Ruhr Economic Papers

Joel Stiebale

Do Financial Constraints Matter for Foreign Market Entry?

A Firm-Level Examination

#51

RWI
ESSEN

Ruhr Economic Papers

Published by

Ruhr-Universität Bochum (RUB), Department of Economics
Universitätsstraße 150, 44801 Bochum, Germany

Technische Universität Dortmund, Department of Economic and Social Sciences
Vogelpothsweg 87, 44227 Dortmund, Germany

Universität Duisburg-Essen, Department of Economics
Universitätsstraße 12, 45117 Essen, Germany

Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI Essen)
Hohenzollernstrasse 1/3, 45128 Essen, Germany

Ruhr Economic Papers #51

Responsible Editor: Christoph M. Schmidt

ISSN 1864-4872 (online) – ISBN 978-3-86788-054-1

Ruhr Economic Papers
#51

Joel Stiebale

Do Financial Constraints Matter for Foreign Market Entry?

A Firm-Level Examination

RWI
ESSEN

Bibliografische Information der Deutschen Nationalbibliothek
Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über http://dnb.d-nb.de abrufbar.

ISSN 1864-4872 (online)
ISBN 978-3-86788-054-1

Joel Stiebale*

Do Financial Constraints Matter for Foreign Market Entry? – A Firm-Level Examination

Abstract
Recent theoretical and empirical contributions stress the importance of financial development for international trade. This paper investigates whether financial constraints matter for foreign market entry at the firm level using dynamic panel data techniques. The empirical framework is applied to a panel of French manufacturing firms over the years 1998–2005. Although financial indicators are significantly correlated with export status and export share, there is no evidence that financial constraints have a direct impact on foreign market participation or sales in foreign markets once observed and unobserved firm heterogeneity is controlled for. This result also holds for subgroups of firms that are more likely to face financial constraints and industries that are more dependent on financial factors.

JEL Classification: F14, D92, C23

Keywords: Exports, financial constraints, sunk costs

July 2008

---

* RWI Essen. – The author would like to thank Dirk Engel, Christoph M. Schmidt and Michaela Trax as well as participants of the 25th DRUID Conference for helpful comments and suggestions. – All correspondence to Joel Stiebale, Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI Essen), Hohenzollernstr. 1-3, 45128 Essen, Germany, e-mail: stiebale@rwi-essen.de.

1 Introduction

Increasing export activities have long been accepted as an important element of growth. Thus, governments in most industrialized countries have seriously engaged in enhancing international trade. Their efforts comprise, among others, the abolishment of trade barriers, the provision of export counselling and financial assistance for export activities. A particular prominent measure for fostering exports is the improvement of the liquidity of firms which aim to engage in international trade, by trade credits, debt guarantees or subsidized bank loans (see e.g. Auboin and Meier-Ewert 2004). Yet, it is not at all clear, whether these measures actually matter for the decision to enter foreign markets. This can only be the case, if liquidity constraints are a serious impediment for this decision and if government support is substantial enough to overcome them.

Economic theory provides some, albeit limited guidance to this question. Only recently the new trade theory has incorporated firm heterogeneity into models of international trade to explain why, within industries, some firms engage internationally and others do not (Melitz 2003, Helpman et al. 2004). In addition, the empirical literature has recognized several firm-level determinants of foreign market participation such as productivity, size, innovation activities and product differentiation (see Greenaway and Kneller 2007 for an overview). From a theoretical point of view there are at least two reasons why one may also expect that financial factors matter for export activities. First, recent theoretical models stress the role of financial markets for international trade. A well developed financial system is regarded as a prerequisite to reach an optimal capital stock and to exploit economies of scale in certain industries (see e.g. Beck 2002). This in turn may help to achieve a comparative advantage and to create foreign demand for the produced goods. Second, exporting involves sunk costs such as product customization or investment in marketing, logistics and distribution networks (Roberts and Tybout 1997). Thus, only firms with sufficient liquidity may be able to cover these costs.

As firms are quite heterogeneous, it seems that the concrete relationship between productivity and liquidity matters. Along these lines, a recent theoretical approach by Chaney (2005) predicts that financial constraints may affect foreign market entry, but acknowledges that whether and how much trade is impeded by financial constraints depends on the distribution of productivity and liquidity across firms. Hence, the question of whether financial constraints

matter for international trade – and whether, consequently, economic policy carries the potential to overcome them – boils down to an empirical question.

The empirical literature is, at best, only suggestive regarding this question. While some papers find evidence for a positive impact of financial development on trade on a macroeconomic level (see Beck 2002, Becker and Greenberg 2005 among others), micro econometric evidence is sparse and the results are mixed. Du and Girma (2007) find that the availability of bank loans affects firms' export share in China, while Greenaway et al. (2007) find that firms that start exporting in the U.K. are not characterized by higher liquidity than other firms. Espanol (2007) reports a negative correlation between financial obstacles to innovation and a firm's export status.

The purpose of this paper is to test whether financial constraints matter for foreign market participation and sales in foreign markets at the firm level. In contrast to previous work, the empirical framework in this paper will explicitly control for unobserved heterogeneity and allow for endogenous initial conditions. This paper is organized as follows. In section two, previous literature on international trade and financial markets is discussed. Section three describes the empirical model and section four provides a description of the data. Results of the empirical analysis are presented in section five, section six concludes.

2 Related Literature

The empirical finance literature has found that financial constraints matter for firm investment and that the impact of financial constraints varies considerably across countries (Bond et al. 2003). Since foreign market entry involves sunk costs, one may expect that financial factors affect exporting decisions. However it is usually found that financial constraints only matter for certain types of firm, usually smaller and younger firms. Exporters are usually found to be larger and especially more productive than their competitors that operate solely on the domestic market (see Wagner 2007 for an overview). The theoretical justification for this observation is that exporting is only feasible if a certain productivity threshold is reached. This is because exporting also incorporates higher variable costs than domestic sales due to transport costs and costs of the "liability of foreignness", i.e. unfamiliarity with the foreign market and disadvantages compared to local producers because of the limited ability to

provide after sales services. Hence, it is not clear whether financial constraints matter for those firms that could profitably export otherwise.

For the same reasons, a recent theoretical approach by Chaney (2005) argues that financial constraints may only be binding for the exporting decision for firms within a certain productivity range. The framework builds on models of international trade with heterogeneous firms (Melitz 2002, Helpman et al. 2004) in which foreign market participation is determined by productivity. It is assumed that foreign market entry involves sunk costs. If financial markets are incomplete, only those firms that either generate enough liquidity from their domestic sales or have access to external finance are able to export. The model argues that financial constraints are only binding for firms with intermediate productivity, since for firms with low productivity exporting is not profitable anyway and firms with a very high productivity will always generate enough internal funds to finance the sunk costs of exporting.[2]

The macroeconomic literature has stressed the importance of financial development for growth in general (Rajan and Zingales 1998) and for the development of international trade in particular. In the macroeconomic trade literature the impact of financial constraints on exports has been used as an explanation for the low response of exports to movements in exchange rates (see e.g. Blalock and Roy 2007). Beck (2002) provides another theoretical argument why trade may be influenced by financial constraints. Building on models by Heckscher-Ohlin and Ricardo he shows that a well developed financial system may help a country to gain competitive advantage in goods that are characterized by economies of scale. The reason is that only if financial constraints are low, a country is able to achieve its desired capital stock. Beck (2002) also provides empirical evidence for his theory using country-level data. In Beck (2003) these results are confirmed using industry-level data, where he finds that countries with better developed financial systems have higher export shares in industries that use external finance to a large extent. Similar results are obtained by Manova (2005) and others. Becker and Greenberg (2005) stress the importance of external finance for trade via its importance for R&D and innovation activities that are important for foreign market entry.

Transactions in international trade are commonly conducted by payment within 180 days of delivery. This introduces some uncertainty for the exporter whether the customer's payment

[2] Sunk costs for foreign market entry may be substantial. Das et al. (2007) develop a structural model of exporting decisions and estimate average sunk costs of more than 400,000 US $ for Columbian industries.

will indeed arrive (Stephens 1999). For instance, importers may become insolvent and hence default on the export contract. Further, trade with some countries may be subject to political risks. In line of this reasoning many countries provide trade credits to ensure exporters against the risk of international market transactions. Moser et al. (2006) conclude that "Hermes trade credits" in Germany have increased exports on an aggregate level. Görg et al. (2007) argue that export grants in Ireland have increased the export share of exporting firms but were not able to turn non-exporters into exporters. A positive effect of subsidized export loans in Pakistan on export participation of smaller firms is reported by Zia (2008). Market intervention may however only be justified if firms are hindered from exporting by financial constraints. Baltensperger and Herger (2007) find that export insurance schemes in OECD countries have increased trade only to high and middle income countries for which only moderate commercial and political risks exist. Thus they argue that these kind of insurance schemes may give rise to adverse incentives for exporting, i.e. too risky engagements.

On the micro level Van Biesenbroeck (2005) reports that after controlling for size, exporters in African countries have the same access to credit as firms that operate only domestically. Campa and Shaver (2002) as well as Guariglia and Mateut (2005) find that firms that operate globally are less likely to face financial constraints than other firms. However, the focus of their analysis is rather causality from exports to liquidity than vice versa. Thus, it is unclear whether firms become exporters because they are not financially constrained, i.e. whether financial constraints matter for foreign market entry.

