

Financial Constraints and Firms Export Behavior

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Aim and Scope

Investigate **empirically** the impact of financial constraints on firm export behavior:

- export participation
- export intensity

Motivations: The French Context

- Apparent **loss of competitiveness** of French Manufacturing firms since the early 2000's: Artus and Fontagné (2006) and Fontagné and Gaullier (2008)
- Most probably because of structural micro-economic factors
 - 1 Modes of firm governance ?
 - 2 Inadequacy of export-promotion policies?
 - 3 Institutional rigidities (labor and/or capital markets)?

Theoretical Background

- New-new trade theory
- H1: Heterogenous firms and Sunk entry costs into foreign markets (Melitz, 2003)
- H2: Adding Capital markets imperfections (Chaney, 2005)

Main Predictions

- Less financially constrained firms **self-select** into exporting
- Financial constraints may prevent **efficient but illiquid** firms from exporting

Relevant Empirical Literature

- No initial support for these theoretical priors: Campa and Shaver(2002), Greeneaway, Kneller and Guariglia (2007,JIE, Benchmark paper),
- Rather, exporting seems to improve firm financial health
- Possible explanations:
 - ① **Diversification**: selling in different markets reduces vulnerability to demand shocks
 - ② **Signaling**: exporting signals the firm's type to investors, thus reducing informational asymmetries
 - ③ **Collateral**: foreign exchange revenues better collateral to access (international) financial markets

What does the paper do?

- Tests whether financial constraints hinder export participation
- Tests whether exporting improves financial health
- Further investigates the relation between finance and export behavior by means of duration models

Contributions

- We use a new alternative measure of financial constraints
- We keep closer to the initial Bernard and Jensen (1999) methodology to test self-selection and *ex-post* effects
- We investigate firm entry decision by the mean of duration models

Data for France

- 1 *Enquête Annuelle d'Entreprises* (EAE-Manufacturing)
 - Collects financial statements and balance sheets of all individual manufacturing firms with at least 20 employees
 - Coverage 1990–2005
- 2 DIANE
 - Detailed financial data for over 1 million French firms
 - Coverage 1993–2006

Resulting Dataset

- More than 25,000 manufacturing firms over the 1993–2005 period
- Around 170,000 observations

Measuring Financial Constraints

- Very sensitive issue, still unresolved
- Theory offers little guidance

Common Methodologies

- **Investment-cash flow sensitivity** increasingly challenged as a valid measure of financial constraints (Kaplan and Zingales, 1997)
- **Proxies for informational asymmetries** often lead to
 - 1 time-invariant and binary definition of FC (age, size,...)
 - 2 uni-dimensional index (ex. liquidity ratio, leverage ratio,..) most likely to face endogeneity problem

A New Approach to Measure Financial Constraints, (Musso and Schiavo, 2008, JEE)

Collapse information from several dimensions into a single index

- 1 size (total assets)
- 2 profitability (ROA)
- 3 liquidity (current ratio)
- 4 (potential) cash flow (CAF)
- 5 solvency ratio (own funds/ liabilities)
- 6 trade credit over total assets
- 7 repaying ability (financial debt /CAF)

Main Features

- 1 time varying index
- 2 accounts for different degrees of constraint

Steps

- 1 Trim top and bottom 0.5% observations for each variable
- 2 Compute (2-digit NACE) sector average
- 3 For each firm/year compute distance from average (for each variable)
- 4 Classify observations in quintiles
- 5 Combine values from 7 variables
 - 1 sum → **Score A**
 - 2 number of times in 1st quintile
 - 3 log sum
 - 4 number of times in 1st or 2nd quintile → **Score B**
- 6 Rescale in 1–10 range
- 7 Lower values for **more** constrained firms
- 8 Rank correlation robust to different ways to combine the information

Financial Variables

- Our synthetic indexes and traditional measures (such as liquidity ratio) do not convey the same information

Pearson's r and Spearman Rho Correlation Coefficients		
	Liquidity ratio	Score A
Liquidity ratio	–	<i>0.49</i>
Score A	0.46	–

