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Export Activity and Firms' Financial Constraints

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7.1 Introduction

The sunk costs associated with the export activity are a fundamental characteristic of the current literature in international trade and industrial organization. Both empirical and theoretical evidences underline the role of fixed cost. Firms that overcome these costs become exporter. Therefore, it becomes crucial to understand if and how firms are able to face fixed costs associated to exports.

Investments' structure contemplates a temporal discrepancy between present cost and expected future profits. In the case of exporting (sunk) costs are certain and immediately paid, while revenues are uncertain and postponed in the future. Imperfect capital markets (e.g., information asymmetries) may decrease the probability to start the export activity. Lenders and borrowers may not own the same information set. Thus, potential lenders are not able to evaluate the investments' value, given

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the uncertainty about future profits, and firms cannot gather enough resources to overcome fixed costs. For example, Das et al. (2007) estimate, for a sample of Mexican firms, an average fixed investment of $400,000 for potential exporters.

This chapter aims at analyzing the role of internal financing on export activity for credit-constrained firms. In the first instance, financially constrained firms are those firms for which internal source of financing cost less than external sources. If it is the case, investments (as exports) are sensitive to the availability of internal resources. This does not imply that the "non-constrained" firms do not use internal funds to implement/increase investments: also "healthy" firms show a positive correlation between investments and internal financial resources (Kaplan and Zingales 1997).

The key point is to understand how much the internal (financial) resources are relevant for the export activity of credit-constrained firms (compared to unconstrained ones). Therefore, the chapter addresses also the question of which type of firms are more likely to face financial constraints.[1]

Using a representative sample of Italian firms, we analyze if financially constrained firms increase their entry probability in the export market, once they own a larger amount of internal financial resources. Since that a credit-constrained firm finds less costly internal resources, we expect a positive effect of the firm's cash flows on the process of internationalization for these firms.[2]

The chapter covers two important issues. First, it is necessary to define a methodology to identify a priori the extent of a firm's credit constraints. Employing a detailed information on asset and liabilities, a firm's credit status is defined as financial reliability in the long and in the short run. This approach consists in evaluating the riskiness of firm from the point of view of a potential lender (bank) using ratio indices. The methodology puts light on the mechanism behind credit constraints, and it allows to

[1]Constrained firms are "constrained" to use their own liquidity for investments because not reliable from the lenders' point of view.

[2]Present chapter is not focusing on trade credits.

understand how the relationship between firms' and banks may affect the investments' choice for the former.[3]

In such a framework, it is possible to offer additional insights for the economic policy analysis. It would be feasible to evaluate the implementation of a more stringent credit requirements, if these requirements rely, among other things, on balance sheet indices.[4]

The present chapter can be ideally placed in the between of two streams of literature: the first one concerns the investments' sensitivity to cash flows as measure of credit constrains, and the second one regards the relationship between exporting and credit constraints. In the former group, since Fazzari et al. (1988), there existed a large body of literature that analyzes the sensitivity of investments to internal resources.[5] Similarly, the entry in the export market is considered as an investment, and consequently entry decision can be sensitive to the level of internal financing.

The second stream of research focuses on the relationship between export and financial health. Such stream may be classified into three subgroups of analysis. The first one analyzes how credit availability affects the export's decisions (Campa and Shaver 2002; Chaney 2016; Manova 2013; Muùls 2015); the second describes whether the export activity eases credit constraints (Manole and Spatareanu 2009); the third observes how financial health changes before and after entry into the export market (Greenaway et al. 2007; Bellone et al. 2010; Wagner 2014 for literature review).

From a theoretical point of view, Chaney (2016) introduces liquidity constraints into a model of international trade with heterogeneous firms (Melitz 2003), so that liquidity becomes a second source of heterogeneity

[3]The methodology allows to describe what happens whether banks' financial requirements become more stringent.

[4]It is important to mention that Basel III agreement uses also balance sheet ratio to monitor the riskiness of banking activity. Basel III is a source of concern for Italian SMEs, which rely on local capital market. For example, short-term debt is one of the indicators used in the monitoring activity. Most of the time, short-term debts are used by firms to finance current operations of production process (Onida 2003).

[5]See Hubbard (1998) and Bond and Van Reenen (2005) for a literature review.

across firm.[6] In an empirical framework, the role of credit constraints has been demonstrated crucial to explain some features of international markets. Manova (2013) shows that credit constraints determine both the zeros in bilateral trade flows, and the variations in the number of exported products as well as the number of destination markets. Berman and Héricourt (2010) find evidence that credit access is an important factor in determining the entry into the export market for firms in developing countries; however, they also show that exporting does not improve firms' financial health ex post.

Despite the increasing literature, the main conclusion remains contrasting. Greenaway et al. (2007), using a dataset for British firms, find that new exporters do not show a larger pool of financial resources than domestic firms before the entry, but long-term exporters own more liquidity than domestic firms.[7] Differently, Bellone et al. (2010), using French data, empirically show that new exporters have an ex ante financial advantage compared to domestic firms, but not an ex post effect.

Similarly to Bellone et al. (2010), in the present chapter we define an index of credit constraints using information on asset and liabilities; however, we use thresholds for balance sheet indices to define a clear-cut rule for a firm's financial reliability. These thresholds are commonly defined as rule of thumb in business economics. As we illustrate in the next sections, we assess credit constraints analyzing the firms from the point of view of a potential lender (bank).

Two papers are close to the present chapter, in terms of both data and research questions. Firstly, Minetti and Zhou (2011) show that the probability of exporting and the level of foreign sales are lower for credit-constrained firms. They evaluate credit rationing using firms' responses to survey questions about their credit status. Differently from them, we assess credit status exploiting the information in the balance sheet data rather than using survey question.

[6] In a Ricardian comparative advantage framework, the basic prediction is that either all or no firms export in each sector. Beck (2002, 2003) finds evidence of links between trade, financial development and credit access.

[7] New exporters generally display low liquidity and high leverage (compared to continuous exporters), probably due to the sunk costs which need to be met to enter export markets.

The second one is by Caggese and Cunat (2013), where they develop a dynamic industry model where financing frictions affect the entry decision in the home market as well as the riskiness of firms' activity. Calibrating the model, they predict that financing friction reduce the likelihood of a given firm to become an exporter, but overall they have an ambiguous effect on the number of firms starting to export. In addition, they find that financing constraints distort selection in the export reducing the aggregate gains due to trade liberalization. Using a similar dataset to Minetti Zhou (2011), their empirical analysis confirms the calibration findings.

The analysis is composed of two parts. In the first one, we develop the methodology to construct an index that allows to identify a priori the firm's financial status. We consider a firm's financial reliability both in a long-term and in a short-term perspective. In the second part, we empirically show that the amount of internal resources affects the entry probability into the export market for those firms identified as highly credit constrained (or without long-term reliability).

From a methodological point of view, we suggest a different strategy for testing the hypothesis of liquidity constraints and export. We classify firms in four groups. The firm clustering can be viewed also as a credit score: depending on firm classification a firm's financial score changes and consequently also its financial reliability. We directly estimate the impact of liquidity across group of firms. Indirectly, we are also able to understand the effect of more stringent criteria, if changes in criteria changes firms' classification.[8]

Finally, we control for potential endogeneity in the clustering process (exogenous to the entry in the export market). As Minetti and Zhou (2011), we use the same instrument set, but we proceed in a more rigorous way; since that we estimate a nonlinear model (probit) we prefer to follow a two-stage residual inclusion approach (2SRI, Terza et al. (2008)) rather than a more standard two-stage predictor inclusion.

