How Do Banking Crises Affect Bilateral Exports?

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Abstract

This paper investigates whether banking crises are associated with declines in bilateral exports. We first develop a simple open economy model in which banking crises translate into negative liquidity shocks, leading to collapses in exports through supply-side and demand-side shocks. We then estimate a gravity model using a sample of developed and developing countries over the period 1988-2010. The results suggest that crisis-hit countries experience lower levels of bilateral exports, particularly in developing countries where supply-side shocks are found to be relatively more important than demand shocks. In developing countries, exports of manufactured goods are disproportionately hurt by banking crises and this negative effect is stronger in industries relying more on external finance. These findings are robust to correcting for potential endogeneity, to changes in the sample, and to alternative estimation methods.

Key words : Banking Crises, Exports, Trade Finance

Codes JEL / JEL codes : F14, G01

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1. Introduction

One of the well-known consequences of financial crises is a collapse in international trade flows owing to the shortage of trade finance and the slowdown in import demand. For instance, the Great Depression of 1930 led to a demand-driven collapse in trade flows and an introduction of various protectionist measures. A similar effect was observed during the financial crises of the 1980s in some emerging market economies. Indeed, this has led to a decline in trade credit by as much as 50 percent and a stagnation of trade in goods in the following years (Wang and Ronci, 2006). Once again, the recent global financial crisis has been associated with the first time collapse in global trade flows since 1982 (IMF, 2009). Furthermore, a firm-level survey commissioned by the World Bank shows that the 2008 global financial crisis has constrained trade finance for both exporters and importers in developing countries (Malouche, 2009). These declines in trade flows may be even more pronounced than slowdowns in economic growth during financial crises (see, for instance, Chor and Manova, 2012).

There are two main alternative but not mutually exclusive channels through which banking crises affect trade flows : supply-side shocks and of demand-side shocks. [1] The first one relates to the credit crunch channel and suggests that banking crises, by reducing the availability of external finance, disproportionately hurt firms typically dependent on external funding in production, notably in export-oriented sectors. The second argument is that banking crises generally lead to a slowdown in economic growth which in turn translates into collapses in the aggregate demand, in general, and notably, in imports. In this regard, banking crises occurring outside the domestic market might lead to substantial declines in import demand from trading partners.

Although most empirical studies agree on the negative effect of financial crises on international trade, the mechanisms through which crises are transmitted to trade flows continue to be widely debated. On the one hand, the conventional wisdom predicts that financial crises may hurt trade flows through demand-side shocks (see, for instance, Levchenko, Lewis and Tesar, 2010 ; Eaton, Kortum, Neiman and Romalis, 2011 ; Bems, Johnson and Yi, 2010 ; Abiad, Mishra and Topalova, 2011b). On the other hand, the second strand of the literature has found evidence for supply-side shocks, suggesting that financial crises are associated with significant reductions in the availability of external finance in

1. A third argument is related to the rise in protectionism during financial crises (Evenett, 2009).

general, and that of trade finance in particular (see, for instance, Ronci, 2004 ; Iacovone and Zavacka, 2009 ; Abiad, Dell'Ariccia and Li, 2011a ; Amiti and Weinstrein, 2011 ; Chor and Manova, 2012). This leads to a collapse in exports of the crisis country.

Further, it is still unclear in the theoretical literature how supply-side and demand-side shocks influence bilateral trade. Ma and Cheng (2005) provide an attempt to understand this issue but their predictions are sensitive to the degree of international capital mobility. They recognize that their framework does not work well in the real world, notably when developed countries are able to defend their banking systems in the face of systemic crises or when developing countries fail to attract a lot of foreign capital. In addition, despite the recognition of a possible heterogeneity of resilience in the face of financial crises, little emphasis has been placed on the differential effect of crises across countries with different levels of economic and institutional development and sectors with varying levels of external financial dependence.

Our study revisits this debate and attempts to make some contributions to the literature. We first develop a simple open economy model in which a banking crisis in the exporting country translates into a negative liquidity shock that reduces the availability of external finance and leads to declines in exports. Similarly, a banking crisis in the importing country is associated with a demand-side shock in the sense that it generates a collapse in demand for imports. To empirically assess the implications of the model, we build upon a gravity model while focusing on both supply-side and demand-side shocks and their interaction. We use recent data on both developed and developing countries and estimation methods allowing us to properly identify the effect of banking crises on trade flows. By taking into account the interaction between the banking crisis in the exporting and importing countries, our empirical approach allows for capturing the impact of global and regional financial crises like the one of 2008. In such situations, banking crises hit both exporter and importer countries and this may exacerbate the overall detrimental effect.

Moreover, we stress the need to focus on differential effects across countries with different levels of economic development. The underlying idea is that developing countries are mostly characterized by a fragile environment, including weak institutional capacity and poor governance, and therefore will tend to be less resilient to crises. For example, Berman and Martin (2012) examine the vulnerability of sub-Saharan African countries to financial crises and find that the disruption effect (the supply-side shock) is much larger and long-lasting for these countries than for other countries. Similarly, Levchenko (2007)

provides empirical evidence of "institutional content of trade", suggesting that countries with low-quality institutions might be less resilient to banking crises.

There are also concerns about between-sector and within-sector differences in resilience to financial crises. Indeed, although access to external funding is a common concern for all exporting sectors, the external financial dependence can be stronger in some sectors (or industries) (Rajan and Zingales, 1998 ; Manova and Wei and Zhang, 2011 ; Chor and Manova, 2012). This is particularly the case in developing countries where primary commodity exports are generally made by state-owned enterprises or foreign-owned firms that benefit from strong financial positions and do not rely heavily on the domestic credit market for their external funding. We first follow Beck (2002) and the standard assumption in international trade theory to assume that unlike primary commodities, manufactured products exhibit increasing returns to scale. Therefore, these products are relatively more credit intensive and will be likely to be disproportionately hurt by banking crises. [2] We then build on the Rajan and Zingales (1998)'s measure of financial dependence to check if manufacturing industries relying more heavily on external funding experience lower levels of bilateral exports during banking crises as suggested by Dell'Ariccia, Detragiache and Rajan (2008).

This study relates closely to two recent empirical work on the impact of financial crises on international trade. First, Abiad et al. (2011b) study the extent to which financial crises influence trade dynamics and find that such crises are associated with sharp collapses in trade flows. Their study differs from ours in two aspects. While they consider both banking and sovereign debt crises we focus only on banking crises, consistent with the arguments developed in our theoretical framework. Furthermore, while they properly document how long-lasting is the effect of financial crises on trade flows, we focus on the heterogeneity of resilience between countries with different levels of development and industries with varying degrees of external financial dependence.

Second, Chor and Manova (2012) investigate the impact of the recent global financial crisis on trade flows, with a focus on the credit channel as in this paper. Using data on monthly US imports, they find that countries with higher interbank rates exported relatively less in financially vulnerable sectors and that this effect intensified during the peak crisis months. This suggests that credit conditions represent an important channel

2. For further discussion of the role of economies of scale in international trade, see, for instance, Krugman and Obstfeld (2009), Chapter 6.

through which financial crises influence international trade. Although our approach to control for the heterogeneity of resilience is similar to theirs, their results may suffer from weak external validity because it is not clear how widely these results may be generalized to other financial crises. A global financial crisis as was the case in 2008 is likely to have different effects on the real economy from those of a local systemic banking crisis.

Our findings mainly suggest that banking crises negatively and robustly affect bilateral exports, particularly in developing countries. On average, supply-side shocks are found to be relatively more detrimental than demand-side shocks and these transmission channels reinforce each other when banking crises occur simultaneously in both exporter and importer countries. In developing countries, manufacturing exports prove to be relatively less resilient to banking crises. More interestingly, in the manufacturing sector, it turns out that industries with higher levels of external financial dependence experience lower levels of bilateral exports during banking crises.

In the remaining part of this paper, we start by reviewing the main findings of the existing empirical literature in Section II. The theoretical framework is described in Section III. In Section IV, we present the empirical strategy and the data used, and then, we discuss the main results in Section V. We explore the robustness of our findings to a number of sensitivity checks in Section VI. Lastly, we present some concluding remarks in Section VII.

2. Empirical Literature

The issue of the impact of financial crises on trade flows has been recently raised by the "The Great Trade Collapse" (Baldwin, 2009). [3] In this growing literature, researchers agree on the negative impact of financial crises on trade flows but two opposite views on the transmission mechanism emerge. The first one finds that trade collapses during financial crises are mostly due to demand-side shocks (see, for instance, Ma and Cheng, 2005 ; Levchenko et al., 2010 ; Eaton et al., 2011 ; Bems, Johnson and Yi, 2012 ; Abiad et al., 2011b). The argument is that financial crises, by causing a recession in the crisis-hit country, might lead to collapses in its imports while its exports may rise because of both a drop in domestic demand and a devaluation of the domestic currency. Using an

3. This book is a collection of studies on the causes of the collapse in international trade during the 2008 global recession.

augmented gravity model and 179 crises episodes over the 1970-2009 period, Abiad et al. (2011b) find that financial crises are associated with substantial collapses in imports in the crisis country. Imports are found to persistently fall short of their gravity-predicted levels in the years following a financial crises but there is a small decline in exports in the crisis inception year, with a quick recovery.

The other strand of the literature highlights the importance of the credit channel. Here, the idea is that the credit crunch during financial crises is likely to be more marked for trade finance because foreign-oriented activities are relatively more risky than domestically-oriented activities (Love, Preve and Sarria-Allende, 2007). This credit crunch could be particularly harmful for exporting firms mainly due to substantial sunk costs of entry into foreign markets (Roberts and Tybout, 1997 ; Bernard and Wagner, 2001 ; Campa, 2004) and a relatively higher sensitivity to financial constraints (Greenaway, Guariglia and Kneller, 2007 ; Manova, 2008 ; Manova et al. 2011).

In addition, this negative effect is likely to be stronger for firms exporting goods with increasing returns to scale that are relatively more credit intensive (Beck, 2002). Chor and Manova (2012) estimate the effects of the recent global financial crisis on trade flows using data on monthly US imports. Their results indicate that countries with higher interbank rates exported relatively less in financially vulnerable sectors and that this effect intensified during the peak crisis months. Using data from 23 banking crises episodes over the period 1980-2006, Iacovone and Zavacka (2009) try to isolate the impact of banking crises on exports growth from that of demand shocks. Building upon the approach developed by Rajan and Zingales (1998), their results indicate that banking crises disproportionately hurt the exports of industries more dependent on external finance in production. Sectors with a higher degree of assets tangibility are found to be more resilient in times of banking crises, suggesting important supply-side shocks.

