Banking Crises and Exports:
Lessons from the Past*

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First Version: June 20, 2009
Current Version: August 18, 2009

Abstract

This paper analyzes the impact of banking crises on manufacturing exports exploiting the fact that sectors differ in their needs for external financing. Relying on data from 23 banking crises episodes involving both developed and developing countries during the period 1980-2000 we separate the impact of banking crises on exports growth from that of other exogenous shocks (i.e. demand shocks). Our findings show that during a crisis the exports of sectors more dependent on external finance grow significantly less than other sectors. However, this result holds only for sectors depending more heavily on banking finance as opposed to inter-firm finance. Furthermore, sectors characterized by a higher degree of assets tangibility appear to be more resilient in the face of a banking crisis. The effect of the banking crises on exports is robust and additional to external demand shocks. The effect of the latter is independent and additional to that of a banking shock, and is particularly significant for sectors producing durable goods.

*The views contained in this paper are of the authors and not necessarily those of the World Bank. The authors are grateful to the World Bank Trade Brown Bag Seminar's participants for suggestions and comments, Caroline Freund, Andrei Levchenko and Claudio Raddatz for sharing their data and useful comments. The financial support of the World Bank's Research Support Budget is gratefully acknowledged.

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1 Introduction

For the first time since 1982 trade volumes are predicted to fall in 2009 by 11 percent (IMF 2009) as a consequence of the simultaneous drop in demand and financial troubles. The recent collapse in exports following the unfolding of the financial crisis has generated new pressing questions about the relationship between banking crises and exports growth.[1] In particular, it is not entirely clear to what extent supply shocks, i.e. the restricted access to finance, due to a collapse in the banking system are responsible for the drop in exports versus the more classical demand side factors. With this question in mind, this paper analyzes the evidence based on 23 banking crises episodes between 1980-2000. In particular, we attempt to disentangle different financial channels through which banking crises can affect exports growth and to separate the impact of these supply shocks from the external demand shocks due to recessionary episodes of trading partners.

The importance of the link between finance and growth cannot be overemphasized and has been extensively studied in the literature.[2] Our study is particularly close to the difference in difference approach originally proposed by Rajan and Zingales (1998) and followed by a number of more recent studies (Beck 2003, Braun 2003, Fisman and Love 2003, Manova 2008a, Raddatz 2006) which substantially reduces concerns about endogeneity present in the finance and growth literature. Building on a similar identification strategy, various recent studies have focused on the impact of financial crises on the industrial activity and growth confirming the hypothesis of a credit crunch channel occurring at times of financial distress (Berman 2009, Dell'Ariccia, Detragiache, and Rajan 2008, Kroszner, Laeven, and Klingebiel 2007, Borensztein and Panizza 2006). However, none of them specifically analyzes the impact of banking crises on export growth and they are silent about the impact of sector-specific external demand shocks.

The impact of banking crises on exports is a particularly relevant empirical question and there are at least two reasons why it differs from merely looking at the impact on production growth. First, based on the findings of the recent firm-level studies pointing toward the importance of fixed costs necessary to penetrate foreign markets, financial constraints may impinge on exporters more than on domestic firms and, therefore, the effect of banking crises on exports could potentially be more adverse than on domestic production (Greenaway, Guariglia, and Kneller 2007, Iacovone and Javorcik 2008, Manova 2008a, Muuls 2008, Roberts and Tybout 1997).[3] Second, it is also possible that given the exporters are on average more productive

[1] "Twenty-eight out of 38 economies reporting November export data (as of January 13, 2009) show double-digit declines relative to the same month in the previous year. On average, exports of the reporting countries declined by 15 percent in November" (World Bank, January 2009).

[2] For a very detailed survey of the literature see Levine (2004).

[3] For example Iacovone and Javorcik (2008) show how Mexican firms, in order to exploit new export opportunities under NAFTA, had to prepare by scaling up their investments and firms unable to keep up with

(Bernard and Jensen 2004, Bernard and Bradford Jensen 1999) they could also be more capable of finding alternative sources of finance and overcome more easily the constraints imposed by the credit crunch than other domestic firms.

Our paper is also related to the emerging theoretical and empirical literature pointing toward the importance of financial development as a factor shaping export patterns (Kletzer and Bardhan 1987, Beck 2002, Beck 2003, Ju and Wei 2005, Hur, Raj, and Riyanto 2006, Becker and Greenberg 2003). While these studies argue that financial development matters for export growth it can also be argued that the development of financial system can actually be shaped by exports patterns themselves as suggested by Do and Levchenko (2007). In this paper, we are interested in the link going from a shock to financial development, or a banking crisis, to export growth rather than vice versa. Therefore, we treat a financial crisis as exogenous to export and test for this assumption in our robustness checks.

This paper provides several contributions to the literature. First, we show that there is a negative and significant effect of banking crises on export growth as sectors more heavily dependent on external finance are hit harder by a financial crisis. Second, we show the importance of distinguishing among different financial channels. Unlike bank finance, inter-firm finance does not appear to dry up at times of crisis as sectors more dependent on trade credit are not significantly more affected. Third, we show that sectors characterized by a higher share of tangible assets are affected significantly less by the crisis. This can be attributed to their higher ability to provide collateral which results in a better access to financial resources in a context of crisis. Fourth, we show that the impact of "supply-side" shocks due to credit crunch is additional and independent from that of "demand-side" shocks, the latter being especially important for sectors producing durable goods. Confirming the importance of the "financial channel" these effects are stronger for deeper crises and in countries with a less developed financial system. These findings are robust to a large number of robustness checks, in particular testing for potential endogeneity and omitted variable biases.

The remainder of the paper is structured as follows. Section 2 reviews the existing related literature. Section 3 presents the data and empirical strategy adopted, before the results are discussed in Section 4. Section 5 concludes summarizing the main results and outlining future steps.

2 Related literature

To our knowledge there is no previous work looking at the impact of banking crises on exports, however, there are several studies analyzing the effects of periods of financial distress on the real

continuous investments are normally forced to exit export markets.

economy. Some of them focus on the impact of banking crises on industrial output, while others analyze the impact of other macroeconomic shocks on exports. From the first group the work of Dell'Ariccia, Detragiache, and Rajan (2008) is particularly close to our study. They show that during periods of financial distress industries that depend more on external finance are hurt disproportionately more. Kroszner, Laeven, and Klingebiel (2007) confirm these results and, additionally, find that the contraction is more pronounced in countries with a more developed financial system. From the second group, Berman (2009) concentrates on the impact of currency crises on trade and finds that impact of devaluation on exports is ambiguous. Even though, a currency crisis has a positive effect on exporters, by improving their competitiveness, it has also and adverse effect on their balance sheets by increasing the cost of their foreign denominated loans. [4] In a related study Borensztein and Panizza (2006) find that industries with higher propensity to export are hurt relatively more during periods of sovereign defaults. Given that banking crises are often accompanied by economic downturns, in a related study Braun and Larrain (2005) show that during recessions industries that depend relatively more on external finance get hurt more.

All above papers rely on the difference-in-difference methodology originally proposed by Rajan and Zingales (1998). This important contribution allowed to tackle many of the econometric shortcomings present in the finance and growth literature due to endogeneity problems. Such shortcomings affected much of the previous literature on finance and growth (King and Levine 1993, Wurgler 2000) and had to be tackled using instrumental variables (Levine 1998, Levine 1999, Levine, Loayza, and Beck 2000) or exploiting quasi-experimental design as in Jayaratne and Strahan (1996)[5]. The main idea of Rajan and Zingales (1998) is that industries differ in terms of their "dependence from external finance" because of industry specific technological reasons. Therefore, when a country's financial system develops those sectors that rely more heavily on external finance to cover their investment will benefit and grow disproportionately faster. Subsequently several other papers followed a similar methodology. Fisman and Love (2003) showed that when analyzing the link between finance and growth, it is important to take into account not only the "bank finance" but also other sources of finance such as inter-firm finance. They find that where the quality of financial intermediation is low, industries relying more on trade finance tend to grow faster. Braun (2003) provides an additional dimension to understanding of the link between financial development and growth by showing that where financial markets are not sufficiently developed the use of collateral becomes particularly important as industries with higher shares of tangible assets tend to grow relatively faster. Finally, Raddatz (2006) finds that better developed financial systems reduce

[4] A similar result was pointed out for the case of Indonesia after the 1997-1998 devaluation (Blalock and Roy 2007).

[5] For a detailed and encompassing survey of the finance and growth literature the reader should refer to Levine (2004)

output volatility in sectors with higher liquidity needs.

Literature that explicitly analyzes the link between trade and finance is also closely related to our paper. Industry level studies such as Beck (2002), Beck (2003) and Manova (2008a) show that higher financial development will lead to a lower search cost for financial intermediaries and higher shares of exports in industries more dependent on external finance. Manova (2008a) and Hur, Raj, and Riyanto (2006) also find that at low levels of financial development industries with more tangible assets tend to export more. A potential explanation for this is that at low levels of financial development problems such as moral hazard and adverse selection will be more pronounced and lenders will be more likely to require a collateral.[6]

Finally, firm level studies provide important insights into why financial constraints are particularly relevant for exporters. These encompass a range of studies focusing on the importance of existing sunk costs to penetrate foreign markets. Kletzer and Bardhan (1987) in a seminal theoretical contribution develop a model where countries with identical technology and endowments can develop a finance based comparative advantage in manufacturing goods requiring more working capital, marketing costs or trade finance. Later Baldwin (1989) and Krugman (1989) develop models where exporters have to pay a significant sunk cost to enter foreign markets and several empirical contributions confirm the validity of the sunk cost hypothesis (Bernard and Jensen (2004), Iacovone and Javorcik (2008), Muuls (2008), Roberts and Tybout (1997)). As discussed by Becker and Greenberg (2003) these costs are large and difficult to finance from reasons including the delay between investment and revenue collection, limited collateral and difficulty to predict and verify revenues from abroad for outsiders.

3 Empirical strategy and data

3.1 Empirical strategy

In order to correctly identify the impact of banking crises on exports growth our empirical strategy has to address the endogeneity and reverse causality issues. The same shocks that trigger the financial crisis might also affect the export performance. Similarly, the performance of exports may be the trigger of the financial crisis. Such concern about reverse causality could be particularly serious in countries where the economy is not sufficiently diversified and relies on just few sectors, the ones affected by adverse exogenous shocks. If the importance of the exporters is sufficiently high in the portfolios of the banks, an adverse demand shock might lead

[6]Do and Levchenko (2007) argue, both theoretically and empirically, that the relationship between finance and trade is not uni-directional and a country's financial development is actually endogenous to the export structure of the economy.

to the inability of the exporters to pay off their loans and consequently to a banking crisis. To tackle these concerns and correctly identify the impact of banking crises on exports growth we adopt a difference-in-difference approach suggested by Rajan and Zingales (1998) that to large extent mitigates both concerns. [7]

Specifically, we will test whether banking crises have an effect on exports growth, by asking if industries more dependent on external finance are more severely affected by the crisis. With this objective in mind we estimate the following equation that is very similar to the one used by Dell'Ariccia, Detragiache, and Rajan (2008):

$$\Delta X_{ijt} = \alpha_{ij} + \beta_{it} + \gamma_{jt} + \phi Share_{ijt-3} + \delta ExtFinDep_j * Crisis_{it} + \epsilon_{ijt} \quad (1)$$

where ΔX_{ijt} corresponds to the growth rate of exports in country i, industry j and time t. The inclusion of the lagged share of the exports of industry j in total exports of country i serves to control for convergence effects. The larger the share the lower the potential of the industry to grow, therefore the expected sign of ϕ is negative. To control for long term growth trends of industries at country-level we include a country-industry fixed effect α_{ij}. The remaining two paired fixed effects β_{it} and γ_{jt} control for country specific and industry specific time varying shocks, these allow us to control country-wide shocks that may affect exports (including macroeconomic and institutional country-wide changes) as well as industry specific global supply or demand shocks that can affect exports growth. Because of the inclusion of all these fixed effects the only additional variables that can be identified are those that simultaneously vary across all three dimensions, i.e. country, industry and time. In fact, our identification strategy only exploits variation between sectors within country and therefore is not affected by country specific, or industry specific, shocks. Furthermore, the inclusion of the fixed effects substantially reduces the risk of obtaining biased results because of omitted variables.

