Spanish bank subsidiaries in the banking systems of Spain's trade partners. Additionally, we use the CEPII Gravity database, which offers country-pair-specific characteristics that shape trade costs, such as geographical distance, trade agreements, and common language.

Our trade data includes 3,141,210 trade flows observations between 190 countries (origin and destination) and 5,216 HS 6-digit products grouped in 96 HS 2-digit goods between 2009 and 2013. The average trade flow is USD 23 million and the median USD 43 thousand. We aggregate BACI data to estimate the impact of Spanish loan loss provisions on other countries exports. The average export flow is USD 2,9 billion and the median USD 227 million. (see Panel D of Table 1).

5 Empirical strategy and results

Our study focuses on assessing whether bank regulations implemented in one country can generate cross-border effects through international trade linkages, which can be empirically challenging.

[8] For the years 2005–2013, Spanish import flows obtained from Balance of Payments data at the 2-digit product-country level represent approximately 90% of BACI data.

First, external macroeconomic conditions may lead to prudential policy interventions in the banking system, making it difficult to identify a causal effect of such interventions. Second, disentangling shocks in destination and origin countries–such as demand shocks for exports or supply shocks for imports–from the effect of the policy intervention poses additional challenges.

Our identification strategy addresses these concerns by exploiting two key elements: (i) an unexpected bank regulatory shock targeting banks exposed to non-tradable industries (real estate and construction) and (ii) a rich database that enables us to control for both observed and unobserved shocks in the destination and origin countries of Spanish firms' exports and imports, respectively.

The regulatory shock we study is the one-time, unexpected increase in provisioning requirements for banks' exposures to the construction and real estate sectors in 2012 (Jiménez et al. 2017). As detailed in section 2, banks were required to raise provisions based on their outstanding lending to these sectors as of 2011Q4. Importantly for our identification strategy, the shock targeted a non-tradable sector–construction and real estate–making it plausibly exogenous to global economic conditions.

Additionally, we exploit the structure of our granular trade-flow dataset for Spanish firms. In particular, we include a comprehensive set of time-invariant and time-varying fixed effects to disentangle our estimates from potential omitted factors, as in Paravisini et al. (2014).

Our analysis proceeds in three steps. First, using bank-firm-level data, we examine whether banks with higher exposure to the policy reduced lending to exporting and importing firms. Next, leveraging our firm-product-country-year dataset, we assess the policy's impact on Spanish firms' trade flows. Finally, utilizing a country-product-year panel of trade flows, we estimate the broader effects of the policy shift on Spain's trade partners.

5.1 Effect on credit supply to exporters and importers

We begin our analysis by examining whether banks reduced credit supply to firms engaged in international trade following the increase in provisions. Specifically, we use bank-firm credit data from before and after the policy intervention to assess whether more exposed banks provided credit

at a slower pace.[9] Specifically, we estimate the following model over the period from 2011Q1 to 2013Q2:

$$\log y_{f,b,t} = \theta \times Exposure_b \times Policy_t + controls_{b,f,t} + \alpha_{f,t} + \alpha_{f,b} + \varepsilon_{f,b,t}. \quad (1)$$

The dependent variable is the logarithm of the committed credit granted by bank b to firm f in quarter t. *Exposure* represents the exposure of bank b to the policy, measured as the ratio of construction and real estate lending to its total corporate lending as of the end of 2011. *Policy* is a dummy variable that takes the value of one starting from 2012Q1, marking the post-policy period, and zero otherwise. Additionally, we control for various bank and bank-firm characteristics measured as of the end of 2011. Specifically, we interact quarter dummies with bank-firm characteristics, including the collateralization rate, the ratio of long-term lending, the share of firm f's NPLs with bank b, and the share of total lending that firm f receives from bank b. Furthermore, we include the interaction of quarter dummies with two sets of bank bins. These bank bins are defined by quartiles of bank size, measured by total assets, and by banks' exposure to exporter/importer firms, measured as the share of lending to exporters and importers relative to lending to the corporate sector. Importantly, our balance-of-covariates analysis indicates that, after controlling for these bank bins, the bank exposure measure is statistically orthogonal to other key bank characteristics, such as ROA, NPLs, liquidity, and capital ratios (see Figure 3).

Finally, we control for firm credit demand by adding firm-time fixed effects, restricting our sample to firms borrowing from multiple banks (Khwaja and Mian, 2008).[10] To aid in the interpretation of our coefficient of interest, θ, we standardized banks' exposure. Consequently, θ measures how a one standard deviation increase in bank b's dependence on the construction and real estate industries affects firm f's credit growth relative to its other lenders following the policy implementation.

Additionally, we measure the effect of the policy on firms' total debt. In particular, firms could have substituted credit from more affected towards less affected banks, lessening the impact of the policy on their total credit. As firms engaged in international trade are typically larger and

[9] Our analysis excludes exporters and importers operating in the construction and real estate sectors.

[10] In our data, firms engaged in international trade typically borrow from multiple banks. In particular, around 30% of firms engaged in international trade borrowing from a bank in 2011 were with a single bank.

have more lending relationships, they could have smoothed the impact of the regulatory shock and limited its effects on real outcomes (e.g., sales or purchases abroad). We explore such a possibility by estimating the next equation:

$$\log y_{f,t} = \theta \times Exposure_f \times Policy_t + controls_{f,t} + \hat{\alpha}_{f,t} + \alpha_f + \varepsilon_{f,t}, \tag{2}$$

The dependent variable is the logarithm of total bank credit to firm f. To calculate the firm-level exposure to the policy, we compute the average exposure of the banks lending to firm f, weighted by the outstanding credit as of the end of 2011 from each bank. As controls, we include interactions of quarter dummies with firm-level variables, which are derived by averaging the controls used in specification (1), weighted by each bank's outstanding credit to the firm. Additionally, we incorporate province and industry indicators. To account for demand shocks, we include the estimated firm-quarter fixed effects from specification (1), $\hat{\alpha}_{f,t}$, following the approach in Abowd et al. (1999) and Bonaccorsi di Patti and Sette (2016). Therefore, θ measures the impact of the policy on firms' total debt. A negative and significant coefficient would suggest that firms more dependent on exposed banks were unable to offset the negative supply shock by leveraging their multiple bank relationships.

[Table 2]

We present our results in Table 2 for two samples of firms: exporters –columns (1) and (2)– and importers –columns (3) and (4)–. Panel A presents the regression results for the model specified in equation (1). Results show an economically meaningful effect of the policy on credit supply to both exporters and importers. Specifically, a one standard deviation increase in bank exposure (approximately 16 percentage points) is associated with a 3.1% reduction in credit supplied to an exporter, relative to other banks lending to the same firm. A similar effect is observed for importers. These estimates are economically significant, especially when compared to the average quarterly credit growth rate of -2.6% observed during the pre-treatment period.

Panel B of Table 2 examines the extensive margin, showing that higher bank exposure is associated with a greater likelihood of terminating lending relationships. Following the policy, more

exposed banks were 1.5 and 1.9 percentage points more likely to terminate relationships with exporters and importers, respectively. This effect is statistically significant only for importers in our preferred specification (Column 4).

[Figure 4]

Additionally, Figure 4 provides further evidence that banks tightened their credit supply in response to the shift in provisions. Specifically, we estimate a modified version of specification (1), where we replace *Policy* with quarter dummies. The dashed lines represent the 2.5%–97.5% confidence interval, with standard errors double-clustered at the bank and firm levels. Notably, before the policy intervention, the most affected banks did not reduce lending to exporters or importers significantly more than other banks. However, following the increase in provisioning, these banks sharply curtailed their credit supply to these firms.

[Table 3]

[Figure 5]

In Table 3, we present results from specification (2) to assess whether firms were able to mitigate the credit supply shock by borrowing from less affected banks. The findings indicate that the policy led to a decline in total bank debt for both exporting (Columns 1-2) and importing firms (Columns 3-4). Specifically, Column (2) shows that a one standard deviation increase in the exposure of all banks lending to an exporter, reduced exporters' total bank debt by approximately 1.6% after the policy implementation, while Column (4) documents a 2.8% reduction for importers.

The absence of pre-trends, as illustrated in Figure 5, supports a causal interpretation, with the negative and significant effects appearing only after the policy implementation. Importers exhibit a more pronounced and persistent decline in total debt, suggesting that exporters were better able to rely on multiple banking relationships to partially mitigate the impact of the shock.

Overall, our results suggest that Spanish firms engaged in international trade were unable to fully offset the policy's effects by borrowing from less exposed banks. This limitation is stronger for importers, while exporters appear to have mitigated roughly half of the impact.[11]

[11] Our baseline classification of exporters and importers allows for overlap–some exporters also import, and vice

5.1.1 Additional checks

To further support the interpretation that our results are driven by the domestic regulatory shock, rather than by shocks to firms' trade partners, we conduct three additional tests. First, following Paravisini et al. (2023), we account for potential bank specialization by augmenting specification (1) with interactions between the *Policy* dummy and indicators capturing whether a bank specializes in countries to (or from) which the firm exports (or imports).[12] As shown in Table A.3, the coefficient on the $Exposure \times Policy$ interaction remains statistically significant and stable, indicating that bank specialization does not drive our main results. Second, we include non-tradable firms in the analysis and find no differential effect relative to tradable firms (Table A.4), suggesting that foreign demand shocks are not behind the observed credit effects. Third, we assess firms' ability to substitute bank credit with non-bank financing. As shown in Panel B of Table A.5, importers exposed to more affected banks experienced a decline in total debt (including non-bank and equity), as well as in investment and employment, indicating limited substitution through alternative funding sources and reinforcing the real effects of the policy. In contrast, exporters' overall debt levels remain unaffected (Panel A), suggesting that they were able to offset the policy's impact by accessing alternative sources of financing.[13] This finding is consistent with our descriptive statistics in Tables A.6 and A.7, which show that the average exporter is larger, more established, and financially stronger than the average importer, carrying greater bank debt and total debt, a higher share of collateralized debt, more tangible assets, and a larger proportion of long-term financing.

versa. Table A.2 in Appendix presents results separately for firms that are *only* exporters, *only* importers, and both. The findings reinforce our main conclusion: firms that are exclusively exporters appear better able to exploit multiple banking relationships compared to importers.

[12] The specialization measure of bank b in country c is constructed for the 50 main destinations of Spanish exports, as:

$$S_b^c = \frac{\sum_f C_{f,b} \times X_{f,c}}{\sum_j \sum_f C_{f,b} \times X_{f,c}}. \tag{3}$$

The numerator is the sum, across all exporting firms served by bank b, of the outstanding credit of firm f with bank b as of 2011 ($C_{f,b}$), multiplied by the shipped value of exports of firm f to country c ($X_{f,c}$) over the period 2009 to 2013. The denominator is the sum of this term over all destination countries.

[13] The first column in Table A.5 reports estimates from our preferred firm-level specification, restricted to the subset of firms for which annual financial statement data are available. This sample is plausibly skewed toward larger firms, which may explain why, for exporters, the estimated effect of the policy on total bank debt (Panel A, column 1) is not statistically significant, as opposed to the estimates using the universe of exporters. Importantly, while the same sample selection bias applies to importers, the estimated effects for this group remain statistically significant.

5.2 Effect on firm-level trade outcomes

Next, we examine whether the increase in provisioning requirements affected the growth of import and export values for firms more dependent on banks significantly impacted by the policy.

To do so, we use Balance of Payments trade flow data, which provide firm-level information disaggregated by partner country, 2-digit product category, and year. The richness of this dataset allows us to estimate the impact of the policy on firms' trade performance while accounting for a rich set of fixed effects and controlling for shocks in foreign markets.

We estimate the following equation:

$$y_{f,c,g,t} = \alpha_{f,c,g} + \alpha_{c,g,t} + \alpha_{p(f),i(f),t} + \theta \times Exposure_f \times Policy_t + \varepsilon_{f,c,g,t}, \tag{4}$$

where our dependent variable is the mid-point growth rate of firm f's exports (imports) of product g to (from) country c in year t, relative to the five-year average of exports (imports) of that product to (from) the same country during 2009-2013.[14] Notably, this dependent variable enables us to capture market entries and exits, which are indicated by a zero value in exports or imports (Cortés et al., 2020).[15] *Exposure* is defined as in equation (2), and *Policy* is a dummy variable that takes the value one in 2012 and 2013, and zero otherwise. Furthermore, we include a rich set of fixed effects following Paravisini et al. (2014). First, we include firm-country-product fixed effects to account for unobserved factors that do not vary over time, such as the firm's specific knowledge of the market for product g in country c. Second, we introduce country-product-year fixed effects. For exports, these fixed effects capture demand shocks for product g in the destination country c, such as fluctuations in consumer demand or changes in local regulations affecting product g in country c at time t. While for imports, they account for supply shocks in the country of origin c, such

[14] Specifically,

$$y_{f,c,g,t} = \frac{Z_{f,c,g,t} - \overline{Z}_{f,c,g}}{1/2(Z_{f,c,g,t} + \overline{Z}_{f,c,g})},$$

where $\overline{Z}_{f,c,g} = 1/5 \sum_{t=2009}^{2013} Z_{f,c,g,t}$ for Z = Exports, Imports.

[15] Given the granularity of our trade-flows data, which results in numerous zero observations in certain periods, our preferred specification employs the mid-point growth rate. This approach mitigates volatility in our dependent variables by reducing the influence of extreme values and ensures bounded growth rates, particularly in the presence of firm entry and exit. Our results remain robust when using the logarithm of trade flows as the dependent variable, with these alternative estimates available upon request.

as production disruptions, or changes in trade costs that affect the availability or price of product g sourced from country c. This specification allows us to compare the export (import) value of product g to (from) country c across firms selling (buying) the same product in the same foreign market. We further augment the regression with province-industry-year fixed effects to account for local economic conditions, for example, regional demand for imported goods or supply capacity for exports within a given sector and year. This ensures that we are comparing firms operating in the same geographic and sectoral environment. Standard errors are double-clustered at both the firm level and the firm's main bank level.

Given the granularity of our data, we exclude the smallest transactions in the sample–those representing less than 1% of total export or import value between 2009 and 2013.[16] This restriction helps ensure that our results are not driven by very small or highly volatile trade flows. Furthermore, trade flow dynamics at the firm level are relevant along both the intensive and extensive margins, and our dependent variable captures both dimensions (see Panel D of Table 1).

[Table 4]

The results of this analysis are presented in Table 4. In columns 1 and 2, we use the mid-point growth rate as the dependent variable, which allows us to capture both the intensive and extensive margins. In columns 3 to 6, we disentangle the policy effect along the extensive margin by employing binary indicators of entry and exit in a particular market. *Entry* takes the value of one if exports (imports) by firm i of product g to (from) country c are strictly positive at time t, conditional on exports (imports) being zero in the previous period. Conversely, *Exit* takes the value of one if exports (imports) by firm i of product g to (from) country c are zero at time t, conditional on exports (imports) being strictly positive in the previous period.

The results indicate that the increase in provisioning requirements had a significant negative impact on the trade flows of both exporters and importers, with more pronounced effects on imports. Column 1 shows that, following the policy implementation, a one standard deviation increase in a

[16] Specifically, we exclude firm-level exports to destination markets where the average annual export value was below 29,000 euros over the 2009-2013 period, and imports from origin markets where the average annual import value was below 35,000 euros.

firm's exposure to banks heavily involved in the construction and real estate sectors is associated with a 2% significant decline in exports. The corresponding decline for imports is 3.6%, suggesting a stronger response of import activity to the credit shock. These effects are also economically meaningful, representing 10% and 14% of the year-on-year growth rates of exports and imports, respectively, in the year prior to the policy implementation.

We also find significant effects along the extensive margin. Firms with one standard deviation higher exposure were 0.9% more likely to exit export markets and 1.4% more likely to exit import markets (columns 5 and 6 of Table 4). In terms of market entry, we find a significant effect only for imports: these firms were 0.7% less likely to enter new import markets following the policy shock (column 4 of Table 4).

[Table 5]

Additional results in Table 5 show that firms more exposed to affected banks experienced a decline in the growth rate of trade diversification and aggregate trade flows. Exporters reduced the number of destination countries and products shipped, while importers contracted the number of origin countries. Firm-level trade flows also declined in line with our main estimates.

[Figure 6]

Figure 6 illustrates dynamic effects of the policy on firm-country-product trade growth by interacting exposure with year dummies (relative to 2011). We find no evidence of pre-trends. Import growth declines significantly post-policy, while export growth follows a similar pattern but shows partial recovery in 2013.

Our first-stage results suggest that exporters–particularly those with access to alternative bank and non-bank financing–were better able than importers to offset the impact of the policy on total credit. To assess whether this is consistent with our trade flow results, we conduct several additional tests. First, we re-estimate our firm-country-product specification using trade-weighted regressions (Table A.8). The effect on exporters' trade flows becomes statistically insignificant, while the impact on import flows remains robust and significant. Second, in Table A.9, we find

that the policy's effect is concentrated among small exporters (bottom 25% by export value), with no significant impact on larger exporters, who account for 75% of total export value. In contrast, the impact on imports is consistent across firm groups, suggesting a more uniform contraction in import demand.