[8]Therefore, if banks define criteria, we offer additional insights in the relationship between banks, and firms' investment activity.

The chapter provides two main results. First, we find that the entry in the export market is affected by the level of internal liquidity: for the more constrained firms, or firms which are not reliable in the long run (from lenders perspectives), exporting is sensitive to cash flows availability. The entry probability for constrained firms raise, compared to unconstrained firms, as the level of liquidity increases. The value of marginal effects remains constant across the different specifications; when we correct for the endogeneity bias in the clustering process, the magnitude of marginal effect increases.

Second, we find that an expansion in additional markets is affected by internal liquidity. However, the effect is not sensitive to firm's financial status. Using a different subsample of firms (only continuous exporters), we find that the entry in new markets is positively correlated with the internal level of liquidity, for every group of firms. Finally, the export activity in close market (EU15) does not depend on internal cash, while exporting in more distant market depend on it.

The results are robust to different thresholds used to identify credit-constrained firms, as well as to financial indices employed to evaluate the level of financial reliability. Independently from the definition of credit constraints we use, the main massage does not change.

The rest of chapter is structured as follows. In Sect. 7.2, we present the data, describing the relevant characteristics and descriptive statistics. In Sect. 7.3, we introduce the motivations for the methodology proposed, and the strategy for identifying the credit-constrained firms. In Sect. 7.4, we present the empirical specifications and we discuss the results. Finally, Sect. 7.5 deals with the endogeneity of clustering process, and Sect. 7.6 concludes.

7.2 Data

The main data source is the "Indagine sulle Imprese Manifatturiere," a survey conducted by the Italian bank Capitalia.[9] Each survey was collected every three years. In the present chapter, we are going to consider the eighth and the ninth wave of the survey, which cover respectively the period 1998–2000 and 2001–2003. Each wave collects data for manufacturing firms with more than 10 employees. A survey includes the universe of large firms, and a stratified sample of firms with less than 500 employees.[10] Each survey includes of 4680 firms, and the surveys can be matched among them every two waves (as in our case eighth and ninth).

An important feature of the survey is that it represents quite well the heterogeneity in the Italian manufacturing sector. Moreover, it allows to focus our analysis on medium- and small-sized firms: the median firm in the sample has 25 employees. The survey investigates different firms' activities such as trade, R&D, and financial activities. The data are relative to year 2000 (eighth wave) or 2003 (ninth wave). It means that it is possible to observe only two time periods, even if the survey covers a three-year period.[11]

The second main data source is the balance sheet dataset associated to surveys. The balance sheet dataset is collected on yearly basis, and it provides information on firms' item as fixed assets or revenues.[12] Most importantly, it collects detailed data on firms' financial activities such as short- and long-term debts, assets, and equity.

Given that, survey data are collected every three years, there exists a problem of matching survey information with the balance sheet data (defined on yearly basis). A researcher cannot associate a survey data

[9]The survey was formerly conducted by MedioCredito Centrale (controlled at the time of the survey by Capitalia). In 2007, Capitalia has merged with *Banca Unicredito*.

[10]The sample is stratified by gross product per employee, size, industry, and location.

[11]For example, in the case of export the questionnaire asks: "Did the firm export at least part of its products in year 2001/2003?" In case of export activity, it implies that we are not able to identify in which exact year a firm starts to export. According to the survey, export may occur in the three year of analysis. In the ninth survey, a firm can export in 2001, or in 2002 or in 2003 (or in all the three years).

[12]The variables' deflators are sector-specific and they come from EU-Klems.

(export status) with the balance sheet data for a specific year. To deal with it, we calculate the average value of balance sheet items on a three-year basis (i.e., average for periods 1998–2000, and 2001–2003). Then, averaged data (from balance sheet) are merged with the corresponding survey.

Finally, the match between the eighth and the ninth wave allows us to follow 2263 firms. Table 7.1 reports the descriptive statistics for the matched observations (firms are classified according with a two-digit ATECO 2002 industrial classification), while Table 7.8 (Appendix) presents the description of data used in the analysis.[13] Finally, we integrate our dataset with "*Struttura funzionale e territoriale del sistema bancario italiano, 1936–1974*" (SFT) from Bank of Italy, that includes our instrumental variables (Sect. 7.5).

7.3 Methodology

Our main hypothesis is that the availability of financial resources affects the entry in the export market, through sunk costs.[14] Fixed investment is paid at the begin of export activity, while profits are uncertain and realized in the future. In this framework, asymmetric information and capital market friction may create a wedge in the cost of financing between internal and external sources. Therefore, the entry probability (in the export market) can be sensitive to the level of internal liquidity for credit rationed firms, for whom external funds are relatively more expensive.

In order to analyze export sensitivity, we proceed similarly to *Euler equation's models* testing the effect of credit constraints on investments' level (Bond and Van Reenen 2005).[15] In these class models, financially constrained firms pay higher prices for external source of financing (issue

[13] For more details on data source, see Minetti and Zhou (2011).

[14] We can interpret these sunk costs as investments in which a firm incurs to enter in the foreign markets (development of a new product, organize distribution, etc.).

[15] The theory of investments and credit constraints has been applied to different field of research analysis (Konings et al. 2003; Love 2003; Forbes 2007).

Table 7.1 Averages by sectors

ATECO Code	Firms	Share	Turnover	Workers	Added value (in th of Euros)	KL	Remuneration per employee (in th of Euros)
DA	208	0.092	27,392.40	105.25	5911.77	100.65	28.56
DB	259	0.114	22,292.19	104.45	5793.51	52.63	41.74
DC	107	0.047	9854.59	44.69	2072.94	28.71	28.17
DD	81	0.036	9691.90	49.83	3036.87	51.29	25.75
DE	116	0.051	17,250.65	95.22	5407.32	50.90	29.30
DG	103	0.045	77,858.44	198.01	15,301.92	70.17	43.44
DH	123	0.054	13,806.88	77.83	4556.11	134.47	84.49
DI	137	0.06	22,791.32	117.61	8646.43	80.99	29.86
DJ	370	0.163	17,606.64	73.46	3988.59	51.15	30.68
DK	345	0.152	24,302.69	136.15	7972.32	311.90	72.95
DL	197	0.087	34,150.63	181.73	12,634.82	53.06	45.16
DM	65	0.029	97,607.76	318.92	22,979.71	58.27	33.54
DN	154	0.068	10,846.89	55.06	2864.09	39.68	28.86
Total	2263	100	25,576.24	112.68	6986.13	101.69	42.54

Data source: Capitalia Survey and balance sheet dataset. The observations used consider firms reported on both balance sheets (from 1998 to 2000 and from 2001 to 2003 for the 2263 matched firms). The first and last centile of observations are eliminated from the mean calculation to avoid outliers. The averages are calculated from 1996 to 2003

new equity, or debt).[16] Therefore, internal liquidity affects the rate of inter-temporal substitution between investment today and investment tomorrow; the more constrained the firm is, the larger (and positive) is the impact of cash availability on the investment level.

For the empirical estimation, it is crucial to identify a priori firms' credit status, because the relationship between liquidity and investment varies in function of firms' characteristics. Therefore, we analyze the role of liquidity for exporting, by clustering firms according to their level of financial reliability.

