Financial factors and exporting decisions

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Abstract

Using a panel of 9292 UK manufacturing firms over the period 1993-2003, we explore the links between firms' financial health and their export market participation decisions. We find that exporters exhibit better financial health than non-exporters. Yet, when we differentiate between continuous exporters and starters, we see that this result is driven by the former. Starters generally display low liquidity and high leverage, possibly due to the sunk costs which need to be met to enter export markets. Furthermore, we find no evidence that that firms enjoying better ex-ante financial health are more likely to start exporting, and strong evidence that participation in export markets improves firms' financial health.

JEL Classification: D24, F14, D92.

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1. Introduction

Recent developments within the trade literature have used a combination of sunk start-up costs and heterogeneity in firm productivity to explain why, even in narrowly defined industries, not all firms are engaged in international trade[1]. According to this line of research, new exporters face significant start-up costs as they gather information on foreign markets, develop marketing channels, adapt products and packaging to foreign tastes, and learn to deal with new bureaucratic procedures. In turn, these sunk costs generate hysterisis in export markets. Moreover, only the most productive and largest firms enter export markets, as it is only for these firms that the expected profits from exporting will be sufficiently high to cover the sunk entry costs[2].

Our paper adds a new dimension of firm heterogeneity to the empirical trade literature, namely a financial dimension[3]. In particular, we focus on whether there exists a link between firms' financial health (which we measure in terms of their liquidity and leverage) and their ability to enter export markets. In so doing we build on an extensive literature that has focused on the effects of capital market imperfections on firms' activities. Within this literature, a general conclusion has been that financial constraints impact on firm investment, employment and R&D decisions (see Hubbard, 1998; and Bond and van Reenen, 2005, for surveys). There are also good theoretical grounds for supposing that financial considerations might also affect entry into export markets: Chaney (2005) incorporates liquidity constraints into the heterogeneous firm framework of Melitz (2003) model and shows that they do have an impact on firm entry.

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[1] See, for instance, Bernard et al. (2003); Campa (2004); Helpman et al. (2004); Melitz (2003); and Roberts and Tybout (1997).

[2] Using data from various countries, empirical papers such as Clerides et al., (1998); Bernard and Jensen (1999, 2004); Aw et al. (2000); and Greenaway and Kneller (2004) have confirmed that exporters tend to be more productive and larger than non-exporters.

[3] While productivity and size have been the main dimensions of firm heterogeneity to be considered as determinants of export market participation, other dimensions have been recognised in the literature as important. For example, Yeaple (2005) considers heterogeneity with respect to different types of workers hired and different technologies used; Davidson et al. (2005) allow for different wages to be paid; while Manasse and Turrini (2001) consider different levels of entrepreneurial ability.

Our analysis is based on a panel of 9292 UK manufacturing firms over the period 1993-2003, extracted from the *Financial Analysis Made Easy* (FAME) database. Focusing on UK firms can be motivated by two considerations. First, the UK is the fifth largest exporter of manufactures in the world, and within our sample, 69.7 per cent of all firms exported in at least one year. Second, FAME contains profit and loss and balance sheet information on a very large number of firms, including firms not quoted on the stock market, which are particularly likely to face financial constraints.

Our results suggest that exporters exhibit better financial health than non-exporters. Yet, when we differentiate between continuous exporters and starters, we see that this finding is driven by the former. Starters generally display low liquidity and high leverage, possibly due to the sunk costs which need to be incurred to enter export markets, and which can be financed drawing down liquidity or increasing leverage. Furthermore, we find no evidence that firms enjoying better ex-ante financial health are more likely to start exporting, and strong evidence that participation in export markets improves firms' ex-post financial health. Financial health can therefore be seen as an outcome rather than a determinant of entry.

These results are relevant from a policy perspective. They suggest that export promotion policies can be beneficial to the economy, not only through their well-known direct growth-enhancing role, but also because they are likely to reduce the level of financial constraints faced by firms, and consequently to indirectly enhance their investment spending and productivity. The latter effect is likely to be particularly relevant for small and medium sized enterprises (SMEs), whose investment is often constrained by the lack of finance.

The rest of the paper is organized as follows. In Section 2, we set out the economic background of our analysis. Section 3 describes our dataset and presents some summary statistics. In Section 4, we present our empirical results. Section 5 concludes.

2. Economic background

A number of recent empirical papers have estimated models of fixed investment, inventory investment, and R&D investment, as a function of cash flow or other financial variables. A high sensitivity of investment to cash flow has typically been interpreted as an indicator of financial constraints. A financially constrained firm, for which it is difficult or too expensive to obtain external finance such as loans, will in fact only invest if it has sufficient internal funds, and will invest more the higher its cash flow.

Evidence in favor of this hypothesis (the financing constraints hypothesis) has been found for the US (see for instance Fazzari et al., 1988; Whited, 1992; Kashyap et al., 1994; Carpenter et al., 1994, 1998); for the UK (Blundell et al., 1992; Bond and Meghir, 1994; Guariglia, 1999, 2000; Bond et al., 2003; Benito, 2005); for other European countries (Vermeulen, 2002; Angeloni et al., 2003; Bond et al., 2003; Chatelain et al., 2003; Konings et al., 2003); for Japan (Hoshi et al., 1991); and for some developing countries (Jaramillo et al., 1996; Harrison and McMillan, 2003).

As discussed in Melitz (2003), entering export markets involves the payment of significant sunk costs. Consequently, firms wishing to export must make an initial fixed investment, and export market participation decisions are likely to be affected by financial variables in the same manner as investment in fixed capital. Yet, very few papers have looked at the link between financial factors and export market participation. Among these, Campa and Shaver (2002) and Guariglia and Mateut (2005) have looked at the link indirectly, comparing the degree of financing constraints faced by exporters and non-exporters. Campa and Shaver (2002) measure liquidity constraints as the sensitivity of investment in fixed capital to financial variables, and find that these constraints are less binding for Spanish exporters compared to non-exporters. Guariglia and Mateut (2005) focus on the sensitivities of firms' inventory investment to financial variables and show that globally engaged firms in the UK face lower

liquidity constraints than their purely domestic counterparts[4]. To the best of our knowledge, no paper has looked at the direct effects of financial variables on firms' export market participation decisions. Our paper fills this gap.

3. Data sample and summary statistics

3.1 The dataset

We construct our dataset from profit and loss and balance sheet data gathered by Bureau Van Dijk Electronic Publishing in the *Financial Analysis Made Easy* (FAME) database. This provides information on companies for the period 1993-2003[5]. It includes a majority of firms which are not traded on the stock market, or which are quoted on alternative exchanges such as the Alternative Investment Market (AIM) and the Off-Exchange (OFEX) market[6]. Unquoted firms are more likely to be characterized by adverse financial attributes such as a short track record, poor solvency, and low real assets compared to quoted firms, which are typically large, financially healthy, long-established companies with good credit ratings.

The firms in our dataset operate in the manufacturing sector. We excluded companies that changed the date of their accounting year-end by more than a few weeks, so that data refer to 12 month accounting periods. Firms that did not have complete records on exports, assets, wages, labor productivity, and the relevant financial variables were also dropped. Finally, to control for outliers, we excluded observations in the 1% tails for each of the variables[7].

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[4] Although this was not their main focus, two other studies have looked at indirect links between financial factors and firms' exporting decisions: Van Biesebroeck (2006), who considers whether having experienced contractual problems with clients in the past affects Sub-Saharian African firms' exporting decisions; and Blalock and Roy (2006), who evaluate the impact of the Indonesian financial crisis on firm exports. Neither finds that financial variables have great importance in determining firms' export behavior.

[5] A maximum of 10 years of complete data history can be downloaded at once. Our data were downloaded early in 2004: the coverage period is therefore 1993-2003.

[6] We only selected firms that have unconsolidated accounts: this ensures that the majority of the firms in our dataset are relatively small. Moreover, it avoids the double counting of firms belonging to groups, which would be included in the dataset if firms with consolidated accounts were also part of it.

