The Effect of Credit on the Export Performance of Colombian Exporters*

Danielken Molina♠
Inter-American Development Bank *(IDB)*

Mónica Roa♣
Pennsylvania State University *(PSU)*

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Abstract

In this paper we use Colombian manufacturing data on exports and external financing for the period $1998 - 2006$ to estimate the credit elasticity of exports. We use bank-firm linked data to construct a supply side instrument for a manufacturer's demand of credit, which we use to address the reverse causality between a manufacturer's export revenue and its demand for credit. We find that access to credit produces a significant increase on a manufacturer's export revenue explained by the positive effect of credit on an exporter's market reach - number of destinations -. Across manufacturers the effect of credit on a manufacturer's export revenue varies by size. While medium sized manufacturers use credit to increase their market reach, market penetration and product mix, large manufacturers only use credit to increase their market reach. Small manufacturers do not seem to benefit from bank credit.

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♠E-mail: danielkenm@iadb.org.
♣E-mail:mroa@psu.edu.

1 Introduction

In order to produce, manufacturers need working capital that is used to pay for upfront costs that are due ex-ante production and sales are realized. When pockets are deep upfront costs are paid with a manufacturer's internal resources, but when the available working capital is limited, an active manufacturer is left with two options: $1)$ downsize the scale of production until the upfront costs are fully paid with internal resources, or $2)$ use an external financing source (investor) to meet its capital needs. In the latter case, access to an external financing source not only enables a manufacturer to avoid the under-investment problem of producing at a lower scale, but it also offers him the possibility to be active even in the cases when upfront costs are higher than the available internal resources.

Since exporting manufacturers incur additional upfront costs to service foreign market destinations, access to external sources of financing plays a key role in determining a manufacturer's export success. In line with the recent empirical evidence that links the use of external financing to the firm with a firm's export performance. We use an instrumental variable approach to estimate the credit elasticity of exports for manufacturing firms.

We use data for Colombian manufacturers'[1] to construct a data set that matches detailed manufacturer level information regarding exports, with detailed balance sheet information and matched firm-bank data. A manufacturer's balance sheet information enables us to know the magnitude of the external financing provided by banking institutions, while the matched firm-bank data is used to identify the banking institutions that provided the external financing to the manufacturer. These data also allows us to know the total lending disbursement performed by each financial institution. Together, these data allow us to estimate the bank financing elasticity of exports while controlling for firm specific and aggregate specific factors that are also related to a manufacturer's export performance.

Our findings suggest that bank financing has a significant and positive effect on a manufacturer's total volume of exports. We find that manufacturers use bank financing to increase their export market reach denoted by the number of export destinations. However, bank financing does not seem to have the same impact on the export outcomes of all manufacturers. Our results suggest that the positive effect of bank financing on a manufacturer's exports varies by manufacturing size. Bank financing seems to have a higher significant effect on medium-sized manufacturers, operating through all export margins. Medium-sized exporters use bank financing to increase their market reach, market penetration and product mix.

Empirically, our strategy uses the firm-year variation of the credit provided by banking institutions to estimate the bank financing elasticity of exports, while controlling for a manufacturer's prior leverage ratio, and a set of manufacturer and sector-year fixed effects. The use of manufacturer fixed effects sweeps out all the manufacturer specific non-observable factors that do not vary over time, but are related to a manufacturer's export performance and access to bank financing. The sector-year fixed effects control for macro and sector specific factors which in turn are known to affect a manufacturer's export performance and bank financing.

[1] Recent evidence on the real effect of bank financing on export entry is also available for other Latin-American countries. For example, Alvarez and Lopez (2012) use plant level data for Chile, and they find that financial development increases the probability of export participation of a plant, while Castagnino, D'Amato, and Sangiacomo (2013) use firm level from Argentina to show that manufacturers with more access to bank credit are more likely to start exporting. Nevertheless, none of these studies are able to make a causal interpretation of the result.

The challenge resides on acknowledging that the estimation of the credit elasticity of exports is subject to a reverse causality bias. While banking credit may lead a manufacturer to export, export participation may lead a manufacturer to accrue debt with banking institutions.[2] To address this problem, all of our estimates instrument a manufacturer's total demand of banking credit with a supply side instrument that is manufacturer specific. We instrument a manufacturer's banking credit demand with the total loan disbursements of the banks that have a lending relationship with a manufacturing firm. Provided that our matched firm-bank dataset enables us to identify the financial institutions that have a lending relationship with a manufacturer, we use the banks' balance sheet information on total loan disbursements jointly with a manufacturer's information on it's financial lending ties to construct a supply side instrument for a manufacturer's demand of banking credit. Our identification strategy uses the supply side determinants of a bank's credit disbursements to isolate a manufacturer's demand of banking credit from the factors determining a manufacturer's export performance. This empirical strategy allows us to estimate the effect of banking credit on a manufacturer's export performance.

In line with the recent and growing trade literature studying the real effects of credit constraints on a manufacturer's export performance, our baseline result suggests that access to external financing in the form of banking credit has a positive and significative effect on a manufacturer's export performance. Although the recent theoretical and empirical literature by Chaney (2005), Muûls (2008), Berman and Héricourt (2010) Manova (2013) and Feenstra, Li, and Yu (2014) supports the idea that access to external financing has a real and positive effect on a manufacturer's export performance,[3] the novelty of our paper resides on using disaggregated financial information at the firm level to determine whether a manufacturer uses external resources to finance it's own operational cycle,[4] rather than relying on standard proxies that the literature uses to infer whether manufacturers rely on external financing or if manufacturers are credit constrained.[5]

Our findings support the concept that external financing to the firm in the form of banking credit not only plays a central role in determining a manufacturer's entry decision into exporting (Chaney (2005), Greenaway, Guariglia, and Kneller (2007), Bellone, Musso, Nesta, and Schiavo (2009) and Berman and Héricourt (2010)), but they also support the concept that manufacturers also use external financing to finance their operational variable cost. As in Guiso, Sapienza, and Zingales (2004), Muûls (2008), Minetti and Zhu (2011), Manova (2013) and Feenstra, Li, and Yu (2014) our empirical setup relates a manufacturer's export revenue with a manufacturer's size of external financing.[6]

[2]Results on the direction of the causality are mixed. For example, Greenaway, Guariglia, and Kneller (2007) use a panel dataset of 9292 UK manufacturing firms, over the period $1993-2003$, and they find evidence suggesting that participation in export markets improves firms' financial health. On the contrary Bellone, Musso, Nesta, and Schiavo (2010) use French data of 25,000 manufacturing enterprises, over the period $1993-2005$, and they find that firms staring to export display a significant ex-ante financial advantage compared to their non-exporting counterparts.

[3]While Manova (2013) provides cross country sectoral evidence on the effect of credit constraints in financially developed economies on sectoral export patterns, Muûls (2008), Berman and Héricourt (2010) and Feenstra, Li, and Yu (2014) use firm level data to provide evidence on the negative effect of credit constraints on a manufacturer's export performance.

[4]Unfortunately, when a manufacturer does not use external financing, we can't differentiate if this was a choice or it was a result of being credit constrained by all the existing banking institutions.

[5]For example, Manova (2013) uses the standard Rajan and Zingales (1998) sectoral financing need to infer if a sector relies intensively on external sources of financing. Muûls (2008) focuses her analysis using a firm level credit score, while Berman and Héricourt (2010) and Feenstra, Li, and Yu (2014) use financial leverage ratios to infer if a manufacturer is credit constrained.

[6]While in Chaney (2005), Muûls (2008) and Manova (2013) a manufacturer's level of debt is taken as given,

Similar to Amiti and Weinstein (2011) and Paravisini, Rappoport, Schnabl, and Wolfenzon (2011), we take advantage of our matched firm-bank data and we construct a manufacturer-specific supply side instrument for credit demand. But, rather than using supply side variations of bank lending in times economic distress, our empirical estimation uses the variations in the supply side of bank credit to the firm.[7] The notion that supply side shocks matter for loan supply has been already established by previous literature. Using 1990s' data of Japanese banks, Peek and Rosengren(1997, 2000 and 2005) documented that financial health deterioration of Japanese banks led to a short supply of credit to construction firms in the US, with significant higher negative effects on the construction activity in the states that were heavily dependent on the financing provided by the affected Japanese banks. Using aggregate data, Ashcraft (2014) finds that the deterioration of the financial health of banks in Texas led to decrease of the country level output.

Our findings are also linked to the evidence found in the literature of finance and growth suggesting that countries with more developed financial systems have a comparative advantage in sectors with higher dependence on external sources of financing. While Rajan and Zingales (1998), Petersen and Rajan (1997) and Fisman and Love (2003) find that access to external financing has a positive and higher significant effect on the sectoral growth rates of financially dependent sectors,[8] recent evidence by Manova (2013) suggests that the sectoral growth rate of exports is higher for financially dependent sectors when located in financially developed countries. But in times of economic downturns, Braun and Larrain (2005), Kroszner, Laeven, and Klingebiel (2007) and Dell'Ariccia, Detragiache, and Rajan (2008) show that the short supply of credit has a higher real effect on the growth rates of financially dependent sectors.[9] In the period of the 2009 global economic crisis, evidence by Berman (2009), Iacovone and Zavacka (2009) and Chor and Manova (2012) confirms that most financially dependent exporters were more negatively affected by the short supply in external financing.