Our main variable of interest is the interaction of the external finance dependence measure with the financial crisis dummy. Finding a negative δ would suggest that during a financial crisis sectors relying more on external finance are hurt more than those that finance their investments using mainly internal funds. Such result would confirm the existence of a financial channel operating during the crisis. As already mentioned, the main advantage of this identification strategy is a substantial reduction of the endogeneity concern, i.e. slow growth of exports translating into a banking crisis . Reverse causality will only be an issue if the relative export performance of a given industry compared to other industries within the manufacturing sector of the same country had a causal effect on the probability of the banking crisis.

A key issue is to define a measure of external dependence from finance that is appropriate

[7] Furthermore in our robustness checks we address specifically the endogeneity concerns.

and relevant for exporters. Based on the previous literature we argue that exporters rely on two main sources of finance. First, exporters are likely to need to finance their investments as much as domestic firms and even more as confirmed by studies pointing to the importance of fixed costs and investment in order to succeed in export markets (Iacovone and Javorcik 2008). Furthermore, given the larger volumes of production that exporters have to generate in order to serve export markets they are also likely to be heavily reliant on working capital and trade finance. These are going to be our main variables that will capture the reliance on external finance and in the next section we will discuss more in details which proxies we use to capture them.

3.2 Data sources and descriptions

Exports data, from UN Comtrade, are disaggregated at 4 digits ISIC Rev 2 and cover the period 1980 to 2006. There are 81 industries at this level of disaggregation, however, not all countries have exported in all industries and years and therefore the resulting panel is unbalanced with the number of observations slightly above 30000.

The information on banking crises is obtained from Dell'Ariccia, Detragiache, and Rajan (2008) who identify 48 episodes of systemic financial crises in both developed and developing countries. Because we are only interested in the effect of pure banking crises we exclude all "twin crises" when a currency crisis occurred jointly with the banking crisis. The rationale for this exclusion is that we want to isolate the credit crunch channel from balance sheet effects. During twin crises, when large devaluations occur, firms with high exposure to foreign debt will be hit particularly hard. If these firms are also the firms highly dependent on external finance, the effect of the crisis on exporters that we observe might be a consequence of their own balance sheet problems rather than a consequence of the credit crunch due to the banking crisis. Finally, out of the remaining 32 crisis episodes we only have disaggregated trade data for 23 crises in 21 countries. We use Dell'Ariccia, Detragiache, and Rajan's (2008) database to identify the start of the crisis but in the estimations the financial crisis dummy is actually a "crisis window". This is equal to 1 if country i faces a financial crisis in year t as well as in the two following years .[8] The reason of using a crisis window is because we are not only interested in the immediate short run effects of the crisis but also its medium-term effects. Furthermore, given the lumpiness of certain investments it is possible that the impact of the credit crunch due to the crisis may emerge with a lag as firms do not have to finance investment continuously.

The list of countries in the sample and their principal characteristics are summarized in Table 1. The sample is composed of countries of different income levels. Financial crises have affected

[8] As a robustness check we consider also two and four years windows and our results are substantially unchanged.

not only very poor countries with less than 1,000 USD real per capita income 3 years before the crisis such as Nepal or Indonesia, but also highly developed countries like USA or Norway with an income above 20,000 USD. A similar pattern is observable for the levels of financial development. The least developed country three years before the crisis has been Nepal which has only borrowed only about 8 percent of its GDP to the private sector. On the other edge Japan has borrowed almost twice its GDP. The crisis periods are spread throughout the whole period 1980-2000, however, the majority is concentrated in the period of the late 80s and early 90s. Even though, we have excluded all the twin crises, the average devaluations in the three year crisis windows are still substantial in some cases with an average of about 7 percent. Except of Costa Rica, all the countries have experienced at least one recession in the period for which we have data. Some of the recessions overlap with financial crisis periods, but in many cases both financial crises and recessions occur at different times.

The measure of external finance dependence is based on data of listed US companies provided in Compustat and obtained from Rajan and Zingales (1998). They compute this variable as the fraction of capital expenditures that a company is not able to finance with internal funds. This measure is a good proxy for the reliance on external funds to cover long-term investments and dependence from banks. However, for exporters it is also important to be able to finance short term needs such as working capital, which is often covered through trade credit. To capture this component we will employ a measure proposed by Fisman and Love (2003) who define the sectoral dependence on trade finance as the ratio of accounts payable over total assets. Finally, as described in the Section 2 various studies have emphasized the importance of collateralizable assets in situations when the confidence in financial sector is low. Therefore, in our baseline estimations we will be also using a proxy for the ability of an industry to provide collaterals. This proxy is obtained from Kroszner, Laeven, and Klingebiel (2007) and is equal to the ratio of tangible assets in total assets.

The values of the measures external dependence on bank finance, trade credit and tangibility are reported in Table 2. The external dependence on bank finance is highest for the drugs industry and lowest for the tobacco industry that is able to generate more cash flow than it needs for its capital expenditures. High external dependence on bank finance does not necessarily imply a high dependence on trade credit. For example the spinning industry belongs to the least dependent on bank finance, but is the one of the most dependent on trade credit. Similarly high tangibility of an industry, e.g. pulp and paper, does not necessarily translate into a high dependence on long or short term finance. In Table 3 we show that the rank correlations between the three measures are indeed low and each of them should be able to provide a different dimension when examining the importance of the financial channel during a banking crisis.

In addition to the above variables we will be using a range of other control variables and alterna-

tive measures throughout the estimations and robustness checks. Their construction and sources will be described as we introduce them in Section 4. More detailed descriptions of variables and procedures applied to the data are providedd in the data section of the Appendix.

4 Results

4.1 Summary statistics

Before proceeding with the estimation we will briefly describe our main variables of interest. Table 4 captures the differences in growth rates of highly dependent industries compared to low dependent industries in an out of a financial crisis. An industry that is highly dependent from financial sector (i.e. at the top decile of financial dependence measured using the RZ proxy) experiences a reduction in its average growth rate by 2.2 percentage points during a crisis relative to non-crisis times. On the other hand an industry characterized by a low external dependence (i.e. from the bottom decile measured using the RZ proxy) tends to actually grow faster during a crisis. The latter result may appear surprising but is easily explained by the devaluation that often takes place during a financial crisis. In fact, Table 1 shows how most of the crises, even though they did not meet the criteria to be classified as twin crises, were accompanied by at least a mild devaluation. Therefore, the increase in export growth in industries that do not rely on external finance is likely to be a direct consequence of their increased competitiveness. Even though the enhanced competitiveness applies to the high dependent industries as well, their response to demand is limited by financial constraints that are likely to be higher during a financial crisis. The resulting difference between growth in non-crisis and crisis period in a high dependent industry compared to the same difference in the low dependent industry is 3.5 percentage points.

In case of the trade credit dependence, both the high dependent and the low dependent industries tend to grow faster during a crisis, however, the differential between the two remains almost unchanged when comparing to non-crisis times. This suggests that both types of industries have reaped the benefits of higher competitiveness brought by the devaluation in almost the same extent and the highly dependent industries did not seem to be affected by their sources of finance drying up.

Finally, industries with higher shares of tangible assets experience higher growth rates during crisis periods than during normal periods. On the other hand, the growth rates of exports in non-tangible industries get slightly lower during crises. The differential between high and low tangible industries rises by almost 3 percentage points in a crisis situation suggesting that possession of tangible assets provides for a buffer and eases access to finance when the economy

is experiencing financial distress.

We will be estimating these difference-in-difference coefficients more formally in the next section using the Rajan and Zingales (1998) methodology described above.

4.2 Baseline regressions

Table 5 summarizes the results from our benchmark regression (1) estimated using OLS with robust standard errors. We estimate the specification separately for each of the two major measures of external finance dependence as well as for the tangibility measure in the first three columns and combine all of them in column 4. The results suggest that exports of industries that depend heavily on external finance from banks suffer significantly more during a banking crisis. Based on results in column 1 when comparing the exports growth performance of the ship building sector which is in the top decile of external dependence with production of non-metallic mineral products from the bottom ten per cent, in a crisis we observe a difference in the growth rates about 4 percentage points higher compared to non-crisis years. While exports growth of high dependent sectors is reduced by about 4.1 percentage points (going down from an average growth of about 11 percent out of crisis), the growth in a low dependent sector is almost unchanged.

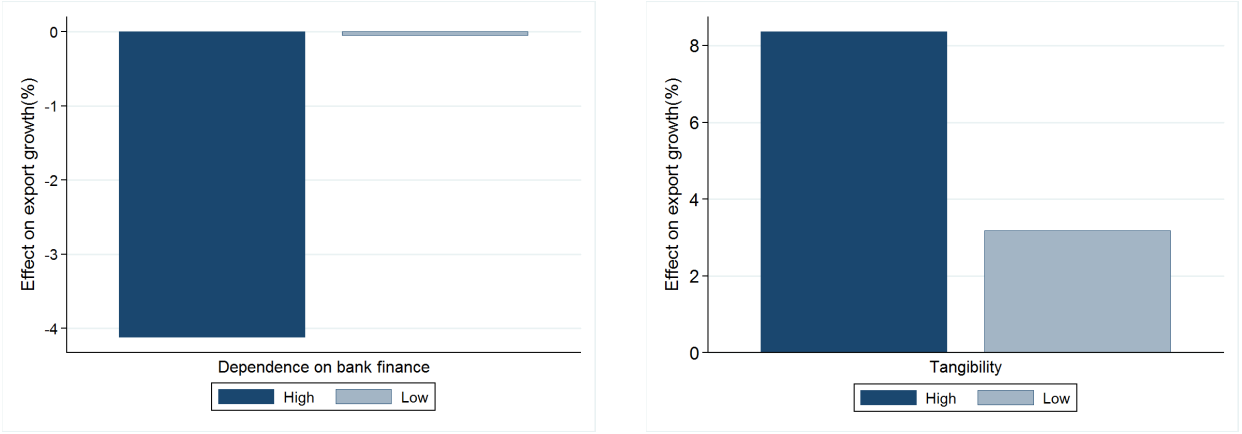
At the same time, it appears that not all the external finance during a crisis dries up. The sign on the estimated coefficient in column 2 of Table 5 suggests that industries more dependent on trade credit are in an advantage during a crisis, however, the result is not statistically significant. This implies that in the past crises despite their adverse effect on the bank finance trade credit provision was not cut. Trade finance is basically inter-firm finance provided to relatively more finance constrained firms by more advantaged firms often with well established relationships with financial institutions (Petersen and Rajan 1996). However, during a financial crisis these privileges might be cut and consequently the firms might also reduce the trade credit provision. This does not seem to have been the case. What can explain our result is that in exporting industries the trade credit providers are not necessarily from the same country as the receiver and therefore there is no reason to expect that trade credit provision would face substantial constraints.

Consistent with our hypothesis that higher ability to provide collateral might ease access to finance during crises when confidence in the economy is low, we find that industries with higher shares of tangible assets are growing faster. The estimated coefficient suggests that the difference in the growth rates between a highly tangible industry such as glass production and an industry with few collateralizable assets such as drugs will be 5 percentage points higher in crisis compared to non-crisis years.

Figure 1 below visualizes these findings by comparing the impact of a banking crisic on a sector in the top and bottom decile of bank finance dependence and tangibility. A sector highly dependent on external finance will experience a drop in export of 4 percentage points while a low dependent sector will be almost unaffected. The high and low tangible industries grow both faster during a crisis, however, this effect is much stronger in the sector with higher shares of tangible assets.