Amiti and Weinstrein (2011) investigate the impact of the causal link between the health of financial institutions and firms' exports using a matching approach. Their results show that deteriorations in the health of financial institutions are associated with declines in firm-level exports. Similarly, the firm-level evidence provides important insights into why sunk costs of entry and financial constraints are particularly relevant for exporters (see, for instance, Greenaway et al., 2007 ; Bellone et al., 2010 ; Manova et al. 2011 ; Stiebale, 2011). Financial crises are associated with credit crunches and increased financial constraints and these problems, by constraining firms' access to working capital, disrupt

trade flows above and beyond their effects on domestically-oriented activities.

Further, a number of empirical studies look at the effects of currency and sovereign debt crises on international trade. Berman (2009) finds that currency crises affect trade flows through a positive competitiveness effect on the intensive margin of trade and through a negative balance-sheet effect on the extensive margin of trade. This effect is more pronounced in industries relying more on external financial services. In addition, Borensztein and Panizza (2010) highlight the effects of sovereign debt crises on trade flows. They use data on a panel of 24 countries and 28 industries over the period 1980-2000 and find that export-oriented industries are relatively more affected by sovereign default crises. However, these sectors tend to benefit from real depreciations and tend to be less procyclical than domestically-oriented industries.

Finally, a new body of the empirical literature looks at the vulnerability of developing countries to financial crises. One of the most recent examples is the study of Berman and Martin (2012). They examine the effects of banking crises on international trade flows over the period 1976-2002, focusing on sub-Saharan African countries. The main result is that African countries are more vulnerable to financial crises affecting their trade partners. Their results suggest that the expected negative impact of banking crises on trade flows might be more pronounced in developing countries or in some regions. Similarly, Levchenko (2007) shows that less developed countries are likely to not gain from trade and particularly that institutional differences prove to be an important determinant of trade flows.

3. Banking Crises, Liquidity Shocks, and Trade Flows : A Simple Model

3.1. Model Setup

We consider two small open economies (Home and Foreign), with one factor K (capital), two goods (Tradable and Nontradable) and two periods. [4] The time horizon consists of intervals $[t, t+1]$, with production taking place at t and consumption taking place at $t+1$. Our framework accounts for both supply-side and demand-side shocks to explain the theoretical connections between banking crises and trade flows. [5]

4. All foreign variables will be denoted by an asterisk.
5. The model is kept as simple as possible in order to derive empirically testable implications.

3.1.1. Households

The representative household consumes both tradable and nontradable goods in the second period only, following a Cobb-Douglas utility function, U :

$$U(X_T, X_N) = X_T^{\gamma} X_N^{1-\gamma} \tag{1}$$

where X_T and X_N are consumptions of tradables and nontradables, respectively.

The household's budget constraint is given by :

$$P_T X_T + P_N X_N = Y = Y_T + Y_N \tag{2}$$

The consumer maximizes (1) subject to (2) and the equilibrium price of tradables is given by :

$$P_T = \frac{\gamma P_N}{1-\gamma} \frac{X_N}{X_T} \tag{3}$$

The equilibrium quantities of tradables and nontradables are respectively given by :

$$X_T = \frac{\gamma}{P_T} Y \tag{4}$$

$$X_N = \frac{(1-\gamma)}{P_N} Y \tag{5}$$

3.1.2. Firms

The representative firm purchases capital (K) in the first period in order to produce Y_T and Y_N, with s being the share of capital that needs to be financed externally. [6] Consistent with Chaney (2005), there is a dichotomy between tradables and nontradables, the latter being the domestic good. While the nontradable good does not rely on external finance in production, the tradable good is assumed to be a financially dependent good. [7] This assumption can be justified by the fact that unlike the Modigliani and Miller (1958)'s theorem, internal and external funds are not perfect substitutes because of the existence of substantial transaction costs, agency problems, and asymmetric information in the credit market. This influence of the firm's financial condition on its investment decisions is more important for export activity due to substantial sunk costs of starting exporting.

6. The firm has access to two alternative sources of financing, namely internal and external.

7. This assumption is consistent with the large literature on the relevance of financial structure for firm investment decisions. Further, there is a large body of empirical evidence showing that financial constraints importantly determine firms'export behavior (see, for instance, Bellone et al., 2010 ; Greenaway et al., 2007).

In the first period, the production of the tradable good, that relies on external funding, is given by :

$$Y_T = A(sK)^{\alpha} \tag{6}$$

where A, α, and s are positive parameters, with $\alpha, s \leq 1$.

Nontradables are produced with a linear technology, with constant returns to scale, requiring one unit of K to produce one unit of X_N so that :

$$Y_N = (1-s)K \tag{7}$$

The firm's budget constraint in the first period can be expressed as follows :

$$K = sK + (1-s)K \tag{8}$$

Firms face borrowing constraints to finance their working capital that depends on the collateral value of their internal liquidity. Hence, the financial constraint is modeled as a collateral constraint so as the amount that firms can borrow from banks (sK) is limited by a multiple (θ) of their internal liquidity ($(1-s)K$) (see, for instance, Fazzari, Hubbard, Petersen, Blinder and Poterba, 1988 ; Céspedes and Chang, 2012) :

$$rsK \leq \tilde{r}\theta(1-s)K \tag{9}$$

with $0 < \theta < 1$.

Any negative liquidity shocks will increase the cost of external finance (r) and the spread between r and the cost of internal finance ($\tilde{r}$), all things being equal. In each time interval $[t, t+1]$, a banking crisis ($Crisis$) could arise with a probability of ω and translates into a negative liquidity shock :

$$Crisis = \begin{cases} 1, & \text{with } prob = \omega \\ 0, & \text{with } prob = 1-\omega \end{cases} \tag{10}$$

In the absence of the banking crisis ($Crisis = 0$), the firm experiences a positive liquidity shock and the external liquidity need is fulfilled. Hence, the price of external funds is equal to that of internal funds so that external funds provide a perfect substitute for internal capital. In this case :

$$r = \tilde{r} \Rightarrow sK \leq \theta(1-s)K \Rightarrow s \leq \frac{\theta}{1+\theta} \tag{11}$$

In the face of a banking crisis ($Crisis = 1$), however, the firm experiences a negative liquidity shock and the price of external funds becomes higher than that of internal funds.

In such a case, internal and external capital are no longer perfect substitutes and therefore :

$$r \geq \tilde{r} \Rightarrow rsK \leq \tilde{r}\theta(1-s)K \Rightarrow s \leq \frac{\theta}{\psi+\theta} \tag{12}$$

with $\psi = r/\tilde{r} \geq 1$.

The higher the magnitude of the negative liquidity shock, the wider is the spread (ψ) between the prices of external and internal funds.

The expected value of the proportion of K that is financed with external funding (s) is therefore given by : [8]

$$s(\psi,\theta) = \frac{\theta[(1-\psi)\omega + \psi + \theta]}{(\psi+\theta)(1+\theta)} \tag{13}$$

Lemma 1 :

$$\frac{\theta}{\psi+\theta} \leq \frac{\theta}{1+\theta} \tag{14}$$

It is clear from Equation (14) that negative liquidity shocks lead to limited access to external finance through a tightening of the credit constraint. The share of the capital financed externally is relatively lower in the face of a banking crisis. On the other hand, positive liquidity shocks translate into a loosening of the credit constraint.

Lemma 2 :

$$s(1,\theta) = \frac{\theta}{1+\theta} \tag{15}$$

and

$$lim_{\psi\to\infty} s(\psi,\theta) = \frac{\theta(1-\omega)}{1+\theta} \tag{16}$$

This suggests that the fraction of K financed externally ($s(\psi,\theta)$) is a decreasing function of the spread (ψ). [9]

The maximization of the profit by the firm gives the equilibrium price of tradables as follows :

$$Max\pi = P_T X_T - rsK = P_T A(sK)^{\alpha} - rsK \tag{17}$$

$$\alpha P_T A s^{\alpha} K^{\alpha-1} - rs = 0 \tag{18}$$

The demand for capital as a function of the optimal output of tradables is given by :

$$K = \frac{\alpha P_T}{rs} Y_T \tag{19}$$

8. See the appendix for more details.
9. See the appendix for more details.

3.2. Autarky Equilibrium

In a closed economy, the equilibrium, given by the market clearing, implies that the output is equal to the consumption of tradables and nontradables.

$$\frac{\gamma}{P_T}Y = A(sK)^{\alpha} \tag{20}$$

$$\frac{(1-\gamma)}{P_N}Y = (1-s)K \tag{21}$$

Following the assumptions above, the allocation of production is given by :

$$s = \gamma \tag{22}$$

This indicates that the share of the capital used to produce the tradable good equals the fraction of this good in the total consumption.

3.3. Trade Equilibrium

Let us consider that Home and Foreign are endowed with K and K^* units of capital, respectively. s and s^* are the shares of the capital that need to be financed by external funding in Home and Foreign, respectively. Given the financial sector's function to channel funds from savers to firms, s and s^* can be considered as the quality of the financial system in Home and Foreign, respectively.

The equilibrium defined in Equations (20) and (21) now gives world consumption values that are equal to the sum of consumption of tradables and nontradables in Home and Foreign.

$$X_T + X_T^* = Y_T + Y_T^* \Rightarrow \frac{\gamma}{P_T}Y + \frac{\gamma^*}{P_T^*}Y^* = A(sK)^{\alpha} + A^*(s^*K^*)^{\alpha^*} \tag{23}$$

and

$$X_N + X_N^* = Y_N + Y_N^* \Rightarrow \frac{(1-\gamma)}{P_N}Y + \frac{(1-\gamma^*)}{P_N^*}Y^* = (1-s)K + (1-s^*)K^* \tag{24}$$

The export supply of tradables from Home country to Foreign country (E) is given by the positive difference between the production of tradables (Y_T) and the consumption of tradables (X_T).

$$E(s) = A(sK)^{\alpha} - \frac{\gamma}{P_T}Y = A(sK)^{\alpha} - \frac{\gamma}{P_T}(Y_T + Y_N) > 0 \tag{25}$$

Equation (25) links the exports from Home country to Foreign country to the proportion of K that is financed with external funding (s).