Our paper contributes to the current literature of trade and external sources of financing to the firm by finding that the positive and significant effect of bank financing on exports varies across manufacturers' size. In particular, we find that the effect of bank financing on a manufacturer's market penetration is significantly higher for small and medium-sized firms, while the effect of bank financing on a manufacturer's export market reach is significantly higher for medium and large-sized firms. The mixed results suggest that there is a clear distinction on bank financing strategy by firm size. Small and medium-sized manufacturers use bank financing to increase their product mix, while medium and large-sized manufac-

Feenstra, Li, and Yu (2014) develop a contract theory model of financing where manufacturer's endogenously choose their level of external financing and their optimal level of interest rates which enables the creditor to acknowledge a manufacturer's credit type. In a general equilibrium setup, Formai (2013) develops a model where firms finance the costs for product innovation and domestic and foreign market entry with external capital. In this setup credit frictions cause misallocations of resources with significant effect over the export performance of manufacturing firms.

[7] In particular Amiti and Weinstein (2011) and Paravisini, Rappoport, Schnabl, and Wolfenzon (2011) use the change of a bank's financial health in periods of economic distress as an instrument for the change of a manufacturer's demand for credit.

[8] While Rajan and Zingales (1998) find that the growth rate of sectors relying more on external financing is higher when located in financially developed economies, Fisman and Love (2003) and Petersen and Rajan (1997) show that in non-developed economies sectoral growth rates are higher for sectors that are more intense in the use of supplier trade debt; an alternative source of external financing to the firm.

[9] A common problem within this literature is that estimates do not address the endogeneity problem between crises and growth. Lower growth rates may deter the ability of agents to repay back loans, so crises may arise as a consequence of low growth rates.

turers prefer to use bank financing to increase their export market reach. We reconcile this finding with the prior evidence of Beck and Demirguc-Kunt (2006) and Beck, Demirgüç-Kunt, Laeven, and Maksimovic (2006) suggesting not only that access to finance is different by firm size, but these differences translate into growth outcomes that vary by firm size.

This paper is structured as follows: section 2 summarizes why external financing to firms is more important for exporting firms, and also describes the theoretical results embodied by previous models of international trade and firm credit constraints. Section 3 provides a description of our dataset and formulates our empirical estimation strategy. Section 4 discusses our results; and finally, section 5 concludes.

2 External Financing and Related Literature

2.1 Relevance of External Financing

Production is a capital intensive activity that requires the payment of upfront costs which are financed using a manufacturer's internal and external resources. When internal resources are limited, external resources become an additional financing source that manufacturers use to accrue the entire upfront costs of production. In this case, access to external financing becomes an important instrument that enables a manufacturer to overcome cash flow needs without affecting its decision on the scale of production. In this sense, domestic and exporting firms are not very different from each other; both require working capital to cover upfront costs.

In comparison when producing for the local market, exporters accrue additional upfront costs. Some of these costs are related to fixed costs of exporting, affecting entry into export market destinations, while others are related to an increase of a manufacturer's marginal cost. The latter may be explained by the rise of per unit charges due to additional transport fees when shipping cargo to a foreign destination, or because per unit costs increase as manufacturers decide to upgrade a product's characteristics to match consumer preferences in more demanding foreign markets, or because a manufacturer engages in per unit marketing costs following a sales strategy to position its product in the foreign market.[10] Either way, an increase in a manufacturer's variable cost structure affects its optimal pricing rule which in turn affects its total demand, total export revenue and total export profit.

In addition to paying for additional upfront costs, exporters face additional financing needs due to the mismatch between the time when costs are accrued and the time when revenue from foreign market destinations is realized. That is, to deliver a product in T days in a foreign destination, a manufacturer must first buy the inputs required for production. Unless the timing of payment of these inputs is set to be equal to the timing when export revenue is realized, manufacturers are required to pay for production costs prior to the realization of revenue. Since production, transportation, customs' processing and local distribution in the final market requires additional time, exporters need to finance operational costs for at least two additional months beyond the time required by manufacturers producing only for the local market.[11] Exporters are thus more dependent on external sources of financing than domestic producers.

[10] In Arkolakis (2010) marketing costs gives rise to a new margin of adjustment of a country's volume of exports.

[11] According to Djankov, Freund, and Pham (2010), on average it takes 31 days for firms to transport a 20 foot container from its factory doors into a shipping vessel, and another 25 days for firms in the destination country to receive the good at the purchaser's location.

Understanding how exporters use external financing to the firm allows us to determine how financing affects a manufacturer's export market performance. Depending on the financing need, external financing to the firm may only affect a manufacturer's decision to enter into foreign export markets (as in Chaney (2005)), while if debt is also used to finance a manufacturer's variable cost, one should expect that the financing cost will also impact export revenues through the implied shift in the variable cost (see Muûls (2008), Manova (2013) and Feenstra, Li, and Yu (2014)). In the following sub-section we will provide a brief overview of the results obtained when heterogenous productive manufacturing firms are internally financially constrained; hence, they use external financing to fund their fixed and variable costs.

2.2 Theoretical Related Framework

Recent literature on international trade accounts for the effects of credit constraints on export market outcomes. In this section, we use Manova's (2013) baseline model to highlight the effects of external financing on a firm's decision to export and on a firm's export revenue. We use these findings to guide our empirical estimation in section 3.

In Manova's (2013) model, heterogenous productive exporters finance their total cost structure using internal and external sources of financing to the firm. As in Braun (2003), manufacturers acquire external financing from financial markets by pledging a tangible asset that is only used when a manufacturer fails to honor the financial contract. Under a given demand for external financing and an exogenous probability of repayment, financially dependent exporters choose an optimal pricing rule which among other factors is determined by the return paid to the external investor. Since the cost of capital shifts a manufacturer variable cost, financially dependent exporters price their products at a higher per unit level. Higher per unit prices decrease demand, which translates into lower export revenues that financially dependent producers are willing to accept at the expense of lower financing costs. This trade off enables financially dependent exporters to export at a scale that, although smaller, is closer in magnitude to the scale achieved if they where not financially dependent.

As proposed, external financing enables a manufacturer to meet the cash flow requirements that they otherwise would not be able to meet, avoiding to shut-down operations due to liquidity constraints. In comparison to this outcome and despite the increase in marginal cost, access to external financing enables the exporter to produce at a higher scale and it enables the exporter to obtain a higher revenue.

In terms of entry, a manufacturer self-selects into local and foreign markets when its productivity level is above certain endogenous market specific certain cut-off level. In the context of a model with financially dependent manufacturers, Manova's (2013) model provides four endogenous entry thresholds per destination market. Two determine entry for non-financially and financially dependent local manufacturers, while the other two determine entry for non-financially and financially dependent foreign manufacturers.

Regardless of the original location of manufacturers, the entry threshold for a financially dependent manufacturer lies to the right of the entry threshold for non-financially dependent firms. Meaning that highly financially dependent manufacturers are less likely to self select into production, as the cost and the magnitude of the external financing makes entry to only be achieved by highly productive manufacturing firms. In this model financially dependent manufacturers experience a productivity cut-off condition that increases with a manufacturer's level of financial external dependence. Consequently, a

highly financially dependent manufacturers are less likely to produce or export, as the endogenous entry conditions are set at a higher level. In this setup external financial dependence is only offset when a manufacturer draws a high productivity, or when the financially dependent manufacturer offers the investor a higher return to secure the external financing.[12] Across sectors, entry into exporting becomes more difficult as sectoral characteristics induce firms to become more dependent upon external sources of financing.

Credit dependence also affects the number of destination countries a firm chooses to serve and the number of products that a firm decides to trade. In terms of destinations, financially dependent firms choose which destinations to service, ranking them from most profitable to least profitable. Conditional on the external financing obtained by the firm, the number of destination markets it serves is directly related to how credit dependent the firm is. Highly financially dependent manufacturers are able to export to fewer destinations. Likewise, manufacturers facing external financing constraints will export only the most profitable products, and will ship fewer products to their foreign market destinations.

To summarize, credit constraints affect both a firm's extensive and the intensive margin of trade. These effects are more pronounced when firms are more dependent on external sources of financing. Understanding how a firm uses external sources of financing allows us to identify the financing sources that might be used to lessen the adverse effects of the cost of external financing on a firm's extensive and intensive margins of trade.

3 Data and Empirical Strategy

3.1 Data

To relate a manufacturer's current export outcomes to its current external financing sources, we constructed an unbalanced panel dataset using detailed information on exports, financial statements and bank-firm linked data for $2,930$ Colombian exporters, classified within the industrial sectors of Agriculture (sectors 1-5) and Manufacturing (sectors 15-39) as defined by the international standard industry classification, ISIC revision 3.1, for the period $1998 - 2006$.

Manufacturing export data was extracted from the Transactional Export Dataset (TED) processed by "Dirección de Impuestos y Aduanas Nacionales" (DIAN). TED contains the universe of transactions realized by Colombian exporters at the product level per destination country.[13] From this dataset we extracted annual information on the total value of exports, the market reach - number of export destinations -, product mix[14] - number of exported products - and the export market penetration - exports per destination - for the universe of Colombian exporters.

A manufacturer's financial information was extracted from the Financial Statement Database processed by the "Superintendencia de Sociedades" (SS). Although this dataset does not allow us to obtain

[12] Unfortunately, this type of setup does not take into account that higher returns imply an endogenous adjustment of the repayment probabilities. Since repayment probabilities are taken as given, the model does not capture the decrease in the probability of repayment caused by rise of a manufacturer's credit dependence, or when exporters accept higher interest rates in return of securing a loan disbursement.

[13] Eaton, Eslava, Kugler, and Tybout(2007,2008) use this data to provide firm level evidence on the patterns of market reach of Colombian exporters.

