Export activities under financial constraints

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International trade and firm behavior

- Traditionally economists have investigated the competitiveness of production systems in light of theories of international trade based on the notions of comparative advantage and of economy of scale.

- Since the 90s economists ability of investigating this issue has dramatically improved thanks to the availability of micro-data.

- A few new results have emerged
  - only a minority of firms exports;
  - high heterogeneity in export participation rates across sectors;
  - exports are a small share of total shipments;
  - within industry trade among similar partners is common;
  - exporters and non-exporters are different in terms of size, productivity and skill intensity.
Italian export: an highly skewed structure

ITALY EXPORTS IN 230 DIFFERENT COUNTRIES
GERMANY, FRANCE, US, UK and SPAIN ACCOUNT FOR ABOUT 50% OF TOTAL EXPORT

ITALY EXPORTS 5,310 DIFFERENT PRODUCT CLASSES (HS6)
TOP 10% OF PRODUCT XCLASSES (HS3) ACCOUNT FOR MORE THAN 60% OF TOTAL EXPORT

ITALY EXPORTS 276,991 DIFFERENT PRODUCT-COUNTRY COMBINATIONS
TOP 10% OF PC COMBINATIONS ACCOUNT FOR 90% OF TOTAL EXPORT.
Financial Constraints and firm behaviour

FCs affect many dimensions of firms’ decisions and evolution:

- investment/divestment decisions
- decision to expand production or entering new markets
- cash management
- R&D policies
Italy: strong dependence on bank credit

- underdeveloped stock market

<table>
<thead>
<tr>
<th>Capitalization (non financial)</th>
<th>ITA</th>
<th>GER</th>
<th>FRA</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>19%</td>
<td>38%</td>
<td>59%</td>
<td>95%</td>
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- underdeveloped bond market

<table>
<thead>
<tr>
<th>Bonds</th>
<th>ITA</th>
<th>UK</th>
<th>US</th>
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<tbody>
<tr>
<td>Financial debt</td>
<td>8%</td>
<td>24%</td>
<td>44%</td>
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</table>

- role of banks

<table>
<thead>
<tr>
<th>Bank credit</th>
<th>ITA</th>
<th>UK</th>
<th>US</th>
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<tbody>
<tr>
<td>Financial debt</td>
<td>67%</td>
<td>27%</td>
<td>33%</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Short-term bank credit</th>
<th>ITA</th>
<th>UK</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term financial debt</td>
<td>37%</td>
<td>43%</td>
<td>26%</td>
</tr>
</tbody>
</table>
Financial Constraints and Exports

- International activities are more dependent on external finance than domestic ones:
  - extra fixed and variable costs;
  - longer time-lag between production and receipt of foreign sales;
  - international contracts more complex, risky and less enforceable.

- Access to external finance is then expected to be particularly crucial for international activity of firms
  - FCs likely affect the decision to entry foreign markets and how much to export
  - FCs may affect the number of destinations served and the range of products exported

- Italian firms are likely to be highly affected by (external) financing problems.
Background: empirics and theory

Contribution of this paper

Data description

Regression analysis
  FC and export margins
  Third exercise: quantity and prices
Related Literature: Empirics

- FCs affect both the extensive and the intensive margin of trade
  - Muuls (2008) [Belgium]; Bellone et al. (2010) [France]; Minetti and Zhu (2011) [Italy]; Manova et al. (2011) [China]

- FCs affect both the product and the country extensive margin of trade
  - Muuls (2011); Manova et al. (2011); Askenazy et al. (2011)[France]
Related Literature: Theory

Manova (2010) embeds FC into a standard monopolistic competition trade model where the selection mechanism into exporting is driven by heterogeneous productivities.

► Richer view on FCs:
  - they do not simply reflect productivity
  - credit market failures: limited screening, unwillingness to take high perceived risk
  thus FCs can arise for otherwise well performing firms.