On the other hand, the Foreign demand for tradables (I^*) is given by :

$$I^*(Y^*) = \frac{\gamma^*}{P_T^*}Y^* - A^*(s^*K^*)^{\alpha^*} = \frac{\gamma^*}{P_T^*}(Y_T^* + Y_N^*) - A^*(s^*K^*)^{\alpha^*} > 0 \tag{26}$$

This gives the link between the imports of Foreign country from Home country (I^*) and the proportion of K^* that is financed with external funding (s^*).

Similarly, the allocation of production is given by :

$$s + s^* = \gamma + \gamma^* \tag{27}$$

Thus, the sum of the capital used to produce the tradable good in Home and Foreign equals the sum of the shares of tradables in the total consumption.

The supply-side shock is given by the marginal effect the spread (ψ) in Home country has on the level of exports from Home country to Foreign country.

$$\frac{\partial E(s)}{\partial \psi} = \frac{\partial E(s)}{\partial s}\frac{\partial s(\theta, \psi)}{\partial \psi} \tag{28}$$

$$\frac{\partial E(s)}{\partial s} = \alpha A s^{\alpha-1}K^{\alpha} > 0 \tag{29}$$

and

$$\frac{\partial s(\theta, \psi)}{\partial \psi} = -\frac{\theta\omega}{(\psi + \theta)^2} < 0 \tag{30}$$

This implies that :

$$\frac{\partial E(s)}{\partial \psi} = -\frac{\omega\theta}{(\psi + \theta)^2}(\alpha A s^{\alpha-1}K^{\alpha}) < 0 \tag{31}$$

On the other hand, the demand-side shock is given by the marginal effect of the spread in Foreign country on the level of demand for imports in Foreign country. Unlike the supply-side shock, this demand-side shock occurs through the revenue channel. Indeed, a banking crisis in Foreign leads to declines in its GDP and contractions in aggregate demand in general, and for imports in particular.

$$\frac{\partial I^*(Y^*)}{\partial \psi^*} = \frac{\partial I^*(Y^*)}{\partial Y^*}\frac{\partial Y^*(s^*)}{\partial s^*}\frac{\partial s^*(\theta^*, \psi^*)}{\partial \psi^*} \tag{32}$$

$$\frac{\partial I^*(Y^*)}{\partial Y^*} = \frac{\gamma^*}{P_T^*} > 0 \tag{33}$$

$$\frac{\partial Y^*(s^*)}{\partial s^*} = K^*(\frac{r^* P_N^* - \alpha^* \tilde{r}^* P_T^*}{\alpha^* P_T^* P_N^*}) > 0 \tag{34}$$

and

$$\frac{\partial s^*(\theta^*, \psi^*)}{\partial \psi^*} = -\frac{\theta^* \omega^*}{(\psi^* + \theta^*)^2} < 0 \tag{35}$$

implying that : [10]

$$\frac{\partial I^*(Y^*)}{\partial \psi^*} < 0 \tag{36}$$

Equations (31) and (36) clearly indicate that banking crises hurt bilateral trade through both supply-side and demand-side shocks.

4. Empirical Strategy

4.1. Econometric Approach

Banking crises are expected to be associated with declines in bilateral exports. In our baseline specification, we estimate the following gravity model : [11]

$$E_{ijt} = \beta_1 Crisis_{it} + \beta_2 Crisis_{jt} + \beta_3 Crisis_{ijt} + \beta_4 X_{ijt} + \mu_{ij} + \lambda_t + \epsilon_{ijt} \tag{37}$$

where E_{ijt} represents the measure of the country i's exports to country j in period t. $Crisis_i$ and $Crisis_j$ stand for dummy variables taking 1 for the banking crisis inception year as well as the two following years, and 0 otherwise, in country i and j, respectively (see, for instance, Dell'Ariccia et al., 2008). Indeed, considering such a crisis window allows us to account for the long-lasting effects of crises. $Crisis_{ij}$ is the interaction term between $Crisis_i$ and $Crisis_j$ that captures the effect of simultaneous crises in both countries and, more broadly, accounts for the impact of regional or international banking crises. μ_{ij} and λ_t denote country-pair fixed effects and time fixed effects, respectively, whereas ϵ_{ijt} is the idiosyncratic error term. X_{ijt} indicates a set of conditioning information to control for other factors associated with export flows.

Using bilateral instead of aggregate data helps account for bilateral time-invariant characteristics. We introduce the level of GDP of the exporter and importer, the bilateral distance, and dummies for common border, common language, common currency, and free-trade agreement. Moreover, since banking crises often coincide with currency crises (see,

10. See the appendix for more details.

11. We adopt the Anderson and van Wincoop (2003) gravity equation, accounting for multilateral resistance terms.

for instance, Kaminsky and Reinhart, 1999), we also control for the impact of exchange rate movements on trade flows. [12] This allows to capture the competitiveness effect. We estimate the specification (37) as a log-linearized gravity equation.

Consistent with our analytical framework, we assume that banking crises may hurt bilateral exports in different ways. Firstly, banking crises experienced by the exporting country is a source of collapses in its export volumes. This supply-side shock is mainly due to the reduction in trade credit in the face of a banking crisis that exacerbates the problem of sunk costs of entry into foreign markets. Secondly, financial distresses in the importing country (country j) is likely to have a negative effect on the country i's exports mainly because of the demand-side shocks and sometimes because crisis-hit countries are tempted to implement protectionist measures. Thirdly, the negative effect of a crisis on export flows is likely to be exacerbated when the exporting and importing countries experience the crisis simultaneously. In sum, the coefficients on the banking crisis dummies are expected to have a negative sign : $\beta_1, \beta_2, \beta_3 < 0$.

A potential concern with estimating a log-linearized gravity equation by ordinary least squares (OLS) is the bias of the estimated elasticities in the presence of heteroskedasticity. As shown by Silva and Tenreyro (2006), the Jensen's inequality ($E(lny) \neq lnE(y)$) suggests that the presence of heteroskedasticity in the basic gravity equation in levels leads to inconsistency in OLS estimates when using the log linear specification, even after controlling for fixed effects. We also have concerns about the zero observations in the bilateral trade matrix. These zeros occur mainly because some pairs of countries did not trade in a given time period. [13] Since we estimate the gravity specification (Equation (37)) in log-linear form, the existence of zero observations on the dependent variable is obviously problematic.

To deal with this issue, we use the logarithm of $(1 + E_{ijt})$ as the dependent variable. [14] The estimation is made using the well-known Fixed-Effect Variance Decomposition (FEVD) estimator of Plümper and Troeger (2007) to properly identify the coefficients of time-invariant variables, such as bilateral time-invariant characteristics. In addition, we use the Poisson Pseudo-Maximum-Likelihood (PPML) estimator proposed

12. An increase in the real exchange rate denotes an appreciation of the exporter vis a vis the importer.

13. These zero observations may also result of rounding errors. For example, if trade volumes are expressed in thousands of dollars, their values will tend to be registered as zero for pairs of countries that do not experience a certain minimum level of bilateral trade.

14. This is a common approach in the literature. Frankel (1997) describes the methods dealing with the zero observations problem.

by Silva and Tenreyro (2006). This estimator helps address the problem of heteroskedasticity. As a consistency check, we also use the threshold tobit (ET-Tobit) estimator proposed by Eaton and Tamura (1994) . The ET-Tobit estimator tackles the heteroskedasticity bias problem and the limited dependent variable problem associated with the presence of a large number of zero observations (Martin and Pham, 2008). We perform a heteroskedasticity-robust RESET test to detect general functional form misspecification (Ramsey, 1969). This simply consists of checking the statistical significance of an additional nonlinear function of the regressor variables. [15] The idea underlying this test is that if our baseline specification is correctly specified, no nonlinear functions of the regressor variables should be statistically significant when added to this equation.

4.2. Data

Our sample consists of 75 developed and developing countries over the period 1988-2010. Data on bilateral exports are obtained from the United Nation's COMTRADE database. We first use the total bilateral exports and then these trade flows are disaggregated at 2 and 4-digit of ISIC (Revision 3), [16] which allows us to explore the heterogeneity in the effect of crises across sectors and industries. [17] Information on banking crises is given by the newly updated banking crises database of Laeven and Valencia (2012). [18] Detailed variable definitions and sources are presented in Table 8 (Appendix). Figure 1 shows the spread of banking crises occurring over the period 1975-2010. Banking crises have been a worldwide phenomena and a feature of the recent economic scene. The number of countries that experienced a banking crisis ranged between 0 and 18. The peaks of crisis episodes were observed in 1982, 1988, 1997, and 2008.

Correlations between bilateral exports and banking crises are reported in Table 1. Consistent with earlier findings, banking crises are negatively and significantly correlated with bilateral exports. The correlation coefficients between bilateral exports and the exporter and importer crisis dummies are 0.81 and 0.60 and statistically significant at 1

15. This additional nonlinear function takes the form $X^{'}\widehat{\beta}$, where X refers to the vector of explanatory variables.

16. ISIC stands for International Standard Industrial Classification.

17. The sector level of aggregation includes Agricultural products, Mineral commodities, Manufactured commodities, and Other commodities, whereas the industry level of aggregation consists of 28 manufacturing industries as presented in Table 9 (Appendix).

18. This database includes all systemic banking crises during the period 1970-2011 around the world. The authors also compile data on currency and sovereign debt crises as well as the policy responses to resolve crises.