[7] These cut-offs are aimed at eliminating observations reflecting particularly large mergers, extraordinary firm shocks, or coding errors. See Appendix 1 for more information on the structure of our panel and complete definitions of all variables used. Also note that because a number of regressors in our estimating equations are lagged once, the dataset actually used in estimation only covers the years 1994-2003.

Our panel therefore includes a total of 51668 annual observations on 9292 companies, covering the years 1993-2003. It has an unbalanced structure, with an average of 7 observations per firm. By allowing for both entry and exit, the use of an unbalanced panel partially mitigates potential selection and survivor bias. Out of the 9292 firms, 5461 are continuous exporters (58.77 percent); 2798 never exported (30.11 percent) 1033 are switchers (11.12 percent); and 434 are starters (4.67 percent)[8].

3.2 Summary statistics

Table 1 reports means and standard deviations of the main variables considered in the literature as determinants of export participation, as well as of two financial variables, which we use to measure firms' financial health: the liquidity ratio and the leverage ratio. The liquidity ratio is defined as the firm's current assets minus its current liabilities over its total assets, while the leverage ratio is defined as the firm's ratio of short-term debt to current assets. The higher its liquidity ratio and the lower its leverage ratio, the better the firm's financial health. We chose these two financial variables because they have been widely used in the financing constraints literature (e.g. Whited, 1992; Fazzari and Petersen, 1993; Cleary et al., 2004 etc.)[9]. We also report means and standard deviations of a measure of the firm's riskiness (labelled *Quiscore*). The *Quiscore* variable is based on information about the credit ratings of the firm and measures the likelihood of company failure in the twelve months following the date of calculation. The lower its *Quiscore* value, the more risky the firm is considered to be.

[8] We define as "continuous exporters" those firms that exported in all the years in which they are present in the sample. It should be noted, however, that since our sample starts in 1993, and our firms are not observed prior to that date, they could have started exporting either at birth, or sometime between their birth and 1993. Our denomination of "continuous exporters" is therefore an approximation as it refers to firms being "continuous exporters" within our sample period. The "switchers" are those firms that switched export status at least once over the same period; and the "starters", those firms that switched from being non-exporters to being exporters over the same period. The "starters" represent a sub-set of the "switchers".

[9] See Greenaway et al. (2005) for a discussion of how other financial variables behave among exporters and non-exporters, and for more motivation for the choice of these two particular variables. Our liquidity variable is consistent with that used by Chaney (2005) to theoretically define liquidity constraints on exports.

Column 1 of Table 1 refers to the entire sample; column 2 to the sub-sample of non-exporting firm-years; column 3 to the sub-sample of exporting firm-years. Column 4 refers to the sub-samples of firms which never exported (the continuous non-exporters); column 5 to the sub-sample that always exported (the continuous exporters). Finally, column 6 refers to the sub-samples of firms that switched export status at least once over the sample period (the switchers); and column 7, to those observations exporting in the current year, but not in the previous one (the starters)[10].

As frequently found in the literature (see, for example, Bernard and Jensen, 1999, for the US; and Greenaway and Kneller, 2004, for the UK), firm-years that export are larger than non-exporting firm-years, in terms of assets, number of employees, and sales, and are typically older. In particular, those firms that never exported are much smaller and younger than average. Furthermore, foreign owned firms and firms with one or more subsidiaries are more likely to export. Regarding our measure of productivity, which was calculated using the Levinsohn and Petrin (2003), method, we can see that exporting firm-years are typically more productive than their non-exporting counterparts[11]. In terms of riskiness, exporters display slightly higher values of *Quiscore* than non-exporters, which suggests that they are less risky.

Regarding the financial variables, exporting firm-years are characterized by considerably higher liquidity ratio (0.16) than non-exporting firm-years (0.09), while non-exporting firm-years display a higher average leverage ratio (0.41) compared to exporting firm-years (0.37). Similar differences are observed if we compare continuous non-exporters with continuous exporters.

[10] Our empirical analysis focuses on firm-years rather than simply firms, because firms can switch between exporter and non-exporter status. In our dataset, 1033 firms out of 9292 switched status once or more times during the period considered.

[11] A key issue in the estimation of production functions is the correlation between unobservable productivity shocks and input levels. Profit-maximizing firms respond to positive productivity shocks by expanding output, which requires additional inputs; and to negative shocks, by decreasing output and input usage. Olley and Pakes' estimator (1996) uses investment as a proxy for these unobservable shocks. This could cause problems as any observation with zero investment would have to be dropped from the data. Levinsohn and Petrin (2003), on the other hand, introduce an estimator, which uses intermediate inputs as proxies, arguing that intermediates (which are in most cases different from zero) are likely to respond more smoothly to productivity shocks.

Some interesting considerations arise if we focus on the starters: although younger, they are larger and more productive compared to the non-exporters. Yet, they display a lower liquidity ratio and, most importantly, a much higher leverage ratio (their leverage ratio is in fact equal to 0.49 compared to 0.41 for non-exporting firm-years). This could be due to the fact that these firms had to draw down their liquidity and increase their leverage in order to pay the sunk costs necessary to enter export markets. Finally, starters display a very low *Quiscore* value, 50.8, which indicates that they are highly risky.

In summary, this preliminary descriptive evidence suggests that there exists a link between firms' financial health and their export status. Yet, while it is necessary for a firm to be sufficiently large and productive in order to enter the export markets, those firms that do enter the export markets are not the most financially healthy ones. But are these starters more financially healthy prior to their entry in export markets, i.e. prior to the moment in which they have to incur the sunk costs? Moreover, given that continuous exporters are more financially healthy than non-exporters, does participating in export markets strengthen firms' financial health? In the sections that follows, we will provide formal tests to answer these questions.

4. Empirical results

4.1 Is there a link between financial variables and exporting decisions?

Table 1 shows that exporters are financially more healthy than non-exporters, as they generally display higher liquidity ratios and lower leverage ratios. But are these differences statistically significant? In Table 2, we test whether this is the case. In particular, we report the mean values of liquidity and leverage for exporters and non-exporters within the full sample, and within size quintiles, accompanied by a *t*-ratio, which indicates whether the difference in these financial

variables between the two groups of firms is statistically significant[12]. In all cases, we find statistically significant differences[13]. So far, we have therefore established that exporters are financially healthier than non-exporters, both unconditionally, and conditional on firms' characteristics such as size[14].

We now turn to a more formal analysis of this issue, by presenting regressions for the export market participation decision as a function of financial variables. We initially estimate the following reduced form model:

$$EXPDUM_{it} = a_0 + a_1 \, Very\ small_{i(t-1)} + a_2 \, Small_{i(t-1)} + a_3 \, Medium_{i(t-1)} + a_4 \, Large_{i(t-1)} +$$
$$+ a_5 \, Wage_{i(t-1)} + a_6 \, TFP_{i(t-1)} +$$
$$+ a_7 \, Subsidiaries_i + a_8 \, Foreign_i + a_9 \, Liquidity_{i(t-1)} / Leverage_{i(t-1)} +$$
$$+ industry\ dummies + time\ dummies + error\ term \qquad (1)$$

where the subscript *i* indexes firms; and *t*, time. $EXPDUM_{it}$ is a dummy variable equal to 1 if firm *i* exported in year *t*, and 0 otherwise. $Very\ small_{it}$ is a dummy variable equal to 1 if firm *i*'s real assets in year *t* are in the first quartile of the distribution of the real assets of all firms operating in the same industry as firm *i* in year *t*. $Small_{it}$, $Medium_{it}$, and $Large_{it}$ are calculated in a similar way for the second, third, and fourth real assets quartiles. $Very\ large_{it}$ is the omitted category. $Wage_{it}$ is given by the ratio of the firms' total wage bill to number of employees; TFP_{it} represents total factor productivity calculated using the Levinsohn and Petrin (2003) method. $Subsidiaries_i$ is a dummy variable equal to 1 if the firm has subsidiaries, and 0

[12] These are the *t*-statistics relative to the coefficient associated with $EXPDUM_{it}$ in a regression of $Liquidity_{it}$ / $Leverage_{it}$ on $EXPDUM_{it}$, time, and industry dummies, where $EXPDUM_{it}$ is a dummy variable equal to 1 if firm *i* exported in year *t*, and 0 otherwise.

