BANCO CENTRAL DE RESERVA DEL PERÚ

Dissecting the Effect of Credit Supply on Trade: Evidence from Matched Credit-Export Data

Daniel Paravisini*, Veronica Rappoport*, Philipp Schnabl** and Daniel Wolfenzon*

* Columbia GSB.
** NYU Stern.

DT. N° 2010-022
Serie de Documentos de Trabajo
Working Paper series
Diciembre 2010

Dissecting the Effect of Credit Supply on Trade: Evidence from Matched Credit-Export Data *

Daniel Paravisini
Columbia GSB, NBER, BREAD

Veronica Rappoport
Columbia GSB

Philipp Schnabl
NYU Stern

Daniel Wolfenzon
Columbia GSB, NBER

December 15, 2010

Abstract

This paper presents evidence on the effect of credit supply shocks on exports. Capital flow reversals in Peru during the 2008 financial crisis induced a decline in the supply of credit by domestic banks with high share of foreign-currency denominated liabilities. We use this variation to estimate the elasticity of exports to bank credit. We use matched customs and firm-level bank credit data to control for non-credit related factors that may also affect the level of exports: we compare changes in exports of the *same* product and to the *same* destination by firms borrowing from different banks. Exports react strongly to changes in the supply of credit in the intensive margin, irrespectively of the firms' export volume. In the extensive margin, the negative credit supply shock increases the probability of exiting a product-destination export market, but does not significantly affect the number of firms entering an export market. The magnitude of the respective elasticities, as well as their heterogeneity across firm and export flow observable characteristics, are estimated.

*We are grateful to Saki Bigio, Paul Castillo, Roberto Chang, and Manuel Luy Molinie for helpful advice and discussions. We thank Diego Cisneros, Jorge Mogrovejo, Javier Poggi, Jorge Olcese, Mitchell Canta, Adriana Valenzuela, and Lucciano Villacorta for outstanding help with the data. Juanita Gonzalez provided excellent research assistance. We thank participants at Columbia University GSB, XXVIII Encuentro de Economistas at the Peruvian Central Bank, FRB of Philadelphia, Fordham University, Instituto de Empresa, London School of Economics, University of Michigan Ross School of Business, University of Minnesota Carlson School of Management, Ohio State University, seminars and workshops for helpful comments. Paravisini, Rappoport, and Wolfenzon thank Jerome A. Chazen Institute of International Business for financial support. All errors are our own. Please send correspondence to Daniel Paravisini (dp2239@columbia.edu), Veronica Rappoport (ver2102@columbia.edu), Philipp Schnabl (schnabl@stern.nyu.edu), and Daniel Wolfenzon (dw2382@columbia.edu).

1 Introduction

The role of banks in the amplification of real economic fluctuations has been debated by policymakers and academics since the Great Depression. The basic premise is that, due to information frictions in capital markets, the deterioration of bank balance sheets during economic downturns increases the real cost of financial intermediation, which in turn reduces credit and output (Friedman and Schwarz (1963), Bernanke (1983)). Motivated by the unprecedented drop in world exports during the subprime financial crisis, this debate has permeated to the international trade literature. Do shocks to the balance sheet of banks affect export performance of related firms? What is the magnitude of the sensitivity of exports to changes in the supply of credit? How do credit fluctuations distort the entry, exit, and quantity choices of exporters? In this paper we address these questions.

We analyze the role played by commercial banks in the international transmission of the 2008 financial crisis to Peruvian exports. Peru is an ideal country for studying the consequences of a credit supply shock on trade for three main reasons. First, although local firms were not directly affected by the drop in the value of U.S. real estate, domestic banks' balance sheets were negatively affected by the reversal of capital flows during the subprime crisis, especially those with high share of foreign-currency denominated liabilities. Second, as a small open economy, one can abstract from general equilibrium effects on international demand or prices. And lastly, customs data are publicly available in Peru, and can be matched at the firm level with bank debt data from the Credit Registry. The matched data allow us, among other things, to effectively control for factors other than the supply of bank credit that potentially affect the demand and supply of exports.

The key empirical challenge is to disentangle the effect of credit supply on trade, from changes in credit demand in response to factors affecting exports, such as economic conditions in destination countries or the cost of export production. To address this identification problem our empirical approach compares how the exports of the *same* product and to the *same* destination change by firms that borrow from banks with different shares of foreign liabilities. Banks that

had a high share of foreign currency denominated liabilities before the financial crisis suffered a large negative funding shock when capital flows reversed during 2008. We demonstrate, using the within firm estimator in Khwaja and Mian (2008), that the supply of credit by these banks declined by 17% after July 2008. We use this heterogeneity in banks' foreign currency denominated liabilities as source of variation in the supply of credit to related firms to estimate the export elasticity to credit.

To illustrate the intuition behind our empirical strategy consider, for example, two firms that export *Men's Cotton Overcoats* to the *U.S.*.[1] Suppose that one of the firms obtains all its credit from Bank A, which had a large share of foreign-currency liabilities before the crisis, while the other firm obtains its credit from Bank B, which did not. Changes in the demand of overcoats in the U.S. should, in expectation, affect exports by both firms in a similar way. Also, any real shock to the production of overcoats in Peru, i.e., changes in the price of cotton, should affect both firms' exports the same way. Thus, the *relative* change in export performance of the two firms before and after the crisis provides an estimate of the effect of the decline in the supply of credit on exports.

Using an instrumental variable approach based on this intuition, we estimate the elasticity of exports to credit on the intensive and extensive margins. On the intensive margin, we find that a 1% reduction in the supply of credit results in a contraction of 0.23% in the volume of export flows for those firm-product-destination flows active before and after the crisis. This elasticity does not vary with the size of the exporter or the export flow. Credit supply also affects the number of firms that continue exporting to a given market, with elasticity of 0.36. This effect is particularly important for small export flows; the number of firms that continue exporting product-destination flows of size below the median drops 0.54% following a reduction of 1% in credit supply. The credit shock does not seem to significantly affect the number of firms entering an export market.

In a *back of the envelope* calculation we assess the importance of the negative credit supply

[1]The detail of the product coincides with the 6-digits aggregation in the Harmonized System, used in the paper.

shock in explaining the observed decline in Peruvian exports during the crisis. In the year following July 2008, the volume of Peruvian exports declined 9.6% (22% in value), which represents a disacceleration of almost 13 percentage points with respect to the previous year (see Figure 1). Assuming that credit supply declined only for the banks with above median foreign liabilities to assets, the estimated elasticities imply that the negative credit supply shock accounts for about 15% of the missing volume of exports. Thus, bank credit appears to have a first order effect on trade, but the bulk of the decline in exports during the analysis period is explained by the drop in international demand for Peruvian goods.

The present paper is the first to use matched customs and Credit Registry data. These data have several distinct advantages for understanding the relationship between credit fluctuations and trade. First, they allow estimating an elasticity of exports to changes in credit supply. Second, they allow decomposing this elasticity along different margins. And third, they allow controlling for any factor other than finance that affects exports at the product-destination level. This is particularly important during an international crisis, which has potentially large and heterogeneous real effects across sectors and countries.[2] We find that not accounting for such variation results in overestimating the elasticity of exports to credit by up to 65% in our setting.

The results emphasize the role played by commercial banks in the international transmission of financial shocks to emerging economies. This channel is believed to be an importance source of contagion during the subprime crisis (see Cetorelli and Goldberg (2010) and IMF (2009)). Existing work provides evidence that banks' share of dollar liabilities are a good predictor of lending performance in times of international capital reversal (Schnabl (2010) and Khwaja and Mian (2008)). Our results extend these findings by showing that this transmission channel affects real economic activity.[3]

[2]See, for example, Alessandria, Kaboski and Midrigan (2010), who focus on the role of inventories in the amplification of export fluctuations, Bems, Johnson and Yi (2010) and Levchenko, Lewis and Tesar (2010), who analyze the role of intermediate goods and vertical linkages, and Eaton, Kortum, Neiman and Romalis (2010), who find that world trade collapse can be explained mainly by real factors.

[3]In general, there has been limited success in determining the consequences of credit supply shocks on real outcomes. Following early work by Bernanke and Blinder (1992) and Kashyap, Lamont and Stein (1994), recent

The effect of finance on the different margins of trade provides information on the impact of finance on the cost of exporting. Consider for example the benchmark model of trade with sunk entry costs.[4] In such a framework, a negative credit shock will affect the entry margin, but once the initial investment is covered, credit fluctuations should not affect the intensive margin of trade or the probability of exiting an export market. Our results on the elasticity of the intensive margin of trade suggest that credit shocks affect the *variable* cost of exporting. By increasing the marginal cost of exporting, adverse credit conditions reduce the equilibrium size and profitability of exports. In combination with fixed costs, the profitability decline will induce firms to abandon small export flows that are closer to the break-even point, consistent with our findings.

Our results cannot distinguish whether the link between finance and the variable cost is general to all production, or specific to international trade. This link can emerge from the general requirements of working capital by the firm, which becomes costlier after a negative credit shock. However, the elasticity of international trade to credit shocks is potentially larger than for domestic sales: cross-country activities require insurance, letters of credit, and more working capital, as the time elapsed between production and closure of the commercial transaction may be larger than for domestic sales.[5] Under the hypothesis that exporting to more distant market requires additional working capital due to longer freight time, we test whether the elasticity to credit changes with distance to destination. We do not find compelling evidence in favor of this interpretation: the estimated elasticity does not vary with distance.

Our results pertain to the elasticity of trade to short-run credit fluctuations. Long-term fi-

papers have provided evidence that credit supply responds to shocks to bank balance sheets but have not assessed the effect on economic activity (see, for example, Kashyap and Stein (2000), Ashcraft (2005), Ashcraft (2006), Gan (2007), Khwaja and Mian (2008), Paravisini (2008), Chava and Purnanandam (2009), and Iyer and Peydro (2010)). An exception is Peek and Eric Rosengren (2000), which looks at changes in real estate economic activity in U.S. states with large presence of Japanese banks after the Japan bank crisis.

[4]See, among others, Baldwin and Krugman (1989), Roberts and Tybout (1999), and Melitz (2003). Motivated by the important fixed costs involved in entering a new market—i.e., setting up distribution networks, marketing– Chaney (2005) develops a model where firms are liquidity constrained and must pay an export entry cost. Participation in the export market is, as a result, suboptimal.