FIGURE 1 – Number of Countries Experiencing a Banking Crisis (Starting Date)

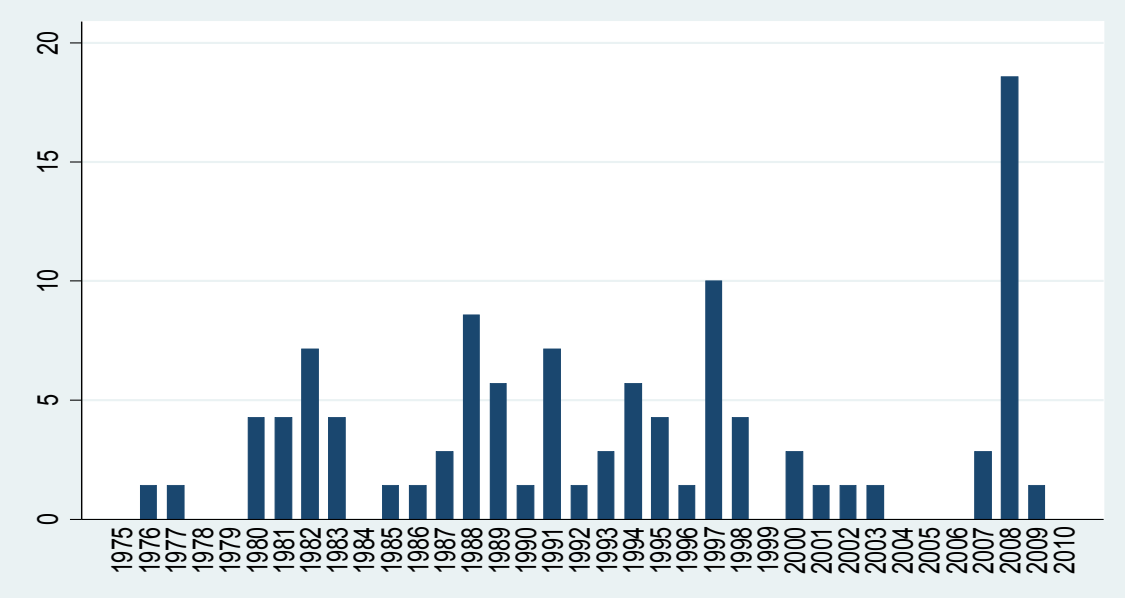


TABLE 1 – Correlation Between Bilateral Exports and Banking Crises

	Bilateral exports	Banking crisis in exporter
Banking crisis in exporter	-0.811	-
	(0.006)	
Banking crisis in importer	-0.600	0.154
	(0.010)	(0.093)

Notes : As previously mentioned, the banking crisis dummy take 1 for the crisis inception year and the two following years (Dell'Ariccia et al., 2008). p-values are reported in parentheses.

and 5 percent, respectively. Interestingly, the correlation between the exporter and importer crisis dummies is positive, but only significant at 10 percent. Finally, as indicated in summary statistics (Table 10 in the appendix), there are wide cross-country variations in bilateral exports and banking crises. The level of bilateral exports (measured by $\ln(1+E_{ijt})$) in our sample ranges from 0.0 to 15.4 with an average of 5.6. The standard deviation of this variable is about two times its average. The average frequency of banking crises is 0.109 with a typical deviation of 0.31 from this average value.

5. Main Results

Our empirical strategy is to estimate the extent to which banking crises hurt bilateral exports in four steps. First, we estimate the overall effect of banking crises on export flows. Second, we check whether this effect is heterogeneous at different levels of economic and institutional development. Third, we allow for cross-sectoral differences in resilience

in the face of banking crises. Fourth, we answer the question whether the effect of crises on bilateral exports is more pronounced in more financially dependent industries.

5.1. Banking Crises and Bilateral Exports

Table 2 reports the estimates of our baseline specification using the two estimators previously mentioned (ET-Tobit and PPML) along with the FEVD estimator with and without accounting for zero observations. [19] The coefficients on the banking crisis in both countries are negative and statistically significant at conventional levels, when controlling for the existence of zeros in trade data. This suggests a detrimental effect of banking crises on bilateral exports.

We also control for the interaction between the exporter and importer crisis dummies to properly distinguish between the effect of supply-side shocks and that of demand-side shocks (columns 2, 4, 6, and 8). Considering the coefficient estimates using the FEVD estimator in column 4, a banking crisis in exporter is associated with a roughly 3.5 percent decline in bilateral exports. The decline is quite similar for a banking crisis in the importer country. These declines are substantial and correspond to about one-quarter of the standard deviation of bilateral exports. Not surprisingly, the coefficient on the interaction between the importer and exporter crisis dummies is negative and statistically significant, indicating that the negative effect of banking crises on export flows is exacerbated during crises affecting both countries. Even after controlling for this interaction, the coefficients on banking crisis dummies in both exporter and importer countries remain negative and statistically significant. In addition, the effect of the banking crisis in exporter is higher than that of the banking crisis in importer, reflecting the importance of supply-side shocks.

Regarding the control variables, it is clear from these results that the level of GDP per capita in both exporter and importer, a proxy for the level of economic development, is associated with higher levels of bilateral exports. Similarly, the results point out the importance of exchange rate shocks in international trade. Indeed, we find that an appreciation of the real exchange rate is associated with lower levels of exports. Further, we follow Abiad et al. (2011b) and the large literature on the geographical determinants of trade to control for bilateral time-invariant characteristics. The results suggest that these bilateral time-invariant factors determine the volume of trade between countries. The ne-

19. The RESET test, for which the p-values are higher than 10 percent, does not find evidence for misspecification, regardless of the estimator considered.

TABLE 2 – The Effect of Banking Crises on Bilateral Exports

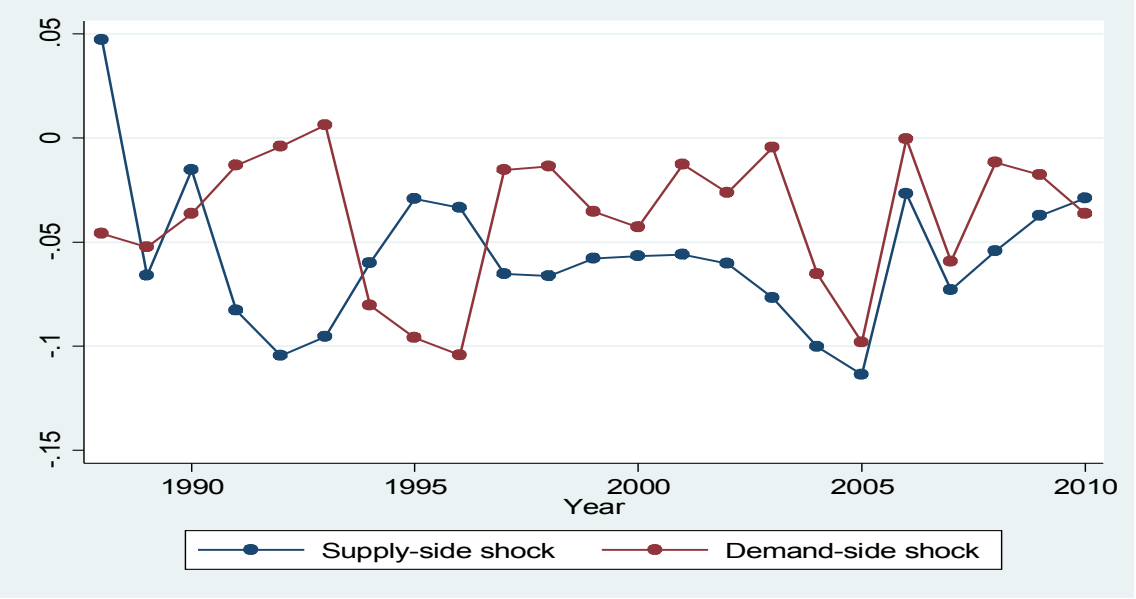
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimator	FEVD	FEVD	FEVD	FEVD	ET-Tobit	ET-Tobit	PPML	PPML
Dependent variable	$\ln(E_{ijt})$	$\ln(E_{ijt})$	$\ln(1+E_{ijt})$	$\ln(1+E_{ijt})$	$\ln(c+E_{ijt})$	$\ln(c+E_{ijt})$	E_{ijt}	E_{ijt}
Banking crisis in exporter	-0.017***	-0.013***	-0.037***	-0.035***	-0.036***	-0.035**	-0.055**	-0.051***
	(0.006)	(0.003)	(0.007)	(0.007)	(0.010)	(0.015)	(0.023)	(0.011)
Banking crisis in importer	-0.011	-0.028	-0.027***	-0.025***	-0.027***	-0.028**	-0.027*	-0.032*
	(0.069)	(0.074)	(0.008)	(0.008)	(0.007)	(0.012)	(0.015)	(0.018)
Banking crises interaction		-0.285**		-0.241**		-0.153**		-0.131***
		(0.135)		(0.112)		(0.072)		(0.039)
Log exporter's GDP per capita	0.263***	0.264***	0.315***	0.301***	0.151***	0.150***	0.232***	0.227***
	(0.042)	(0.042)	(0.047)	(0.067)	(0.039)	(0.039)	(0.051)	(0.044)
Log importer's GDP per capita	0.249***	0.235***	0.302***	0.238***	0.331***	0.340***	0.317***	0.344***
	(0.073)	(0.054)	(0.070)	(0.064)	(0.071)	(0.080)	(0.051)	(0.073)
Log real exchange rate	-0.136**	-0.099**	-0.111**	-0.133***	-0.170**	-0.105**	-0.184***	-0.152
	(0.064)	(0.048)	(0.047)	(0.036)	(0.028)	(0.050)	(0.057)	(0.066)
Log distance	-0.612***	-0.298**	-0.693**	-0.675***	-0.243***	-0.226***	-0.237**	-0.252***
	(0.149)	(0.129)	(0.322)	(0.160)	(0.049)	(0.056)	(0.103)	(0.081)
Common border dummy	0.632***	0.143***	0.814***	0.817***	0.344*	0.333**	0.197*	0.208**
	(0.148)	(0.036)	(0.198)	(0.181)	(0.194)	(0.146)	(0.115)	(0.089)
Common language dummy	0.292**	0.294**	0.412**	0.411**	0.315*	0.308**	0.386***	0.414***
	(0.124)	(0.124)	(0.182)	(0.182)	(0.165)	(0.134)	(0.104)	(0.126)
Common currency dummy	0.519*	0.523*	0.370*	0.368*	0.338***	0.331***	0.211*	0.227
	(0.305)	(0.294)	(0.215)	(0.212)	(0.120)	(0.101)	(0.122)	(0.356)
Free-trade agreement dummy	0.183*	0.106*	0.118*	0.125*	0.101	0.114*	0.129*	0.187**
	(0.105)	(0.058)	(0.067)	(0.071)	(0.102)	(0.060)	(0.068)	(0.080)
Observations	70303	70303	103933	103933	103933	103933	103933	103933
Number of bilateral relations	8133	8133	9805	9805	9805	9805	9805	9805
R-squared	0.573	0.639	0.622	0.690	0.673	0.644	0.534	0.663
RESET test p-value	0.159	0.111	0.209	0.286	0.193	0.336	0.504	0.373

Notes : Heteroskedasticity-robust standard errors are reported in parentheses. In Column 6, c represents the threshold of the ET-Tobit estimator. ***, **, and * denote significance at the 1-percent, 5-percent, and 10-percent levels, respectively.

gative coefficient on the bilateral distance shows that the more the exporting country is remote from the importing country, the lower the level of bilateral trade between these countries will be. Also, sharing a common border, language or currency translates into higher levels of bilateral exports. In addition, preferential trade agreements significantly raise bilateral trade. As a first sensitivity check, we add sovereign debt crises to the model as in Abiad et al. (2011b) but this does not alter the main results. [20]

Figure 2 shows the change in the coefficients on the importer and exporter crisis over the period 1988-2010 to assess the relative importance of supply-side and demand-side shocks over time. It appears that, on average, supply side-shocks are relatively more important than demand-side shocks.