[14] For robustness purposes we performed this calculation defining a product line at the 10, 8 and 6 digit level of the harmonized system code product classification.

financial information for the universe of manufacturing firms, it allows us to gather detailed financial information on the type, the term and the currency composition of the external financing of a sub-set of manufacturing firms. Colombian regulations established that there are two reasons why a commercial manufacturer could be included in this data set: First, if at the end of the fiscal year[15] its sales/total assets are higher than a reporting threshold that is set in multiples of the country's yearly monthly minimum wage. Since 1993, the reporting threshold requirement has been modified three times. Decree 1258 of 1993 initially established that firms with only a value of assets over the equivalent of 20,000 times the minimum monthly wage were oblige to report their financial statement to SS.[16] Decree 3100 of 1997 modified the baseline financial account upon which the threshold was set. From this point onwards, the threshold was set to be compared with a manufacturer's total assets or total sales. Decree 4350 of 2006 increased the minimum monthly wage multiple up to 30,000 times the total level of assets or sales of the firm. Meaning that in year 2006, a manufacturer was oblige to report its financial statements to SS if at the end of the fiscal year its level of sales or total assets was above USD5.2 millions.[17]

Second, for regulation purposes the superintendent in charge might decide to include manufacturers in the survey even though they fail to meet the minimum reporting threshold upon which they are obliged to report their financial statements to SS. Several non-observed reasons may explain the inclusion of these firms within the data set. For example, a direct petition of the stakeholders, or a judicial requirement may require the superintendent to oblige a manufacturer to report its financial statements to SS.[18]

The two rule selection criteria of inclusion into the SS data set not only implies that our data set is mainly composed by medium and large sized firms, but it also introduces a bias on a manufacturer's entry decision into producing/exporting. That is, the year when a firm reports financial information to the SS does not correspond to the year when the firm decides to be active. Across time, when a firm fails to be included within the SS database, it does not imply that the corresponding manufacturer has decided to exit the market; it only means that a manufacturer's sales/assets size does not meet the selection reporting criteria. For our empirical exercise, we cannot use the data to study the self-selection process into producing/exporting, but we can use the data to investigate the relation between a manufacturer's external financing choices and a manufacturer's export outcomes. In this context, our empirical strategy requires accounting for the selection bias to include a manufacturer in the database.

A manufacturer's information on sources of financing was used to construct a bank-firm linked dataset that we built using Superfinanciera's financial format 341 and the banks' balance sheet information. We used Superfinanciera's format 341 to obtain yearly information of the financial institutions that are effectively providing credit to manufacturing firms. We matched this dataset with a bank's information on the yearly total loan disbursements, and we obtained a manufacturer specific variable that we use as a supply side instrument for credit demand.[19]

[15] Decree 2649 of 1993 sets December 31st as the end of the fiscal year in Colombia.

[16] From $1993 - 1996$, commercial manufacturers where only obliged to report their financial statements to SS by only comparing their level of total assets to the level set by the given reporting threshold.

[17] In table 1 we report by year the thresholds that are used to determine if a manufacturer is obliged to report its financial statements to SS.

[18] We would like to thank Marcela Eslava for sharing detailed information on the entry selection criteria into the SS's database.

[19] Sub section 3.2 provides detailed explanation on the construction and use of the financing supply side instrument.

Export Outcomes and External Financing

Table 2 reports summary statistics for our firm-year unbalanced panel data set that we construct using firm-level export outcome data, firm-level balance sheet information, and bank-firm linked information. Our dataset includes $11,191$ observations, for a sample of $2,930$ manufacturing exporters classified within industrial sectors of Agriculture (sectors 1-5) and Manufacturing (sectors 15-39) as defined by the international standard industry classification, ISIC revision 3.1, for the period $1998-2006$. The available information within the SS's database enable us to construct an unbalanced database containing 38.4% of the universe of Colombian exporters, which in turn represents on average 72.1% of Colombia's total export volume (per year results are reported in table 3).[20] This percentage corresponds to almost the country's total export share achieved by manufacturers classified in the economic sectors that are not related to the extraction of petroleum, gas and coal; which in the case of Colombia represents on average 28% of the country's yearly exports.

On average, a Colombian manufacturer exports a total volume of USD$312,000$, with a reported export market penetration of USD$82,500$, an average export market reach of six countries and an average product mix equal to 8 products.[21] A manufacturer's average size is around USD5.7 millions, with an asset tangibility equivalent to 20% of a manufacturer's average size and an average leverage ratio equal to 49% of a manufacturer's total assets. While a manufacturer's active financing is on average provided by three different financing institutions; our evidence suggests that a manufacturer's access to finance might be concentrated, as 25% of the sample of manufacturers obtains external financing from only one financing institution.[22]

Although a manufacturer can obtain external financing from different sources, (e.g. standard debt loans, supplier trade debt, equity and other financing sources), the empirical evidence for Colombian exporters reveals a concentration on the financing source type. Almost 61% of a manufacturer's total liability is financed using bank credit and supplier trade debt. Bank financing accounts to 33% of a manufacturer's total liabilities, while supplier trade debt accounts up to 28% of a manufacturer's total liabilities.[23] The term structure of a manufacturer's external financing supports the idea that manufacturers use external financing to finance their cash flow requirements for production, as 52% of a manufacturer's total liabilities are short term related. While50% of this short term financing is provided by domestic financing institutions, 37% is provided by domestic suppliers.

Across manufacturers, the characterization of the sources and term structure of external financing reveals differences on the type of financing used to meet a manufacturer's cash flow requirements. As reported in panel B in table 2, we classified manufacturers by size using Colombia's asset classification criteria as given by Law 590 of year 2000.[24] Although Colombia's current manufacturer size classifi-

[20]Although the database only matches at most 44% of the country's number of exporters (year 1998), the match on the total value of exports is high, and it is in line with recent evidence by Freund and Pierola (2012) where regardless of the country, custom level data around the world reflects a concentration of a country's level of exports. As reported by the authors, the top 1% of Colombian exporters concentrate nearly 51% of the countries total volume of exports.

[21]Measured at the 6,8 and 10 digit level of the harmonized system code. For details, refer to table 2.

[22]Corresponding to the number of financing institutions evaluated at the 25th percentile; see table 2.

[23]The other 49% is composed by liabilities not related to production; two examples are differed debt to workers and other liabilities.

[24]Since late 1980's, the size classification criteria has been modified in three opportunities: 1)Law 78 of 1988. 2) Law 590 of 2000 and 3) Law 905 of 2004.

cation is determined by law 905 of 2004, the sample period of our database implies that 70% of the firm-year observations were subject to the size classification given by Law 590 of year 2000. Hence, we use the total asset thresholds as determined by Law 590 of year 2000 to classify a manufacturer within one of the following three size categories: 1) Small: when a manufacturer's level of total assets is lower than USD 2.5 millions. 2) Medium: when a manufacturer's level of total assets is between USD 2.5 millions and USD 5.1 millions, and 3) Large: when a manufacturer's level of total assets is greater than USD 5.1 millions.[25]

We not only find that export performance increases with size (see figure 1(a)), but we also find that there are also significant differences in the type and the terms upon which manufacturer's use external financing. Small manufacturer's have a higher percentage of tangible assets, they exhibit a higher leverage ratio despite having a lower level of bank debt, and having a lower number of financing ties. Though, the higher leverage ratio of small manufacturers seems to be explained by their higher use of supplier trade debt. In contrast, large manufacturers tend to rely more on bank financing, as their total debt ratio is 8 percentage points higher than the observed for small manufacturers. A manufacturer's different financing choice may be partially explained by the relative cost of bank debt. As reported in figure 1(c), credit interest rates are higher for small manufacturing firms than they are for large manufacturing firms. We now turn to test whether these financing patterns are related to a manufacturer's export performance.

3.2 Empirical Strategy

Our objective is to test whether a manufacturer's current external bank financing $bloan_{i,s,t}$ has a positive and significant effect on a manufacturer's current export outcomes $y_{i,s,t}$. Our baseline specification is

$$\ln y_{i,s,t} = \beta_0 + \beta_1 \ln \text{bloan}_{i,s,t} + \beta_2 \text{levrat}_{i,s,t-1} + \Lambda_i \gamma + \Gamma_{s,t} \delta + \varepsilon_{i,s,t}, \tag{1}$$

where sub-indexes i, s, t refer to a manufacturer i, classified within the industrial sector s at time t. $y_{i,s,t}$ corresponds to a manufacturer's total value of exports, but provided that its total export revenue may be decomposed into its export margins, we extend our baseline specification by testing whether current bank financing also affects a manufacturer's export margins. Therefore, $y_{i,s,t}$ not only represents a manufacturer's total export revenue, but it also represents a manufacturer's export market reach (number of export destinations), a manufacturer's export market penetration (exports per destination) and a manufacturer's product mix (number of exported products). These are measured at the 6, 8 and 10 digit level of the harmonized system code.