The direct estimate of liquidity for the entry choice is biased. For example, if we estimate the impact of cash stock (*CS*) on the entry probability (*Enter*) for firm *i* as follows,

$$\Pr(\text{Enter}|X, CS)_i = \alpha X_i + \beta CS_i + \epsilon_i \tag{7.1}$$

where X_i is a set of control variables. We have no a priori on β coefficient. If constrained and unconstrained firms are not differentiated in the empirical model, the effect of internal liquidity can be biased. We may identify three different potential situations. First, a not-constrained firm enters into the export market even with a low level of liquidity, because the sources of external financing are not too costly. Second, a healthy firm can also self-finance its own export activity (Kaplan and Zingales 1997): in this case, we observe a positive correlation between liquidity and the entry probability. Finally, a credit-constrained firm must rely on internally generated resources: also, in this case, we expect that entry is sensitive (positively) to internal liquidity.

Therefore, it is crucial to identify a priori firms' financial status to estimate β in Eq. 7.1 across different types of firms (class of financial status). For this reason, we cluster firms in four groups according to their

[16] In the presence of perfect capital markets, financial variables should have no impact on the investment decisions of firms. If an investment is profitable, internal and external financing are supposed to be perfect substitutes with frictionless capital markets.

level of financial status, and for each group we assess the role of internal liquidity in the internationalization's process.[17]

In the existing literature, many indices have been used to assess the financial health of a firm, as liquidity ratio or leverage ratio (Greenaway et al. 2007). However, as Bellone et al. (2010) underline, these indices do not capture the differences between short-term and long-term financial stability. Conversely, we define credit status from long- and short-term perspectives. To do that, we exploit information in the balance sheet to assess the degree of credit constraints.

Similarly to external investors, using balance sheet data, we can assess a firm' financial reliability calculating financial ratios. In business economics, such ratios are often employed to determine the "goodness" of an investment.[18] More recently, financial ratios are used by banks (among other procedures) to assess the riskiness of granted loans; according to the principles imposed by Basel III agreement (Bank for International Settlements 2006), banks have to manage the risk of credit by using objective criteria.

This approach allows to define an exogenous clustering process (exogenous to investment choice); the financial reliability is assessed by criteria external to firm's decision process.[19] To simplify the clustering process, we consider two indices, for which conventional thresholds exist. The two ratios consider respectively a firm's financial reliability in the long run and in the short run.[20]

- The *Equity Ratio* (ER hereafter) is used to assess long-term financial reliability. It is defined as the ratio between the total amount of internal resources (equity plus profits and reserves) and the total amount of capital invested (total assets). *ER* measures the proportion of the total

[17] In the previous literature, the common practice is to plug into the main equation an indicator for credit rationing, and then interact it with a measure of internal liquidity (Bellone et al. 2010; Minetti and Zhou 2011). A continuous index for credit constraints is not able to capture potential not-monotonicity for the relationship between credit status, liquidity, and entry decision.

[18] For more specific discussion of this subject, see Brealey and Myers (1999).

[19] In the robustness check analysis, we test the exogeneity of our clustering process.

[20] Table 7.9 reports the ratios' means and the standard deviations.

assets that are financed by internal funds: it evaluates to what extent a firm is self-financing its economic activities. A ratio lower than *0.33* suggests a situation of sub-optimality, because a firm has a low capacity to self-financing; at least one-third of firm's assets have be covered by internal resources in order to reach a financial stable situation in the long run (Brealey and Myers 1999).

- The *Quick Ratio* (QR hereafter) assesses short-term financial reliability, and it is a rough indicator of cash's availability; *QR* measures a company's ability to meet its short-term obligations with its most liquid assets. It is defined as the ratio of instantaneous liquidity or cash assets (cash, bank, and current account) to short-term debts (interests, furniture, wages etc.). The optimal value is fixed as greater than 1: if *QR* meets this criterion, a firm owns enough resources to face the daily cost of production process. The ratio indicates a firm's chances of paying off short-term debts without the need for additional external funds.

A firm's financial health improves when the ratios increase. Nonetheless, we test if the indices are reliable indicators for a firm's financial health. Therefore, we exploit information on credit rationing, provided by the survey data. Each survey (the eighth and the ninth survey) report firms' response to the following questions.

(a) "In 2000 (or 2003), would the firm have liked to obtain more credit at the market interest rate ?" In case of a positive answer, the following question is asked:
(b) "In 2000 (or 2003), did the firm demand more credit than it actually obtained?"

According to question (a) and (b), we create two dummy variables, *Des* and *Ask*, respectively. *Des* is equal to 1 if a firm replies yes to question (a), otherwise 0; similarly *Ask* is equal to 1 if a firm replies yes to question (b),

otherwise 0. We use such information to understand if *ER* and *QR* can approximate a firm's credit constraints.[21]

We expect that for high values of ER and *QR* correspond a lower probability to answer yes to questions (a) and (b). We estimate

$$Y_i = \alpha_0 + \alpha_1 \delta \text{Index}_i + \gamma \overline{X_i} + \epsilon_i, \tag{7.2}$$

where Y represents the binary information *Des* and *Ask*. δ*Index* takes value of 1 if ER or QR criteria are meet, and $\overline{X_i}$ is a vector of control variables. We expect a negative sign for α_1. We estimate Eq. 7.2 for firms that appear in both surveys (eighth and ninth).[22] Table 7.2 reports the results for the Probit estimation of Eq. 7.2, where *Des* is the dependent variable (dummy).[23,24]

The coefficients suggest that the degree of self-reported credit status is statistically correlated with the two ratios. As expected, the coefficients' sign for the two dummies is negative, so that a firm is less likely to self-report as credit constrained when a threshold is satisfied. The magnitude (of coefficients) does not change with the inclusion of control variables.

Results suggests that the ratios (and thresholds) are correlated with firms' ability to raise funding. Using *QR* and *ER* thresholds, we cluster firms in four different groups, according to the concept of short-term and long-term financial reliability. In our framework, the most constrained firms do not satisfy the conditions for both short-term and long-term financial reliabilities, that is, both *QR* and *ER* thresholds are not satisfied, respectively.

Firms in cluster *0* are defined as the most constrained firms, because they report an *ER* lower than *0.33*, and *QR* smaller than *1*. Table 7.3 illustrates how clusters are constructed. Then, we define with *Cluster*, an

[21]These two dummies are used by Minetti and Zhou (2011) to directly assess a firm's credit rationing.

[22]The dependent variable (credit status from survey) refers to year 2003, and it is explained by the correspondent financial ratios (year 2003).

[23]Results are unchanged if ER and QR are included as continuous variables.

[24]Given that *Des* implies question related to variable *Ask*, we do not report results for also for the second dummy. The inclusion of *Ask* as dependent variable does not change the conclusions. Additional tables are available upon request.