These findings indicate that the estimated average decline in exports was primarily driven by smaller, potentially more financially constrained firms, with limited implications at the aggregate country-product level. As a result, in the next section, we focus our analysis of cross-border spillovers on the contraction in Spanish import demand, which appears to be the dominant transmission channel of the policy's cross-border effects.

5.2.1 Additional checks

To reinforce that our firm-level trade results are driven by domestic financial conditions rather than foreign supply or demand shocks, and other macroeconomic factors, we conduct several robustness checks. First, Table A.10 in the Appendix examines whether bank-firm relationships mitigated the impact of the financial shock on trade flows. Firms more dependent on a single bank were less affected than those borrowing from multiple banks lending relatively smaller amounts, consistent with the notion that relationship banks protect their clients in downturns (see Bolton et al. 2016). Importers with greater credit line availability also experienced smaller trade contractions, while the effect for exporters is similar in direction but not statistically significant. Firms with more non-performing loans were more adversely affected, particularly importers. These findings underscore the importance of liquidity, relationship strength, and firm risk in buffering the shock, and again suggest that the policy was more financially binding for importers than for exporters.

Second, in Table A.11, we explore the role of trade credit in shaping the impact of the financial shock, distinguishing between trade credit received by importers and trade credit supplied by exporters. We find that importers who relied more heavily on supplier credit–as a share of total debt prior to the policy–were better able to attenuate the negative effects of the credit supply shock. For exporters, a higher share of sales involving trade credit extended to customers is associated

with a more negative impact on trade flows, although the coefficient is not statistically significant.[17] While we cannot identify whether trade credit counterparties are foreign or domestic, Figure A.1 shows that firms more reliant on exports are also more likely to grant trade credit to their customers, while those that import more intensively rely more heavily on supplier-provided trade credit. To account for this correlation, we also control for fixed effects for each quintile of the share of imports to total purchases (column 6) and of the share of exports to total sales (column 3), interacted with time dummies. Overall, our findings suggest that foreign suppliers may have helped alleviate the financial shock for importers.

Third, we perform sensitivity analyses excluding sequentially each of the top 10 destination (for exports), origin countries (for imports), and product categories to ensure our results are not driven by particular markets or goods. Figure A.2 and Figure A.3 show that the estimated coefficients remain statistically significant and stable. Additionally, to rule out confounding effects from the sovereign debt crisis, we exclude firms highly exposed to GIIP countries.[18] Table A.12 shows results remain barely unchanged.

Finally, it is worth mentioning the work of Almunia et al. (2021), who argue that, following the Great Recession in Spain (2009–2013), local firms experienced a decline in marginal production costs, which translated into competitiveness gains that contributed to an unprecedented 31% increase in exports over this period–coinciding with our timeframe of analysis.[19] One might argue that this domestic demand shock could partially explain the differential change in exports that we find. Furthermore, the relatively muted impact of our policy intervention on exports might reflect attenuation resulting from the export boom during this period. We argue that this is unlikely for two reasons. First, by including time-varying fixed effects at both the province and industry levels we account for the local demand shocks identified by Almunia et al. (2021). Second, we show that there is no geographic sorting of banks with varying exposure to the regulation. In particular, we examine if, for instance, firms operating in provinces that experienced larger domestic sales drops

[17] This direction is consistent with the idea that supplying trade credit increases vulnerability by tightening liquidity constraints.

[18] Exposure is measured using 2006 data (prior to the 2008 GFC) as the share of trade with Greece, Italy, Portugal, and Ireland. We drop firms in the top quartile of this distribution.

[19] The authors exploit geographic variation in the recession's impact to estimate the causal relationship between a demand-driven decline in domestic sales and the subsequent rise in exports.

(as identified by Almunia et al. (2021)'s boom-bust sales indicators) relied more (or less) on lending from highly treated banks. Figure A.4 show no clear correlation between provinces' sales declines and the regulation exposure of the top 10 banks with a higher share of total lending allocated to those areas. This finding holds whether using province-level sales variation (Panel A) or changes in the number of vehicles per capita as a proxy for local manufacturing demand (Panel B).[20]

5.3 Cross-Border Spillovers

5.3.1 Effect on other countries' exports to Spain

In this section, we estimate the extent to which Spain's trade partners were affected by the increase in Spanish banks' loan loss provisions through international trade linkages. As previously noted, the decline in trade flows among Spanish firms highly exposed to the policy–through their relationships with the most affected banks–does not necessarily imply a contraction in Spain's aggregate trade flows. For example, reduced demand for machinery from highly exposed firms in the wine industry could, in equilibrium, be offset by increased demand from less exposed firms whose banks were less affected by the policy.[21] Thus, a small or even null response in total Spanish imports is consistent with our firm-level findings. Conversely, even if total Spanish imports exhibit a significant decline after the regulation, foreign exporters may still reallocate shipments to alternative destinations. (Almunia et al., 2021).[22]

To test the role of general equilibrium forces in shaping the cross-border effects of domestic bank regulations, we use BACI data, which report the value of trade flows by country of origin, destination, and product (defined at the 2002 Harmonized System level). The dataset is annual, and we focus on the period 2009-2013. Given the level of aggregation, we construct a measure of

[20] Since we do not have direct access to the authors' data, we derived the provincial classifications by reverse-engineering the information presented in Figure 3 of Almunia et al. (2021).

[21] This is particularly relevant for firms engaged in international trade. Since they are typically large, they can capture market share from competitors facing negative shocks.

[22] This section focuses exclusively on the impact of the policy-driven contraction in import demand, since Spanish exports remain largely unaffected–owing to large exporters mitigating most of the policy's effects; see Section 5.2.

exposure to the policy at the product–country-of-origin level as follows:

$$\text{Exposure}_{go} = \sum_b w_b^{go} \times \text{Exposure}_b \,, \qquad \text{where } w_b^{go} = \frac{\sum_f L_{fb} \times M_f^{go}}{\sum_b \sum_f L_{fb} \times M_f^{go}} \tag{5}$$

and L_{fb} represents the outstanding debt that firm f holds with bank b, and M_f^{go} denotes firm f's imports of product g from country o. This measure represents the weighted average exposure of banks, where the weights w_b^{go} capture each bank's relative importance in financing imports of good g from country o. To construct this measure, we use information from the end of 2006–three years prior to the start of our sample period.[23] Markets–defined as product–country-of-origin pairs–are considered as highly exposed to the policy if their imports rely more heavily on banks most affected by the regulation. The distribution of this exposure measure, shown in Figure 7, reveals substantial variation in market exposure to the shift in domestic bank provisions.

[Figure 7]

We begin this level of analysis by examining the impact of market-level exposure to the regulation. Specifically, we compare the evolution of exports to Spain from highly versus less exposed markets, before and after the policy, relative to exports to other countries from the same markets, within a triple difference-in-differences setting:

$$\frac{X_{godt} - \overline{X}_{god}}{(X_{godt} + \overline{X}_{god})/2} = \gamma \times \text{Exposure}_{go} \times \mathbb{1}[d = \text{Spain}] \times Post_t + \delta_{god} + \delta_{gt} + \delta_{ot} + \delta_{dt} + u_{godt}, \tag{6}$$

where X_{godt} denotes exports of product g from country-of-origin o to country-of-destination d in year t. Thus, our dependent variable is a mid-point growth rate relative to the corresponding average value in the sample period. $Exposure_{go}$ is defined as in equation (5) and is multiplied by an indicator equal to one when Spain is the importing country and by $Post_t$, which is a dummy that takes the value of one in the years after the policy implementation–2012 and 2013. We include time-invariant product×origin×destination fixed effects denoted by δ_{cgo}, and time-varying fixed effects

[23] From 2008 onward, the representativeness of the Balance of Payments data by country and product declines due to a change in reporting procedures; see Prades and Villegas-Sanchez (2022) for details. We therefore use 2006 as the baseline year to compute market-level exposure and match it with BACI trade flows. For all other exposure measures–bank-level and firm-level–we employ end-of-year 2011 data.

at the product, origin, and destination level, denoted by δ_{gt}, δ_{ot}, and δ_{dt}, respectively. Given the granularity of our data, we trim extreme values of Spanish participation by (i) excluding markets where Spanish purchases represent less than 1.1 percent (the median) and (ii) excluding markets where Spain accounts for more than 90 percent of total purchases. After this trimming, the sample covers 91 percent of Spain's total purchases.[24]

Our parameter of interest, γ, captures the impact of Spanish loan loss provisions on Spanish imports relative to those of other countries. If firms less exposed to the policy offset the decline in imports from more exposed firms, exports to Spain will not differentially respond to our market-level exposure after the policy, and γ will be zero. We identify this parameter using a triple-differences approach that flexibly controls for market-specific shocks through time-varying fixed effects, thereby relaxing the identifying assumption. This specification also addresses the concern that our market-level exposure to the Spanish regulation could be correlated with product- or exporter-specific trends coinciding with the increase in loan loss provisions. In addition, by including destination×year fixed effects, we account for demand shocks occurring simultaneously with the policy. Thus, our identifying assumption is that, absent the policy, the difference in Spanish imports between high- and low-exposure markets would have evolved similarly to the corresponding difference in other countries.

As a robustness check, we re-estimate the triple-differences specification replacing destination×year fixed effects with a restricted set of importers comparable to Spain. Specifically, we consider EU members and other advanced economies as defined by Autor et al. (2013).[25] Additionally, we exclude Greece, Italy, Ireland, and Portugal (GIIP) from the set of exporters to address potential identification concerns related to the decline in their exports to Spain during the sovereign debt crisis.

[Table 6]

We report our results in Table 6. Column (1) shows that one standard deviation higher market

[24] Results are robust to including all markets.

[25] Specifically, high-income countries with comparable trade data: Australia, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Portugal, Spain, Switzerland, and the United States.

exposure is associated with a 3.2 percent decline in exports to Spain relative to exports to other countries in a naive specification with market-destination and destination-year fixed effects. Column (2) reports a similar effect in a more saturated specification that includes time-varying product fixed effects. Our benchmark specification in Column (3) adds time-varying origin fixed effects to control for supply shocks and indicates that a one standard deviation increase in exposure leads to a 2.1 percent decline in exports to Spain–relative to exports to other countries from the same markets–after the policy. Column (4) shows similar results when restricting the sample to EU founders and other advanced economies that are likely to face demand patterns similar to Spain. Finally, Column (5) finds consistent effects when excluding GIIP exporters from the sample.

[Figure 8]

Figure 8 presents the event-study graph corresponding to our benchmark specification. We find no statistically significant effect of market exposure on Spanish imports prior to the policy, consistent with our identifying assumption. After the policy, however, exports to Spain from highly exposed markets decline persistently relative to exports to other destinations. Overall, these results confirm that reallocation across Spanish importing firms was limited: the firm-level decline in imports documented in Section 5.2 translated into an aggregate contraction in Spain's import demand.

Despite the advantages of our triple-differences specification in controlling for multiple demand and supply shocks beyond the increase in Spanish loan loss provisions, the narrow level of disaggregation in our data raises the concern that results may be disproportionately driven by small destination markets, which could follow different dynamics than larger ones. To address this, we complement our analysis by aggregating the data to the market level and estimating the following standard difference-in-differences specification:

$$\frac{X_{got} - \overline{X}_{go}}{(X_{got} + \overline{X}_{go})/2} = \beta \times \text{Exposure}_{go} \times Post_t + \delta_{go} + \delta_{x(g)t} + \delta_{x(o)t} + \delta_{x(o,g)t} + u_{got}, \tag{7}$$

where X_{got} denotes exports of product g from country o either to Spain or the rest of the world in year t. In this aggregate analysis, we cannot saturate the model with high-dimensional fixed

effects. Instead, we include time-varying fixed effects for different categories of exporters and products: $\delta_{x(o)t}$ captures exporter characteristics such as distance to Spain and official language, while $\delta_{x(g)t}$ accounts for product differentiation. In principle, exports to Spain may also respond to Spain's relative importance in a given market, not only to our exposure measure. To isolate the policy effect, we therefore include market-level time-varying fixed effects by deciles of Spanish participation, $\delta_{x(o,g)t}$, which allow us to compare markets with similar levels of dependence on Spain.

[Table 7]

Our results are consistent with our triple difference-in-differences specification. Our benchmark specification reported in column (3) of Table 7 shows a decline of 2.7 percent in exports to Spain, while column (7) shows an insignificant response of aggregate exports to other countries. Results remain almost unchanged when excluding GIIP exporters in columns (4) and (8). Figure 9 shows the event-study graph associated with our average effects reported in column (3). We can observe a decline in exports to Spain after the increase in loan loss provisions to Spanish banks, with no evidence of pre-trends. Overall, our results are similar to those reported in Table 6, suggesting that the impact of the policy is not driven by the evolution of small destination markets.

[Figure 9]

5.3.2 Attenuation of Spanish shock

Having established that Spanish import demand declined as a result of the policy, we now explore how Spain's trade partners responded to this contraction. Exporters can attenuate the decline in Spanish demand by offering more favorable trade terms to Spanish importers. For example, exporters can offer longer repayment periods through trade credit, which can help alleviate the credit constraints faced by Spanish firms.

We begin by examining the role of financial development in origin countries and test the hypothesis that exporters with access to more developed financial sectors are more likely to offer

favorable trade finance terms.[26]

[Table 8]

Our results in Table 8, where we estimate equation (7) with exports to Spain as the dependent variable, show how financial development shapes the attenuation of the decline in Spanish imports. Column (1) shows that exporters in highly financially developed countries fully offset the Spanish credit contraction, leaving exports to Spain unaffected. By contrast, Column (2) indicates that a one standard deviation increase in regulatory exposure reduces exports to Spain by 3.3 percent for partners with weaker financial development.[27] These results support our hypothesis that exporters in deeper financial systems are better able to absorb credit-driven demand shocks by extending more favorable trade finance conditions to importers. They are also consistent with firm-level evidence showing that Spanish importers with established trade credit relationships with suppliers experienced smaller import declines (Section 5.2). Taken together, this evidence underscores financial development as a key factor in containing cross-border spillovers of bank regulatory shocks through international trade linkages.

Then, we explore how country-specific characteristics that are associated with trade costs interact with financial development. Higher trade costs create a stronger need for external financing, thereby limiting exporters' ability to offer more favorable trade credit terms. For instance, exporters located farther from Spain face higher variable trade costs, as longer shipment times intensify liquidity pressures. Likewise, exporters from non-Spanish-speaking countries may face higher fixed trade costs, as exporting to Spain often requires investments to overcome language barriers.

Our results are reported in Table 8. The decline in exports from less financially developed countries is concentrated among those that are geographically distant from Spain and do not share a common language. Columns (3) and (4) show that a one standard deviation increase in exposure leads to a statistically insignificant 2.2 percent decline for exporters located close to Spain (in the

[26] It is well established that countries with more developed financial markets export more, particularly in industries that rely heavily on external financing (Beck 2002, 2003; Chan and Manova 2015).

[27] Figure 10 plots the density of market exposure by financial development group and shows that the distributions are similar, addressing concerns that our findings may be driven by a negative correlation between exposure and financial development.

bottom quartile of the distance distribution), but a significant 3.6 percent decline for those farther away. Similarly, columns (5) and (6) indicate no effect for Spanish-speaking countries, while the effect is significantly negative for non-Spanish-speaking countries.[28] Finally, column (8) shows a 3.9 percent contraction in exports for countries that are both distant and non-Spanish-speaking, whereas column (7) reveals no significant effect for countries that are either close to Spain or Spanish-speaking.

Table 9 reports results from a parallel analysis using exports to destinations other than Spain as the dependent variable. In this case, neither financial development nor trade costs play a role. Taken together, these results confirm that trade costs–stemming from greater distance and language barriers–amplify spillovers specifically by limiting exporters' ability to attenuate the contraction in Spanish import demand.

The role of Spanish global banks. Spanish banks operate across multiple countries and provide financing to firms engaged in international trade. As a result, our estimates may partially capture a reduction in business loans by Spanish banks abroad, similar to the mechanism documented by Tripathy (2020). Our results remain robust when including exporter-year fixed effects, which already control for the presence of Spanish banks in foreign countries. Nonetheless, the trade channel could still be amplified by the Spanish banking footprint in foreign markets. For example, if Spanish banks are specialized in firms exporting to Spain (Paravisini et al., 2023), the impact of our market exposure would be larger.

To assess the role of this financial channel in driving our results, we use BankFocus data to track the footprint of Spanish banks in foreign countries. We then compare exports from countries without a Spanish bank presence–representing 75 percent of our observations and 80 percent of Spanish purchases–to those from countries where Spanish banks do operate.

[Table 10]

Our results reported in Table 10 demonstrate that the presence of Spanish banks does not alter

[28] Figure 11 plots the density of market exposure across country groups defined by trade costs and shows that the distributions are similar.

the response of other countries' exports to Spain. Columns (1)-(2) show that exports from high financially developed countries remain unaffected by the regulatory shock regardless of Spanish bank presence. Similarly, the decline of exports from low financially developed countries shows no significant variation based on whether Spanish banks operate or not. Furthermore, we find no evidence that Spanish bank operations meaningfully interact with trade costs. This pattern clearly indicates that the cross-border transmission mechanism for Spanish loan loss provisions operates independently of internal capital markets of Spanish global banks. Rather, the cross-border effects continue to be driven by financial development at origin and trade costs. These results reinforce our main conclusion that the spillover effects are channeled through international trade linkages rather than through multinational banking networks.