Provided that a manufacturer's current external financing comes from a wide set of investors; i.e. bank financing, equity finance, supplier trade debt or loans from non-financial institutions or other in-

[25] Originally, Law 590 of year 2000 determines that the thresholds used to determine a manufacturer's size classification are based on a cutoff level given in multiples of the country's yearly minimun wage (ymw). Large manufacturers are those whose level of total assets is greater than $30,000$ ymw. Medium manufacturers are those whose level of total assets is within the bracket of $15,001 - 30,000$ ymw. Small manufacturers are those whose level of total assets is within the bracket of $5,001 - 15,000$ ymw and Micro-manufacturers are those whose level of total assets is below $5,000$ ymw. The calculations included in the text are obtained using the implied ymw in US dollars of year 2006 as reported in column 4 of table 2. Since the country's ymw. changes by year, in our estimates a manufacturer's size classification varies through time not only because the implied threshold level changes with each year's minimum wage level, but also because a manufacturer's total asset value also varies through time.

dividual investors. In all of our specifications $bloan_{i,s,t}$ corresponds to the current total value of new loan disbursements given by banking institutions; $bloan_{i,s,t} = \sum_{b \in B} bloan_{b,i,s,t}$, where b identifies the bank providing the external financing and B is the set of banks in the database. The reason to only focus on current bank financing is based on the evidence that Colombian manufacturers use bank financing as their main external financing source, while the use of other financing sources represents less than 4% of a manufacturer's total liabilities.[26]

All of our estimates control for a manufacturer's ex-ante leverage ratio $\text{levrat}_{i,s,t-1}$ which we use to control for manufacturer specific credit constraints that limit its own current export performance and current bank credit access. We also include a set of firm fixed effects Λ_i and a set of year fixed effects Γ_t. The use of manufacturer fixed effects enables us to sweep all the manufacturer specific non-observable factors that do not vary through time and are related to a manufacturer's export performance and to a manufacturer's access to current bank financing. Year fixed effects control for non-observable macro factors that are known to affect a manufacturer's export performance and a manufacturer's demand for bank financing. As an alternative one may also would like to control for non-observable macro factors that are sector-year specific which in turn affect a manufacturer's export performance and credit demand. Hence, our results also include estimates that instead of including year fixed effects, include sector-year fixed effects. In addition, all of our estimates cluster standard errors using a manufacturer's industry classification - 4 digit level, ISIC revision 3.1-.

Even though the use of external financing implies an increase of a manufacturer's marginal cost that is equal to the cost of financing (credit interest rate), one should also take into account that external financing may also imply a decrease of marginal cost due to the scale effect of production. When there are increasing returns to scale, the marginal cost of production decreases with the scale of production. When externally financed, the scale of production is higher than the level obtained when production is limited by a manufacturer's internal financing. If the savings due to the scale effect of production are higher than the marginal cost increase due to the cost of financing, one should expect that $\hat{\beta}_1 > 0$.

3.2.1 Estimation Problems

Empirically, there are several factors affecting the correct estimate of coefficient $\hat{\beta}_1$. First, the estimated magnitude of $\hat{\beta}_1$ is subject to a reverse causality bias. While banking credit may lead a manufacturer to export, current export participation may lead a manufacturer to accrue current debt with banking institutions. Second, the correct estimation of parameter $\hat{\beta}_1$ should take into account that the selection criteria to include a manufacturer into SS's data set produces a sampling of manufacturers that is non-random (see Wooldridge (2002), chapter 17). This implies that when estimating equation (1) one not only should take into account the reverse causality problem, but one should also take into account that there is an incidental truncation problem that if significant may make the estimates of parameter $\hat{\beta}_1$ to be inconsistent.

[26] See debt ratios of equity and other financing sources reported in table 2.

We address these problems by re-setting the estimation of equation (1) as

$$\ln y_{i,s,t} = \beta_0 + \beta_1 \ln \text{bloan}_{i,s,t} + \beta_2 \text{levrat}_{i,s,t-1} + \Lambda_i\gamma + \Gamma_{s,t}\delta + \varepsilon_{i,s,t}, \tag{2a}$$

$$\ln \text{bloan}_{i,s,t} = \eta_0 + \eta_1 \ln sloan_{i,s,t} + \eta_2 \text{levrat}_{i,s,t-1} + \Lambda_i\theta + \Gamma_{s,t}\mu + \xi_{i,s,t} \quad \text{and} \tag{2b}$$

$$y_{1,i,s,t} = \mathbb{1}\{z_{i,s,t}\lambda + \Lambda_i\alpha + \Gamma_{s,t}\rho + \nu_{i,s,t} > 0\}. \tag{2c}$$

Equation $(2a)$ is our equation of interest. Equation $(2b)$ is the linear projection that we use to address the reverse causality problem of bank lending and equation $(2c)$ is the selection equation that we use to correct for the non-random sampling of SS's dataset. The variables $\ln sloan_{i,s,t}$ and $z_{i,s,t}$ are the instruments that we use to address the reverse causality problem and the incidental truncation problem. While Λ_i and $\Gamma_{s,t}$ are a manufacturer and year/sector-year fixed effects, and $\varepsilon_{i,s,t}$, $\xi_{i,s,t}$ and $\nu_{i,s,t}$ are the corresponding error terms with $\nu_{i,s,t} \sim \text{N}(0,1)$.[27]

As proposed by equation $(2b)$, in all of our specifications we instrument a manufacturer's current bank lending with a manufacturer specific supply side instrument of bank credit that we construct using the bank-firm matched data set. Provided that this data set contains information on the financial institutions that have a lending relationship with a manufacturer, and given that from a bank's balance sheet information we extract a bank's total loan disbursements $sloan_{b,s,t}$, we use these data to construct a supply side instrument of bank credit $sloan_{i,s,t}$ that is equal to the sum of the loan disbursements executed by the banking institutions that have a commercial banking relationship with the manufacturing firm; i.e. $sloan_{i,s,t} = \sum_{b \in B} sloan_{b,s,t}$. Since one may think that the credit demand of big manufacturers may affect a bank's overall supply of credit, for each manufacturer the supply side instrument is net of a manufacturer's own credit demand obtained from these banks. To sum up, our identification strategy uses a bank's supply side determinants of credit disbursements to isolate a manufacturer's demand of banking credit from the factors determining a manufacturer's export performance. We expect that the first stage results of $\hat{\eta}_1$ should be significantly greater than zero.

We use equation $(2c)$ to address the non-random sampling problem that affects the selection of manufacturers into SS's database. In this context $y_{1,i,s,t}$ is an indicator variable that takes the value of one when $z_{i,s,t}\lambda + \Lambda_i\alpha + \Gamma_{s,t}\rho + \nu_{i,s,t} > 0$, where $z_{i,s,t}$ is a manufacturer-year specific exogenous instrument that determines whether in a given year a manufacturer is included in the data set. Provided that the SS's superintendent has discretionary power to oblige a manufacturer to report its financial statements even though it might not meet the exogenous threshold condition to report, and given that within a ten year period the SS's superintendent has been changed every two years, we use a superintendent's term in office as an instrument for a manufacturer's inclusion into SS's data set. Hence, $z_{i,s,t}$ in equation $(2c)$ is a matrix with four dummy variables. Each variable takes the value of one during the term when a given superintendent was in office. Since superintendents are in office for more than a year, and given that their term in office does not correspond to a calendar year, one does not expect that the set of year fixed effects will absorb the significance of the coefficients linked to the term in office instruments.

While $y_{1,i,s,t}$ and $z_{i,s,t}$ are always observed, $\ln y_{i,s,t}$ and $\ln \text{bloan}_{i,s,t}$ are only observed when $y_{1,i,s,t} = 1$. Our estimation procedure is applied as follows: First, we estimate parameters $\hat{\lambda}'$, $\hat{\alpha}$ and $\hat{\rho}$ in equation $2c$ with a probit of $y_{1,i,s,t}$ on $z_{i,s,t}$ using all the observations. Second, after testing for the sig-

[27] Additional assumptions require that $\varepsilon_{i,s,t}$, and $\nu_{i,s,t}$ are independent of $z_{i,s,t}$, and that $\text{E}\left(sloan'\xi\right) = 0$.

nificance of our term in office instruments, we proceed to estimate the inverse mills ratio $\hat{\lambda}^{M}_{i,s,t} = \frac{\phi\left(z_{i,s,t}\hat{\lambda}+\Lambda_i\hat{\alpha}+\Gamma_{s,t}\hat{\rho}\right)}{1-\Phi\left(z_{i,s,t}\hat{\lambda}+\Lambda_i\hat{\alpha}+\Gamma_{s,t}\hat{\rho}\right)}$. Third, we proceed to estimate equation (2a) using a standard $2SLS$ estimation procedure on the observations where $y_{1,i,s,t} = 1$, while including the inverse mills ratio which is set to control for the sample selection bias. In other words we proceed to estimate

$$\ln y_{i,s,t} = \beta_0 + \beta_1 \ln \text{bloan}_{i,s,t} + \beta_2 \text{levrat}_{i,s,t-1} + \beta_3 \hat{\lambda}^{M}_{i,s,t} + \Lambda_i\gamma + \Gamma_{s,t}\delta + \varsigma_{i,s,t}, \tag{3}$$

using a standard IV estimation approach that deals with the reverse causality problem between $\ln y_{i,s,t}$ and $\ln \text{bloan}_{i,s,t}$. At this stage we need to test if our supply side instrument is significantly different from zero ($\hat{\eta}_1 \neq 0$), and if the estimate of $\hat{\beta}_3$ is statistically different from zero. If we fail to reject that $\hat{\beta}_3 \neq 0$, we find that the sample selection bias in the SS dataset is not significant, and estimates of equation (1) can be carried out by implementing a standard $2SLS$ without requiring to control for the sample bias.

The observed differences in the financing patterns by size lead us to extend our baseline specifications by testing whether the estimate magnitude of $\hat{\beta}_1$ in equation (3) differs across manufacturers' size. Prior evidence by Carpenter and Petersen (2002),Beck and Demirguc-Kunt (2006), and Beck, Demirgüç-Kunt, Laeven, and Maksimovic (2006) supports the view that access to credit is more difficult for small and medium sized firms. Hence, one should expect that the estimated credit elasticity of export outcomes should vary by manufacturer size.