[5]See Hummels (2001), Auboin (2009), and *Doing Business* by the World Bank for evidence on these factors. See also Amiti and Weinstein (2009) for supporting evidence on the elasticity differential between export and domestic activities and Ahn (2010) for a model that rationalizes this phenomenon.

nance availability has also been found to have an impact on the patterns of trade in other studies: countries with developed financial markets have comparative advantage in sectors characterized by large initial investments (see Beck (2003) and Manova (2008)). We explore whether factors found to affect the sensitivity to long-term finance can also predict the effect of short-term credit shocks. We look, in particular, at the heterogeneity of the estimated elasticity across sectors with different external finance dependence, measured as in Rajan and Zingales (1998). This measure represents firms' technological requirements of capital and it is found to predict the sensitivity of sectoral exports to long-term financial conditions. We find that the elasticity of exports to short-term fluctuations in credit is higher in sectors considered to be less dependent on external finance; the elasticities are 0.25 and 0.12 for low and high external finance dependence products respectively. This result suggests that the elasticity to short-term and long-term changes in financial conditions represent different aspects of the firm's usage of credit; they are complementary measures for understanding the link between trade and finance.

We contribute to a growing body of research that studies the effect of financial shocks on trade. This literature is mostly based on cross-sectoral variations: using sectoral heterogeneity in dependance on external financing as an indicator of export sensitivity to credit, they find that country specific financial conditions are correlated with the relative export performance of finance sensitive sectors (Bricongne, Fontagne, Gaulier, Taglioni and Vicard (2009), Iacovone and Zavacka (2009), Chor and Manova (2010), and Levchenko et al. (2010)).[6] We show that, in our setting, cross sectional analysis does not correctly identify the impact of credit shocks. Our approach is fundamentally different: we focus on firm-level variation within the export sector to identify the impact of finance on trade. In this sense, our paper is closest to Amiti and Weinstein (2009), which documents that bank stock prices are positively correlated with the export performance of related firms during Japan's crisis in the 1990s, after controlling for industry variation. However, data limitations prevent them from measuring the elasticity of

[6]The sign of the correlation is not the same in all studies. The first three studies find that exports in finance-intensive sectors decline more in countries with more adverse finance conditions, while Levchenko et al. (2010) finds the opposite.

exports to credit and its heterogeneity across observable dimensions of exporting firms.

The rest of the paper proceeds as follows. Section 2 describes the data. Section 3 describes in detail the empirical strategy. In Section 4 we show the estimates of the export elasticity to credit supply. Section 5 we analyze how the sensitivity of exports to credit shocks varies according to observable characteristics of the export flow. In section 6 we perform a back of the envelope calculation of the contribution of the credit channel to the drop in Peruvian exports during the subprime crisis, and Section 7 concludes.

2 Data Description

We use three data sets for the empirical analysis: bank level data on Peruvian banks, loan level data on loans provided by Peruvian banks to Peruvian firms, and customs data for Peruvian firms. We obtain the first two data sets from the Peruvian bank regulator Superintendence of Banking, Insurance, and Pension Funds (SBS). We obtain the customs data from the Website of the Peruvian tax agency Superintendence of Tax Administration (SUNAT). This involves using a computer program to download each individual export document, and then compiling the information in these documents into a database. We match the loan data to export data using the unique tax identifier provided in both data sets. All data are public information.

The bank data consist of financial statements for all of Peru's commercial banks from January 2007 to December 2009. Columns 1 to 3 in Table 1 provide bank descriptive statistics of the 13 commercial banks.

Peruvian exports in 2009 totaled almost $27bn, approximately 20% of Peru's GDP. North America and Asia are the main destinations of Peruvian exports; in particular United States and China jointly account for approximately 30% of total flows. Exports are concentrated around extractive activities, goods derived from gold and copper account for approximately 40% of Peruvian exports. Other important sectors are food products (coffee, asparagus, and fish) and textiles.

In the time series, Peruvian exports grew steadily during the decade leading to the crisis,

and suffered a sharp drop in 2008. Figure 1 shows the monthly (log) export flows between 2007 and 2009. Peak to trough, monthly exports dropped around 60% in value (40% in volume) during the second half of 2008. The timing of this decline aligns closely with the sharp collapse of world trade during the last quarter of 2008.

Table 2 provides the descriptive statistics of Peruvian exporting firms. The universe of exporters includes all firms with at least one export registered between January 2007 and December 2009. The average debt outstanding of the universe of exporters as of December 2007 is 2.9m Soles and the average level of exports is 9.6m Soles. The average firm exports to 2.75 destinations with an average distance of 6,040 kilometers. The average number of four-digit products is 5.3 and the average number of product-destinations is 8.7. Our empirical analysis in Section 4 is based on exporting firms with positive debt in the domestic banking sector, both, before and after the negative credit supply shock. As shown in Table 2, firms in this sample are larger than in the full sample. For example, average debt outstanding in the analysis sample is 3.6m Soles and average exports in the first sample is 11.4m Soles.

3 Empirical Strategy

This section describes our approach to identifying the causal effect of finance on exports. Consider the following general characterization of the level of exports by firm i of product p to destination country d at time t.

$$X_{ipdt} = X_{ipdt}(H_{ipdt}, C_{it}). \tag{1}$$

The first argument, H_{ipdt}, represents demand and supply real determinants of exports, i.e., willingness to pay for product p in country d, the income level of country d, the cost of inputs for producing product p, the productivity of firm i, etc.. The second argument, C_{it}, represents the amount of credit taken by the firm.

We are interested in estimating the elasticity of trade to credit: $\eta = \frac{\partial X}{\partial C}\frac{C}{X}$. The identification

problem is that the amount of credit is a function of real demand and supply factors, H_{ipdt}, as well as determinants of the supply of finance faced by the firm, S_{it}:

$$C_{it} = C_{it}(H_{ipdt}, S_{it}). \tag{2}$$

To address this problem, we perform an instrumental variable estimation of a model that accounts for all unobserved heterogeneity in the cross section of firm-product-destination export flows, and controls for shocks at the product-destination level. As an instrument for the supply of credit, we use shocks to the balance sheet of the lenders to firm i. We explain in detail each of these aspects of the empirical strategy below.

3.1 Empirical Model

We separate the real determinants of exports, H_{ipdt}, in three components: 1) time-invariant firm-product-destination heterogeneity, δ_{ipd}, 2) shocks to the productivity and demand of exports at the product-country level, α_{pdt}, and 3) firm idiosyncratic shocks, ε_{ipdt}. The first component captures, for example, the managerial ability of firm i, or the firm knowledge of the market for product p in destination d. The second component captures changes in the cost of production of good p, variations in the transport cost for product p to destination d, or any fluctuation in the demand for product p at destination d. The last component captures firm idiosyncratic shocks, such as plant stoppages due to machine breakdowns or fire.

The trade data at the firm-product-destination level used in this study, and described in detail in the next section, allow us to fully account for the first two real determinants of exports. The third component is captured in the error term. Specifically, we estimate the following empirical model of exports:

$$\ln(X_{ipdt}) = \eta \cdot \ln(C_{it}) + \delta_{ipd} + \alpha_{pdt} + \varepsilon_{ipdt}, \tag{3}$$

where, as in equation (1) above, X_{ipdt} represents the exports by firm i of product p to destination

country d at time t, C_{it} is the the sum of all outstanding credit from the banking sector to firm i at time t. The right-hand side includes two sets of dummy variables that account for the cross sectional unobserved heterogeneity, δ_{ipd}, and the product-destination shocks, α_{pdt}. Our parameter of interest is η, the elasticity of exports to credit.

Despite the flexible empirical specification, OLS estimation of η in equation (3) will be biased because the endogenous relationship between credit and real factors established in equation (2) implies a correlation between C_{it} and the error term, ε_{ipdt}. We estimate equation (3) using shocks to the financial condition of the banks lending to firm i as an instrument for the amount of credit received by firm i at time t, C_{it}. We explain the economic rationale behind the instrument, and discuss the identification hypotheses behind the instrumental variable (IV) estimation next.

3.2 Bank Foreign Liabilities and the Supply of Credit during the SubPrime Crisis

Total bank lending in Peru disaccelerated sharply after the collapse of Lehman Brothers in September of 2008. Although this trend characterizes all Peruvian financial institutions, there were differences across banks depending on their share of foreign currency denominated liabilities (see Figure 2).

Portfolio capital inflows, that were growing prior to the crisis, stopped suddenly in mid 2008; the same evolution characterizes total foreign lending to Peruvian banks (see Figure 3). Closely related, the Peruvian Sol, that was appreciating prior to the crisis, lost value abruptly after March 2008 (see Figure 4) and the burden of foreign liabilities increased, specially for banks that relied the most in foreign markets. This liquidity shock led to a decline in lending. As Figure 2 illustrates —and we formally demonstrate below–, the market share of domestic lending by banks with above the median foreign liabilities to assets dropped by 6 percentage points during 2008.[7] Based on the evolution of total foreign lending to Peruvian banks, we set July 2008 as the turning point for the relative lending performance of banks with heterogeneous

[7]See Banco Central de Reserva del Peru (2009) for an analysis of the performance of the domestic financial market during the subprime crisis.

share of foreign liabilities.

We use banks' heterogenous dependence on foreign capital *before* the crisis, interacted with the aggregate decline in dollar funding *during* the crisis, as a source of variation in bank supply of credit. To construct the instrument we first rank banks according to their dependence on liabilities denominated in foreign currency in 2006, a year before the crisis. A bank b is considered to be *exposed* if the share of foreign liabilities in its balance sheet is above the mean (9.5%); in that case, the indicator variable FD_b is equal to one.

Table 1 provides the descriptive statistics of the two groups of banks: Banks with above-mean exposure to foreign borrowing and banks with below-mean exposure to foreign borrowing as of December 2007. High foreign exposure banks are slightly smaller than low foreign exposure banks with total assets of 7.6bn Soles relative to 8.7bn Soles. Both high and low foreign exposure banks have loans worth more than 60% of assets and finance more than 50% of assets with retail deposits. The main difference between the two types of banks is that foreign finance represents 19.6% of total liabilities for high exposure banks relative to 5% for low exposure banks.

Our instrument is a function F_{it} that predicts variations in the supply of credit to firm i in time t. The cross sectional variation in F_{it} comes from the amount of credit that firm i receives from exposed banks in 2006. The classification of banks and firms in 2006 reduces the likelihood that bank foreign dependence and firm-bank matching were endogenously chosen in anticipation of the crisis. The time series variation in F_{it} is given by the aggregate decline of foreign liquidity in the Peruvian economy.

In the baseline estimations the functional form of the instrumental variable is

$$F_{it} = F_i \cdot Post_t, \tag{4}$$

where the indicator function F_i is one if firm i borrows more than 50% from exposed banks in 2006, and zero otherwise. In robustness checks, we also define F_{it} as the fraction of the firm's total debt that came from an exposed bank in 2006. $Post_t$ is an indicator variable that turns to one after July 2008, when the decline in foreign liquidity began.