In the last three columns of Table 5 we show that all three effects are almost unchanged also when we control for financial development interacted with the proxies for external dependence and tangibility. Financial development is defined as private credit in GDP and is taken from Beck, Demirguc-Kunt (2009).

Figure 1: Impact of banking crisis on exports growth by sector characteristic



(a) Dependence on bank finance

(b) Tangibility

4.3 Demand side effects

In addition to the supply side effect of the financial channel we are also interested in the impact of external demand shocks. For this purpose we construct an industry specific external demand shock and estimate the following specification:

$$\Delta X_{ijt} = \alpha_{ij} + \beta_{it} + \gamma_{jt} + \phi Share_{ijt} + \delta ExtFinDep_j * Crisis_{it} + \lambda ExtDemShock_{ijt} + \epsilon_{ijt} \quad (2)$$

The external demand shock for exporter i in industry j is defined as GDP growth of the importer p weighted by the trade share of this partner in total exports of i in industry j and summed over all partners that import goods from this specific exporter in this specific industry. This gives a measure that varies across exporters, industries and time. The estimated positive and significant coefficient on the demand shock variable in the first column of Table 6 can be interpreted as follows. Should the GDP growth of the only trading partner (100 percent share)

decrease by 1 percentage point then the exports growth decreases by 1.18 percentage points. Obviously, the effect of the same demand shock of importer p will have a different impact across sectors dependent on the relative importance of this importer in each industry.[9]

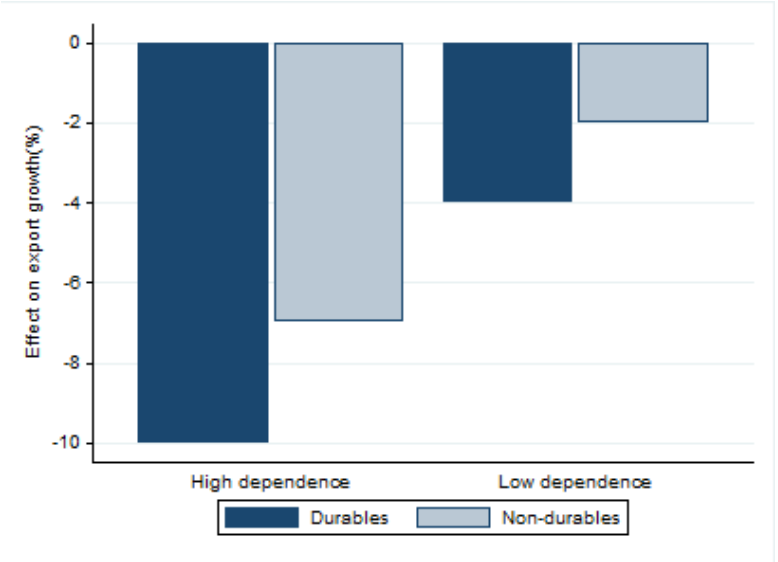
To see whether a demand shock differentially affects sectors based on their dependence on external finance, in columns 2-4, we interact the demand shock with each of our three core financial measures. Unlike for dependence on trade credit and tangibility, where no significant differential effect is observed, a positive demand shock abroad also leads to a higher growth in industries relatively more dependent on external finance. This could imply that sectors relying heavily on external finance are also more pro-cyclical as durable goods tend to. It is a well established fact that during downturns the consumption of durables decreases disproportionately more than of non-durables. To test whether our external dependence measure is not just a proxy for durables in column 5 of Table 6 we include in addition to the interactions with external dependence also similar interactions with a dummy variable taken from Kroszner, Laeven, and Klingebiel (2007) which equals one when the sector is producing predominantly durable goods. Even though, the coefficient on the main interaction slightly decreases in its in magnitude, it still remains negative and significant at 1 percent level. Exports of durables are not significantly more affected by a domestic crisis, however, consistent with previous literature they tend to be much more affected than non-durable goods by demand shocks.

In Figure 2 below we visualize the results from column 5 of Table 6. It depicts a situation when a country that faces a banking crisis simultaneously experiences a drop in demand from the only importer. The drop of 2.8% that we choose for our simulation corresponds to the projection of IMF for the United States in 2009. As the figure shows, the effect of finance is amplified by the demand shock and the it is particularly pronounced in sectors producing durable goods whose exports growth drops as much as 10 percentage points.

Most importantly for us, controlling for the demand does not affect the coefficient of the interaction of crisis and external dependence which remains strongly significant and with a magnitude that is almost unchanged compared to the baseline regressions. We also run similar tests using a recession dummy instead of the GDP growth variable and find the results to be consistent with the findings above. Therefore, from our analyses we can conclude that in a situation when a domestic banking crisis is accompanied by a demand shock abroad the industries that depend heavily on external finance will be double hit.

[9]The importance of demand shocks is shown to be very large also in recent works by Freund (2009) and (Freund and Klapper 2009) who find that this has been particularly important in the context of the current financial crisis.

Figure 2: Impact of a banking crisis combined with a demand shock on exports growth



4.4 Deepness of the crisis

In this section we will analyze whether certain characteristics of the crisis or of the country that experienced it have resulted in heterogeneous outcomes. We start by asking if crises that are deeper also have stronger differential effects on exports growth across industries. We use the GDP loss experienced during the crisis to measure the deepness of a banking crisis. The variable is computed as the difference between GDP predicted from a linear or quadratic trend and the actual GDP observed during a crisis. Based on the work of Braun and Larrain (2005) one could expect that when a banking crisis is accompanied with a high GDP loss the overall pessimism which is likely to prevail in the economy will cause that banks will be more stingy with the lending resulting in a more adverse impact on the industries that rely heavily on external finance. In Table 7 we report the estimation results of our baseline specification augmented by the triple interaction of the crisis dummy, GDP loss and each of the financial measures in separate regressions. We report the results obtained from both using the GDP loss computed from linear as well as quadratic trend. As the results in the first two columns attest higher GDP loss during a crisis indeed widens the gap between the growth of the high and low dependent industries and increases the importance of a collateral as shown in the last two columns of Table 7. On the other hand, the impact of a crisis on industries highly dependent on trade credit does not seem to be affected by its deepness (columns 3 and 4).

4.5 Impact of economic and financial development

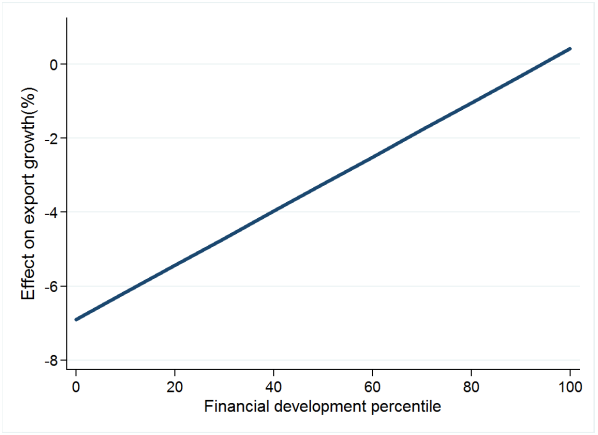
We also attempt to understand whether the impact of financial constraints arising during a crisis is more or less pronounced in countries with higher GDP per capita or higher level of financial development. In the first column of Table 8 we show that the triple interaction of the crisis with bank finance dependence and GDP per capita is significant but very small in magnitude. This result implies that poorer countries hit by a financial crisis experience a stronger impact on their exports in industries that require more external finance than their richer counterparts. The second and third column of Table 8, however, show that higher GDP per capita before the crisis does not significantly help industries highly dependent on trade credit or more tangible industries. In Table 9 we look at the same issue differently and, in line with the above results, show that the fact that a country is developed implies a less severe impact of the banking crisis.

We run similar regressions as for GDP per capita using financial development measured as private credit in GDP instead of the GDP per capita variable. As documented in Table 10 we find that countries with less developed financial systems are hit harder. A conclusion one may make from these results is that countries that are richer and more financially developed might also have additional financing options outside of the banking sector. As shown in last column of Table 10 this really seems to be the case. In economies with higher shares of other financial assets in GDP the impact of the crises on industries with high need of external finance is less pronounced. [10]

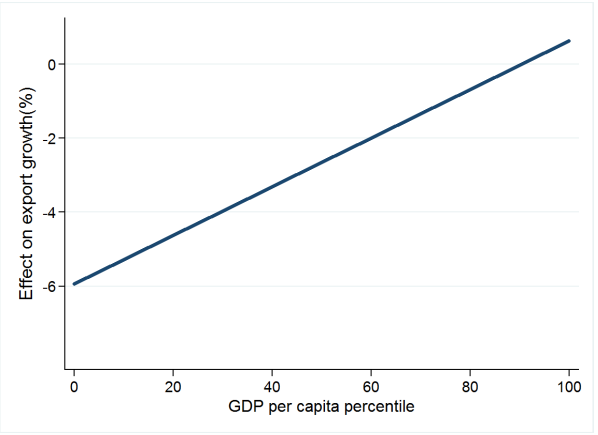
Results from this section are visualized in Figure 3. Panel (a) captures the relationship between the financial development and the difference in the impact on exports growth in a high and low dependent industry induced by a banking crisis. The values on the horizontal axis represent the percentiles of financial development in our sample, ranging from 0.07 in Nepal to 1.81 in Japan. We show that when a crisis hits a country like Nepal, it will induce a differential of almost 7 percentage points, while at higher values of financial development the differential decreases until it completely vanishes. Panel (b), with GDP per capita percentiles on the horizontal axis, offers

[10] It is important to notice that there could be two reasons why our result differ from Kroszner, Laeven, and Klingebiel (2007) who find that the effect of a financial crisis is deeper in countries with a more developed financial system. First, it is possible that exporters in countries with a more developed financial system are perceived more reliable and better able at dealing with foreign banks so in a context of crisis they can replace their domestic loans with foreign loans - a possibility that is much less likely in the case of domestic producers given their more limited relationships with international banks and exchange risk concerns. Second, our sample of countries differ from the one covered by Kroszner, Laeven, and Klingebiel (2007) as their sample includes many more poor and African countries while our sample is more representative of middle-upper income countries. The reason of these discrepancies in the sample used is due to data availability and the fact we rely on the dataset used by Dell'Ariccia, Detragiache, and Rajan (2008) while Kroszner, Laeven, and Klingebiel (2007) rely on Caprio and Klingebiel (2002).

Figure 3: Impact of banking crisis on exports growth: effect of financial development and GDP



(a) Financial development



(b) GDP per capita

a very similar picture. The higher the GDP per capita, the lower will be the difference in the impact on industries from opposite ends of the external finance dependence distribution.

4.6 Impact of policies

We have shown that banking crises bring by financial constraints and frictions that have repercussions in the real economy. A question arises whether there is anything for the policy maker to do in order to mitigate these effects. Honohan and Klingebiel (2003) compile a list of measures put in place by the government during the financial crises. These include blanket depositor protection and two types of forbearance. Forbearance of type A allows insolvent or illiquid banks to operate for 12 months. Forbearance of type B means that either there is type A forbearance or some regulations are not enforced. Two additional measures capture repeated recapitalizations and government sponsored debt relief for corporate or private borrowers. These five policies are captured as zero-one dummies. We borrow their measures and enclose them in our baseline regressions in form of triple interactions with the measure of financial dependence or tangibility and financial crisis. In addition to the first five measures we also include a policy total variable which adds the dummies and gives the number of policies that have been implemented during each crisis. The results are presented in Table 11. The information about policy interventions is not available for all crises and therefore the number of observations is cut substantially. The results from this constrained sample suggest that none of the general policies put in place in order to ease the situation of the banks did not significantly help to reduce the effect of the crisis and some of the policies even enter with a negative sign.