Table 7.2 Credit request and financial indices

	Des $_{i03}$	Des $_{i03}$	Des $_{i03}$	Des $_{i03}$
δER_{i03}	−0.288***	−0.271***	−0.239**	−0.235**
	[0.084]	[0.088]	[0.094]	[0.092]
δQR_{i03}	−0.460***	−0.496***	−0.509***	−0.503***
	[0.080]	[0.081]	[0.096]	[0.098]
Banks $_{i03}$			0.034**	0.034**
			[0.014]	[0.014]
Share $_{i03}$			0.006***	0.006***
			[0.001]	[0.001]
Expo $_{i03}$				−0.002
				[0.102]
NDest $_{i03}$				−0.01
				[0.010]
Log(Age) $_{i03}$		0.122	0.113	0.121
		[0.082]	[0.102]	[0.102]
Log(Y) $_{i03}$		−0.126***	−0.155***	−0.151***
		[0.021]	[0.034]	[0.038]
Cons.	−0.572**	−0.247	0.489	0.444
	[0.246]	[0.294]	[0.490]	[0.477]
Obs.	1598	1598	1598	1598
Pseudo R^2	0.067	0.079	0.095	0.095

Probit estimation. Robust standard errors are clustered by regions and are reported in squared brackets. Sector and area dummies are included. The regressors are contemporaneous to the dependent variables, that is, relative to 2003. δER and δQR are, respectively, equity ratio and quick ratio. Data description in Table 7.8. All balance sheet data are defined as averages for years 2001–2003. Significance level: * is the p-value < 0.1, ** is the p-value < 0.05, and *** is the p-value < 0.01

indicator variable that takes value 0,1,2, or 3 according to firm's financial reliability.

The cluster should identify (exogenously) whether a firm is constrained or not; it is likely that a firm in group 0 or 1 faces difficulties to finance investments with external resources, because not reliable in the long

Table 7.3 Cluster definition

Cluster	0	1	2	3
Description	δER=0; δQR=0 Neither short-term (QR<1) nor long-term reliability (ER<0.33)	δER=0; δQR=1 No long-term reliability (QR>1; ER<0.33)	δER=1; δQR=0 No short-term reliability (QR<1; ER>0.33)	δER=1; δQR=1 Both ratios satisfied(QR>1; ER>0.33)

term.[25] We can also think to clusters in Table 7.3 as a financial score. The lower is the score, the lower is the financial reliability of a firm.[26]

7.4 Empirical Specification

In this section, we describe the empirical model to test if financially constrained firms largely rely on internally generated cash to overcome sunk costs associated to exports.

Comparing the eighth and the ninth wave, we estimate a discrete choice model (probit) for continuous nonexporting firms and new exporters. We observe 644 firms in 12 different manufacturing sectors: among them 122 firms are reported as new exporter in 2003 (i.e., reported domestic in the eighth survey, and exporter in the ninth survey).[27] The empirical model follows the nonstructural approach of Roberts and Tybout (1997) or Bernard and Jensen (1999), namely

$$\text{Entry}_{i03} = \begin{cases} 1 \; if \; G\left(\alpha_0 CS_i + \sum_{c=0}^{3} \alpha_c X_c * CS_i + \mathbf{Z}(n)_i + \gamma + \epsilon_i\right) > 0 \\ 0 \;\; \text{otherwise} \end{cases} \tag{7.3}$$

where Entry_{i03} is the firm i export status in the ninth survey. Variable Entry_{i03} takes a value of 1 if a firm starts to export between the eighth and the ninth survey, otherwise it takes value of 0. X_c, with $c=0,1,2,3$ is a

[25] We specify two alternative clustering process; the main source of concern is the different capital intensity across sectors, so that a low value of ER or *QR* may not have the same implication for different firms. We can define alternative thresholds using sectoral distribution of the indices. ER and QR thresholds are satisfied if the indices are above the 25th or the median for the corresponding sector. In addition, we can use the sectoral distribution of liquidity and leverage ratio. Finally, we can use variations across the two surveys of ER and QR indices. Main conclusions do not change. Results available upon request.

[26] As explained in Sect. 7.2, we take the averages of ER and QR within each survey period. Therefore, clustering process refers to a period of three years (i.e., clusters refer to the three-year period 2001–2003). If a firm belongs to cluster 0, it means that the average ratios of ER and QR are below the thresholds.

[27] More precisely, we consider as exporters, a firm that report to sell abroad at least the 2% of their total revenues, in order to minimize the risk of temporary exporting activity.

set of dummies that specify cluster membership; for example, if $X_0 = 1$, a firm belongs to cluster *0*. Our terms of interest are the coefficient of cash stock (α_0) for log of cash stock *Log(CS)*, and the interactions between liquidity and clusters (α_c).[28]

The α's coefficients capture the effect of liquidity on the entry probability, so that a positive sign indicates that the export probability rises when the level of internally generated cash increases. The interaction term is introduced to identity if cash stock has different effect depending on firms' financial status.

Equation 7.3 also includes a vector of control variables (***Z****(n)*), while ε is the *i.i.d.* error term. The control variables are retrieved from the Capitalia surveys, or from the associated balance sheet dataset. The former group includes information about the number of banks (*Banks*), R&D indicator (dummy variable), or product innovation/upgrading dummy (*UpProd* or *NewProd*). Balance sheet controls include capital intensity (*KL*), labor productivity (*LabProd*), and additional financial ratios as *LiqRatio* and *LevRatio* (see Greenaway et al. 2007). The balance sheet controls are defined as averages for the three-year period 2001–2003 (subscript *03*). Vector γ includes sector and area dummies (North East, North West, Center, South and Islands). Finally, we cluster the standard error across regions, given that Italian economy is highly regionalized.[29]

In Table 7.4, we directly report the marginal effects (average marginal effect) obtained by estimating Eq. 7.3. Coefficients can be interpreted as the elasticities of cash with respect to entry probability. Each column represents a different regression, and financial score are defined according to Table 7.3. The average level of cash stock has no effect on the entry probability; instead, the interaction of cash with the dummy X_0 (and X_1) has a positive and significant coefficient. In column (1), the effect of cash cancels out across different groups. In the other specifications (from Col.(2) to Col.(7)), an increase by 10% in the level of cash stock raises the

[28] Unlike the Euler equation for investment (Fazzari et al. 1988), we do not scale the level of cash with tangible assets; the fixed costs of exporting are assumed to be equal across firms. The results and conclusions do not change if we introduce a scaled measure of cash stock (*CSKB*). Results available upon request.

[29] See Table 7.8, for a detailed data description.

Table 7.4 Baseline results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Exp_{i03}	Exp_{i03}	Exp_{i03}	Exp_{i03}	Exp_{i03}	Exp_{i03}	Exp_{i03}
$Log(CS)_{i03}$	0.02	0.023	0.026	0.023	0.023	0.023	0.027
	[0.019]	[0.016]	[0.022]	[0.015]	[0.019]	[0.019]	[0.021]
X_0 *$Log(CS)_{i03}$		0.017***	0.015***	0.013***	0.017***	0.017***	0.010**
		[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.005]
X_1 *$Log(CS)_{i03}$		0.016***	0.016***	0.014**	0.016***	0.016***	0.011**
		[0.006]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]
X_2 *$Log(CS)_{i03}$		0.010*	0.010*	0.008	0.010*	0.010*	0.008
		[0.005]	[0.006]	[0.005]	[0.006]	[0.006]	[0.006]
$Banks_{i03}$			0.006				−0.004
			[0.030]				[0.026]
$ShareMainBank_{i03}$			0.007				0.008
			[0.006]				[0.006]
$LiqRatio_{i03}$				−0.072			−0.111
				[0.057]			[0.076]
$LevRatio_{i03}$				0.032			0.032
				[0.026]			[0.036]
$R\&D_{i03}$					0.045	0.058*	0.031
					[0.032]	[0.033]	[0.030]
$NewProd_{i03}$					0.016		0.034*
					[0.018]		[0.020]
$UpProd_{i03}$						−0.032	−0.027
						[0.027]	[0.024]
$Log(KL)_{i03}$	0.038***	0.029***	0.025**	0.021*	0.026***	0.029***	0.011
	[0.009]	[0.011]	[0.011]	[0.012]	[0.010]	[0.009]	[0.010]
$LabProd_{i03}$	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Obs.	641	640	562	640	519	520	445
Pseudo R^2	0.071	0.115	0.125	0.118	0.117	0.131	0.143
$X^2(4)$	0	0	0	0	0	0	0