3.2.1 Identification Hypothesis 1: Foreign Dependence and Credit Supply

Our first identification hypothesis is that banks that had a larger fraction of their funding from foreign sources reduced the supply of credit relative to other banks after the crisis. This hypothesis is consistent with the observed decline in the market share of total lending by exposed banks observed in Figure 2. We can test formally this identification assumption by following the *within-firm* estimation procedure in Khwaja and Mian (2008) to disentangle credit supply from changes in the demand for credit.

The *within-firm* estimator entails comparing amount of lending by banks with different dependence on foreign capital, to the *same firm*. The empirical model is the following:

$$\ln(C_{ibt}) = \delta_{ib} + \alpha_{it} + \gamma \cdot FD_b \cdot Post_t + \nu_{ibt} \tag{5}$$

C_{ibt} refers to average outstanding debt of firm i with bank b during the intervals $t = \{Pre, Post\}$, where the Pre and $Post$ periods correspond to the 12 months before and after July 2008, respectively. As defined above, FD_b is a dummy that takes value one if the share of foreign liabilities of bank b is above the mean (9.5%), and $Post_t$ is a dummy that signals whether $t = Post$. The regression includes firm-bank fixed effects, δ_{ib}, which control for all (time-invariant) unobserved heterogeneity in the demand and supply of credit. It also includes a full set of firm-time dummies, α_{it}, that control for the firm-specific evolution in overall credit demand during the period under analysis. As long as changes in a firm's demand for credit are equally spread across different lenders in expectation, the coefficient γ measures the change in credit supply by banks with higher dependence of foreign capital.

We present in Table 5, column 1, the estimated parameters of specification (5), obtained by first-differencing to eliminate the firm-bank fixed effects, and allowing correlation of the error term at the bank level in the standard error estimation. We find that, indeed, banks transmitted the international liquidity supply shock to the firms. Banks with share of foreign liabilities above the median contracted lending almost 17% relative to banks with lower exposure,

once the demand for credit is accounted for.

It is important to emphasize that the identification assumption tested above, that the instrument is correlated with the *supply* of credit, is much stricter than the one required by the IV estimation, i.e., that the instrument is correlated with the *amount* of credit. This assumption is tested through the first stage of the IV estimation of equation (3). The coefficient θ of the first stage of the IV estimator:

$$\ln(C_{it}) = \delta_i + \beta_t + \theta \cdot F_i \cdot Post_t + \upsilon_{it}. \tag{6}$$

shown in Column 1, Table 7, is -0.56 and significant at the 1% level. This implies that credit received by borrowers linked to exposed banks declines 56% during the crisis relative other firms. This parameter confounds demand and supply factors, and it is substantially larger than the estimated credit supply shock using empirical model (5), 17%. This highlights the importance of controlling for changes in the firm specific demand for credit to properly identify the magnitude of the supply shock. Still, as long as F_{it} is correlated with credit supply and the exclusion restriction holds (discussed next), the parameters of equation (3) are identified.

3.2.2 Identification Hypothesis 2: Exclusion Restriction

Our second identification assumption is that the instrument is conditionally uncorrelated to the error term in equation (3). Formally, the exclusion restriction is:

$$E\left[(F_i \cdot Post_t) \cdot \varepsilon_{ipdt} | \delta_{ipd}, \alpha_{pdt}\right] = 0. \tag{7}$$

Conditioning on firm-product-destination heterogeneity, and on product-destination shocks is not necessary if firms are randomly matched to banks. In this case, firms characteristics and shocks are uncorrelated to bank exposure. However, the instrument is likely to be correlated to other firm level determinants of exports. Table 3 provides the correlation between the two definitions of F_{it} and observable firm characteristics in the Pre period ($Post_t = 0$). The corre-

lations are reported for both the full exporting firm sample, and the analysis sample (firms with positive debt in the *Pre* and *Post* periods). There is a low correlation between F_{it} and firm characteristics. With the exception of number of destinations and fraction of debt in foreign currency, the correlation is not statistically different from zero and often switches sign across samples. Table 4 provides the descriptive statistics of firms classified in two groups according to our main definition of F_{it}: firms that borrow more than 50% from exposed banks in 2006, and those that do not. Firms that borrow from affected banks have a larger fraction of their bank debt denominated in foreign currency, tend to be larger according to their overall debt and exports, their exports are concentrated on products with higher unit value, and they serve more destinations. These patterns suggest that the matching between firms and banks is not random.

Such non-random matching may lead the instrument to be unconditionally correlated to firm exports. For example, suppose that banks with higher liabilities in foreign currency specialize in firms that export *Men's Cotton Overcoats* to the U.S.. If the demand for Men's Overcoats in the U.S. drops disproportionately during the crisis, then the external exposure instrument and changes in the demand for credit will be correlated.

Our identification strategy does not require this unconditional correlation to be zero. Our identification assumption is much weaker: that non-finance determinants of exports and the instrument are uncorrelated after conditioning on time-invariant flow characteristics, δ_{ipd}, and product-destination shocks, α_{pdt}. In the example above, our estimation procedure compares the change in Men's Cotton Overcoat exports to the U.S. by a firm that is linked to an exposed bank, relative to the change in Men's Cotton Overcoat exports to the U.S. of a firm whose lender is not exposed. Thus, the identification assumption is that factors other than bank credit that may affect the exports of mens' cotton overcoats differentially across these two firms during the crisis are not related to the bank the firms borrow from.

A violation of this conditional exclusion restriction would require, for example, that production stoppages due to equipment breakdowns become more frequent during the crisis for firms

that borrow from banks with a high fraction of foreign liabilities.[8] Such a correlation between bank affiliation, and idiosyncratic shocks to exports of the same product and to the same destination are unlikely. To corroborate this, we demonstrate in the results section that our point estimates are unchanged when we allow same product-destination exports to vary differentially across firms that produce products of different quality, firms that have different currency composition of their liabilities, single and multi-product firms, and small and large firms measured both in volume of exports and in number of destinations.

4 Effect of Financial Supply Shock on Trade

It was established in the previous section that, although the disacceleration in lending by Peruvian banks after the Subprime crisis was general to all banks, those with higher share of foreign liabilities had a proportionally larger reduction in credit supply. In this section, we exploit the fact that firms borrow from different sets of banks, to analyze the relative export performance of firms related to banks with high foreign dependence. First, we estimate the impact on the intensive margin of trade. And second, we estimate the relative effect of this credit supply shock on the extensive margin of trade. That is, the differential probability that an exporting firm related to a high foreign dependance bank reduced the number of products, or discontinued supplying a given destination; or, correspondingly, that a firm expands the set of products exported and destinations served. Table 6 presents the relevance of these margins in the overall export drop during the period under analysis. In all cases, we focus on firms with positive debt positions before and after the shock. The descriptive statistics of the firms in our analysis sample are in Table 2.

[8]Note that a negative credit supply shock may cause production stoppages, for example, due to financial distress. This does not invalidate our identifying assumptions.

4.1 Intensive Margin of Trade

In this section we analyze how the identified credit supply shock affects the intensive margin of trade; that is, how a decline in the supply of credit affects the amount of exports by firms which are exporting before and after the crisis. We emphasize the importance of fully controlling for shocks to the productivity or demand by accounting for common fluctuations in product-destination flows. For that reason, we use a restrictive definition of intensive margin. It corresponds to firm export flows of a given product to a given destination, that were active, both, in the Pre and $Post$ periods.

The richness of the data allows us to control for trade shocks with high precision. As explained in Section 3, we control for trade demand and productivity fluctuations by comparing variations in the magnitude of trade flows of the same destination-product pair across firms, where destination is defined at the country level, and products are aggregated at 4-digit level according to the Harmonized System. As a result, all our estimations are obtained from exports variation within close to 6,000 product-destinations in the baseline specification. Results are also shown with product definition at 6-digit level.

To address concerns related to estimation bias due to serial correlation, we collapse each period, Pre and $Post$, into a single observation (see Bertrand, Duflo and Mullainathan (2004)). Thus, X_{ipdt} corresponds to aggregate exports of product p to destination d by firm i in the period $t = \{Pre, Post\}$, where the Pre and $Post$ periods correspond to the 12 months before and after July 2008, respectively. We estimate equation (3) on the Pre-Post panel by first differencing to eliminate the firm-product-destination fixed effects. The resulting estimation equation is:

$$\ln\left(X_{ipdPost}\right) - \ln\left(X_{ipdPre}\right) = \alpha'_{pd} + \eta \cdot \left[\ln\left(C_{iPost}\right) - \ln\left(C_{iPre}\right)\right] + \varepsilon'_{ipd} \tag{8}$$

The product-destination dummies, $\alpha'_{pd} = \alpha_{pdPost} - \alpha_{pdPre}$ in equation (3), absorb all demand fluctuations of product p in destination d.

The results of both the OLS and the Instrumental Variable (IV) estimations of the export

elasticity to credit supply in specification (8) are presented in Table 7, for the volume and value of exports respectively. The IV estimate implies that a 1% increase in the stock of credit results in an increase of 0.23% in the volume of yearly export flows and 0.26% in their value. The volume and value elasticities are similar, which confirms that our estimation strategy properly accounts for shocks that affect exports beyond the finance channel, i.e., through export prices. We find similar results if the export data uses product definition at 6-digit level, according to the Harmonized System (see Table 8).

The IV estimate of the export elasticity to finance is ten times that implied by the OLS estimate (the OLS point estimate is 0.025 in the case of export volume). This highlights the importance of firms' credit demand in explaining the drop in total lending during this period. The OLS estimate is biased downwards because the credit credit supply shock explains only a small portion of the overall drop in firms' credit during the crisis.

This raises the question of what would the magnitude of the bias in the estimated elasticity be if we could not account for all shocks to trade at the product-destination level. This is an important question since most empirical estimates of the effect of finance on credit use data that are not disaggregated at the firm-product-destination level, and thus cannot account for such variation.

Table 9 presents the results of specification (8) that would arise in our environment, if the data did not allow to fully control for demand shocks. Columns 1 and 4 in Table 9 present the estimated impact of the supply shock on firm exports if no information on products or destination was available. In our environment, this would lead to overestimate the impact of the credit supply shock by more than 65% in the volume and 54% in the value of exports. Columns 2 and 5 in Table 9 correspond to the estimation based on firm exports by product, aggregated across all destinations. In this case, the specification imperfectly controls for fluctuations in demand by including product-time dummies, but cannot account for variations in demand driven by destination shocks. The resulting coefficients overestimate the elasticity of the value of exports to credit supply by 16% (9% in value). Finally, columns 3 and 6 are based on overall firm

exports by destination, aggregated across all products. The specification includes destination-time dummies, but cannot account for its interaction with product demand. The resulting coefficients, although statistically insignificant, are the ones closest to our estimates in Table 7.

