Bank Credit and Firm Export: Is There Really a Link?

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Abstract

This paper analyzes the role of bank credit for the export performance of firms. We use Italian bank-firm matched data and contribute to the literature along several dimensions: we focus on the link between bank-credit and export in 'normal times' (1997-2009); we measure access to credit with hard data on the credit actually granted to firms by the banking system; we establish the causal link that goes from bank credit to export, exploiting banks' mergers and acquisition episodes as a source of bank credit supply shocks. Somehow in contrast with existing literature, our analysis suggests that that exporters are more resilient to short-run drops in the supply of bank credit: once we properly control for firm characteristics and demand factors, export flows are not affected by short-run shocks in the credit supply. Access to bank credit is instead a key determinant of total revenues.

1 Introduction

This paper analyzes the role of bank credit for the export performance of firms. This research question is at the core of trade literature, especially after the 2008 financial crisis.

The ability of a country to boost its competitiveness and grow is linked to the possibility of its firms to export. This fact has spurred trade literature to identify which country characteristics and institutional factors are key in enhancing firms' export capabilities. Among these characteristics, a prominent role has been ascribed to the access to financial instruments that may help firms to overcome the liquidity problems associated with export activities. Foreign transactions are usually characterized by higher payment uncertainty and long cash cycles. Moreover, a vast theoretical and empirical literature has documented the need for exporters to engage in relevant fixed costs in order to enter and maintain a presence in foreign markets (see for instance Roberts and Tybout (1997), Bernard and Jensen (2004) and Melitz (2003)).

Understanding the role of bank credit for export activity has become even more crucial after the financial crisis of 2008: trade fell much more than global demand, suggesting that export is, compared to domestic sale, a credit intensive activity. Nevertheless, studies that analyze the role of financial constraints during the crisis deliver ambiguous results: some conclude that credit frictions were among the factors that contributed the most to the disproportionately large decline in international trade (see Amiti and Weinstein (2011), Ahn et al. (2011), Chor and Manova (2012)); others explain the trade collapse mainly with the international fragmentation of the production process and the sectoral composition of world trade, while they find very little evidence for the credit channel (see Levchenko et al. (2010) and Eaton et al. (2011)).

In this paper, using Italian bank-firm matched data, we contribute to the literature that explore the role of bank credit for firm export activity along several dimensions: first, differently from the papers written in the aftermath of the 2008-crisis, we focus on the link between bank-credit and export in 'normal times', considering a long time-span (1997-2009). Second, differently from the papers that proxy access to credit either with firm balance-sheet variables or with credit scores, we use hard data on the credit actually granted to firms by the banking system. Finally, to establish a causal link from bank credit to export, we exploit banks' mergers and acquisition episodes (henceforth,

M&As) as a source of bank credit supply shocks.

The choice of our instrument is motivated by a vast banking literature showing that, following M&As , consolidated banks generally reduce, at least in the short run, their supply of credit to continuing borrowers (Beretta e del Prete (2012), Bonaccorsi di Patti and Gobbi (2007), Degryse et al. (2010), Sapienza (2002)). A main reason for this effect is that larger banks differ substantially from small banks in their lending practices, especially in processing soft information that are key in relationship-based lending, which is particular important in bank oriented financial systems such as Italy (Angelini et al (1998) and De Mitri et al. (2010)). Moreover, bank M&As are generally followed by extensive organizational and strategy changes which may lead to relatively long transition periods during which difficulties in refocusing lending policies can dominate over longer term efficiency gains (Rhoades (1998), Calomiris and Karceski (2000)). The validity of our instrument also relies on the fact that, in the short run, switching costs and other barriers prevent firms from fully substitute the credit from banks that reduce their credit supply by increasing loans from other financial institutions (see Bonaccorsi di Patti and Gobbi (2007)). Given that the effects of M&As on credit supply is mainly a short run effect, our estimates will refer to the response of exports to (short run) shocks to bank credit.

One may argue that banks subject to M&As reduce credit disproportionately more to worst firms or that worst firms are less able to substitute the reduced credit from other banks. Both these critiques refer to the idea that the reduction of credit supply after M&As may differently affect firms according to some unobservable characteristics that, in turn, may be correlated with firms ability to export (for instance better firms, that are more able to export, may be exactly those firms that are less subject to the bank credit rationing after M&As). To take those critiques into account we follow the strategy proposed by Jimenez et al. (2011) and by Bofondi et al. (2013). Specifically, we first consider the regression of bank credit on M&As at the bank-firm relationship level, as to estimate firm-time fixed effects. These represent the unobserved firm-time characteristics that affect the overall amount of credit granted to each firm in each time period. Then we use these estimates as a further independent variable in our main regression at the firm level, which is conducted using a two-steps IV estimation. Thus our instrument is valid conditional on the unobserved demand components of the credit granted at the firm level, proxied by the firm-time fixed effects estimated at the

bank-firm relationship level.

Our first finding is that export flows are not affected by short-run shocks in the credit supply. The positive correlation between trade flows and credit granted at the firm level seems to be explained entirely by firm's characteristics and demand factors. Second, we find that access to bank credit is instead a key determinant of total revenues. In particular, according to our most conservative specification of the relationship between credit granted and revenues, a reduction of 10% in the supply of credit causes a reduction of total revenues of 1.6% for the sub-sample of exporting firms, and of 2.4% for the full sample of firms, domestic and exporting. Differently from previous results, our analysis suggest that that exporters are more resilient to short-run drops in the supply of bank credit.[1]

Our finding may seem counter-intuitive. As mentioned before, exporting activities, because of sunk costs and more problematic transactions, may require more access to credit and specific form of trade finance. However, recent papers that look at this issue using matched bank-firm data find results broadly in line with ours. Paravisini et al. (2011), using Peruvian custom data at the firm-product-destination level, find that the credit shortage following the financial crisis reduced exports by rising the cost of working capital for general production. This finding is against the idea of exports being credit intensive compared to domestic activity. Analogously, Del Prete and Federico (2013) use Italian bank-firm matched data and find that the contribution of finance to trade is not limited to the specific financing of export activities, but reflects a more general provision of credit to the exporting firm. They also find that, among the different types of credit granted by banks, trade finance for exporting activities was the least affected by the negative shocks that hit banks' balance sheets during the crisis period.

Although pointing in the same direction, our results are indeed stronger than the ones mentioned above: finding that export is not elastic, at least in the short-run, to credit supply does not suggest that credit constraints affect exports simply via an overall negative impact on firm total production. It says that, when facing negative credit shocks, firms reduce domestic production and revenues and keep unchanged those from foreign markets. This may be a strategic choice due to the importance to preserve their market share abroad and motivated by the relevance of the fixed costs that create

[1]See Formai (2013) for a theoretical model that shows how exporters, being bigger and more profitable, can have easier access to credit. The main idea of the paper is that, with imperfect creditor protection, the access to credit is easier for firms with higher profits that can be pledged by the bank.

what in the literature is known as "export hysteresis" (see for instance Baldwin and Krugman (1989), Roberts and Tybout (1997) and Bernard and Jensen (2004)).

This paper is related to the recent but fast growing body of empirical trade literature that looks at the relationship between credit constraints and firm export activity. Pre-crisis contributions analyze the relation between access to bank credit and export behavior either at the cross-country or at the firm-level. Manova (2013) incorporates financial frictions in a theoretical model a la Melitz (2003) finds that financial vulnerable sectors grow more in countries with higher financial development (measured as credit to private sector over GDP). The way she tackles the issue is only partially comparable with ours, since in her setting credit is an institutional variable with a long-run nuance.

Minetti and Zhu (2011) and Secchi et al. (2012) use Italian firm-level data and proxy credit constraints with survey data on loan applications and with firm credit worthiness (Z-score), respectively. They both use an IV strategy based on the 1936 reform of the banking system.[2] They find that bank credit is an important determinant of export. In our opinion, the drawback of their IV strategy is that it does not capture financial restrictions at the firm level, somehow imposing that different firms in the same province suffer from the same credit restrictions. Moreover, as mentioned above, our analysis, focusing on the effect of short-run shocks in the supply of credit, takes a different perspective and cannot be interpreted as the broader effect of the quality of financial institutions on firms activity.