4.7 Robustness tests

Throughout the estimations we have been finding a strong impact of the banking crisis on export growth through a financial channel. Our work is prone to several potential criticisms, therefore, the role of this section is to assess the robustness of our findings.[11] We will assess them one by one. First, the result might be driven by other accompanying events such as recessions rather than by the banking crisis itself. Second, our financial measures might not be robust to the use of alternative proxies or they might measure other industry characterisitics not related to finance. Third, our result might be driven by one country or by a small group of countries sharing a common characteristic such as similar level of economic development. Fourth, even though our methodology mitigates the endogeneity concerns, there are still situations in which reverse causality might be an issue. Finally, previous literature has pointed toward biases present in the difference in difference literature when the data is serially correlated. Therefore, we also test whether our results are not driven by the methodology we use.

4.7.1 Is banking crisis just like any other period of economic distress?

Banking crises are often accompanied by economic downturns during which even healthy banks may cut lending in response to balance sheet problems of the borrowers rather than because of their own solvency or liquidity problems (Dell'Ariccia, Detragiache, and Rajan 2008). In order to better understand if our results are simply driven by the recession we construct a recession dummy as suggested by Braun and Larrain (2005). We then estimate our baseline model substituting the banking crisis dummy with the recession dummy. The results are summarized in Table 12. When we include the interaction between the recession and financial dependence alone we confirm that indeed there is an adverse effect of the recession which may be operating through a credit channel too but the coefficient is not significant. Furthermore, when we also include the interaction between financial crisis and external dependence the sign and size on our main interaction of interest, i.e. financial crisis and external finance dependence, is unchanged (column 2). We observe a similar pattern in columns 3 and 4 when we interact the recession dummy with tangibility. When we include only the recession and tangibility interaction, the more tangible industries seem to fare significantly better when a recession hits. However,with both interactions in one regression, the coefficient on recession gets insignificant while the crisis interaction with tangibility remains strong and almost unchanged in magnitude compared to our baseline regressions. Alternatively, instead of the recession dummy we include GDP growth. In this case we find that a decrease in the growth rate of domestic income has a significant negative impact on exporters in intangible and high dependent industries, however, even in this

[11] Given that we obtain siginificant results for the interactions of crisis with external dependence on bank finance and with tangibility, we will do most of the robustness tests for these two measures only.

case the result on the banking crisis interaction is not substantially affected confirming there is a separate effect of a banking crisis on export growth.[12]

4.7.2 Alternative measures of external dependence and tangibility

The measure of external finance dependence as computed by Rajan and Zingales (1998) might not always be ideal. For example when looking at developing countries one could argue that using the data of mature firms in the US might not give the best benchmark. Therefore, directly from Rajan and Zingales (1998) we take the same type of measure but only computed for the young firms that are likely to resemble more the firms in developing countries composing a big part of our sample. In addition, this measure might also be more appropriate because firms tend to rely much more on external finance in their early life. The first column in the top panel of Table 13 shows that even though the coefficient on the main interaction weakens slightly the results are qualitatively unchanged. A second concern that one might have with using US data is that a country that has itself experienced a financial crisis might not be the best frictionless benchmark. Therefore, our second alternative is based on Kroszner, Laeven, and Klingebiel (2007) who again compute the same measure but based only on data of countries that have never experienced a financial crisis. Here again, as shown in column 2, the results are very similar to the ones from our benchmark regressions. To provide additional testing of whether the dependence on external finance really matters in last two columns we employ two additional measures both originally developed by Raddatz (2006): cash conversion cycle and inventories to sales. These measures are meant to provide a proxy for more short term financial needs required to cover mainly the working capital. When we use these additional proxies interacted with financial crisis our main coefficients remain negative and significant but becomes smaller than when we use the original measure. This suggests that it is particularly the long term financing that is hurt during a crisis which is consistent with our finding using the Fisman and Love (2003) trade credit measure.

We do a similar set of tests for the tangibility measure. This variable is inherently different from the external finance dependence and therefore we use a different set of proxies to check its robustness. We take the alternative measures from Braun (2003). He similarly as Kroszner, Laeven, and Klingebiel (2007) uses the book value of the property, plant and equipment in total assets as the benchmark measure. However, he only constructs it at the 3 digit ISIC level and for the period 1985-1995. For comparison we report the result of our benchmark regression using this new definition of tangibility (see bottom part of Table 13). The coefficient is slightly lower in its magnitude but the result is consistent with our previous findings. To better capture

[12]The positive sign on the interaction between GDP growth and external dependence from finance can be both a consequence of the larger pro-cyclicality of sectors highly dependent from finance as well as a spurious result due to the fact that exports are a component of GDP by construction.

the actual value of the tangible assets we use Braun's measures of tangibility which has the same numerator but is related to market value of total assets or total sales rather than to the book value of total assets. In both cases the estimated coefficient is positive, highly significant and almost identical in magnitude.

To summarize, Table 13 shows that when using alternative proxies for external dependence from finance and tangibility our results slightly change in terms of magnitude but remains almost unaffected which reinforces our conclusions and confirms the robustness of our results.

4.7.3 Do the proxies measure something else?

Another concern with our measure of the external finance dependence is that it might potentially capture other industry characteristics that are not inherently related to finance. We have already shown that even though the high dependent RZ industries are pro-cyclical, durability of goods produced is not what is driving our results. Another possibility is that the financial needs of an industry might be driven by the sophistication of the industry. Therefore, other possible drivers could be capital or R&D intensity of the industry. We obtain proxies for both measures from Kroszner, Laeven, and Klingebiel (2007) and include their interaction with the financial crisis dummy as additional controls in our baseline regression. As shown in column one and two in the top panel of Table 14 inclusion of none of them weakens our main result. Three additional industry characteristics that the RZ could potentially capture are reported in the same table. The first two, the share of 20 largest intermediates and the Herfindahl index are both capturing the dependence on intermediates and are taken from the work of Cowan and Neut (2007). The reason to include these two proxies is their relation to the complexity of the product. The higher complexity, the higher the number of tasks involved in production and potentially the higher are the working capital and the external finance requirements (Raddatz 2006). The third variable, the product homogeneity is based on the Rauch (1999) classification of industries. Rauch classifies a good as homogeneous if it is sold in organized exchanges or if there is a reference price for it. A heterogeneous product on the other hand requires building up a trading relationship. Therefore, we can expect that a differentiated product will have a higher fixed cost of entry into a foreign market. If the inclusion of this variable weakens the coefficient on the main interaction it would suggest that the Rajan and Zingales (1998) measure is a proxy of entry cost rather than external finance dependence. Again inclusion of any of these variables does not affect the coefficient on the main interaction in any substantial way.

We do a similar set of tests for tangibility. In addition to the capital-labor ratio, R&D intensity and product homogeneity we also include the interactions of physical capital intensity, natural resources intensity and human capital intensity with the crisis dummy. The thought behind

including the latter three is that tangibility might be spuriously capturing an industry characteristics that provides a comparative advantage. If importers are highly dependent on the goods of certain industries in crisis situations they will be more likely to support them by extending additional trade credit or providing advance payments. On the other hand, in industries that are more easily substitutable it is likely that importers will switch to other suppliers rather than accepting less favorable payment conditions. If this was really the case, the positive and significant coefficient on the tangibility interaction with crisis would be spurious. However, inclusion of any of these additional interactions does not weaken the baseline result and also none of them enters significantly.

4.7.4 Country exclusions

We also perform several robustness checks to see whether our results are driven by a specific country or group of countries. First, to test whether the results are spuriously driven by one country, we run our baseline model given by equation (1) excluding one of the crisis countries at the time. We do this for both, the external finance dependence and tangibility measures. In both sets of 21 unreported regressions the coefficient on our variable of interest stays significant with the sign and magnitude almost unchanged throughout the experiment.

Second, we exclude the poorest and the richest countries (Table 15) to see whether one of these particular groups is driving the results. We find that in both cases the coefficient on the interaction of the external dependence measure with financial crisis remains negative and statistically significant. Given that the result is stronger after excluding the rich countries, this is also consistent with our previous conclusion that poorer countries were hurt more by the banking crises. Similarly, the estimated coefficient on the tangibility interaction with financial crisis is positive and significant in both cases, implying the importance of collateral in crisis rises regardless of the level of economic development with the effect being slightly stronger in richer countries.

Finally, we look at whether having countries in the sample that have experienced more than one crisis might have affected our results. In Table 16 we show that the coefficients on the main interactions get slightly weaker after the exclusion. This result is not very strong but it seems to suggest that in countries that have already experienced a crisis the effect of the credit crunch gets especially pronounced.

4.7.5 Addressing endogeneity issues

Even though, our identification strategy built on Rajan and Zingales (1998) is much less exposed to endogeneity concerns than typical cross-country models some concerns still remain. In our

specific case an observed drop in exports in the high dependent industries might actually be the cause of a banking crisis rather than other way round. However, as pointed out in Manova (2008a), this argument does not come through so clearly for the tangibility measure. As we have shown, there is negative correlation between tangibility of an industry and its dependence on external finance, but it is not very high. Therefore, foreign demand skewed toward less tangible industries should not necessarily translate in higher demand for external finance that could potentially trigger a banking crisis due to a sudden stop in demand and inability of exporters to pay off their earlier loans. However, for completeness we provide results for tangibility as well as for the trade finance dependence measure. We do two different tests in order to show that our results are not driven by reverse causality.

The results of our first test are summarized in Table 17. The top panel reports our benchmark regressions estimated only for sectors whose share in total exports three years before the crisis was larger than the median share, i.e. large sectors, while the bottom panel reports the results from the below median sectors, i.e. small sectors. If our results were driven by reverse causality we would expect that the coefficient on the interaction of external dependence and financial crisis in the regression of the large sectors would be negative, significant and larger in magnitude, while in the case of small sectors it would be insignificant. Our results show that while in both cases the coefficients are negative and significant, they are actually twice as large in the case of the small sectors that, given their sheer size, are certainly less likely to be triggers of a financial crisis.

In our second test we address the potential endogeneity by only looking at crises that can be strictly exogenous, i.e. they have started as a result of investors reverting from certain markets. More specifically we focus only on crises that can be the result of a contagion from other countries within the same region. The criterion to identify these crises is an occurrence of a financial crisis in a country in the same region one or two years before the exporter has experienced a financial crisis itself. We identify 14 episodes of this type and we rerun our baseline regressions on this reduced sample. As shown in first column of Table 18 the coefficient on the interaction of external dependence and financial crisis becomes slightly less significant, not surprisingly given the substantially smaller sample we are using, but remains negative and very similar in its magnitude to our baseline results. Interacting the crisis dummy with tangibility leads similarly to almost the same conclusion as when using the whole sample.

4.7.6 Placebo crises

Bertrand, Duflo, and Mullainathan (2004) show that difference in difference estimates can be severely biased when the data used is serially correlated. Therefore, our final robustness check tests whether our results are really capturing an economically important effect or are completely

spurious and driven by our methodology. In order to do so we take data for all countries that never experienced a financial crisis and we randomly assign 23 crisis episodes. We repeat this 200 times and then we test our model using each of these "placebo crises" interacted with the external dependence as in our baseline regression. Our results speak against the spuriousness of our findings. The coefficient on the interaction of external dependence and financial crisis turns out negative and significant at the critical 5 percent degree of confidence in less than 3 percent of cases, but also turns out positive at the same degree of confidence in 3 percent of the estimations. In case our results were spurious we would expect the negative and significant result to occur much more frequently. We do a similar experiment with the tangibility measure and in this case the coefficient is positive and significant at 5 percent level in only 3 cases out of 200. However, in 13 more cases it is negative and statistically significant. This suggests that once again our results do not seem to suffer by an apparent bias, if anything it seems such bias would work against us by affecting our estimates downward.

5 Conclusions

In the context of the current financial crisis and the sharp drop in trade volumes this paper relied on evidence from past banking crises to analyze the impact of banking crises on export growth. With this purpose in mind we used a difference-in-difference identification strategy originally suggested by Rajan and Zingales (1998) which allowed us to tackle various endogeneity concerns and identify more precisely the impact of a domestic financial breakdown on exports.