[13] Similar results were obtained within wage and capital intensity quintiles, as well as when the size, wage, and capital intensity quintiles were further divided across foreign owned and non-foreign owned firms, and across firms with and without subsidiaries. These results are not reported for brevity, but are available from the authors upon request.

[14] Our finding that exporters are financially healthier than non-exporters is therefore not a consequence of the fact that non-exporters are small, while exporters are large.

otherwise; $foreign_i$ is a dummy equal to 1 if the firm is foreign owned, and 0 otherwise. $Liquidity_{it}$ denotes our liquidity ratio, and $Leverage_{it}$, our leverage ratio.

As in previous literature, which estimated similar regressions (Roberts and Tybout, 1997; Bernard and Jensen, 1999, 2004 etc.), all time-varying regressors are lagged once[15]. Except in our fixed-effects and GMM specifications, we include industry dummies in all regressions. These control for any fixed effects common across industries. Time dummies are also included to account for business cycle effects.

Our estimates of Equation (1) are reported in Table 3 (where the relevant financial variable is the liquidity ratio) and Table 4 (where the financial variable is the leverage ratio). We estimate Equation (1) using a number of estimators. As our dependent variable is dichotomous, we initially use a pooled Probit estimator, which corrects for clustering (column 1)[16], and a random-effects panel Probit estimator (column 2). Although clustering takes into account the fact that observations within the same firm are not independent, unobserved heterogeneity is not fully controlled for in our pooled Probit model[17]. On the other hand, the random-effects Probit, which takes unobserved heterogeneity into account, requires that firm-specific unobserved effects are uncorrelated with the regressors, which might not be a plausible assumption in our context.

Following Bernard and Jensen (2004), we then report estimates obtained using fixed-effects (column 3) and GMM (Arellano and Bond, 1991) estimators (column 4)[18]. Although the latter two estimators take into account unobserved heterogeneity, and GMM, also allows for the possible endogeneity of the regressors, linear probability models are problematic as they fail to properly capture the curvature of the regression function in the proximity of 0 and 1. This

[15] Our results were robust to using contemporaneous variables instead of lagged variables on the right-hand side of Equation (1).
[16] Given that we have repeated observations on firms, clustering allows the observations to be independent between firms, but not necessarily within firms. Clustering affects the estimated standard errors and variance-covariance matrix of the estimators, but not the estimated coefficients.
[17] Unobserved heterogeneity arises because unobserved firm-specific effects such as managerial ability, product characteristics, technology, foreign experience, which are not included among the regressors are likely to affect firms' decisions to export.
[18] We thank an anonymous referee for suggesting this exercise.

problem is likely to be particularly severe in our dataset as 8259 firms out of a total of 9292 always or never exported throughout the sample period, leading to a large number of very high and very low probabilities to export[19].

Finally in columns 5 and 6 of both Tables, we report dynamic random-effects Probit and GMM specifications. These are motivated by numerous studies that found considerable hysterisis in export market participation (Roberts and Tybout, 1997; Bernard and Jensen, 1999, 2004; Campa, 2004). As our main focus is on financial variables, we believe that if all our estimators deliver similar coefficients on the latter, then these coefficients can be considered as reliable.

Both in Tables 3 and 4, we can see that the size dummies are generally negatively signed and precisely determined. They are larger in absolute value for the smallest firms, indicating that the smaller the firm is, the less likely it is to export. Similar findings were reported in the literature (see for instance Bernard and Jensen, 1999, 2004, for the US). TFP has no significant effect on the firms' decision to export[20], and the wage rate attracts a negative coefficient in the static Probit specifications[21]. Foreign owned firms are more likely to export than other firms, as are firms with subsidiaries. This suggests some additional strategic motives for exporting for multinational firms even when controlling for their generally more favorable underlying characteristics.

Finally, both the coefficients on our liquidity and leverage variables have the expected sign (positive for liquidity, and negative for leverage), which is statistically significant in nine

[19] Another problem associated with the linear probability model is that predicted probabilities may lie outside the 0-1 range.
[20] Similar results were found when labor productivity was used instead of TFP.
[21] This particular result is puzzling as other studies generally found that higher wages are positively associated with the probability of entering export markets (e.g. Greenaway and Kneller, 2004, for the UK; and Bernard and Jensen, 1999, 2004, for the US). It might be due to the fact that wages are correlated with firms' size and productivity. When we ran a bivariate regression, with the export dummy on the right-hand side, and the wage rate, time, and industry dummies on the right-hand side, we found in fact that the coefficient associated with the wage variable was no longer statistically significant.

out of twelve regressions[22]. This suggests that more liquid and less leveraged firm-years are generally more likely to export. Yet, these results pool together continuous exporters and starters. We next attempt to evaluate whether, as suggested in Table 1, financial health differs across these two categories of firms, and more specifically, whether it differs according to the firm's past export status.

4.2 Are continuous exporters different from starters?

In Table 5, we investigate whether the link between export status and financial variables is affected by the firms' past export status. In particular, the Table compares the liquidity and leverage ratios at firms that exported in both periods *t* and *t*-1, and firms that exported in period *t*, but not *t*-1. We can see that the former firms always display a higher liquidity and lower leverage compared to the latter. The difference, as measured by the *t*-statistics on $EXPDUM_{i(t-1)}$ in a regression of $Liquidity_{it}$ / $Leverage_{it}$ of exporters on $EXPDUM_{i(t-1)}$, time, and industry dummies, is statistically significant both for the entire sample, and within size quintiles[23]. For comparison purposes, the liquidity and leverage ratios of non-exporters in both periods is also reported in the Table. Comparing non-exporters and starters, we see little differences in the two financial variables[24]. This suggests that firms that just started to export are not very different from non-exporters in terms of their financial health.

For the full sample, another comparison is undertaken, which further exploits the time dimension of our data. The following groups of firms are compared:

- firms the exported in years *t*, *t*-1, and *t*-2
- firms that exported in *t* and *t*-1, but not in *t*-2
- firms that exported in *t*, but not in *t*-1 and *t*-2

[22] The fact that the coefficient associated with our liquidity variable is statistically insignificant in the dynamic specifications could be due to collinearity between the firm's liquidity and its lagged export status.
[23] Similar results were obtained within wage and capital intensity quintiles. These results are not reported for brevity, but are available from the authors upon request.
[24] These differences are measured by the *t*-statistics on $EXPDUM_{it}$ in a regression of the $Liquidity_{it}$ / $Leverage_{it}$ of non-exporters at time *t*-1 on $EXPDUM_{it}$, time, and industry dummies.

- firms that did not export in *t*, *t*-1, and *t*-2.

Those firms that exported throughout have the lowest leverage ratio and the highest liquidity. Those firms that never exported come next, followed by those that exported in *t* and *t*-1, but not in *t*-2; and finally, by those who exported in *t*, but not in *t*-1 and *t*-2[25].

These findings suggest that those firms that export throughout the period considered are the most financially solid. The most financially constrained firms are not those who never exported, but those that entered the export markets one or two years before. This could be due to the fact that firms finance the sunk start-up costs by drawing down their liquidity or increasing their leverage.

Table 6 presents some more structural evidence regarding how our financial variables relate to the probability of being a continuous exporter or a starter. The Table presents cross-sectional Probit estimates for the probabilities of being a continuous exporter (columns 1 and 2) and being a starter (columns 3 and 4), as a function of the same controls used in Equation (1)[26]. Consistent with our descriptive evidence in Table 1, the results show that while it is the largest firms which are most likely to be continuous exporters, it is the medium-sized firms that are most likely to be starters. Moreover, a higher average liquidity and a lower average leverage are associated with a higher probability of being a continuous exporter, while starters generally display a poorer financial health.