4 Results

4.1 Overall Evidence

Tables 5 through 8 report the results for our benchmark specification as proposed in equations $2a - 2c$. We estimate the credit elasticity of exports outcomes, where export outcomes are measured by an exporter $1)$ total export volume (table 5), $2)$ market reach (table 6), $3)$ market penetration (table 7) and $4)$ product mix (table 8). In all tables column (1) corresponds to the results obtained when we do not take into account the estimation problems as recently discussed. Columns $(2) - (4)$ report the results obtained when we follow the self-selection estimation approach with some differences. While columns (2) and (3) only take into account the reverse causality problem using an standard IV approach with year and sector-year fixed effects, column (4) reports the results obtained when we also control for the sample selection bias using the inverse mills ratio that we calculate after estimating equation $(2c)$. In columns $(2) - (4)$, we include the first stage results on the coefficient of credit supply and we include the corresponding F-statistic that we use to determine whether our instrument in the first stage is weak. Since column (4) is the only specification that controls for the entry selection problem, we also include a joint significance test of the relevance of the estimated coefficients for the instruments of term in office that we use to estimate the probit specification.

Results in table 5 are in line with the theoretical findings that current access to bank financing enables a manufacturer to increase its current export revenue. Not only the estimated coefficient for current bank financing is positive and significant at 5% in all specifications, but our results suggest that disregarding the reverse causality problem between exports and bank credit produces a downward bias in the estimated coefficient that is corrected once we use our manufacturer specific supply side

instrument as reported in column (2). The first stage results on the significance of our instrument not only suggests that our supply side instrument is relevant, but the reported magnitude of the estimated F-statistic suggests that our estimation strategy does not suffer from a weak instrument problem as the estimated value of the F-statistic is in all cases greater than 10 (Stock, Wright, and Yogo (2002)). Results in column (4) show that the sample selection bias of the SS's data set is not statistically different from zero as the significance of the inverse mills ratio fails to be different from zero. One may wonder if this is because the instruments in the selection equation are not significant. Although we do not report the estimates of the probit estimate, we report the F-statistic associated to the joint test on the significance of the instruments that we use to characterize the sample selection into the SS's data. The term in office instruments in the probit specification are jointly significantly different from zero. Hence, the lack of significance of the inverse mills ratio in column (4) implies that estimating equation (1) following the standard IV estimation approach to deal with the reverse causality bias will produce consistent estimates for $\hat{\beta}_1$. Hence, our estimates in column (3) suggest that an increase in a manufacturer's bank financing debt level from the sample average to the level obtained at the 75th percentile implies an increase of manufacturer's export revenue of 63.1%.[28]

Our detailed export data, enables us to test whether the effect of bank financing on a manufacturer's export revenue is channeled through an specific export margin. The available export information extracted from the TED allows us to calculate a manufacturer's market reach, market penetration and product mix at three different levels of aggregation of the harmonized system code. Tables 6 and 7 report the results obtained when testing for the effect of current bank financing on a manufacturer's market reach and on a manufacturer's export market penetration. Table 8 reports the results obtained when testing for the effect of bank financing on a manufacturer's product mix, given three alternative definitions to of the head count of products.

Results in table 6 support the idea that current bank financing has a significant effect on a manufacturer's decision to export to more foreign destinations. The reported first stage results in columns $(2) - (4)$, not only validate the significance of our instrument, but also suggests that our estimation strategy does not suffer from an estimation bias due to the use of a weak instrument. Column (4) confirms that the sample selection bias does not affect the overall estimates of bank-credit coefficient. The estimated coefficient in column (3) suggests that increasing a manufacturer's bank financing debt level from the sample average to the level obtained at the 75th percentile increases a manufacturer's number of export destinations by 24.6%, the equivalent to 2 additional destinations.[29]

Unfortunately, our estimates on market penetration (7) and the product mix (8) reveal that bank

[28]The estimated percentage increase of a manufacturer's exports is obtained using the percentage increase of bank financing when moving from the sample average up to the level observed at the 75th percentile joint with the estimated coefficient of the current New Bank Financing reported in column (3)-table 5. Thus, a manufacturer's export revenue increase of $63.1\% = \hat{\beta}_1 * \% \triangle \text{bloan}_{75-50}$. Provided that $\hat{\beta}_1 = .059$ and $\% \triangle \text{bloan}_{75-50} = \left[\frac{\text{bloan}_{75}}{\text{bloan}_{50}} - 1\right] * 100$, where bloan_{75} and bloan_{50} correspond to the level of bank financing at the 75th and the 50th percentile reported in log. scale in table 2.

[29]The estimated percentage increase of a manufacturer's number of export destination is obtained using the percentage increase of bank financing when moving from the sample average up to the level observed at the 75th percentile joint with the estimated coefficient of the current New Bank Financing reported in column (3)-table 6. Thus, a manufacturer's export destination increase of $28.9\% = \hat{\beta}_3 * \% \triangle \text{bloan}_{75-50}$. Provided that $\hat{\beta}_1 = .027$ and $\% \triangle \text{bloan}_{75-50} = \left[\frac{\text{bloan}_{75}}{\text{bloan}_{50}} - 1\right] * 100$, where bloan_{75} and bloan_{50} correspond to the level of bank financing at the 75th and the 50th percentiles obtained from reported log. scales in table 2.

financing does not have any significant effect in affecting these export margins.

4.2 Evidence by Manufacturing Size

Since our data reveals that there are significant differences on the financing sources used by manufacturing firms when characterized by size, we extended our benchmark estimates by testing whether the effect of bank financing on a manufacturer's export outcomes vary by firm size. Following the same estimation approach that we lay out in equations $(2a) - (2c)$, we first test whether bank financing has a different effect on a manufacturer's export revenue when exporters are characterized by size. Second, we continue to test whether the effect of bank financing operates throughout a particular export margin, and if so, we test if there are significant differences of the effect across manufacturer's size.

Following Law 590 of year 2000, we classified manufacturers in our database within three groups: $1)$ Small: Manufacturers with a level of total assets lower than USD2.5 millions. $2)$ Medium: Manufacturers with a level of total assets between USD2.5 millions and USD5.1 millions, and $3)$ Large: Manufacturers with a level of total assets that is higher than USD5.1 millions.

Although we know that estimating equation (1) under the standard IV procedure provides consistent estimates of the bank financing parameter, in tables $9 - 12$ we continue to report the results obtained even when we control for the sample selection bias. In all tables columns $(1) - (3)$ correspond to the effect of bank financing when we only address the reverse causality problem while columns $(4) - (6)$ correspond to the results when we include the inverse mills ratio in the estimates. In all tables we confirm that omitting the sample selection correction parameter (inverse mills ratio) does not produce a bias on the $\hat{\beta}_1$. Hence, we focus our analysis on the results reported in columns $(1) - (3)$.

As reported in table 9, bank financing has a differential effect on the export revenue of medium-size manufacturers. The estimates in column (2) suggest that increasing bank financing from the sample average up to the level observed at the 75th percentile produces an export increase of 63%. The differential export increase of medium-size manufactures is not only explained by an increase in market reach, but it is also explained by an increase on market penetration and product mix. Reported results in column (2) - tables 9 through 12 - show that an increasing bank financing from the sample average up to the level observed at the 75th percentile produces a market reach increase equivalent to 1.5 destinations; produces an increase of market penetration equivalent to 37.6%, and produces an increase on its product mix equivalent to 2 new products.

Our results only find that bank credit has a significant effect on the market reach of large manufacturing firms. In the case of small manufacturers, we do not find significant differential benefits of access to credit.

5 Conclusions

Recent theoretical and empirical research on international trade provides evidence of the importance of external financing for exporters. As explained by Chaney (2005), Muûls (2008), Paravisini, Rappoport, Schnabl, and Wolfenzon (2011), Manova (2013) and Feenstra, Li, and Yu (2014), financing fixed costs of exporting with external financing sources only affects the entry decision into exporting, while the pricing, and export revenue are not affected. However, when variable costs are financed with external

sources of credit, one may find that the external financing has a significant effect on an exporter's export revenue, and on an exporter's export margins.

Inspired by these literature, in this paper we use detailed manufacturer and bank-firm linked data to construct a database that allows us to test whether current access to bank financing has a significant effect on the current export revenue of manufacturing firms. We also test whether this external financing has a significant effect on export margins as measured by market reach, market penetration and product mix. Finally, we test whether the effect of current bank financing on a manufacturer's current export outcomes may vary by manufacturer size.

Our empirical results suggest that access to current bank financing has a positive and significative effect on a manufacturer's current export outcomes. Initial results suggest that current bank financing increases a manufacturer's current export revenue. We find that this effect is mainly channeled through the increase of its market reach.

Across manufacturers size, we find evidence supporting the view that the effect of current bank financing on a manufacturers export outcomes varies by size. Medium-size exporters are the ones who benefit the most from bank financing as we find that their export revenue increase because the export to more destination, they export more per destination and they export new products.

While future research depends on the data availability of detailed financing sources, further empirical evidence should take a look at the substitution or complementarity effect among a manufacturer's different external sources of financing. The possibility for a manufacturer to use supplier trade debt instead of debt with financial institutions may be a key factor that smooths out potential negative effects of a sudden reduction in access to bank finance.