5.3.3 Aggregate effects on Spain's trade partners and export reallocation

We now examine the aggregate implications of the documented decline in Spanish imports. The impact of our market-level treatment defined in equation (5) may be amplified or dampened by Spain's share in other countries' exports. For instance, a market can be highly exposed to Spanish loan loss provisions if Spanish importers in that market rely heavily on treated banks. However, if Spain represents only a small share of that market's exports (at the product $\times$ origin level), the aggregate exposure is effectively low. To account for this, we construct the following measure of exposure:

$$\text{Aggregate Exposure}_{go} = \frac{X_{go\,\text{Spain}}}{X_{go}} \times \text{Exposure}_{go}. \tag{8}$$

Where $\frac{X_{go:\text{Spain}}}{X_{go}}$ denotes Spain's share of country o's exports of product g prior to the policy.[29] Thus, for markets to be highly exposed to the regulation, Spanish importers must rely on highly treated banks, and Spain must represent a substantial share of purchases in those markets. We then re-estimate the difference-in-differences equation (7), using our new exposure measure as the

[29] Shares are calculated using 2006 data, consistent with the product exposure measure in equation (5).

independent variable and markets' total exports as the dependent variable, as follows:

$$\frac{X_{got} - \overline{X}_{go}}{(X_{got} + \overline{X}_{go})/2} = \rho \times \text{Aggregate Exposure}_{go} \times Post_t + \delta_{go} + \delta_{x(g)t} + \delta_{x(o)t} + u_{got}, \tag{9}$$

Thus, our parameter of interest, ρ, measures the cross-border effects of Spanish loan loss provisions and is identified by comparing total exports in highly exposed markets to those in less exposed markets, before and after the regulation. If Spain's trade partners faced no frictions in reallocating sales away from Spain, our exposure measure would have no effect on total exports. Conversely, we would observe a significant decline in total exports delivered by Spain's trade partners.

[Table 11]

We report our results in Table 11. Column (1) shows that markets with one-standard deviation higher exposure experience a 1.6 percent decline in total exports after the policy. Although not statistically significant at conventional levels, this aggregate effect reflects a 3.4 percent contraction in exports to Spain and an insignificant response of exports to other destinations, as shown in columns (2) and (3). To explore heterogeneity, we split markets into two groups based on Spain's share in their total sales, such that each group accounts for 50 percent of Spain's total imports.[30] Columns (4)-(6) show that the effect of aggregate exposure is statistically insignificant in markets where Spain accounts for a small share of sales. By contrast, columns (7)-(9) show that in markets where Spain is a major buyer, aggregate exposure leads to a 2.8 percent decline in total exports, driven by a 4.5 percent contraction in sales to Spain, with no evidence of reallocation to other countries.[31]

[Figure 12]

[30] Markets with high Spanish share are those in which exports to Spain represent more than 6 percent of total sales.

[31] Table A.13 in the Appendix conducts a similar analysis, estimating the impact of our aggregate exposure in countries that are geographically distant from Spain and do not share a common language. Columns (2), (5), and (8) show that exports to Spain decline sharply in these higher-trade-cost countries, consistent with our main results, which in turn drives the aggregate export response in columns (1), (4), and (7). By contrast, the response of exports to other destinations is unrelated to the trade costs of exporting to Spain.

Figure 12 presents the event-study graph corresponding to the average effect reported in column (7) of Table 11. The decline in total exports of highly exposed markets emerges only after the policy implementation, while exports of differently exposed markets followed parallel trends prior to 2011, consistent with our identifying assumption. These results suggest that loan loss provisions generated aggregate effects on other countries through international trade linkages, as reallocation was limited for the average market.

Spain's trade partners may also adjust to the decline in Spanish demand by reallocating sales to other destinations. To assess the role of this adjustment margin, we conduct a heterogeneity analysis at the product level. Homogeneous products, such as commodities, can be reallocated across countries relatively easily, whereas heterogeneous products–where buyers demand differentiated varieties–pose greater difficulties for reallocation. Using BACI data, we compute an implicit price for each HS 6-digit product–country pair by dividing total value by total weight, and then calculate the variance of these prices at the HS 2-digit level. Products with price dispersion in the bottom quartile are classified as homogeneous, while those above this cutoff are defined as heterogeneous.

[Table 12]

We report our results in Table 12, restricting the analysis to countries where the decline in Spanish demand was most pronounced–those with low financial development, geographically distant from Spain, and without a common language.Columns (1) to (3) show our estimation results when product prices are more dispersed (i.e., products are more heterogeneous). We find that total exports fall by 9%, entirely driven by a contraction in exports to Spain that is not offset by sales to other destinations. By contrast, when products are relatively homogeneous, exports remain statistically unaffected, as shown in column (4). Columns (5) and (6) further indicate that although countries continue to experience a sharp decline in exports to Spain, they are able to reallocate homogeneous products to alternative markets, fully compensating for the contraction in Spanish imports.[32]

Overall, our findings suggest that exporters face two types of frictions when attempting to

[32] Figure 13 plots the density of market exposure across product groups defined by price dispersion and shows that the distributions are similar.

smooth demand shocks in a partner country. Attenuation frictions arise in financially less developed countries, where limited access to external finance restricts exporters' ability to ease importers' financial constraints by offering more favorable trade terms. These frictions become especially binding when exporters also face high trade costs to serve the Spanish market. Reallocation frictions, by contrast, stem from product differentiation, which limits exporters' capacity to redirect sales of highly differentiated products to alternative destinations.

6 Conclusions

This paper provides novel evidence of an international trade channel through which domestic bank regulations spill over across borders. Using detailed Spanish administrative and international trade data, we show that financial regulations targeting the domestic banking sector can generate unintended effects on the trade flows of Spain's partners.

We focus on the sharp and unexpected 2012 increase in loan loss provisions for Spain's construction and real estate sectors–a regulaton plausibly unrelated to global trade. Leveraging granular data from the Spanish Central Credit Register (CIR), the quasi-universe of firm-level trade flows, and bilateral trade data from BACI, we estimate the regulation's impact along three dimensions: (1) credit supply to firms engaged in international trade, (2) firm-level trade outcomes, and (3) the total exports of Spain's trade partners.

Our results show that the policy-induced increase in provisions constrained credit supply to firms engaged in international trade, who could not fully substitute through other banking relationships or funding sources. This contraction translated into a significant decline in trade flows, particularly at the intensive margin, with imports falling more persistently than exports. While small exporters were affected, large exporters largely sustained Spanish export flows, underscoring that the primary cross-border transmission channel was the contraction in Spanish import demand.

In the aggregate, we document limited import reallocation within Spain. Our cross-border analysis suggests that the ability of Spain's trading partners to attenuate the policy-driven import demand shock depended significantly on their domestic financial systems. Exporters in financially

developed countries could extend trade credit and absorb the shock, whereas those in less developed financial systems faced stronger frictions–especially when trade costs to Spain were high. Reallocation to alternative markets was also constrained: while homogeneous products were redirected to other destinations, heterogeneous products faced significant declines in total exports.

Taken together, these findings demonstrate that the cross-border consequences of banking regulation are not confined to international capital flows or multinational bank networks. Rather, they propagate through international trade linkages, with distributional effects shaped by financial development, trade costs, and product differentiation.

The evidence presented in this paper carries important policy implications. Domestic policymakers should account for externalities beyond their borders when designing prudential policies. International coordination on financial regulation may therefore be critical, not only to safeguard financial stability, but also to minimize unintended disruptions to global trade.

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Figures and tables

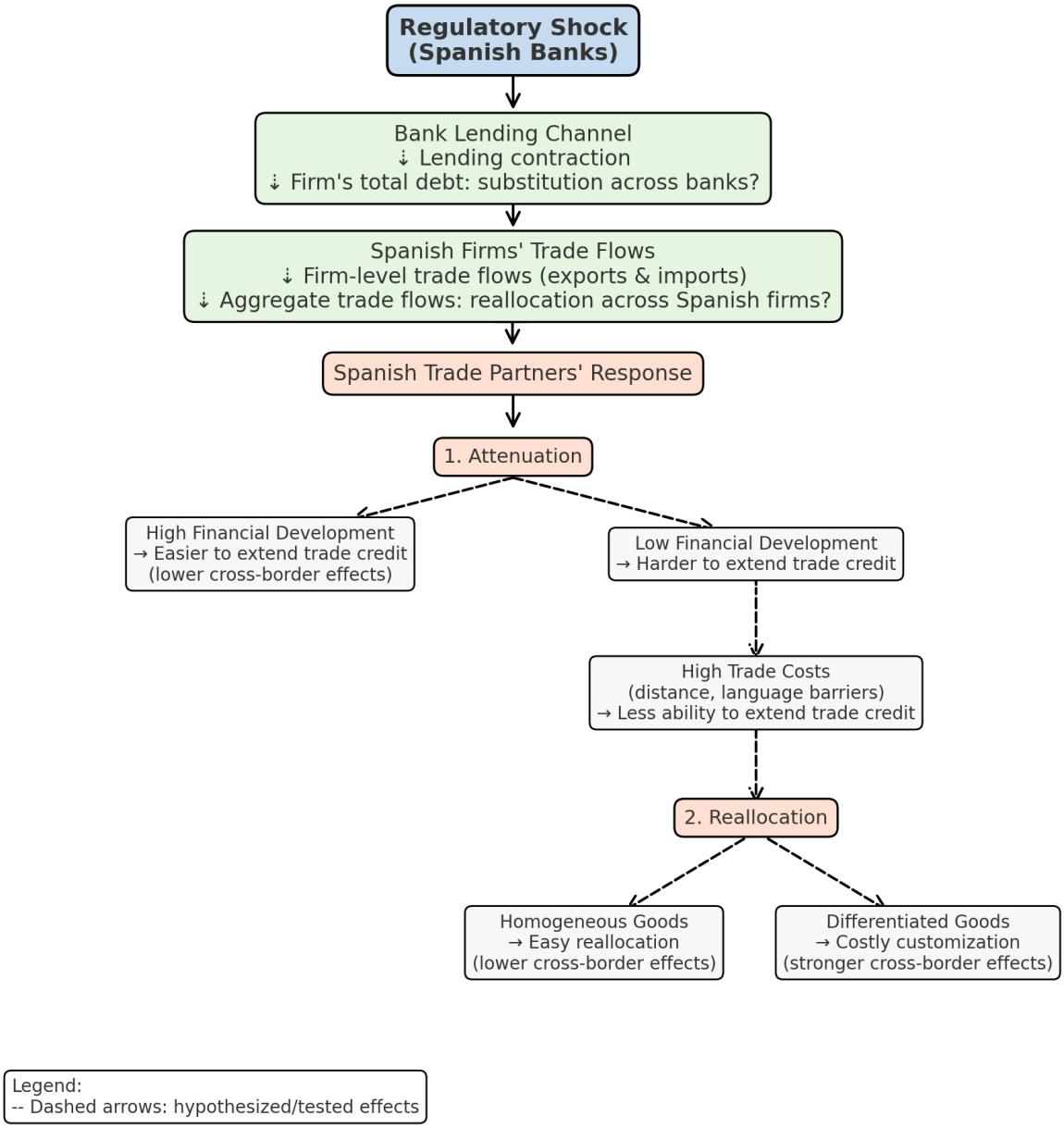


Figure 1: Channels of Cross-Border Spillovers of Bank Regulation

Table 1: Summary statistics

	Obs.	Mean	sd	p25	p50	p75
Panel A: *Bank-firm credit data*						
Log of Credit	1,288,007	5.65	1.65	4.61	5.64	6.65
Long-term credit ratio	1,288,007	54.33	41.08	6.07	59.32	100.00
Collateralization rate	1,288,007	13.40	30.25	0.00	0.00	0.00
NPL ratio	1,288,007	8.07	26.87	0.00	0.00	0.00
Credit share	1,288,007	23.30	22.83	6.34	15.29	32.85
Termination dummy	137,800	0.18	0.38	0.00	0.00	0.00
Panel B: *Firm data*						
Log of Total Bank Credit	316,925	7.17	1.60	6.12	7.09	8.13
Panel C: *Bank data*						
Exposure	83	36.76	16.71	25.70	34.95	47.36
Size	83	14.69	2.38	12.84	14.13	16.63
Capital ratio	83	9.56	6.46	6.66	8.04	10.31
Liquidity ratio	83	5.70	5.73	1.83	3.49	8.12
ROA	83	0.08	1.07	0.11	0.27	0.45
NPL ratio	83	5.39	4.26	2.75	4.84	6.61
Rural bank dummy	83	0.47	0.50	0.00	0.00	1.00
% Lending to X or M	83	34.66	21.11	18.57	34.18	48.59
Local Govt. Credit/Assets	83	2.67	6.20	0.32	1.50	3.08
Panel D: *Balance of Payments data*						
Exports, mid-point growth	649,050	-0.89	1.30	-2.00	-2.00	0.39
Imports, mid-point growth	558,540	-0.84	1.28	-2.00	-1.93	0.39
Exports, Entry dummy	274,933	0.35	0.48	0.00	0.00	1.00
Imports, Entry dummy	214,098	0.35	0.48	0.00	0.00	1.00
Exports, Exit dummy	229,050	0.36	0.48	0.00	0.00	1.00
Imports, Exit dummy	221,390	0.33	0.47	0.00	0.00	1.00
Panel E: *BACI data*						
Imports, mid-point growth	3,141,210	-0.54	1.07	-1.90	-0.28	0.23
Exports, mid-point growth	24,945	-0.07	0.40	-0.17	-0.00	0.11

In Panel A, bank-firm controls are computed using end of 2011 credit information. In Panel C, bank variables are calculated using supervisory financial statements at the end of 2011. All variables are defined in Appendix B.

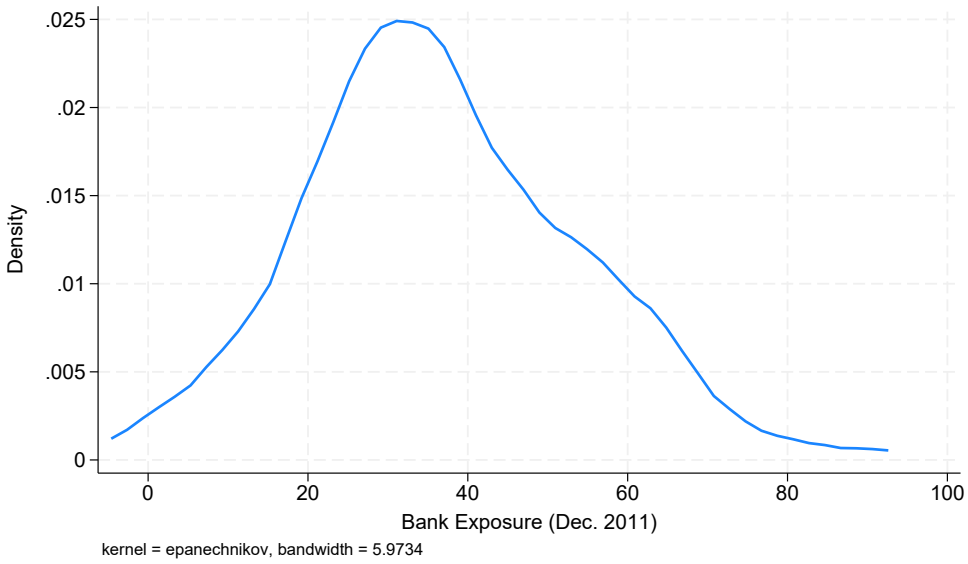


Figure 2: Bank Exposure: Kernel Density Estimate

This figure plots the kernel density of bank exposure defined by the ratio of construction and real estate lending over total corporate loans as of December 2011.