Marginal effect reported for probit estimation. Robust standard errors are clustered by regions and are reported in squared brackets. Sector and area dummies are included. X_0, X_1, and X_2 are dummies that take value of 1 if a firm is in cluster 0, 1, and 2, respectively. All balance sheet data are defined as averages for year 2001–2003. The χ^2 reports the p-value of joint test of significance for $Log(CS)_{i03}$ and three interacted variables; the statistics is distributed as a χ^2 with degrees of freedom in parenthesis: H_0 four coefficients are jointly not different from zero. Significance level: * is the p-value < 0.1, ** is the p-value < 0.05, and *** is the p-value < 0.01

entry probability by almost 0.2% for credit-constrained firms belonging to group *0* (i.e., firms without long- and short-term financial reliability). Similarly, an increase by 10% in the level of cash stock for firms in cluster *1* raise their entry probability by 0.1\%.

The coefficient of *Log(CS)* is the average marginal effect for all the firms, while interacted terms report the extra gains for firms in groups *0, 1*, and *2* compared to group *3*. Then, a 10% increase in cash raises the entry probability for constrained firms (in Cluster *0*) by an additional 0.2% compared to the entry probability of not-constrained firms.[30] The results are statistically more robust for firms in cluster *0* than in cluster *1*. It suggests that long-term financial reliability plays a central role in the access to external credit. Finally, coefficients in Table 7.4 are constant across specifications maintaining the same magnitude and sign.

Estimation results suggest that credit access is an important factor to determine the first entry in the export market. If a firm is not reliable from a financial point of view (lack of long-term stability), it has to pay higher price for external financing, and consequently it has to increasingly rely on internal funds. In such a framework, a credit-rationed firm experiences difficulties to overcome sunk cost associated to trade and the entry probability raises with the level of internal liquidity.

7.4.1 Expansion to New Markets

We demonstrated in the previous section that the entry probability of credit-constrained firms is affected by internal liquidity. Now, we want to understand if trade activity of established exporters is affected by cash stock, and financial reliability too. Therefore, we exploit information about regions served by exporting firm.[31]

We perform three exercises, and in all of them we consider continuous exporters (firms that export in both surveys). We analyze the effect of

[30] In all the specifications cluster *3* is omitted (for reasons of multicollinearity), so that marginal effects must be interpreted in comparison with the group of the less-constrained firms. If we omit cluster 0 instead of 3, the signs of the coefficients become negative.

[31] Regions are Europe 15, East Europe, Russia, Asia, China, North America, South America and Oceania.

liquidity on the decision to reach new foreign markets. Compared to previous exercises, sample has changed given that new exporters and domestic firms are excluded.[32] In the first two exercises, we estimate a probit model (like Eq. 7.3).

1. We estimate the export status in each region in function of cash stock (and interacted values): in this case, the dependent variable is a dummy equal to 1 if a firm exports in a region in 2003; otherwise the dummy takes value of 0.
2. In the second exercise, we estimate if cash affects the entry probability in additional markets: here the dependent dummy variable takes value of 1 if a firm adds new regions among its destination markets in 2003 (compared to 2000); otherwise the dummy is equal to 0.

Table 7.5 presents estimations' results for the first exercise (control variables are not reported for the sake of space). Each column represents an equation for each destination market.[33] Dependent variable takes value of 1 if a continuous exporter (in eighth and ninth surveys) is exporting in a given region in the period 2001–2003, otherwise 0.

Cash stock coefficient turns to be positive and significant for all destination markets, with the exclusion of EU15 (column 1), while the interacted terms are not statistically significant. Given sample composition, we are just providing correlations among exporting and liquidity, that is, exporters own (on average) a higher liquidity (Greenaway et al. 2007) for each market they serve. Alternatively, a higher in liquidity is associated to a higher probability to serve a foreign market (EU15 excluded).

[32] Given that our aim is to understand whether the choice to serve an additional market involves an additional sunk cost, we focus only on the expansion of the extensive margin of trade (number of markets). Quitters, entrants and continuous domestic firms are excluded from the regression, in order to eliminate any type of noise that biases the estimation. The inclusion of new entrants, quitters or domestic firms would have introduced firms' choices different from our main dichotomous choice, that is, exporting in a new market or not.

[33] We exclude South America and Oceania both for reasons of space and lack of variability in the dependent variable.

Table 7.5 Expansion to new markets

	(1)	(2)	(3)	(4)	(5)	(6)
	$EU15_{i03}$	$RestEU_{i03}$	$RussiaEU_{i03}$	$Asia_{i03}$	$China_{i03}$	$NorthA_{i03}$
$Log(CS)_{i03}$	0.004	0.052***	0.028***	0.053***	0.020***	0.046***
	[0.007]	[0.010]	[0.009]	[0.008]	[0.005]	[0.012]
X_0 *$Log(CS)_{i03}$	−0.003	0.001	0.006	0.004	−0.001	0.007
	[0.002]	[0.004]	[0.004]	[0.003]	[0.003]	[0.004]
X_1 *$Log(CS)_{i03}$	0.000	−0.002	0.001	0.002	0.001	0.001
	[0.003]	[0.004]	[0.004]	[0.004]	[0.003]	[0.004]
X_2 *$Log(CS)_{i03}$	0.003	−0.006	0.001	0.003	0.000	0.012*
	[0.005]	[0.006]	[0.007]	[0.008]	[0.002]	[0.007]
Obs.	1353	1353	1353	1353	1353	1353
Pseudo R^2	0.037	0.04	0.041	0.046	0.083	0.062
$X^2(4)$	0.231	0.000	0. 000	0. 000	0. 000	0. 000

Marginal effect reported for probit estimation. Robust standard errors are clustered by regions and are reported in squared brackets. Sector and area dummies are included. Each column represents a regression for a specific area. X_0, X_1, and X_2 are dummies that take value of 1 if a firm is in cluster 0, 1, and 2, respectively. All balance sheet data are defined as averages for year 2001–2003. The χ^2 reports the p-value of joint test of significance for $Log(CS)_{i03}$ and three interacted variables; the statistics is distributed as a χ^2 with degrees of freedom in parenthesis: H_0 four coefficients are jointly not different from zero. Significance level: * is the p-value < 0.1, ** is the p-value < 0.05, and *** is the p-value < 0.01. Controls variable non-reported

In the second exercise, the binary-dependent variable describes if an exporter enters in new markets between 2000 and 2003. Also in this case, cash stock coefficient *Log(CS)* is positive and significant for all the specifications, while interacted term is not. Again, we observe a positive correlation between export activity and liquidity independently from firms' credit status: an expansion in the extensive margin of trade is associated to higher internal liquidity. It is interesting to note that *R&D* activity plays an important role to expand regions of destinations rather than to start exporting. Both *R&D* dummy and new product dummy (*NewProd*) suggest a positive relationship between firms' innovation and exporting (Van Beveren and Vandenbussche 2010). Therefore, the development of new products seems important to enter in different destination markets.[34]

[34]Table with the second exercise is not reported for space constraints. Table is available upon request.