These estimates imply that during the period under analysis, controlling for the country of destination is crucial to correctly estimate the elasticity of exports to finance. A bias in unconditional estimates implies, as discussed in Section 3, that firms and banks are not randomly matched. Specifically, the upwards bias in this context implies that exposed banks, with a larger fraction of dollar liabilities, were specialized in lending to firms that experienced disproportionate declines in the demand for their exports.

Our results are informative about the cost structure of the firm. The impact of credit shocks on the intensive margin suggests that finance affects the variable cost of export activities. The link between the credit shock and the variable cost of exports can be explained by the nature of international trade —i.e, the extra time elapsed in the commercial transaction, insurance, or the use letters of credit–, but also by the general need of working capital used in the production of exporting goods.[9] In both cases, an increase in the cost of funding results in higher effective unit cost and lower international sales.

4.1.1 Identification Tests

In this section we perform three identification tests. The first one tests for potential unaccounted correlations between firm export sensitivity to the crisis and bank affiliation. The second, tests for pre-existing differential trends in the export and borrowing behavior of firms linked with exposed and non-exposed banks. The third test the robustness of the estimated elasticities to the instrument definition.

As we mentioned in Section 3, the exclusion restriction 7 will be violated if firms associated with banks with high dollar liabilities experience a disproportionate negative shock to exports relative to other firms exporting to the same product-destination. This could occur, for example,

[9]See Auboin (2009) and IMF (2003) for detail on the banking services related to international trade and the increase in their cost when the financial market conditions tighten.

if firms that borrow from affected banks export products of a higher quality, and the demand for higher quality products dropped more during the crisis. Alternatively, it could be that firms with high foreign denominated liabilities borrow from banks with high dollar denominated liabilities, and the capital flow reversals affect the balance sheet of firms directly and not through bank lending.

To verify whether the above results are driven by such heterogeneity, we augment equation (8) with a set of observable firm characteristics in the Pre period as control variables (average unit price of exports at the firm-product-destination level, average fraction of debt denominated in foreign currency, total exports, number of products, and number of destinations at the firm level). Including these pre-determined variables in the first differenced specification is equivalent to including them interacted with time dummies in the panel specification (3). Thus, this augmented specification controls for heterogeneity in the evolution of exports after the crisis along the product quality, firm external exposure, and firm size dimensions. The elasticities obtained from the specifications with and without the controls, shown in Table 10, are virtually identical.

In the second test we explore the possibility that firms associated with exposed banks were simply on a different export and borrowing growth path before the crisis. If this were the case, our estimates could be capturing such pre-existing differences. We perform the following placebo test: we estimate equation (8) lagging the debt and export measures one year, as if the capital flow reversals had occurred in 2007 instead of 2008. That is, for $t = \{Pre - 1, Pre\}$, where Pre is, as above, the period July 2007-July 2008, and $Pre - 1$ corresponds to the previous 12 months. The results are reported in Table 11. The coefficients of interest in the First Stage (FS), in column 1, and the IV regressions, in columns 4 and 7, are not statistically different from zero. This confirms that firms borrowing from banks with high share of dollar liabilities as of December 2007 did not face any differential credit supply prior to the crisis. And, correspondingly, their exports performance was not different from those of firms linked to banks with lower share of dollar liabilities. Overall, the results in Tables 10 and 11 suggest that our instrument satisfies

the exclusion restriction and it correctly identifies the effect of credit supply shocks to the firms during the subprime crisis.[10]

Finally, we test the robustness of our estimates to the functional form of the instrument. If the identification assumptions hold, the instrumental variable approach should obtain consistent estimates regardless of the definition of the instrument. To verify this, we substitute the indicator variable F_i with a continuous function, defined as the maximum fraction of total funding that firm i obtained from exposed banks during 2006. The results, qualitatively and quantitatively similar to those described above, are presented in Table 12.

4.2 Extensive Margin of Trade

In this subsection we analyze how the identified credit supply shock affects the extensive margin of trade. As before, we emphasize the importance of fully controlling for shocks to the productivity or demand by accounting for common fluctuations in product-destination flows. For that reason, we define a market as a pair product-destination. Then, we analyze how the credit shock affects the number of firms exporting a given product-destination in the *Pre* period that continue exporting during the *Post* period. And, correspondingly, we measure the effect of credit on the number of firms that entry new a product-destination market in the *Post* period.

4.2.1 Entry

To measure the effect of supply of credit on the number of new firm-product-destination flows, we classify exporting and non exporting firms into different groups, F, according to their exposure to credit shocks. The dependent variable is a product-destination-group observation: the (log) number of new product-destination flows at time t, for the each group of firms F. We estimate

[10]Note that the OLS estimate in this placebo test is positive, indicating that exports and debt are positively correlated. This positive correlation is natural and expected: firms that export more also borrow more for reasons unrelated to credit supply shocks. This emphasizes the importance of or instrumental variable approach.

the following equation:

$$\ln N^E_{Fpdt} = \delta_{Fpd} + \alpha_{pdt} + \nu^e \cdot \ln\left(\sum_{i \in F} C_{it}\right) + \xi_{Fpdt} \tag{9}$$

N^E_{Fpdt} is the number of firms in group F that start exporting product p to destination d at time t, for $t = \{Pre, Post\}$. As in the previous subsection, we define each time t to be a 12 month period and, in particular, the Pre and $Post$ periods are the 12 months before and after July 2008, respectively. There are large number of intermittent export flows in the sample; we consider a firm-product-destination flow to be active at time t if it registered positive exports at any time during those 12 months.

We include product-destination-time dummies, α_{pdt}, that control for changes in demand and productivity. This specification differs from the one in (8) in that the unit of observation is defined at the group-product-destination level. Then, the fixed effects δ_{Fpd} control for any observable time-invariant heterogeneity of exports of product p to destination d by the group of firms F, instead of controlling at the firm-product-destination level as in specification (8).

We are interested in the effect of a credit shock to group F on its entry margin of trade, which is measured by the elasticity ν^e. As before, we instrument $\ln(\sum_{i \in F} C_{it})$ with a function F_{it} (defined in equation (4)) that predicts the credit supply to the firms in group F, based on the external dependence of its related banks. This implies the existence of two groups of firms, those with at least 50% of their debt with affected banks (firms i such that $F_i = 1$) and those with most of their debt with non affected banks (firms i such that $F_i = 0$).

We estimate the parameter ν^e after first differencing equation (9) to eliminate the group-destination fixed effect. The dependent variable is therefore $\Delta \ln N^E_{Fpdt}$. The results are presented in Table 13, Column 1 and 2, for product definition at the 4 and 6 digit level, according to the Harmonized System. The elasticity of the entry margin to credit is not statistically significant.

4.2.2 Continuation

In the case of the continuation margin, we estimate the effect of credit on the number of export flows that continue active. The dependent variable is a product-destination-group observation: the number of firm-product-destination export flows open at time $t-1$, that continue active at time t for a group of firms, F, that experienced a similar change in credit. This empirical model does not differentiate between firms that stop exporting from those that continue exporting but discontinue a given product-destination flow. We estimate the following equation:

$$\ln N^C_{Fpdt} = \delta_{Fpd} + \alpha_{pdt} + \nu^c \cdot \ln\left(\sum_{i \in F} C_{it}\right) + \xi_{Fpdt} \tag{10}$$

N^C_{Fpdt} is the number of firms in group F that were exporting product p to destination d at time $t-1$ and continue doing so in time t, for $t = \{Pre, Post\}$. This specification includes product-destination-time dummies and group-product-destination fixed effects. As before, we instrument $\ln(\sum_{i \in F} C_{it})$ with the external dependence of the corresponding banks, F_{it}.

We estimate equation (10) on the $Pre - Post$ panel by first differencing to eliminate the group-product-destination fixed effects. The dependent variable is therefore the change in the (log) number of continuing exporters between the Pre and $Post$ periods. The result of the IV estimation is in Table 13, Columns 2 and 3. According to our preferred specification, using product definition aggregated at 4-digit level, a 10% increase in the stock of credit increases the number of firms continuing exporting a given product-destination flow in 3.6%. More disaggregated product data is likely to be measured with errors, as exports are misclassified in very narrow categories; therefore the elasticity in Table 13, Column 3 is potentially estimated with the classic attenuation bias.

5 Characterization of Export Elasticity to Credit

In this section we analyze how the export sensitivity to credit shocks varies according to observable characteristics of the export flow, namely, the size of the firm or the flow, the distance to

the destination market, and presumed external finance dependence of the sector of production.

5.1 Firm and Export Flow Size

This subsection explores whether exports' response to credit shocks varies with export size. We consider two size definitions: the size of the firm's overall export, and the size of the firm-product-destination flow. The first definition allows us to test whether larger firms, which potentially have sources of finance other than banking, present different export elasticities to credit. The second definition, allows us to further characterize the costs of exporting.

Columns 1 and 2 in Table 14 show how the intensive margin elasticities of the volume and value of exports change for firms with overall export size above the median in our sample. The difference is not statistically significant. In the case of the continuation margin in Column 1, Table 15, the continuation of a product-destination export flow is more responsive to credit conditions for large exporters. The results concerning the entry margin are again not statistically significant irrespectively of the size of the exporting firm (column 3, Table 15).

These cross sectional patterns are potentially specific to the overall availability of external financing during the Subprime Crisis. Alternative sources of financing, usually available to larger firms, disappeared during our sample period. For example, between March and October of 2008 the spread on domestic corporate bonds increased more than 400bp and firms avoided issuing new debt until mid 2009 (See Banco Central de Reserva del Peru (2009).) Given these macroeconomic conditions, our estimated coefficients can be interpreted as elasticities of exports to changes in overall finance, and not only to bank credit.

Interestingly, although the intensive margin elasticities are statistically equal for small and large exporters, the overall effect of credit supply shocks on the amount of exports is not. During the crisis, illiquid banks cut credit disproportionately more to small firms. We estimate equation (5) for firms of different sizes and find that affected banks reduced credit supply by 19.5% in the case of small firms and 13.5% in the case of large one (see Table 5). Combining the magnitude of the credit supply shock and the elasticity of exports to finance in Table 7, a *back of the envelope*

calculation of the drop in the intensive margin of (volume of) exports due to reduction in credit is 4.5% and 3.1% for small and large exporters respectively (relative to firms borrowing from non exposed banks).