After the collapse in world trade that followed the financial crisis, many works have tackled again the research question introducing two main novelties: they use recently available matched bank-firm data and they exploit the 2008-crisis to exogenously identify the bank credit shortage and solve the endogeneity problem. The most prominent among these papers is the already cited Paravisini et al. (2011). The authors estimate the elasticity of exports to credit using custom trade data and matched bank-firm credit data from Peru. To account for non-credit determinants of exports, they compare changes in exports of the same product and to the same destination by firms borrowing from banks differentially affected by capital flow reversals during the 2008 financial crisis.[3] As mentioned above, they find that credit shortage reduces exports through rising

[2]Guiso et al. (2004) show that the number of per-capita bank branches during the '90s, and consequently bank credit supply, increases differently in Italian provinces depending on the (exogenous) distribution of types of banks across provinces in the early '30s.

[3]Their IV strategy is based on shocks to the balance sheet of the banks due to the foreign capital flow

the cost of working capital for general production. The main difference of our work is that we do not focus on the crisis period, which was somehow "exceptional", but we study the relationship between credit supply and exports in "normal times", thus using a different IV strategy.

Del Prete and Federico (2013) use our same Italian matched bank-firm data to investigate the effects of credit shocks on trade during the recent financial crisis. They look more specifically on the response to the crisis of trade finance. They build a more sophisticated version of the instrument used by Paravisini et al. (2011) and find that credit shortage reduces export activity. However they also find that import loans and loans for domestic activities were hit harder by the crisis than export loans.

In terms of the methodology used, our work is closely related to Cingano et al. (2013). In order to study the effect of the bank credit on firms' investment choices during the 2008 crisis, they also employ a three-step empirical approach that starts from the bank-firm level analysis to estimate firm-time fixed effects as proxy for unobservable credit demand drivers.

The rest of the paper is organized as follows. The next section discusses the data and shows descriptive statistics. In section 3 we explain our empirical methodology and justify the choice of the instrument. Section 4 describes our main results as well as robustness checks, section 5 concludes.

2 The Data

We collected annual data from 1997 to 2011 from four different sources. Our baseline estimations exclude the crisis period, so the main sample ends in 2009.[4] As for the firm level variables, the two main sources are the Company Accounts Data Service (henceforth CERVED), a commercial database which represents the most important source of balance-sheet data on Italian firms, and the Bank of Italy's Survey of Industrial and Service Firms (henceforth INVIND), which covers about 4000 italian firms each year with at least 20 employees in manufacturing and services. The firms included in our sample are those that are in INVIND: these data are of very high quality, being collected

reversal that hit Peruvian's banks starting from mid 2008. The hypothesis behind their instrumental variable is that, after the capital flow reversal, banks with a larger fraction of funding from foreign sources reduced disproportionately more the supply of credit relative to other banks.

[4]In robustness checks, we also consider the period 1997-2008.

by economists at the local branches of the Bank of Italy. Unfortunately the panel of INVIND's firms is not balanced: the sample of firms interviewed in not the same every year. We filled some of the gaps in the data for revenues, exports and employment using CERVED, which is also the source for many of our controls (credit rating, value added, fixed assets, etc..). Firm level summary statistics for our sample are reported in Table 1. The statistics pool together all firms in all years between 1997 and 2009, distinguishing between observations with zero and non-zero exports. Exporting firms are bigger, more productive and more credit intensive. More surprisingly, exporters have on average a lower Z-score: this is a credit rating based on balance sheet information that ranks firms from 1 (highly secure) to 9 (very high risk). Of course, some firms (19%, see Table 2) change exports status during the sample period. In our sample, biased toward bigger units (the average number of employee is 267 for non exporting firms and 342 for exporting firms), the majority of firms (56%) is always exporting.

Data on bank-firm relationships are from the Italian Credit Register (henceforth CR). This source lists all outstanding loan amounts above 75,000 Euros that each borrower has with banks operating in Italy, including branches and subsidiaries of foreign banks.[5] Data are available at a monthly frequency and are of very high quality since intermediaries use the CR as a screening and monitoring device for borrowers. The dataset includes both granted and drawn amounts. We focus on credit granted, as drawn credit is more closely related to the demand. Loans are distinguished into three types of risk: revolving credit lines, term loans, and loans backed by account receivables; and into three classes of usage: export, import and other. Table 3 reports the share of each type of credit line over the total value of credit granted in 2003 to firms in our sample.[6] The bulk is given by term loans used to finance activities other than export and import (58%). Trade credit to export represents only 4% of total credit granted and it is entirely given by 'factoring', a contract in which the bank purchases the exporter's short-term foreign accounts receivable for cash at a discount from the face value.[7] Of course, loans for working capital funds that may be used to finance materials, labor and inventory related to export activity could be classified as "other",

[5]The threshold was reduced to 30,000 Euros in 2009. For consistency over the sample period, we drop all firm-bank relationship with total loans lower than 75,000 Euros.

[6]The share reported in this table are very stable across the years.

[7]See Del Prete e Federico (2013) for a more complete description of the trade finance data available in CR.

and we are not able to distinguish them.

The last data source is the Bank of Italy, which lists banking mergers and acquisitions. The data include the date of each operation and the codes identifying the active bank (both as bidder or acquirer) and of those classified as passive banks (the target) in each transaction (see Table 4). For instance, in year 2000 there were in total 41 operations, 9 merges and 32 acquisitions; each involved only one bidder/active bank, while some involved more than one target/passive banks (there were 56 targets in total).

3 Empirical Strategy

This section describes our approach to identifying the causal effect of finance on exports. We assume the following log linear model for exports of firm i at time t:

$$ln(Exp_{it}) = \alpha_i + \beta ln(Cr_{it}) + \varphi X_{it} + \epsilon_{it} \tag{1}$$

where Cr_{it} represents the amount of credit granted to the firm and X_{it} represents all determinants of exports other than finance. We want to estimate the elasticity of trade to credit: $\beta = \frac{\partial Exp}{\partial Cr}\frac{Cr}{Exp}$. The problem is that Cr_{it} is an equilibrium outcome that depends on both the supply of credit faced by the firm and on the firm's demand for credit, which may be driven by the same factors included in X_{it}. For instance, if exporting firms requires more working capital they can require more liquidity and investments and, as a consequence, demand more external founding. If this is the case, the OLS estimation of β will be upward biased. On the other hand, if exporting activities generate extra liquidity, exporters may require less external fundings than domestic firms and demand less credit. In this case the OLS estimation of β will be downward biased. Taking differences we eliminate firms fixed effects α_i from equation (1). For reasons that will become clear later in this section, we take the difference between t and $t-3$. The equation we will estimate is thus given by:

$$\Delta_3 ln(Exp_{it}) = \beta \Delta_3 ln(Cr)_{it} + \gamma \hat{\delta}_{it} + u_{it}. \tag{2}$$

where $\Delta_3 ln(Y_{it}) = ln(Y_{it}) - ln(Y_{it-3})$ and $\hat{\delta}_{it}$ is a proxy for the unobserved firm heterogeneity that affect also the growth rate of credit demand and that needs to be controlled for. Our empirical strategy to consistently estimate β is based on two pillars: first, we

instrument the supply of credit using banks' M&As, second we use the firm-bank relationship level of our data to estimate the proxy that controls for the demand component of the credit granted.

The relevance of our instrument is documented by the banking literature: a common result in the analysis of the impact of M&As on bank lending is that in the short run consolidated banks generally reduce their supply of credit to continuing borrowers (Beretta e del Prete (2012), Bonaccorsi di Patti and Gobbi (2007), Degryse et al. (2010), Sapienza (2002)) and overall to medium and small sized firms (Berger et al. (1998), Berger et al. (1999)). Larger banks differ substantially from small banks in their lending practices. For instance, large organization could have greater difficulty processing soft information and may have a disadvantage in relationship-based lending, which is important in bank oriented financial systems such as Italy (Angelini et al (1998) and De Mitri et al. (2010)), as well as in more market oriented systems as the U.S. (Petersen and Rajan (1994) and Berger and Udell (1995)). Moreover, bank M&As are generally followed by extensive organizational change, employee turnover, and branch downsizing, which may lead to a loss of the knowledge accumulated within each of the merging banks (see Berger et al. (2002)). New management usually reassesses the risk of borrowers and might apply different standards to loan approval. The evidence is consistent with relatively long transition periods during which difficulties in refocusing lending policies can dominate over longer term efficiency gains (Rhoades (1998), Calomiris and Karceski (2000)). The implementation of diversification strategies can explain the decrease of credit jointly provided by consolidated banks in case of mergers involving banks that were financing the same firm before the deal (Beretta e del Prete (2012)).

The validity of our instrument also depends on the fact that in the short run, due to switching costs and other barriers, firms are not able to fully substitute the credit from banks that reduce their credit supply by increasing loans from other institutions. Bonaccorsi di Patti and Gobbi (2007) provide direct evidence in case the negative supply shock is due to banks M&As. Bofondi et al. (2013) show that, during the burst of the sovereign debt crisis, Italian firms did not fully compensate the reduction in credit from domestic banks with increased loans from foreign banks, that were not directly hit by crisis.