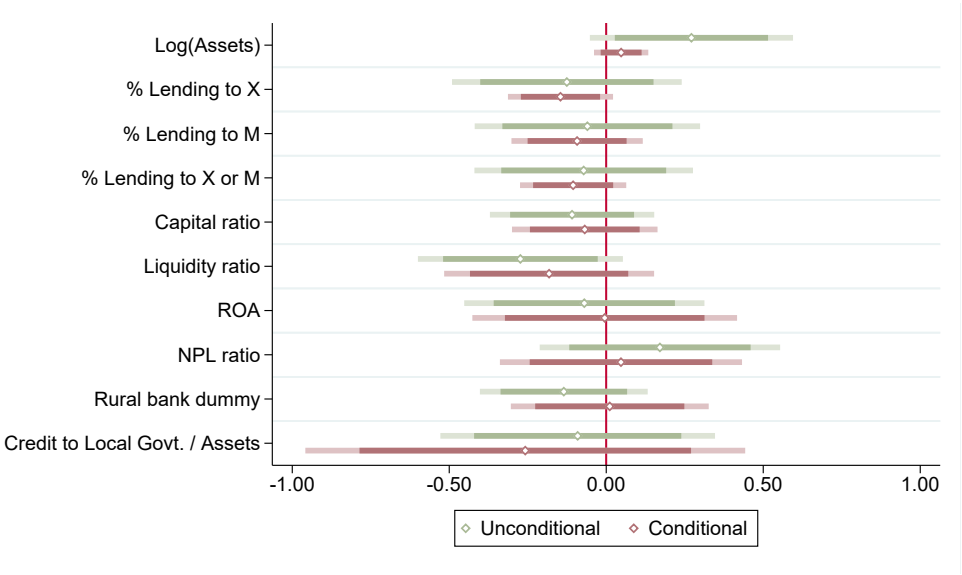


Figure 3: Bank Covariate Balance

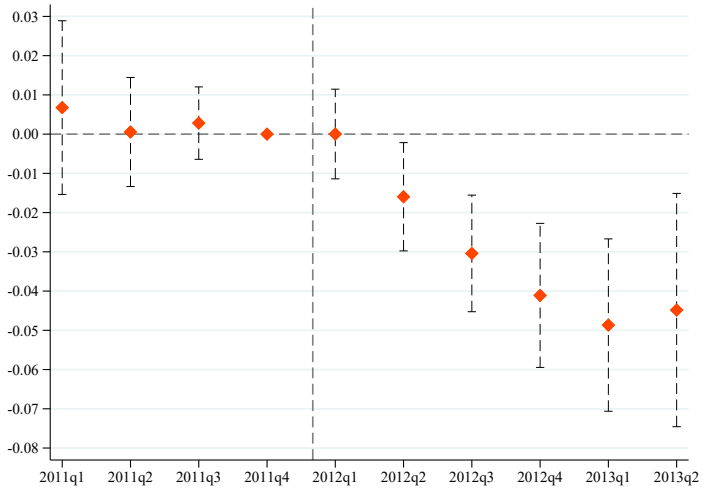
This figure shows coefficient estimates along with 95% confidence intervals (darker bars) and 99% confidence intervals (lighter bars) for the impact of a one standard deviation increase in bank exposure across different variables. All variables are standardized to have zero mean and a standard deviation of one. "Unconditional" estimates compare banks with different levels of exposure without conditioning on any fixed effects. "Conditional" estimates compare banks within the same size quartile (measured by total assets) and the same trade exposure quartile (measured by the share of loans to exporters and importers, excluding real estate and construction loans). Rural is an indicator variable equal to one for rural savings banks, and NPL represents non-performing loans, defined as outstanding debt with a repayment delay of more than 90 days.

Table 2: Impact of Provisioning Shift on Lending to Exporting and Importing Firms, Bank-Firm Level Analysis

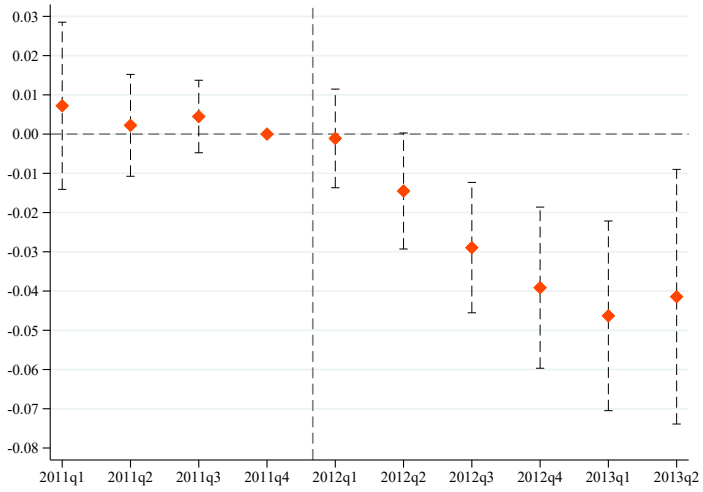
Panel A:	Intensive Margin			
Dep. Variable: Log(Credit)	X		M	
	(1)	(2)	(3)	(4)
Exposure × *Policy*	-0.025**	-0.031**	-0.025**	-0.031**
	(0.011)	(0.012)	(0.011)	(0.013)
Controls×time	No	Yes	No	Yes
Firm-time FE	Yes	Yes	Yes	Yes
Bank-firm FE	Yes	Yes	Yes	Yes
Obs.	973,386	973,386	962,963	962,963
R^2	0.97	0.97	0.97	0.97

Panel B:	Extensive Margin			
Dep. Variable: Termination	X		M	
	(1)	(2)	(3)	(4)
Exposure × *Policy*	0.014*	0.015	0.016*	0.019*
	(0.008)	(0.010)	(0.008)	(0.010)
Controls	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Obs.	103,957	103,957	102,788	102,788
R^2	0.51	0.56	0.52	0.56

This table presents regression results on lending from bank b to firm f at the intensive margin (Panel A) and the extensive margin (Panel B). In Panel A, the dependent variable is the logarithm of credit granted by bank b to firm f in quarter t. In Panel B, conditional on the existence of the lending relationship at the end of 2011, the dependent variable is a dummy variable that takes the value of one if the lending relationship was terminated in the aftermath of the policy and zero otherwise. Columns (1) and (2) correspond to the sample of exporters, whereas columns (3) and (4), importers. *Exposure* is computed as the ratio of construction and real estate lending to total corporate sector lending by bank b as of the end of 2011. *Controls* are measured as of the end of 2011 and include bank-firm characteristics (the collateralization rate, the ratio of long-term lending, the share of firm f's NPLs with the bank, and the share of lending coming from bank b out of firm f's total bank lending) and bank characteristics (dummies for quartiles of size, measured by total assets, and quartiles of exposure to exporter/importer companies, measured as the lending share to exporters and importers relative to total corporate sector lending). All variables are defined in Appendix B. We exclude importing and exporting firms in the construction or real estate sectors. Standard errors are double clustered at the bank and firm levels and reported in parentheses. $***$ $p < 0.01$, $**$ $p < 0.05$, $*$ $p < 0.10$.



Panel A: Lending to Exporters



Panel B: Lending to Importers

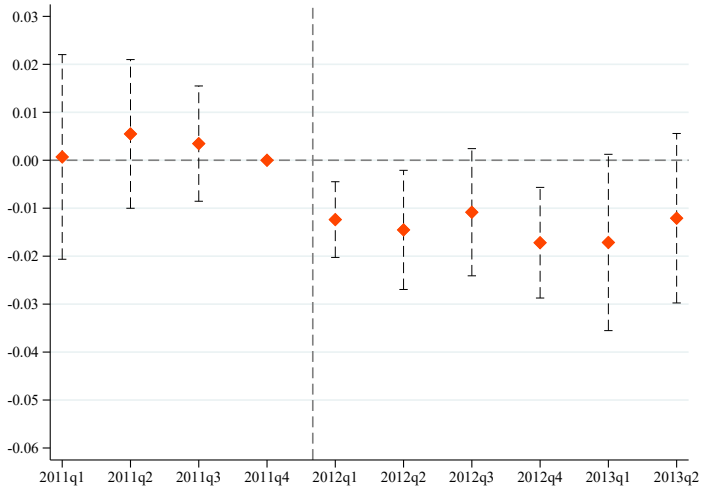
Figure 4: Impact on Lending to Exporting and Importing Firms at the Intensive Margin

This figure plots the event study associated with specification (1), where we replace *Policy* with quarter dummies. Panel (a) includes only exporters, while panel (b) consider only importers. The dependent variable is the logarithm of credit. We drop importing and exporting firms in construction or real estate sectors. Each dot represents the estimated coefficient of the interaction of bank exposure and a quarter dummy. We normalize the coefficient of 2011Q4 to zero. The dashed lines indicate the 2.5%–97.5% confidence interval, with standard errors double clustered at the bank and firm levels.

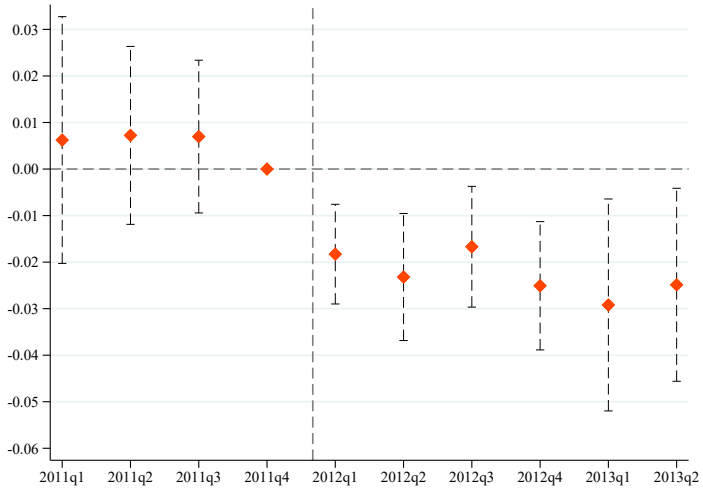
Table 3: Impact of Provisioning Shift on Total Bank Debt to Exporting and Importing Firms, Firm Level Analysis

Dep. Variable: Log(Credit)	X		M	
	(1)	(2)	(3)	(4)
$Exposure \times Policy$	-0.012**	-0.016**	-0.019***	-0.028***
	(0.005)	(0.007)	(0.006)	(0.007)
Controls×time	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Time FE	Yes	No	Yes	No
$\hat{\alpha}_{f,t}$	No	Yes	No	Yes
Obs.	230,099	230,099	228,786	228,786
R^2	0.98	0.98	0.98	0.98

This table presents firm-level regression results for firms' total bank debt, estimated using equation (2). Columns (1) and (2) correspond to the sample of exporters, whereas columns (3) and (4), importers. The dependent variable is the logarithm of firm f's total bank debt. *Exposure* is calculated as the weighted average of the exposure of banks lending to firm f, using outstanding credit at the end of 2011 as weights. To account for credit demand, regressions in columns (2) and (4) include estimated firm-quarter fixed effects obtained from specification (1), while regressions in columns (1) and (3) include quarter fixed effects instead. *Controls* are the weighted average of bank-firm characteristics (collateralization rate, ratio of long-term lending, share of firm f's NPLs with the bank) and bank characteristics (quartiles of size and exposure to exporter/importer companies), measured as of the end of 2011 and weighted by banks' lending to firm f as of 2011. Additionally, we include industry and province indicators as control variables. All variables are defined in Appendix B. Importing and exporting firms in the construction or real estate sectors are excluded. Standard errors are double-clustered at the main bank and firm levels and are reported in parentheses.
$***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.



Panel A: Lending to Exporters



Panel B: Lending to Importers

Figure 5: Impact on Total Bank Debt to Exporting and Importing Firms

This figure plots the event study associated with specification (2), where *Policy* is replaced with quarter dummies. Panel (a) includes only exporters, while panel (b) consider only importers. The dependent variable is the logarithm of firms' total bank credit. To account for credit demand, all regressions include the estimated firm-quarter fixed effects obtained from our bank-firm specification in (1). Importers and exporters in the construction or real estate sectors are excluded. Each dot represents the estimated coefficient of the interaction between a quarter dummy and the firm-level exposure, which is computed as the weighted average of the exposure of banks lending to firm f, using the outstanding credit at the end of 2011 as weights. The coefficient for 2011Q4 is normalized to zero. The dashed lines indicate the 2.5%–97.5% confidence interval, with standard errors double-clustered at the main bank level and firm level.

Table 4: Impact of Provisioning Shift on Firms' International Trade Flows

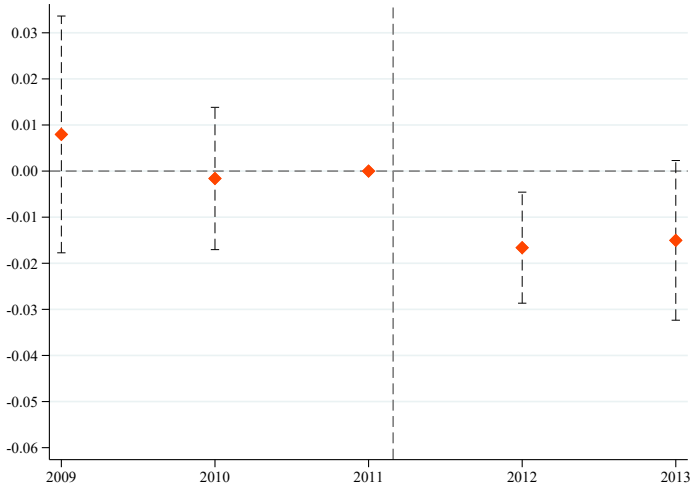
	Mid-point growth		Entry Dummy		Exit Dummy	
	X	M	X	M	X	M
	(1)	(2)	(3)	(4)	(5)	(6)
Exposure × *Policy*	-0.020**	-0.036***	0.000	-0.007**	0.009**	0.014***
	(0.009)	(0.011)	(0.003)	(0.003)	(0.004)	(0.004)
Product-Country-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Province-Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Product-Country-Firm FE	Yes	Yes	No	No	No	No
Firm FE	No	No	Yes	Yes	Yes	Yes
Obs.	649,050	558,540	274,933	214,098	229,050	221,390
R^2	0.17	0.17	0.16	0.18	0.25	0.23

This table presents the regression estimates on firm's trade flows at the product-country-year level. In columns 1 and 2, we compute the mid-point growth rate between firm f's exports (imports) of product g to (from) country c and the 5-year average of firm f's exports (imports) of the same product to (from) that country, and regress it on the firm's exposure and a set of fixed effects. In columns 3 and 4, we employ a binary indicator that, conditional on not participating in the market the previous year, takes the value of one if the firm enters the market. In columns 5 and 6, we use a binary indicator that takes the value of one if the firm exits the market, conditional on participating in the same market the previous year. *Exposure* is computed as the average exposure of banks lending to firm f, with weights based on the outstanding credit as of the end of 2011. *Policy* is a dummy variable that takes the value of one after the provisioning increase. The fixed effects included in each regression are noted in the lower part of the table. All variables are defined in Appendix B. Importers and exporters in the construction or real estate sectors are excluded. Standard errors are double-clustered at the main bank and firm levels and are reported in parentheses. $***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.

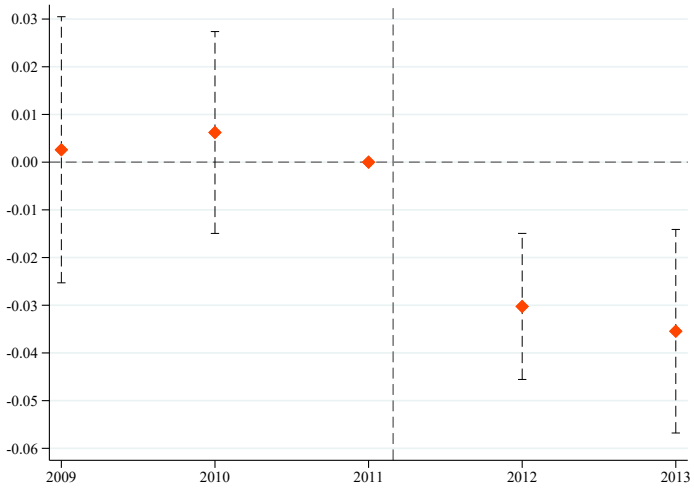
Table 5: Impact of Provisioning Shift on Additional Trade Outcomes

	Mid-point growth (2011:2012)					
	X			M		
	No. Countries	No. Products	Total X	No. Countries	No. Products	Total M
	(1)	(2)	(3)	(4)	(5)	(6)
Exposure	-0.021**	-0.027***	-0.027***	-0.016*	-0.015	-0.032***
	(0.008)	(0.008)	(0.009)	(0.009)	(0.010)	(0.011)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Main Destination FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	20,430	20,430	20,430	22,078	22,078	22,078
Obs.	0.07	0.07	0.07	0.09	0.09	0.08

This table presents the regression estimates for additional firm-level trade outcomes. The dependent variable is the mid-point growth rate between 2011 and 2012 of an exporter (importer) number of trade partners, number of products shipped (imported), and total value of exports (or imports). We regress these variables on the firm's exposure and a set of fixed effects. *Exposure* is computed as the average exposure of banks lending to firm f, weighted by the outstanding credit as of the end of 2011. The fixed effects included in each regression are specified in the lower part of the table. All variables are defined in Appendix B. Importers and exporters in the construction or real estate sectors are excluded. Standard errors are double-clustered at the main bank and firm levels and are reported in parentheses. $***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.



(a) Exports



(b) Imports

Figure 6: Impact of Provisioning Shift on Exports and Imports at the Intensive Margin

This figure plots coefficient estimates from a modified version of the specification in (4). For each year, the coefficient corresponds to the interaction of *Exposure* with a year dummy. Each coefficient measures the impact of a one standard deviation increase in firm f's exposure to the policy on its exports (or imports) growth of good g to (or from) country c, relative to the year before the policy implementation (2011). Panel A presents the estimates for exporters, whereas Panel B presents the estimates for importers. Importers and exporters in the construction or real estate sectors are excluded. The dashed lines indicate the 2.5%–97.5% confidence interval, with standard errors double clustered at the main bank and firm levels.