In summary, our results so far indicate that being in good financial health and participating in the export markets are positively related. Yet, it also appears that it is important to distinguish between continuous exporters (which make up 58.8% of the firms in our sample) and starters (which make up 4.7% of our sample). Specifically, the positive (negative)

[25] This exercise was not performed within size classes, as too few observations would have been available in each group.

[26] In this Table, the "starters" are defined as those firms that switched from being non-exporters to exporters over the sample period. This category includes therefore firms that exported for a period ranging from a minimum of one year to a maximum of nine years. The "continuous exporters", on the other hand, include firms that exported throughout the sample period, i.e. for a minimum of ten years (see footnote 8 for further discussion of this issue). As the "continuous exporter" and "starter" categories are time-invariant, we averaged all the variables, leading to a cross-sectional data set of averages.

relationship between liquidity (leverage) only seems to apply to the former group, as starters exhibit higher leverage and lower liquidity. This could be due to the fact that starters pay the foreign market entry costs by drawing down their liquidity or increasing their leverage. If this is indeed the case, do firms that start exporting enjoy particularly good financial health (measured in terms of their liquidity and leverage) in the years preceding their actual entry in the export markets? Moreover, considering that continuous exporters enjoy good financial health, does prolonged participation in export markets lead to better ex-post financial health? We now turn to answering these questions, by formally testing whether good ex-ante financial health leads to exporting, and whether exporting leads to improved ex-post financial health.

4.3 Does good ex-ante financial health lead to export market participation?

Table 7 examines whether future exporters have an ex-ante financial advantage compared to non-exporters[27]. Results are presented for two short sub-samples (1993-1997; 1998-2003), as well as for the entire sample (1993-2003)[28]. Firms are included in each sample if they did not export in any of the initial years (1993-96; 1998-2002; 1993-2002). Firms may or may not have exported in the final year (1997, 2003, 2003).

The numbers in the Table represent the average financial advantage for future exporters Specifically, they represent the coefficients on $EXPDUM_{iT}$, where T indexes the last year available for firm i, in a cross-sectional regression of the average value of $Liquidity_{it}$ / $Leverage_{it}$ calculated in all years excluding the last one. Industry dummies are included in the regressions reported in column (2). Industry dummies and a control for the firm's initial size, measured in terms of the logarithm of its real assets are included in the regressions reported in column (3).

[27] Our approach is similar to that of Bernard and Jensen (1999) and Aw et al. (2000), who looked at the links between exporting and various measures of firms' performance. Contrary to these authors, however, we do not focus on the growth rates of our financial variables over the time periods considered, but on their average values. While it makes sense to look at the growth in variables such as employment, sales, and productivity, we think that average values of financial ratios are more informative than their growth rates.

[28] The division of the sample is motivated by the fact that our original sample covers eleven years, and some of the effects that we analyze might take place over shorter intervals. For instance, it might be more relevant to test whether some of the desirable attributes found in exporters relative to non-exporters are also found in these firms four to five years before they begin exporting, rather than nine to ten years before.

As the coefficients associated with the $EXPDUM_{iT}$ dummy are generally poorly determined, the results suggest that there is no clear ex-ante financial advantage of exporters. A few of the coefficients in the Table (relative to the full sample) are marginally significant: they indicate that those firms that exported in the last available year actually display higher leverage and lower liquidity than non-exporters. This is further evidence against the presence of a financial advantage of future exporters. Although future exporters have been found to have many of the desirable performance characteristics (such as productivity) several years before they started exporting (see Bernard and Jensen, 1999, for the US; Greenaway and Kneller, 2004, for the UK; Clerides et al., 1998, for Morocco, Mexico, and Columbia etc.), they do not seem to display the same desirable financial characteristics[29].

4.4 Does participation in foreign markets improve firms' ex-post financial health?

Table 8 looks at whether there is an ex-post financial advantage of continuous exporters, providing evidence on the relationship between the export status of the firm today and its subsequent financial health. Results are presented for the same time horizons as in Table 7. Firms are included in the sample if they exported in the final year (1997, 2003, 2003). Firms may or may not have exported in the years preceding the last. Firms that changed export status more than once over the sample period are excluded, so that those firms that exported in the first year are in fact continuous exporters[30].

The numbers in the Table represent the average financial advantage for initial exporters over the years following the first (1994-97; 1999-2003; 1994-2003). Specifically, they represent the coefficients on $EXPDUM_{i1}$, where *i* indexes the firm and *1*, the first year available for firm *i*, in a cross-sectional regression of the average value of $Liquidity_{it}$ / $Leverage_{it}$ calculated in all years following the first one. Industry dummies are included in the regressions reported in

[29] This finding contradicts Chaney's (2005) theoretical predictions.
[30] 282 firms out of 9292 changed export status more than once over the sample period, and were excluded.

column (2). Industry dummies and a control for the firm's initial size, measured in terms of the logarithm of its real assets are included in the regressions reported in column (3).

The results indicate that whatever the time horizon analyzed, those firms that exported in the first year (in addition to the last, i.e. the continuous exporters), always display lower leverage and higher liquidity, compared to those firms that did not export in the first year[31]. All reported coefficients are strongly significant. Being a continuous exporter seems therefore to lead to better ex-post financial health. This is in line with those studies that found that exporting leads to better performance (Baldwin and Gu, 2003; Aw et al., 2000, etc.)

On balance, the results in Tables 7 and 8 suggest that, while there is no evidence that those firms enjoying particularly good ex-ante financial health are more likely to start exporting, there is strong evidence that continuous exporter enjoy good financial health. This suggests that participation in export markets improves firms' ex-post financial health, and can be due to the fact that firms that export have access to both internal and international financial markets, which allows them to diversify their sources of financing and the associated risks. Moreover, given the presence of sunk costs that need to be met when entering foreign markets for the first time (Roberts and Tybout, 1997; Melitz, 2003), being an exporter also provides a signal that the firm is sufficiently productive to generate enough profits in foreign markets to recover the sunk costs. This increases the likelihood that the firm will be able to service its external debt, and further relaxes the liquidity constraints that it faces. Finally, being also dependent on demand from foreign countries, exporting firms are less tied to the domestic cycle, and less subject to those financial constraints induced by tight monetary policy and recessions in their home country (Campa and Shaver, 2002)[32]. The positive relationship

[31] For the time interval 1993-97, this group includes those firms that only started to export in 1997, as well as those that started in 1996, 1995, or 1994. It therefore includes starters, as well as firms that exported for two, three, or four years (i.e. all firms except those that exported throughout the five-year period, and which were probably also exporting before 1993).

[32] This argument relies on the assumption that business cycles are not perfectly coordinated across countries.

observed between firms' financial health and their export status is therefore driven by the fact that exporting improves firms' ex-post financial health.

5. Conclusions

In this paper, we have introduced a new dimension of firm heterogeneity to understand why some firms engage in international trade while others do not, namely a financial dimension. In particular, we have used a panel of 9292 UK firms over the period 1993-2003 to analyze the role played by financial variables in determining firms' decisions to export.

We found that exporters exhibit better financial health than non-exporters. Yet, when we differentiated between continuous exporters (which make up the majority of our sample) and starters, we found that this result is driven by the former. Starters displayed in fact low liquidity and high leverage, possibly due to the sunk costs which need to be incurred to enter export markets, and which can be financed drawing down liquidity or increasing leverage. Furthermore, we found no evidence that firms enjoying better ex-ante financial health are more likely to start to export, and strong evidence that participation in export markets improves firms' ex-post financial health. Financial health can therefore be seen as an outcome rather than a determinant of entry.

These findings are relevant from a policy perspective. They suggest that export promotion policies can be beneficial to the economy, not only through their well-known direct growth-enhancing role, but also because they are likely to reduce the level of financial constraints faced by firms, and consequently to indirectly enhance their investment spending and productivity. The latter effect is likely to be particularly relevant for SMEs, whose investment is often constrained by the lack of finance.