Although M&As between banks are usually very complex financial operations that

can be assumed to be exogenous to clients activities such as exports, one may argue that the reduction in the credit granted that follows these operations is indeed correlated to firms' unobservable characteristics. For instance, a new consolidated bank, that decides to diversify its portfolio and to reduce the credit granted to pre-M&A clients, could do it disproportionately more toward the worst ones. Analogously, the ability to substitute the reduced credit from merging banks with credit form other financial institutions can vary according to some firm characteristics. These unobservables, as for instance firm reputation or management ability, may be correlated also with the firm exporting performance. To overcome these issues we employ an empirical strategy implemented by Bofondi et al. (2013) and similar to the one used in Jimenez et al. (2011). Specifically, we first consider the regression of bank credit on M&As at the bank-firm relationship level, as to estimate firm-time fixed effects. These represents those unobserved firm-time characteristics that affect the overall amount of credit granted to each firm in each time period and that can also be correlated with exports. Then we use these estimates as a further independent variable in our main regression at the firm level, which is conducted using a two-steps IV estimation. Thus our identification assumption is that our instrument, the relative liability of firms toward banks involved in M&As, is valid conditional on the unobserved demand component of the credit granted at the firm level (henceforth $\hat{\delta}_{it}$), proxied by the firm-time fixed effects estimated at the bank-firm relationship level.

In order to implement our strategy, we thus proceed in three steps: first we identify the shock induced by M&As at the bank-firm relationship level as to estimate the credit demand shock $\hat{\delta}_{it}$. Second, we aggregate the M&As shock at the firm level, and finally we use the aggregate shock as an instrument for $\Delta_3 ln(Cr)_{it}$ in estimating equation (2). The nest sections describe the three stages in detail.

3.1 The bank-firm relationship level.

Using data on single credit relationship, we estimate

$$\Delta_3 lnCr_{ibt} = \alpha + \eta M\&A_{ibt} + \delta_{it} + \upsilon_{ibt} \tag{3}$$

where Cr_{ibt} is the total outstanding credit granted by bank b to firm i at time t. The dummy $M\&A_{ibt}$ captures the M&As: it is equal to 1 whenever bank b has been involved

in the period [t-2,t], either as a bidder or a target bank, in any M&As (0 otherwise). The firm-time fixed effects δ_{it} capture all time varying firm level unobserved heterogeneity that affects the dynamic of credit granted (including firm level demand, firm balance sheet conditions, etc.).[8] Our main interest is the estimation of the fixed effects δ_{it}, as a proxy for the demand-side drivers of the credit granted. The identification of these fixed effects requires to restrict the analysis to those firms borrowing from more than one bank (see Khwaja and Mian (2008)). Multi-banking is a common practice among Italian firms which mainly rely on banking financing, and it is so even more in our sample of firms. As Table 5 shows, the average number of banks per firm is above 7, with a median of 6. The percentage of firms in our sample borrowing from more than 1 bank is above 90% and these numbers are quite constant over the years.

The time span of three years is the one generally identified by the literature on M&As as the transition period in which the impact of the reorganization is felt. Some studies consider variables referring to M&As taking place on a specific year t, but entering the regression with a lag structure to ensure completion of the post-merger transition period (Bonaccorsi and Gobbi (2007), Degryse et al. (2010), Sapienza (2002)). Others consider one unique three-year variable to identify the effect over the whole transition period (Beretta and Del Prete (2013), Focarelli et al. (2002)). We chose this second approach as to increase the relevance of our instrument and to be agnostic on the relative relevance of the different lags, which can varies depending on the sample used.

At the firm-bank relationship level, in order to compute $\Delta_3 lnCr_{ibt}$ it is necessary to ensure the comparability of the credit granted at the beginning and at the end of each three-year period. For instance, suppose that two banks, A and B, both lending to firm i, merge in year t-1 in a new bank, C. For year $t-3$, CR data will report separately the credit granted by A and B to firm i, while for year t only the total debit granted by C. Computing a meaningful growth rate $\Delta_3 lnCr_{ibt}$ requires to consider for the entire period a pro-forma bank corresponding to C and to sum up the credit granted by A and B starting from year $t-3$. Following Beretta and Del Prete (2013), we create pro-forma financial balance sheets for each period $[t-3, t]$ separately and we pool this pro-forma observations instead of considering a unique panel over the period 1997-2009. For all years in the interval $[t-3, t]$ each bank j is replaced by the sum of all banks that in the three years $t-2, t-1$ and t merged in the same consolidated bank. In this way we

[8] We assume that firm credit demand is not bank-specific.

do not have to consider for the whole sample the banking ownership structure at the last available date, loosing all the information from intermediate M&As operation not involving the consolidated banks as in 2009.[9]

From the estimation of equation (3), we are ultimately interested in the estimated fixed effects $\hat{\delta}_{it}$ as a proxy for the demand drivers of credit granted.[10] The next session shows how these effects enter the firm-level version of equation (3).

3.2 The supply shock at the firm level.

Consider equation (3) and take the weighted average of both sides, with weights equal to the share of each bank b on total credit of firm i at the beginning of the period, $w_{ibt-3} = \frac{Cr_{ibt-3}}{Cr_{it-3}}$:

$$\sum_{b}^{n_{it}} \Delta_3 lnCr_{ibt} w_{ibt-3} = \alpha \sum_{b}^{n_{it}} w_{ibt-3} + \eta \sum_{b}^{n_{it}} M\&A_{ibt} w_{ibt-3} + \delta_{it} \sum_{b}^{n_{it}} w_{ibt-3} + \upsilon_{ibt} w_{ibt-3}$$

where n_{it} is the set of banks lending to firm i both at time t and $t-3$. Notice that the left hand side is approximately the growth rate over the period of the firm aggregate credit:

$$\begin{aligned}
\sum_{b}^{n_{it}} \Delta_3 lnCr_{ibt} w_{ibt-3} &\approx \sum_{b}^{n_{it}} \frac{Cr_{ibt} - Cr_{ibt-3}}{Cr_{ibt-3}} \frac{Cr_{ibt-3}}{Cr_{it-3}} \\
&\approx \frac{1}{Cr_{it-3}} \sum_{b}^{n_{it}} \frac{Cr_{ibt} - Cr_{ibt-3}}{Cr_{ibt-3}} Cr_{ibt-3} \\
&\approx \frac{1}{Cr_{it-3}} \left[\sum_{b}^{n_{it}} Cr_{ibt} - \sum_{b}^{n_{it}} Cr_{ibt-3} \right] \\
&\approx \frac{Cr_{it} - Cr_{it-3}}{Cr_{it-3}}.
\end{aligned}$$

[9] See the Methodological Appendix for an illustration.

[10] For robustness we also estimated equation (3) with the inclusion of a full set of bank fixed effects that control for bank time invariant unobserved heterogeneity and of a dummy equal to 1 if at time $t-3$ bank b is the main bank of firm i in terms of credit share, to control for the specificity of the relationship. The estimates for η are always negative and significant at 1% level.

Using this result, together with $\sum_b^{n_{it}} w_{ibt-3} = 1$, the firm level relationship between the growth of credit granted and banks M&As is given by:

$$\Delta_3 lnCr_{it} = \alpha + \eta M\&A_{it} + \delta_{it} + \bar{v}_{it}$$

where $M\&A_{it}$ is now a firm level weighted dummy, greater than zero if any of the banks lending to firm i is involved in M&As in any of the years $t-2$, $t-1$ and t. The equation above is the basis for the first stage equation in the IV estimation of the effect of credit supply on exports. The supply shock induced by M&As to total credit granted to firm i, conditional to demand factors, can be estimated by:

$$\Delta_3 lnCr_{it} = \theta M\&A_{it} + \lambda\hat{\delta}_{it} + \phi X_{it} + \xi_{it} \tag{4}$$

where $\hat{\delta}_{it}$ are obtained from the estimation of equation (3) and X_{it} represents additional controls and fixed effects. As $\hat{\delta}_{it}$ is an estimated regressor and not a stochastic variable, we will obtain standard errors by bootstrapping.

3.3 Instrumental variable estimation of the effect of credit supply on exports

We now have all the ingredients to estimate the effects of credit shock on firm's exports. We will estimate equation (2) using as instrument for the supply of credit the M&As weighted dummy derived in the previous section and controlling for firm unobserved heterogeneity by including the estimated demand proxy $\hat{\delta}_{it}$.