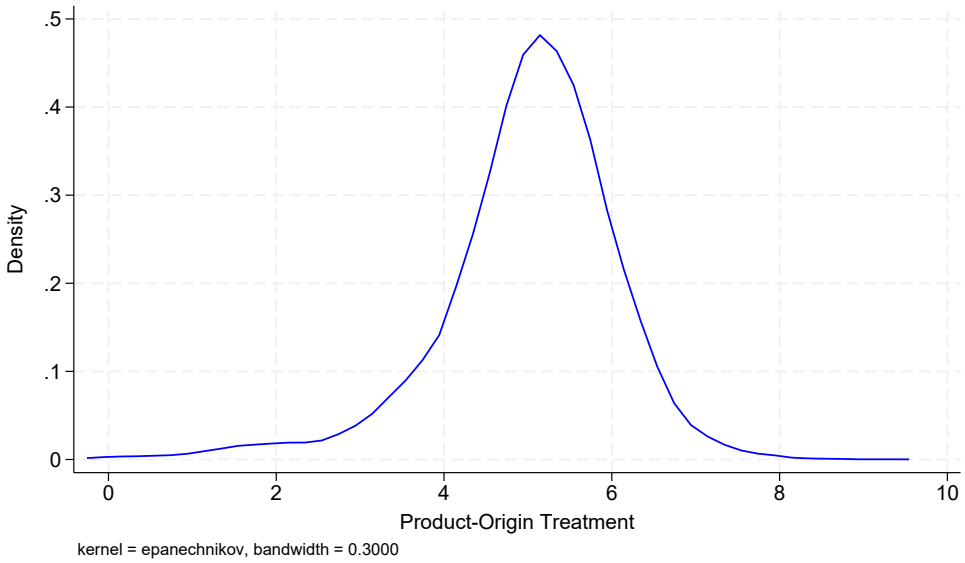


Figure 7: Treatment: Kernel Density Estimate

This figure plots the kernel density of the standardized product-origin treatment.

Table 6: Impact of Provisioning Shift on Exports to Spain Relative to Other Destinations
Triple diff-in-diff

	Mid-point growth				
	All destinations			Comparable destinations	All dest. Excl. GIIP exporters
	(1)	(2)	(3)	(4)	(5)
$Exposure_{go} \times \mathbb{1}[d = \text{Spain}] \times Post_t$	-0.032**	-0.027**	-0.021*	-0.022*	-0.023*
	(0.013)	(0.013)	(0.012)	(0.013)	(0.013)
Observations	1,600,910	1,600,910	1,600,910	144,500	1,394,170
Fixed Effects					
Exporter × Importer × Product	Yes	Yes	Yes	Yes	Yes
Importer × Year	Yes	Yes	Yes	Yes	Yes
Product × Year	No	Yes	Yes	Yes	Yes
Exporter × Year	No	No	Yes	No	Yes

This table presents the regression results for the mid-point growth rate of exports of product g from country o to country d in year t relative to its five-year average. The analysis is based on a product-level measure of exposure, interacted with a dummy variable that equals one when Spain is the importing country, and incorporates different sets of fixed effects, as specified in equation (6). Product exposure is calculated as the weighted average of the exposures of Spanish banks lending to firms importing product g from country o, following equation (5). The fixed effects included in each regression are listed in the lower part of the table. Columns (1) to (3) include all importers, while column (4) focuses on a set of comparable destinations, as those in Autor et al. (2013). Column (5) includes all importers and excludes GIIP exporters. All variables and comparable countries are defined in Appendix B. Standard errors shown in parentheses are clustered by product and country of origin.
$***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.

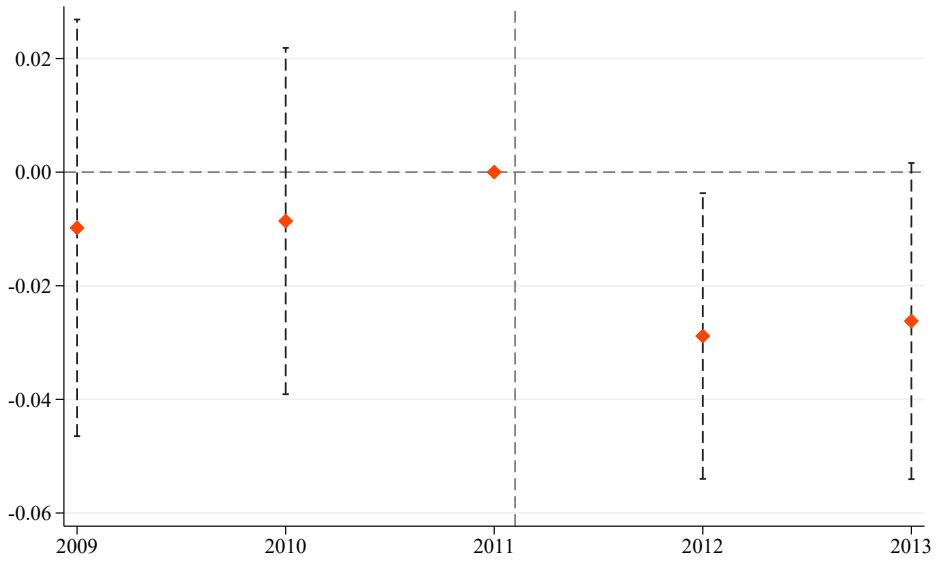


Figure 8: Event Study for the Average Effect of Product Exposure to Provisioning Shift on Exports to Spain Relative to Other Destinations

This figure plots coefficient estimates from a modified version of the specification in equation (6), which coincides with our benchmark specification in column (3) of Table 6. For each year, the coefficient corresponds to the interaction of the product-level exposure, the year dummy, and an indicator equal to one when Spain is the importing country. The dashed lines indicate the 2.5%–97.5% confidence interval, with standard errors clustered by product and country of origin.

Table 7: Impact of Provisioning Shift on Exports to Spain and Other Destinations

	Mid-point growth							
	Exports to Spain				Other Destinations			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Exposure_{go} \times Post_t$	-0.034**	-0.035***	-0.027**	-0.028*	-0.003	-0.004	-0.010	-0.010
	(0.013)	(0.013)	(0.014)	(0.015)	(0.007)	(0.007)	(0.007)	(0.008)
Observations	11,363	11,363	11,363	9,948	11,363	11,363	11,363	9,948
Fixed Effects								
Exporter × Product	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Spanish share decile × Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Product charact. × Year	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Country charact. × Year	No	No	Yes	Yes	No	No	Yes	Yes

This table presents regression results for the mid-point growth rate of exports of product g from country o relative to its five-year average: to Spain (columns 1-3) and to destinations other than Spain (columns 5-7). Columns (4) and (8) report results excluding GIIP exporters. The analysis is based on a product-level measure of exposure, and incorporates different sets of fixed effects, as specified in equation (7). Product exposure is calculated as the weighted average of the exposures of Spanish banks lending to firms importing product g from country o, following equation (5). The fixed effects included in each regression are listed in the lower part of the table. Product characteristics include a dummy for high or low heterogeneity: i.e, low, if price dispersion of the product is at the bottom quartile of the price dispersion distribution. Exporter country characteristics include: distance to Spain indicator (close to Spain if it belongs to the bottom quartile of the distance-to-Spain distribution), official language (Spanish or not). Spanish share corresponds to the participation of Spain in total exports of a specific market (origin×product). All variables are defined in Appendix B. Standard errors shown in parentheses are clustered by product and country of origin.

$***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.

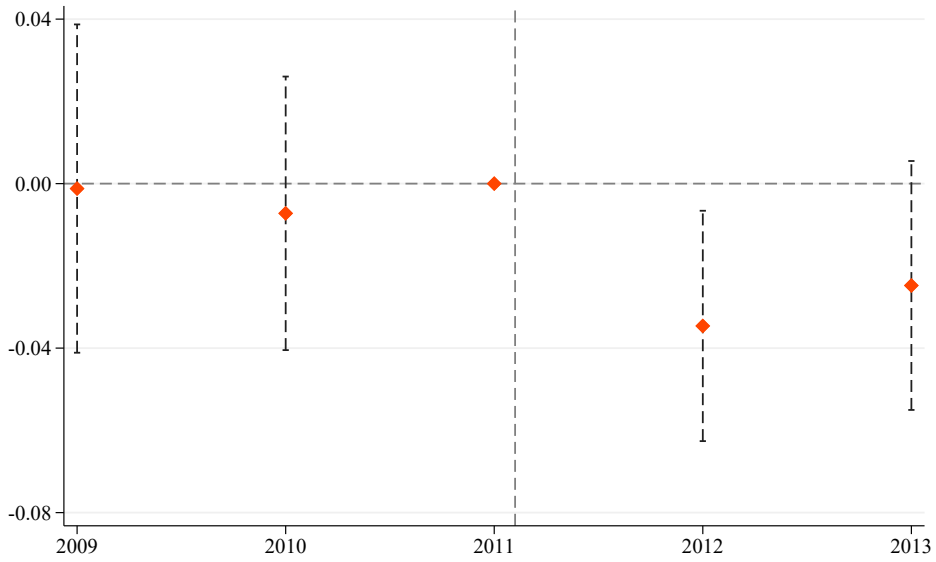


Figure 9: Event Study for the Average Effect of Product Exposure to Provisioning Shift on Exports to Spain

This figure plots coefficient estimates from a modified version of the specification in equation (7), which coincides with our benchmark specification in column (3) of Table 7. For each year, the coefficient corresponds to the interaction of the product-level exposure and the year dummy. The dashed lines indicate the 2.5%–97.5% confidence interval, with standard errors clustered by product and country of origin.

Table 8: Impact of Provisioning Shift on Exports to Spain, by Origin-Country Characteristics

	Mid-point growth Exports to Spain							
	High FD	Low Financial Development						
		All	Distance		Language		Far & Not Spanish	
			Close	Far	Spanish	Other	No	Yes
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Exposure_{go} \times Post_t$	0.005	-0.033**	-0.022	-0.036**	-0.026	-0.035**	-0.023	-0.039**
	(0.024)	(0.016)	(0.034)	(0.018)	(0.055)	(0.017)	(0.031)	(0.019)
Observations	2,703	8,271	1,620	6,651	1,040	7,231	2,660	5,611
Fixed Effects								
Exporter × Product	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Product charact. × Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country charact. × Year	Yes	Yes	Yes	Yes	Yes	Yes	–	–
Spanish share decile × Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table presents the regression results for the mid-point growth rate of exports of product g from country o to Spain, relative to its five-year average. Column (1) reports estimates for exports to Spain from countries with high financial development, defined as those in the top quartile of the private credit-to-GDP ratio. Columns (2)-(8) report estimates for countries with low financial development, those at the bottom three quartiles. Column (2) includes all origins. Columns (3) and (4) correspond to exporters that are geographically close to Spain (bottom quartile of the distance-to-Spain distribution), or far from Spain, respectively. Columns (5) and (6) report estimates for exporters from Spanish-speaking and non-Spanish-speaking countries, respectively. Column (7) includes exporters that are either geographically close to Spain or Spanish-speaking, while Column (8) covers exporters that are both geographically distant and non-Spanish-speaking. The analysis is based on a product-level measure of exposure, and incorporates different sets of fixed effects, as specified in equation (7). Product exposure is calculated as the weighted average of the exposures of Spanish banks lending to firms importing product g from country o, following equation (5). The fixed effects included in each regression are listed in the lower part of the table. Product characteristics include a dummy for high or low heterogeneity: i.e, low, if price dispersion of the product is at the bottom quartile of the price dispersion distribution. Exporter country characteristics include: distance to Spain indicator (close to Spain or not), official language (Spanish or non Spanish). Spanish share corresponds to the participation of Spain in total exports of a specific market (origin×product). All variables are defined in Appendix B. Standard errors shown in parentheses are clustered by product and country of origin.
$***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.

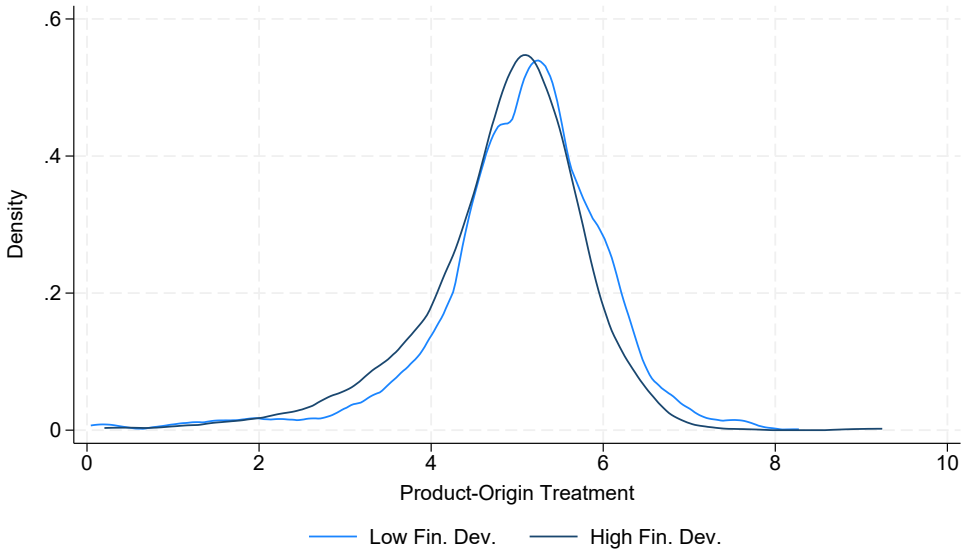


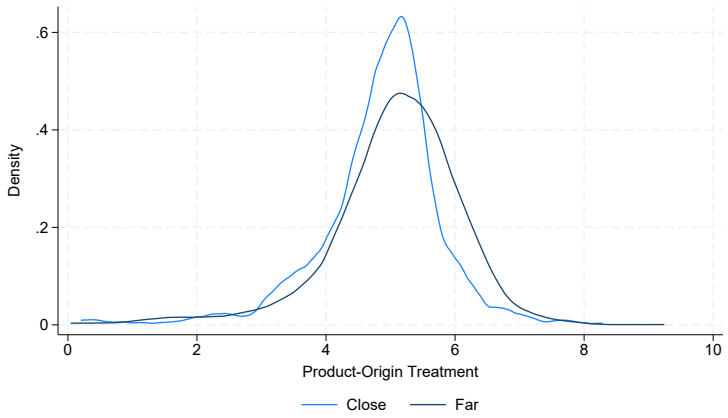
Figure 10: Treatment: Kernel Density Estimate

This figure plots the kernel density of the standardized product-origin treatment.

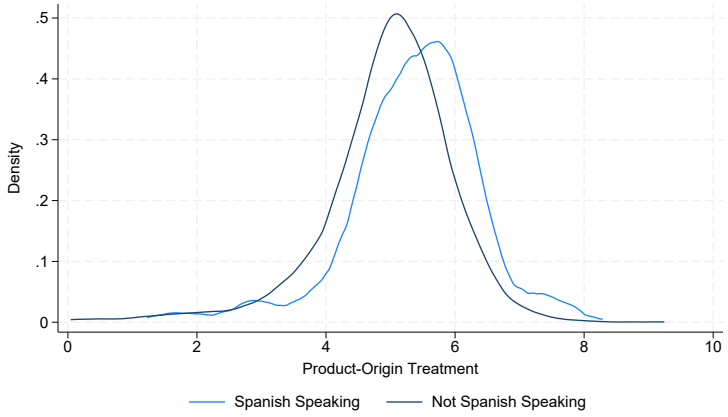
Table 9: Impact of Provisioning Shift on Exports to Destinations other than Spain, by Origin-Country Characteristics

	Mid-point growth Exports to Destinations other than Spain							
	High FD	Low Financial Development						
		All	Distance		Language		Far & Not Spanish	
			Close	Far	Spanish	Other	No	Yes
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Exposure_{go} \times Post_t$	0.001	-0.008	-0.015	-0.008	-0.034	-0.005	-0.022	-0.004
	(0.013)	(0.008)	(0.020)	(0.009)	(0.026)	(0.008)	(0.015)	(0.009)
Observations	2,703	8,271	1,620	6,651	1,040	7,231	2,660	5,611
Fixed Effects								
Exporter × Product	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Product charact. × Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country charact. × Year	Yes	Yes	Yes	Yes	Yes	Yes	–	–
Spanish share decile × Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table presents the regression results for the mid-point growth rate of exports of product g from country o to destinations other than Spain, relative to its five-year average. Column (1) reports estimates for exports to Spain from countries with high financial development, defined as those in the top quartile of the private credit-to-GDP ratio. Columns (2)-(8) report estimates for countries with low financial development, those at the bottom three quartiles. Column (2) includes all origins. Columns (3) and (4) correspond to exporters that are geographically close to Spain (bottom quartile of the distance-to-Spain distribution), or far from Spain, respectively. Columns (5) and (6) report estimates for exporters from Spanish-speaking and non-Spanish-speaking countries, respectively. Column (7) includes exporters that are either geographically close to Spain or Spanish-speaking, while Column (8) covers exporters that are both geographically distant and non-Spanish-speaking. The analysis is based on a product-level measure of exposure, and incorporates different sets of fixed effects, as specified in equation (7). Product exposure is calculated as the weighted average of the exposures of Spanish banks lending to firms importing product g from country o, following equation (5). The fixed effects included in each regression are listed in the lower part of the table. Product characteristics include a dummy for high or low heterogeneity: i.e, low, if price dispersion of the product is at the bottom quartile of the price dispersion distribution. Exporter country characteristics include: distance to Spain indicator (close to Spain or not), official language (Spanish or non Spanish). Spanish share corresponds to the participation of Spain in total exports of a specific market (origin×product). All variables are defined in Appendix B. Standard errors shown in parentheses are clustered by product and country of origin.
$***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.