In the last exercise, we estimate the effect of financial variables on the number of new destination markets. We define the dependent variable as a discrete number of new regions served among established exporters (ΔDest_{i03}). Dependent variable takes value 1, 2, 3, or 4, depending on the number of new added markets.[35] Given the nature of the dependent variable (ordered and discrete) we are going to estimate an ordered logit model; compared to Eq. 7.3, the ordered logit model maintains the same vector of independent variables. This last exercise confirms the previous results. First, higher liquidity is associated to a larger number of new regions, independently from credit status; second, innovation activity facilitates the entry in more than one new market.[36]

We can conclude that the availability of internal resources is particularly relevant for credit-constrained firms that aim to start export activity *ex-novo*. Internally generated cash are important to increase the extensive margin of export of established exports, but this effect does not vary in function of firms' financial reliability. The key role of liquidity for new entrants suggests that credit-constrained firms must pay higher cost for external source of financing.[37]

7.5 Endogenous Selection of Financial Score

Even if we assume that our clustering process is exogenous (it is exogenous because we are evaluating firms from the external point of view of an investor),[38] firms' selection in groups may be endogenous to the entry in the export market. The endogeneity can be generated by two sources:

[35] We consider only firm that decide to serve additional markets in 2003 compared to 2000. We exclude exporters that do not expand export activity in the next period: it would have included a first stage of self-selection (i.e., first, a firm decides to export, and, second, it decides how many markets to serve).

[36] Table with the third exercise is not reported for space constraints. Table is available upon request.

[37] These firms may offer few collaterals, and have no experience of international markets, or sunk cost associated to export are higher for the new entrants than for established export.

[38] The use of averages for financial variables should reduce the concerns of endogenous clustering (Kaplan and Zingales 1997).

1. The first source is the omitted variable bias. Whether or not a firm is constrained is likely to be correlated with unobserved firm's characteristics, even if we include control variables (i.e., from Eq. 7.3, *X(i)* is correlated with some unobserved characteristics).
2. The second type of problem is that credit constraint level and entry decision may be jointly determined; for example, a firm may worsen its financial situation (reduction in *ER*) because it is using external financing to start export activity. Firms in lower clusters self-select in the export market through anticipated investments. Therefore, financial ratios are endogenous to export status.[39]

In order to deal with endogeneity, we use an instrumental variable approach. We are going to define an instrument that may explain firm's ability to obtain financing (or to not be credit constrained), but uncorrelated with export status. Similarly to Minetti and Zhou (2011), we are going information reported in "*Struttura funzionale e territoriale del sistema bancario italiano, 1936–1974*" (SFT).[40]

In the beginning of 1930s, the Italian regulatory authorities were concerned about financial and banking instability: they thought that an excess of competition has favored this instability. As a result, in 1936 the *Comitato Interministeriale per il Credito e il Risparmio* (CICR) enacted strict norms for the entry of banks into local credit markets. As a consequence, from 1938 each credit institution could only open branches in an area of competence (one or multiple provinces) determined on the basis of its presence in 1936. Banks were also required to shut down branches outside their area of competence. Guiso et al. (2004) demonstrated empirically that the1936 regulation had a profound impact on the local supply of banking services and credit (creation and location of new branches) and, hence, on firms' ability to obtain credit.

In this report, SFT are reported several information on Italian banking system in 1936:

[39]Indeed, data shows that ex ante new exporters are more likely to show high leverage ratios.

[40]SFT contains historical data on the regional structure of the Italian banking system, such as the number of financial institutions by type and province. It also contains information on the implementation of the financial reform in 1936.

1. the number of savings by Italian provinces (*SavBank*);
2. the number of cooperative banks by Italian province (*CooBank*);
3. number of overall credit institute by region (NUTS 2) per 1000 inhabitants (*RegBank*);
4. the average number of banks per province by Italian regions (*PrBan*). We use this information as instrumental variables.

We exploit the variability in the types of banks across provinces in 1936 to predict current level of credit clustering (i.e., the firm's probability to stay in one of the four clusters). While, territorial distribution of banks in 1936 is unlikely to affect firms' export decision between 1998 and 2003, it is very likely that the share of different bank types affects credit availability for the Italian firms today.[41]

Given that the clustering process is a discrete (and not-ordinal) variable, we are going to estimate a multinomial probit in order to capture the sorting effect (assuming independence of irrelevant alternatives, I.I.A.). Therefore, both the first and the second stage are not linear models, and traditional (linear) instrumental variable approach may not seem adequate. As Terza et al. (2008), we address this issue using the two-stage residual inclusion (2SRI). The 2SRI estimator has the same first stage of a 2-Stage Least Square (2SLS), but in the second stage the endogenous variables are not replaced by their predicted values but by residuals from the first stage are included in addition to endogenous regressors.[42] Following the 2SRI technique, the main equation in our empirical model is as follows:

$$\text{Entry}_{i03} = \begin{cases} 1 \; if \; G\left(\alpha_0 CS_i + \sum_{c=0}^{3} \alpha_c X_c * CS_i + \boldsymbol{Z}(n)_i + \eta_n \boldsymbol{Res}\ (\mathbf{X_c})_i + \gamma + \epsilon_i\right) > 0 \\ 0 \;\; \text{otherwise} \end{cases} \tag{7.4}$$

[41] According to Guiso et al. (2004), the territorial distribution of banks (by type) that occurred in 1936 was relatively random. It is unlikely that structural characteristics of the provinces (constant over time) are correlated with location and creation of branches.

[42] Terza et al. (2008) support the use of 2SRI, showing that 2SRI is generally statistically consistent in the broader class of nonlinear model, whereas 2SLS is not (they provide an example where the first stage is estimated with a multinomial probit and the second stage is a probit).

Table 7.6 First stage (multinomial logit)

	(1)	(2)	(3)	(4)	(5)	(6)
	$CL0_{i03}$	$CL1_{i03}$	$CL2_{i03}$	$CL0_{i03}$	$CL1_{i03}$	$CL2_{i03}$
SavBank	−0.027***	−0.038***	−0.045**	−0.028***	−0.032	−0.034*
	[0.010]	[0.014]	[0.019]	[0.007]	[0.022]	[0.018]
CooBank	−0.001	0.032***	0.035*	−0.004	0.024*	0.034**
	[0.007]	[0.012]	[0.021]	[0.006]	[0.013]	[0.017]
RegBank	−0.011	0.07	−0.357***	0.240***	0.225***	−0.225**
	[0.056]	[0.053]	[0.087]	[0.092]	[0.078]	[0.095]
PrBan	−0.001	−0.025**	−0.040**	−0.008***	−0.016	−0.035**
	[0.002]	[0.011]	[0.020]	[0.002]	[0.012]	[0.017]
$LiqRatio_{i00}$				−9.609***	−4.513***	−4.887***
				[0.891]	[0.849]	[1.149]
$LevRatio_{i00}$				−0.066	0.257	−0.304
				[0.358]	[0.353]	[0.537]
Obs.	644	644	644	490	490	490

Multinomial probit. Exogenous variables are omitted. Entrants and domestic firms are considered in the sample. Robust standard errors are clustered by region and are reported in squared brackets. Sector and area are dummies included. Baseline choice, cluster 3. CL stays for cluster. Significance level: * is the *p*-value < 0.1, ** is the *p*-value < 0.05, and *** is the *p*-value < 0.01. Controls variable non-reported

where $\boldsymbol{Res}\ (\mathbf{X_c})_i$ is a vector of residual from multinomial first stage estimation. Given that, in our first stage, we estimate a multinomial probit, we obtain four vectors of residuals, one for each category. To calculate residuals' vectors, we use the formula for generalized residual for discrete choice models (Vella 1993).