Descriptive Statistics

	All Firms	Cont. Exp.	Export Starters	Never Exp.	F-stat
Employees	88.083	115.839	59.672	56.799	1,477.65***
Wage per empl.	0.103	0.107	0.099	0.091	515.14***
Score A	5.620	5.825	5.448	5.261	1,133.34***
Liquidity	0.293	0.320	0.273	0.240	727.78***
Observations	167,597	85,720	63,402	18,475	

- A clear and consistent ranking across the different subsamples of exporting and non-exporting firms
- Broadly consistent with the literature on export and productivity
- Exporters seem to enjoy better size, wage/employee...and better financial health

Self-Selection Effect: Framework

- Only less constrained firms enter foreign markets
- Empirical strategy adapted from Bernard and Jensen (1999)
- Compare exporters and non exporters **before** the former entered foreign markets
- Measure the *ex ante* export premium of future exporters in terms of financial variables
- Control for size, TFP, sector-time dummies

$$FIN_{i,t-s} = \alpha + \beta EXP_{it} + \gamma \mathbf{Z}_{i,t-s} + \varepsilon_{it}$$

Self-Selection Effect: Results

	Score A		Liquidity ratio	
	t-1, t (1)	t-3, t (2)	t-1, t (3)	t-3, t (4)
Export	0.146*** [0.052]	0.228** [0.094]	0.016* [0.010]	0.009 [0.016]
log Empl. _{t-s}	0.188*** [0.041]	0.075 [0.067]	0.006 [0.008]	-0.025** [0.012]
log TFP* _{t-s}	2.794*** [0.142]	2.933*** [0.247]	0.347*** [0.026]	0.443*** [0.043]
Observations	5,727	2,169	5,727	2,169

* Nonparametric index based on Caves et al. 1982; Nadiri et al. 1997

Results

- future exporters enjoy better access to external financial funds even **before** entry into export markets
- robust to different time horizons for Score A
- effect is less pronounced using Liquidity

Signaling Effect: Framework

- As a result of exporting, firms gain better access to external financial resources
- Compare exporters and non exporters **after** the former have entered foreign markets
- Difference between two group of firms should increase if exporting grants better access to external funds
- Control for age, size, TFP, sector-time dummies

$$\Delta\%FIN_{i,t+s/t+q} = \alpha + \beta EXP_{i,t} + \gamma Z_{i,t} + \varepsilon_{i,t}$$

Signaling Effect: Results

	Score A			Liquidity ratio		
	t	$t + 1$	$t + 1$	t	$t + 1$	$t + 1$
	$t + 1$	$t + 3$	$t + 5$	$t + 1$	$t + 3$	$t + 5$
	(1)	(2)	(3)	(4)	(5)	(6)
Export	-0.003 [0.013]	0.036 [0.022]	0.042 [0.034]	0.047 [0.033]	-0.057 [0.057]	-0.052 [0.090]
log Empl _{$t=0$}	-0.012 [0.009]	-0.001 [0.014]	0.019 [0.018]	-0.035 [0.026]	0.007 [0.038]	-0.003 [0.053]
log TFP _{$t=0$}	-0.185*** [0.034]	0.065 [0.059]	-0.071 [0.083]	0.066 [0.093]	-0.198 [0.157]	-0.302 [0.226]
Observations	4,387	1,823	1,152	3,307	1,448	905

Results

- No significant improvement in financial access
- Robust to use of different scores
- Focus only on successful entrants

The Decisions to Start Exporting

- In France 70% of firms with more than 20 employees export
- Proportion grows to 95% for large firms
- Exporting seems a necessary step for growth
- *When* more relevant than *if* firm export
- We tackle it using a discrete time duration model (Prentice and Gloeckler, 1978) which controls for unobserved heterogeneity modeled by means of a Normal or a Gamma function (Jenkins, 1995)