Our results reinforce the evidence about the importance of a healthy financial system for exports growth, or as suggested by previous studies the idea that finance may be a source of comparative advantage and shape exports patterns (Manova 2008a, Manova 2008b). In fact, we find a negative and significant effect of banking crises on exports growth with sectors more dependent on finance growing by 4 percentage points less than sectors less relying on external finance during a crisis.

Second, we find that when analyzing the relationship between finance and exports it is important to distinguish among different financial channels as we show that not all financial channels dry up at times of crisis. In fact, the banking crisis does not appear to adversely affect exporters particularly dependent on inter-firm finance in any significant manner.

Third, the finding that sectors characterized by higher shares of tangible assets are significantly less affected by the crisis, arguably because of their ability to provide collateral, points toward an important policy message. Guarantee schemes can be an important policy device in the context of crisis to reduce credit constraints and support exporting firms to gain access to financial markets.

Fourth, for the first time, we simultaneously analyzed the effect of supply side shocks, i.e. financial crisis, and demand side ones. Our results confirm the importance of demand shocks, especially for sectors producing durable goods. Interestingly, the effect of demand shocks is independent and additional to that of the financial crisis. In the present context this can explain the magnitude of the drop in trade flows as a consequence of a double shock from both supply and demand side.

Concluding, we have some limited evidence about the impact on exports of alternative policies applied during previous banking crises which did not seem to have a significant positive impact on the exporters. Rather, it emerges that general economic and financial development and access to alternative sources of finance helps to reduce the adverse impact of a financial crisis. The caveat here is that the available dataset on policy interventions is rather limited and specific policies targeted at exporters might be more relevant than general interventions intended to ease the solvency and liquidity problems of the banking sector. Unfortunately, a comprehensive database of export oriented interventions does not yet exist and thus constitutes an attractive avenue for future research.

References

Baldwin, R. (1989): "Sunk-Cost Hysteresis," NBER Working Papers 2911, National Bureau of Economic Research, Inc.

Beck, T. (2002): "Financial development and international trade: Is there a link?," *Journal of International Economics*, 57(1), 107–131.

——— (2003): "Financial Dependence and International Trade," *Review of International Economics*, 11(2), 296–316.

Becker, B., and D. Greenberg (2003): "The real effects of finance: evidence from exports," Mimeo.

Berman, N. (2009): "Financial Crises and International Trade: The Long Way to Recovery," Economics Working Papers ECO2009/23, European University Institute.

Bernard, A. B., and J. Bradford Jensen (1999): "Exceptional exporter performance: cause, effect, or both?," *Journal of International Economics*, 47(1), 1–25.

Bernard, A. B., and J. B. Jensen (2004): "Why Some Firms Export," *The Review of Economics and Statistics*, 86(2), 561–569.

Bertrand, M., E. Duflo, and S. Mullainathan (2004): "How Much Should We Trust Differences-in-Differences Estimates?," *The Quarterly Journal of Economics*, 119(1), 249–275.

Blalock, G., and A. Roy, Sonali (2007): "Firm-Level Examination of the Exports Puzzle: Why East Asian Exports Didn't Increase After the 1997-1998 Financial Crisis," *The World Economy*, 30(1), 39–59.

Borensztein, E., and U. Panizza (2006): "Do Sovereign Defaults Hurt Exporters?," RES Working Papers 4447, Inter-American Development Bank, Research Department.

Braun, M. (2003): "Financial Contractibility and Asset Hardness," Job market paper, Harvard University.

Braun, M., and B. Larrain (2005): "Finance and the Business Cycle: International, Inter-Industry Evidence," *Journal of Finance*, 60(3), 1097–1128.

Caprio, G., and D. Klingebiel (2002): *Episodes of financial and borderline financial crises*pp. 31–49, no. 428. World Bank.

Cowan, K., and A. Neut (2007): "Intermediate Goods, Institutions and Output per Worker," Working Papers Central Bank of Chile 420, Central Bank of Chile.

Dell'Ariccia, G., E. Detragiache, and R. Rajan (2008): "The real effect of banking crises," *Journal of Financial Intermediation*, 17(1), 89–112.

Do, Q.-T., and A. A. Levchenko (2007): "Comparative advantage, demand for external finance, and financial development," *Journal of Financial Economics*, 86(3), 796–834.

Fisman, R., and I. Love (2003): "Trade Credit, Financial Intermediary Development, and Industry Growth," *Journal of Finance*, 58(1), 353–374.

Frankel, J. A., and A. K. Rose (1996): "Currency crashes in emerging markets: An empirical treatment," *Journal of International Economics*, 41(3-4), 351–366.

Freund, C. (2009): "The Trade Response to Global Downturns: Historical Evidence," Policy Research Working Paper Series Forthcoming, The World Bank.

Freund, C., and L. Klapper (2009): "Has the Decline in the Supply of Financing Affected Trade During the Crisis?," Mimeo, The World Bank.

Greenaway, D., A. Guariglia, and R. Kneller (2007): "Financial factors and exporting decisions," *Journal of International Economics*, 73(2), 377–395.

Honohan, P., and D. Klingebiel (2003): "The fiscal cost implications of an accommodating approach to banking crises," *Journal of Banking & Finance*, 27(8), 1539–1560.

Hur, J., M. Raj, and Y. E. Riyanto (2006): "Finance and trade: A cross-country empirical analysis on the impact of financial development and asset tangibility on international trade," *World Development*, 34(10), 1728–1741.

Iacovone, L., and B. S. Javorcik (2008): "Multi-product exporters : diversification and micro-level dynamics," Policy Research Working Paper Series 4723, The World Bank.

IMF (2009): "World Economic Outlook Update," Discussion paper, IMF.

Jayaratne, J., and P. Strahan (1996): "The finance-growth nexus: Evidence from bank branch deregulation," *Quarterly Journal of Economics*, 111, 639–670.

Ju, J., and S.-J. Wei (2005): "Endowment versus Finance: A Wooden Barrel Theory of International Trade," IMF Working Papers 05/123, International Monetary Fund.

King, R. G., and R. Levine (1993): "Finance and Growth: Schumpeter Might Be Right," *The Quarterly Journal of Economics*, 108(3), 717–37.

Kletzer, K., and P. Bardhan (1987): "Credit markets and patterns of international trade," *Journal of Development Economics*, 27(1-2), 57–70.

Kroszner, R. S., L. Laeven, and D. Klingebiel (2007): "Banking crises, financial dependence, and growth," *Journal of Financial Economics*, 84(1), 187–228.

Krugman, P. (1989): "Exchange rate instability," Discussion paper, Cambridge:MIT Press.

Levine, R. (1998): "The Legal Environment, Banks, and Long-Run Economic Growth," *Journal of Money, Credit and Banking*, 30(3), 596–613.

——— (1999): "Law, Finance, and Economic Growth," *Journal of Financial Intermediation*, 8(1-2), 8–35.

——— (2004): "Finance and Growth: Theory and Evidence," NBER Working Papers 10766, National Bureau of Economic Research, Inc.

Levine, R., N. Loayza, and T. Beck (2000): "Financial intermediation and growth: Causality and causes," *Journal of Monetary Economics*, 46(1), 31–77.

Manova, K. (2008a): "Credit Constraints, Equity Market Liberalizations and International Trade," *Journal of International Economics*, 76, 33–47.

——— (2008b): "Credit Constraints, Heterogeneous Firms, and International Trade," NBER Working Papers 14531, National Bureau of Economic Research, Inc.

Muuls, M. (2008): "Exporters and credit constraints. A firm-level approach," Research series 200809-22, National Bank of Belgium.

Petersen, M. A., and R. G. Rajan (1996): "Trade Credit: Theories and Evidence," NBER Working Papers 5602, National Bureau of Economic Research, Inc.

Raddatz, C. (2006): "Liquidity needs and vulnerability to financial underdevelopment," *Journal of Financial Economics*, 80(3), 677–722.

Rajan, R. G., and L. Zingales (1998): "Financial Dependence and Growth," *American Economic Review*, 88(3), 559–86.

Rauch, J. E. (1999): "Networks versus markets in international trade," *Journal of International Economics*, 48(1), 7–35.

Roberts, M. J., and J. R. Tybout (1997): "The Decision to Export in Colombia: An Empirical Model of Entry with Sunk Costs," *American Economic Review*, 87(4), 545–64.

Wurgler, J. (2000): "Financial markets and the allocation of capital," *Journal of Financial Economics*, 58(1-2), 187–214.

6 Appendix

6.1 Appendix: Data

To construct our **dependent variable** we first exclude all very small trade values, i.e. smaller than 1000 USD, then we compute the exports growth rates as log differences and exclude extreme growth values by trimming top and bottom 5 percent of observations. A similar cleaning procedure is also used by Dell'Ariccia, Detragiache, and Rajan (2008) and Borensztein and Panizza (2006), both using more aggregated 3 digit ISIC data, exclude 2 percent on each tail. Furthermore, we test the robustness of our results by trimming the top and bottom 1 percent and our results are qualitatively unchanged, while the size of our main coefficient of interest becomes marginally larger in the baseline regressions.

The information on **banking crises** is obtained from Dell'Ariccia, Detragiache, and Rajan (2008). Based on their definition, an episode of financial crisis occurs if one of the following four conditions is satisfied. First, emergency measures have been taken to assist the banking system. Second, large scale nationalization took place. Third, non-performing loans reached at least 10 percent in total assets or finally, costs of rescue operations were more than 2 percent of GDP. Because we are only interested in the effect of pure banking crises we exclude all "twin crises" when a currency crisis occurred jointly with the banking crisis. We identify these using the standard Frankel and Rose (1996) criteria. They define a currency crash as a 25 percent depreciation which simultaneously has to be also a 10 percent increase in the rate of depreciation. Finally, out of the remaining 32 crisis episodes we only have disaggregated trade data for 23 crises in 21 countries. The countries for which the data are missing are primarily African countries that experienced a crisis early in the sample.

The measure of **external finance dependence** is based on data of listed US companies provided in Compustat and obtained from Rajan and Zingales (1998). They compute the proxy as a fraction of capital expenditures that an industry is not able to finance with internal funds. To construct it they first compute the median of all firms in each sector and year and then they average the sectoral measures over the entire period of 1980-89.

The measure of **trade credit dependence** is obtained from Fisman and Love (2003) who define it as the ratio of accounts payable in total assets. Similarly to Rajan and Zingales (1998) they base their measure on US data from Compustat.

Finally, the **tangibility** obtained from Kroszner, Laeven, and Klingebiel (2007) measure uses the same procedure and data and is defined as the ratio of the book values of property, plant and equipment in total assets.

All three measures, the external finance dependence, the dependence on trade credit and tan-

gibility were originally computed for a mixture of 3 and 4 digit ISIC industries. Unlike many previous papers that work at the three digit level, we use 4 digit trade data assuming that the values of the financial variables computed on the three digit level apply to all 4 digit industries except the ones for which values are provided in the original papers.