Table 7.6 reports first-stage estimations (we omit exogenous variables). We present the results for the instrumentation of *Cluster* (as in Table 7.3) considering group *3* as baseline choice. In the first three columns, we use as instruments only credit data for Italian provinces in 1936 (as excluded instruments); in the last three columns we introduce the lagged values of *LevRatio* and *LiqRatio* as additional instruments (i.e., lagged averages for period 1998–2000). In this case, we also instrument *LevRatio* and *LiqRatio* in 2001–2003 with their lagged values (but we do not report first stage for these two additional variables). The coefficients show that instruments are correlated with endogenous sorting.[43] In particular,

[43]The first stage results hold also for alternative clustering process. Results available upon request.

larger is the presence of saving banks (*SavBank*) in 1936, and the lower is the probability for a firm (in a given province) to be credit constrained (belonging to group 0)

Given that, our instruments seem to have very high explanatory power, we include in the second-stage residuals, for alternatives *0*, *1*, and *2* Eq. 7.4. We estimate the model it with probit (again cluster 3 is omitted for multicollinearity). Finally, to retrieve robust standard errors, we bootstrap the entire two-stage procedure stratifying the sample by regions (Terza 2008; Wooldridge 2008). Table 7.7 presents the second-stage results (marginal effect reported).

The estimations confirm the previous intuitions. The coefficients' sign does not change compared estimations from Table 7.4. The cash stock and interacted terms are jointly significant (X^2 I° test). For all the specifications, an increase of liquidity raises the entry probability for constrained firms (group 0). More precisely, if cash stock raises by 10%, the entry probability of rationed firms increases by 0.11% (column 1).[44] Finally, the additional controls (both exogenous and endogenous) have a negligible impact on the entry probability.

Some final comments concern 2SRI approach. In large part of the specifications, the joint significance of the residuals (*Res(x)*) is rejected (X^2 II° test): under the null, the coefficients are jointly equal to zero. It suggests that our clustering process is potentially exogenous to the entry decision.

We test if instruments have some explicative power on the main dependent variable (export decision). So, we include instruments from first stage in the second stage (Eq. 7.4). We report in Table 7.7 the *p*-value of overidentification test (LR test).[45] The *LR test* for overidentification

[44]We obtain similar results for alternative clustering process. Interaction between group 1 and cash is significant with alternative clustering procedures.

[45]In order to test overidentification, we perform a likelihood ratio test. First, we calculate the log likelihood of second stage of Eq. 7.4 (*L*1). Then, we estimate Eq. 7.4, by including also instruments of first stage (i.e., *SavBank, CooBank, RegBank*, and *PrBan*), and we calculate again the log-likelihood (*L*2). The likelihood ratio test is defined by 2*(*L*2–l*L*1), and it is distributed as a X^2 with degrees of freedom equal to the difference between the parameters in the first and the second model (i.e., 4). Under the null, the new variables (instruments) are not jointly significant so that instruments do not explain additional variability of main dependent variable.

Table 7.7 Entry in the export market (second stage)

	(1)	(2)	(3)
	Exp_{i03}	Exp_{i03}	Exp_{i03}
$Log(CS)_{i03}$	0.083	0.141	0.206
	[0.105]	[0.126]	[0.140]
$X_0\ Log(CS)_{i03}$	0.112***	0.112***	0.110***
	[0.028]	[0.029]	[0.027]
$X_1\ Log(CS)_{i03}$	0.041	0.049	0.023
	[0.027]	[0.033]	[0.039]
X_2 *$Log(CS)_{i03}$	0.031	0.036	0.023
	[0.034]	[0.041]	[0.048]
$Log(KL)_{i03}$	−0.026	0.039	−0.041
	[0.195]	[0.189]	[0.210]
$LabProd_{i03}$	0.002	−0.002	−0.004
	[0.006]	[0.006]	[0.005]
$Banks_{i03}$		0.128	
		[0.352]	
$Share_{i03}$		0.057	
		[0.067]	
$LiqRatio_{i03}$			1.101
			[1.393]
$LevRatio_{i03}$			0.127
			[0.346]
$Res(0)_i$	−1.153	0.268	−0.745***
	[0.924]	[0.400]	[0.232]

(Continued)

Table 7.7 (continued)

	(1)	(2)	(3)
Res(1) $_i$	0.293	0.126	0.389
	[0.349]	[0.252]	[0.246]
Res(2)$_i$	−0.011	−0.01	−0.052
	[0.161]	[0.163]	[0.161]
Res(LQ)$_i$			0.19
			[0.601]
Res(LV)$_i$			−0.915
			[1.701]
Obs.	642	642	490
Pseudo R^2	0.129	0.126	0.194
X^2 I°	0	0	0
X^2 II°	0.531	0.821	0.001
LR Test	0.067	0.189	0.642

Marginal effect reported for probit estimation. Robust bootstrapped standard errors (200 replications stratified by regions). Sector and area dummies are included. X_0, X_1, and X_2 are dummies that take value of 1 if a firm is in cluster 0, 1, and 2, respectively. All balance sheet data are defined as averages for year 2001–2003. Significance level: * is the p-value < 0.1, ** is the p-value < 0.05, and *** is the p-value < 0.01. The X^2 I° reports the p-value of joint significance test for Log(CS)$_{i03}$, and three interacted variables. The statistics is distributed as a X^2: in the null the four coefficients are jointly not different from zero. The X^2 II° reports the p-value of joint significance test for residuals *Res(x)*. *LR test* reports the p-value for the likelihood ratio test: under the null, the instruments of first stage have no additional explicative power in the second stage

suggests that instruments have not additional explanatory power in large part of regressions. Moreover, the test provide evidence that the instruments satisfy the exclusion restriction. This result reinforces also the idea that the sorting process is relatively exogenous.

As last exercise, we implement the 2SRI approach also to analyze expansions of export activity in new regions; we evaluate the effect of financial variables on the export status for a given region, on the binary decision of expanding in new markets. In both cases, we compare firms that report export activity in both surveys.

The results for the second stage show that the coefficients' signs and statistical significance do not change, when we deal with endogeneity (results remain unchanged compared to Table 7.5). Similarly, to previous analysis, cash stock is positive correlated with exporting. Residuals from first stage are not jointly significant, and the *LR Test* suggests that instruments have no additional explicative power.[46]

7.6 Conclusion

Exporting is an activity that entails several costs, and most of them are sunk costs associated with the first entry in the export. In real world, the new exporter faces a well-defined entry costs against an uncertain future profit. If we assume the existence of asymmetric information and imperfect capital markets, not all potential exporters begin export activity. Throughout the chapter, we discuss the impact of financial resources on the probability of entry into the export market, particularly for credit-constrained firms.