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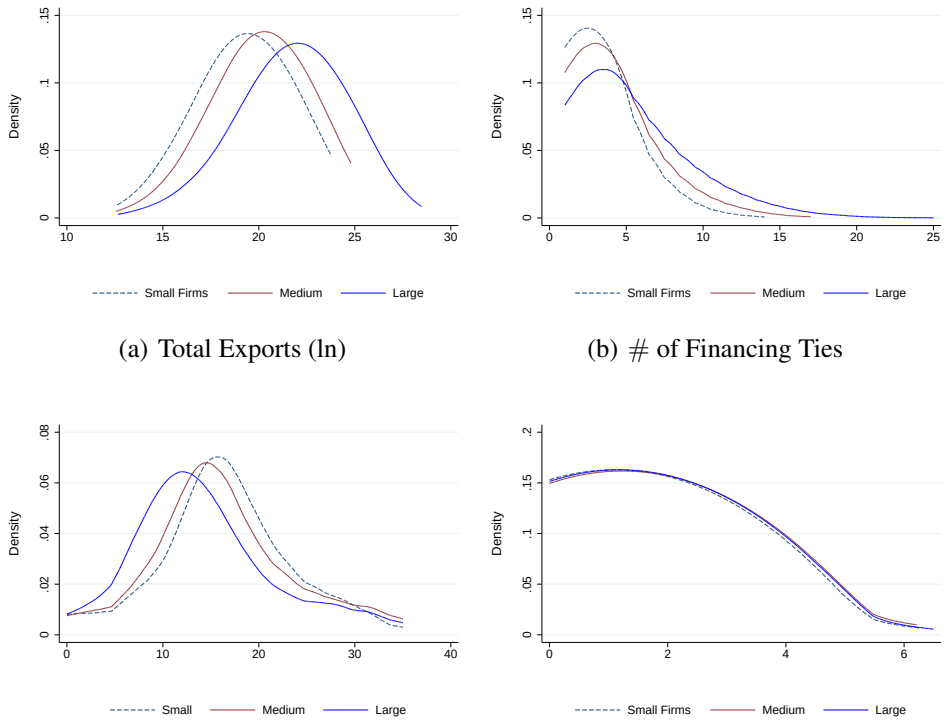
Figures

Figure 1: Financing Terms by Manufacturer Size.



(a) Total Exports (ln)

(b) # of Financing Ties

(c) Interest Rate

(d) Collateral as % of Debt

Source: Own authors' Calculations. Note: Data on a manufacturer's export volume was extracted from TED. Data on a manufacturer's number of financing ties, loan interest rates and collateral size by financing need were extracted from SS's format 341. A manufacturer's size classification corresponds to the asset size criteria determined by Law 590 of 2000.

Table 1: **Yearly Minimum Wage in Colombia and Yearly Entry Threshold Criteria into SS Database.**

Year	Decrete[a]	Monthly Minimum Wage[a] (Col. Pesos)	Monthly Minimum Wage[b] (US. Dollars)	Reporting Entry Threshold SS[c] (US - Dollars)
1998	3106, December 1997	203,826	142.93	2,858,634.75
1999	2560, December 1998	236,460	134.64	2,692,812.25
2000	2647, December 1999	260,100	124.57	2,491,494.00
2001	2579, December 2000	286,000	124.37	2,487,353.25
2002	2910, December 2001	309,000	123.39	2,467,813.25
2003	3232, December 2002	332,000	115.37	2,307,436.25
2004	3770, December 2003	358,000	136.19	2,723,870.00
2005	4360, December 2004	381,500	164.38	3,287,611.00
2006	4686, December 2005	408,000	172.80	5,183,938.00

[a] As reported by the Central Bank of Colombia in http://obiee.banrep.gov.co/analytics/saw.dll?Go&Path=/shared/Consulta%20Series%20Estadisticas%20desde%20Excel/1.%20Salarios/1.1%20Salario%20minimo%20legal%20en%20Colombia/1.1.1%20Serie%20historica&Options=rdf&NQUser=salarios&NQPassword=salarios&lang=es. [b] For calculation purposes we use the yearly average level of the exchange rate (col-pesos/us-dollar) as reported in the IMF's International Financial Statistics Database (IFS). [c] Until 2005, the threshold was set at $20,000$ times of the corresponding yearly monthly minimun wage. Since 2006, the threshold was modified to $30,000$ times of the corresponding yearly monthly minimun wage. The Reporting threshold is equal to the product of the minimun wage in Colombia in US dollars and the threshold expansion factor as previously defined.

Table 2: **Summary Statistics**

Panel A: Summary Statistics All Manufacturers

Variable	Obs.	Avg.	Std. Dev.	Min.	Max.	Perc. 25	Perc. 75
Tot Value of Exports (ln)	11,191	12.651	2.613	4.605	20.703	10.874	14.550
Export Market Penetration (ln)	11,191	11.320	2.010	3.912	19.150	10.026	12.640
Export Market Reach	11,191	6.070	6.187	1.000	57.000	2.000	9.000
Product Mix (hs 6 digit level)	11,191	8.215	13.710	1.000	208.000	1.000	9.000
Product Mix (hs 8 digit level)	11,191	8.784	14.690	1.000	217.000	2.000	9.000
Product Mix (hs 10 digit level)	11,191	8.902	14.750	1.000	217.000	2.000	10.000
Total Assets (ln)	11,191	15.563	1.555	10.164	22.422	14.474	16.540
Total Bank Financed Debt (ln)	11,191	12.892	4.455	0.000	20.657	12.398	15.356
Asset Tangibility Ratio[a]	11,190	0.201	0.157	0.000	0.931	0.081	0.283
Leverage Ratio[a]	11,191	0.494	0.258	0.006	4.499	0.327	0.634
# of Active Financing Relations	11,191	2.786	2.595	0.000	19.000	1.000	4.000
# of Historical Financing Relations	11,191	3.980	3.173	1.000	25.000	2.000	5.000
Ratio Total Debt with Banks[b]	11,191	0.324	0.235	0.000	0.988	0.113	0.511
Ratio Total Debt with Domestic Banks[b]	11,191	0.305	0.229	0.000	0.988	0.097	0.486
Ratio Total Debt with Foreign Banks[b]	11,191	0.019	0.081	0.000	0.940	0.000	0.000
Ratio Total Debt with Suppliers[b]	11,191	0.281	0.197	0.000	0.997	0.132	0.393
Ratio Total Debt with Domestic Suppliers[b]	11,191	0.181	0.163	0.000	0.975	0.058	0.259
Ratio Total Debt with Foreign Suppliers[b]	11,191	0.100	0.165	0.000	0.997	0.000	0.130
Ratio Other Debt[b]	11,191	0.032	0.086	0.000	0.928	0.000	0.014
Ratio Equity Debt[b]	11,191	0.003	0.029	0.000	0.532	0.000	0.000
Ratio Short Term Debt[b]	11,191	0.522	0.244	0.000	1.000	0.334	0.721
Ratio Long Term Debt[b]	11,191	0.119	0.174	0.000	1.000	0.000	0.194
Ratio Short Term Bank Financing[b]	11,191	0.225	0.205	0.000	0.945	0.039	0.369

Panel B: Summary Statistics External Financing by Manufacturing Size[c]

Variable	Obs.	Avg.	Std. Dev.	Min.	Max.	Perc. 25	Perc. 75
Asset Tangibility Ratio - Large Size[a]	5,982	0.200	0.152	0.000	0.931	0.086	0.274
Asset Tangibility Ratio - Medium Size[a]	2,191	0.189	0.148	0.000	0.865	0.070	0.277
Asset Tangibility Ratio - Small Size[a]	3,017	0.213	0.171	0.000	0.916	0.077	0.306
Leverage Ratio - Large Size[a]	5,982	0.459	0.226	0.006	3.867	0.299	0.596
Leverage Ratio - Medium Size[a]	2,191	0.518	0.291	0.033	4.499	0.337	0.660
Leverage Ratio - Small Size[a]	3,018	0.547	0.283	0.015	3.878	0.380	0.672
Total Bank Financed Debt (ln) - Large Size	5,982	13.911	4.619	0.000	20.657	13.802	16.285
Total Bank Financed Debt (ln) - Medium Size	2,191	12.325	3.971	0.000	15.940	12.527	14.329
Total Bank Financed Debt (ln) - Small Size	3,018	11.283	3.873	0.000	15.503	11.323	13.341
# of Historical Financing Relations - Large Size	5,982	4.622	3.518	1.000	25.000	2.000	6.000
# of Historical Financing Relations - Medium Size	2,191	3.759	2.885	1.000	17.000	2.000	5.000
# of Historical Financing Relations - Small Size	3,018	2.868	2.165	1.000	15.000	1.000	4.000
Ratio Total Debt with Suppliers - Large Size[b]	5,982	0.270	0.195	0.000	0.984	0.120	0.377
Ratio Total Debt with Suppliers - Medium Size[b]	2,191	0.291	0.190	0.000	0.965	0.148	0.398
Ratio Total Debt with Suppliers - Small Size[b]	3,018	0.297	0.203	0.000	0.997	0.144	0.420
Ratio Total Debt with Banks - Large Size[b]	5,982	0.356	0.246	0.000	0.971	0.129	0.558
Ratio Total Debt with Banks - Medium Size[b]	2,191	0.303	0.221	0.000	0.988	0.105	0.480
Ratio Total Debt with Banks - Small Size[b]	3,018	0.276	0.210	0.000	0.929	0.094	0.425

Sample: $1998 - 2006$. [a] Measured as a ratio to Total Assets. [b] Measured as a ratio to Total Liabilities. [c] A manufacturer's size is determined by the entry thresholds given by Law 590 of 2000. Small manufacturers are those who have a total level of assets lower than $15,000$ times Colombia's yearly minimum wage (ymw). Medium sized manufacturers are those who have a total level of assets between $15,001$ and $30,000$ times Colombia's ymw. Large sized manufacturers are those who have a total level of assets higher than $30,001$ times Colombia's ymw. See table 2 for a by year reference of the implied ymw in US dollars.