Given equation (2) as our baseline specification, we will also include some further controls: observed firm characteristics that are widely recognized to affect firm export capability, as size and productivity, and characteristics used in the literature as measure of financial vulnerability and credit worthiness, as assets tangibility and credit rating. To avoid further endogeneity problems, all controls are taken at the predetermined value in time $t-3$. Paravisini et al. (2011) show the importance to control for the potential non-random matching between firms and banks by introducing a full set of time varying export destination and product dummies.[11] The custom data used by

[11]Paravisini et al. (2011) find that Peruvian banks that before the crisis were more exposed to financial capitals tended to specialize in firms exporting in product and destination markets dispro-

Paravisini et al. (2011) are disaggregated at the firm-destination-product level. Our data do not allow the same level of detail: we will control for shocks to firms' product demand by adding province-time fixed effects, the growth rate of the world trade of the main sector of each firm and sectoral-time fixed effects. Given the set of controls X_{it} to be added to the structural relationship between export and credit growth, equation (4) represents the corresponding first stage equation.

4 Results

In this section we present the main results of the paper. In the first subsection we show that the elasticity of export flows to bank credit is not significantly different from zero, once proper controls are taken into account. In the second subsection we show that, differently from export flows, the access to bank credit causes an increase of total revenues.

4.1 Credit and Exports

In Tables 6 and 7 we report the main results of the effect of bank credit on the export revenues for the period 1997-2009.[12] We start from the the basic specification, for which we show both the structural and the IV regression, and we proceed by adding controls and more detailed fixed effects. Column (1) of Table 6 shows the structural OLS estimations without controls and with year fixed effects only: bank credit is positively and significantly correlated with export revenues. As explained in the previous sections, in order to asses causality, we instrument the growth rate of credit with M&As. Column (2) presents the results of the IV regression: the coefficient is still positive but it looses statistical significance (from 1% to 5% level). Column (3) reports the results of the first stage of the IV procedure. Notice that the instrument performs well: the weighted M&As dummy is negatively associated with bank credit, as we expected.[13]

portionately affected by the crisis.

[12]The main results are also reported in Table 8 for the period 1997-2008

[13]The usual statistics that rules out the weakness of the instrument are not available in our first stage since we bootstrap standard errors. However, without bootstrapping techniques, we obtain similar standard errors (see Table 9) and we have a first-stage F stat well above the thumb rule of 10. This is in line with the literature that identifies M&As as an exogenous shock to bank credit to firms.

From column (4) we add firm level controls: firm size (measured in terms of number of employees) and productivity (measured as the ratio between value added and number of workers) to control for firm characteristics correlated with export propensity, firm tangible assets (proxied with the ratio between fixed asset and total assets) and credit rating to control for credit worthiness.[14] As expected, a higher initial level of productivity, collateral and credit rating is associated with a higher export growth. The IV estimate of the elasticity of export to credit supply (column (5)) is still positive but now significant only at the 10% level. The magnitude of the coefficient (which will be stable in all other regressions) is -0.27 (column (2)), meaning that a 10% reduction in supply of credit implies a contraction of 2.7% in the volume of export flows. The magnitude is very similar to what found in Paravisini et al. (2011), that estimate an elasticity of Peruvian export to credit supply of 0.23. It is worth noticing that the IV estimate of the elasticity is higher than the OLS estimate. This could suggest either an attenuation bias due to measurement errors or a negative bias due to a negative correlation between credit demand and export revenues: when exports revenues are low, firms must compensate for the lower internal liquidity by rising more external founds.

The estimates for the first stage are also quite stable across the different specifications (see column (5) and (6)): a coefficient equal to -0.26 means that when banks covering, let's say, 50% of a firm total debt are involved in M&As between [t-2,t], the growth rate of the firm's credit supply between $t-3$ and t is, everything else equal, 13 percentage points lower than for a firm with no lenders involved in M&As.

Our empirical strategy releases unbiased parameters if the matching between banks and firms is random. Suppose instead that banks subject to M&As are also banks that give more credit to firms specialized in fast-growing sectors. If this is the case, without controlling for time-varying sector characteristics, the coefficient of interest could be negatively biased as we do not fully control for the world demand in each sector. Ideally one would like to control for demand shock for any product and to any destination in a given year. Paravisini et al. (2011) use highly disaggregated custom data that allow to insert product-country-time fixed effects and to fully control for this source of unobserved heterogeneity. Although we do not have data at the firm-destination-product level, Table 7 shows that controlling for demand's shocks at a lower

[14]We tried many other control variables, such as liquidity, cash flow, leverage and ROA, which were generally not significant.

level of details is enough to wash out the causal effect of bank credit on export flows. In columns (1) and (2) we first add province-time fixed effects, under the hypothesis that unobserved demand shock are province-time specific. Here results still hold. In column (3) we keep province-time fixed effect and we introduce variation in the foreign demand of the goods produced by firm i, measured as the growth rate between $t-3$ and t of the world trade in sector j, the main sector of firm i: even if the coefficient of interest has the same magnitude as before, it looses significance. Finally, in column (4) we introduce 2-digit sector-time fixed effects, under the hypothesis that demand shocks are specific at the sector level.[15] The coefficient of interest is no more significant. Once we properly specify the time-varying unobserved heterogeneity at the sector level, the causal effect from bank credit to export sales disappears.[16]

For completeness, Table 10, shows the estimation of the reduced form relationship between export flows and the instrument, the M&As weighted dummy. We report only the results for the specification including also the world demand controls. As expected, bank M&As have a very weak effect on the export of their costumers. In particular, as in the IV analysis, this effect is not significantly different from zero once we introduce sector-time fixed effects.

In what follows we present a series of robustness check to confirm that export flows are resilient to short run bank credit shocks. First, Table 11 shows that our results are unchanged when we restrict the sample to manufacturing firms only: these firms are more capital intensive than those in the service sector and may need more investments and more external capital. In Table 12 we restrict our sample to short-term bank credit only. The idea is that, by eliminating long-term credit, the first stage of the analysis may be strengthened as our strategy should capture only short-run effects. Results show that this is not the case and the the elasticity of trade flows to credit is still not significantly different from zero. In Table 13 we restrict the analysis to the effect of the credit specifically granted to finance exporting activities. If trade credit, consisting mainly in 'factoring', is what really matters for exports, its effect could be concealed by the other types of credit, as it represents only 4% of the total (see Table 3). According to the last row of Table 13, the first stage now fails: the coefficient of the M&As dummy,

[15]We use the ATECO 2002 classification of economic activity developed by the Italian National Institute of Statistics, which corresponds to the European NACE.

[16]Product-time fixed effects are more accurate than the growth rate of world sectoral trade as, for instance, they allow to control for factors that more specifically affect the demand of Italian products.

whose magnitude is much smaller than in the previous tables, is significant only in the last column. It follows that we cannot interpret the IV results. Nevertheless, we can infer that trade credit is much less sensitive to episodes of M&A compared to other forms of bank credit.

One may argue that bank credit is particularly important for small firms, which can rely less on internal finance. Even if we already condition our analysis to some firm characteristics that could affect the ability to access external capital, there could be other factors that prevent small firms to access to bank credit. Therefore, in Table 14 we restrict our sample to firms with a number of employees below the 25th percentile and in Table 15 to firms with a number of employees below the median. In both cases the elasticity of export flows to bank credit is nil. Finally, in Table 16 we add crisis years and we find again very similar results.

4.2 Credit and Revenues

Italian firm export flows are not reduced by negative shocks to bank credit. Is this specific to export activity or does it also apply to firms' overall production activity? We tackle this issue by studying the effect of bank credit supply on firm's total revenues, using the same strategy and the same specifications employed in the previous section. In Table 17 we restrict our sample to exporters, to make these results more comparable with those of Table 7. Results strongly suggest that there is a positive and causal link between access to bank credit and total revenues: a reduction of 10% in the supply of credit causes a reduction of revenues of 1.6%, once sector time-varying unobserved characteristics are taken into account (column (4)).[17]

In Table 18 we consider all the firms for which we have data on revenues, regardless on whether they export or not. In this way the sample is more than doubled. We repeat the exercise and we find again a strong evidence of a positive relation between credit and total firm activity. Moreover, the estimated elasticity is now 53.8% higher than for the sample that includes only exporters: considering column (4), the more complete specification, the coefficient jumps from 0.158 in Table 17 to 0.243 in Table 18. This result suggests that, even if bank credit is overall an important determinant of total revenues, firms that serve also foreign markets are, ceteris paribus, less sensitive to it

[17]Notice that the coefficients of M&As dummy in the first stage of the IV regressions coincide with those in Table 7, being the first-stage regressions the same in these two tables.

than domestic firms.