Greenaway et al. (2007) were the first to test the importance of variables that reflect financial constraints in static and dynamic models of export market participation. They find that liquidity is positively correlated with export participation. Once they take state dependence in export market participation into account this effect becomes insignificant. They argue that differences in financial performance between exporters and non-exporters are more pronounced after firms have entered a foreign market. Analyzing survey data Espanol (2007) reports that firms invest in training, innovation activities and environmental issues to gain access to foreign markets or to increase exports. To evaluate the impact of financial constraints Espanol (2007) uses a similar empirical strategy as Greenaway et al. (2007) where financial factors are mainly accounted for by using indicators for financial obstacles to innovation. Hence this study rather estimates indirect effects of financial constraints via innovation to foreign market entry. However the nonlinear estimation techniques used in both

studies do not allow for correlation between unobserved time-invariant heterogeneity on the one hand and liquidity or previous export status on the other hand. Using a static model for pooled cross-sections, Du and Girma (2007) find that access to bank loans in China is correlated with firms´ export share.

Unobserved heterogeneity may be important if unobserved factors such as managerial ability, corporate culture and attitudes towards risk affect both foreign market entry and a firm's liquidity. Accounting for the dynamic aspects of exporting has been found to be crucial in analyzing export determinants (see e.g. Roberts and Tybout 1997). Thus, both unobserved heterogeneity and state dependence will be accounted for in the empirical analysis. The importance of financial factors for both export status and export intensity is analyzed and the robustness of the results is checked by the use of different financial indicators, different estimation techniques and an application of the empirical framework to various sub-groups of firms.

3 Empirical Framework

3.1 A Model for export decisions

The empirical strategy builds on the sunk cost model of exporting that was introduced by Roberts and Tybout (1997) and was widely applied (see e.g. Bernard and Wagner 2001, Bernard and Jensen 2004). Profits from exporting for firm *i* in period *t* are given by:

$$\pi_{it}(x_{it}, f_{i,t-1}, z_t) = p_{it}(x_{it}, f_{i,t-1}, z_t) q_{it}(x_{it}, f_{i,t-1}, z_t) - c_{it}(x_{it}, f_{i,t-1}, z_t \mid q_{it}) - s_{it}(x_{it}, f_{i,t-1}, z_t) \cdot (1 - dEX_{i,t-1}).$$

Where p_{it} is the price at which goods can be sold in the foreign market and q_{it} denotes the firm-specific profit maximizing quantity of exports. The costs that result from exporting consist of variable costs c_{it} of producing, selling and shipping the good and s_{it} denote sunk costs that have to be paid when a foreign market is entered. dEX_{it} is a dummy variable that takes the value of one if the firm exports in period *t*.

x_{it} denotes a vector of firm-specific variables that includes among other things size, productivity and product characteristics. f_{it} is a financial indicator that reflects the availability of internal financial resources and the costs at which external finance is available. For a financially constrained firm obtaining external finance is not possible or only possible at prohibitively high costs. Such a firm can only invest or meet the sunk costs of foreign market entry if it has sufficiently internal finance available. Indeed, in the presence of sunk costs foreign market entry can be interpreted as an investment. Since foreign market entry takes time, the profit function depends on internal finance at *t*-1. z_t is a vector of macroeconomic factors such as exchange rates and the state of the business cycle.

A firm will choose its sequence of future desired export levels $\{q_{is}\}_{t=s}^{t+h}$ that maximizes the sum of current and discounted future profits:

$$\Pi_{it} = E_t\left[\sum_{s=t}^{t+h} \delta^{s-t} \pi_{is} dEX_{is}\right].$$

δ denotes a discount factor and *h* the firm's planning horizon. The optimal level of exports in period *t* can be expressed as the value q_{it} that solves the following Bellman equation:

$$v_{it}(\cdot) = \max_{\{q_{it}\}}\left(\pi_{it} \cdot dEX_{it} + E_t\left[v_{i,t+1}(\cdot) \mid q_{it}\right]\right).$$

A firm will export in period *t*, i.e. will choose a level of q_{it}>0, if the expected revenue from exporting exceeds the costs, hence if

$$EX_{it}^{*} = p_{it}(x_{it}, f_{i,t-1}, z_t) q_{it}(x_{it}, f_{i,t-1}, z_t) + \delta\left(E_t\left[v_{i,t+1}(\cdot) \mid q_{it} > 0\right] - E_t\left[v_{i,t+1}(\cdot) \mid q_{it} = 0\right]\right)$$

$$-c_{it}(x_{it}, f_{i,t-1}, z_t \mid q_{it}) - s_{it}(x_{it}, f_{i,t-1}, z_t) \cdot (1 - dEX_{i,t-1}) > 0.$$

Thus, the firm will choose $dEX_{it} = \begin{cases} 1 \text{ if } EX_{it}^{*} > 0 \\ 0 \quad \text{else.} \end{cases}$

3.2 Estimation

Thus, it is crucial to control for firms' past export status in the empirical specification, since only firms that did not export in the previous year have to pay the sunk costs when a foreign

market is entered.[3] Further, other sources of state dependence such as customer loyalty or persistence in firm success are possible. If financial factors are crucial in obtaining a competitive advantage, they may affect expected revenues and variable costs and hence, they may be relevant for all firms. But if financial factors only affect the height of the sunk costs they will only be relevant for firms that did not export in the previous year. Therefore, alternative empirical specifications are used. The first approach simply controls for previous year's export status and the second approach allows the impact of financial factors to differ between incumbents and potential entrants. Estimation of the determinants of firms' export status is undertaken in a discrete choice framework, where a non-structural approach is chosen to identify the impact of financial constraints.

The following empirical model is specified:

$$dEX_{it} = \begin{cases} 1 \text{ if } \gamma dEX_{it-1} + \phi f_{i,t-1} + x_{it}\beta + z_t + \mu_i + \varepsilon_{it} > 0 & i=1,...N, \quad t=1,...T \\ 0 \quad \text{else.} \end{cases}$$

μ_i is unobserved time-invariant firm heterogeneity and ε_{it} is an idiosyncratic error that is assumed to be normally distributed and uncorrelated with the regressors. z_t consists of a vector of time dummies that captures macroeconomic factors. It is assumed that both $f_{i,t-1}$ and x_{it} are strictly exogenous conditional on μ_i. If the estimate of ϕ is positive and significant, this is interpreted as evidence for financial constraints, which follows the literature on financial constraints and investment.

Two major problems have to be solved, the treatment of the unobserved heterogeneity and especially its relation to the covariates and the initial condition of the export status. Several approaches have been proposed to deal with dynamic discrete choice models. An approach proposed by Heckman (1981) suggests specifying a conditional distribution for the initial condition, while Wooldridge (2005) suggests specifying a distribution of the unobserved heterogeneity, conditional on observed covariates and the initial condition, as a generalization of the Chamberlain (1980) and Mundlack (1978) estimators for correlated random effects. The Wooldridge (2005) estimator has an advantage in the case of panel attrition. In contrast to the Heckman (1981) estimator, attrition is allowed to depend on the initial condition. This is a

[3] Previous empirical work finds that only the first lag of a firm's export status is a significant predictor of current export status (see e.g. Roberts and Tybout 1997).

major advantage since a lot of observations have to be deleted as the estimation techniques do not allow the use of panels with gaps.

Hence, I follow Wooldridge (2005) and assume a distribution of the unobserved heterogeneity that allows unobserved time-invariant heterogeneity to be correlated with the initial condition and moments of the covariates. In particular it is assumed that unobserved heterogeneity can be expressed as a linear combination of firm-specific time averages of the regressors and the initial condition of the dependent variable:

$$\mu_i = \alpha_0 + \alpha_1 dEX_{i0} + \overline{x_i}\alpha_2 + \alpha_3 \overline{f_i} + a_i$$
$$\text{and } \left(a_i \mid dEX_{i0}, \overline{x_i}, \overline{f_i}\right) \sim N\left(0, \sigma_a^2\right).$$

In this formulation, $\overline{x_i} = T^{-1}\sum_{t=1}^{T} x_{it}$, $\overline{f_i} = T^{-1}\sum_{t=1}^{T} f_{i,t-1}$ and T denotes the number of time periods.

Since it is assumed that $\left(\varepsilon_{it} \mid dEX_{i,t-1}, x_{it}, f_{i,t-1}, \mu_i\right) \sim N\left(0, \sigma_\varepsilon^2\right)$ it follows that the probability of exporting at time t is given by:

$$\Pr(dEX_{it} = 1 \mid dEX_{i0}, ..dEX_{i,t-1}, x_{it}, f_{i,t-1}, \overline{x_i}, \overline{f_i})$$
$$= \Phi\left(\gamma dEX_{i,t-1} + x_{it}\beta + \phi f_{i,t-1} + \alpha_0 + \alpha_1 dEX_{i0} + \overline{x_i}\alpha_2 + \alpha_3 \overline{f_i} + a_i\right).$$

Estimation can be carried out by a standard random effects Probit model with dEX_{i0} , $\overline{x_i}$ and $\overline{f_i}$ as additional regressors. Time-invariant variables like industry dummies are added to the model to decrease the error variance and appear either in the vector x_{it} or in $\overline{x_i}$.

In all specification lagged values of the financial indicators are used. This is to allow for a time lag between financial development and the export decision, since planning and realization of foreign market entry and expansion might take time. The use of lagged values also reduces simultaneity problems. If switching the export status involves sunk costs, exporting may also affect financial variables to some extent.[4] The problem of simultaneity is only reduced but not completely resolved by the use of lagged variables since the model assumes strict exogeneity of the regressors conditional on the unobserved heterogeneity. Strictly speaking this rules out feedback from exporting to future values of the regressors, in

[4] The main results of this paper were not sensitive to using contemporaneous instead of lagged values of the regressors.

particular if the number of time periods is small.[5] On the one hand this might be a minor problem, since recent evidence shows that causality rather runs from exporting to firm performance than vice versa.[6] On the other hand feedback and other sources of endogeneity cannot be completely ruled out.