Appendix 1: Data

Structure of the unbalanced panel:

Number of observations per firm	Number of firms	Percent	Cumulative
1	1306	14.06	14.06
2	918	9.88	23.93
3	870	9.36	33.30
4	825	8.88	42.18
5	752	8.09	50.27
6	703	7.57	57.83
7	650	7.00	64.83
8	757	8.15	72.98
9	1078	11.60	84.58
10	1433	15.42	100.00
Total	9292	100.00	

Definitions of the variables used:

EXPDUM: dummy variable equal to 1 if the firm exports a positive amount, and 0 otherwise.

Total assets: sum of the firm's fixed (tangible and intangible) assets and current assets. Current assets are defined as the sum of stocks, work-in-progress inventories, trade and other debtors, cash and equivalents, and other current assets.

Sales: includes both UK and overseas turnover.

TFP: Total factor productivity calculated using the Levinsohn and Petrin (2003) method.

Wage: the ratio of the firms' total wage bill (which includes wages, salaries, social security and pension costs) to number of employees.

Foreign: dummy equal to 1 if the firm is foreign owned, and 0 otherwise. To be considered as foreign owned, the share of foreign ownership in a firm's equity must exceed 24.99 percent. This dummy variable is only available in the last year of observations available for each firm. We therefore assume that a firm which was foreign owned in its last available year was foreign owned throughout the period in which it was observed. Actual data on the share of foreign ownership in a firm's equity are only available for a very limited number of observations.

Subsidiaries: dummy variable equal to 1 if the firm has subsidiaries, and 0 otherwise. This variable is only available in the last year of observations for each firm. We therefore assume that a firm which had subsidiaries in its last available year also had them throughout the period in which it was observed.

Liquidity ratio: ratio between the firm's current assets minus its current liabilities and its total assets. Current liabilities are defined as the sum of short-term debt, trade credit, and other current liabilities that include some forms of finance resembling commercial paper or bonds.

Leverage ratio: the firm's short-term debt to current assets ratio.

Quiscore is given as a number in the range from 0 to 100. The lower its *Quiscore*, the more risky a firm is likely to be. The indicator is constructed taking into account a number of factors, including the presence of any adverse documents appearing against the company on the public file, and the timeliness of getting the accounts filed. However, the most important factors relate to the financial performance of the company as evidenced by its balance sheet and profit and loss accounts. The key financial items used include turnover, pre-tax profits, working capital, intangibles, cash and bank deposits, creditors, bank loans and overdrafts, current assets, current liabilities, net assets, fixed assets, share capital, reserves and shareholders funds. The underlying economic conditions are also taken into account.

Deflators: all variables are deflated using the aggregate GDP deflator.

References

Angeloni, I., Kashyap, A., and B. Mojon (eds.) (2003). *Monetary Policy Transmission in the Euro Area.* Cambridge University Press, Cambridge.

Arellano, M. and S. Bond (1991). "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *Review of Economic Studies*, 58, 277-97.

Aw, B-Y, Chung, S., and M. Roberts (2000). "Productivity and Turnover in the Export Market: Micro Evidence from Taiwan and South Korea." *World Bank Economic Review,* 14, 65-90.

Baldwin, J. and W., Gu (2003). "Export-Market Participation and Productivity Performance in Canadian Manufacturing." *Canadian Journal of Economics,* 36, 63457.

Benito, A. (2005). "Financial Pressure, Monetary Policy Effects and Inventories: Firm-level Evidence from a Market-based and a Bank-based Financial System." *Economica,* 72, 201-224.

Bernard, A., J. Eaton, J. Jensen, and S. Kortum (2003). "Plants and Productivity in International Trade." *American Economic Review,* 93, 1268-1290.

Bernard, A. and J. Jensen (1999). "Exceptional Exporters Performance: Cause, Effect or Both?" *Journal of International Economics,* 47, 1-25.

Bernard, A. and B. Jensen (2004). "Why some Firms Export". *Review of Economics and Statistics,* 86, 561-69.

Blalock, G. and S. Roy (2006). "A Firm-Level Examination of the Exports Puzzle: Why East Asian Exports Didn't Increase After the 1997-1998 Financial Crisis?" *The World Economy* (forthcoming).

Blundell, R., Bond, S., Devereux, M., and F. Schiantarelli (1992). "Investment and Tobin's Q: Evidence from Company Panel Data." *Journal of Econometrics,* 51, 233-57.

Bond, S., Elston, J., Mairesse, J., and B. Mulkay (2003). "Financial Factors and Investment in Belgium, France, Germany, and the United Kingdom: A Comparison Using Company Panel Data." *Review of Economics and Statistics,* 85, 153-65.

Bond, S., and C. Meghir (1994). "Dynamic Investment Models and the Firm's Financial Policy." *Review of Economic Studies,* 61, 197-222.

Bond, S. and J. Van Reenen (2005). "Microeconometric Models of Investment and Employment." forthcoming in J. Heckman and E. Leamer (eds) *Handbook of Econometrics*, Volume 6, Elsevier, North Holland.

Clerides, S., Lack, S., and J. Tybout (1998). "Is Learning by Exporting Important? Micro-Dynamic Evidence from Colombia, Mexico, and Morocco." *Quarterly Journal of* Economics, 113, 903-47.

Campa, J-M. (2004). "Exchange Rates and Trade: How Important is Hysterisis in Trade?" *European Economic Review*, 48, 527-48.

Campa J-M. and J-M. Shaver (2002). "Exporting and Capital Investment: On the Strategic Behavior of Exporters". IESE Business School, University of Navarra, Discussion Paper No. 469.

Carpenter, R., Fazzari, S., and B. Petersen (1994). "Inventory (Dis)investment, Internal Finance Fluctuations, and the Business Cycle." *Brookings Papers in Economic Activity*, 2, 75-122.

Carpenter, R., Fazzari, S., and B. Petersen (1998). "Financing Constraints and Inventory Investment: a Comparative Study with High-Frequency Panel Data." *Review of Economics and Statistics*, 80, 513-19.

Chaney, T. (2005). "Liquidity Constrained Exporters". *Mimeograph*, Massachusetts Institute of Technology.

Chatelain, J-B., Generale, A., Hernando, I., Von Kalckreuth, U., and P. Vermeulen (2003). "New Findings on Firm Investment and Monetary Transmission in the Euro Area." *Oxford Review of Economic Policy*, 19, 73-83.

Cleary, S., Povel, P., and M. Raith (2004). "The U-Shaped Investment Curve: Theory and Evidence." Centre for Economic Policy Research, Discussion Paper No. 4206. (forthcoming in the *Journal of Financial and Quantitative Analysis*).

Davidon, C., Matusz, S., and A. Shevchenko (2005). "Globalization and Firm-Level Adjustment with Imperfect Labor Markets." *Mimeograph*, Michigan State University.

Fazzari, S., Hubbard, G., and B. Petersen (1988). "Financing Constraints and Corporate Investment." *Brookings Papers on Economic Activity*, 1, 141-95.

Fazzari and Petersen (1993). "Working Capital and Fixed Investment: New Evidence on Financing Constraints." *RAND Journal of Economics* 24: 328-42.

Greenaway, D., Guariglia, A., and R. Kneller (2005). "Do Financial Factors Affect Exporting Decisions?" *GEP Research Paper 05/28*, Leverhulme Centre for Research on Globalization and Economic Policy, University of Nottingham.

Greenaway, D., and R. Kneller (2004). "Exporting and Productivity in the United Kingdom." *Oxford Review of Economic Policy*, 20, 358-71.

Guariglia, A. (1999). "The Effects of Financial Constraints on Inventory Investment: Evidence from a Panel of UK Firms." *Economica*, 66, 43-62.

Guariglia, A. (2000). "Inventory Investment and Capital Market Imperfections: A Generalization of the Linear Quadratic Inventory Model." *Oxford Bulletin of Economics and Statistics*, 62, 223-42.