As we did for exports, in Table 19, we report the estimations of the reduced form relationship between total revenues and M&As: according to the most conservative specification, reported in column (3), a firm, whose banks representing 50% of its total debt are involved in M&As, experiences a decrease in the growth rate of exports of 4 percentage points, cumulated over the three year-period following the M&As. According to our IV strategy, we believe that this intention to treat effect is entirely driven by the decrease in the supply of credit that follow the M&As.

Table 20 shows some robustness checks, considering the extended sample of both exporters and domestic firms. We report only results for the specification with sector-time fixed effects. Column (1) reports results for manufacturing firms only, column (2) those for small firms (defined as firms with a number of employees smaller than the median), and column (3) those for the effect of short-term debt only. All results confirm a positive effects of bank credit supply on firm revenues and, although we do not provide any formal statistical test, the three elasticity are all in magnitude higher than the one for the full sample reported in column (4) of Table 18. It is worth noticing that the estimation of the total revenue elasticity doesn't suffer for the limitation of our trade data, in particular in terms of destinations. To control for the local market, it is enough to add, as we did in robustness checks, the province-time fixed effects.

5 Summary and Conclusions

The aim of this paper is to estimate the elasticity of the intensive margin of trade to shocks in the supply of bank credit in "normal times", meaning shocks not related to the recent financial crisis. We use italian bank-firm matched data on credit granted and firm level data on trade flows between 1997 and 2009. To tackle the endogeneity of the credit data we observe, we use banks' M&As as an instrument, exploiting the common finding in the finance empirical literature that consolidated banks tend to reduce, at least in the short run, the credit granted to continuing borrowers.

We find that, once we properly controls for firms' unobserved etherogeneity and for the the demand of the goods exported, the trade elasticity to credit shocks is not significantly different from zero. In order to understand wether this result is specific to exports or wether it is generic for the overall firm activity, we employ the same empirical

strategy to estimate the elasticity of total revenues to credit supply shocks. We find that, even with the most conservative specification, this elasticity is positive and both statistically and economically significant. These results are only partially surprising.

Before the financial crisis, the empirical trade literature that studied the link between exports and financial constraints generally found evidence of a negative effect and supported the idea that exports are credit intensive compared to overall firm activity (see Minetti e Zhu (2011), Secchi et al. (2012) and Manova (2013)). This literature suggests that countries with better financial institutions are able to export more. However, some recent contributions (see Paravisini et al. (2011) and del Prete e Federico (2013)) that use, as we do, highly disaggregated data, do not find evidence that exports responded more than general production to the negative credit supply shock induced by the financial crisis. In particular, they claim that the effect found on exports is simply driven by the negative effect on firms' working capital. Our results are more closely related to these second stream of literature, as our instrument allows to capture the effect of a short run shocks to the credit supply, and not that of different level of financial development.

Nevertheless our results are stronger than those found, for instance, by Paravisini et al. (2011) and del Prete e Federico (2013). We find that export revenues, differently from total revenues, are not elastic to short run shocks to the credit supply. This means that in "normal times", when credit temporally drops, firms may adjust their total production, but on average they do not vary their exports. This can be explained in terms of a specific firms' strategy to keep unchanged their foreign market shares, as their adjustment is more costly. The idea of fixed cost of exporting creating hysteresis in trade flows is not new in the literature (Baldwin and Krugman (1989), Roberts and Tybout (1997), Bernard and Jensen (2004)). The relevance of sunk investments form firms' exporting decisions should also imply that it is less likely to become exporters in the years immediately following a negative credit supply shock. The extension of our analysis to the extensive margin of trade is definitively a direction for further research.

The other results in our paper also support the idea of exports being, at least in the short run, less responsive to credit shocks. The fact that the total revenue elasticity is larger when we extend the sample to include also non-exporting firms points in this direction. Moreover, the failure of our IV strategy in case of trade finance only, implies that the reduction in credit supply following M&As does not involve the credit lines

explicitly targeting exporting activities. A similar results similar is found in Del Prete e Federico (2013). Formai (2013) presents a theoretical model that can explain these findings: with imperfect credit markets, exporters, as being active in more than one market and perceiving higher profits, offer more guarantees to the repayment of their debt and find it easier to borrow than non-exporting firms do.

Finally, it is also worth to point out that previous works that compare the response of exports to credit shocks to that of total firm activity usually do that only indirectly. For instance, Paravisini et al. (2011) explore if the sensitivity of exports to credit varies with the cash-cycle length of the export flows and with the trade credit arrangements between the importer and the exporter. The idea is that if the effect of credit shortage is specific to working capital used in export activity and not to general production working capital, then elasticity should be heterogeneous according to those dimensions which are specific to export activity. They find no result in this direction and interpret this as evidence that the sensitivity of intensive margin of exports is driven by a general working capital channel, in the same way as for domestic sales. Manova (2013) uses a Rajan and Zingales (1998) methodology and run a country-sector-time regression of bilateral exports on the interaction between the exporter level of financial development (measured by total credit to private sector over GDP) and a measure of the sector external finance dependence. To isolate the effect of financial frictions on trade above and beyond that on overall production, she controls for the number of establishments in the exporting country by year and sector. As she finds that, including this variable, the impact of credit on export is 25% lower, but positive and significant, she concludes that financial frictions restrict trade flows more than total output.

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A Methodological Appendix: the M&As over the three-year blocks.

Consider the following example: at the beginning of the sample (1997) firm i had a relationship with bank A; between 1997 and 2009, bank A first incorporates bank B (in 2003), then bank C (in 2008). According to our procedure, we will consider the 3 banks separately up to $t = 2002$, when the relevant growth rates are given by $lnCr_{ibt} - lnCr_{ibt-3}$, for $b = A, B, C$ and $t = 2000, 2001, 2002$. From $t = 2003$ to $t = 2007$ the existing banks are $A+B$ and C and, to compute the growth rates $lnCr_{ibt} - lnCr_{ibt-3}$ for $b = A+B, C$ and $t = 2003, 2004, 2005, 2006, 2007$, A and B must be considered as one starting from $t-3 = 2000$. For the last two years we have only one bank $A+B+C$, and this consolidation must be applied for computing the growth rates $lnCr_{ibt} - lnCr_{ibt-3}$ for $t = 2008, 2009$ and $b = A + B + C$, from $t - 3 = 2006$. If we used a unique panel from 1997 to 2009, for the building of pro-forma balance sheet data it would have been necessary to merge all the banks and observe only bank A+B+C over the entire period. This would imply to miss the effect of the M&A between A and B in 2003. Moreover, with a traditional panel we would have introduced some distortions. Keeping in mind the example above, take the case of a firm j which has always been a client only of bank C. Using a traditional panel, for the only one existing bank $A + B + C$ the M&A dummy would be equal to 1 both in the blocks including 2003 (for the grouping of A and B) and in those including the year 2008 (for the merger between $A + B$ and C). Firm j would appear as a client of the consolidated bank over the whole period and we would look for the effect of a merger even in 2003, although the firm was not a client of either A and B.

B Tables and Figures

Table 1: Summary Statistics - Firms' Data

Variable	Mean		Std. Dev.		Min.		Max.		N	
	No Exp.	Exp.	No Exp.	Exp.	No Exp.	Exp.	No Exp.	Exp.	No Exp.	Exp.
Export	0	41	0	218	0	0.01	0	9663	10500	39300
Revenue	56	106	291	610	0.01	0.02	13281	33691	10600	38900
Exp. Share	0	0.40	0	0.37	0	0.00	0	1	10600	38900
Credit	16216	27547	77990	164670	75	75	2098474	14093759	9200	30600
Employment	267	341	1835	1581	11	1	153149	83666	10600	38700
Productivity	50	60	59	136	-638	-4522	2084	12194	9400	34300
Fixed Asset	0.36	0.23	7.05	0.15	0.00	0.00	0.87	0.89	9500	36500
Z Score	4.63	4.30	1.8	1.79	1	1	9	9	9400	34600

The data refer to the period 1997-2009. Exports, Revenues and Credit are expressed in thousands of Euros. Productivity is defined as the ratio between value added and employees. Fixed Assets as the ratio between fixed assets and revenues. Z score is a credit rating based on balance sheet information that ranks firms from 1 (highly secure) to 9 (very high risk).

Sources: INVIND, CEBIL/CERVED and Credit Register.