(a) Distance



(b) Language

Figure 11: Treatment: Kernel Density Estimate

This figure plots the kernel density of the standardized product-origin treatment.

Table 10: Impact of Provisioning Shift on Exports to Spain by Presence of Spanish Banks

	Mid-point growth Exports to Spain							
	High FD		Low Financial Development					
					Far		Not Spanish	
	Without	With	Without	With	Without	With	Without	With
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Exposure_{go} \times Post_t$	0.004	-0.016	-0.037**	-0.032	-0.039*	-0.037	-0.034*	-0.057*
	(0.032)	(0.028)	(0.018)	(0.032)	(0.020)	(0.037)	(0.018)	(0.032)
Observations	1,788	915	6,571	1,700	5,366	1,285	6,196	1,035
Fixed Effects								
Exporter × Product	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Product charact. × Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country charact. × Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Spanish share decile × Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table presents the regression results for the mid-point growth rate of exports of product g from country o to Spain, relative to its five-year average. Columns (1)-(2) reports estimates for exports to Spain from countries with high financial development, defined as those in the top quartile of the private credit-to-GDP ratio. Columns (3)-(8) report estimates for countries with low financial development, those at the bottom three quartiles. Columns (5)-(6) report estimates for countries that are geographically distant from Spain (top three quartiles of the distance-to-Spain distribution), columns (7)-(8) report estimates for countries that are not Spanish speakers. Columns (1), (3), (5), and (7) report estimates for exporting countries without a Spanish bank presence. Columns (2), (4), (6), and (8) report estimates for exporting countries where Spanish banks are present. The analysis is based on a product-level measure of exposure, and incorporates different sets of fixed effects, as specified in equation (7). Product exposure is calculated as the weighted average of the exposures of Spanish banks lending to firms importing product g from country o, following equation (5). The fixed effects included in each regression are listed in the lower part of the table. Product characteristics include a dummy for high or low heterogeneity: i.e, low, if price dispersion of the product is at the bottom quartile of the price dispersion distribution. Exporter country characteristics include: distance to Spain indicator (close to Spain or not), official language (Spanish or non Spanish). Spanish share corresponds to the participation of Spain in total exports of a specific market (origin×product). All variables are defined in Appendix B. Standard errors shown in parentheses are clustered by product and country of origin.
$***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.

Table 11: Impact of Provisioning Shift on the Total Exports of Spain's Trade Partners, conditional on Spanish Market Share

	Mid-point growth rate of Exports								
	All Product × Origin Pairs			Low Spanish Share			High Spanish Share		
	All	Spain	Rest	All	Spain	Rest	All	Spain	Rest
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Agg.\ Exposure_{go} \times Post_t$	-0.016	-0.034**	0.007	-0.041	-0.082	-0.034	-0.028*	-0.045**	-0.002
	(0.011)	(0.015)	(0.012)	(0.075)	(0.119)	(0.076)	(0.015)	(0.018)	(0.015)
Observations	11,363	11,363	11,363	8,525	8,525	8,525	2,838	2,838	2,838
Fixed Effects									
Exporter × Product	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Product charact. × Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country charact. × Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table reports regression results for the mid-point growth rate of exports of product g from country o, relative to its five-year average. Columns (1), (4), and (7) present results for total exports to all destinations; columns (2), (5), and (8) for exports to Spain; and columns (3), (6), and (9) for exports to destinations other than Spain. Columns (1)-(3) include all markets. Columns (4)-(6) restrict the sample to markets with a low Spanish share, defined as less than 6 percent of total exports. Columns (7)-(9) restrict the sample to markets with a high Spanish share. The analysis is based on an aggregate measure of market exposure, and incorporates different sets of fixed effects, as specified in equation (9). Aggregate market exposure is calculated as the product-level exposure defined in equation (5) multiplied by Spain's share of country o's exports of product g, following equation (8). The fixed effects included in each regression are listed in the lower part of the table. Product characteristics include a dummy for high or low heterogeneity: i.e, low, if price dispersion of the product is at the bottom quartile of the price dispersion distribution. Exporter country characteristics include: distance to Spain indicator (close to Spain if it belongs to the bottom quartile of the distance-to-Spain distribution), official language (Spanish or non Spanish). All variables are defined in Appendix B. Standard errors shown in parentheses are clustered by product and country of origin.
$***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.

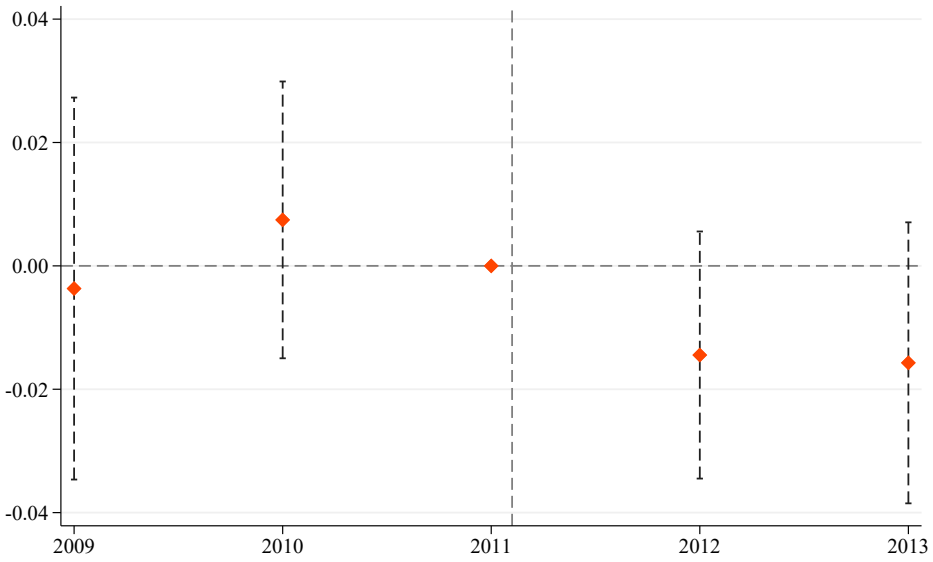


Figure 12: Event Study for the Average Effect of Aggregate Exposure to Provisioning Shift on Total Exports of Spain's Trade Partners, conditional on high Spanish market share

This figure plots coefficient estimates from a modified version of the specification in equation (9), which coincides with our benchmark specification in column (7) of Table 11. For each year, the coefficient corresponds to the interaction of the aggregate market exposure and the year dummy. The dashed lines indicate the 2.5%–97.5% confidence interval, with standard errors clustered by product and country of origin.

Table 12: Impact of Provisioning Shift on the Total Exports of Spain's Trade Partners and Product Differentiation: Low Financial Development and High Trade Costs Origins

	Mid-point growth rate of Exports					
	High Price Dispersion			Low Price Dispersion		
	All	Spain	Rest	All	Spain	Rest
	(1)	(2)	(3)	(4)	(5)	(6)
$Agg.\ Exposure_{go} \times Post_t$	-0.088**	-0.160***	-0.026	0.057	-0.291***	0.121**
	(0.037)	(0.049)	(0.025)	(0.052)	(0.098)	(0.059)
Observations	4,172	4,172	4,172	1,439	1,439	1,439
Fixed Effects						
Exporter × Product	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes

This table reports regression results for the mid-point growth rate of exports of product g from country o, relative to its five-year average. Columns (1) and (4) present results for total exports to all destinations; columns (2) and (5) for exports to Spain; and columns (3) and (6) for exports to destinations other than Spain. Columns (1)-(3) restrict the sample to products with high price dispersion, defined as those in the top three quartiles of the distribution. Columns (4)-(6) restrict the sample to products with low price dispersion (bottom quartile). The analysis is based on an aggregate measure of market exposure, and incorporates different sets of fixed effects, as specified in equation (9). Aggregate market exposure is calculated as the product-level exposure defined in equation (5) multiplied by Spain's share of country o's exports of product g, following equation (8). The fixed effects included in each regression are listed in the lower part of the table. All variables are defined in Appendix B. Standard errors shown in parentheses are clustered by product and country of origin.
$***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.

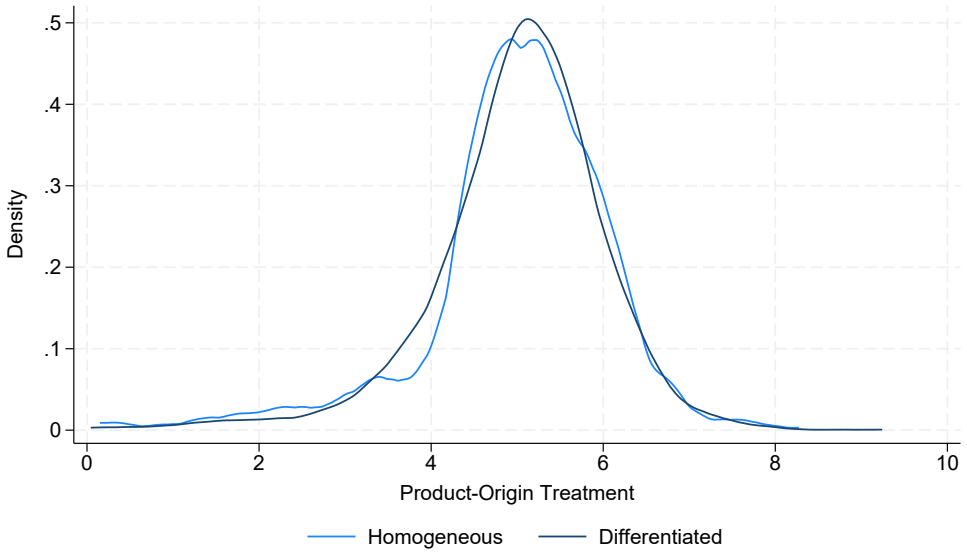


Figure 13: Treatment: Kernel Density Estimate

This figure plots the kernel density of the standardized product-origin treatment.

A Additional Tables and Figures

Table A.1: Comparison with Related Literature

Aspect	**Paravisini et al. (2014)**	**Amado et al. (2025)**	**Tripathy (2020)**
Domestic economy analyzed	Peru	Spain	Mexico
Transmission channel	Credit supply (to firms) → exports	Credit supply (to firms) → imports and exports → foreign exporters	Subsidiaries' credit supply (to households) → local macro activity
Origin of shock	Shortage in foreign funding for domestic banks (driven by 2008 GFC)	Domestic regulatory shock (Spain's provisioning rule)	Foregin regulatory shock (Spain's provisioning rule)
Trade dimension	Exporting firms only	Importing and exporting firms	Not explored
Scope of outcomes	Firm-level exports	Firm-level imports/exports; aggregate partner exports	Household credit; credit to the NT sector (bank-municipality-level)
Reallocation margin	Not explored	Shows limited reallocation within and among countries	Not explored
Contribution	Identifies trade finance channel of domestic bank shocks	Identifies a real channel (trade-linkages) of cross-border spillovers of domestic bank regulation	Identifies cross-border spillovers via subsidiaries of global banks
Main Datasets	Credit registry + firm-country-product-level trade flows	Credit registry + firm-country-product-level trade flows + BACI	bank-municipality level household and corporate credit + credit registry

Table A.2: Effect of Shift in Provisions on Importing and Exporting Firms' Debt, Both Exporters and Importers, Exporters only and Importers only

Panel A: Bank-firm level regressions			
Dep. Variable: Log(Credit)	$X \cap M$	$X \neg M$	$M \neg X$
	(1)	(2)	(3)
Exposure × *Policy*	-0.033**	-0.028**	-0.026**
	(0.013)	(0.011)	(0.012)
Controls×time	Yes	Yes	Yes
Firm-time FE	Yes	Yes	Yes
Bank-firm FE	Yes	Yes	Yes
Obs.	648,342	325,044	314,621
R^2	0.97	0.97	0.97
Panel B: Firm level regressions			
Dep. Variable: Log(Credit)	$X \cap M$	$X \neg M$	$M \neg X$
	(1)	(2)	(3)
Exposure × *Policy*	-0.022**	-0.010*	-0.038***
	(0.009)	(0.006)	(0.005)
Controls×time	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
$\hat{\alpha}_{f,t}$	Yes	Yes	Yes
Obs.	141,937	88,059	86,796
R^2	0.98	0.98	0.98

This table presents regression results on lending from bank b to firm f (Panel A) and on total firm's debt (Panel B). Column (1) corresponds to the sample of firms that are simultaneously exporters and importers, column (2) corresponds to the sample of exporters that are not importers, whereas column (3) corresponds to the sample of importers that are not exporters. *Exposure* in Panel A is computed as the ratio of construction and real estate lending to total corporate sector lending by bank b as of the end of 2011. In panel B, it is calculated as the weighted average of the exposure of banks lending to firm f, using outstanding credit at the end of 2011 as weights. In Panel A, *Controls* are measured as of the end of 2011 and include bank-firm characteristics (the collateralization rate, the ratio of long-term lending, the share of firm f's NPLs with the bank, and the share of lending coming from bank b out of firm f's total bank lending) and bank characteristics (dummies for quartiles of size, measured by total assets, and quartiles of exposure to exporter/importer companies, measured as the lending share to exporters and importers relative to total corporate sector lending). In Panel B, *Controls* are the weighted average of bank-firm characteristics and bank characteristics, measured as of the end of 2011 and weighted by banks' lending to firm f as of 2011. All variables are defined in Appendix B. We exclude importing and exporting firms in the construction or real estate sectors. Standard errors are double clustered at the bank and firm levels and reported in parentheses. $***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.

Table A.3: Effect of Shift in Provisions on Lending to Importing and Exporting Firms, Bank-Firm Level Analysis Accounting for Bank Specialization

Dep. Variable: Log(Credit)	X		M	
	(1)	(2)	(3)	(4)
$Exposure \times Policy$	-0.031**	-0.032***	-0.031**	-0.031**
	(0.012)	(0.011)	(0.013)	(0.012)
$Q_2 \times$ Policy		0.010		0.014
		(0.010)		(0.011)
$Q_3 \times$ Policy		-0.002		-0.002
		(0.007)		(0.008)
$Q_4 \times$ Policy		-0.017**		-0.022**
		(0.008)		(0.008)
Controls×time	Yes	Yes	Yes	Yes
Firm-time FE	Yes	Yes	Yes	Yes
Bank-firm FE	Yes	Yes	Yes	Yes
Obs.	973,386	973,386	962,963	962,963
R^2	0.97	0.97	0.97	0.97

This table presents bank-firm-level regression results on credit, obtained from estimating equation (1). Columns (1) and (2) correspond to the sample of exporters, whereas columns (3) and (4), importers. The dependent variable is the logarithm of credit granted by bank b to firm f. *Exposure* is computed as the ratio of construction and real estate lending to total corporate sector lending by bank b as of the end of 2011. In columns (2), and (4), we augment specification (1) by including interactions of *Policy* with indicators that capture whether the bank lending to the firm specializes in a country from which the firm exports or imports. Specifically, Q_i equals one if the bank's country specialization measure falls in the i-th quartile for at least one country from which the firm exports or imports. The specialization measure of bank b in destination country c is computed as in equation (3), following Paravisini et al. (2023). *Controls* are measured as of the end of 2011 and include bank-firm characteristics (the collateralization rate, the ratio of long-term lending, the share of firm f's non-performing loans (NPLs) with the bank, and the share of lending from bank b out of firm f's total bank lending) and bank characteristics (dummies for quartiles of size, measured by total assets, and quartiles of exposure to exporter/importer companies, measured as the lending share to exporters and importers relative to total corporate sector lending). All variables are defined in Appendix B. We exclude importers and exporters in the construction or real estate sectors. Standard errors are double-clustered at the bank and firm levels and are reported in parentheses.
$***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.

Table A.4: Effect of Shift in Provisions on Lending to Tradable and Non-tradable firms, Bank-Firm Level Analysis

Dep. Variable: Log(Credit)	*All Firms* (1)	$X + M$ (2)	*All Firms* (3)
$Exposure \times Policy$	-0.019**	-0.029**	-0.015*
	(0.009)	(0.012)	(0.009)
$Exposure \times Policy \times Tradable$			-0.011
			(0.008)
Controls×time	Yes	Yes	Yes
Firm-time FE	Yes	Yes	Yes
Bank-firm FE	Yes	Yes	Yes
Obs.	5,513,983	1,288,007	5,513,983
R^2	0.98	0.97	0.98

This table presents regression results on lending from bank b to firm f at the intensive margin, as specified in equation (1). Columns (1) and (3) include all firms, both tradable and non-tradable, while column (2) includes only firms engaged in international trade. The dependent variable is the logarithm of credit granted by bank b to firm f. *Exposure* is computed as the ratio of construction and real estate lending to total corporate sector lending by bank b as of the end of 2011. *Controls* are measured as of the end of 2011 and include bank-firm characteristics (the collateralization rate, the ratio of long-term lending, the share of firm f's non-performing loans (NPLs) with the bank, and the share of lending from bank b out of firm f's total bank lending) and bank characteristics (dummies for quartiles of size, measured by total assets, and quartiles of exposure to exporter/importer companies, measured as the lending share to exporters and importers relative to total corporate sector lending). All variables are defined in Appendix B. We exclude firms in the construction or real estate sectors. Standard errors are double-clustered at the bank and firm levels and are reported in parentheses.
$***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.