Tables 14 and 15 also report the difference in the elasticities for small and large export flows, irrespectively of the size of overall exports by the firm. This variation adds to the characterization of the cost of exporting. If exports are characterized by fixed costs, firms may abandon a given market when sales drop below the minimum level required for the activity to be profitable. As it was already established in the previous section, credit supply shocks affect firm export quantities. In this scenario, credit conditions are expected to disproportionately affect the continuation margin for small export flows, which are more likely to drop below the break even point. The results in Tables 14 and 15 are consistent with this hypothesis. For those export flows that remain active during the whole period (intensive margin) the elasticity to credit shocks is similar across flows of different size. The continuation margin, on the other hand, is more sensitive to credit shocks for small export flows than for larger ones: 0.54 and 0.15 respectively (column 2 in Table 15).

5.2 Distance

The export elasticities to credit shocks computed in the previous section account for, both, the effect of the credit shock on the general variable cost of producing, irrespectively of the destination of the goods, and the additional impact of finance on cross-border trade. Presumably, as the freight time for international trade is longer than for domestic transactions, exports are more responsive to credit than domestic sales. To explore this link, we analyze how this elasticity changes with distance to the destination market. The hypothesis that the working capital required to finance exports increases with distance due to longer freight time. The results in Table 16 do not support this interpretation. The elasticity is statistically indistinguishable for exports to close and distant markets.

5.3 Sectorial Heterogeneity

In the United States, characterized by relatively frictionless financial markets, firms of different manufacture sectors vary in their *external finance dependence*. Since the seminal work by Rajan and Zingales (1998), this source of heterogeneity across sectors has been widely used to identify the effect of credit constraints on long-term growth and the cross country pattern of international trade. It remains to be shown whether those factors considered to affect the sensitivity to long-term finance can also predict the effect of short-term credit shocks. This subsection explores this topic.

We analyze how our estimates of the export elasticities to credit shocks vary across sectors with different external finance dependence. Our measure of external finance dependence follows Chor and Manova (2010); it corresponds to the fraction of total capital expenditure not financed by internal cash flows, from cross sectoral data of U.S. firms. This measure is considered to represent technological characteristics of the sector of firm. For example, according to this measure, *textile mills* that transform basic fibers into fabric, intensively require external finance, while *apparel manufacturing* firms that process that fabric into the final piece of clothing, are considered to be less dependent.

We estimate equations (8), (9), and (10), for sectors with external finance dependence above (below) the cross sectoral median. The results are reported in Table 17. We find that the elasticity of (volume of) exports to finance is higher in manufacture sectors considered to be less dependent on external finance; the elasticities are 0.25 and 0.12 for low and high external finance dependence sectors respectively. The elasticity of the continuation and entry margins does not vary across sectors with different levels of external finance dependence.

Our results suggest that the elasticities to short-term and long-term changes in financial conditions represent different aspects of the firm's usage of credit. The measure of external finance dependence may indicate the sensitivity of the firm to long term access to credit, which is potentially related to the presence of important fixed investments or entry costs. The elasticity of exports to credit shocks, on the other hand, is related to the short term needs of working

capital.

6 Contribution of Finance to Overall Export Decline

In this section, we use the estimated elasticities to perform a *back of the envelop calculation* of the contribution of finance to the overall export decline during the period under analysis.

The magnitude of the supply shock was estimated with equation (5), which controls for changes in the demand of credit at the firm level. Affected banks contracted credit supply 16.8% beyond the change in supply by non affected banks (see Table 5). These banks accounted for 30.5% of total credit to exporters in the *Pre* period (12 months before July 2008). We take the conservative stand that non affected banks —i.e., banks with share of foreign liabilities below 9.5%– were not liquidity constrained. Then, the overall drop in credit supply was 5.1%.

The effect of the credit shock on the intensive margin of exports is found to be statistically equal for small and large export flows (Tables 14). Then, we consider the intensive margin elasticity for the volume of exports in Table 7, 0.23. In the case of the continuation margin, on the other hand, the elasticities change significantly with the size of the flow (15). Since export flows of size below median account for less than 2% of total exports, our back of the envelope calculation focuses only on the estimates characterizing the performance of large flows, 0.15. The exit margin is not found to be significantly affected by the credit supply shock. Then, the drop in credit supply explains a reduction in the volume of exports during the 12 months following July 2008 (*Post* period) of –1.9%.

Most of the reduction in the value of exports was due to the collapse in international prices of Peruvian goods. The total drop in the annual growth rate of the value of exports between the *Pre* and *Post* periods was 33.3 percentage points, while in volume this difference is reduced to 12.8 percentage points (see Table 6). Then, the drop in credit supply can account for approximately 15% of this missing volume of trade.

Following the decomposition in export growth rates presented in Table 6, we decompose the total missing volume trade in intensive and extensive margins. The intensive margin, that was

growing at 2.1% in the 12 months of the *Pre* period, declined 2.2% during the *Post* period. Finance alone can account for 27% of this drop. However, the intensive margin accounts for only 33% of the missing trade, while 64% of the missing trade is explained by the increase in the exit margin, which doubled between the *Pre* and *Post* periods. The credit shock can explain 9% of the exit margin. This suggests that the large increase in the exit margin during the 12 months following July 2008 was triggered by the contraction in international demand and prices for Peruvian goods, which made the value of the trade flows insufficient to cover the export fixed costs.

7 Conclusions

It has long been argued that shocks to banks liquidity are transmitted to the credit conditions of related firms. There is no evidence, however, of their consequences in terms of real outcomes. In this paper, we provide evidence of this link. Banks subject to liquidity shocks change their lending to firms, which in turn adjust their volume of exports.

Our results stem from analyzing Peruvian exports during the subprime crisis. Although Peru was not directly affected by the collapse in the value of U.S. real estate, the capital flow reversal during the international financial crisis affected the lending capacity of domestic commercial banks. We use this drop in the supply of credit to Peruvian firms to estimate the sensitivity of exports to credit. We find that the elasticity of the intensive margin of exports is 0.23. Credit is found to affect the number of firms that continue exporting, and the elasticity is larger for small export flows. Short term fluctuations in credit supply, on the other hand, are not found to significantly affect the decision of firms to entry a new export market.

These results cast light on the link between finance and production activities. They suggest that credit shocks affect the variable cost of the firm —in particular, of exporting. When credit conditions tighten, the unit cost of exports increases and, as a result, sales drop. Along the same lines, an increase in the variable cost of exporting can trigger firms to discontinue those export flows with size close to the break-even point.

References

Ahn, JaeBin (2010) 'A theory of domestic and international trade finance.' *Columbia University*

Alessandria, George, Joseph Kaboski, and Virgiliu Midrigan (2010) 'The great trade collapse of 2008-09: an inventory adjustment?' *NBER Working Paper*

Amiti, Mary, and David Weinstein (2009) 'Exports and financial shocks.' *NBER Working Paper*

Ashcraft, Adam (2005) 'Are banks really special? new evidence from the fdic-induced failure of healthy banks.' *The American Economic Review* 95(5), 1712–1730

—— (2006) 'New evidence on the lending channel.' *Journal of Money, Credit, and Banking* 38(3), 751–776

Auboin, Marc (2009) 'Boosting the availability of trade finance in the current crisis: Background analysis for a substantial g20 package.' *CEPR Policy Research Paper*

Baldwin, Richard, and Paul Krugman (1989) 'Persistent trade effects of large exchange rate shocks.' *The Quarterly Journal of Economics* 104(4), 635–654

Banco Central de Reserva del Peru (2009) 'Reporte de estabilidad financiera.' May

Beck, Thorsen (2003) 'Financial dependence and international trade.' *Review of International Economics* 11(2), 296–316

Bems, Rudolfs, Robert Johnson, and Kei-Mu Yi (2010) 'The role of vertical linkages in the propagation of the global downturn of 2008.' *Working Paper*

Bernanke, Ben (1983) 'Non monetary effects of the financial crisis in the propagation of the great depression.' *The American Economic Review* 82(4), 901–921

Bernanke, Ben, and Alan Blinder (1992) 'The federal funds rate and the channels of monetary transmission.' *The American Economic Review* 82(4), 901–921

Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan (2004) 'How much should we trust differences-in-differences estimates?' *Quarterly Journal of Economics* 119(1), 249–275

Bricongne, Charles, Lionel Fontagne, Guillaume Gaulier, Daria Taglioni, and Vincent Vicard (2009) 'Exports and financial shocks.' *Banque de France Working Paper*

Cetorelli, Nicola, and Linda Goldberg (2010) 'Global banks and international shock transmission: Evidence from the crisis.' *NBER Working Paper*

Chaney, Thomas (2005) 'Liquidity constrained exporters.' *Chicago University Working Paper*

Chava, Sudheer, and Amiyatosh Purnanandam (2009) 'The effect of banking crisis on bank-dependent borrowers.' *Journal of Financial Economics*

Chor, Davin, and Kalina Manova (2010) 'Off the cliff and back? credit conditions and international trade during the global financial crisis.' *NBER Working Paper*

Eaton, Jonathan, Sam Kortum, Brent Neiman, and John Romalis (2010) 'Trade and the global recession.' *Penn State University Working Paper*

Friedman, Milton, and Anna Schwarz (1963) *Monetary History of the United States, 1867–1960* (Princeton University Press)

Gan, Jie (2007) 'The real effects of asset market bubbles: Loan- and firm-level evidence of a lending channel.' *Review of Financial Studies* 20(5), 1941–1973

Hummels, David (2001) 'Time as a trade barrier.' *Purdue University Working Paper*

Iacovone, Leonardo, and Veronika Zavacka (2009) 'Banking crisis and exports: Lessons from the past.' *The World Bank Policy Research Working Paper*

IMF (2003) 'Trade finance in financial crises: Assessment of key issues.' Policy Development and Review Department

___ (2009) 'World economic outlook.' April

Iyer, Rajkamal, and Jose-Luis Peydro (2010) 'Interbank contagion at work: Evidence from a natural experiment.' ECB Working Paper

Kashyap, Anil, and Jeremy Stein (2000) 'What do one million observations on banks have to say about the transmission of monetary policy.' *The American Economic Review* 90(3), 407–428

Kashyap, Anil, Owen Lamont, and Jeremy Stein (1994) 'Credit conditions and the cyclical behavior of inventories.' *Quarterly Journal of Economics* 109(3), 565–592

Khwaja, Asim, and Atif Mian (2008) 'Tracing the impact of bank liquidity shocks: Evidence from an emerging market.' *The American Economic Review* 98(4), 1413–1442

Levchenko, Andrei, Logan Lewis, and Linda Tesar (2010) 'The collapse of international trade during the 2009-2009 crisis: In search of the smoking gun.' *NBER Working Paper*