Duration Model: Results

	Normal RE [†]		Gamma RE [‡]	
log Time	-0.327 [0.098]***	-0.340 [0.096]***	-0.189 [0.096]**	-0.198 [0.095]**
log Empl.	0.172 [0.030]***	0.172 [0.030]***	0.226 [0.036]***	0.226 [0.036]***
log (Wage/Empl.)	0.959 [0.073]***	0.959 [0.072]***	1.002 [0.073]***	1.002 [0.072]***
log TFP	-0.450 [0.092]***	-0.465 [0.090]***	-0.398 [0.100]***	-0.412 [0.098]***
Score A	0.014 [0.007]*		0.014 [0.008]*	
Liquidity Ratio		0.159 [0.040]***		0.167 [0.042]***

Results

- Financially healthy firms find it easier to start exporting
- Size and Human Capital also have the expected sign
- TFP negative: U-shape dynamic? (Bellone et al., 2008 RoWE)

Duration Model: Results by Deciles

Time (in years)	Baseline Hazard	Score A		Size	
		1 st decile	9 th decile	1 st decile	9 th decile
1	0.353	0.344	0.363	0.316	0.410
2	0.318	0.309	0.327	0.284	0.371
3	0.298	0.290	0.307	0.266	0.349
4	0.285	0.277	0.294	0.254	0.334
5	0.275	0.267	0.284	0.245	0.323
6	0.267	0.259	0.275	0.237	0.314
7	0.261	0.253	0.269	0.232	0.306
8	0.255	0.247	0.263	0.226	0.300
9	0.250	0.243	0.258	0.222	0.294
10	0.246	0.239	0.254	0.218	0.289
11	0.242	0.235	0.250	0.215	0.285
12	0.239	0.232	0.246	0.212	0.281
13	0.236	0.228	0.243	0.209	0.278

Results

- The effect of financial constraints is significant but economically small

Summary of the main Results

- Less constrained firms self-select into export markets
- Exporting does not improve access to external funds
- Financial health increases the probability to become an exporter

Policy implications: the French Context again

- First best: To reduce Financial market imperfections would be the best way to proceed
- Second Best: Direct financial support to "candidates" for exports has to be called for with cautious ("effet d'aubaine")
- Could be more relevant to design policies in favor of the growth of French SMEs (and let the market self-select exporters)

What next?

- **Modeling**: to model the relationship between Financial constraints, *firm growth*, and export dynamics (Hsieh and Klenow, 2009)
- **Data**: to work with - more reliable financial data - with exports by destination markets (Bugamelli and Schivardi, 2008, Berman, Berthou and Hericourt, 2009))
- **International comparisons**: Next ISGEP meeting "Firm selection, and Country Competitiveness" in Nice 24-26 March 2010 => Google "[DIME-ISGEP-2010](#)"

Duration Model: Methodology

- Model the hazard rate of first export for firm i in time interval t as a complementary log logistic function of financial constraints
- Control for size, wage, TFP, multiplant, + firm age and year dummies
- Control for Unobserved heterogeneity modeled by means of a Normal or a Gamma function (Jenkins, 1995)

$$h_t(X_{it}) = 1 - \exp \left\{ - \exp \left(X'_{it} \beta + \theta(t) \right) + \varepsilon_i \right\}$$

where

- $X = \{FIN; Size; Wage; TFP; Subs; agedum; yeardum\}$
- ε_i is an unobserved individual-specific effect with zero mean, uncorrelated with the X 's

Measuring Total Factor Productivity

$$\ln TFP_{it} = \ln Y_{it} - \overline{\ln Y}_t + \sum_{\tau=2}^t \left(\overline{\ln Y}_\tau - \overline{\ln Y}_{\tau-1} \right) \\ - \left[\sum_{n=1}^N \frac{1}{2} (S_{nit} + \overline{S}_{nt}) (\ln X_{nit} - \overline{\ln X}_{nt}) \right. \\ \left. + \sum_{\tau=2}^t \sum_{n=1}^N \frac{1}{2} (\overline{S}_{n\tau} + \overline{S}_{n\tau-1}) (\overline{\ln X}_{n\tau} - \overline{\ln X}_{n\tau-1}) \right]$$

- Where Y , X , and S are gross output, inputs (employees, intermediate inputs, capital stock), and cost shares for firm i at time t
- Bars denote arithmetic means
- Non-parametric measure allows for cross-sectional and inter-temporal comparisons (Caves et al. 1982; Nadiri et al. 1997)