Guariglia, A. and S. Mateut (2005). "Inventory Investment, Global Engagement and Financial Constraints in the UK: Evidence from Micro Data." *GEP Research Paper 05/23*, Leverhulme Centre for Research on Globalization and Economic Policy, University of Nottingham.

Harrison, A. and M. McMillan (2003). "Does Direct Foreign Investment Affect Domestic Firms Credit Constraints?" *Journal of International Economics*, 61, 73-100.

Helpman, E., Melitz, M., and S. Yeaple (2004). "Export Versus FDI with Heterogeneous Firms." *American Economic Review*, 94, 300-16.

Hoshi, T, Kashyap, A, and D. Scharfstein (1991). “Corporate Capital Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups.” *Quarterly Journal of Economics*, 106, 33-60.

Hubbard, G. (1998). “Capital Market Imperfections and Investment.” *Journal of Economic Literature*, 35, 193-225.

Jaramillo, F., Schiantarelli, F., and A. Weiss (1996). “Capital Market Imperfections, before and after Financial Liberalization: an Euler Equation Approach to Panel Data for Ecuadorian Firms.” *Journal of Development Economics*, 51, 367-86.

Konings, J., Rizov, M., and H. Vandenbussche (2003). “Investment and Financial Constraints in Transition Economies: Micro Evidence from Poland, the Czech Republic, Bulgaria and Romania.” *Economics Letters*, 78, 253-258.

Levinsohn, J. and A. Petrin (2003). “Estimating Production Functions Using Inputs to Control for Unobservables”. *Review of Economic Studies* 70: 317-342.

Manasse, P. and A. Turrini (2001). “Trade, Wages, and ‘Superstars.’” *Journal of International Economics*, 54, 97-117.

Melitz, M. (2003). “The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity.” *Econometrica*, 71, 1695-1725.

Olley, S. and A. Pakes (1996). “The Dynamics of Productivity in the Telecommunications Equipment Industry”. *Econometrica* 64: 1263-97.

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

Van Biesebroeck, J. (2006). “Exporting Raises Productivity in Sub-Saharan African Manufacturing Firms.” *Journal of International Economics* (forthcoming).

Vermeulen, P. (2002). “Business Fixed Investment: Evidence of a Financial Accelerator in Europe.” *Oxford Bulletin of Economics and Statistics*, 64, 213-31.

Whited, T. (1992). “Debt, Liquidity Constraints and Corporate Investment: Evidence from Panel Data.” *Journal of Finance*, 47, 1425-60.

Yeaple, S. (2005). “Firm Heterogeneity, International Trade and Wages.” *Journal of International Economics*, 65, 1-120.

Table 1: Summary statistics of the key variables

	Total sample	Obs.such that $EXPDUM_{it}$=0	Obs. such that $EXPDUM_{it}$=1	Conti-nuous non-exporters	Conti-nuous exporters	Switchers	Starters ($EXPDUM_{it}$=1 and $EXP\text{-}DUM_{i(t-1)}$=0)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Real assets$_{it}$	240.801	161.634	271.516	142.858	270.108	271.723	226.400
	(705.47)	(631.91)	(729.72)	(576.52)	(725.82)	(792.61)	(639.03)
Employees$_{it}$	285.893	212.838	311.827	197.205	311.584	303.052	266.778
	(756.08)	(609.55)	(800.09)	(571.43)	(804.98)	(758.85)	(575.10)
Real sales$_{it}$	303.655	205.607	341.767	175.042	340.345	353.485	303.997
	(876.07)	(839.75)	(886.88)	(667.15)	(890.24)	(1088.31)	(753.73)
Age$_{it}$	27.72	24.402	29.005	24.233	29.206	26.614	23.374
	(24.13)	(22.77)	(24.51)	(22.73)	(24.53)	(23.82)	(21.69)
TFP$_{it}$	5.650	5.120	5.833	5.104	5.844	5.553	5.484
	(2.44)	(2.26)	(2.47)	(2.27)	(2.47)	(2.45)	(2.51)
Wage$_{it}$	22.456	22.176	22.556	22.121	22.614	22.215	22.046
	(8.19)	(9.26)	(7.77)	(9.43)	(7.78)	(7.97)	(7.77)
Foreign$_{i}$	0.460	0.332	0.500	0.306	0.500	0.480	0.468
	(0.50)	(0.47)	(0.50)	(0.46)	(0.50)	(0.50)	(0.50)
Subsidiaries$_{i}$	0.319	0.253	0.344	0.244	0.345	0.322	0.285
	(0.47)	(0.43)	(0.47)	(0.43)	(0.47)	(0.47)	(0.45)
Quiscore$_{it}$	54.867	54.090	55.169	54.676	55.311	53.00	50.829
	(22.31)	(22.10)	(22.39)	(22.03)	(22.41)	(22.27)	(21.98)
Liquidity$_{it}$	0.138	0.093	0.155	0.096	0.160	0.105	0.091
	(0.26)	(0.27)	(0.26)	(0.27)	(0.26)	(0.27)	(0.26)
Leverage$_{it}$	0.379	0.413	0.367	0.402	0.361	0.429	0.485
	(0.42)	(0.47)	(0.39)	(0.46)	(0.38)	(0.46)	(0.44)
Obs.	51668	14467	37201	12009	32993	6666	733

Notes: The Table reports the variables' means. Standard deviations are reported in parentheses. $EXPDUM_{it}$ is a dummy variable equal to 1 if firm *i* reported a positive amount of exports in year *t*. The continuous exporters are defined as those firms that exported in all the sample years. The continuous non-exporters are defined as those firms that never exported over the same period. The switchers are those firms that switched between export statuses at least once over the sample period. Real assets and real sales are expressed in thousands of pounds. TFP_{it} is the firm's total factor productivity calculated using the Levinsohn and Petrin (2003) method. $Wage_{it}$ is the ratio between the firm's total wage bill and its number of employees. $Subsidiaries_i$ is a dummy variable equal to 1 if firm *i* has subsidiaries, and 0 otherwise. $Foreign_i$ is a dummy equal to 1 if firm *i* is foreign owned, and 0 otherwise. $Liquidity_{it}$ is defined as the ratio of the firm's current assets minus its current liabilities over its total assets. $Leverage_{it}$ is the ratio of the firm's short-term debts to its current assets. *Quiscore* measures the likelihood of company failure in the twelve months following the date of calculation. The lower its quiscore value, the more risky the firm is considered to be. Sample period 1993-2003. See Appendix 1 for more accurate definitions of the variables in this Table.

Table 2: Mean liquidity and leverage ratios for exporters and non-exporters for the entire sample and different sub-samples based on firms' size

	Liquidity ratio	Leverage ratio	Observations
Entire sample			
$EXPDUM_{it}$=0	0.093	0.413	13231
$EXPDUM_{it}$=1	0.156	0.367	35175
t-statistic	17.64***	-8.10***	
First size quintile			
$EXPDUM_{it}$=0	0.106	0.357	4526
$EXPDUM_{it}$=1	0.156	0.342	4868
t-statistic	5.83***	-0.74	
Second size quintile			
$EXPDUM_{it}$=0	0.099	0.377	3038
$EXPDUM_{it}$=1	0.176	0.327	6541
t-statistic	9.63***	-4.81***	
Third size quintile			
$EXPDUM_{it}$=0	0.083	0.423	2386
$EXPDUM_{it}$=1	0.172	0.258	7341
t-statistic	11.00***	-7.19***	
Fourth size quintile			
$EXPDUM_{it}$=0	0.098	0.459	1784
$EXPDUM_{it}$=1	0.153	0.378	8383
t-statistic	6.57***	-5.49***	
Fifth size quintile			
$EXPDUM_{it}$=0	0.047	0.585	1497
$EXPDUM_{it}$=1	0.126	0.422	8383
t-statistic	9.16***	-8.78***	

Notes: The Table reports the variables' means. The rows labelled "*t*-statistic" report the *t*-statistics on $EXPDUM_{it}$ in a regression of $Liquidity_{it}$ / $Leverage_{it}$ on $EXPDUM_{it}$, time, and industry dummies. Also see Notes to Table 1.