Table 1: Country descriptives

exporter	years in sample			GDP per	Financial	Crises	Average	Recessions	# of sectors per year		
	min	max	total	capita	development		devaluation		Min	Max	In crisis
Argentina	1981	2006	26	6861	0.13	1995	0.00%	1985, 1988-90, 1999-02	63	79	75
Bolivia	1980	2006	27	895	0.24	1994	5.03%	1985 -1986	10	56	48
Colombia	1980	2006	27	1592, 2097	0.24, 0.34	1982, 1999	19.97%	1981-85, 1998-02	61	80	73
Costa Rica	1987	2006	20	3115	0.10	1994	13.33%	–	52	73	62
Finland	1980	2006	27	19200	0.70	1991	16.97%	1990-93	75	80	78
Indonesia	1980	2006	27	572	0.27	1992	3.37%	1985-88, 1998-99	46	80	73
Italy	1980	2006	27	15064	0.49	1990	6.20%	1981-83, 1990-93	78	81	80
Jordan	1982	2006	25	2118	0.61	1989	13.32%	1988-91	40	64	48
Japan	1980	2006	27	31828	1.81	1992	-7.18%	1980-84, 1986	79	81	80
Sri Lanka	1980	2005	26	537	0.19	1989	9.17%	1987-89, 1992, 2001-02	45	73	62
Mexico	1987	2006	20	5080	0.17	1994	39.23%	1986-88, 1995	63	81	76
Malaysia	1980	2006	27	1992, 3241	0.52, 1.04	1985, 1997	9.11%	1985-87,2001	72	80	78
Norway	1980	2006	27	24644	0.72	1987	-3.23%	1981-82, 1987-93,2001-03	74	80	78
Nepal	1983	2000	18	159	0.08	1988	12.15%	1983, 1986-87	3	33	10
Panama	1987	2006	20	3371	0.42	1988	0.00%	1987-89, 1999-03	28	57	33
Philippines	1980	2006	27	939	0.33	1981	24.14%	1984-85	49	75	56
Papua New Guinea	1982	2004	23	625	0.27	1989	4.94%	1987-90, 2000-02	27	46	39
Portugal	1980	2006	27	6405	0.84	1986	-1.88%	1981-85, 1992-94	72	80	78
Sweden	1980	2006	27	22311	0.95	1990	5.31%	1980-83, 1990-93	73	81	79
Tunisia	1981	2006	26	1418	0.49	1991	7.79%	1988-89, 1993-95	52	74	69
United States	1980	2006	27	21418	0.83	1980	0.00%	1980-82, 2006	77	81	79

Notes: The table includes the list of countries that experienced a banking crisis in the period 1980-2000. The first three columns give the span for which we have trade data for each country and the total span. The values of GDP per capita and financial development correspond to the magnitudes reported three years before the country experienced a banking crisis. The column Crises specifies the year when the crisis began. Average devaluation is computed for a three year crisis window including the starting year and two following years. The column Recessions summarized the periods in which the country experienced a recession as defined in Braun and Larrain (2005). The final three columns summarize for how many sectors out of 81 we have trade data in each country.

Table 2: Sector dependence on external finance

ISIC	**Industrial sectors**	**RZ**		**FL**		**TANG**	
isic	**sector**	**RZ**	**rank**	**FL**	**rank**	**TANG**	**rank**
311	Food products	0.14	25	0.112	3	0.37	13
312	Food manufacturing	n/a	n/a	n/a	n/a	n/a	n/a
313	Beverages	0.08	27	0.091	16	0.4	9
314	Tobacco	-0.45	36	0.066	32	0.19	28
321	Textile	0.4	11	0.101	7	0.31	17
322	Apparel	0.03	30	0.111	5	0.15	32
323	Leather	-0.14	34	0.055	35	0.12	36
324	Footwear	-0.08	32	0.093	13	0.13	35
331	Wood products	0.28	15	0.088	18	0.32	15
332	Furniture	0.24	17	0.092	15	0.28	18
341	Paper and products	0.18	22	0.081	26	0.42	7
342	Printing and publishing	0.2	21	0.075	29	0.21	26
351	Industrial chemicals	n/a	n/a	n/a	n/a	n/a	n/a
352	Other chemicals	0.22	20	0.097	10	0.27	23
353	Petroleum refineries	0.04	29	0.118	2	0.62	1
354	Petroleum and coal products	0.33	13	0.096	11	0.46	4
355	Rubber products	0.23	19	0.088	18	0.36	14
356	Plastic products	1.14	2	0.099	9	0.38	11
361	Pottery	-0.15	35	0.067	31	0.28	18
362	Glass	0.53	7	0.089	17	0.42	7
369	Nonmetal products	0.06	28	0.064	34	0.48	3
371	Iron and steel	0.09	26	0.094	12	0.44	5
372	Nonferrous metal	0.01	31	0.078	27	0.32	15
381	Metal products	0.24	17	0.088	18	0.28	18
382	Machinery	0.45	10	0.086	22	0.22	25
383	Electric machinery	0.77	6	0.082	25	0.21	26
384	Transportation equipment	0.31	14	0.105	6	0.23	24
385	Professional goods	0.96	5	0.072	30	0.16	30
390	Other industries	0.47	8	0.087	21	0.18	29
3211	Spinning	-0.09	33	0.149	1	0.38	11
3411	Pulp, paper	0.15	24	0.065	33	0.6	2
3511	Basic excluding fertilizers	0.25	16	0.083	23	0.43	6
3513	Synthetic resins	0.16	23	0.093	13	0.4	9
3522	Drugs	1.49	1	0.055	35	0.16	30
3825	Office and computing	1.06	3	0.083	23	0.14	33
3832	Radio	1.04	4	0.076	28	0.14	33
3841	Ship	0.46	9	0.101	7	0.28	18
3843	Motor vehicle	0.39	12	0.112	3	0.28	18

Notes: RZ is the measure of external dependence based on Rajan, Zingales (1998) calculated as fraction of capital expenditures not funded by internal funds. FL is a measure of dependence on trade credit based on Fisman, Love (2003) calculated as ratio of accounts payable in total assets. TANG is defined as property, plant and equipment in total assets and is taken from Kroszner et al (2007).

Table 3: Rank correlations between financial measures

	Bank finance dependence	Trade credit dependence	Tangibility
Bank finance dependence	1		
Trade credit dependence	-0.1142	1	
Tangibility	-0.3912	0.3386	1

Notes: The table reports rank correlations between bank finance dependence, trade credit dependence and tangibility of an industry computed at 4 digit ISIC level. Bank finance dependence is based on Rajan, Zingales (1998) and is calculated as fraction of capital expenditures not funded by internal funds. Trade credit dependence is based on Fisman, Love (2003) and is calculated as ratio of accounts payable in total assets. Tangibility is defined as property, plant and equipment in total assets and is taken from Kroszner et al (2007).

Table 4: Summary statistics: Difference in difference

External dependence from banks			
	mean	**median**	**N.**
No crisis, high dependence	11.24%	10.22%	2467
Crisis, high dependence	9.00%	7.79%	396
No crisis, low dependence	7.44%	6.16%	2805
Crisis, low dependence	8.75%	6.18%	440
Differences - Drop in Export Growth			
	High dep	**Low dep**	**Dif in dif**
mean	2.24%	-1.31%	**3.55%**
median	2.42%	-0.02%	**2.44%**

External dependence from trade credit			
	mean	**median**	**N.**
No crisis, high dependence	8.19%	7.32%	4397
Crisis, high dependence	11.48%	8.92%	688
No crisis, low dependence	7.94%	7.08%	2733
Crisis, low dependence	10.55%	7.76%	426
Differences - Drop in Export Growth			
	High dep	**Low dep**	**Dif in dif**
mean	-3.29%	-2.61%	-0.68%
median	-1.60%	-0.68%	-0.92%

Tangibility			
	mean	**median**	**N.**
No crisis, high tangibility	9.47%	8.38%	2796
Crisis, high tangibility	12.00%	9.32%	440
No crisis, low tangibility	8.64%	8.04%	3793
Crisis, low tangibility	8.38%	6.76%	603
Differences - Drop in Export Growth			
	High tang	**Low tang**	**Dif in dif**
mean	-2.53%	0.27%	-2.80%
median	-0.94%	1.28%	-2.21%

Notes: Bank finance dependence is based on Rajan, Zingales (1998) and is calculated as fraction of capital expenditures not funded by internal funds. Trade credit dependence is based on Fisman, Love (2003) and is calculated as ratio of accounts payable in total assets. Tangibility is defined as property, plant and equipment in total assets and is taken from Kroszner et al (2007).

6.2 Appendix: Results

Table 5: Baseline regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Trade share	-0.680***	-0.679***	-0.674***	-0.676***	-0.660***	-0.661***	-0.656***
	(0.115)	(0.115)	(0.115)	(0.115)	(0.122)	(0.122)	(0.122)
RZ*Crisis	-0.0536***			-0.0354*	-0.0599***		
	(0.0171)			(0.0181)	(0.0172)		
FL*Crisis		0.203		-0.240		0.274	
		(0.351)		(0.366)		(0.352)	
TANG*Crisis			0.199***	0.175***			0.240***
			(0.0543)	(0.0583)			(0.0544)
RZ*Fin Dev					-0.0315		
					(0.0200)		
FL*Fin Dev						-0.145	
						(0.401)	
TANG*Fin Dev							0.0987
							(0.0630)
Constant	-0.153	-0.163	-0.160	-0.235	-0.0258	0.107	-0.413***
	(0.143)	(0.131)	(0.135)	(0.154)	(0.195)	(0.104)	(0.107)
Observations	30753	30753	30753	30753	29126	29126	29126
R-squared	0.275	0.275	0.275	0.275	0.283	0.282	0.283

Notes: The dependent variable is the log difference of the gross export disaggregated at 4 digit ISIC level for the period 1980-2006. RZ is the measure of external dependence based on Rajan, Zingales (1998) calculated as fraction of capital expenditures not funded by internal funds. FL is a measure of dependence on trade credit based on Fisman, Love (2003) calculated as ratio of accounts payable in total assets. TANG is defined as property, plant and equipment in total assets and is taken from Kroszner et al (2007). The crisis dummy equals to one in the year of the crisis and in the first and second year after the crisis and is zero otherwise. The trade share is the share of industry exports in total exports lagged three periods. Financial development is computed as private credit in GDP and taken from Beck, Demirguc-Kunt (2009). All regressions include the exporter-year, exporter-product and year-product fixed effects, coefficients not reported. Robust standard errors in parentheses. Significance (p-value): *10%, **5%, ***1%

Table 6: Impact of demand shocks abroad

	(1)	(2)	(3)	(4)	(5)
Trade share	-0.673***	-0.668***	-0.675***	-0.669***	-0.670***
	(0.111)	(0.114)	(0.114)	(0.114)	(0.114)
RZ*Crisis		-0.0480***			-0.0418**
		(0.0170)			(0.0172)
Demand shock	0.0118***	0.00790***	0.0227***	0.0185***	0.00551**
	(0.00198)	(0.00231)	(0.00833)	(0.00475)	(0.00241)
RZ*Demand shock		0.0144***			0.0110***
		(0.00397)			(0.00406)
FL*Crisis			0.129		
			(0.352)		
FL*Demand shock			-0.120		
			(0.0871)		
TANG*Crisis				0.192***	
				(0.0544)	
TANG*Demand shock				-0.0214	
				(0.0136)	
Durables*Crisis					-0.0162
					(0.0121)
Durables*Demand shock					0.00848***
					(0.00307)
Constant	0.0239	-0.0471	0.144*	-0.305*	-0.254
	(0.0707)	(0.150)	(0.0783)	(0.157)	(0.161)
Observations	31980	30753	30753	30753	30753
R-squared	0.274	0.277	0.276	0.277	0.277

Notes: The dependent variable is the log difference of the gross export disaggregated at 4 digit ISIC level for the period 1980-2006. RZ is the measure of external dependence based on Rajan, Zingales (1998) calculated as fraction of capital expenditures not funded by internal funds. FL is a measure of dependence on trade credit based on Fisman, Love (2003) calculated as ratio of accounts payable in total assets. TANG is defined as property, plant and equipment in total assets and is taken from Kroszner et al (2007). The crisis dummy equals to one in the year of the crisis and in the first and second year after the crisis and is zero otherwise. The trade share is the share of industry exports in total exports lagged three periods. An external demand shock for exporter i in industry j is defined as GDP growth of the importer p weighted by the trade share of this partner in total exports of i in industry j and summed over all partners. All regressions include the exporter-year, exporter-product and year-product fixed effects, coefficients not reported. Robust standard errors in parentheses. Significance (p-value): *10%, **5%, ***1%