Table A.5: Effect of Shift in Provisions on annual Firm-level Outcomes

Panel A:	Exporters				
	Bank Debt	Total Debt	Total Debt +Equity	Employment	Tangible Assets
	(1)	(2)	(3)	(4)	(5)
Exposure	-0.022	-0.009	0.036	-0.006	-0.008
	(0.014)	(0.012)	(0.047)	(0.004)	(0.006)
Firm controls	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Main Buyer FE	Yes	Yes	Yes	Yes	Yes
Obs.	17,194	17,194	17,194	17,194	17,194
R^2	0.01	0.02	0.02	0.02	0.03
Panel B:	Importers				
	Bank Debt	Total Debt	Total Debt +Equity	Employment	Tangible Assets
	(1)	(2)	(3)	(4)	(5)
Exposure	-0.036***	-0.023*	-0.015*	-0.008*	-0.014**
	(0.013)	(0.013)	(0.009)	(0.004)	(0.005)
Firm controls	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Main Buyer FE	Yes	Yes	Yes	Yes	Yes
Obs.	17,269	17,269	17,269	17,269	17,269
R^2	0.02	0.02	0.02	0.02	0.02

This table presents regression results on firm-level outcomes obtained from annual financial statements. The dependent variable is the mid-point growth rate of firm f's total bank debt, total debt, total debt plus equity, employment, and tangible assets between 2011 and 2012. We regress these variables on firm-level exposure, controls, and a set of fixed effects. *Exposure* is computed as the weighted average of the exposure of banks lending to firm f, using outstanding credit as of the end of 2011 as weights. *Controls*, measured as of the end of 2011, include the weighted average of banks' total assets and the lending share to importing and exporting firms of banks lending to firm f, with outstanding debt of each bank lending to the firm used as weights. Additionally, controls include the logarithm of the firm's total assets, the ratio of cash to total assets, sales to total assets, and own funds to total assets. The fixed effects included in each regression are specified in the lower part of the table and account for industry, province, and indicators for the main destination country of a firm's exports. All variables are defined in Appendix B. Standard errors are double clustered at the main bank and firm levels, and reported in parentheses.
$***$ $p < 0.01$, $**$ $p < 0.05$, $*$ $p < 0.10$.

Table A.6: Characteristics of Exporters and Importers

	Exporters				Importers			
Firm characteristics	p75	p50	p25	mean	p75	p50	p25	mean
log(assets)	9.66	8.54	7.52	8.65	9.61	8.46	7.49	8.61
log(employees)	4.14	3.17	2.09	3.14	4.04	2.96	1.94	3.03
log(age)	3.26	2.83	2.30	2.70	3.21	2.83	2.30	2.69
log(debt)	8.46	7.12	5.65	6.97	8.40	6.99	5.56	6.90
log(bank debt)	7.99	6.74	5.23	6.50	7.92	6.61	5.15	6.43
average collateral	0.14	0	0	0.12	0.11	0	0	0.11
Nr. of banks	5	3	2	3.88	5	3	2	3.82
Credit concentration (HHI_{firm})	0.98	0.51	0.30	0.58	0.99	0.52	0.30	0.58
log(tangible fixed assets)	8.01	6.62	4.92	6.41	7.91	6.44	4.67	6.23
log(LT financial investment)	6.65	4.29	2.13	4.44	6.48	4.10	2.00	4.33
log(LT external funds)	7.70	6.39	5.00	6.32	7.65	6.28	4.88	6.24
log(LT funds from financial institutions)	7.31	6.09	4.71	5.97	7.24	5.97	4.59	5.89

This table reports, in columns 2-5, the 75th, 50th, 25th percentile and mean of exporters characteristics, and in columns 6-9, the corresponding values for importers.

Table A.7: Average difference: exporters only minus importers only

Firm characteristics	p75	p50	p25	mean difference
log(assets)	0.008	0.002	-0.06**	-0.07***
log(employees)	0.22***	0.29***	0.18***	0.13***
log(age)	0.04***	0	0	0.024**
log(debt)	0.1***	0.11***	0.015	0.032
log(bank debt)	0.13***	0.11***	0.06	0.07*
average collateral	0.07***	0	0	0.02***
Nr. of banks	0	0	–	-0.003
Credit concentration (HHI_{firm})	–	0.004	0.010**	0.005*
log(tangible fixed assets)	0.15***	0.26***	0.35***	0.19***
log(long term financial investment)	0.17**	0.24***	-0.04	0.08
log(long term external funds)	0.09**	0.14***	0.16***	0.1***
log(long term funds from financial institutions)	0.1**	0.12***	0.17***	0.11***

This table reports, in columns 2-4, the difference between the sample of only exporters and only importers, at the 75th, 50th and 25th percentile of their characteristics' distribution. These coefficients are estimated through quantile regressions on a dummy that takes the value of 1 if the firm is classified as exporter only and zero if classified as importer only. Column 5 reports the mean difference in these characteristics for the two groups of firms. The statistical significance of these coefficients is based on the T-test.

Table A.8: Impact of Provisioning Shift on Firms' International Trade Flows, Weighted Regressions

	Mid-point growth			
	Unweighted		Weighted	
	X	M	X	M
	(1)	(2)	(3)	(4)
$Exposure \times Policy$	-0.020**	-0.036***	-0.018	-0.035**
	(0.009)	(0.011)	(0.013)	(0.014)
Product-Country-Year FE	Yes	Yes	Yes	Yes
Province-Industry-Year FE	Yes	Yes	Yes	Yes
Product-Country-Firm FE	Yes	Yes	Yes	Yes
R-squared	649,050	558,540	649,050	558,540
Observations	0.17	0.17	0.27	0.27

This table presents the regression estimates on firm's trade flows at the product-country-year level. The dependent variable is the mid-point growth rate between firm f's exports (imports) of product g to (from) country c and the 5-year average of firm f's exports (imports) of the same product to (from) that country, and it is regressed on the firm's exposure and a set of fixed effects. *Exposure* is computed as the average exposure of banks lending to firm f, with weights based on the outstanding credit as of the end of 2011. *Policy* is a dummy variable that takes the value of one after the provisioning increase. The fixed effects included in each regression are noted in the lower part of the table. Columns 1 and 2 present the unweighted results and correspond to columns 1 and 2, respectively, in Table 4. Columns 3 and 4 show the weighted results, using the 5-year average of exported and imported values as weights. Due to the presence of extremely large imported and exported values, weights are winsorized at the 5% level. All variables are defined in Appendix B. Importers and exporters in the construction or real estate sectors are excluded. Standard errors are double-clustered at the main bank and firm levels and are reported in parentheses.
$***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.

Table A.9: Impact of Provisioning Shift on Firms' International Trade Flows by Cumulative Product-Level Trade Share

Product-Level Trade Share:	Exporters			Importers		
	100%	Bottom 25%	Top 75%	100%	Bottom 25%	Top 75%
	(1)	(2)	(3)	(4)	(5)	(6)
Exposure × *Policy*	-0.020**	-0.022**	-0.011	-0.036***	-0.035***	-0.035*
	(0.009)	(0.011)	(0.016)	(0.011)	(0.010)	(0.020)
Product-Country-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Province-Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Product-Country-Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	649,050	450,235	188,005	558,540	415,620	135,535
R^2	0.17	0.16	0.26	0.17	0.16	0.28

This table presents the regression estimates on firm's trade flows at the product-country-year level. Columns 1-3 correspond to exporters and 4-6 correspond to importers. Columns 1 and 4 use the full sample of exporters and importers, respectively. Columns 2 and 5 restrict the sample to firms representing the top 75% of total trade value by product in 2011. Columns 3 and 6 restrict the sample to firms representing the bottom 25% of total trade value by product in 2011. *Exposure* is computed as the average exposure of banks lending to firm f, with weights based on the outstanding credit as of the end of 2011. *Policy* is a dummy variable that takes the value of one after the provisioning increase. The fixed effects included in each regression are noted in the lower part of the table. All variables are defined in Appendix B. Importers and exporters in the construction or real estate sectors are excluded. Standard errors are double-clustered at the main bank and firm levels and are reported in parentheses.
$***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.

Table A.10: Bank-Firm Relationship Characteristics and Trade Flows

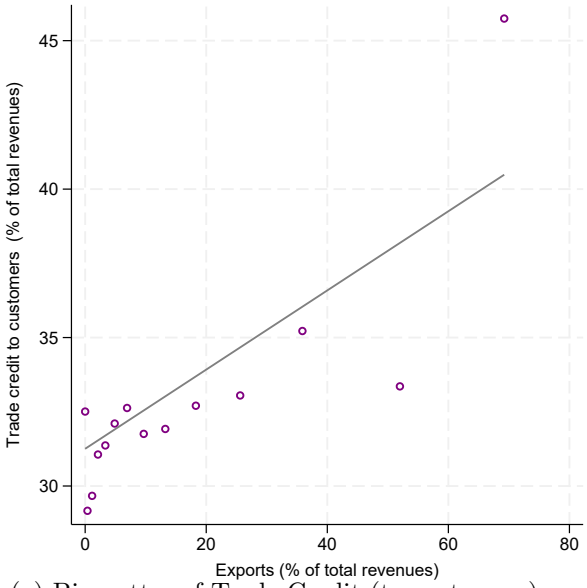
Panel A:	Exporters				
	(1)	(2)	(3)	(4)	(5)
Exposure × *Policy*	-0.020**	-0.019**	-0.010	-0.043***	-0.026***
	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)
×Available funds in CLs		0.006			0.009
		(0.007)			(0.007)
×NPL			-0.093*		-0.072
			(0.048)		(0.047)
×Share Main Bank				0.033***	0.021***
				(0.005)	(0.006)
Product-Country-Firm FE	Yes	Yes	Yes	Yes	Yes
Product-Country-Year FE	Yes	Yes	Yes	Yes	Yes
Province-Industry-Year FE	Yes	Yes	Yes	Yes	Yes
Observations	649,050	649,050	649,050	649,050	649,050
R^2	0.17	0.17	0.17	0.17	0.17
Panel B:	Importers				
	(1)	(2)	(3)	(4)	(5)
Exposure×Policy	-0.036***	-0.034***	-0.029**	-0.063***	-0.050***
	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)
×Available funds in CLs		0.010*			0.012**
		(0.005)			(0.005)
×NPL			-0.134***		-0.111**
			(0.049)		(0.047)
×Share Main Bank				0.036***	0.028***
				(0.007)	(0.007)
Product-Country-Firm FE	Yes	Yes	Yes	Yes	Yes
Product-Country-Year FE	Yes	Yes	Yes	Yes	Yes
Province-Industry-Year FE	Yes	Yes	Yes	Yes	Yes
Observations	558,540	558,540	558,540	558,540	558,540
R^2	0.17	0.17	0.17	0.17	0.17

This table presents the heterogeneous effects of the provisioning shift on trade outcomes based on lending relationship characteristics. The dependent variable is the mid-point growth rate of firm f's exports of product g relative to the 5-year average of firm f's exports of the same product. We regress this variable on the firm's exposure and a set of fixed effects. *Exposure* is computed as the weighted average of the exposure of banks lending to firm f, using outstanding credit as of the end of 2011 as weights. *Policy* takes a value of one for 2012 and 2013 and zero otherwise. *Available Funds in CLs* represents the share of undrawn to total committed funds available in firm f's credit lines as of the end of 2011. *Share Main Bank* is the share of firm f's outstanding credit held with its main bank as of the end of 2011. *NPL* takes a value of one if the firm had at least one non-performing loan as of the end of 2011 and zero otherwise. To facilitate the interpretation of the coefficients, *Available Funds in CLs* and *Share Main Bank* are standardized. The fixed effects included in each regression are specified in the lower part of the table. All variables are defined in Appendix B. Importers and exporters in the construction or real estate sectors are excluded. Standard errors are double-clustered at the main bank and firm levels and are reported in parentheses.
$***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.

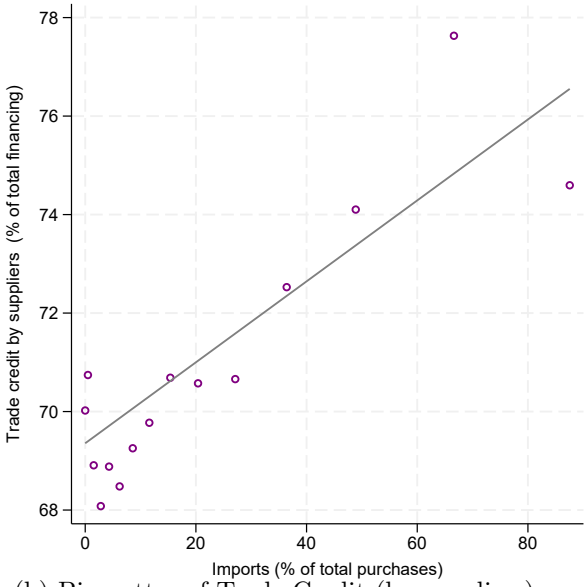
Table A.11: Reliance on Trade Credit and Policy Impact on Trade Flows

	Exporters			Importers		
	(1)	(2)	(3)	(4)	(5)	(6)
Exposure × *Policy*	-0.020**	-0.012	-0.014*	-0.036***	-0.033***	-0.032**
	(0.009)	(0.008)	(0.008)	(0.011)	(0.011)	(0.013)
Exposure × *Policy* × *Customer Credit*			-0.008			
			(0.008)			
Exposure × *Policy* × *Supplier Credit*						0.020**
						(0.008)
Product-Country-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Province-Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Product-Country-Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Imports/Purchases Bins-Year FE	No	No	No	No	No	Yes
Exports/Sales Bins-Year FE	No	No	Yes	No	No	No
Obs.	649,050	590,985	590,300	558,540	519,335	519,265
R^2	0.17	0.18	0.18	0.17	0.17	0.18

This table presents the heterogeneous effects of the provisioning shift on trade outcomes based on firms' reliance on trade credit, specifically, exporter-provided credit in Column (3) and importer-received credit in Column (6). *Customer Credit* is defined as the average share of trade credit extended, by exporters, to customers relative to total revenues, using data from 2010 and 2011. *Supplier Credit* is defined as the average share of supplier credit, received by importers, in total financing (supplier credit plus bank debt) over the same period. Both measures are standardized to have mean zero and standard deviation one. Columns (1) and (4) replicate the main specification from Table 4 using the full sample. Columns (2) and (5) restrict the sample to firms for which trade credit data are available. Lower-order interaction terms corresponding to the triple interactions are included in the regressions but not reported. Columns (3) and (6) additionally include fixed effects at the year-imports share bins and year-exports share bins levels. Bins are constructed using quintiles of the firm's average imports-to-purchases and exports-to-sales ratios over 2010-2011. The dependent variable is the mid-point growth rate of firm f's exports of product g relative to the 5-year average of firm f's exports of the same product. *Exposure* is computed as the weighted average of the exposure of banks lending to firm f, using outstanding credit as of the end of 2011 as weights. *Policy* takes a value of one for 2012 and 2013 and zero otherwise. The fixed effects included in each regression are specified in the lower part of the table. Importers and exporters in the construction or real estate sectors are excluded. Standard errors are double-clustered at the main bank and firm levels and are reported in parentheses.
$***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.



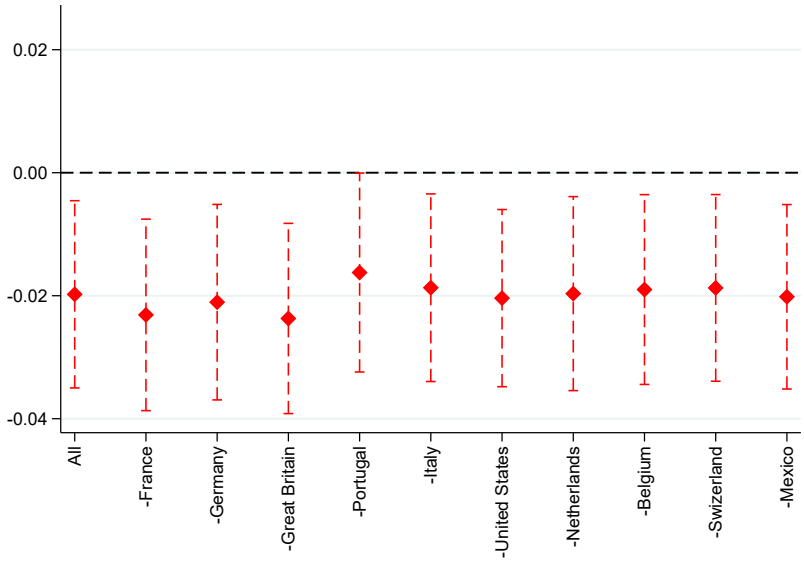
(a) Binscatter of Trade Credit (to customers) on Exports (15 bins)



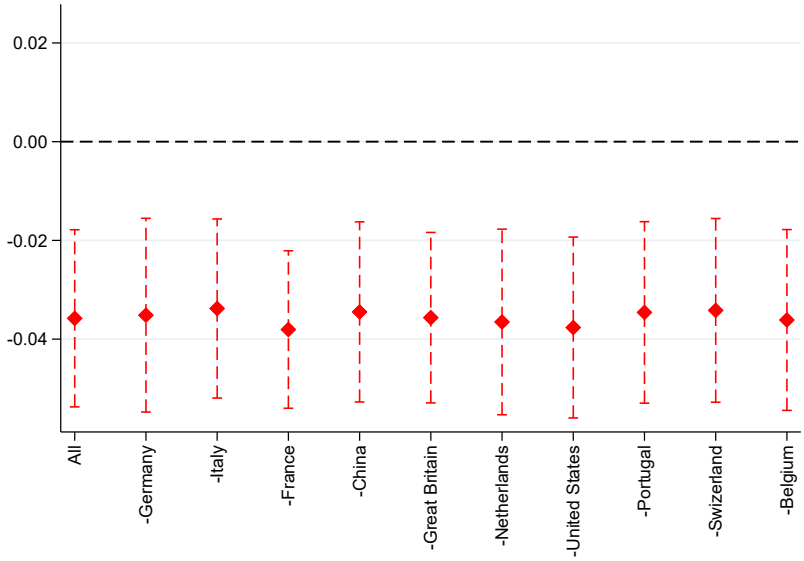
(b) Binscatter of Trade Credit (by suppliers) on Imports (15 bins)

Figure A.1: Trade intensity and use of Trade Credit

This figure presents binned scatterplots illustrating the relationship between firms' trade intensity and their reliance on trade credit. Panel A plots exports as a share of total revenues (x-axis) against trade credit extended to customers as a share of total revenues (y-axis). Panel B plots imports as a share of total purchases (x-axis) against trade credit granted by suppliers as a share of total financing (y-axis). In both panels, points represent the average values of the X and Y variables within 15 quantile bins of the X-axis variable.