In the current chapter, we analyze two important issues. On the one hand, we develop a methodology for identifying a priori the level of a firm's financial health, borrowing insights from the literature on investments' sensitivity on cash flows, and using ratios from business economics. On the other hand, we empirically evaluate whether the level

[46]Table available upon request.

of internal resources affects both first entry in the export market and the extensive margin of trade.

We find that the internal resources are an important factor for firms' internationalization. The level of cash stock is crucial for new entrants which are identified as credit constrained. Moreover, we find that internal liquidity is positively correlated with the extensive margin of trade: an expansion in new destination market is associated to higher liquidity. Findings are robust also to endogeneity concerns.

However, further work is needed to understand the mechanisms through which liquidity affects the internationalization process of medium- and small-sized firms, with a more detailed dataset about export and asset/liabilities.

A.1 Appendix

Table A.1 Data description

Name	Description	Details	Source
Log(Y)	Log of sales	Operating revenues	Balance sheet
Log(KL)	Log of capital intensity	Ratio of fixed assets to labor force	Balance sheet
Log(Age)	Log of age	Difference between year of reference and year of foundation	Balance sheet
LabProd	Labor productivity	Value added per worker	Balance sheet
ER	Equity ratio	Sect. 7.3	Balance sheet
QR	Quick ratio	Sect. 7.3	Balance sheet
Log(CS)	Log of cash stock (broad measure of liquidity)	CS=Profits+DA+TFR+liquid assets	Balance sheet
CSKB	Cash stock divided by capital value at begin of period t	$CSKB=CS/KB$	Balance sheet
Inv	Investment in tangible fixed assets	$\text{Inv}_{it} = K_{it} - (1-\delta)K_{it-1}$ with $\delta = 0.1$	Balance sheet
DA	Value of depreciation and amortization		Balance sheet
TFR	Trattemento Fine Rapporto	Worker leave indemnity	Balance sheet
KB	Fixed asset at begin of period t	$\text{KB}_{it} = K_{it} - \text{Inv}_{it} + \text{DA}_{it}$	Balance sheet
LevRatio	Leverage ratio	Ratio of firm's short-term debt to current assets	Balance sheet
LiqRatio	Liquidity ratio	Ratio of firm's current assets minus its short-term debt to total assets	Balance sheet
Banks	Number of banks	Number of banks used by a firm	Survey
Share	Share of principal bank	Share of debt owned by principal bank in percentage point	Survey

(Continued)

Table A.1 (Continued)

Name	Description	Details	Source
R&D	R&D activity dummy	Dummy equal to 1 if firm invests in R&D activity	Survey
NewProd	Product innovation dummy	Dummy variable equal to 1 if a firm invest in product innovation	Survey
UpProd	Quality upgrading dummy	Dummy variable equal to 1 if a firm invest product upgrading	Survey
Expo	Export status	Dummy variable equal to 1 if a firm export at least the 2% of revenues	Survey
Ndest	Number of regions covered by export	Europe 15, East Europe, Russia, Asia, China, North America, South America, Oceania	Survey
Cluster	Four cluster groups	Clusters defined by ER>0.3 and QR>1	Own calculation
Cluster(Med)	Four cluster groups	Clusters defined by ER and QR greater sector median	Own calculation
Cluster(P25)	Four cluster groups	Clusters defined by ER and QR greater sector 25th percentile	Own calculation
Cluster(StMed)	Four cluster groups	Clusters defined by LevRatio and LiqRatio greater than sector median	Own calculation
Variation ER	Four cluster groups-based *ER*	Clusters defined by ER variation across two survey periods: Worsen, Bad Improve, Good	Own calculation

Table A.2 Descriptive statistics

Variable	Mean	S.D	Obs.	Min	Max	Domestic	Exporter	Cont.Dom	New Export
Log(Y)	8.92	1.33	2553	3.97	15.69	8.23	9.01	8.19	8.49
Log(KL)	3.53	0.97	2553	0.85	12.18	3.48	3.49	3.44	3.59
Age	27.26	18.79	2553	4	313	24.88	27.74	24.21	28.93
LabProd	96.54	999.82	2553	−114.78	41,191.38	52.61	133.21	51.83	54.43
δER	0.32	0.47	2553	0	1	0.33	0.32	0.35	0.14
δER	0.38	0.49	2553	0	1	0.44	0.38	0.46	0.21
North-West	0.37	0.48	2553	0	1	0.33	0.4	0.32	0.38
North-East	0.29	0.46	2553	0	1	0.26	0.31	0.25	0.33
Center	0.2	0.4	2553	0	1	0.21	0.18	0.22	0.13
South	0.13	0.34	2553	0	1	0.19	0.11	0.2	0.15
QR	1.06	0.83	2553	0.02	18.36	1.17	1.05	1.2	0.82
ER	0.26	0.2	2553	−4.06	0.9	0.25	0.27	0.26	0.18
Log(CS)	8.39	1.38	2550	3.09	14.55	7.74	8.46	7.71	7.87
CSKB	858.93	42,459.52	2491	−6.64	2,119,159	3359.67	8.71	3887.95	7.11
LevRatio	0.49	0.94	2553	0	39.63	0.41	0.49	0.4	0.49
LiqRatio	0.14	0.22	2553	−3.76	0.85	0.11	0.16	0.12	0.04
IKB	0.14	0.33	2490	−0.95	7.51	0.17	0.13	0.16	0.11
Log(Debt)	5.08	2.68	2553	0	13	4.1	5.18	4.02	4.69
Banks	5.01	3.13	2006	1	25	4.2	5.38	4.1	4.75
Share	34	26.72	1811	0	100	35.54	33.23	36.28	39.66
R&D	0.42	0.49	2013	0	1	0.22	0.52	0.2	0.36
Ask	0.37	0.48	333	0	1	0.33	0.39	0.34	0.39
Des	0.17	0.37	1981	0	1	0.19	0.15	0.19	0.28
UpProd	0.57	0.5	2553	0	1	0.7	0.71	0.7	0.68
NewProd	0.43	0.5	2553	0	1	0.32	0.53	0.31	0.39

(Continued)

Table A.2 (Continued)

Variable	Mean	S.D	Obs.	Min	Max	Domestic	Exporter	Cont.Dom	New Export
Expo	0.68	0.47	2015	0	1	0	1	0.05	1
NewExpo	0.13	0.34	644	0	1	0	1	0	1
Ndest	1.55	2.05	2553	0	9	0	2.86	0	1.45
Expo(EU15)	0.48	0.5	2553	0	1	0	0.89	0	0.77
Expo(EU-Rest)	0.15	0.36	2553	0	1	0	0.29	0	0.12
Expo(Russia)	0.18	0.38	2553	0	1	0	0.33	0	0.19
Expo(Asia)	0.16	0.37	2553	0	1	0	0.3	0	0.07
Expo(China)	0.05	0.22	2553	0	1	0	0.09	0	0.01
Expo(NorthA.)	0.2	0.4	2553	0	1	0	0.37	0	0.14

Data source: Capitalia Survey and balance sheet dataset. We consider 2263 firms which are present both in the eighth and the ninth survey. First five columns include statistics at aggregate level. S.D.: Standard deviation. Exporter: Exporters in 2003. Domestic: nonexporting firm in 2003. New-Export: Exporting firm in 2003, but domestic in 2000. Cont.Dom.: nonexporting firm in 2000 and 2003

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