To check whether the results are sensitive to the assumption of strict exogeneity, results from the dynamic Probit model are compared with those of linear dynamic panel data models estimated by the generalized method of moments (GMM), where lagged values of the regressors are used as instruments. In particular the "System GMM" estimator (Arellano and Bover 1998) is used. The validity of the instruments is checked by appropriate over-identification and autocorrelation tests.

In an extension of the model, separate equations for incumbents and potential entrants into foreign markets are estimated to allow for a parameter vector that differs between these groups. When estimating a separate equation for incumbents or potential entrants one has to consider that either group of firms is not a random sample from the population. Hence, the problem is treated as one of endogenous sample selection. In year *t* information is only used for those firms that did (not) export in the previous year. Estimation is carried out in a Probit model with endogenous selection. The dependent variable in the selection equation equals one for firms that did (not) export in the previous year and the independent variables are lagged values of the regressors of the basic specification (without previous year's export status). It is assumed that the joint distribution of the error terms of the two equations is bivariate normal. The model is estimated on pooled data for all years and not in a random effects model to keep the analysis simple.[7] Hence, previous year's export status is treated as the initial condition. Again, firm specific time averages of the time variant variables are included in the model to allow for a correlation between these variables and time-invariant unobserved heterogeneity.

In alternative specifications, the impact of financial variables on export intensity measured as the export share (export sales divided by total sales) is examined. This can be interpreted as a measure of success in foreign markets. Sunk costs may only be relevant if a firm exports a

[5] A framework to account for feedback in dynamic nonlinear models was proposed by Wooldridge (2000). However, the model becomes intractable if there are a large number of predetermined variables and it does not account for other potential sources of endogeneity.
[6] For an overview see Engel and Procher (2007) or Wagner (2007).
[7] The empirical strategy is similar to Cappellari and Jenkins (2004) and Stewart and Swaffiled (1999) who analyze transition probabilities between different income groups.

substantial amount and the costs probably differ substantially across foreign markets. Hence, an alternative interpretation of the export share is that significant increases in export sales proxy the development of a new market. Since a lot of firms have zero exports, left censoring has to be taken into account. The export share is modelled by the following equation:

$$EXshare_{it} = \max\left[0, \tilde{\gamma} EXshare_{i,t-1} + \tilde{\phi} f_{i,t-1} + x_{it}\tilde{\beta} + \tilde{\mu}_i + \tilde{\varepsilon}_{it}\right].$$

Estimation is therefore carried out in a dynamic random effects Tobit model. Analogous to the dynamic Probit model I follow the framework proposed by Wooldridge (2005) and assume that:

$$\tilde{\mu}_i = \tilde{\alpha}_0 + \tilde{\alpha}_1 EXshare_{i0} + \overline{x}_i\tilde{\alpha}_2 + \tilde{\alpha}_3 \overline{f}_i + \tilde{a}_i ,$$

$$\left(\tilde{a}_i \mid EXshare_{i0}, \overline{x}_i, \overline{f}_i\right) \sim N\left(0, \sigma_{\tilde{a}}^2\right) \text{ and } \left(\tilde{\varepsilon}_{it} \mid EXshare_{i,t-1}, x_{it}, f_{i,t-1}, \tilde{\mu}_i\right) \sim N\left(0, \sigma_{\tilde{\varepsilon}}^2\right).$$

Strictly speaking, the export share is also right censored, but in the sample used for estimation there are only five firm-year observations with an export share of one (less than 0.003%), hence I treat the distribution as left-censored only. Both the random effect Probit and the random effect Tobit models are fitted by the adaptive Gauss-Hermite quadrature with 12 integration points.

4 Data and Model Specification

4.1 Data

The data set used in this paper is extracted from the AMADEUS database, a commercial database that provides information on financial data as well as ownership and subsidiary information.[8] The financial data include balance sheet items and information from profit and loss accounts – which include export sales in some countries – and are collected from company reports which are supplemented by specialized regional information providers. Further, among other variables, AMADEUS includes information about employment, industry, legal form and date of incorporation. The AMADEUS database has been used in numerous empirical studies on internationalization topics (Budd et al. 2004, Konings and Murphy 2006, Helpman et al. 2004, to mention a few).

[8] AMADEUS is provided by Bureau van Dijk. For the empirical analysis update numbers 88, 113, 136 and 146 are used.

AMADEUS includes information on roughly 8 million European firms. Since data availability varies considerably across countries, this paper restricts the analysis to French firms. Especially data on exports are available for a representative sample of firms for few countries only. The empirical analysis is further restricted to manufacturing firms. One reason is to obtain a sample of rather homogenous firms. Second, exporting in service sectors may be completely different from manufacturing since not all goods are tradable and classifying the tradability of goods is difficult with balance sheet data. Further, as pointed out by Beck (2002) external finance may especially be relevant for industries with increasing returns to scale, which are mostly manufacturing industries.

Firms with missing information on key variables like export sales, financial indicators, employment and value added were deleted from the sample. A few observations had to be dropped because of implausible values such as negative values of value added or export sales. Further, the upper and lower 0.5%-quantile of all monetary variables was deleted from the sample to eliminate coding errors and extraordinary firm shocks from the sample. After the data cleaning process around 280,000 firm-year observations are left for the analysis. The available time period spans the years 1998 to 2005. Since the preferred estimation method is not applicable to panels with gaps, the number of firm-year observations reduces to about 200,000.

Table 1 provides some summary statistics of the key variables used in this study including variable definitions and Table A1 shows the distribution of exporters across industries. About one third of all firm are exporters and the average export share is 6.3 %. Several financial indicators were extracted from the data set. Two of these were also used by Greenaway et al. (2007) in the context of financial constraints and exports. The first one is a measure of liquidity which is defined as the ratio of current assets minus current liabilities to total assets. This liquidity ratio proxies the availability of internal resources, but should also be negatively correlated with the costs at which external finance is available. The second measure refers to a firm's leverage and is defined as the long term debt to total assets ratio. The cash flow to capital ratio, which is the most common indicator in the literature on financial constraints and firm investment, indicates the availability of internal finance. A further indicator, the coverage ratio, which is defined as earnings before interest and tax payments (EBIT) divided by interest payment, indicates a firm's ability to meet short term liabilities. This measure is inversely

related to a firm's riskiness and can thus be interpreted as a proxy for the costs firms have to pay for external finance (Guariglia 1999).

Table 1: Summary statistics

		Exporters		Non-exporters	
Variable	Description	Mean	Stdev.	Mean	Stdev.
liquidity ratio	(Current assets - current liabilities)/ total assets	0.225	0.256	0.140	0.300
leverage	long term liabilities / total assets	0.171	0.150	0.230	0.180
coverage ratio	Earnings before interest and taxes / interest payments	15.044	30.270	14.218	26.848
cashflow ratio	Cash flow / tangible fixed assets	0.836	1.071	0.836	1.084
log (size)	log number of employees	3.055	1.468	1.870	1.222
log(productivity)	log value added per employee	4.438	0.600	4.151	0.605
d(R&D)	=1, if firm reports intangible assets	0.696	0.460	0.541	0.498
log (R&D)	log intangible assets, if *d(R&D)*=1	3.280	2.050	2.961	1.769
log (capital)	log (tangible fixed assets)	4.810	2.142	3.431	1.716
log (wage)	log (personal costs per employee)	3.529	0.403	3.401	0.509
EXshare	export sales / total sales	0.185	0.231	0.000	0.000
size	number of employees	75.218	317.500	25.930	518.705
productivity	value added per employee	113.689	612.213	90.833	1592.908
sales per employee	sales per employee	207.750	1135.629	157.661	5341.475
wage	personal costs per employee	37.030	20.483	33.963	21.392
age	firm age, in years	20.253	19.064	12.832	13.390
d(foreign sub)	=1, if firm has a foreign subsidiary, ownership at least 25%	0.040	0.196	0.004	0.064
d(foreign owner)	=1, if firm is owned by a foreign company by at least 25%	0.070	0.256	0.009	0.093
d(public limited)	=1, if firm's legal form is a "Société anonyme" (public limited company)	0.207	0.405	0.072	0.259
distance to border	distance to closest border in 100 kilometers	1.728	0.913	1.899	0.912

Note: All monetray values are measured in 1000€ and are deflated by a GDP deflator.

The comparison of financial indicators between exporters and non-exporters in Table 1 shows that exporters are better equipped than non-exporters if liquidity and leverage are taken into account. On the other hand there is only a small difference in the interest coverage ratio and no difference in the cash flow to capital ratio. The summary statistics also agree with some stylized facts. Exporters are on average larger, older and more productive than other firms. Further, they pay higher wages and are more innovative as proxied by the value of intangible assets. The positive correlation between export status and liquidity may stem from the fact that only firms with sufficient liquidity are able to export. On the other hand causality might also run from exporting to liquidity as argued by Camper and Shaver (2002) or differences may simply be due to correlation with other observed and unobserved factors. For example

variables like productivity and size, which are on average higher for exporters, are probably positively correlated with financial power.

As Table A1 shows export participation and intensity vary considerably across industries. This may be due to differences in capital intensity or the possibility to realize economies of scale, but may also reflect transport costs and differences in firm size and productivity. There is a high amount of state dependence in export decisions as Table A2 shows. Only 8.65% percent of non-exporters switch to exporting in the next year and almost 85% of exporting firms are exporters in the next year.

4.2 Empirical specification

Unfortunately, AMADEUS does not break down export sales by location. Hence, entry into different markets cannot be modelled separately and export status is measured by a dummy variable that takes the value of one if the company reports positive sales from exports. For comparability with the results from Greenaway et al. (2007) in the main specifications the same measure of financial strength is used which they label liquidity. A similar measure is sometimes used to analyze the impact of financial constraints on firm investment (see e.g. Fazzari and Petersen 1993).