Manova, Kalina (2008) 'Credit constraints, equity market liberalizations, and international trade.' *Journal of International Economics* 76, 33–47

Melitz, Marc J. (2003) 'The impact of trade on intra-industry reallocations and aggregate industry productivity.' *Econometrica* 71(6), 1695–1725

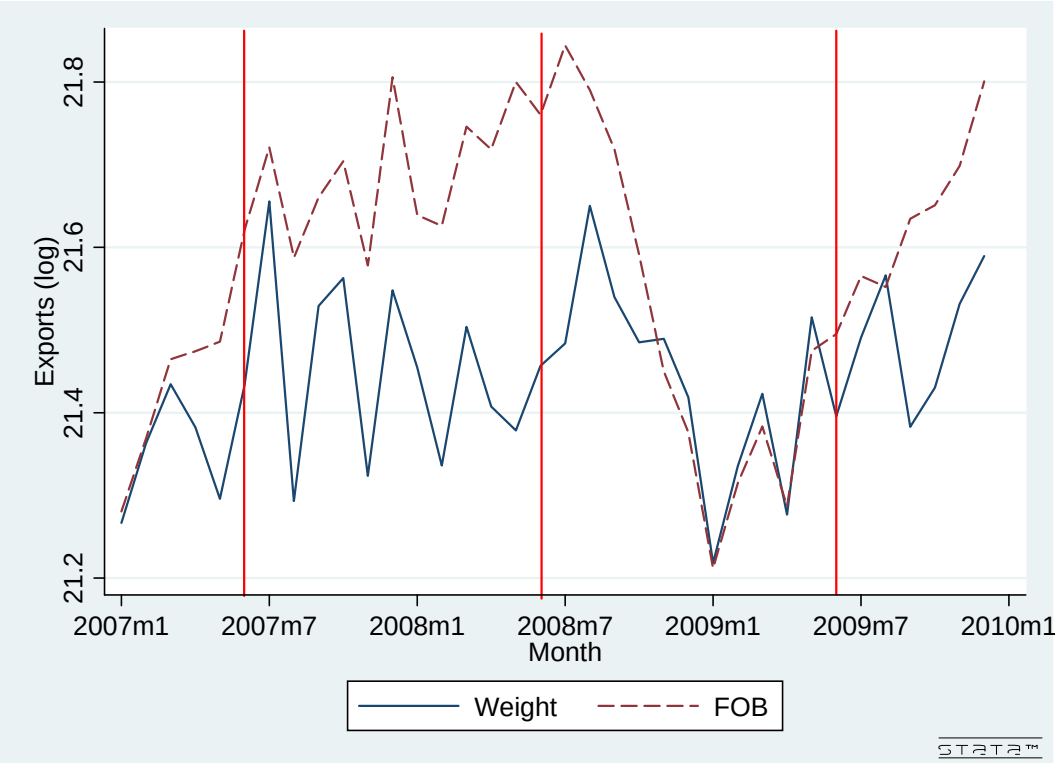
Paravisini, Daniel (2008) 'Local bank financial constraints and firm access to external finance.' *The Journal of Finance* 63(5), 2160–2193

Peek, Joe, and Eric Eric Rosengren (2000) 'Collateral damage: Effects of the japanese bank crisis on real activity in the united states.' *The American Economic Review* 90(1), 30–45

Rajan, Raghuram, and Luigi Zingales (1998) 'Financial dependence and growth.' *The American Economic Review* 88(3), 559–586

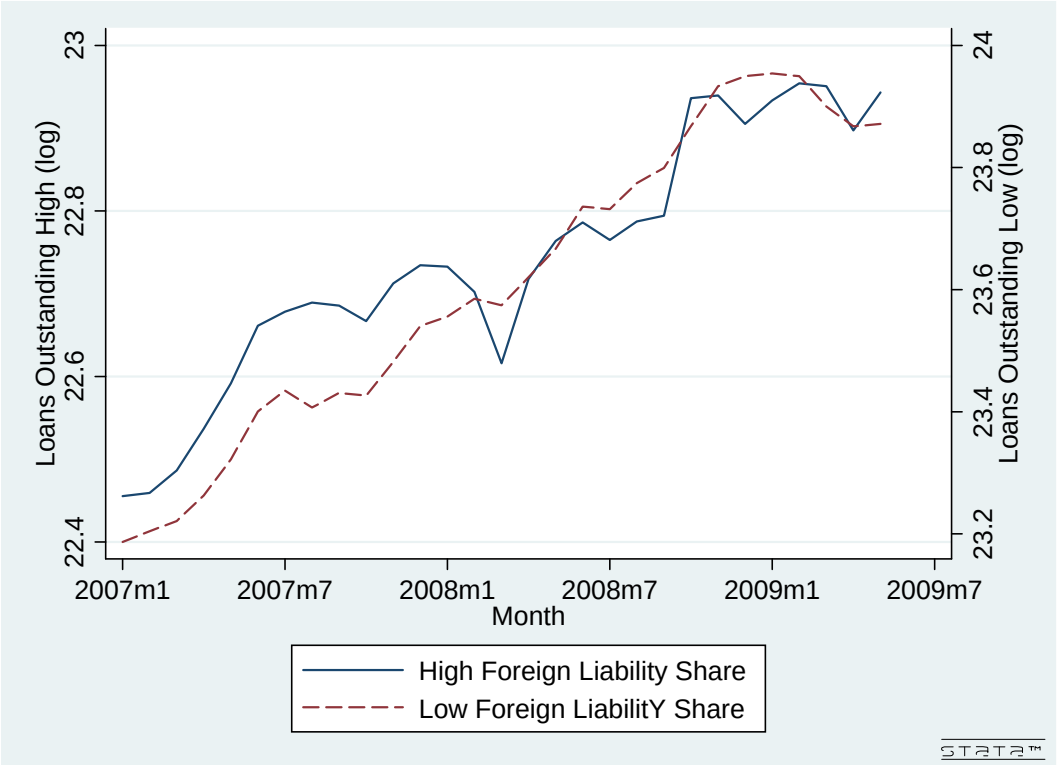
Roberts, Mark, and James Tybout (1999) 'An empirical model of sunk costs and the decision of exports.' *World Bank Working Paper*

Schnabl, Philipp (2010) 'Financial globalization and the transmission of bank liquidity shocks: Evidence from an emerging market.' *The Journal of Finance*



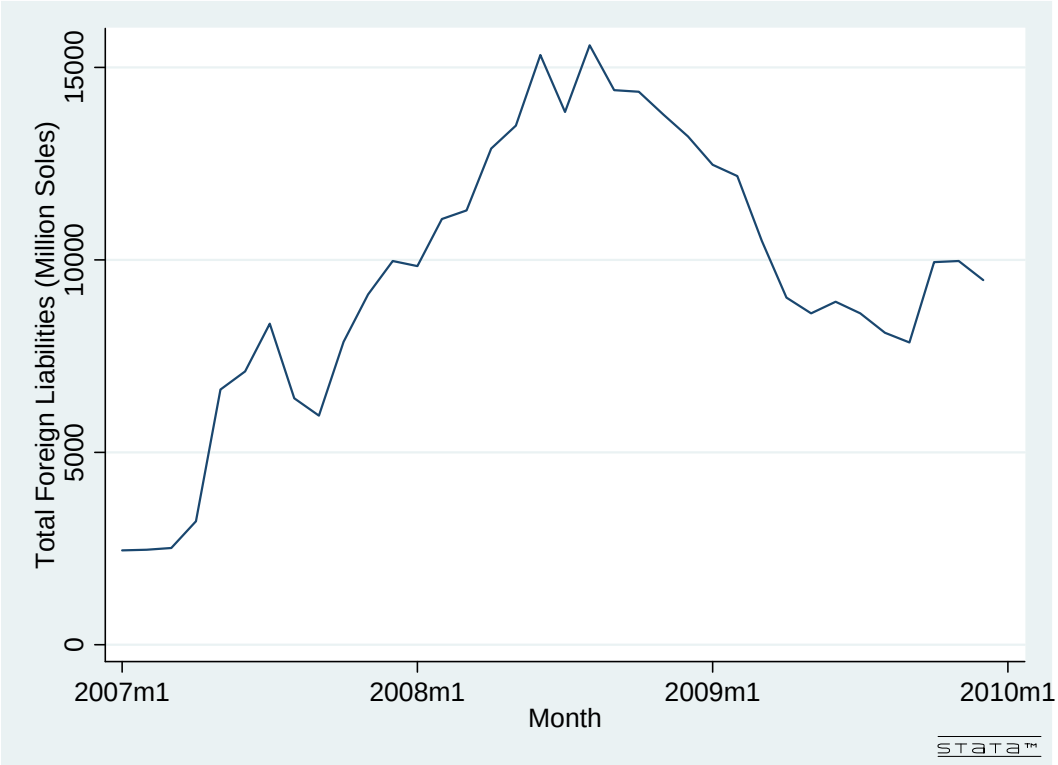
Source: SUNAT. Volume of exports in kg, and value in dollars FOB.

Figure 1: Total Peruvian Exports



Source: Bank Financial Statements and Credit Registry, Superintendencia de Bancos y Seguros de Peru, and SUNAT. Banks with high (low) foreign liability share are those with fraction of foreign liabilities to assets above (below) 9.5% in January-June 2008.

Figure 2: Lending by Banks with High Share of Foreign Liabilities



Source: Bank Financial Statements, Superintendencia de Bancos y Seguros de Peru. Foreign financing: bank liabilities with institutions outside Peru.