FIGURE 2 – Evolution of the Effects of Banking Crises on Bilateral Exports in 1988-2010 : Annual Estimates



In sum, the regression results in Table 2 indicate that both supply-side and demand-side shocks discourage trade flows and that such shocks amplify each other when banking crises occur simultaneously in both the exporter and importer. However, an interesting question is whether these negative effects differ in magnitude across countries with different levels of economic development and belonging to different regions, which is the purpose of the next subsection.

20. Results not reported, but available upon request.

5.2. Differences in Resilience Across Countries and Regions

Previous studies have paid little attention to the fact that country's resilience to crises can vary with the level of economic development. The vulnerability to crises may differ across countries depending on the level of economic development in opposite directions. On the one hand, there are good reasons to postulate that developing countries are less resilient to financial crises than developed countries. Indeed, developing economies face severe challenges including weak institutional capacity and poor governance, and therefore are likely to experience low resilience and capacity to cope with adverse shocks (see, for instance, Levchenko, 2007 ; Allen and Giovannetti, 2011 ; Berman and Martin, 2012). On the other hand, however, developing countries could be less affected during financial crises because they are not well connected to the international market. For example, during the recent global financial crisis, most of the projections indicated that developing countries, especially African countries, would withstand the crisis better than developed countries, although the long-run effect remains uncertain.

To answer this question, we follow the World Bank income group classification and estimate the baseline specification by differentiating between developed and developing exporters (columns 1 and 2 of Table 3). [21] Consistent with our baseline results in Table 2, these results indicate that, on average, crisis-hit countries experience lower levels of bilateral exports. This negative effect appears to be stronger for developing countries than for developed countries. The coefficients on the exporter and importer crisis dummies are higher in developing countries, suggesting significant differential effects across countries with different levels of economic development. The magnitude of demand-side shocks is about four times higher in developing countries than in developed countries. However, the coefficient on the banking crisis in the exporter is statistically insignificant for developed countries. This suggests that supply-side shocks are not as important in developed countries as in developing countries, probably because credit market imperfections, which constrain firms' access to working capital, are relatively more important in developing countries.

We also look at cross-region differences in resilience by estimating our baseline specification for each region, using the World Bank geographic region classification. [22] The

21. In unreported regressions, we also use the Log of GDP per capita and dummies indicating the level of economic development of the exporter country to account for the heterogeneity of resilience. We find that this does not affect our main findings.

22. In this classification, the region is either East Asia & Pacific (EAP), Europe & Central Asia

TABLE 3 – Differences in Resilience Across Countries and Regions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimator	FEVD	FEVD	FEVD	FEVD	FEVD	FEVD	FEVD	FEVD
Dependent variable	$\ln(1+E_{ijt})$	$\ln(1+E_{ijt})$	$\ln(1+E_{ijt})$	$\ln(1+E_{ijt})$	$\ln(1+E_{ijt})$	$\ln(1+E_{ijt})$	$\ln(1+E_{ijt})$	$\ln(1+E_{ijt})$
	Developed countries	Developing countries	East Asia & Pacific	Europe & Central Asia	Latin America & the Caribbean	Middle East & North Africa	South Asia	Sub-Saharan Africa
Banking crisis in exporter	-0.016	-0.056***	-0.014*	-0.013	-0.034***	-0.042***	-0.003**	-0.016***
	(0.114)	(0.017)	(0.008)	(0.022)	(0.009)	(0.010)	(0.001)	(0.004)
Banking crisis in importer	-0.010***	-0.041***	-0.006	-0.007**	-0.021***	-0.030***	-0.011***	-0.013***
	(0.003)	(0.011)	(0.009)	(0.003)	(0.006)	(0.007)	(0.003)	(0.002)
Banking crises interaction	-0.128***	-0.108***	-0.100	-0.155	-0.178***	-0.203***	-0.156***	-0.137***
	(0.042)	(0.031)	(0.133)	(0.201)	(0.060)	(0.054)	(0.038)	(0.036)
Log exporter's GDP per capita	0.138***	0.134***	0.103***	0.138***	0.146***	0.229***	0.144**	0.251***
	(0.042)	(0.035)	(0.032)	(0.035)	(0.044)	(0.060)	(0.047)	(0.064)
Log importer's GDP per capita	0.156***	0.279***	0.186***	0.149***	0.092**	0.108***	0.114***	0.147***
	(0.047)	(0.073)	(0.061)	(0.033)	(0.043)	(0.024)	(0.037)	(0.048)
Log real exchange rate	-0.101*	-0.120*	-0.198**	-0.079	-0.132*	-0.150*	-0.195*	-0.109*
	(0.058)	(0.069)	(0.085)	(0.081)	(0.075)	(0.086)	(0.109)	(0.060)
Log distance	-0.107**	-0.116***	-0.172***	-0.256***	-0.152***	-0.305***	-0.304***	-0.132***
	(0.047)	(0.036)	(0.038)	(0.057)	(0.049)	(0.092)	(0.073)	(0.036)
Common border dummy	0.282***	0.363***	0.355***	0.207***	0.295***	0.727***	0.511*	0.211***
	(0.085)	(0.091)	(0.084)	(0.056)	(0.071)	(0.238)	(0.262)	(0.058)
Common language dummy	0.086*	0.036	0.320**	0.232***	0.237***	0.112***	0.143***	0.148***
	(0.048)	(0.073)	(0.034)	(0.049)	(0.065)	(0.039)	(0.044)	(0.033)
Common currency dummy	0.589***	0.129***	0.197***	0.754***	0.805***	0.577*	0.612**	0.226**
	(0.136)	(0.042)	(0.048)	(0.157)	(0.210)	(0.295)	(0.287)	(0.102)
Free-trade agreement dummy	0.206**	0.238**	0.145**	0.303**	0.199**	0.204**	0.322***	0.197**
	(0.098)	(0.110)	(0.062)	(0.137)	(0.094)	(0.091)	(0.100)	(0.090)
Observations	43019	60914	16742	27808	26886	9798	8384	13744
Number of bilateral relations	4054	5751	1570	2614	2480	915	783	1306
R-squared	0.702	0.686	0.665	0.551	0.703	0.534	0.636	0.702
RESET test p-value	0.113	0.149	0.163	0.091	0.113	0.087	0.121	0.106

Notes : Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1-percent, 5-percent, and 10-percent levels, respectively.

results are reported in columns 3-8 of Table 3.[23] The coefficients on banking crisis dummies in the importer and exporter countries are negative and vary across regions. With the exception of EAP, demand-side shocks are statistically significant. The coefficient on the crisis in the exporter is insignificant in ECA.

Considering the magnitude of the impact of banking crises, these results suggest that supply-side shocks are relatively more important in all regions but ECA and SA. As previously found, the coefficient on the banking crises interaction indicates, in most cases, an exacerbating effect when the crisis occurs in both exporter and importer countries. Overall, MENA, LAC, and SSA regions prove to be relatively less resilient compared to EAP, ECA, and SA regions. Furthermore, results on the control variables are robust to controlling for the heterogeneity of resilience. Overall, the results in Table 3 suggest that there are substantial cross-country and cross-region differences in resilience in the face of banking crises.

5.3. Emphasizing the Role of Institutions

In this subsection, we argue that countries with better institutions will likely experience a relatively lower negative effect of banking crises on exports, all things being equals (see, for instance, Levchenko, 2007 ; Allen and Giovannetti, 2011). The rationale is that countries with strong institutions will tend to have better and healthier financial systems which can quickly recover from a banking crisis, with a mild impact on the real economy. Thus, countries with strong institutions will tend to be more resilient to banking crises. We empirically investigate this hypothesis by introducing interactions between the banking crisis in exporter and measures of institutional quality in our baseline specification.

We use three measures of institutional quality, namely : (*i*) the International Country Risk Guide (ICRG) indicator of quality of government,[24] (*ii*) the Revised Combined Polity Score (Polity) from the Center for Systemic Peace (CSP),[25] and (*ii*) the Civil Liberties Index (CLI) from Freedom House.[26]

The results in Table 4 are quite intuitive. It is clear that high-quality institutions are

(ECA), Latin America & the Caribbean (LAC), Middle East & North Africa (MENA), South Asia (SA), or sub-Saharan Africa (SSA).

23. Once again, using dummy variables indicating the region of the exporter country does not alter our main results.

24. This composite index is the mean value of the ICRG variables "Corruption", "Law and Order", and "Bureaucracy Quality", scaled 0-1, with higher values indicating better quality of government.