Table 7: Deepness of the crisis

	(1)	(2)	(3)	(4)	(5)	(6)
Trade share	-0.682***	-0.681***	-0.677***	-0.680***	-0.675***	-0.668***
	(0.115)	(0.115)	(0.115)	(0.115)	(0.115)	(0.115)
RZ*Crisis	-0.0398**	-0.0502***			0.161***	0.185***
	(0.0173)	(0.0171)				
RZ*Crisis*Loss(linear)	-0.469***					
	(0.179)					
RZ*Crisis*Loss(quadratic)		-0.504***				
		(0.174)				
FL*Crisis			0.0332	0.187		
			(0.356)	(0.349)		
FL*Crisis*Loss(linear)			6.469			
			(3.994)			
FL*Crisis*Loss(quadratic)				3.046		
				(3.475)		
TANG*Crisis					0.161***	0.185***
					(0.0549)	(0.0540)
TANG*Crisis*Loss(linear)					1.174**	
					(0.598)	
TANG*Crisis*Loss(quadratic)						2.071***
						(0.568)
Constant	-0.0968	-0.0989	-0.179	-0.129	-0.177	-0.199
	(0.118)	(0.118)	(0.141)	(0.122)	(0.143)	(0.152)
Observations	30753	30753	30753	30753	30753	30753
R-squared	0.275	0.275	0.275	0.275	0.275	0.276

Notes: The dependent variable is the log difference of the gross export disaggregated at 4 digit ISIC level for the period 1980-2006. RZ is the measure of external dependence based on Rajan, Zingales (1998) calculated as fraction of capital expenditures not funded by internal funds. FL is a measure of dependence on trade credit based on Fisman, Love (2003) calculated as ratio of accounts payable in total assets. TANG is defined as property, plant and equipment in total assets and is taken from Kroszner et al (2007). The crisis dummy equals to one in the year of the crisis and in the first and second year after the crisis and is zero otherwise. The trade share is the share of industry exports in total exports lagged three periods. The loss is defined as the deviation of the predicted GDP from actual GDP over actual GDP. Either linear or quadratic trend is used for prediction. All regressions include the exporter-year, exporter-product and year-product fixed effects, coefficients not reported. Robust standard errors in parentheses. Significance (p-value): *10%, **5%, ***1%

Table 8: Does higher GDP alleviate the impact of the crisis on exporters?

	(1)	(2)	(3)	(4)
Trade share	-0.683***	-0.679***	-0.675***	-0.680***
	(0.115)	(0.115)	(0.115)	(0.115)
RZ*Crisis	-0.0786***			-0.0706***
	(0.0259)			(0.0273)
FL*Crisis		0.368		0.0207
		(0.533)		(0.559)
TANG*Crisis			0.141*	0.0677
			(0.0812)	(0.0871)
RZ*Crisis*GDP cap	2.73e-06**			3.86e-06***
	(1.36e-06)			(1.45e-06)
FL*Crisis*GDP cap		-1.83e-05		-2.80e-05
		(2.94e-05)		(3.08e-05)
TANG*Crisis*GDP cap			6.37e-06	1.16e-05**
			(4.38e-06)	(4.79e-06)
Constant	-0.130	0.204	-0.0900	0.202
	(0.134)	(0.129)	(0.132)	(0.129)
Observations	30753	30753	30753	30753
R-squared	0.275	0.275	0.275	0.275

Notes: The dependent variable is the log difference of the gross export disaggregated at 4 digit ISIC level for the period 1980-2006. RZ is the measure of external dependence based on Rajan, Zingales (1998) calculated as fraction of capital expenditures not funded by internal funds. FL is a measure of dependence on trade credit based on Fisman, Love (2003) calculated as ratio of accounts payable in total assets. TANG is defined as property, plant and equipment in total assets and is taken from Kroszner et al (2007). The crisis dummy equals to one in the year of the crisis and in the first and second year after the crisis and is zero otherwise. The trade share is the share of industry exports in total exports lagged three periods. The GDP cap variable is the real GDP per capita expressed in US dollars and taken from WDI. All regressions include the exporter-year, exporter-product and year-product fixed effects, coefficients not reported. Robust standard errors in parentheses. Significance (p-value): *10%, **5%, ***1%

Table 9: Developed countries

	(1)	(2)	(3)
Trade share	-0.683***	-0.679***	-0.674***
	(0.115)	(0.115)	(0.115)
RZ*Crisis	-0.0739***		
	(0.0244)		
RZ*Crisis*Developed	0.0553*		
	(0.0304)		
FL*Crisis		0.539	
		(0.499)	
FL*Crisis*Developed		-0.935	
		(0.643)	
TANG*Crisis			0.187**
			(0.0759)
TANG*Crisis*Developed			0.0330
			(0.0983)
Constant	-0.182	-0.185	0.146*
	(0.152)	(0.140)	(0.0866)
Observations	30753	30753	30753
R-squared	0.275	0.275	0.275

Notes: The dependent variable is the log difference of the gross export disaggregated at 4 digit ISIC level for the period 1980-2006. RZ is the measure of external dependence based on Rajan, Zingales (1998) calculated as fraction of capital expenditures not funded by internal funds. FL is a measure of dependence on trade credit based on Fisman, Love (2003) calculated as ratio of accounts payable in total assets. TANG is defined as property, plant and equipment in total assets and is taken from Kroszner et al (2007). The crisis dummy equals to one in the year of the crisis and in the first and second year after the crisis and is zero otherwise. The trade share is the share of industry exports in total exports lagged three periods. The dummy developed takes value of one when the country is classified as developed by the World Bank and is zero otherwise. All regressions include the exporter-year, exporter-product and year-product fixed effects, coefficients not reported. Robust standard errors in parentheses. Significance (p-value): *10%, **5%, ***1%

Table 10: Does higher financial development alleviate the impact of the crisis on exporters?

	(1)	(2)	(3)	(4)	(5)
Trade share	-0.665***	-0.661***	-0.654***	-0.659***	-1.300***
	(0.122)	(0.122)	(0.122)	(0.122)	(0.364)
RZ*Crisis	-0.0952***			-0.0757**	-0.144**
	(0.0310)			(0.0326)	(0.0589)
RZ*Crisis*Fin Dev	0.0557*			0.0616*	
	(0.0311)			(0.0341)	
FL*Crisis		0.688		0.137	
		(0.630)		(0.654)	
FL*Crisis*Fin Dev		-0.703		-0.669	
		(0.671)		(0.695)	
TANG*Crisis			0.244**	0.163	
			(0.0952)	(0.102)	
TANG*Crisis*Fin Dev			-0.000305	0.0895	
			(0.0997)	(0.109)	
RZ*Crisis*OFA/GDP					0.316**
					(0.144)
Constant	-0.487***	0.0878	0.104	0.130*	0.382
	(0.132)	(0.103)	(0.113)	(0.0760)	(0.374)
Observations	29126	29126	29126	29126	13815
R-squared	0.283	0.282	0.283	0.283	0.307

Notes: The dependent variable is the log difference of the gross export disaggregated at 4 digit ISIC level for the period 1980-2006. RZ is the measure of external dependence based on Rajan, Zingales (1998) calculated as fraction of capital expenditures not funded by internal funds. FL is a measure of dependence on trade credit based on Fisman, Love (2003) calculated as ratio of accounts payable in total assets. TANG is defined as property, plant and equipment in total assets and is taken from Kroszner et al (2007). The crisis dummy equals to one in the year of the crisis and in the first and second year after the crisis and is zero otherwise. The trade share is the share of industry exports in total exports lagged three periods. Financial development is computed as private credit in GDP and taken from Beck, Demirguc-Kunt (2009). All regressions include the exporter-year, exporter-product and year-product fixed effects, coefficients not reported. Robust standard errors in parentheses. Significance (p-value): *10%, **5%, ***1%

Table 11: Impact of policy

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Trade share	-1.085***	-1.085***	-1.089***	-1.083***	-1.084***	-1.089***	-1.084***
	(0.149)	(0.149)	(0.149)	(0.149)	(0.149)	(0.149)	(0.149)
RZ*Crisis	-0.0461**	-0.0368*	-0.0363**	-0.0401**	-0.0393**	-0.0355*	-0.0388*
	(0.0202)	(0.0196)	(0.0181)	(0.0199)	(0.0189)	(0.0183)	(0.0201)
Blanket guarantee	0.0389						
	(0.0342)						
Liquidity support		-0.0130					
		(0.0393)					
Forbearance A			-0.118				
			(0.141)				
Forbearance B				0.00549			
				(0.0377)			
Recapitalizations					0.00394		
					(0.0427)		
Debt relief						-0.0771	
						(0.0816)	
Policy total							-0.000333
							(0.0103)
Constant	0.660***	-0.0198	-0.103	-0.164	-0.104	-0.0497	-0.146
	(0.0941)	(0.0932)	(0.102)	(0.113)	(0.104)	(0.0960)	(0.112)
Observations	20216	20216	20216	20216	20216	20216	20216
R-squared	0.329	0.329	0.329	0.329	0.329	0.329	0.329

Notes: The dependent variable is the log difference of the gross export disaggregated at 4 digit ISIC level for the period 1980-2006. RZ is the measure of external dependence based on Rajan, Zingales (1998) calculated as fraction of capital expenditures not funded by internal funds. FL is a measure of dependence on trade credit based on Fisman, Love (2003) calculated as ratio of accounts payable in total assets. TANG is defined as property, plant and equipment in total assets and is taken from Kroszner et al (2007). The crisis dummy equals to one in the year of the crisis and in the first and second year after the crisis and is zero otherwise. The trade share is the share of industry exports in total exports lagged three periods. Policy measures are from Honohan and Klingebiel (2003). They include blanket depositor protection and two types of forbearance. Forbearance of type A allows insolvent or illiquid banks to operate for 12 months. Forbearance of type B means that either there is type A forbearance or some regulations are not enforced. Two additional measures capture repeated recapitalizations and government sponsored debt relief for corporate or private borrowers. These first five measures are captured as zero-one dummies. The policy total variable adds the dummies and gives the number of policies that have been implemented during each crisis. The policy variables are always included as a tripple interaction with external finance dependence and financial crisis. All regressions include the exporter-year, exporter-product and year-product fixed effects, coefficients not reported. Robust standard errors in parentheses. Significance (p-value): *10%, **5%, ***1%

6.3 Appendix: Robustness

Table 12: Banking crisis just like any other economic distress?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trade share	-0.679***	-0.680***	-0.676***	-0.673***	-0.684***	-0.684***	-0.681***	-0.676***
	(0.115)	(0.115)	(0.115)	(0.115)	(0.115)	(0.115)	(0.115)	(0.115)
RZ*recession	-0.0182	-0.00614						
	(0.0147)	(0.0153)						
TANG*recession			0.109**	0.0667				
			(0.0460)	(0.0479)				
RZ*GDPgr					0.00648***	0.00537**		
					(0.00210)	(0.00218)		
TANG*GDPgr							-0.0231***	-0.0188***
							(0.00645)	(0.00665)
RZ*Crisis		-0.0518***				-0.0415**		
		(0.0178)				(0.0177)		
TANG*Crisis				0.179***				0.156***
				(0.0566)				(0.0560)
Constant	-0.168	-0.157	-0.213	-0.0940	-0.0932	-0.0688	-0.237	-0.248
	(0.142)	(0.147)	(0.145)	(0.114)	(0.138)	(0.125)	(0.162)	(0.161)
Observations	30753	30753	30753	30753	30753	30753	30753	30753
R-squared	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275

Notes: The dependent variable is the log difference of the gross export disaggregated at 4 digit ISIC level for the period 1980-2006. RZ is the measure of external dependence based on Rajan, Zingales (1998) calculated as fraction of capital expenditures not funded by internal funds. FL is a measure of dependence on trade credit based on Fisman, Love (2003) calculated as ratio of accounts payable in total assets. TANG is defined as property, plant and equipment in total assets and is taken from Kroszner et al (2007). The crisis dummy equals to one in the year of the crisis and in the first and second year after the crisis and is zero otherwise. The trade share is the share of industry exports in total exports lagged three periods. The recession dummy is based on Braun, Larrain (2005). GDP growth is taken from WDI. All regressions include the exporter-year, exporter-product and year-product fixed effects, coefficients not reported. Robust standard errors in parentheses. Significance (p-value): *10%, **5%, ***1%