Figure 3: Total Banking Sector Foreign Financing

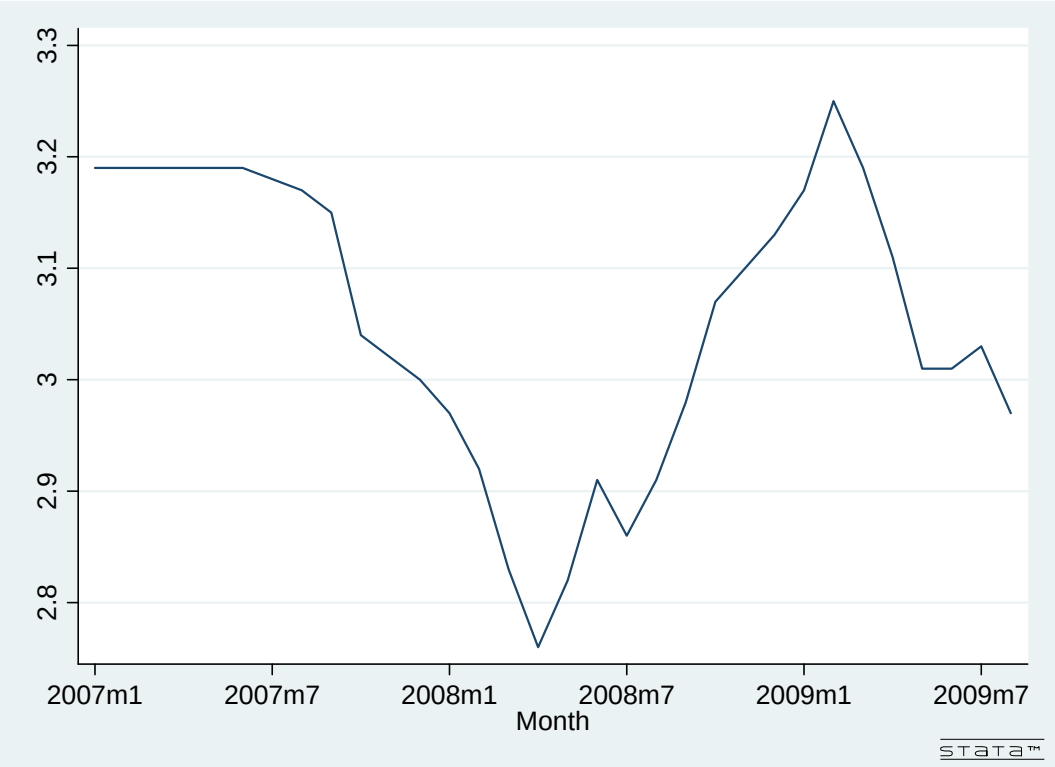


Figure 4: Exchange Rate (Soles/USD)

	All Commercial Banks (N = 13)			High Foreign Exposure (N = 4)			Low Foreign Exposure (N = 9)		
	mean	sd	p50	mean	sd	p50	mean	sd	p50
Assets (M Soles)	8,335	12,526	2,260	7,599	11,451	2,382	8,661	13,630	2,260
Loans (M Soles)	5,004	7,138	1,521	5,127	7,724	1,687	4,949	7,352	1,521
Deposits (M Soles)	5,938	9,180	1,396	5,043	8,045	1,309	6,336	10,078	1,396
Foreign Financing (M Soles)	767	1,199	212	1,059	1,520	362	637	1,109	155
Loans/Assets	0.661	0.105	0.673	0.659	0.126	0.660	0.661	0.103	0.673
Deposits/Assets	0.637	0.142	0.691	0.573	0.082	0.543	0.665	0.158	0.733
Foreign Financing/Assets	0.095	0.101	0.068	0.196	0.135	0.175	0.050	0.034	0.065

Source: Bank Financial Statements as of December 2007, Superintendencia de Bancos y Seguros de Peru.

Table 1: Bank Descriptive Statistics

	All Exporters (N = 6,169)			Analysis Sample (N=4,974)		
	mean	sd	p50	mean	sd	p50
Debt (1,000 Soles)	2,203	15,367	2	2,726	17,072	22
Fraction of Debt in Foreign Currency	0.708	0.385	0.951	0.713	0.381	0.953
Exports - FOB (1,000 Soles)	9,568	150,450	81	11,447	166,880	88
Exports (1,000 Kg)	8,529	230,792	11	10,449	256,985	12
# destinations	2.7	4.3	1.0	2.9	4.5	1.0
Distance (km)	6,040	7,462	4,725	5,962	7,302	4,725
# products (4-digit)	5.3	9.4	2.0	4.7	8.2	2.0
# Product x Destinations	8.7	20.5	3.0	8.0	18.5	3.0
Over 50% debt from exposed bank (dummy)	0.219			0.262		
Fraction borrowed from exposed bank	0.221	0.378	0.000	0.265	0.398	0.000

Source: Bank Financial Statements and Credit Registry as of December 2007, Superintendencia de Bancos y Seguros de Peru. Customs data between January 2007 and December 2009, SUNAT. Analysis Sample: firms with positive debt in both periods.

Table 2: Firm Descriptive Statistics

Variable	Dummy = 1 if borrows more than 50% from exposed bank in 2006		Fraction of debt from exposed banks in 2006	
	All exporters	Analysis Sample	All exporters	Analysis Sample
Debt (1,000 Soles)	0.044	0.030	0.082	0.068
Fraction of Debt in Foreign Currency	0.147	0.141	0.178	0.171
Exports - FOB (1,000 Soles)	0.004	-0.004	0.019	0.010
Exports (1,000 Kg)	-0.007	-0.012	0.008	0.004
# destinations	0.095	0.087	0.131	0.126
Distance (km)	-0.003	0.008	-0.009	0.001
# products (4-digit)	-0.037	-0.003	-0.035	0.004
# Product x Destinations	0.002	0.026	0.021	0.053

Pair-wise correlation between the different definitions of the instrument for firm exposure to the credit supply shock and observable firms characteristics in *Pre* period. In the first column, the instrument is a dummy equal to one if firm borrowed more than 50% from exposed bank in 2006. In the second column, the instrument is defined as the maximum fraction borrowed from an exposed bank in 2006.

Table 3: Correlation between Firm Characteristics and Debt with Exposed Banks

	Borrows > 50% from Affected Banks					
	Yes (N = 1,471)			No (N=3,503)		
	mean	sd	p50	mean	sd	p50
Debt (1,000 Soles)	4,694	22,630	391	4,263	18,698	52
Fraction of Debt in Foreign Currency	0.778	0.333	0.978	0.690	0.390	0.934
Exports - FOB (1,000 Soles)	14,442	110,132	632	24,886	272,614	328
Exports (1,000 Kg)	7,604	49,369	91	25,758	436,421	44
# destinations	4.5	6.0	2.0	4.2	5.7	2.0
Distance (km)	5,858	7,303	3,266	5,760	6,171	3,154
# products (4-digit)	5.6	8.5	3.0	5.6	8.8	3.0
# Product x Destinations	11.6	19.1	5.0	11.4	24.7	5.0
Frac share of debt from exposed bank > 50%	1.000			0.000		
Fraction borrowed from exposed bank	0.892	0.157	1.000	0.071	0.143	0.000

Source: Bank Financial Statements and Credit Registry as of December 2007, Superintendencia de Bancos y Seguros de Peru. Customs data between January 2007 and December 2009, SUNAT.

Table 4: Firm Descriptive Statistics by Relationship with Exposed Banks

Dependent Variable:	$\Delta \ln C_{ib}$		
	All firms	Small ($< median\ X$)	Large ($> median\ X$)
	(1)	(2)	(3)
FD_b	-0.168***	-0.194***	-0.136***
	(0.046)	(0.049)	(0.049)
Firm FE	yes	yes	yes
Observations	10,336	6,349	3,987
R^2	0.630	0.669	0.557
R^2 adj	0.261	0.264	0.239
# banks	42	41	33
# firms	5157	3490	1667

Estimation of equation (5). FD_b is a dummy that signals whether foreign liabilities of bank b is above the median. Robust standard errors in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, and $^{*}p < 0.1$

Table 5: Transmission of Credit Shocks by Banks with High Foreign Dependence

	Value (FOB)		Volume (kg)	
	t=Pre	t=Post	t=Pre	t=Post
Total	10.9%	-22.4%	3.2%	-9.6%
Intensive	10.6%	-15.7%	2.1%	-2.2%
Extensive	0.3%	-6.6%	1.2%	-7.4%
Entry	8.4%	8.2%	8.6%	8.3%
Exit	-8.1%	-14.8%	-7.4%	-15.7%

Source: SUNAT. Extensive and intensive margins defined at the level of product destination flows. For each $t = \{Pre, Post\}$, it corresponds to the growth rate $X_t/X_{t-1} - 1$. Each time t is a 12 months period and Pre and $Post$ periods correspond to the 12 months before and after July 2008. A flow firm-product-destination is considered active at time t if exports were positive at any time during the period. Product definition aggregated at 4-digit level according to the Harmonized System.

Table 6: Descriptive Statistics of Export Growth

Dependent Variable:	$\Delta \ln C_i$	$\Delta \ln Vol_{ipd}$			$\Delta \ln FOB_{ipd}$		
	FS	RF	OLS	IV	RF	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dummy Affected: $> 50\%$	-0.561***	-0.127**			-0.144**		
	(0.192)	(0.058)			(0.062)		
$\Delta \ln C_i$			0.025	0.227***		0.035*	0.257***
			(0.018)	(0.068)		(0.020)	(0.060)
Product-Destination FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Product-Destinations	5,997	5,997	5,997	5,997	5,997	5,997	5,997
Observations	14,208	14,208	14,209	14,210	14,210	14,210	14,210
R^2	0.360	0.438	0.438		0.437	0.437	

Estimation of equation (8). In the IV regression $\Delta \ln C_i$ is instrumented with F_i, a dummy that takes value 1 if the firm borrows more than 50% from an affected bank. Product definition aggregated at 4-digit level according to the Harmonized System. Robust standard errors in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, and $^{*}p < 0.1$

Table 7: Intensive Margin Elasticity to Credit Shocks — 4 digits Harmonized System

Dependent Variable:	$\Delta \ln C_i$	$\Delta \ln Vol_{ipd}$		$\Delta \ln FOB_{ipd}$	
	FS	RF	IV	RF	IV
	(1)	(2)	(4)	(5)	(7)
Dummy Affected: $> 50\%$	-0.636**	-0.133*		-0.155**	
	(0.250)	(0.071)		(0.076)	
$\Delta \ln C_i$			0.209***		0.249***
			(0.060)		(0.058)
Product-Destination FE	Yes	Yes	Yes	Yes	Yes
# Product-Destinations	8,567	8,567	8,567	8,567	8,567
Observations	16,472	16,472	16,472	16,472	16,472
R^2	0.447	0.528		0.524	

Estimation of equation (8). In the IV regression $\Delta \ln C_i$ is instrumented with F_i, a dummy that takes value 1 if the firm borrows more than 50% from an affected bank. Product definition aggregated at 6-digit level according to the Harmonized System. Robust standard errors in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, and $^{*}p < 0.1$.