Table 2: Export Status

Export Status	N. of Firms	Share of Firms
Always Exporting	5444	0.56
Never Exporting	2457	0.25
Changing Status	1802	0.19
Total	9703	1.00

Sources: INVIND, CEBIL/CERVED

Table 3: Shares of credits by types and destinations

	Export	Import	Other	Total
Loans backed by account-receivables	3.9	0.0	18.6	22.7
Term loans	0.01	2.7	58.1	60.8
Revolving credits lines	0.00	0.03	16.4	16.4
Total	3.9	2.6	93.4	100

Notes: The data represent the shares of each type on the total amount of credit granted in 2003.

Source: Credit Register

Table 4: Mergers and Acquisitions

	N. Mergers	N. Acquisitions	N. Bidders	N. Targets
1997	5	17	22	24
1998	3	27	30	34
1999	6	42	48	59
2000	9	32	41	56
2001	6	23	29	36
2002	3	29	32	40
2003	6	24	30	35
2004	-	16	16	17
2005	-	6	6	7
2006	1	11	12	13
2007	1	8	9	10
2008	4	12	16	19
2009	1	13	14	15

Source: Bank of Italy - Albo Operazioni Bancarie

Table 5: Number of Banks by Firm

	1997	2003	2009
Average	7.3	7.9	7.6
Max	137	78	77
Min	1	1	1
Median	6	6	6
Mode	4	5	4
Standard Deviation	6.1	6.1	6.0
Number of firms	6273	7247	6579
Share with more than 1 bank	90%	93%	93%

Source: Italian Credit Register

Table 6: Total Credit and Export

	Dependent variable: $\Delta_3 ln(Exp)_{it}$					
	(1) (OLS)	(2) (IV)	(3) (FS)	(4) (OLS)	(5) (IV)	(6) (FS)
$\Delta_3 ln(Cr)_{it}$	0.120***	0.272**		0.143***	0.249*	
	(0.021)	(0.132)		(0.022)	(0.138)	
$\hat{\delta}_{it}$	0.084***	-0.050	0.899***	0.060**	-0.031	0.874***
	(0.026)	(0.117)	(0.014)	(0.029)	(0.119)	(0.013)
$M\&A_{it}$			-0.265***			-0.256***
			(0.018)			(0.021)
$Empl_{it-3}$				-0.010	-0.009	-0.015***
				(0.008)	(0.008)	(0.004)
$Prod_{it-3}$				0.052**	0.055**	0.023***
				(0.022)	(0.022)	(0.008)
$fixassets_{it-3}$				0.228***	0.233***	-0.054**
				(0.061)	(0.063)	(0.022)
$RATING_{it-3}$				0.010**	0.010**	-0.002
				(0.005)	(0.005)	(0.002)
Observations	17161	17161	17161	15282	15282	15282
Dummies	Y	Y	Y	Y	Y	Y

Note: Results of regressions (1). Columns (1) and (4) report OLS estimates, columns (2) and (5) report the corresponding IV estimates and columns (5) and (6) report the results for the corresponding first stages. The sample period is 1997-2009. Bootstrapped standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 7: Total Credit and Export-Continue

	Dependent variable: $\Delta_3 ln(Exp)_{it}$			
	(1)	(2)	(3)	(4)
	(OLS)	(IV)	(IV)	(IV)
$\Delta_3 ln(Cr)_{it}$	0.146***	0.316**	0.302*	0.128
	(0.024)	(0.153)	(0.166)	(0.150)
$\hat{\delta}_{it}$	0.060**	-0.085	-0.077	0.069
	(0.029)	(0.130)	(0.140)	(0.130)
$Empl_{it-3}$	-0.013	-0.010	-0.008	-0.016*
	(0.009)	(0.010)	(0.011)	(0.010)
$Prod_{it-3}$	0.054**	0.059***	0.074***	0.027
	(0.024)	(0.023)	(0.026)	(0.019)
$fixassets_{it-3}$	0.174***	0.186***	0.136**	0.134**
	(0.063)	(0.063)	(0.068)	(0.068)
$RATING_{it-3}$	0.011**	0.011**	0.012**	0.008
	(0.005)	(0.005)	(0.005)	(0.005)
$\Delta_3 ln(Wtrade)_{it}$			0.272***	
			(0.075)	
Observations	15223	15223	13511	15253
Fixed effects	PT	PT	PT	ST
$M\&A_{it}$		-0.283***	-0.249***	-0.277***

Note: Results of regressions (1). Columns (1) reports OLS estimates, columns (2)- (4) report IV estimates. Regressions in columns (1)-(3) control for province-time fixed effects. Regression in column (4) controls for sector-time dummies. Last row reports the coefficients of M&A in the first stage regression corresponding to the IV regression in each column. The sample period is 1997-2009. Bootstrapped standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 8: Total Credit and Export - Up to 2008

	Dependent variable: $\Delta_3 ln(Exp)_{it}$			
	(1)	(2)	(3)	(4)
	(OLS)	(IV)	(IV)	(IV)
$\Delta_3 ln(Cr)_{it}$	0.146***	0.370**	0.343*	0.172
	(0.025)	(0.156)	(0.195)	(0.154)
$\hat{\delta}_{it}$	0.049	-0.143	-0.121	0.024
	(0.031)	(0.134)	(0.168)	(0.137)
$Empl_{it-3}$	-0.013	-0.009	-0.007	-0.017
	(0.009)	(0.010)	(0.012)	(0.011)
$Prod_{it-3}$	0.058**	0.063***	0.077***	0.030
	(0.023)	(0.024)	(0.027)	(0.020)
$fixassets_{it-3}$	0.190***	0.210***	0.157**	0.150**
	(0.071)	(0.067)	(0.070)	(0.072)
$RATING_{it-3}$	0.008	0.008	0.009	0.004
	(0.006)	(0.005)	(0.006)	(0.005)
$\Delta_3 ln(Wtrade)_{it}$			0.313***	
			(0.077)	
Observations	13519	13519	11870	13544
Fixed effects	PT	PT	PT	ST
$M\&A_{it}$		-0.278***	-0.270***	-0.247***

Note: Results of regressions (1). Columns (1) reports OLS estimates, columns (2)- (4) report IV estimates. Regressions in columns (1)-(3) control for province-time fixed effects. Regression in column (4) controls for sector-time dummies. Last row reports the coefficients of M&A in the first stage regression corresponding to the IV regression in each column. The sample period is 1997-2008. Bootstrapped standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 9: Total Credit and Export - Conventional Standard Errors

	Dependent variable: $\Delta_3 ln(Exp)_{it}$			
	(1)	(2)	(3)	(4)
	(OLS)	(IV)	(IV)	(IV)
$\Delta_3 ln(Cr)_{it}$	0.146***	0.316**	0.302*	0.128
	(0.022)	(0.151)	(0.162)	(0.152)
$\hat{\delta}_{it}$	0.060**	-0.085	-0.077	0.069
	(0.029)	(0.130)	(0.138)	(0.131)
$Empl_{it-3}$	-0.013	-0.010	-0.008	-0.016*
	(0.009)	(0.009)	(0.009)	(0.008)
$Prod_{it-3}$	0.054**	0.059***	0.074***	0.027
	(0.022)	(0.020)	(0.021)	(0.019)
$fixassets_{it-3}$	0.174***	0.186***	0.136**	0.134**
	(0.064)	(0.060)	(0.063)	(0.060)
$RATING_{it-3}$	0.011**	0.011**	0.012**	0.008
	(0.005)	(0.005)	(0.005)	(0.005)
$\Delta_3 ln(Wtrade)_{it}$			0.272***	
			(0.053)	
Observations	15223	15223	13511	15253
Fixed effects	PT	PT	PT	ST
$M\&A_{it}$		-0.283***	-0.249***	-0.277***

Note: Results of regressions (1). Columns (1) reports OLS estimates, columns (2)- (4) report IV estimates. Regressions in columns (1)-(3) control for province-time fixed effects. Regression in column (4) controls for sector-time dummies. Last row reports the coefficients of M&A in the first stage regression corresponding to the IV regression in each column. The sample period is 1997-2009. Conventional standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 10: M&A and Export- Reduced Form Estimation