To check the robustness of the results, alternative measures are considered. First, the long term debt to total assets ratio is added to the model, since the liquidity ratio may only adequately proxy the availability of external finance if debt is controlled for. The most common measure of internal financial capabilities is the cash flow. This measure has been subject to critique as cash flow may be correlated with expected future sales and hence, a correlation between cash flow and investment may measure other things than financial constraints. On the other hand Bond et al. (2003) show that once investment opportunities are properly controlled for the cash flow is not a significant predictor of future sales for European firms. Further it is usually found that cash flow sensitivities are higher for subgroup of firms that are more likely to exhibit financial constraints (see e.g. Carpenter and Petersen 2002). The cash flow is normalized by the value of tangible fixed assets as common in the financial literature. As a further measure of financial strength the coverage ratio is used.

Besides financial indicators and previous export status several control variables that are likely to be correlated with exporting and financial constraints are included in the model.[9] These variables are assumed to reflect expected revenues and costs from exporting. Theory predicts that superior productivity is a determinant of foreign market entry (Helpman et al. 2004). Only the most productive firms are able to generate positive profits from exporting as they are able to cover transport costs and sunk costs from foreign market entry. Productivity is measured as the log of value added per employee. A measure of firm size is included in the model which measures firms´ ability to realize economies of scale in production, benefits from bulk purchasing and an increasing capacity of taking risks through internal diversification (Wagner 1995). The empirical literature also stresses that firm size is correlated with the ability to raise finance at low costs (see e.g. Wagner 2001). Firm size is measured as the number of employees.

Exporting firms are often characterized by product differentiation and a high research and development (R&D) intensity. Recent theoretical and empirical approaches stress the importance of product innovations for foreign market entry in particular (Becker and Egger 2007). Unfortunately, innovation activities are not directly observed in AMADEUS. Intangible assets are used as a proxy for R&D as it is often done in empirical investigations using firm level data (see e.g. Budd et al. 2005). Intangible assets enter the equations as a dummy variable that takes the value of one if the firm reports a positive value of intangible assets in its balance sheet. Exporters usually pay higher wages than other firms which has been found to reflect mainly different characteristics of the work force (Bernard and Jensen 1995). In this analysis average wages may capture between-firm variation in skills but also differences in production costs. As productivity is controlled for in the estimations, wages should be negatively correlated with the firms' competitiveness. Wages are measured as average employment costs per employee.

Since business practices in foreign markets may be different, firms will have to develop skills and knowledge that is specific to a foreign market. The age of the firm can be interpreted as a reflection of learning (Jovanovic 1982) and is included the model, measured in years. One of the most important determinants of the magnitude of trade between regions is their distance (Leamer and Levinsohn 1995). Transport costs are higher the higher the distance to a foreign

[9] For a survey on export determinants see Greenaway and Kneller (2007).

market. Since a major part of French trade is undertaken with other European countries, the distance to the closest border, measured in 100 kilometres is included as a regressor.

Foreign-owned firms are usually found to be more likely to export than indigenous firms (Kneller and Pisu 2004). The costs to enter foreign markets might be lower for foreign-owned firms since they might benefit from networks and other resources of the parent company. The new trade theory emphasises horizontal motives for foreign direct investment (Helpman et al. 2004). Exports and outward FDI should be substitutes if FDI is motivated by market access. Unfortunately information about ownership and subsidiaries is not available for all years in the sample. Since these variables seldom change over time the last available ownership status is used as it is common practice for this database (see e.g. Konings and Murphy 2006).[10] Two dummy variables for foreign ownership and foreign subsidiaries are included in the model.

To account for differences in governance, legal obligations and risk attitudes across firms, a dummy variable for firms that have the legal form of a "Société Anonyme" is included in the model. A "Société Anonyme" is equivalent to a public limited company. Differences in the tradability of goods, transport costs, competition and technological opportunities across industries are accounted for by two-digit industry dummies based on the NACE Rev 1.1 classification.[11] Time dummies account for macroeconomic factors such as changes in the business cycle, market demand and exchange rate movements.

5. Results

In Table 2 marginal effects from pooled Tobit and Probit estimates that do not account for unobserved heterogeneity are presented for the preferred measures, the liquidity ratio and the long term debt ratio. If unobserved heterogeneity is not correlated with the regressors, the pooled estimator yields consistent parameter estimates. Standard errors are adjusted to allow for clustering at the firm level. Columns (1) to (3) show estimation results for the liquidity ratio only, in columns (4) to (6) the measure of leverage is added to the model. Marginal effects are calculated at the sample averages of the control variables. For comparison with the results from the Probit model, marginal effects for the Tobit model are also presented for the

[10] When restricting the analysis to a subsample of four periods where ownership changes can be tracked it was found that this assumption was not crucial for the results. Estimation results are available upon request.
[11] NACE codes 15 (food) and 16 (tobacco) had to be grouped together because of the low number of tobacco firms.

expected probability of exporting in addition to the expected export share. Full estimation results including all control variables are presented in the appendix. Table A3 contains the results of dynamic and Table A4 contains for comparison the results of static specifications.[12]

It can be seen that the financial measures have the sign that is predicted by theory for both export status and export success. The liquidity ratio is positively correlated with exporting, while the long term debt ratio is negatively correlated. In contrast to Greenaway et al. (2007) the results remain significant when the lagged dependent variable is included. The high and significant estimate of the lagged dependent variable shows that the model should be estimated dynamically as there is a considerable amount of state dependence. Sign and significance of almost all control variables are the same as in the static model. Both the expected probability of exporting and the expected export share increases with financial health, also after controlling for previous export experience. For example conditional on previous export status and the other covariates, firms with a 100% higher liquidity ratio have a ten percent higher probability to export, while a 100% higher debt ratio corresponds to a decreased probability of exporting of roughly 6.5%.

The results of the control variables are mostly in line with expectations. Firm size, productivity and intangible assets are favorable to exporting.[13] Wages are negatively correlated with export performance since they hamper competitiveness for a given level of labor productivity. Further, exporting is more likely the older a firm is, and is less likely if a firm has a long distance from foreign markets. Firms with a foreign owner are more often exporters and export a higher share of their output, while having a foreign subsidiary is negatively correlated with a firm's export share. Public limited firms have a higher propensity to export and a higher export share. Comparing the marginal effects for the probability of exporting for Tobit and Probit models shows that a separate modelling of incidence and intensity does not seem to be necessary, since the estimates are very similar. However, the estimation technique does not allow for unobserved heterogeneity to be correlated with the regressors.

[12] To make the results comparable to the dynamic specifications the first period is dropped from the estimation sample for the static specifications.
[13] A measure of physical capital intensity was also included, but it was never significant in any of the specifications.

Table 2: Estimation results of pooled Probit and Tobit models

	(1) Probit *Pr (EX>0)*	(2) Tobit *Pr (EX>0)*	(3) Tobit *E[EX|EX>0]*	(4) Probit *Pr (EX>0)*	(5) Tobit *Pr (EX>0)*	(6) Tobit *E[EX|EX>0]*
liquidity ratio	0.097***	0.101***	0.013***	0.098***	0.102***	0.013***
	(0.007)	(0.006)	(0.001)	(0.007)	(0.006)	(0.001)
leverage				-0.065***	-0.112***	-0.014***
				(0.018)	(0.016)	(0.002)
Contol variables	yes	yes	yes	yes	yes	yes
Industry and time dummies	yes	yes	yes	yes	yes	yes
σ		0.263	0.263		0.263	0.263
		(0.001)	(0.001)		(0.002)	(0.002)
log (Pseudo-)Likelihood	-116824.73	-63169.76	-63169.76	-116689.94	-63065.04	-63065.04
N	207158	207158	207158	207158	207158	207158
pseudo R-squared	0.196			0.196		

Notes: ***, **, * denotes significance at the 1%, 5%, 10% level. Marginal effects are reported, calculated at the sample means of the regressors. Standard errors, clustered at the firm level are shown in parantheses.

Table 3 presents the results for dynamic random effect estimations that control for unobserved heterogeneity. Full estimation results are presented in Table A5. The coefficients of the financial indicators become insignificant. This is the case, no matter if the impact on export status or export intensity is investigated and whether leverage is included or not. As Table A5 shows, financial indicators are highly and significantly correlated with time invariant unobserved heterogeneity which can be seen from the coefficient of the firm specific mean values. The liquidity ratio is positively correlated, while leverage is negatively correlated. Unobserved heterogeneity is substantial and explains between 40 and 50 percent of the variance of the dependent variables as indicated by the estimate for ρ.

Thus, it seems that cross-sectional estimates overestimate the impact of financial factors. The reason is probably that financial factors are positively correlated with unobserved factors such as managerial ability, technological opportunities or attitudes towards risk that positively affect exporting.

Table 3: Dynamic Random Effect Estimates

	(1) Probit *Pr (EX>0)*	(2) Probit *Pr (EX>0)*	(3) Tobit *E[EX|EX>0]*	(4) Tobit *E[EX|EX>0]*
liquidity ratio	-0.002	-0.015	-0.000	-0.000
	(0.003)	(0.013)	(0.000)	(0.000)
leverage		0.028		0.002
		(0.026)		(0.002)
Control variables	yes	yes	yes	yes
Industry and time dummies	yes	yes	yes	yes
σ_a	0.881	0.880	0.104	0.104
	(0.013)	(0.012)	(0.001)	(0.001)
σ_u			0.105	0.105
			(0.000)	(0.000)
ρ	0.437	0.436	0.492	0.492
	(0.007)	(0.007)	(0.004)	(0.004)
log Likelihood	-66001.556	-65879.479	31483.996	13813.983
N	207158	207158	207158	207158
pseudo R-squared	0.48	0.48		

Notes: ***, **, * denotes significance at the 1%, 5%, 10% level. Marginal effects are reported, calculated at the sample means of the unobserved heterogeneity. Standard errors are shown in parantheses.