25. This score is between -10 (strongly autocratic regime) and 10 (strongly democratic regime).

26. For this measure, countries are graded between 1 (most free) and 7 (least free).

TABLE 4 – Crises and Bilateral Exports : The Role of Institutional Quality

Estimator	FEVD	FEVD	FEVD
Dependent variable	ln(1+E_{ijt})	ln(1+E_{ijt})	ln(1+E_{ijt})
Banking crisis in exporter	-0.222***	-0.285***	-0.113***
	(0.062)	(0.087)	(0.034)
Banking crisis in importer	-0.147***	-0.146***	-0.142**
	(0.055)	(0.048)	(0.063)
(Banking crisis in exporter)×(ICRG)	0.835***		
	(0.123)		
(Banking crisis in exporter)×(Polity)		0.022***	
		(0.007)	
(Banking crisis in exporter)×(CLI)			-0.878***
			(0.193)
Log exporter's GDP per capita	0.103***	0.127***	0.126***
	(0.018)	(0.026)	(0.023)
Log importer's GDP per capita	0.285***	0.303***	0.294***
	(0.062)	(0.103)	(0.060)
Log exporter's population	0.035	0.041	0.022
	(0.028)	(0.032)	(0.023)
Log real exchange rate	-0.095*	-0.103*	-0.106*
	(0.054)	(0.059)	(0.060)
Log distance	-0.327***	-0.439***	-0.448***
	(0.072)	(0.077)	(0.069)
Common border dummy	0.139	0.696*	0.592**
	(0.213)	(0.398)	(0.161)
Common language dummy	0.129***	0.106***	0.341***
	(0.031)	(0.031)	(0.110)
Common language dummy	0.176*	0.136*	0.213***
	(0.094)	(0.078)	(0.068)
Free-trade agreement dummy	0.105**	0.128*	0.119*
	(0.046)	(0.070)	(0.067)
Observations	102756	103108	100646
Number of bilateral relations	9149	9714	8928
R-squared	0.729	0.734	0.736
RESET test p-value	0.371	0.248	0.193

Notes : ***, **, and * denote significance at the 1-percent, 5-percent, and 10-percent levels, respectively.

associated with a lower cost of banking crises, regardless of the indicator of institutions used. All the interactions between the banking crisis dummy and the measures of institutional quality come out significantly, and with the expected sign. The ICRG index and the Combined Polity Score in exporter country significantly reduce the negative impact of banking crises on export flows. The negative coefficient on the interaction between banking crises and the CLI suggests that increases in the CLI, corresponding to reduced civil liberties, are likely to exacerbate the negative effect of banking crises on trade flows. These results highlight the importance of the quality of financial institutions in the relationship between banking crises and international trade. Furthermore, accounting for institutional differences does not alter our results on control variables.

Having shown that developing countries and countries with lower institutional quality are more vulnerable, we would like to assess the way the negative impact of banking crises on bilateral exports can differ across sectors in the developing world. This issue is investigated in the next subsection.

5.4. Cross-Sectoral Differences in Resilience in Developing Countries

One of the shortcomings of the existing empirical literature is the lack of evidence on the cross-sectoral differences in resilience to banking crises. As previously indicated, we consider three exporting products, namely manufacturing exports, exports of agricultural products, and exports of mineral commodities. Services exports are not consider here because our focus in this subsection is on developing countries that do not significantly export services. [27] Here, the idea is that manufacturing exports should be more sensitive to banking crises than other sub-categories of exports.

Consistent with the standard analytical framework of international trade theory, the underlying assumption is that manufactured goods are goods with increasing returns to scale (see, for instance, Krugman and Obstfeld, 2009, chapter 6). This suggests that manufacturing industries benefit more from a higher level of external finance than other sectors. Accordingly, manufacturing exports are likely to suffer more from financial crises than other sub-categories of exports, especially in developing countries.

Overall, the regression results reported in Table 5 suggest that there are significant differences in resilience across sectors exporting different products. As anticipated, exports of manufactured goods tend to suffer relatively more than exports in other sectors in developing countries. [28] The coefficients on the importer and exporter crisis dummies are negative and vary significantly across sectors. Both supply-side and demand-side shocks are significantly higher for exports of manufactured commodities (column 3).

This signals the relevance of economies of scale for the structure of trade. The manufacturing sector exhibits high scale economies, and therefore relies relatively more on external financing. Exports of mineral commodities have the particularity of being relatively more

27. Indeed, most of the services produced in these countries are likely to be nontradable services. However, such countries are found to be exporters of agricultural and natural resources, and to a lesser extent, exporters of manufactured goods.

28. Very similar results are found when using sectoral dummies to control for this differential effect of banking crises across sectors.

resilient (column 2). Exports of agricultural products are hit by demand-side shocks but are relatively resilient to supply-side shocks (column 1). Concerning the exports of other commodities, the coefficients on the banking crisis in exporter and importer are negative but the latter is insignificant (column 4). Regarding the banking crises interaction, its coefficient indicates that the exacerbating effect of banking crises is only significant for exports of other commodities.

TABLE 5 – Crises and Bilateral Exports : Cross-Sectoral Differences in Resilience

	(1)	(2)	(3)	(4)
Estimator	FEVD	FEVD	FEVD	FEVD
Dependent variable	$\ln(1+E_{ijt})$	$\ln(1+E_{ijt})$	$\ln(1+E_{ijt})$	$\ln(1+E_{ijt})$
	Agricultural exports	Mineral exports	Manufactured exports	Other exports
Banking crisis in exporter	-0.098	-0.008	-0.102***	-0.010*
	(0.041)	(0.020)	(0.031)	(0.005)
Banking crisis in importer	-0.102*	-0.001	-0.009*	-0.003
	(0.058)	(0.003)	(0.005)	(0.005)
Banking crises interaction	0.107	-0.201	-0.304	-0.142**
	(0.175)	(0.309)	(0.315)	(0.061)
Log exporter's GDP per capita	0.154***	0.111*	0.122*	0.119
	(0.033)	(0.064)	(0.069)	(0.143)
Log importer's GDP per capita	0.168***	0.176***	0.165***	0.177***
	(0.046)	(0.056)	(0.045)	(0.055)
Log real exchange rate	-0.113**	-0.196**	-0.108	-0.119*
	(0.051)	(0.085)	(0.123)	(0.068)
Log distance	-0.158***	-0.150***	-0.169***	-0.165***
	(0.037)	(0.031)	(0.034)	(0.035)
Common border dummy	0.436***	0.263***	0.639**	0.541**
	(0.080)	(0.067)	(0.273)	(0.225)
Common language dummy	0.793***	0.852***	0.936***	0.909***
	(0.222)	(0.224)	(0.224)	(0.225)
Common currency dummy	0.549***	0.433***	0.496***	0.489***
	(0.124)	(0.126)	(0.121)	(0.123)
Free-trade agreement dummy	0.100*	0.096	0.093	0.113*
	(0.057)	(0.104)	(0.118)	(0.064)
Observations	8598	7712	20242	24362
Number of bilateral relations	812	731	1913	2295
R-squared	0.610	0.695	0.722	0.483
RESET test p-value	0.101	0.073	0.133	0.111

Notes : Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1-percent, 5-percent, and 10-percent levels, respectively. Regressions are run using data for each sector (Agricultural products, Mineral commodities, Manufactured commodities, and Other commodities) and for each country-pair. "Other" stands for the remaining categories of exports.

These results suggest that exports of manufactured goods are relatively less resilient to banking crises in developing countries. However, it would be more interesting to explore differences in resilience to banking crises within the manufacturing sector. This issue is tackled in the next subsection.

5.5. Cross-Industry Differences in Resilience

This subsection is concerned with industry-level channels through which banking crises affect bilateral exports. More specifically, we want to test if the negative effect of banking crises on export flows is likely to be higher in some industries than in others. Indeed, banking crises would disproportionately hurt manufacturing industries that rely more on external financing. We therefore include interactions between the Rajan and Zingales index of external financial dependence and banking crisis dummies. [29]

TABLE 6 – Crises and Bilateral Exports : Cross-Industry Differences in Resilience

	(1)	(2)
Estimator	FEVD	FEVD
Dependent variable	$\ln(1+E_{ijt})$	$\ln(1+E_{ijt})$
(Banking crisis in exporter)×(RZ)	-0.194***	-0.239***
	(0.060)	(0.066)
(Banking crisis in importer)×(RZ)	-0.168*	-0.111***
	(0.097)	(0.036)
(Banking crises interaction)×(RZ)		-0.127***
		(0.031)
Log exporter's GDP per capita	0.129***	0.128***
	(0.032)	(0.032)
Log importer's GDP per capita	0.321***	0.320***
	(0.103)	(0.103)
Log real exchange rate	-0.182***	-0.109***
	(0.050)	(0.033)
Log distance	-0.459***	-0.454***
	(0.096)	(0.109)
Common border dummy	0.366*	0.369*
	(0.209)	(0.218)
Common language dummy	0.155***	0.161***
	(0.030)	(0.030)
Common currency dummy	0.210***	0.199***
	(0.066)	(0.066)
Free-trade agreement dummy	0.101*	0.096*
	(0.058)	(0.054)
Observations	3667070	3667070
Number of bilateral relations	215710	215710
R-squared	0.834	0.837
RESET test p-value	0.293	0.197

Notes : Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1-percent, 5-percent, and 10-percent levels, respectively. Regressions are run using disaggregated at 4-digit of ISIC (Revision 3). RZ represents the Rajan and Zingales index of external financial dependence.

29. This strategy is close to that used by Rajan and Zingales (1998) to estimate the impact of financial dependence on industry-level growth. By allowing us to account for both country and industry characteristics, the regression results from this strategy are likely to be better corrected for omitted variable bias and model misspecification problem. Here, the banking crisis plays the role of financial development in Rajan and Zingales (1998).

The regression results are reported in Table 6.[30] These results clearly indicate that the negative effect of banking crises on manufacturing exports is more pronounced in industries that are relatively more dependent on external funding. The coefficient on the interaction between banking crisis dummies and the external financial dependence is negative and statistically significant. Table 9 in the appendix reports the distribution of the Rajan and Zingales index of external financial dependence across industries. This table shows that in the most financially dependent industry (Plastic products) the index of external dependence is 1.14, while this index equals 0.01 in the least financially dependent industry (Nonferrous metal). With a banking crisis in exporter, these results predict that, ceteris paribus, exports of plastic products would fall more rapidly than exports of nonferrous metals, compared to non-crisis periods. Considering the demand-side shock, during banking crises in importer, exports in the plastic products industry will decrease faster than exports in the nonferrous metal industry relative to non-crisis times, all else equal. This differential effect of banking crises across manufacturing industries with varying levels of financial vulnerability is exacerbated when exporter and importer are both in crisis. The results on the control variables remain broadly similar to the previous ones.