Table 3: **Per Year Export Sample Representation**

Year	% Number of Exporters in Sample	% Value of Total Exports in Sample
1998	37.16	63.92
1999	43.96	64.15
2000	41.61	66.81
2001	39.50	73.13
2002	39.37	73.30
2003	38.29	74.48
2004	35.11	75.06
2005	35.58	79.70
2006	34.63	79.09
Sample Avg.	38.36	72.18

Sample: $1998 - 2006$. Note: Own authors' calculations made with the match of exporters and the yearly universe of exporting manufacturers reported in TED.

Table 4: **Superintendent's Time in Office at "Superintendencia de Sociedades",** $1998 - 2006$**.**

Term in Office	Super-Intendent Name
1997 - 1998	Cesar Ucros Barros
1998 - 2003	Jorge Gabino Pinzon Sanchez
2003 - 2006	Rodolfo Danies Lacouture
2006 - 2007	Francisco Nogera Rocha

Sample: $1998 - 2006$. Source: "Superintendencia de Sociedades". For additional information on the terms in office of each Superintendent refer to: http://www.supersociedades.gov.co/superintendencia/Historia/Documents/revista-supersociedades-73anios.pdf.

Table 5: **Credit Elasticity of Total Value of Exports**

Dependent Variable:	**(1)**	**(2)**	**(3)**	**(4)**
Total Value of Exports in t (ln)	**No IV**	**IV**	**IV**	**IV**
Total Bank Financed Debt in t (ln)	.008	.051	.059	.049
	(.003)**	(.023)**	(.026)**	(.023)**
Leverage Ratio in t-1	-.241	-.286	-.319	-.278
	(.199)	(.202)	(.227)	(.198)
Inverse Mills Ratio				.583
				(.611)
Observations	11,191	11,191	11,191	11,191
R^2	.887	.882	.91	.883
First Stage: Credit Supply in t		.743	.682	.743
First Stage: F-statistic		46.294	30.415	47.136
Test Instruments Selection Equation				800.798
P-value				0.000
Manufacturer Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	No	Yes
Sector-Year Fixed Effects	No	No	Yes	No

Sample: $1998 - 2006$. Number of exporters: $2,930$. We only include manufacturers within economic sectors of Agriculture $(1-5)$ and Manufacturing $(15-39)$ as defined by the international standard industry classification, ISIC revision 3.1 at the 4 digit level. Source: Authors' own calculations. Notes: New Bank Financing in t (ln) corresponds to the logarithm of the new bank financing obtained in t. Columns (2), (3) and (4) instrument a manufacturer's demand for bank credit with the total bank supply of banking credit net of a manufacturer's own credit supply. Column (4) includes a control for the sample selection bias of SS's database. Instruments for entry into the SS's database are obtained from the terms in office reported in table 4. All specifications cluster standard errors by industry classification. $***$,$**$ and $*$ means significant at 1%, 5% and 10% respectively.

Table 6: **Credit Elasticity of Market Reach**

Dependent Variable:	**(1)**	**(2)**	**(3)**	**(4)**
Total Market Reach in t (ln)[a]	**No IV**	**IV**	**IV**	**IV**
Total Bank Financed Debt in t (ln)	.002	.024	.027	.023
	(.001)	(.007)***	(.008)***	(.007)***
Leverage Ratio in t-1	-.066	-.090	-.102	-.085
	(.081)	(.082)	(.095)	(.082)
Inverse Mills Ratio				.369
				(.294)
Observations.	11,191	11,191	11,191	11,191
R^2	.871	.862	.89	.863
First Stage: Credit Supply in t		.743	.682	.743
First Stage: F-statistic		46.294	30.415	47.136
Test Instruments Selection Equation				800.798
P-value				0.000
Manufacturer Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	No	Yes
Sector-Year Fixed Effects	No	No	Yes	No

[a] Market Reach is the measured as the ln of the head count of export market destinations. Sample: $1998 - 2006$. Number of exporters: $2,930$. We only include manufacturers within economic sectors of Agriculture $(1-5)$ and Manufacturing $(15-39)$ as defined by the international standard industry classification, ISIC revision 3.1 at the 4 digit level. Source: Authors own calculations. Notes: New Bank Financing in t (ln) corresponds to the logarithm of the new bank financing obtained in t. Columns (2), (3) and (4) instrument a manufacturer's demand for bank credit with the total bank supply of banking credit net of a manufacturer's own credit supply. Column (4) includes a control for the sample selection bias of SS's database. Instruments for entry into the SS's database are obtained from the terms in office reported in table 4. All specifications cluster standard errors by industry classification. $***$,$**$ and $*$ means significant at 1%, 5% and 10% respectively.

Table 7: **Credit Elasticity of Market Penetration**

Dependent Variable:	**(1)**	**(2)**	**(3)**	**(4)**
Market Penetration in t (ln)[a]	**No IV**	**IV**	**IV**	**IV**
Total Bank Financed Debt in t (ln)	.006	.027	.032	.026
	(.003)**	(.020)	(.024)	(.020)
Leverage Ratio in t-1	-.174	-.196	-.217	-.193
	(.164)	(.166)	(.186)	(.164)
Inverse Mills Ratio				.214
				(.509)
Observations	11191	11191	11191	11191
R^2	.85	.848	.884	.848
First Stage: Credit Supply in t		.743	.682	.743
First Stage: F-statistic		46.294	30.415	47.136
Test Instruments Selection Equation				800.798
P-value				0.000
Manufacturer Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	No	Yes
Sector-Year Fixed Effects	No	No	Yes	No

[a] Market Penetration is measured as the $\ln$ of a manufacturer's exports per destination. Sample: $1998-2006$. Number of exporters: $2,930$. We only include manufacturers within economic sectors of Agriculture $(1-5)$ and Manufacturing $(15-39)$ as defined by the international standard industry classification, ISIC revision 3.1 at the 4 digit level. Source: Authors' own calculations. Notes: New Bank Financing in t (ln) corresponds to the logarithm of the new bank financing obtained in t. Columns (2), (3) and (4) instrument a manufacturer's demand for bank credit with the total bank supply of banking credit net of a manufacturer's own credit supply. Column (4) includes a control for the sample selection bias of SS's database. Instruments for entry into the SS's database are obtained from the terms in office reported in table 4. All specifications cluster standard errors by industry classification. $***$,$**$ and $*$ means significant at 1%, 5% and 10% respectively.

Table 8: **Credit Elasticity of Product Mix**

Panel A: Product Mix at 6 digits HS

Dependent Variable: Product Mix in t (ln)[a]	**(1)**	**(2)**	**(3)**	**(4)**
Total Bank Financed Debt in t (ln)	.004 (.002)**	.018 (.010)*	.016 (.010)	.018 (.010)*
Leverage Ratio in t-1	-.090 (.081)	-.105 (.085)	-.107 (.092)	-.104 (.085)
Inverse Mills Ratio				.080 (.284)
Observations	11,191	11,191	11,191	11,191
R^2	.838	.835	.874	.835
First Stage: Credit Supply in t		.743	.682	.743
First Stage: F-statistic		46.294	30.415	47.136
Test Instruments Selection Equation				800.798
P-value				0.000

Panel B: Product Mix at 8 digits HS

Dependent Variable: Product Mix in t (ln)[a]	**(1)**	**(2)**	**(3)**	**(4)**
Total Bank Financed Debt in t (ln)	.005 (.002)***	.019 (.010)*	.016 (.010)	.019 (.010)*
Leverage Ratio in t-1	-.066 (.088)	-.082 (.092)	-.089 (.098)	-.081 (.091)
Inverse Mills Ratio				.052 (.284)
Observations	11,191	11,191	11,191	11,191
R^2	.83	.827	.868	.827
First Stage: Credit Supply in t		.743	.682	.743
First Stage: F-statistic		46.294	30.415	47.136
Test Instruments Selection Equation				800.798
P-value				0.000

Panel C: Product Mix at 10 digits HS

Dependent Variable: Product Mix in t (ln)[a]	**(1)**	**(2)**	**(3)**	**(4)**
Total Bank Financed Debt in t (ln)	.005 (.002)***	.020 (.010)**	.015 (.010)	.020 (.010)**
Leverage Ratio in t-1	-.059 (.091)	-.075 (.095)	-.083 (.100)	-.074 (.094)
Inverse Mills Ratio				.126 (.280)
Observations	11,191	11,191	11,191	11,191
R^2	.828	.825	.867	.825
First Stage: Credit Supply in t		.743	.682	.743
First Stage: F-statistic		46.294	30.415	47.136
Test Instruments Selection Equation				800.798
P-value				0.000
Manufacturer Fixed Effect	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	No	Yes
Sector-Year Fixed Effect	No	No	Yes	No

[a] Product Mix is measured as the ln of the head count of products exported, given the corresponding hs category. Sample: $1998 - 2006$. Source: Authors' own calculations. Notes: All specifications cluster standard errors by industry classification. $***$,$**$ and $*$ means significant at 1%, 5% and 10% respectively.