In Table 4 separate estimations for the export status of incumbents and potential entrants are presented to investigate whether financial factors are relevant for market entry rather than for maintenance of presence in foreign markets. Estimations results presented in columns (1) and (2) assume that regressors are uncorrelated with unobserved heterogeneity while columns (3) and (4) show estimation results that allow for a correlation. Table A6 shows full estimation results. Leverage is significantly negatively correlated with foreign market entry but not with maintenance of the export status of incumbent firms. The liquidity ratio is significantly correlated with the export status for both groups of firms, but the correlation with the export status of potential entrants is higher. However, when unobserved heterogeneity is taken into account this effect disappears. Other firm-level characteristics such as labor productivity, size and past export status remain significant.[14]

[14] Estimating a separate probit equation for incumbents and potential entrants without correcting for endogenous previous export status yielded similar results. The same is true if a linear probability model with or without a probit selection equation was used instead. Thus, the crucial point is to take unobserved heterogeneity into account and not to correct for endogenous selection.

Export market entry as well as enhancements of export intensity seems to be rather driven by productivity and employment growth than by movements in financial liquidity. Thus, it seems that sunk costs for foreign market entry for French manufacturing firms are not that high that financial constraints matter. At least for the group of firms that can expect positive profits from exporting, financial constraints are not binding because of their high productivity, size and other characteristics.

Table 4: Separate estimations for incumbents and potential entrants

	(1) entrants	(2) incumbents	(3) entrants	(4) incumbents
liquidity ratio	0.252***	0.111***	-0.068	-0.061
	(0.030)	(0.030)	(0.052)	(0.063)
leverage	-0.244***	-0.038	0.151	-0.180
	(0.078)	(0.086)	(0.107)	(0.137)
control variables	yes	yes	yes	yes
mean values of time invariant variables	no	no	yes	yes
Industry and time dummies	yes	yes	yes	yes
log (Pseudo-)Likelihood	-122192.3	-120926.7	-113694.4	-112725.4
N	171450	171450	171450	171450

Notes: ***, **, * denotes significance at the 1%, 5%, 10% level. Marginal effects that refer to the probability of exporting conditional on previous year's export status are reported. Marginal effects are calculated at the sample means of the regressors. Standard errors, clustered at the firm level are shown in parantheses.

In Table A7 the equations for export status and export share are estimated with alternative financial measures, the interest coverage ratio and the cash flow to capital ratio. The results are very similar to the specification with liquidity since the coefficients for cash flow and coverage ratio are close to zero and insignificant. No direct impact of financial factors on exporting can be identified; hence, there is no evidence that firms are hindered from exporting by financial constraints.

The results so far may be driven by the fact that financial constraints are only relevant for certain types of firms. Therefore, the sample is split into some sub groups to investigate whether there are heterogeneous effects. In his theoretical model, Chaney (2005) argues that liquidity only matters for exporting decisions within a medium range of productivity. Therefore the model is estimated separately for the 2nd and the 3rd quartile of the distribution of labor productivity across firms. It is often argued that financial constraints are more severe

for smaller firms (see e.g. Carpenter and Petersen 2002). To check whether financial factors matter for small firms, separate estimations for the 1st and 2nd quartile of the size distribution (measured as the number of employees) were performed.

The macroeconomic literature predicts that the importance of finance differs between capital and labor intensive industries (Manova 2005) and that financial factors matter in particular for scale intensive industries (Beck 2002). Further, sunk costs may differ across industries because of product characteristics, e.g. R&D and advertising intensity. Although the analysis was already restricted to manufacturing firms, sunk costs and capital intensity may differ substantially across industries. To investigate whether financial constraints matter in certain industries separate estimations for labor and capital intensive industries and for industries in which low and high sunk costs can be expected, are performed. The classification of industries is shown in Table A8 and is closely related to Davies and Lions (1996).[15]

Table A9 shows estimation results for dynamic Probit estimates with liquidity ratio and leverage as financial indicators for the various mentioned subgroups. Only the coefficients for the financial variables are presented. Control variables are the same as in the previous estimations. For none of the subgroups a positive impact of the financial indicators can be confirmed. Hence, the previous estimation results are not driven by an inappropriate pooling of industries or firms that are dependent on external finance to a different extent. Unfortunately the impact of financial factors cannot be decomposed by destination, since AMADEUS does not provide this information. Sunk costs probably differ across foreign target markets and a major part of French trade is conducted with other European countries. In contrast trading partners differ across industries and there was no evidence for heterogeneous effects in the estimations.

As already mentioned the assumption of strict exogeneity of the regressors might be violated. For example exporting may reduce future liquidity if firms have to raise a high amount of investments to achieve or maintain their export status at least in the short run. In the long run, exporting may have a positive impact on liquidity as suggested by Guariglia and Mateut (2005) and Greenaway et al. (2007). A similar argument may be relevant for other regressors such as firm size and labor productivity, although recent evidence suggests that causality rather runs from firm performance such as productivity to exports and not vice versa (see

[15] The classification according to the height of sunk costs is partly overlapping with the classification according to capital intensity and with high-tech industries.

Wagner 2007 for an overview). A further disadvantage of the maximum likelihood procedure is that the estimations are not robust to the distributional assumptions of the error term.[16]

To check whether the previous results where driven by these assumptions, I estimate a linear probability model for the export dummy using a GMM system estimator.[17] Compared to the Probit estimates the GMM estimator has the disadvantage that it does not account for the binary nature of the dependent variable, hence the predicted probabilities are not necessarily bounded between zero and one. Within this estimation framework all regressors are treated as potentially endogenous. Hence, I use as instruments levels lagged two periods and more for the equations in first differences and lagged differences for the equations in levels. The two-step estimator which has been found to be more efficient than the one-step estimator (Windmeijer 2005) is used for estimation. To adjust standard errors for heteroscedasticity and possible autocorrelation the Windmeijer (2005) finite sample correction is used.[18]

Table A10 reports the results for the GMM estimates. The results are similar to the non-linear estimation techniques. In all specifications the coefficients of the financial indicators become very small and insignificant. As the difference in Hansen test statistics for the validity of the instruments for the level equations shows, the validity of these instruments cannot be rejected. Further, the results of the Arellano-Bond-test for autocorrelation show that lagged levels and differences are valid instruments, since there is no evidence for autocorrelation of second order in the difference equations.[19] The Hansen test for the validity of all instruments (for level and difference equations) is only rejected for the equation with the coverage ratio as financial indicator. Since the results are very similar across estimation techniques and financial measures, the GMM estimates can be taken as further confirmation of the previous results. Strict exogeneity cannot easily be relaxed in equations with censored outcome variables as the export share. But estimating the export share equations as a fractional Probit

[16] Another critical assumption of the random effect estimator is the independence of observations across time conditional on the regressors and unobserved heterogeneity. However, estimating the models with pooled Probit and Tobit techniques with the mean values of the time-varying variables -which does not assume independence across observations- yielded the same conclusions for the financial measures. Results from these estimations are available upon request.

[17] An alternative estimator is the "Difference GMM" estimator proposed by Arellano and Bond (1991). The problem with difference GMM is that lagged levels can be weak instruments for difference equations when there is high persistence in the variables (Blundell and Bond 1998a), which is typically the case if variables such as exports and productivity are used. Hence, the GMM system estimator which has been found to outperform the difference GMM estimator in the case of highly persistent variables (Blundell and Bond 1998b) is used here.

[18] Estimation was carried out in STATA®, version 10.0. The command xtabond2 (Roodman 2006) was used for estimation.

[19] This is equivalent to no autocorrelation of first order in the level equations.

model as proposed by Papke and Wooldridge (2005), which is more robust to violations of the distributional assumptions than the Tobit model, yielded similar results.

To summarize, it cannot be confirmed that French manufacturing firms are hindered from exporting by financial constraints, since the correlation between exports and financial indicators does not seem to reflect a causal relationship from financial factors to foreign market entry. It rather seems that there are unobserved factors such as corporate strategy and managerial ability that help a firm both to enter foreign markets and to achieve financial strength.

6 Conclusion

Recent theoretical approaches from both macro- and microeconomic models predict that financial factors can be an important determinant of trade. Using a large panel data set of French manufacturing firms, this paper analyzes the impact of financial constraints on export participation and sales in foreign markets. A first look at the data showed that exporters are characterized by better financial equipment at least for some financial indicators. Financial factors are a significant predictor of export participation and the height of the export share after controlling for past export status, industry and standard control variables predicted by previous empirical and theoretical approaches. Once unobserved heterogeneity is taken into account the effects disappear. Thus, there is no evidence that financial constraints matter for export decisions. The reason for this result is probably that the selective group of firms for whom exporting is relevant is not likely to face financial constraints for foreign market entry. It rather seems that there are unobservable characteristics that enable a firm both to enter foreign markets and to achieve financial strength. An alternative explanation is that financial factors indeed matter, but public measures for export activities have reduced financial constraints for foreign market entry.

The results are robust across different model specifications and also hold for sub-groups of firms that are more likely to face financial constraints and for industries in which scale economies and sunk costs may be relevant in particular. The results have a direct policy implication. To increase export activities it seems to be more important to enhance firms´ innovation activities or productivity enhancing investments than to finance trade credits or to subsidize loans for exporting activities - at least in highly developed countries. Financial

constraints may only have an indirect effect on exporting activities. If financial constraints hamper domestic growth, investment and innovation, they may also hinder firms from exporting in the long run. For future research it might be interesting to compare the impact of financial constraints on exports across different countries. It is possible that financial constraints matter for trade in less developed countries or countries with different financial institutions. Further it might be interesting to investigate whether the impact of financial factors is different for entry into different target markets.