Table 8: Intensive Margin Elasticity to Credit Shocks — 6 digits Harmonized System

Dependent Variable:	$\Delta \ln Vol_i$ (1)	$\Delta \ln Vol_{ip}$ (2)	$\Delta \ln Vol_{id}$ (3)	$\Delta \ln FOB_i$ (4)	$\Delta \ln FOB_{ip}$ (5)	$\Delta \ln FOB_{id}$ (6)
$\Delta \ln C_i$	0.376***	0.263***	0.234	0.396***	0.280***	0.255
	(0.116)	(0.077)	(0.187)	(0.110)	(0.080)	(0.212)
FE	no	prod	dest	no	prod	dest
Observations	2,438	5,811	5,421	2,438	5,812	5,421
# firms	2,438	1914	1834	2,438	1914	1834
# destination			140			140
# products		759			758	

IV estimation of equation (8). $\Delta \ln C_i$ is instrumented with F_i, a dummy that takes value 1 if the firm borrows more than 50% from an affected bank. Product definition aggregated at 4-digit level according to the Harmonized System. Robust standard errors in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, and $^{*}p < 0.1$

Table 9: Estimation Bias

Dependent Variable:	$\Delta \ln Vol_{ipd}$		$\Delta \ln FOB_{ipd}$	
	(1)	(2)	(3)	(4)
$\Delta \ln C_i$	0.227***	0.227***	0.257***	0.249***
	(0.070)	(0.070)	(0.071)	(0.074)
$\ln X_i$		-0.041**		-0.024
		(0.017)		(0.017)
ln dollar debt		0.135*		0.110
		(0.069)		(0.069)
unit price		0.000		0.000
		(0.000)		(0.000)
ln # products		0.002		-0.003
		(0.020)		(0.021)
ln # destinations		0.057*		0.041
		(0.034)		(0.032)
Product-Destination FE	Yes	Yes	Yes	Yes
Observations	14,208	14,024	14,208	14,024
# product-destination	5,996	5,956	5,996	5,956

Columns 1 and 3 correspond to estimation of equation (8), using volume and value (FOB) of exports respectively. Columns 2 and 4 add the following firm level controls: overall volume of export, fraction of dollar debt, unit price of the export flow, number of products exported, and number of destinations. $\Delta \ln C_i$ is instrumented with F_i, a dummy that takes value 1 if the firm borrows more than 50% from an affected bank. Product definition aggregated at 4-digit level according to the Harmonized System. Robust standard errors in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, and $^{*}p < 0.1$

Table 10: Controlling for Observable Firm Characteristics

Dependent Variable:	$\Delta \ln C_i$	$\Delta \ln Vol_{ipd}$			$\Delta \ln FOB_{ipd}$		
	FS	RF	OLS	IV	RF	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dummy Affected: $> 50\%$	-0.138	-0.008			0.001		
	(0.120)	(0.055)			(0.055)		
$\Delta \ln C_i$			0.030**	0.059		0.038**	0.010
			(0.015)	(0.352)		(0.016)	(0.342)
Product-Destination FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Product-Destinations	6,046	6,046	6,046	6,046	6,046	6,046	6,046
Observations	15,265	15,265	15,265	15,265	15,265	15,265	15,265
R^2	0.329	0.417	0.418		0.409	0.411	

Estimation of equation (8) for $t = Pre - 1, Pre$, where Pre = June 2007-July 2008 and $Pre - 1$ = June 2006-July 2007. In the IV regression $\Delta \ln C_i$ is instrumented with F_i, a dummy that takes value 1 if the firm borrows more than 50% from an affected bank. Product definition aggregated at 4-digit level according to the Harmonized System. Robust standard errors in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, and $^{*}p < 0.1$

Table 11: Placebo Test

Dependent Variable:	$\Delta \ln C_i$	$\Delta \ln Vol_{ipd}$		$\Delta \ln FOB_{ipd}$	
	FS	RF	IV	RF	IV
	(1)	(2)	(3)	(4)	(5)
Fraction Borrowed from Affected Banks	-0.991***	-0.193**		-0.215**	
	(0.295)	(0.079)		(0.085)	
$\Delta \ln C_i$			0.195***		0.217***
			(0.048)		(0.050)
Product-Destination FE	Yes	Yes	Yes	Yes	Yes
# Product-Destinations	5,997	5,997	5,997	5,997	5,997
Observations	14,208	14,208	14,210	14,210	14,210
R^2	0.371	0.438		0.437	

Estimation of equation (8). In the IV regression $\Delta \ln C_i$ is instrumented with F_i: (max) proportion of firm debt in affected banks. Product definition aggregated at 4-digit level according to the Harmonized System. Robust standard errors in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, and $^{*}p < 0.1$

Table 12: Alternative Instrument Functional Form

Dependent Variable:	$\Delta \ln N^E_{Fpd}$		$\Delta \ln N^C_{Fpd}$	
	4-digit HS (1)	6-digit HS (2)	4-digit HS (3)	6-digit HS (4)
$\Delta \ln(\sum_{i \in F} C_i)$	0.232	0.594	0.363***	0.275***
	(0.185)	(0.435)	(0.095)	(0.065)
Product-Destination FE	Yes	Yes	Yes	Yes
Observations	3,088	3,739	4,658	6,143

Columns (1) and (2) correspond to the IV estimation of equation (9) for the entry margin; columns (3) and (4) to equation (10) for the continuation margin. $\Delta \ln C_i$ is instrumented with F_i, a dummy that takes value 1 if the firm borrows more than 50% from an affected bank. Robust standard errors in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, and $^{*}p < 0.1$

Table 13: Extensive Margin Elasticity to Credit Shocks

Dependent Variable:	Size: Overall Exports		Size: Export Flow	
	$\Delta \ln Vol_{ipd}$ (1)	$\Delta \ln FOB_{ipd}$ (2)	$\Delta \ln Vol_{ipd}$ (3)	$\Delta \ln FOB_{ipd}$ (4)
$\Delta \ln C_i$	0.154*	0.181**	0.239**	0.284***
	(0.091)	(0.091)	(0.107)	(0.103)
$\Delta \ln C_i \cdot (X_i > \overline{X})$	0.078	0.089		
	(0.162)	(0.169)		
$\Delta \ln C_i \cdot (X_{ipd} > \overline{X}_{pd})$			-0.136	-0.151
			(0.152)	(0.136)
Size-Product-Destination FE	Yes	Yes	Yes	Yes
Observations	14,208	14,218	14,208	14,218
# Firms	6,854	6,859		
# Size-Product-Destinations			7,116	7,121

IV estimation of equation (8). $\Delta \ln C_i$ is instrumented with F_i, a dummy that takes value 1 if the firm borrows more than 50% from an affected bank. In columns (1) and (2), size is defined by the firm's total exports relative to the median; in columns (3) and (4) size corresponds to the firm's export of product p to destination d relative to the median flow of the same product-destination. In all cases, size corresponds to the value of exports in the Pre period. Product definition aggregated at 4-digit level according to the Harmonized System. Robust standard errors in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, and $^{*}p < 0.1$

Table 14: Intensive Margin Elasticity by Size of Export Flow

Dependent Variable:	$\Delta \ln N^C_{Fpd}$		$\Delta \ln N^E_{Fpd}$
	Size: Overall Exports	Size: Export Flow	Size: Overall Exports
	(1)	(2)	(3)
$\Delta \ln(\sum_{i \in F} C_i)$	0.127**	0.543***	-2.223
	(0.060)	(0.206)	(3.904)
$\Delta \ln(\sum_{i \in F} C_i) \cdot (X_i > \overline{X})$	0.276*		2.068
	(0.158)		(4.292)
$\Delta \ln(\sum_{i \in F} C_i) \cdot (X_{ipd} > \overline{X}_{pd})$		-0.391*	
		(0.228)	
Size-Product-Observation FE	Yes	Yes	Yes
Observations	6,447	6,712	3,289
# Size-Product-Destinations	5,349	5,583	2,733

Columns (1) and (2) correspond to IV estimation of continuation margin in equation (10); column (3) to entry margin in equation (9). $\Delta \ln C_i$ is instrumented with F_i, a dummy that takes value 1 if the firm borrows more than 50% from an affected bank. In columns (1) and (3), size is defined by the firm's total exports relative to the median; in column (2) size is defined by the firm's exports of product p to destination d relative to the median export flow of the same product-destination. In all cases, size corresponds to the value of exports in the *Pre* period. Product definition aggregated at 4-digit level according to the Harmonized System. Robust standard errors in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, and $^{*}p < 0.1$

Table 15: Continuation Margin Elasticity to Credit Shocks by Size of Export Flow

Dependent Variable:	Intensive Margin		Continuation Margin
	$\Delta \ln Vol_{ipd}$	$\Delta \ln FOB_{ipd}$	$\Delta \ln N^C_{Fpd}$
	(1)	(2)	(3)
$\Delta \ln C_i$	0.294***	0.350***	
	(0.077)	(0.077)	
$\Delta \ln C_i \cdot (dist_{ipd} > \overline{dist})$	-0.172	-0.232	
	(0.152)	(0.146)	
$\Delta \ln(\sum_{i \in F} C_i)$			0.377**
			(0.151)
$\Delta \ln(\sum_{i \in F} C_i) \cdot (dist_{Fpd} > \overline{dist})$			-0.231
			(0.170)
Distance-Product-Destination FE	Yes	Yes	Yes
Observations	14,146	14,156	6,324
# Distance-Product-Destinations	5,955	5,959	5,192

Columns (1) and (2) correspond to IV estimation of equation (8); column (3) to continuation margin in equation (10). $\Delta \ln C_i$ is instrumented with F_i, a dummy that takes value 1 if the firm borrows more than 50% from an affected bank. $(dist_{ipd} > \overline{dist})$ $((dist_{Fpd} > \overline{dist})$ in the case of continuation margin) is a dummy that signals whether the distance to the market d for export flow ipd (resp. Fpd) is larger than the median distance. Product definition aggregated at 4-digit level according to the Harmonized System. Robust standard errors in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, and $^{*}p < 0.1$

Table 16: Export Elasticity to Credit Shocks by Distance to Destination

Dependent Variable:	$\Delta \ln Vol_{ipd}$ Intensive Margin		$\Delta \ln N^C_{Fpd}$ Continuation Margin		$\Delta \ln N^E_{Fpd}$ Entry Margin	
	Low (1)	High (2)	Low (2)	High (3)	Low (4)	High (5)
$\Delta \ln C_i$	0.249***	0.117				
	(0.086)	(0.197)				
$\Delta \ln(\sum_{i \in F} C_i)$			0.119	0.084	0.164	-0.082
			(0.685)	(0.058)	(2.925)	(0.092)
Product-Destination FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,077	4,465	2,048	3,176	2,830	5,026
# Product-Destinations	1529	2542	1,535	2,502	2,037	3,950

Intensive, entry, and continuation margins correspond to IV estimation of equations (8), (9), and (10) respectively. $\Delta \ln C_i$ is instrumented with F_i, a dummy that takes value 1 if the firm borrows more than 50% from an affected bank. The classification of sectors according to their dependence of external finance follows Chor and Manova (2010). Robust standard errors in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, and $^{*}p < 0.1$

Table 17: Export Elasticity to Credit Shocks by Sector Characteristic