In short, the regressions results in Tables 2-6 support the hypothesis that banking crises exert a negative impact on bilateral exports. On average, supply-side shocks are found to be relatively more detrimental than demand-side shocks and these transmission channels reinforce each other when the crisis occurs simultaneously in exporter and importer countries. As expected, developing countries and countries with low-quality institutions appear to be relatively less resilient to banking crises. In developing countries, manufacturing exports prove to be relatively more vulnerable to banking crises, particularly for industries with higher levels of external financial dependence.

These results complement earlier work on the issue of the impact of financial crises on trade flows. Our result on supply-side shocks is comparable to the contemporaneous effect of financial crises on exports found by Abiad et al. (2011b), although they do not find evidence for significant supply-side shocks in the medium term. Moreover, our result on the importance of supply-side shocks is consistent with the findings of Chor and Manova (2012). Interestingly, our results reconcile the two existing opposite views, since accounting for the heterogeneity of resilience allows to understand that both supply-side and demand-side shocks are important in developing countries, whereas only demand-side

30. As before, results in the bottom line of Table 6 show that the diagnostic statistics are valid.

shocks appear to be significant in developed countries.

6. Robustness Checks

In this Section, we carry out two consistency checks for our baseline results obtained in Table 2. We first look at an alternative estimation method dealing with the problem of endogeneity bias and then we test the sensitivity of our results to influential observations and to the number of importer countries considered.

6.1. Controlling for Endogeneity

In this subsection we deal with the endogeneity bias that may affect the coefficient of banking crisis dummies, due to omitted variables. For example, the probability of a banking crisis may be positively influenced by financial openness because of the increased exposure to international financial contagion. In addition, the same shocks affecting the health of the banking sector might also affect bilateral trade, notably when the share of the export sector in the portfolio of banks is high. To properly isolate the exogenous variations in banking crises, we follow a procedure to estimate the impact of endogenous treatments (See, for instance, Vella and Verbeek, 1999 ; Keen and Lockwood, 2010). Here, the banking crisis is considered as a treatment that is driven by a number of factors. We therefore estimate the following mixed system of both continuous and discrete dependent variables :

$$E_{ijt} = \beta_1 Crisis_{it} + \beta_2 Crisis_{jt} + \beta_3 Crisis_{ijt} + \beta_4 X_{ijt} + \mu_{ij} + \gamma_t + \epsilon_{ijt} \tag{38}$$

$$Crisis_{kt} = \begin{cases} 1, Z'_{kt}\delta \geq \eta_{kt} \\ 0, Z'_{kt}\delta < \eta_{kt} \end{cases} \tag{39}$$

with $k = i, j$ and Z a vector of explanatory variables.

The banking crisis equation is estimated as a dynamic probit in which the initial values of banking crises are taken as exogenous. Since countries with high levels of trade may be more likely to experience banking crises, ϵ_{ijt} and η_{kt} can be correlated. This leads to a bias in the estimate of the coefficients on banking crisis dummies in the export equation. To deal with such a bias we use a two-step estimation procedure in which the crisis equation

is first estimated using a probit specification and the coefficient estimated are then used to construct the so-called Inverse Mills Ratio (IMR) :

$$IMR_{kt} = \begin{cases} -\frac{\phi(Z'_{kt}\widehat{\delta})}{\Phi(Z'_{kt}\widehat{\delta})}, Crisis_{kt} = 1 \\ \frac{\phi(Z'_{kt}\widehat{\delta})}{1-\Phi(Z'_{kt}\widehat{\delta})}, Crisis_{kt} = 0 \end{cases} \tag{40}$$

IMR_{kt} are then included in the export equation along with their interaction term.

TABLE 7 – Crises and Bilateral Exports : Dealing with Endogeneity

	(1)	(2)
Estimator	FEVD	FEVD
Dependent variable	ln(1+E_{ijt})	ln(1+E_{ijt})
Banking crisis in exporter	-0.028***	-0.026**
	(0.008)	(0.011)
Banking crisis in importer	-0.016*	-0.015*
	(0.008)	(0.008)
Banking crises interaction		-0.046**
		(0.020)
Log exporter's GDP per capita	0.102	0.103
	(0.183)	(0.183)
Log importer's GDP per capita	0.476***	0.476***
	(0.137)	(0.137)
Log real exchange rate	-0.099*	-0.106*
	(0.054)	(0.056)
Log distance	-0.402***	-0.400***
	(0.138)	(0.138)
Common border dummy	0.669**	0.670**
	(0.301)	(0.301)
Common language dummy	0.104	0.104
	(0.171)	(0.170)
Common currency dummy	0.179***	0.179***
	(0.063)	(0.061)
Free-trade agreement dummy	0.103	0.135*
	(0.144)	(0.077)
Exporter's IMR	-0.004	-0.004
	(0.006)	(0.005)
Importer's IMR	-0.002	-0.003
	(0.005)	(0.007)
IMR interaction		-0.627
		(0.581)
Observations	101446	101446
Number of bilateral relations	9749	9749
R-squared	0.507	0.542
RESET test p-value	0.249	0.188

Notes : ***, **, and * denote significance at the 1-percent, 5-percent, and 10-percent levels, respectively. IMR stands for Inverse Mills Ratio.

For the banking crisis equation, we follow the empirical literature on the determinants of banking crises to choose the explanatory variables (see, for instance, Demirgüç-Kunt and Detragiache, 1998). We first include the growth rate of real GDP, the growth rate of terms of trade, and the real interest rate to capture adverse macroeconomic shocks (Table 11 in the appendix). We also include the growth rate of real private credit as a

proxy for credit cycles. In addition, inflation is introduced to control for the quality of the macroeconomic environment that affects the banking system. Consistent with earlier findings, the results show that low growth rates of real GDP and terms of trade are associated with a higher probability of a banking crisis. On the other hand, the growth rate of real private credit, the real interest rate, and inflation have a positive impact on the likelihood of a banking system crisis but the coefficient on the latter is statistically insignificant.

Turning to the export equation, the regression results reported in Table 7 suggest that our conclusions remain unchanged even after controlling for the endogeneity of the banking crisis variable. Interestingly, the coefficients on the exporter's IMR and importer's IMR as well as their interaction are statistically insignificant, suggesting that there is no evidence that the errors in the probit and export equations are correlated.

Alternatively, we use the System-GMM estimator developed by Blundell and Bond (1998) to correct for endogeneity for all right-hand side variables and account for trade dynamics by including the lagged dependent variable as a regressor (Bun and Klaassen, 2002). [31] Once again, these results confirm that our main findings are robust to corrections for endogeneity (Table 12 in the appendix).

6.2. Controlling for Outliers

We use the regression diagnostics to make sure that our results are not driven by influential observations (see, for instance, Belsley, Kuh and Welsch, 1980 ; Cook and Weisberg, 1982). In testing for outliers, we use the jack-knifed residual and test if the i-th observation follows the same model as the rest of the data. We start from our baseline regression and add a dummy variable allowing a location shift for the i-th observation. We then run regressions omitting identified outliers.

The regression results reported in Table 13 of the appendix indicate that our main findings are not significantly sensitive to the presence of outliers. The coefficients on the importer and exporter crisis dummies continue to be negative and significant. On average, the magnitude of the impact of banking crises is even slightly higher than that found in Table 2, when comparing to the corresponding results in columns 3 and 4. Moreover, the coefficient on the banking crises interaction indicates that the negative effect of banking crises is exacerbated when the crisis occurs in both exporter and importer countries. With

31. Here, all bilateral time-invariant characteristics are taken as strictly exogenous.

regard to control variables, these results suggest that, with very few exceptions, the results found in Table 2 are not influenced by the presence of outliers.

6.3. Sensitivity to the Number of Importers

In this subsection, we examine whether the relationship between banking crises and bilateral exports depends on the number of importer countries considered. The results for a number of top importers (50, 40, 20, and 10) for a given country are presented in Table 14 of the appendix. Panel A reports results using the top 50 importer countries of our sample. The negative impact of banking crises holds when limiting the sample to the top 50 partner countries. As previously found, the magnitude of supply-side shocks is stronger than that of demand-side shocks. When controlling for the banking crises interaction, we find, once again, that the negative impact of banking crises is amplified when exporter and importer countries are simultaneously hit by banking crises.

Similar results are found in Panels B, C and D. However, for a number of top partner countries of 20 or 10, the magnitude of demand-side shocks becomes higher than that of supply-side shocks. This suggests that demand-side shocks are likely to be found important when considering only the top partner countries and could be one explanation for the divergent results in the empirical literature.

7. Concluding Remarks

This paper addresses the issue of the effects of banking crises on bilateral trade using a gravity model and a sample of developed and developing countries over the period 1988-2010. We examine the effect of banking crises occurring in exporting and importing countries, while considering cases of simultaneous banking crises in both countries.

The results suggest that banking crises exert a negative impact on bilateral exports. Supply-side shocks are found to be relatively more detrimental that demand-side shocks and this negative effect of banking crises on trade flows is exacerbated when the banking crisis occurs in both exporting and importing countries. In addition, developing countries appear to be less resilient to banking crises than developed countries. Moreover, in developing countries, exports of manufactured goods are disproportionately hurt by banking crises and this effect is more pronounced in industries that rely more on external finance.

These findings suggest that the effects of banking crises can be sizable on both the

domestic and foreign economies due to substantial international spillovers. On the one hand, at the country level, this highlights the importance financial stability should have on policymakers' agendas, and the need to improve the access to trade finance, while also taking structural measures to strengthen domestic banking systems. Furthermore, the evidence of differential effects of banking crises on export flows suggests that no common export policy can be effective for all sectors and industries. Policies to improve the resilience of the export sector to banking crises should therefore be targeted and tailored for more financially dependent sectors and industries. In addition, improving the quality of institutions, for example, by strengthening governance can help mitigate the negative effects of banking crises on bilateral exports. On the other hand, at the international and regional levels, further coordination and better supervision and regulation are needed to mitigate the negative spillovers generated by banking crises.