References

Arellano, M. and Bond, S. (1991), "Some tests of specification for Panel Data: Monte Carlo Evidence and an application to Employment Equations," *Review of Economic Studies* 58, 277-297.

Arellano, M. and Bover, O. (1995), "Another Look at the Instrumental Variable Estimation of Error–Components Models," *Journal of Econometrics* 68, 29–51.

Auboin, M. and Meyer-Ewert, M. (2004), "Improving the Availability of Trade Finance during Financial Crises," World Trade Organization Discussion Paper No.2.

Baltensperger, E. and Herger, N. (2007), „Exporting against Risk? Theory and Evidence from Public Export Insurance Schemes in OECD Countries," NCCR Trade Regulation Working Paper No. 2007/29.

Beck, T. (2002), "Financial Development and International Trade. Is there a link?" *Journal of International Economics* 57, 107-131.

Beck, T. (2003), "Financial Dependence and International Trade," *Review of International Economics* 11 (2), 296-316.

Becker, O. S. and Egger, P. (2007), "Endogenous Product versus Process Innovation and a Firm's Propensity to Export," CESifo Working Paper No. 1906.

Becker, B. and Greenberg, D. (2007), "Financial Development, Fixed Costs and International Trade," mimeo, University of Illinois.

Bernard, A. and Jensen, J. B. (1995), "Exporters, Jobs and Wages in US manufacturing:1976-1987," *Brookings Papers on Economic Activity*, *Microeconomics* 95, 67-119.

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

Bernard, A. B. and Wagner, J. (2001), "Export Entry and Exit by German Firms," *Review of World Economics* 137 (1), 105-123.

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

Blundell, R. and Bond, S. (1998a), "GMM Estimation with Persistent Panel Data: an Application to Production Functions," Working Paper Series No. W99/4, Institute for Fiscal Studies.

Blundell, R. and Bond, S. (1998b), "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models," *Journal of Econometrics* 87: 115–143.

Bond, S., Elston, J. A., Mairesse, J. and Mulkay, B. (2003), "Financial Factors and Investment in Belgium, France, Germany, and the United Kingdom: A Comparison Using Company Level Panel Data," *The Review of Economics and Statistics*, 85(1), 153–165.

Budd, J. W., Konings, J. and Slaughter, M. J. (2005), "Wages and International Rent Sharing in Multinational Firms," *The Review of Economics and Statistics* 87(1), 73-84.

Campa, J. M. and Shaver, J. M. (2002), "Exporting and Capital Investment: On the Strategic Behavior of Exporters," IESE Research Papers D/469.

Cappellari, L. and Jenkins, S. P. (2004), "Modelling low income transitions," *Journal of Applied Econometrics* 19 (5), 593-610.

Carpenter, R. E. and Petersen, B. (2002), "Is the Growth of Small Firms Constrained by Internal Finance?" *The Review of Economics and Statistics* 84 (2), 298-309.

Chamberlain, G. (1980), "Analysis of Covariance with Qualitative Data," *Review of Economic Studies* 47, 225-238.

Chaney, T. (2005), "Liquidity Constrained Exporters," mimeo, University of Chicago.

Das, S., Roberts, M. J. and Tybout, J. R. (2007), "Market Entry Costs, Producer Heterogeneity and Export Dynamics," *Econometrica* 75 (3), 837-873.

Davies, S. and Lyons, B. (1996), *Industrial Organisation in the European Union*. London: Clarendon Press.

Du, J. and Girma, S. (2007), "Finance and Firm Export in China," *Kyklos* 60 (1), 37-54.

Engel, D. and Procher, V. (2007), "Exports, Heterogeneity of Foreign Direct Investment and Productivity: Further Insights Based on French Data," mimeo, RWI Essen.

Espanol, P. (2007), "Exports, sunk costs and financial restrictions in Argentina during the 1990s," Working Paper 2007-01, Paris School of Economics.

Fazzari, S. M. and Petersen, B. C. (1993), "Working Capital and Fixed Investment: New Evidence on Financial Constraints," *RAND Journal of Economics* 24 (3), 328-342.

Görg, H., Henry, M. and Strobl, E. (2008), "Grant Support and Exporting Activity," *The Review of Economics and Statistics* 90 (1), 168-174.

Greenaway, D., Guariglia, A. and Kneller, R. (2007), "Financial Factors and Exporting Decisions," *Journal of International Economics* 73, 377-395.

Greenaway, D. and Kneller, R. (2007), "Firm Heterogeneity, Exporting and Foreign Direct Investment," *Economic Journal* 117 (517), 134-161.

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

Guariglia, A., and Mateut, S. (2005), "Inventory Investment, Global Engagement and Financial Constraints in the UK: evidence from micro data," GEP Research Paper 2005/23.

Heckman, J. J. (1981), "The Incidental Parameters Problem and the Problem of Initial Conditions in Estimating a Discrete Time-Discrete Data Stochastic Process," in Manski, C. F. and McFadden, D. (eds.), *Structural Analysis of Discrete Data with Econometric Applications*, 179-195, MIT Press: Cambridge, MA.

Helpman, E., Melitz, M. J. and Yeaple, S. R. (2004), "Export versus FDI with Heterogeneous Firms," *American Economic Review* 94(1), 300-316.

Jovanovic, B. (1982), "Selection and Evolution of Industry," *Econometrica*, 50 (3), 649-670.

Kneller, R. and Pisu, M. (2007), "Export Barriers: What are they and who do they matter to?" University of Nottingham Working Paper No. 2007/12.

Konings, J. and Murphy, A. (2006), "Do multinational enterprises relocate employment to low wage regions? Evidence from European multinationals," *Review of World Economics* 142 (2), 267-286.

Leamer, E. E. and Levinsohn, J. (1995), "International Trade Theory: The Evidence," in: Grossman, G. M. and Rogoff, K. (eds.), *The Handbook of International Economics* vol. III. Elsevier.

Manova, K. (2005), "Credit Constraints in Trade: Financial Development and Export Composition," mimeo, Harvard University.

Melitz, M. (2003), "The Impact of Trade on Aggregate Industry Productivity and Intra-Industry Reallocations," *Econometrica* 71 (6), 1695-1725.

Moser, C., Nestman, T., and Wedow, M. (2006), "Political Risk and Export Promotion," Deutsche Bundesbank Discussion Paper 36/2006.

Mundlak, Y. (1978), "On the Pooling of Time Series and Cross Section Data," *Econometrica* 46, 69-85.

Papke, L. E. and Wooldridge, J. M. (2005), "Panel Data Methods for Fractional Response Variables with an Application to Test Pass Rates," mimeo, Michigan State University.

Rajan, R. G. and Zingales, L. (1998), "Financial Dependence and Growth," *American Economic Review* 88 (3), 559-586.

Roberts, M. J. and Tybout, J. R. (1997), "The Decision to Export in Colombia: An Empirical Model of Entry with Sunk Costs," *American Economic Review* 87 (4), 545-556.

Roodman, D. (2005), "How to do xtabond2: An Introduction to "Difference" and "System" GMM in Stata," Center for Global Development Working Paper 103.

Stephens, M. (1999), *The Changing Role of Export Credit Agencies*. International Monetary Fund: Washington. DC.

Stewart, M. B. and Swaffield, J. K. (1999), "Low Pay Dynamics and Transition Probabilities," *Economica* 66, 23-42.

Van Biesebroeck, J. (2005), "Exporting raises productivity in Sub-Saharan African manufacturing firms," *Journal of International Economics* 67, 373–391.

Wagner, J. (2007), "Exports and Productivity: A Survey of the Evidence from Firm-Level Data," *The World Economy* 30 (1), 60-82.

Windmeijer, F. (2005), "A Finite Sample Correction for the Variance of Linear Efficient Two-Step GMM Estimators," *Journal of Econometrics* 126, 25-51.

Wooldridge, J. M. (2000), "A Framework for Estimating Dynamic, Unobserved Effects Panel Data Models with Possible Feedback to Future Explanatory Variables," *Economics Letters* 68, 245-250.

Wooldridge, J. M. (2005), "Simple Solutions to the Initial Conditions Problem in Dynamic Nonlinear Panel Data Models with Unobserved Heterogeneity," *Journal of Applied Econometrics* 20(1), 39–54.

Zia, B. H. (2008), "Export incentives, financial constraints, and the (mis)allocation of credit: Micro-level evidence from subsidized export loans," *Journal of Financial Economics* 87 (2), 498-527.