Table 3: Liquidity and the export market participation decision

	Pooled Probit	Random-effects Probit	Fixed-effects	GMM	Dynamic random-effects Probit	Dynamic GMM
	(1)	(2)	(3)	(4)	(5)	(6)
$EXPDUM_{i(t-1)}$					3.502***	0.517***
					(0.04)	(0.03)
Very small $_{i(t-1)}$	-0.999***	-1.655***	-0.027**	-0.078*	-0.304***	-0.043
	(0.08)	(0.13)	(0.01)	(0.04)	(0.07)	(0.04)
$Small_{i(t-1)}$	-0.627***	-1.111***	-0.018*	-0.052	-0.155**	-0.029
	(0.08)	(0.12)	(0.009)	(0.03)	(0.07)	(0.03)
$Medium_{i(t-1)}$	-0.430***	-0.781***	-0.018**	-0.031	-0.105*	-0.017
	(0.07)	(0.11)	(0.008)	(0.03)	(0.06)	(0.03)
$Large_{i(t-1)}$	-0.181	-0.283***	-0.007	-0.006	-0.105	0.003
	(0.07)	(0.09)	(0.006)	(0.02)	(0.06)	(0.02)
$Wage_{i(t-1)}$	-0.009***	-0.012**	-0.0004	0.001	-0.005	0.001
	(0.003)	(0.005)	(0.0003)	(0.001)	(0.003)	(0.001)
$TFP_{i(t-1)}$	-0.012	0.006	0.001	-0.001	-0.007	-0.004
	(0.01)	(0.02)	(0.001)	(0.005)	(0.01)	(0.005)
$Subsidiaries_i$	0.125**	0.278***			0.022	
	(0.05)	(0.09)			(0.04)	
$Foreign_i$	0.252***	0.610***			0.127**	
	(0.05)	(0.09)			(0.04)	
$Liquidity_{i(t-1)}$	0.509***	0.634***	0.007	0.048*	0.101	0.022
	(0.07)	(0.11)	(0.007)	(0.03)	(0.07)	(0.02)
Sargan (*p*)			0.814			0.741
m2(*p*)			0.074			0.028
Observations	24623	24623	24623	19187	24623	19187

<u>Note:</u> $Very\ small_{it}$ is a dummy variable equal to 1 if firm *i*'s real assets in year *t* are in the first quartile of the distribution of the real assets of all firms operating in the same industry as firm *i* in year *t*. $Small_{it}$, $Medium_{it}$, and $Large_{it}$ are calculated in a similar way for the second, third, and fourth real assets quartiles. $Very\ large_{it}$ is the omitted category. In the pooled Probit specifications, the standard errors are corrected for clustering. Robust *z*-statistics are reported in parentheses. The GMM estimates were obtained using the Arellano and Bond (1991) first-difference GMM estimator, where the instruments are all right-hand side variables lagged twice or more. Time-dummies were included in all specifications. Industry dummies were included in the specifications in columns 1, 2, and 5. *m2* is a test for second- order serial correlation in the first-differenced residuals of the GMM specification, asymptotically distributed as N(0,1) under the null of no serial correlation. The *J* statistic is a test of the overidentifying restrictions, distributed as chi-square under the null of instrument validity. Sample period: 1994-2003. * indicates significance at the 10% level. ** indicates significance at the 5% level. *** indicates significance at the 1% level. Also see Notes to Table 1.

Table 4: Leverage and the export market participation decision

	Pooled Probit	Random-effects Probit	Fixed-effects	GMM	Dynamic random-effects Probit	Dynamic GMM
	(1)	(2)	(3)	(4)	(5)	(6)
$EXPDUM_{i(t-1)}$					3.496***	0.508***
					(0.04)	(0.04)
Very small $_{i(t-1)}$	-0.975***	-1.647***	-0.027**	-0.071	-0.283***	-0.029
	(0.08)	(0.13)	(0.01)	(0.05)	(0.07)	(0.04)
$Small_{i(t-1)}$	-0.632***	-1.105***	-0.017*	-0.042	-0.154**	-0.017
	(0.08)	(0.12)	(0.009)	(0.04)	(0.07)	(0.03)
$Medium_{i(t-1)}$	-0.440***	-0.776***	-0.017**	-0.019	-0.118*	-0.006
	(0.07)	(0.11)	(0.008)	(0.03)	(0.06)	(0.03)
$Large_{i(t-1)}$	-0.184	-0.268***	-0.005	0.001	-0.008	0.009
	(0.07)	(0.09)	(0.006)	(0.02)	(0.06)	(0.02)
$Wage_{i(t-1)}$	-0.009***	-0.012**	-0.0004	0.001	-0.004	0.001
	(0.003)	(0.005)	(0.0003)	(0.0009)	(0.003)	(0.0009)
$TFP_{i(t-1)}$	-0.012	0.002	0.0008	-0.002	-0.008	-0.004
	(0.01)	(0.02)	(0.001)	(0.006)	(0.01)	(0.005)
$Subsidiaries_i$	0.122**	0.313***			0.039	
	(0.05)	(0.09)			(0.04)	
$Foreign_i$	0.290***	0.672***			0.140***	
	(0.05)	(0.09)			(0.04)	
$Leverage_{i(t-1)}$	-0.279***	-0382***	-0.013***	-0.039**	-0.080*	-0.031**
	(0.04)	(0.07)	(0.004)	(0.02)	(0.04)	(0.01)
Sargan (*p*)			0.973			0.767
m2(*p*)			0.188			0.032
Observations	23641	23641	23641	18061	23641	18061

Note: In the pooled Probit specifications, the standard errors are corrected for clustering. Robust *z*-statistics are reported in parentheses. Time-dummies were included in all specifications. Industry dummies were included in the specifications in columns 1, 2, and 5. Sample period: 1994-2003. * indicates significance at the 10% level. ** indicates significance at the 5% level. *** indicates significance at the 1% level. Also see Notes to Tables 1 and 3.

Table 5: Mean liquidity and leverage ratios for exporters and non-exporters, considering the firms' past export behavior