	Dependent variable: $\Delta_3 ln(Exp)_{it}$		
	(1)	(2)	(3)
$M\&A_{it}$	-0.092**	-0.083*	-0.037
	(0.039)	(0.049)	(0.038)
$\hat{\delta}_{it}$	0.187***	0.180***	0.179***
	(0.020)	(0.021)	(0.020)
$Empl_{it-3}$	-0.015*	-0.013	-0.018**
	(0.008)	(0.009)	(0.008)
$Prod_{it-3}$	0.047**	0.065***	0.022
	(0.023)	(0.024)	(0.022)
$fixassets_{it-3}$	0.167**	0.111	0.128**
	(0.068)	(0.069)	(0.064)
$RATING_{it-3}$	0.010**	0.012**	0.007
	(0.005)	(0.006)	(0.005)
$\Delta_3 ln(Wtrade)_{it}$		0.298***	
		(0.073)	
Observations	15285	13569	15316
Fixed effects	PT	PT	ST

Note: Estimation for the reduced form equation, where the dependent variable is regressed directly on the instrument. Regressions in columns (1) and (2) control for province-time fixed effects. Regression in column (3) controls for sector-time dummies. The sample period is 1997-2009. Bootstrapped standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 11: Total Credit and Export- Manufacturing

	Dependent variable: $\Delta_3 ln(Exp)_{it}$			
	(1)	(2)	(3)	(4)
	(OLS)	(IV)	(IV)	(IV)
$\Delta_3 ln(Cr)_{it}$	0.141***	0.282*	0.266*	0.095
	(0.022)	(0.155)	(0.155)	(0.141)
$\hat{\delta}_{it}$	0.039	-0.082	-0.077	0.081
	(0.026)	(0.134)	(0.133)	(0.125)
$Empl_{it-3}$	-0.006	-0.004	-0.007	-0.015
	(0.009)	(0.010)	(0.011)	(0.010)
$Prod_{it-3}$	0.069***	0.073***	0.068***	0.034*
	(0.022)	(0.024)	(0.024)	(0.021)
$fixassets_{it-3}$	0.110*	0.122*	0.114*	0.128*
	(0.066)	(0.066)	(0.067)	(0.069)
$RATING_{it-3}$	0.011**	0.012**	0.010*	0.009*
	(0.005)	(0.005)	(0.005)	(0.005)
$\Delta_3 ln(Wtrade)_{it}$			0.467***	
			(0.064)	
Observations	14329	14329	13343	14387
Fixed effects	PT	PT	PT	ST
$M\&A_{it}$		-0.275***	-0.244***	-0.276***

Note: Results of regressions (1). Columns (1) reports OLS estimates, columns (2)- (4) report IV estimates. Regressions in columns (1)-(3) control for province-time fixed effects. Regression in column (4) controls for sector-time dummies. Last row reports the coefficients of M&A in the first stage regression corresponding to the IV regression in each column. The sample period is 1997-2009 for manufacturing firm only. Bootstrapped standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 12: Short Term Credit and Export

	Dependent variable: $\Delta_3 ln(Exp)_{it}$			
	(1)	(2)	(3)	(4)
	(OLS)	(IV)	(IV)	(IV)
$\Delta_3 ln(Cr)_{it}$	0.075***	0.314*	0.292*	0.104
	(0.019)	(0.173)	(0.173)	(0.168)
$\hat{\delta}_{it}$	0.146***	-0.027	-0.018	0.119
	(0.027)	(0.128)	(0.128)	(0.123)
$Empl_{it-3}$	-0.015	-0.013	-0.012	-0.016*
	(0.009)	(0.010)	(0.011)	(0.009)
$Prod_{it-3}$	0.051**	0.054**	0.070***	0.027
	(0.022)	(0.021)	(0.026)	(0.020)
$fixassets_{it-3}$	0.155**	0.170**	0.105	0.121*
	(0.063)	(0.071)	(0.071)	(0.065)
$RATING_{it-3}$	0.011*	0.011**	0.012**	0.007
	(0.006)	(0.005)	(0.006)	(0.005)
$\Delta_3 ln(Wtrade)_{it}$			0.291***	
			(0.072)	
Observations	15112	15112	13413	15132
Fixed effects	PT	PT	PT	ST
$M\&A_{it}$		-0.267***	-0.234***	-0.286***

Note: Results of regressions (1), excluding term credit. Columns (1) reports OLS estimates, columns (2)- (4) report IV estimates. Regressions in columns (1)-(3) control for province-time fixed effects. Regression in column (4) controls for sector-time dummies. Last row reports the coefficients of M&A in the first stage regression corresponding to the IV regression in each column. The sample period is 1997-2009. Bootstrapped standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 13: Trade Credit and Export

	Dependent variable: $\Delta_3 ln(Exp)_{it}$			
	(1)	(2)	(3)	(4)
	(OLS)	(IV)	(IV)	(IV)
$\Delta_3 ln(Cr)_{it}$	0.043***	-0.014	-0.313	-0.082
	(0.008)	(3.795)	(5.231)	(42.187)
$\hat{\delta}_{it}$	0.229***	0.275	0.493	0.323
	(0.027)	(2.964)	(4.038)	(31.946)
$Empl_{it-3}$	0.006	0.005	0.001	0.004
	(0.010)	(0.126)	(0.120)	(1.922)
$Prod_{it-3}$	0.007	0.001	-0.014	-0.020
	(0.023)	(0.397)	(0.449)	(7.429)
$fixassets_{it-3}$	0.087	0.102	0.191	0.084
	(0.081)	(1.182)	(1.874)	(24.466)
$RATING_{it-3}$	0.013**	0.014	0.021	0.012
	(0.006)	(0.136)	(0.175)	(0.531)
$\Delta_3 ln(Wtrade)_{it}$			0.457	
			(0.461)	
Observations	9332	9332	8318	9329
Fixed effects	PT	PT	PT	ST
$M\&A_{it}$		-0.134	-0.132**	-0.139

Note: Results of regressions (1), considering only credit granted to finance exporting activities. Columns (1) reports OLS estimates, columns (2)- (4) report IV estimates. Regressions in columns (1)-(3) control for province-time fixed effects. Regression in column (4) controls for sector-time dummies. Last row reports the coefficients of M&A in the first stage regression corresponding to the IV regression in each column. The sample period is 1997-2009. Bootstrapped standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 14: Total Credit and Export- small firms (1)

	Dependent variable: $\Delta_3 ln(Exp)_{it}$			
	(1)	(2)	(3)	(4)
	(OLS)	(IV)	(IV)	(IV)
$\Delta_3 ln(Cr)_{it}$	0.116	-0.073	-0.171	-0.100
	(0.090)	(0.405)	(0.405)	(0.378)
$\hat{\delta}_{it}$	0.024	0.174	0.231	0.216
	(0.102)	(0.338)	(0.342)	(0.305)
$Empl_{it-3}$	-0.434***	-0.454***	-0.435***	-0.529***
	(0.160)	(0.146)	(0.157)	(0.140)
$Prod_{it-3}$	0.039	0.039	0.053	0.052
	(0.052)	(0.045)	(0.059)	(0.043)
$fixassets_{it-3}$	0.008	0.001	-0.115	0.028
	(0.192)	(0.162)	(0.210)	(0.155)
$RATING_{it-3}$	-0.006	-0.005	0.000	0.008
	(0.015)	(0.014)	(0.017)	(0.014)
$\Delta_3 ln(Wtrade)_{it}$			0.750***	
			(0.211)	
Observations	2677	2677	2689	2400
Fixed effects	PT	PT	PT	ST
$M\&A_{it}$		-0.328***	-0.259***	-0.338***

Note: Results of regressions (1). Columns (1) reports OLS estimates, columns (2)- (4) report IV estimates. Regressions in columns (1)-(3) control for province-time fixed effects. Regression in column (4) controls for sector-time dummies. Last row reports the coefficients of M&A in the first stage regression corresponding to the IV regression in each column. The sample period is 1997-2009 for firm with size, in terms of employment, below the 25th percentile. Bootstrapped standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 15: Total Credit and Export- small firms (2)

	Dependent variable: $\Delta_3 ln(Exp)_{it}$			
	(1)	(2)	(3)	(4)
	(OLS)	(IV)	(IV)	(IV)
$\Delta_3 ln(Cr)_{it}$	0.151***	0.228	0.090	0.020
	(0.051)	(0.252)	(0.285)	(0.237)
$\hat{\delta}_{it}$	0.078	0.014	0.108	0.189
	(0.061)	(0.218)	(0.237)	(0.201)
$Empl_{it-3}$	-0.144***	-0.139***	-0.148***	-0.121***
	(0.044)	(0.045)	(0.049)	(0.044)
$Prod_{it-3}$	0.020	0.020	0.030	-0.006
	(0.036)	(0.035)	(0.037)	(0.035)
$fixassets_{it-3}$	0.242**	0.243**	0.189	0.146
	(0.111)	(0.099)	(0.117)	(0.096)
$RATING_{it-3}$	-0.004	-0.004	-0.003	0.004
	(0.009)	(0.009)	(0.009)	(0.009)
$\Delta_3 ln(Wtrade)_{it}$			0.563***	
			(0.107)	
Observations	6245	6245	5618	6264
Fixed effects	PT	PT	PT	ST
$M\&A_{it}$		-0.270***	-0.264***	-0.226***