Appendix

Table A1: Distribution of exporters across industries

NACE code	Description	share of firms in sample	share of exporters	average export share
15-16	food and tobacco	17.91%	15.93%	2.44%
17	textiles	2.74%	55.35%	13.74%
18	wearing apparel and accessories	3.30%	55.38%	14.18%
19	tanning and dressing of leather; luggage.	0.94%	52.84%	11.47%
20	wood and wood products	4.00%	34.94%	6.56%
21	pulp, paper and paper products	1.11%	56.63%	8.31%
22	publishing and printing	13.66%	28.76%	2.98%
23	coke, refined petroleum products and nuclear fuel	0.09%	37.16%	3.78%
24	chemicals and chemical products	2.53%	63.12%	18.22%
25	rubber and plastic products	3.39%	55.40%	9.42%
26	other non-metallic mineral products	3.62%	26.04%	4.52%
27	basic metals	0.77%	62.60%	15.88%
28	fabricated metal products	16.89%	34.62%	5.20%
29	machinery and equipment n.e.c.	8.19%	39.10%	8.09%
30	office machinery and computers	0.29%	41.05%	10.42%
31	electrical machinery and apparatus n.e.c.	3.53%	38.67%	7.90%
32	television and communication equipment	1.52%	41.50%	9.48%
33	medical, precision and optical instruments	4.89%	30.06%	6.88%
34	motor vehicles, trailers and semi-trailers	1.30%	42.97%	8.33%
35	other transport equipment	1.29%	44.42%	10.79%
36	furniture; manufacturing n.e.c.	6.57%	31.18%	5.53%
37	recycling	1.46%	37.27%	8.60%
	all	100.00%	34.03%	6.30%

Table A2: Transition probabilities

	Export status in:					
	t+1		t+2		t+3	
Export status in t :	Non-Exporter	Exporter	Non-Exporter	Exporter	Non-Exporter	Exporter
Non-Exporter	91.35%	8.65%	88.71%	11.29%	86.88%	13.12%
Exporter	15.25%	84.75%	19.07%	80.93%	21.53%	78.47%

Table A3: Dynamic specification - pooled estimates

	(1) Probit *Pr(EX>0)*	(2) Tobit *Pr(EX>0)*	(3) Tobit *E[EX|EX>0]*	(4) Probit *Pr(EX>0)*	(5) Tobit *Pr(EX>0)*	(6) Tobit *E[EX|EX>0]*
liquidity ratio	0.097***	0.101***	0.013***	0.098***	0.102***	0.013***
	(0.007)	(0.006)	(0.001)	(0.007)	(0.006)	(0.001)
leverage				-0.065***	-0.112***	-0.014***
				(0.018)	(0.016)	(0.002)
EXshare (t-1)		3.038***	0.391***		3.038***	0.391***
		(0.029)	(0.002)		(0.029)	(0.002)
dEX (t-1)	0.713***			0.713***		
	(0.002)			(0.002)		
log size	0.069***	0.061***	0.008***	0.068***	0.060***	0.008***
	(0.002)	(0.001)	(0.000)	(0.002)	(0.001)	(0.000)
log productivity	0.140***	0.131***	0.017***	0.140***	0.130***	0.017***
	(0.004)	(0.004)	(0.000)	(0.004)	(0.004)	(0.000)
d(R&D)	0.031***	0.035***	0.004***	0.032***	0.036***	0.005***
	(0.003)	(0.003)	(0.000)	(0.003)	(0.003)	(0.000)
log wage	-0.080***	-0.073***	-0.009***	-0.081***	-0.074***	-0.010***
	(0.006)	(0.006)	(0.001)	(0.006)	(0.006)	(0.001)
d(foreign sub)	-0.003	-0.025***	-0.003***	-0.002	-0.023***	-0.003***
	(0.012)	(0.006)	(0.001)	(0.012)	(0.006)	(0.001)
d(foreign owner)	0.063***	0.032***	0.004***	0.064***	0.033***	0.004***
	(0.009)	(0.005)	(0.001)	(0.009)	(0.005)	(0.001)
d(public limited)	0.034***	0.040***	0.005***	0.033***	0.039***	0.005***
	(0.004)	(0.003)	(0.000)	(0.004)	(0.003)	(0.000)
log age	0.016***	0.020***	0.003***	0.016***	0.019***	0.002***
	(0.002)	(0.002)	(0.000)	(0.002)	(0.002)	(0.000)
distance to border	-0.027***	-0.026***	-0.003***	-0.027***	-0.026***	-0.003***
	(0.002)	(0.001)	(0.000)	(0.002)	(0.001)	(0.000)
σ		0.128	0.128		0.128	0.128
		(0.001)	(0.001)		(0.001)	(0.001)
(Pseudo-)logL	-70928.18	18129.64	18129.64	-70864.99	18163.59	18163.59
N	207158	207158	207158	207158	207158	207158
pseudo R-squared	0.511			0.511		

Notes: ***, **, * denotes significance at the 1%, 5%, 10% level. All regressions include industry and time dummies. Marginal effects are reported, calculated at the sample means of the regressors. Standard errors, clustered at the firm level are shown in parentheses.

Table A4: Static estimates for export status and export share

	(1) Probit *Pr (EX>0)*	(2) Tobit *Pr (EX>0)*	(3) Tobit *E[EX|EX>0]*	(4) Probit *Pr (EX>0)*	(5) Tobit *Pr (EX>0)*	(6) Tobit *E[EX|EX>0]*
liquidity ratio	0.190***	0.155***	0.034***	0.191***	0.155***	0.034***
	(0.009)	(0.009)	(0.002)	(0.009)	(0.009)	(0.002)
leverage				-0.131***	-0.118***	-0.026***
				(0.023)	(0.021)	(0.005)
log size	0.123***	0.095***	0.021***	0.122***	0.095***	0.021***
	(0.002)	(0.002)	(0.000)	(0.002)	(0.002)	(0.000)
log productivity	0.237***	0.209***	0.046***	0.236***	0.208***	0.046***
	(0.006)	(0.006)	(0.001)	(0.006)	(0.006)	(0.001)
d(R&D)	0.061***	0.036***	0.008***	0.062***	0.037***	0.008***
	(0.005)	(0.004)	(0.001)	(0.005)	(0.004)	(0.001)
log wage	-0.121***	-0.087***	-0.019***	-0.123***	-0.088***	-0.019***
	(0.009)	(0.009)	(0.002)	(0.009)	(0.009)	(0.002)
d(foreign sub)	0.007	0.102***	0.024***	0.010	0.104***	0.024***
	(0.019)	(0.014)	(0.003)	(0.019)	(0.014)	(0.003)
d(foreign owner)	0.135***	0.198***	0.049***	0.136***	0.198***	0.050***
	(0.014)	(0.011)	(0.003)	(0.014)	(0.011)	(0.003)
d(public limited)	0.069***	0.053***	0.012***	0.069***	0.052***	0.012***
	(0.006)	(0.005)	(0.001)	(0.006)	(0.005)	(0.001)
log age	0.046***	0.023***	0.005***	0.044***	0.022***	0.005***
	(0.004)	(0.003)	(0.001)	(0.004)	(0.003)	(0.001)
distance to border	-0.054***	-0.048***	-0.011***	-0.055***	-0.049***	-0.011***
	(0.003)	(0.002)	(0.001)	(0.003)	(0.002)	(0.001)
σ		0.263	0.263		0.263	0.263
		(0.001)	(0.001)		(0.002)	(0.002)
(Pseudo-)logL	-116824.7	-63169.8	-63169.8	-116689.9	-63065.0	-63065.0
N	207158	207158	207158	207158	207158	207158
Pseudo R-squared	0.196			0.196		

Notes: ***, **, * denotes significance at the 1%, 5%, 10% level. Al regressions include industry and time dummies. Marginal effects are reported, calculated at the sample means of the regressors. Standard errors, clustered at the firm level are shown in parentheses.

Table A5: Dynamic Random-Effect Models

	(1) Probit *Pr (EX>0)*	(2) Probit *Pr (EX>0)*	(3) Tobit *E[EX|EX>0]*	(4) Tobit *E[EX|EX>0]*
liquidity ratio	-0.002 (0.003)	-0.015 (0.013)	-0.000 (0.000)	-0.000 (0.000)
leverage		0.028 (0.026)		0.002 (0.002)
EXshare (t-1)			0.158*** (0.001)	0.158*** (0.001)
dEX (t-1)	0.370*** (0.004)	0.370*** (0.004)		
log size	0.107*** (0.007)	0.108*** (0.007)	0.011*** (0.001)	0.011*** (0.001)
log productivity	0.103*** (0.010)	0.103*** (0.010)	0.015*** (0.001)	0.015*** (0.001)
d(R&D)	-0.004 (0.006)	-0.004 (0.006)	-0.000 (0.000)	-0.000 (0.000)
log wage	-0.022* (0.011)	-0.020* (0.011)	-0.006*** (0.001)	-0.006*** (0.001)
d(foreign sub)	-0.013 (0.014)	-0.007 (0.014)	-0.003** (0.001)	-0.003** (0.001)
d(foreign owner)	0.058*** (0.011)	0.064*** (0.011)	0.006*** (0.001)	0.006*** (0.001)
d(public limited)	0.037*** (0.005)	0.036*** (0.005)	0.007*** (0.001)	0.006*** (0.001)
log age	0.011*** (0.003)	0.005* (0.003)	0.002*** (0.000)	0.002*** (0.000)
distance to border	-0.026*** (0.002)	-0.028*** (0.002)	-0.004*** (0.000)	-0.004*** (0.000)
EXshare (t=0)			0.196*** (0.002)	0.196*** (0.002)
dEX (t=0)	0.438*** (0.007)	0.435*** (0.007)		
Mean liquidity ratio	0.120*** (0.015)	0.149*** (0.017)	0.003*** (0.000)	0.003*** (0.000)
Mean leverage		-0.161*** (0.040)		-0.029*** (0.004)
Mean log size	-0.032*** (0.008)	-0.035*** (0.008)	-0.001* (0.001)	-0.002** (0.001)
Mean log productivity	0.070*** (0.011)	0.067*** (0.011)	0.007*** (0.001)	0.007*** (0.001)

Table A5-continued from previous page

Mean d(R&D)	0.046***	0.055***	0.007***	0.007***
	(0.008)	(0.008)	(0.001)	(0.001)
Mean log wage	-0.087***	-0.095***	-0.006***	-0.006***
	(0.015)	(0.015)	(0.002)	(0.002)
σ_a	0.881	0.880	0.104	0.104
	(0.013)	(0.012)	(0.001)	(0.001)
σ_u			0.105	0.105
			(0.000)	(0.000)
ρ	0.437	0.436	0.492	0.492
	(0.007)	(0.007)	(0.004)	(0.004)
log Likelihood	-66001.556	-65879.479	31483.996	13813.983
N	207158	207158	207158	207158
pseudo R-squared	0.48	0.48		

Notes: ***, **, * denotes significance at the 1%, 5%, 10% level. Al regressions include industry and time dummies. Marginal effects are reported, calculated at the sample means of the unobserved heterogeneity. Standard errors are shown in parentheses.