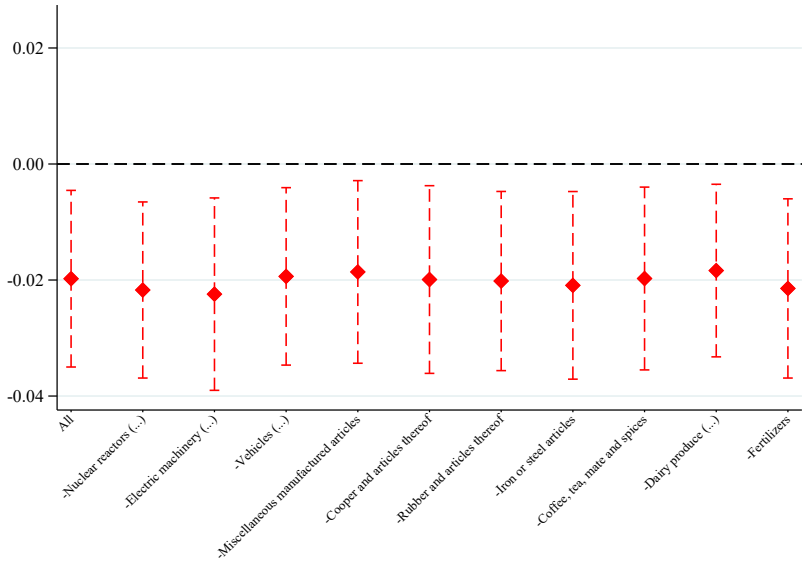
(a) Exports



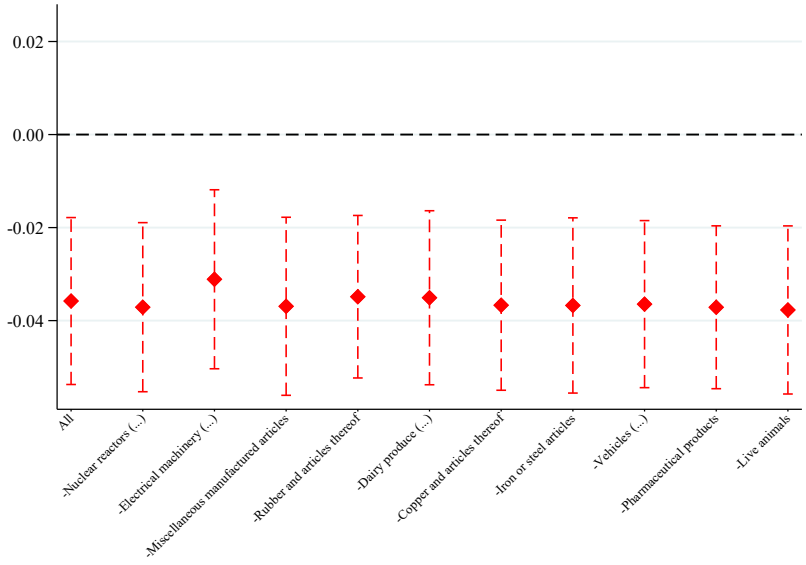
(b) Imports

Figure A.2: Sensitivity Analysis to Main Destination and Origin Countries

The figure presents a sensitivity analysis of our baseline results in specification (4). In Panel (a), we present the sensitivity analysis for exports after sequentially excluding each of the top 10 main destinations for Spanish exports. In Panel (b), we present the analysis for imports after sequentially excluding each of the top 10 main origin countries for Spanish imports. As a benchmark, the first point in each figure (*All*) coincides with the coefficient in columns 1 and 2 of Table 4, respectively. We drop firms in the construction or real estate sectors. Bands represent the 90% confidence intervals. Standard errors are double-clustered at the main bank and firm levels.



(a) Exports



(b) Imports

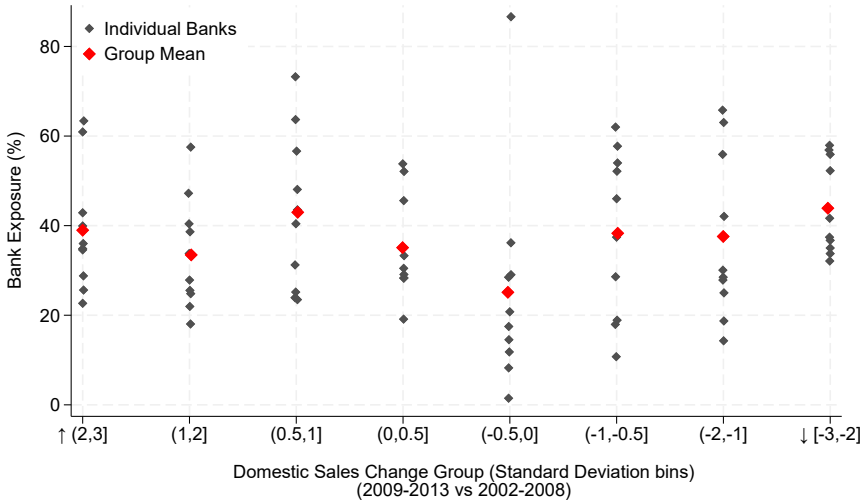
Figure A.3: Sensitivity Analysis to Main Export and Import Products

The figure presents a sensitivity analysis of our baseline results in specification (4). In Panel (a), we present the sensitivity analysis for exports after sequentially excluding each of the top 10 main exported products of Spanish firms. In Panel (b), we present the analysis for imports after sequentially excluding each of the top 10 main imported products for Spanish firms. As a benchmark, the first point in each figure (*All*) coincides with the coefficient in columns 1 and 2 of Table 4, respectively. We drop firms in the construction or real estate sectors. Bands represent the 90% confidence intervals. Standard errors are double-clustered at the main bank and firm levels.

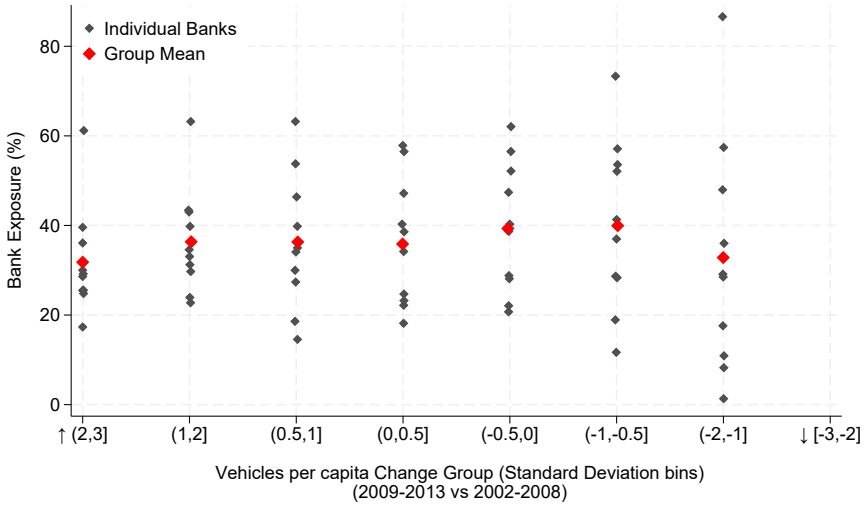
Table A.12: Impact of Provisioning Shift on Firms' International Trade Flows
Excluding firms highly related to GIIPS

	Mid-point growth		Entry Dummy		Exit Dummy	
	X	M	X	M	X	M
	(1)	(2)	(3)	(4)	(5)	(6)
Exposure × *Policy*	-0.022**	-0.039***	-0.000	-0.006	0.010**	0.014***
	(0.010)	(0.010)	(0.004)	(0.004)	(0.004)	(0.003)
Product-Country-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Province-Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Product-Country-Firm FE	Yes	Yes	No	No	No	No
Firm FE	No	No	Yes	Yes	Yes	Yes
Obs.	541,365	455,025	230,960	175,864	187,332	177,588
R^2	0.17	0.17	0.17	0.19	0.26	0.25

In this table, we replicate the specification from Table 4, excluding firms highly exposed to GIIPS countries. Exposure is defined using 2006 data–prior to the global financial crisis: we compute the share of each firm's exports and imports originating from or destined to Greece, Italy, Portugal, and Ireland, and exclude firms in the top quartile of this distribution.



(a) Exposure of Top 10 Lenders by Province Grouped by Change in Domestic Sales



(b) Exposure of Top 10 Lenders by Province Grouped by Change in Vehicles per Capita

Figure A.4: Bank exposure across provinces, based on Almunia et. al (2021)

Panel (a) shows, for each group of provinces on the x-axis–classified based on the standardized percentage change in average firm-level domestic sales between the periods 2002-2008 and 2009-2013–the exposure to the regulation (as defined in Section 5.1) for the top 10 banks with the highest share of loans granted to firms operating in each group. In Panel (b), the groups on the x-axis are defined based on the standardized percentage change in the number of vehicles per capita. The classification of provinces across groups is obtained by reverse-engineering the information presented in Figure 3 of Almunia et al. (2021).

Table A.13: Impact of Provisioning Shift on the Total Exports of Spain's Trade Partners and Trade Costs
Low Financially Developed Origins

	Mid-point growth rate of Exports								
	Far from Spain			Not Spanish Speaking			Far and Not Spanish		
	All	Spain	Rest	All	Spain	Rest	All	Spain	Rest
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Agg.\ Exposure_{go} \times Post_t$	-0.046*	-0.117***	0.009	-0.022	-0.103***	0.025	-0.065*	-0.181***	-0.003
	(0.027)	(0.039)	(0.020)	(0.023)	(0.032)	(0.018)	(0.033)	(0.045)	(0.025)
Observations	6,651	6,651	6,651	7,231	7,231	7,231	5,611	5,611	5,611
Fixed Effects									
Exporter × Product	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Product charact. × Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country charact. × Year	Yes	Yes	Yes	Yes	Yes	Yes	–	–	–

This table reports regression results for the mid-point growth rate of exports of product g from country o, relative to its five-year average. Estimates consider only low financially developed origins. Columns (1), (4), and (7) present results for total exports to all destinations; columns (2), (5), and (8) for exports to Spain; and columns (3), (6), and (9) for exports to destinations other than Spain. Columns (1)-(3) correspond to exporters that are geographically far from Spain (top three quartiles of the distance-to-Spain distribution). Columns (4)-(6) restrict the sample to exporters from non-Spanish-speaking countries. Columns (7)-(9) restrict the sample to exporters that are both geographically distant and non-Spanish-speaking. The analysis is based on an aggregate measure of market exposure, and incorporates different sets of fixed effects, as specified in equation (9). Aggregate market exposure is calculated as the product-level exposure defined in equation (5) multiplied by Spain's share of country o's exports of product g, following equation (8). The fixed effects included in each regression are listed in the lower part of the table. Product characteristics include a dummy for high or low heterogeneity: i.e, low, if price dispersion of the product is at the bottom quartile of the price dispersion distribution. Exporter country characteristics include: distance to Spain indicator (close to Spain if it belongs to the bottom quartile of the distance-to-Spain distribution), official language (Spanish or non Spanish). All variables are defined in Appendix B. Standard errors shown in parentheses are clustered by product and country of origin.
$***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.10$.

B Variable definitions

Firm-bank variables (Source: Credit Register, Bank of Spain)

- *Log of Credit*: The logarithm of committed credit granted by bank b to firm f at quarter t.
- *Termination*: A dummy variable that equals 1 if the bank-firm relationship is terminated in the aftermath of the policy, conditional on its existence as of the end of 2011.
- *Long-term credit ratio*: The ratio of the amount of loans with residual maturity above a year that a firm has with its bank, divided by the credit granted by the bank, as of the end of 2011.
- *Collateralization rate*: The ratio of the amount of collateralized loans that a firm has with its bank, divided by the credit granted by the bank, as of the end of 2011.
- NPL ratio: The amount of non-performing loans that a firm has with its bank as of the end of 2011, divided by the credit granted by the bank as of the end of 2011.
- *Credit Share*: The total amount of loans from bank b as of the end of 2011, divided by the firms' total bank debt as of the end of 2011.

Bank variables (Source: Supervisory Reports, Bank of Spain)

- *Exposure*: The amount of loans to the construction and real estate sectors over total lending to non-financial firms as of the end of 2011.
- *Size*: The logarithm of the bank's total assets as of the end of 2011.
- *Capital*: Equity to total assets as of the end of 2011.
- *Liquidity*: Liquid assets (cash and balance with central banks, and loans and advances to governments and credit institutions) to total assets as of the end of 2011.

- *ROA*: Net income to assets as of the end of 2011.
- *NPL ratio*: Non-performing loans as a share of the bank's total credit as of the end of 2011.
- *Rural bank dummy*: A dummy variable that equals 1 if the bank is a rural saving bank.
- % *Lending to X or M*: Lending share to exporters and importers relative to total corporate sector lending as of the end of 2011.
- *Local Govt. Credit to Assets*: Credit to local governments to assets as of the end of 2011.

Firm-level variables (Source: Credit Register, Bank of Spain)

- *Log of Total Bank Credit*: The logarithm of firm's f total bank credit at quarter t.
- $Exposure_f$: Weighted average of the exposure of banks lending to firm f, using the outstanding credit as of the end of 2011 as weights.

Exports and imports, firm-market level (Source: Customs data, Bank of Spain)

- *Exports*: Exports of the 2-digit-HS product g to country c by firm f at year t.
- *Imports*: Imports of the 2-digit-HS product g from country c by firm f at year t.
- *Entry*: A dummy variables that takes the value of one if exports/imports in market (g,c) of firm f are greater than zero at year t, conditional on being zero the previous year.
- *Exit*: A dummy variables that takes the value of one if exports/imports in market (g,c) of firm f are zero at year t, conditional on being positive the previous year.
- *No. Countries*: Number of countries to (from) which a firm exports (imports) in year t.
- *No. Products*: Number of products shipped (purchased) to (from) abroad by a firm in year t.

Firm balance sheet data (Source: Central Balance Sheet Data Office)

- *Total Debt*: Firm's f total debt (bank and non-bank debt) in year t.
- *Employment*: The average number of employees of a firm in year t.
- *Tangible Assets*: Tangible assets of firm f in year t.

Bilateral trade flows (Source: BACI)

- M_{cgot}: Imported value of country c from country o and product g in year t.
- $Exposure_{go}$: Weighted average of banks' exposure to the policy, where the weights account for the relative importance of banks as credit suppliers for firms importing product g from country o.
- *Agg. Exposure*$_{go}$: This aggregate exposure is equal to Exposure$_{go}$ interacted with the share of Spanish purchases in a given market defined by product g and country o.
- X_{got}: Exported value of product g by country o in year t.
- *Comparable countries*: Australia, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Portugal, Spain, Switzerland and United States.

Country of origin characteristics (Source: CEPII Gravity, Global Financial Development Database, and BankFocus)

- *Close to Spain*: If the distance from the origin country to Spain is below the percentile 25 of the distance to Spain distribution.
- *Spanish Speaking*: If the origin country is a Spanish-speaking country.
- *FTA*: If the origin country has a trade agreement with Spain.
- *Spanish share*: If Spain's share of global purchases for good g is above the median.

- *Price dispersion*: Product's price dispersion is measured as the HS2-level variance of implicit prices, computed at the HS6-digit product level for each country.
- *Heterogeneous products*: If the product's price dispersion is above the percentile 25 of the price dispersion distribution.
- *Financial Development*: If private credit to GDP ratio is above the percentile 75 of the corresponding distribution.
- *Spanish Banks*: If Spanish banks operate in the country.