Note: Results of regressions (1). Columns (1) reports OLS estimates, columns (2)- (4) report IV estimates. Regressions in columns (1)-(3) control for province-time fixed effects. Regression in column (4) controls for sector-time dummies. Last row reports the coefficients of M&A in the first stage regression corresponding to the IV regression in each column. The sample period is 1997-2009 for firm with size, in terms of employment, below the median. Bootstrapped standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 16: Total Credit and Export- sample including global crisis (1997-2011)

	Dependent variable: $\Delta_3 ln(Exp)_{it}$			
	(1)	(2)	(3)	(4)
	(OLS)	(IV)	(IV)	(IV)
$\Delta_3 ln(Cr)_{it}$	0.160***	0.297*	0.302*	0.118
	(0.021)	(0.153)	(0.165)	(0.144)
$\hat{\delta}_{it}$	0.040	-0.076	-0.077	0.068
	(0.026)	(0.130)	(0.139)	(0.122)
$Empl_{it-3}$	(0.008)	(0.009)	(0.011)	(0.009)
$Prod_{it-3}$	0.076***	0.078***	0.074***	0.046***
	(0.020)	(0.022)	(0.026)	(0.017)
$fixassets_{it-3}$	0.205***	0.215***	0.136**	0.158**
	(0.061)	(0.056)	(0.069)	(0.063)
$RATING_{it-3}$	0.013***	0.013***	0.012**	0.010**
	(0.004)	(0.005)	(0.005)	(0.004)
$\Delta_3 ln(Wtrade)_{it}$			0.272***	
			(0.076)	
Observations	18553	18553	13511	18593
Fixed effects	PT	PT	PT	ST
$M\&A_{it}$		-0.259***	-0.277***	-0.228***

Note: Results of regressions (1). Columns (1) reports OLS estimates, columns (2)- (4) report IV estimates. Regressions in columns (1)-(3) control for province-time fixed effects. Regression in column (4) controls for sector-time dummies. Last row reports the coefficients of M&A in the first stage regression corresponding to the IV regression in each column. The sample period is 1997-2011. Bootstrapped standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 17: Total Credit and Revenues - Exporters only

	Dependent variable: $\Delta_3 ln(Revenues)_{it}$			
	(1)	(2)	(3)	(4)
	(OLS)	(IV)	(IV)	(IV)
$\Delta_3 ln(Cr)_{it}$	0.109***	0.187***	0.200***	0.158***
	(0.010)	(0.051)	(0.056)	(0.052)
$\hat{\delta}_{it}$	0.054***	-0.013	-0.024	0.013
	(0.010)	(0.044)	(0.049)	(0.044)
$Empl_{it-3}$	-0.003	-0.002	-0.002	-0.006
	(0.003)	(0.003)	(0.004)	(0.004)
$Prod_{it-3}$	0.041***	0.043***	0.048***	0.025***
	(0.008)	(0.009)	(0.009)	(0.009)
$fixassets_{it-3}$	0.109***	0.114***	0.096***	0.088***
	(0.022)	(0.019)	(0.020)	(0.020)
$RATING_{it-3}$	0.007***	0.007***	0.007***	0.004**
	(0.002)	(0.002)	(0.002)	(0.002)
$\Delta_3 ln(Wtrade)_{it}$			0.173***	
			(0.043)	
Observations	15155	15155	13459	15186
Fixed effects	PT	PT	PT	ST
$M\&A_{it}$		-0.283***	-0.249***	-0.277***

Note: Results of regressions (1),where total revenues has replaced total exports as dependent variable. Columns (1) reports OLS estimates, columns (2)- (4) report IV estimates. Regressions in columns (1)-(3) control for province-time fixed effects. Regression in column (4) controls for sector-time dummies. Last row reports the coefficients of M&A in the first stage regression corresponding to the IV regression in each column. The sample period is 1997-2009 and includes only firms with positive exports. Conventional standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 18: Total Credit and Revenues - Extended sample

	Dependent variable: $\Delta_3 ln(Revenues)_{it}$			
	(1)	(2)	(3)	(4)
	(OLS)	(IV)	(IV)	(IV)
$\Delta_3 ln(Cr)_{it}$	0.147***	0.245***	0.309***	0.243***
	(0.007)	(0.031)	(0.035)	(0.032)
$\hat{\delta}_{it}$	0.040***	-0.047*	-0.084***	-0.050*
	(0.008)	(0.027)	(0.032)	(0.027)
$Empl_{it-3}$	0.000	0.001	0.001	-0.000
	(0.002)	(0.002)	(0.003)	(0.003)
$Prod_{it-3}$	0.018***	0.020***	0.032***	0.016**
	(0.006)	(0.005)	(0.008)	(0.007)
$fixassets_{it-3}$	0.084***	0.087***	0.097***	0.092***
	(0.012)	(0.012)	(0.017)	(0.015)
$RATING_{it-3}$	0.006***	0.006**	0.007****	0.005***
	(0.001)	(0.001)	(0.002)	(0.001)
$\Delta_3 ln(Wtrade)_{it}$			0.011	
			(0.007)	
Observations	39715	39715	28419	39809
Fixed effects	PT	PT	PT	ST
$M\&A_{it}$		-0.343***	-0.301***	-0.321***

Note: Results of regressions (1),where total revenues has replaced total exports as dependent variable. Columns (1) reports OLS estimates, columns (2)- (4) report IV estimates. Regressions in columns (1)-(3) control for province-time fixed effects. Regression in column (4) controls for sector-time dummies. Last row reports the coefficients of M&A in the first stage regression corresponding to the IV regression in each column. The sample period is 1997-2009. Conventional standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 19: M&A and Total Revenues - Reduced Form Estimation, (extended sample)

	Dependent variable: $\Delta_3 ln(Revenues)_{it}$		
	(1)	(2)	(3)
$M\&A_{it}$	-0.087***	-0.100***	-0.076***
	(0.010)	(0.011)	(0.009)
$\hat{\delta}_{it}$	0.176***	0.197***	0.168***
	(0.007)	(0.009)	(0.007)
$Empl_{it-3}$	-0.000	-0.002	-0.005**
	(0.002)	(0.003)	(0.002)
$Prod_{it-3}$	0.015***	0.028***	0.011**
	(0.005)	(0.008)	(0.006)
$fixassets_{it-3}$	0.078***	0.073***	0.079***
	(0.013)	(0.017)	(0.014)
$RATING_{it-3}$	0.006***	0.006***	0.004***
	(0.001)	(0.002)	(0.001)
$\Delta_3 ln(Wtrade)_{it}$		0.012**	
		(0.006)	
Observations	39942	28575	40037
Fixed effects	PT	PT	ST

Note: Estimation for the reduced form equation, where the dependent variable is regressed directly on the instrument. Regressions in columns (1) and (2) control for province-time fixed effects. Regression in column (3) controls for sector-time dummies. The sample period is 1997-2009. Bootstrapped standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 20: Total Credit and Revenues - Robustness (extended sample)

	Dependent variable: $\Delta_3 ln(Revenues)_{it}$		
	(1)	(2)	(3)
	(IV)	(IV)	(IV)
$\Delta_3 ln(Cr)_{it}$	0.304***	0.265***	0.283***
	(0.042)	(0.048)	(0.043)
$\hat{\delta}_{it}$	-0.074**	-0.068*	-0.031
	(0.035)	(0.037)	(0.029)
$Empl_{it-3}$	-0.000	-0.105***	-0.001
	(0.003)	(0.010)	(0.003)
$Prod_{it-3}$	0.024***	-0.024***	0.017**
	(0.008)	(0.007)	(0.007)
$fixassets_{it-3}$	0.122***	0.128***	0.079***
	(0.018)	(0.019)	(0.016)
$RATING_{it-3}$	0.005***	0.003	0.006***
	(0.001)	(0.002)	(0.002)
Observations	27778	19800	39204
Dummies	ST	ST	ST

Note: IV estimations of equation (1), where total revenues has replaced total exports as dependent variable. Columns (1) reports results for manufacturing firms, columns (2) for small firms and column (3) for short term debt. The sample period is 1997-2009. Bootstrapped standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.