Table 9: **Credit Elasticity of Total Value of Exports by Size**[a]

Dependent Variable:	**Manufacturer Size**[a]			**Manufacturer Size**[a]		
Total Value of Exports in t (ln)	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Small[b]	**Medium**[c]	**Large**[d]	**Small**[b]	**Medium**[c]	**Large**[d]
Total Bank Financed Debt in t (ln)[e]	.080	.100	.024	.084	.098	.024
	(.042)*	(.029)***	(.033)	(.043)*	(.029)***	(.033)
Leverage Ratio in t-1	-.727	-.467	.122	-.768	-.420	.128
	(.439)*	(.324)	(.251)	(.428)*	(.320)	(.255)
Inverse Mills Ratio				-.709	3.781	1.798
				(.747)	(3.620)	(4.223)
Observations.	3,018	2,191	5,982	3,018	2,191	5,982
R^2	.872	.836	.868	.87	.837	.868
First Stage: Credit Supply in t	.693	.885	.665	.677	.884	.665
First Stage: F-statistic	14.285	23.276	25.421	13.452	23.024	25.235
Test Instruments Selection Equation				1195.897	38.01	13.334
P-value				0.000	0.000	.01
Manufacturer Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

[a] A manufacturer's size is determined by the entry thresholds given by Law 590 of 2000 described in detailed in table 2. Number of exporters: $2,930$ distributed as follows: $5,982$ Large, $2,191$ Medium and $3,018$ Small. The database only includes manufacturers classified within economic sectors of Agriculture $(1-5)$ and Manufacturing $(15-39)$ as defined by the international standard industry classification, ISIC revision 3.1. Source: Authors' own calculations. Notes: New Bank Financing in t (ln) corresponds to the logarithm of the new bank financing obtained in t. Columns (2), (3) and (4) instrument a manufacturer's demand for bank credit with the total bank supply of banking credit net of a manufacturer's own credit supply. Column (4) includes a control for the sample selection bias of SS's database. Instruments for entry into the SS's database are obtained from the terms in office reported in table 4. All specifications cluster standard errors by industry classification. $***$,$**$ and $*$ means significant at 1%, 5% and 10% respectively.

Table 10: **Credit Elasticity of Market Reach by Size**

Dependent Variable:	**Manufacturer Size**[b]			**Manufacturer Size**[b]		
Market Reach in t (ln)[a]	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Small[c]	**Medium**[d]	**Large**[e]	**Small**[c]	**Medium**[d]	**Large**[e]
Total Bank Financed Debt in t (ln)[f]	.001	.041	.030	.002	.040	.030
	(.017)	(.016)**	(.011)***	(.018)	(.016)**	(.011)***
Leverage Ratio in t-1	-.181	-.080	-.058	-.192	-.058	-.052
	(.148)	(.175)	(.117)	(.151)	(.177)	(.121)
Inverse Mills Ratio				-.194	1.776	1.736
				(.268)	(1.658)	(1.488)
Observations	3,018	2,191	5,982	3,018	2,191	5,982
R^2	.848	.811	.853	.848	.812	.853
First Stage: Credit Supply in t	.693	.885	.665	.677	.884	.665
First Stage: F-statistic	14.285	23.276	25.421	13.452	23.024	25.235
Test Instruments Selection Equation				1195.897	38.01	13.334
P-value				0.000	0.000	.01
Manufacturer Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

[a] A manufacturer's size is determined by the entry thresholds given by Law 590 of 2000 described in detailed in table 2. Number of exporters: $2,930$ distributed as follows: $5,982$ Large, $2,191$ Medium and $3,018$ Small. The database only includes manufacturers classified within economic sectors of Agriculture $(1-5)$ and Manufacturing $(15-39)$ as defined by the international standard industry classification, ISIC revision 3.1. Source: Authors' own calculations. Notes: New Bank Financing in t (ln) corresponds to the logarithm of the new bank financing obtained in t. Columns (2), (3) and (4) instrument a manufacturer's demand for bank credit with the total bank supply of banking credit net of a manufacturer's own credit supply. Column (4) includes a control for the sample selection bias of SS's database. Instruments for entry into the SS's database are obtained from the terms in office reported in table 4. All specifications cluster standard errors by industry classification. $***$,$**$ and $*$ means significant at 1%, 5% and 10% respectively.

Table 11: **Credit Elasticity of Market Penetration by Size**

Dependent Variable:	**Manufacturer Size**[b]			**Manufacturer Size**[b]		
Market Penetration in t (ln)[a]	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Small[c]	**Medium**[d]	**Large**[e]	**Small**[c]	**Medium**[d]	**Large**[e]
Total Bank Financed Debt in t (ln)[f]	.079	.059	-.006	.082	.058	-.006
	(.035)**	(.027)**	(.026)	(.037)**	(.026)**	(.026)
Leverage Ratio in t-1	-.547	-.387	.180	-.576	-.362	.180
	(.335)	(.200)*	(.191)	(.321)*	(.201)*	(.192)
Inverse Mills Ratio				-.515	2.005	.062
				(.577)	(3.194)	(3.582)
Observations	3,018	2,191	5,982	3,018	2,191	5,982
R^2	.846	.798	.825	.844	.799	.825
First Stage: Credit Supply in t	.693	.885	.665	.677	.884	.665
First Stage: F-statistic	14.285	23.276	25.421	13.452	23.024	25.235
Test Instruments Selection Equation				1195.897	38.01	13.334
P-value				0.000	0.000	.01
Manufacturer Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

- [a] A manufacturer's size is determined by the entry thresholds given by Law 590 of 2000 described in detailed in table 2. Number of exporters: $2,930$ distributed as follows: $5,982$ Large, $2,191$ Medium and $3,018$ Small. The database only includes manufacturers classified within economic sectors of Agriculture $(1-5)$ and Manufacturing $(15-39)$ as defined by the international standard industry classification, ISIC revision 3.1. Source: Authors' own calculations. Notes: New Bank Financing in t (ln) corresponds to the logarithm of the new bank financing obtained in t. Columns (2), (3) and (4) instrument a manufacturer's demand for bank credit with the total bank supply of banking credit net of a manufacturer's own credit supply. Column (4) includes a control for the sample selection bias of SS's database. Instruments for entry into the SS's database are obtained from the terms in office reported in table 4. All specifications cluster standard errors by industry classification. $***$,$**$ and $*$ means significant at 1%, 5% and 10% respectively.

Table 12: **Credit Elasticity of Product Mix by Size**

Panel A. Product Mix - 6 digits HS

Dependent Variable:	**Manufacturer Size**[b]			**Manufacturer Size**[b]		
Product Mix in t (ln)[a]	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Small[c]	**Medium**[d]	**Large**[e]	**Small**[c]	**Medium**[d]	**Large**[e]
Total Bank Financed Debt in t (ln)[f]	.035	.036	.011	.037	.036	.011
	(.023)	(.014)**	(.014)	(.024)	(.015)**	(.014)
Leverage Ratio in t-1	-.141	-.138	-.020	-.157	-.137	-.014
	(.124)	(.104)	(.175)	(.127)	(.106)	(.179)
Inverse Mills Ratio				-.289	.109	1.522
				(.339)	(2.171)	(1.992)
Observations	3,018	2,191	5,982	3,018	2,191	5,982
R^2	.842	.778	.821	.84	.778	.821
First Stage: Credit Supply in t	.693	.885	.665	.677	.884	.665
First Stage: F-statistic	14.285	23.276	25.421	13.452	23.024	25.235
Test Instruments Selection Equation				1195.897	38.01	13.334
P-value				0.000	0.000	.01

Panel B. Product Mix - 8 digits HS

Dependent Variable:	**Manufacturer Size**[b]			**Manufacturer Size**[b]		
Product Mix in t (ln)[a]	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Small[c]	**Medium**[d]	**Large**[e]	**Small**[c]	**Medium**[d]	**Large**[e]
Total Bank Financed Debt in t (ln)[c]	.038	.037	.011	.039	.037	.011
	(.022)*	(.015)**	(.014)	(.024)*	(.015)**	(.014)
Leverage Ratio in t-1	-.118	-.085	-.012	-.132	-.080	-.007
	(.129)	(.127)	(.177)	(.130)	(.126)	(.180)
Inverse Mills Ratio				-.250	.398	1.464
				(.345)	(2.182)	(2.059)
Observations	3,018	2,191	5,982	3,018	2,191	5,982
R^2	.831	.759	.817	.829	.759	.817
First Stage: Credit Supply in t	.693	.885	.665	.677	.884	.665
First Stage: F-statistic	14.285	23.276	25.421	13.452	23.024	25.235
Test Instruments Selection Equation				1195.897	38.01	13.334
P-value				0.000	0.000	.01

Panel C. Product Mix - 10 digits HS

Dependent Variable:	**Manufacturer Size**[b]			**Manufacturer Size**[b]		
Product Mix in t (ln)[a]	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Small[c]	**Medium**[d]	**Large**[e]	**Small**[c]	**Medium**[d]	**Large**[e]
Total Bank Financed Debt in t (ln)[c]	.039	.037	.012	.040	.037	.012
	(.023)*	(.015)**	(.015)	(.024)*	(.015)**	(.015)
Leverage Ratio in t-1	-.082	-.074	-.021	-.089	-.067	-.016
	(.151)	(.134)	(.175)	(.153)	(.134)	(.178)
Inverse Mills Ratio				-.119	.534	1.331
				(.340)	(2.216)	(2.026)
Observations	3,018	2,191	5,982	3,018	2,191	5,982
R^2	.828	.757	.816	.828	.757	.816
First Stage: Credit Supply in t	.693	.885	.665	.677	.884	.665
First Stage: F-statistic	14.285	23.276	25.421	13.452	23.024	25.235
Test Instruments Selection Equation				1195.897	38.01	13.334
P-value				0.000	0.000	.01
Manufacturer Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

- [a] Product Mix is measured as the ln of the head count of products exported, given the corresponding hs category. Sample: $1998 - 2006$. Source: Authors own calculations. Notes: All specifications cluster standard errors by industry classification. $***$,** and $*$ means significant at 1%, 5% and 10% respectively.