	Liquidity ratio	Leverage ratio	Observations
Entire sample			
$EXPDUM_{it}$=1; $EXPDUM_{i(t-1)}$=1	0.158	0.368	28407
$EXPDUM_{it}$=1; $EXPDUM_{i(t-1)}$=0	0.094	0.420	645
t-statistic (1)	5.71***	-3.31***	
$EXPDUM_{it}$=0; $EXPDUM_{i(t-1)}$=0	0.097	0.410	9517
t-statistic (2)	-1.19	1.19	
$EXPDUM_{it}$=1; $EXPDUM_{i(t-1)}$=1; $EXPDUM_{i(t-2)}$=1	0.160	0.372	22788
$EXPDUM_{it}$=1; $EXPDUM_{i(t-1)}$=1; $EXPDUM_{i(t-2)}$=0	0.096	0.422	464
$EXPDUM_{it}$=1; $EXPDUM_{i(t-1)}$=0; $EXPDUM_{i(t-2)}$=0	0.072	0.447	311
$EXPDUM_{it}$=0; $EXPDUM_{i(t-1)}$=0; $EXPDUM_{i(t-2)}$=0	0.105	0.406	6974
First size quintile			
$EXPDUM_{it}$=1; $EXPDUM_{i(t-1)}$=1	0.169	0.334	3531
$EXPDUM_{it}$=1; $EXPDUM_{i(t-1)}$=0	0.103	0.378	129
t-statistic (1)	2.35**	-1.20	
$EXPDUM_{it}$=0; $EXPDUM_{i(t-1)}$=0	0.118	0.350	3042
t-statistic (2)	-0.91	0.89	
Second size quintile			
$EXPDUM_{it}$=1; $EXPDUM_{i(t-1)}$=1	0.178	0.330	5136
$EXPDUM_{it}$=1; $EXPDUM_{i(t-1)}$=0	0.102	0.370	159
t-statistic (1)	3.30***	-1.65*	
$EXPDUM_{it}$=0; $EXPDUM_{i(t-1)}$=0	0.100	0.376	2216
t-statistic (2)	-0.47	0.28	
Third size quintile			
$EXPDUM_{it}$=1; $EXPDUM_{i(t-1)}$=1	0.175	0.343	5934
$EXPDUM_{it}$=1; $EXPDUM_{i(t-1)}$=0	0.074	0.429	123
t-statistic (1)	4.47***	-2.53**	
$EXPDUM_{it}$=0; $EXPDUM_{i(t-1)}$=0	0.082	0.425	1809
t-statistic (2)	-0.88	0.16	
Fourth size quintile			
$EXPDUM_{it}$=1; $EXPDUM_{i(t-1)}$=1	0.155	0.377	6747
$EXPDUM_{it}$=1; $EXPDUM_{i(t-1)}$=0	0.112	0.408	117
t-statistic (1)	1.44	-0.87	
$EXPDUM_{it}$=0; $EXPDUM_{i(t-1)}$=0	0.099	0.444	1353
t-statistic (2)	0.61	-1.26	
Fifth size quintile			
$EXPDUM_{it}$=1; $EXPDUM_{i(t-1)}$=1	0.126	0.426	7059
$EXPDUM_{it}$=1; $EXPDUM_{i(t-1)}$=0	0.074	0.539	117
t-statistic (1)	2.06**	-2.38**	
$EXPDUM_{it}$=0; $EXPDUM_{i(t-1)}$=0	0.049	0.582	1097
t-statistic (2)	0.28	-0.56	

Notes: The rows labelled "*t*-statistic (1)" report the *t*-statistics on $EXPDUM_{i(t-1)}$ in a regression of $Liquidity_{it}$ / $Leverage_{it}$ of exporters on $EXPDUM_{i(t-1)}$, time, and industry dummies. The rows labelled "*t*-statistic (2)" report the *t*-statistics on $EXPDUM_{it}$ in a regression of the $Liquidity_{it}$ / $Leverage_{it}$ of non-exporters at time *t*-1 on $EXPDUM_{it}$, time, and industry dummies. Also see Notes to Table 1.

Table 6: Differential effects of financial variables on the probabilities of being a continuous exporter or a starter

	Continuous exporters	Continuous exporters	Starters	Starters
	(1)	(2)	(3)	(4)
Very smal1$_i$	-0.810***	-0.812***	0.132	0.127
	(0.08)	(0.08)	(0.14)	(0.14)
Small$_i$	-0.406***	-0.419***	0.147	0.152
	(0.08)	(0.08)	(0.13)	(0.13)
Medium$_i$	-0.268***	-0.276***	0.248**	0.254**
	(0.08)	(0.08)	(0.12)	(0.12)
Large$_i$	-0.093	-0.091	0.024	0.017
	(0.08)	(0.08)	(0.12)	(0.12)
Wage$_i$	-0.008***	-0.008**	-0.005	-0.005
	(0.003)	(0.002)	(0.005)	(0.005)
TFP$_i$	0.0004	-0.001	0.003	0.002
	(0.01)	(0.01)	(0.02)	(0.02)
Subsidiaries$_i$	0.051	0.052	-0.051	-0.049
	(0.043)	(0.04)	(0.07)	(0.07)
Foreign$_i$	0.171***	0.197***	0.164***	0.142**
	(0.04)	(0.04)	(0.06)	(0.06)
Liquidity$_i$	0.521***		-0.519***	
	(0.08)		(0.11)	
Leverage$_i$		-0.341***		0.266***
		(0.05)		(0.06)
Observations	5477	5430	5272	5226

Note: All estimates in this Table are obtained from Probit models conducted on the cross-sectional data containing the means of all relevant variable for each firm. Firms that changed export status more than once over the sample period are excluded. Robust *z*-statistics are reported in parentheses. Industry dummies were included in all specifications. Sample period: 1993-2003. * indicates significance at the 10% level. ** indicates significance at the 5% level. *** indicates significance at the 1% level. Also see Notes to Tables 1 and 3.

Table 7: Ex-ante financial advantage of future exporters over various time horizons

	No control	Industry controls	Industry and size controls	Observations
	(1)	(2)	(3)	(4)
1993-1997				
$Liquidity_{it}$	0.008 (0.04)	-0.011 (0.04)	-0.011 (0.04)	1004
$Leverage_{it}$	0.076 (0.07)	0.095 (0.06)	0.084 (0.07)	974
1998-2003				
$Liquidity_{it}$	-0.031 (0.04)	-0.041 (0.03)	-0.037 (0.03)	1515
$Leverage_{it}$	0.105 (0.07)	0.109 (0.07)	0.090 (0.07)	1470
1993-2003				
$Liquidity_{it}$	-0.042 (0.03)	-0.061* (0.03)	-0.06* (0.03)	1821
$Leverage_{it}$	0.093 (0.06)	0.111 (0.06)	0.101* (0.06)	1781

Note: Firms are included in the sample if they did not export in any of the initial years (1993-96; 1998-2002; 1993-2002). Firms may or may not have exported in the final year(1993, 2003, 2003). The numbers in this Table represent the average financial advantage for future exporters calculated over the years preceding the last one. Specifically, they represent the coefficients on $EXPDUM_{iT}$, where *i* indexes the firm and *T*, the last year available for firm *i*, in a cross-sectional regression of the average value of $Liquidity_{it}$ / $Leverage_{it}$ calculated in all years excluding the last one. Industry dummies are included in the regressions reported in column (2). Industry dummies and a control for the firm's initial size, measured in terms of the logarithm of its real assets are included in the regressions reported in column (3). Standard errors are reported in parentheses. * indicates significance at the 10% level. ** indicates significance at the 5% level. *** indicates significance at the 1% level. Also see Notes to Table 1.

Table 8: Ex-post financial advantage of continuous exporters over various time horizons

	No control	Industry controls	Industry and size controls	Number of obs.
	(1)	(2)	(3)	(4)
1993-1997				
$Liquidity_{it}$	0.064***	0.053***	0.056***	3599
	(0.02)	(0.01)	(0.01)	
$Leverage_{it}$	-0.068***	-0.063***	-0.069***	3526
	(0.02)	(0.02)	(0.02)	
1998-2003				
$Liquidity_{it}$	0.085***	0.074***	0.082***	3923
	(0.02)	(0.02)	(0.02)	
$Leverage_{it}$	-0.074**	-0.074**	-0.092***	3855
	(0.03)	(0.03)	(0.03)	
1993-2003				
$Liquidity_{it}$	0.074**	0.066***	0.071***	4825
	(0.01)	(0.01)	(0.01)	
$Leverage_{it}$	-0.073***	-0.071***	-0.082***	4766
	(0.02)	(0.02)	(0.02)	

Note: Firms are included in the sample if they exported in the final year (1997, 2003, 2003). Firms may or may not have exported in the years preceding the last. Firms that changed export status more than once over the sample period are excluded, so that those firms that exported in the first year are in fact continuous exporters. The numbers in this Table represent the average financial advantage for initial exporters over the years following the first (1994-97; 1999-2003; 1994-2003). Specifically, they represent the coefficients on $EXPDUM_{i1}$, where *i* indexes the firm and *1*, the first year available for firm *i*, in a cross-sectional regression of the average value of $Liquidity_{it}$ / $Leverage_{it}$ calculated in all years following the first one. Industry dummies are included in the regressions reported in column (2). Industry dummies and a control for the firm's initial size, measured in terms of the logarithm of its real assets are included in the regressions reported in column (3). Standard errors are reported in parentheses. * indicates significance at the 10% level. ** indicates significance at the 5% level. *** indicates significance at the 1% level. Also see Notes to Tables 1 and 3.