Table 13: Alternative measures of external finance dependence and tangibility

Alternative measures of external dependence				
	(1)	(2)	(3)	(4)
Trade share	-0.657***	-0.680***	-0.675***	-0.674***
	(0.115)	(0.115)	(0.111)	(0.111)
RZ young *Crisis	-0.0229**			
	(0.00986)			
RZ non crisis * Crisis		-0.0364**		
		(0.0166)		
INVSA*Crisis			-0.218**	
			(0.103)	
CCC*Crisis				-0.0391**
				(0.0161)
Constant	-0.256	-0.0432	-0.151	-0.224**
	(0.164)	(0.143)	(0.110)	(0.106)
Observations	29908	30753	30916	30916
R-squared	0.277	0.275	0.271	0.271

Tangibility alternatives from Braun(2003)			
	(1)	(2)	(3)
Trade share	-0.668***	-0.667***	-0.666***
	(0.112)	(0.112)	(0.113)
TANG (Braun)*Crisis	0.174***		
	(0.0502)		
TANG(Market)*Crisis		0.214***	
		(0.0650)	
TANG(Sales)*Crisis			0.172***
			(0.0540)
Constant	-0.373	-0.357	-0.386
	(0.305)	(0.306)	(0.306)
Observations	30102	30102	30102
R-squared	0.273	0.273	0.273

Notes: RZ young is a measure of external dependence based on Rajan, Zingales (1998) calculated as fraction of capital expenditures not funded by internal funds computed for firms listed for less than 10 years. RZ non crisis is based on Kroszner, Laeven, and Klingebiel (2007) who compute the same measure based only on data of countries that have never experienced a financial crisis. INVSA and CCC are from Raddatz (2006). They are defined as cash conversion cycle and as inventories to sales and are meant to capture short term financial needs intended to cover mainly the working capital. TANG(Market) and TANG(Sales) are from Braun (2003). These measures relate the book value of property, plant and equipment to market value of total assets and to total sales respectively. All regressions include the exporter-year, exporter-product and year-product fixed effects, coefficients not reported. Robust standard errors in parentheses. Significance (p-value): *10%, **5%, ***1%

Table 14: Are we measuring something else?

External dependence						
	(1)	(2)	(3)	(4)	(5)	
Trade share	-0.670***	-0.680***	-0.676***	-0.677***	-0.675***	
	(0.115)	(0.115)	(0.120)	(0.115)	(0.115)	
RZ*Crisis	-0.0485***	-0.0766***	-0.0351*	-0.0481***	-0.0389**	
	(0.0171)	(0.0225)	(0.0193)	(0.0177)	(0.0179)	
Capital/labor*Crisis	0.000384**					
	(0.000195)					
R&D*Crisis		0.173**				
		(0.0754)				
Rauch*Crisis			0.0273			
			(0.0177)			
Herfindahl*Crisis				0.00333		
				(0.0113)		
Intermediates*Crisis					0.0848**	
					(0.0418)	
Constant	-0.229	-0.143	0.264**	0.369**	0.381***	
	(0.148)	(0.127)	(0.113)	(0.155)	(0.139)	
Observations	30753	30753	23806	29689	29689	
R-squared	0.275	0.275	0.272	0.274	0.274	

Tangibility						
	(1)	(2)	(3)	(4)	(5)	(6)
Trade share	-0.675***	-0.674***	-0.675***	-0.676***	-0.672***	-0.672***
	(0.115)	(0.115)	(0.120)	(0.115)	(0.115)	(0.115)
TANG*Crisis	0.204***	0.205***	0.0935	0.278***	0.202***	0.218***
	(0.0721)	(0.0565)	(0.0741)	(0.0776)	(0.0663)	(0.0559)
Capital/labor*Crisis	-2.51e-05					
	(0.000258)					
R&D*Crisis		0.0336				
		(0.0582)				
Homogeneity*Crisis			0.0272			
			(0.0188)			
Phys cap intensity*Crisis				-0.343		
				(0.305)		
Nat res intensity*Crisis					0.00816	
					(0.0209)	
Hum cap intensity*Crisis						-0.00270
						(0.0257)
Constant	-0.182	-0.177	0.243**	0.346**	0.397***	0.337**
	(0.142)	(0.143)	(0.106)	(0.152)	(0.150)	(0.141)
Observations	30753	30753	23806	29689	29689	29689
R-squared	0.275	0.275	0.272	0.274	0.274	0.274

Notes: The dependent variable is the log difference of the gross export disaggregated at 4 digit ISIC level for the period 1980-2006. Capital and R&D intensity are from Kroszner, Laeven, and Klingebiel (2007). The share of 20 largest intermediates and the Herfindahl index are capturing the complexity of a product and are taken from the work of Cowan and Neut (2007). The product homogeneity is based on the Rauch (1999) classification of industries. Physical capital intensity, natural resources intensity are from Braun (2003). All regressions include the exporter-year, exporter-product and year-product fixed effects, coefficients not reported. Robust standard errors in parentheses. Significance (p-value): *10%, **5%, ***1%

Table 15: Excluding the poorest and richest countries

Poor countries out

	(1)	(2)	(3)
Trade share	-1.113***	-1.115***	-1.110***
	(0.193)	(0.193)	(0.193)
RZ*Crisis	-0.0542***		
	(0.0166)		
FL*Crisis		0.327	
		(0.344)	
TANG*Crisis			0.191***
			(0.0534)
Constant	0.338**	0.258	0.208*
	(0.142)	(0.228)	(0.119)
Observations	25047	25047	25047
R-squared	0.290	0.289	0.290

Rich countries out

	(1)	(2)	(3)
Trade share	-0.624***	-0.622***	-0.618***
	(0.128)	(0.128)	(0.128)
RZ*Crisis	-0.0714***		
	(0.0240)		
FL*Crisis		0.364	
		(0.498)	
TANG*Crisis			0.156**
			(0.0754)
Constant	0.224	0.194	0.218
	(0.151)	(0.145)	(0.161)
Observations	18505	18505	18505
R-squared	0.303	0.302	0.303

Notes: In the top panel we exclude the poorest countries with average real per capita income less than 1000USD. In the bottom panel we exclude countries with average in sample per capita real income higher than 10000USD. The dependent variable is the log difference of the gross export disaggregated at 4 digit ISIC level for the period 1980-2006. RZ is the measure of external dependence based on Rajan, Zingales (1998) calculated as fraction of capital expenditures not funded by internal funds. FL is a measure of dependence on trade credit based on Fisman, Love (2003) calculated as ratio of accounts payable in total assets. TANG is defined as property, plant and equipment in total assets and is taken from Kroszner et al (2007). The crisis dummy equals to one in the year of the crisis and in the first and second year after the crisis and is zero otherwise. The trade share is the share of industry exports in total exports lagged three periods. All regressions include the exporter-year, exporter-product and year-product fixed effects, coefficients not reported. Robust standard errors in parentheses. Significance (p-value): *10%, **5%, ***1%

Table 16: Excluding countries with more than one crisis

	(1)	(2)	(3)
Trade share	-0.611***	-0.609***	-0.606***
	(0.138)	(0.138)	(0.138)
RZ*Crisis	-0.0449**		
	(0.0212)		
FL*Crisis		-0.103	
		(0.430)	
TANG*Crisis			0.170**
			(0.0673)
Constant	1.061***	1.091***	1.072***
	(0.173)	(0.164)	(0.170)
Observations	24565	24565	24565
R-squared	0.297	0.297	0.297

Notes: Baseline regressions estimated for countries that only had one crisis. The dependent variable is the log difference of the gross export disaggregated at 4 digit ISIC level for the period 1980-2006. RZ is the measure of external dependence based on Rajan, Zingales (1998) calculated as fraction of capital expenditures not funded by internal funds. FL is a measure of dependence on trade credit based on Fisman, Love (2003) calculated as ratio of accounts payable in total assets. TANG is defined as property, plant and equipment in total assets and is taken from Kroszner et al (2007). The crisis dummy equals to one in the year of the crisis and in the first and second year after the crisis and is zero otherwise. The trade share is the share of industry exports in total exports lagged three periods. All regressions include the exporter-year, exporter-product and year-product fixed effects, coefficients not reported. Robust standard errors in parentheses. Significance (p-value): *10%, **5%, ***1%

Table 17: Small and large sectors

Large sectors			
	(1)	(2)	(3)
Trade share	-0.575***	-0.575***	-0.570***
	(0.119)	(0.119)	(0.119)
RZ*Crisis	-0.0404**		
	(0.0184)		
FL*Crisis		0.281	
		(0.421)	
TANG*Crisis			0.157**
			(0.0623)
Constant	-0.0253	0.370***	-0.107
	(0.164)	(0.108)	(0.141)
Observations	15646	15646	15646
R-squared	0.398	0.397	0.398

Small sectors			
	(1)	(2)	(3)
Trade share	-40.97***	-41.02***	-41.15***
	(5.137)	(5.140)	(5.140)
RZ*Crisis	-0.0634*		
	(0.0341)		
FL*Crisis		0.0707	
		(0.614)	
TANG*Crisis			0.227**
			(0.0996)
Constant	-0.487	-0.300	-0.238
	(0.397)	(0.367)	(0.303)
Observations	15351	15351	15351
R-squared	0.377	0.377	0.377

Notes: The baseline regressions estimated for sectors larger than median in upper pannel and lower than median share in total exports in the bottom panel. The dependent variable is the log difference of the gross export disaggregated at 4 digit ISIC level for the period 1980-2006. RZ is the measure of external dependence based on Rajan, Zingales (1998) calculated as fraction of capital expenditures not funded by internal funds. FL is a measure of dependence on trade credit based on Fisman, Love (2003) calculated as ratio of accounts payable in total assets. TANG is defined as property, plant and equipment in total assets and is taken from Kroszner et al (2007). The crisis dummy equals to one in the year of the crisis and in the first and second year after the crisis and is zero otherwise. The trade share is the share of industry exports in total exports lagged three periods. All regressions include the exporter-year, exporter-product and year-product fixed effects, coefficients not reported. Robust standard errors in parentheses. Significance (p-value): *10%, **5%, ***1%

Table 18: Contagious crises only

	(1)	(2)	(3)
Trade share	-0.797***	-0.802***	-0.781***
	(0.157)	(0.157)	(0.157)
RZ*Crisis	-0.0613**		
	(0.0250)		
FL*Crisis		0.439	
		(0.529)	
TANG*Crisis			0.318***
			(0.0781)
Constant	0.0859	0.453**	0.0851
	(0.163)	(0.200)	(0.202)
Observations	14887	14887	14887
R-squared	0.335	0.334	0.335

Notes: Baseline regressions estimated only for countries that experienced a crisis which was most likely a result of contagion and can be therefore considered an exogenous event. The dependent variable is the log difference of the gross export disaggregated at 4 digit ISIC level for the period 1980-2006. RZ is the measure of external dependence based on Rajan, Zingales (1998) calculated as fraction of capital expenditures not funded by internal funds. FL is a measure of dependence on trade credit based on Fisman, Love (2003) calculated as ratio of accounts payable in total assets. TANG is defined as property, plant and equipment in total assets and is taken from Kroszner et al (2007). The crisis dummy equals to one in the year of the crisis and in the first and second year after the crisis and is zero otherwise. The trade share is the share of industry exports in total exports lagged three periods. All regressions include the exporter-year, exporter-product and year-product fixed effects, coefficients not reported. Robust standard errors in parentheses. Significance (p-value): *10%, **5%, ***1%