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Appendix

Proof. of Equation 13 :

If $Crisis = 0$, then $r = \tilde{r} \Rightarrow sK \leq \theta(1-s)K \Rightarrow s \leq \theta(1-s) \Rightarrow s \leq \frac{\theta}{1+\theta}$

If $Crisis = 1$, then $r \geq \tilde{r} \Rightarrow rsK \leq \tilde{r}\theta(1-s)K \Rightarrow rs \leq \tilde{r}\theta(1-s) \Rightarrow s \leq \frac{\tilde{r}\theta}{r+\tilde{r}\theta} \Rightarrow s \leq \frac{\theta}{\frac{r}{\tilde{r}}+\theta}$

$s(\psi,\theta) = \omega\frac{\theta}{\psi+\theta} + (1-\omega)\frac{\theta}{1+\theta} = \frac{\omega\theta(1+\theta)+(1-\omega)\theta(\psi+\theta)}{(\psi+\theta)(1+\theta)} \Rightarrow s(\psi,\theta) = \frac{\theta[(1-\psi)\omega+\psi+\theta]}{(\psi+\theta)(1+\theta)}$

Proof. of Lemma 2 :

$s(1,\theta) = \frac{\theta(1+\theta)}{(1+\theta)(1+\theta)} = \frac{\theta}{1+\theta}$

$\lim_{\phi\to\infty} s(\phi,\theta) = \frac{\theta(1-\psi)\psi}{\psi(1+\theta)} = \frac{\theta(1-w)}{1+\theta}$

Proof. of Equation 36 :

$$I^*(Y^*) = \frac{\gamma^*}{P_T^*}[\frac{r^*s^*K^*}{\alpha^*P_T^*} + \frac{\tilde{r}^*(1-s^*)K^*}{P_N^*}] - A^*(s^*K^*)^{\alpha^*} > 0 \tag{41}$$

$$\Rightarrow \frac{\partial I^*(s)}{\partial Y^*} = \frac{\gamma^*}{P_T^*} > 0 \tag{42}$$

and

$$\frac{\partial Y^*(s)}{\partial s^*} = K(\frac{r^*P_N^* - \alpha^*\tilde{r}^*P_T^*}{\alpha^*P_T^*P_N^*}) = K(\frac{1-\alpha}{\alpha}) > 0 \tag{43}$$

since profit maximization in the tradable and nontradable sectors implies that the price of each good is equal to the price of the input : $P_T = r$ and $P_N = \tilde{r}$, respectively.

TABLE 8 – Source and Definition of the Variables

Variable	Variable Definition	Source
E_{ij}	Bilateral exports	United Nation's COMTRADE database
Banking crisis	1 for the banking crisis inception year and the two following years and 0 otherwise	Laeven and Valencia (2012)
Real exchange rate	Real effective exchange rate, CPI base	IFS, International Monetary Fund
GDP per capita	GDP per capita (constant 2000 US$)	World Development Indicators, World Bank
Distance	Weighted distance (pop-wt, km)	CEPII distance database
Common border dummy	1 for contiguity and 0 otherwise	CEPII distance database
Common language dummy	1 for common official of primary language and 0 otherwise	CEPII distance database
Common currency dummy	1 for common currency and 0 otherwise	CEPII distance database
Free-trade agreement dummy	1 for regional trade agreement in force and 0 otherwise	CEPII distance database
RZ	Index of external financial dependence	Rajan and Zingales (1998)
ICRG	International Country Risk Guide Indicator of quality of government (Exporter)	The Political Risk Services Group
Polity	Combined Polity Score (Exporter)	Center for Systemic Peace
CLI	Civil Liberties Index (Exporter)	Freedom House

TABLE 9 – Financial Dependence Across Industries

ISIC code	Manufacturing industry	External dependence
311	Food products	0.14
313	Beverages	0.08
314	Tobacco	-0.45
321	Textile	0.40
322	Apparel	0.03
323	Leather	-0.14
324	Footwear	-0.08
331	Wood products	0.28
332	Furniture	0.24
341	Paper and products	0.18
342	Printing and publishing	0.20
351	Basic excluding fertilizers	0.25
352	Other chemicals	0.22
353	Petroleum refineries	0.04
354	Petroleum and coal products	0.33
355	Rubber products	0.23
356	Plastic products	1.14
361	Pottery	-0.15
362	Glass	0.53
369	Nonmetal products	0.06
371	Iron and steel	0.09
372	Nonferrous metal	0.01
381	Metal products	0.24
382	Machinery	0.45
383	Electric machinery	0.77
384	Transportation equipment	0.31
385	Professional goods	0.96
390	Other industries	0.47

Source : Rajan and Zingales (1998)

TABLE 10 – Summary Statistics for the Main Variables

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
$\ln(1+E_{ijt})$	215328	5.689	11.672	0.003	15.484
Banking crisis in exporter	103997	0.109	0.311	0	1
Banking crisis in importer	103997	0.109	0.311	0	1
Log Distance	214417	8.825	0.796	2.134	9.892
Common border dummy	214417	0.013	0.116	0	1
Common language dummy	214417	0.171	0.376	0	1
Common currency dummy	214417	0.012	0.112	0	1
Free-trade agreement dummy	214417	0.071	0.257	0	1
Log exporter's GDP per capita	214104	8.063	2.068	-3.927	7.179
Log importer's GDP per capita	214104	8.063	2.068	-3.927	7.179
Log real exchange rate	214851	4.642	0.513	2.725	5.506
ICRG	179169	0.595	0.221	0.111	1
Polity	179978	4.610	6.312	-10	10
CLI	202875	3.139	1.651	1	7

TABLE 11 – Results of the Probit Regression to Generate Inverse Mills Ratio

Estimator	Probit
Dependent variable	Banking crisis
Banking crisis (lagged)	0.315***
	(0.085)
Growth rate of real GDP	-0.020**
	(0.008)
Growth rate of terms of trade	-0.106***
	(0.027)
Real interest rate	0.057*
	(0.032)
Growth rate of real private credit	0.116***
	(0.033)
Inflation	0.043
	(0.104)
Observations	1698
Pseudo R-squared	0.507

Notes : These estimates are obtained by using our sample of 75 countries over the 1988-2010 period. Standard errors are reported in parentheses. ***, **, and * denote significance at the 1-percent, 5-percent, and 10-percent levels, respectively. Pseudo R-squared denotes unity minus the ratio of the maximized log likelihood to the log likelihood when only a constant term is included.

TABLE 12 – Crises and Bilateral Exports : Using the System GMM Estimator

	(1)	(2)
Estimator	System GMM	System GMM
Dependent variable	$\ln(1+E_{ijt})$	$\ln(1+E_{ijt})$
Banking crisis in exporter	-0.144**	-0.144**
	(0.060)	(0.062)
Banking crisis in importer	-0.072	-0.109***
	(0.399)	(0.033)
Banking crises interaction		-0.134***
		(0.032)
Dependent variable (lagged)	0.605***	0.691***
	(0.128)	(0.241)
Log exporter's GDP per capita	0.041	0.080
	(0.052)	(0.058)
Log importer's GDP per capita	0.405***	0.505***
	(0.115)	(0.161)
Log real exchange rate	-0.072***	-0.104***
	(0.021)	(0.028)
Log distance	-0.380***	-0.414***
	(0.082)	(0.097)
Common border dummy	0.208***	0.231***
	(0.040)	(0.073)
Common language dummy	0.151*	0.140
	(0.087)	(0.128)
Common currency dummy	0.102**	0.327**
	(0.040)	(0.136)
Free-trade agreement dummy	0.106*	0.109*
	(0.060)	(0.059)
Observations	94895	94895
Number of bilateral relations	9805	9805
AR(1) p-value	0.000	0.000
AR(2) p-value	0.122	0.161
Hansen OID p-value	0.411	0.333

Notes : We use the small sample correction of Windmeijer (2005). Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1-percent, 5-percent, and 10-percent levels, respectively. The lagged dependent variable is instrumented by its first difference lagged one period. However, we use second lagged values in levels of the other regressors as instruments in the equations in differences and their second lagged values in differences as instruments in the equations in levels. Bilateral time-invariant characteristics are considered as strictly exogenous.

TABLE 13 – Crises and Bilateral Exports : Excluding Potential Influential Observations

	(1)	(2)
Estimator	FEVD	FEVD
Dependent variable	ln(1+E_{ijt})	ln(1+E_{ijt})
Banking crisis in exporter	-0.043***	-0.041***
	(0.006)	(0.005)
Banking crisis in importer	-0.031**	-0.034***
	(0.005)	(0.004)
Banking crises interaction		-0.108**
		(0.114)
Log exporter's GDP per capita	0.152**	0.159**
	(0.075)	(0.075)
Log importer's GDP per capita	0.554***	0.557***
	(0.173)	(0.173)
Log real exchange rate	-0.093*	-0.107**
	(0.053)	(0.050)
Log distance	-0.413***	-0.295***
	(0.098)	(0.086)
Common border dummy	0.326*	0.338*
	(0.189)	(0.195)
Common language dummy	0.391*	0.407*
	(0.230)	(0.230)
Common currency dummy	0.132***	0.129***
	(0.038)	(0.038)
Free-trade agreement dummy	0.166**	0.137**
	(0.075)	(0.059)
Observations	103678	103678
Number of bilateral relations	9783	9783
R-squared	0.724	0.725
RESET test p-value	0.177	0.106

Notes : Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1-percent, 5-percent, and 10-percent levels, respectively.

TABLE 14 – Crises and Bilateral Exports : Sensitivity to the Number of Importers

	(1)	(2)
Estimator	FEVD	FEVD
Dependent variable	ln(1+E_{ijt})	ln(1+E_{ijt})
Panel A : top 50 importer countries		
Banking crisis in exporter	-0.034***	-0.031***
	(0.010)	(0.008)
Banking crisis in importer	-0.014**	-0.011*
	(0.006)	(0.006)
Banking crises interaction		-0.123**
		(0.053)
Panel B : top 40 importer countries		
Banking crisis in exporter	-0.022***	-0.021**
	(0.007)	(0.005)
Banking crisis in importer	-0.017**	-0.017**
	(0.080)	(0.007)
Banking crises interaction		-0.169**
		(0.073)
Panel C : top 20 importer countries		
Banking crisis in exporter	-0.030***	-0.022***
	(0.009)	(0.005)
Banking crisis in importer	-0.033***	-0.035***
	(0.010)	(0.010)
Banking crises interaction		-0.244**
		(0.056)
Panel D : top 10 importer countries		
Banking crisis in exporter	-0.021**	-0.020***
	(0.006)	(0.005)
Banking crisis in importer	-0.033***	-0.036***
	(0.008)	(0.009)
Banking crises interaction		-0.188*
		(0.108)

Notes : Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1-percent, 5-percent, and 10-percent levels, respectively.