Table A6: Heterogeneous effects for incumbents and potential entrants

	(1) entrants	(2) incumbents	(3) entrants	(4) incumbents
liquidity ratio	0.252*** (0.030)	0.111*** (0.030)	-0.068 (0.052)	-0.061 (0.063)
leverage	-0.244*** (0.078)	-0.038 (0.086)	0.151 (0.107)	-0.180 (0.137)
log size	0.220*** (0.010)	0.087*** (0.010)	0.182*** (0.032)	0.215*** (0.038)
log productivity	0.453*** (0.022)	0.189*** (0.021)	0.198*** (0.041)	0.234*** (0.043)
d(R&D)	0.110*** (0.015)	0.038*** (0.014)	-0.003 (0.022)	-0.022 (0.025)
log wage	-0.239*** (0.029)	-0.150*** (0.028)	-0.041 (0.047)	-0.044 (0.055)
d(foreign sub)	-0.081 (0.074)	0.083** (0.036)	-0.037 (0.072)	0.092** (0.036)
d(foreign owner)	0.266*** (0.056)	0.099*** (0.028)	0.343*** (0.053)	0.106*** (0.028)
d(public limited)	0.139*** (0.021)	0.017 (0.015)	0.164*** (0.020)	0.015 (0.015)
log age	0.059*** (0.012)	0.027*** (0.010)	0.079*** (0.012)	0.025*** (0.010)
distance to border	-0.101*** (0.008)	-0.033*** (0.007)	-0.130*** (0.008)	-0.030*** (0.007)
mean values of time invariant variables	no	no	yes	yes
Pseudo log likelihood	-122192.3	-120926.7	-113694.4	-112725.4
N	171450	171450	171450	171450

Notes: ***, **, * denotes significance at the 1%, 5%, 10% level. All regressions include industry and time dummies. Marginal effects that refer to the probability of exporting conditional on previous year's export status are reported. Marginal effects are calculated at the sample means of the regressors. Standard errors, clustered at the firm level, are shown in parentheses.

Table A7: Alternative financial measures- dynamic random effect models

	(1) Probit *Pr (EX>0)*	(2) Probit *Pr (EX>0)*	(3) Tobit *E[EX|EX>0]*	(4) Tobit *E[EX|EX>0]*
cash flow ratio	-0.001		-0.000*	
	(0.002)		(0.000)	
coverage ratio		-0.000		-0.000*
		(0.000)		(0.000)
EXshare (t-1)			0.166***	0.190***
			(0.002)	(0.002)
dEX (t-1)	0.397***	0.404***		
	(0.004)	(0.005)		
log size	0.104***	0.111***	0.011***	0.012***
	(0.008)	(0.008)	(0.001)	(0.001)
log productivity	0.109***	0.102***	0.016***	0.017***
	(0.011)	(0.011)	(0.001)	(0.001)
d(R&D)	-0.007	-0.003	-0.000	0.000
	(0.006)	(0.006)	(0.000)	(0.001)
log wage	-0.031**	-0.013	-0.007***	-0.007***
	(0.013)	(0.014)	(0.001)	(0.001)
d(foreign sub)	-0.012	-0.009	-0.003***	-0.002
	(0.014)	(0.014)	(0.001)	(0.001)
d(foreign owner)	0.055***	0.057***	0.006***	0.007***
	(0.011)	(0.011)	(0.001)	(0.001)
d(public limited)	0.036***	0.033***	0.006***	0.007***
	(0.005)	(0.005)	(0.001)	(0.001)
log age	0.015***	0.017***	0.003***	0.003***
	(0.003)	(0.003)	(0.000)	(0.000)
distance to border	-0.025***	-0.026***	-0.004***	-0.004***
	(0.002)	(0.002)	(0.000)	(0.000)
σ_a	0.835	0.834	0.101	0.096
	(0.013)	(0.013)	(0.001)	(0.001)
σ_u			0.104	0.102
			(0.000)	(0.000)
ρ	0.411	0.398	0.486	0.471
	(0.007)	(0.008)	(0.004)	(0.004)
log Likelihood	-60928.62	-55005.753	29834.564	33956.792
N	191244	168009	191244	168009
pseudo R-squared	0.52	0.43		

Notes: ***, **, * denotes significance at the 1%, 5%, 10% level. All regressions include firm specific time averages of the time-varying regressors, the initial export status, time dummies and industry dummies Marginal effects are reported, calculated at the sample means of the unobserved heterogeneity. Standard errors are shown in parentheses.

Table A8: Industry type classification for heterogeneous effects

Industry type	NACE Rev 1.1
Low sunk cost industries	151, 152, 156, 158, 17, 18, 19, 20, 21, 22, 252, 262, 26, 27, 28, 292, 296, 342, 351, 361, 362, 366
Medium sunk cost industries - advertising	153-155, 157, 159, 16, 363-365
Medium sunk cost industries - R&D	241, 242, 246, 247, 251, 291, 294, 295, 30, 31, 321, 331, 332, 343, 352-354
High sunk cost industries - advertising and R&D	243-245, 293, 297, 322, 323, 334, 335, 341, 401, 402, 642,
Industries with scale economies	21, 22, 241, 242, 245, 246, 247, 251, 26, 27, 297, 31, 321-323, 341, 343, 351, 352
Capital intensive industries	155-159, 211, 241, 243, 245, 247, 252, 261, 265, 267, 271, 274, 34
Labor intensive industries	151-153, 262, 282, 262, 282, 293, 29, 335, 342, 351, 352, 354, 364, 365
High tech industries	244, 30, 32, 33, 353

Table A9: Heterogenous effects - dynamic Probit models

a) sample split by sunk costs

	(1)	(2)	(3)	(4)
sample	sunk costs low	sunk cost R&D	sunk cost advertising	sunk cost high
liquidity ratio	-0.018	0.031	-0.029	-0.027
	(0.018)	(0.086)	(0.036)	(0.066)
leverage	0.021	0.132	0.121	0.061
	(0.034)	(0.128)	(0.077)	(0.132)
N	156608	6416	32262	11074
pseudo R-squared	0.525	0.551	0.520	0.522

b) sample split by production technology

	(1)	(2)	(3)	(4)
sample	scale economies	capital intensive	labor intensive	high tech
liquidity ratio	-0.018	0.001	0.011	-0.006
	(0.018)	(0.029)	(0.036)	(0.034)
leverage	0.021	0.057	-0.025	0.046
	(0.034)	(0.061)	(0.061)	(0.064)
N	156608	52708	40118	42901
pseudo R-squared	0.525	0.495	0.627	0.553

c) sample split by size and productivity

	(1)	(2)	(3)	(4)
sample	*size* 1st quartile	*size* 2nd quartile	*produtivity* 2nd quartile	*productivity* 3rd quartile
liquidity ratio	-0.005	-0.033	-0.010	0.005
	(0.021)	(0.029)	(0.034)	(0.032)
leverage	0.051	-0.024	0.002	0.054
	(0.038)	(0.053)	(0.066)	(0.064)
N	30669	40993	46414	51191
Pseudo R-squared	0.488	0.491	0.517	0.506

Notes: ***, **, * denotes significance at the 1%, 5%, 10% level. Marginal effects are reported, calculated at the sample means of the unobserved heterogeneity. Standard errors are shown in parentheses. All regressions include control variables from the previous specifications, firm specific time averages of the time-varying regressors, the initial export status, time dummies and industry dummies on the two-digit NACE level for those industries that are included in the sub sample.

Table A10: GMM-System estimates for export status

	(1)	(2)	(3)
liquidity ratio	-0.056		
	(0.035)		
leverage	-0.046		
	(0.049)		
cash flow ratio		-0.011	
		(0.009)	
coverage ratio			-0.000
			(0.000)
dEX (t-1)	0.428***	0.419***	0.448***
	(0.067)	(0.066)	(0.068)
dEX (t-2)	0.060***	0.062***	0.065***
	(0.018)	(0.018)	(0.018)
log size	0.086***	0.069**	0.067***
	(0.022)	(0.029)	(0.021)
log productivity	0.163***	0.225***	0.153***
	(0.052)	(0.067)	(0.056)
d(R&D)	-0.021	-0.024	0.007
	(0.021)	(0.024)	(0.021)
log wage	-0.110*	-0.147*	-0.111
	(0.060)	(0.080)	(0.085)
m1(p)	0.000	0.000	0.000
m2(p)	0.432	0.378	0.378
Hansen (p)	0.311	0.483	0.035
Difference Hansen (p)	0.995	0.999	0.315
N	171450	175439	155739

Notes: ***, **, * denotes significance at the 1%, 5%, 10% level. All regressions include industry and time dummies. Robust standard errors are shown in parentheses. In all columns instruments used are levels lagged two periods and deeper for the equation in differences and differences lagged one period and deeper for the equation in levels. m1 (m2) is a test of the null hypothesis of no first (second) order serial correlation for the difference equation. Hansen is a test on the overidentifying restrictions based on the two-step GMM estimator. Difference Hansen is a test of the validity of the additional instruments in differences for the equation in levels. For all test statistics, p-values are reported.