► We need to envisage a dynamic extension where firms make multiple products that export to multiple countries and their profitability evolves over time (as in Bernard et al., 2010)

► Quality and Prices:
  - product quality differentiation (Kugler and Verhoogen, 2011)
  - prices as a strategic variable (Dasgupta and Titman, 1998)
Background: empirics and theory

Contribution of this paper

Data description

Regression analysis
  FC and export margins
  Third exercise: quantity and prices
Financial Constraints and Exports: our contribution

With the detailed data at hand we are able to extend previous empirical investigations to consider:

1. the relation between FC and export margins when export costs are assumed to vary across firms, products, countries;

2. the dynamics of adding and dropping products and countries from firms’ export portfolio;

3. the relation of financing problems with quantities exported and with prices charged to foreign customers together with the role destination characteristics play in influencing volumes and prices.
Background: empirics and theory

Contribution of this paper

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Background: empirics and theory

Contribution of this paper

Data description

Regression analysis
  FC and export margins
  Third exercise: quantity and prices
Data description

- **Custom data (COE)**
  - Transactions level data: export value and quantity for HS6 product-country destination pairs
  - All cross-border transactions, 2000-2003

- **Census of Italian firms (ASIA)**
  - Census of all operating businesses: sales, employment, main activity of the firm (NACE code)

- **Bilanci Civilistici (CADS - Company Accounting Data Service)**
  - Annual reports for all limited liability firms
Our measure of financial constraints

- An official credit rating developed by an independent agency
  - It results from a multivariate score that summarizes a wide range of firms’ characteristics
  - It varies over time, allowing for the identification of time effects
  - It captures “the opinion [of the markets] on the future obligor’s capacity to meet its financial obligations (Crouhy et al., 2001)”

- Heavy reliance of banks on this ratings, and tight link between the index and the availability and cost of external finance

- Non Financially Constrained (NFC) firms, rated from 1 to 7, and Financially Constrained (FC) firms, with rating 8 or 9

- The rating in $t - 1$ is relevant for credit suppliers’, as the index is updated at the end of each year
Constrained firm does not mean 'bad' firm
Background: empirics and theory

Contribution of this paper

Data description

Regression analysis
  FC and export margins
  Third exercise: quantity and prices
1. the relation between FC and export margins when export costs are assumed to vary across firms, products, countries;

2. the dynamics of adding and dropping products and countries from firms’ export portfolio;

3. the relation of financing problems with quantities exported and with prices charged to foreign customers together with the role destination characteristics play in influencing volumes and prices.
First exercise: FC and export margins

- **FCs correlates with intensive/extensive margins of firms’**

\[
\ln Y_{ft} = \alpha + \gamma FC_{ft-1} + \beta Z_{ft-1} + c_f + \epsilon_{ft}
\]

where
- \(Y\) is either \(\ln \text{Exports}_{ft}\), \(\ln \# \text{Products}_{ft}\), or \(\ln \# \text{Countries}_{ft}\)
- \(FC_{ft-1}\) is the indicator variable for constrained firms
- \(Z_{ft-1}\) is a set of predetermined control variables
- \(c_f\) is an unobserved firm fixed effect

- **Potential problems:**
  - Endogeneity
  - Self-Selection Bias: export performance is only known for those firms which do export
Econometric Strategy

To control for selection in our panel data we employ the 2-stage Heckman-type procedure (Semykina and Wooldridge, 2010)

\[
\ln Y_{ft} = \gamma_1 FC_{ft-1} + \beta Z_{ft-1} + c_1f + \varepsilon_{1ft}
\]

\[
s_{ft} = 1 \left[ \gamma_2 FC_{ft-1} + \delta_t W_{ft-1} + c_2f + \varepsilon_{2ft} \right]
\]

where

- \( W_{ft-1} \) is a set of explanatory variables
- \( W_f \) includes the exclusion restriction variable, which proxies for fixed cost of entry into exports (\( ExpCost \)),

Procedure.

For each \( t \), obtain the inverse Mills ratio \( \hat{\lambda}_{ft} \) from a Probit estimate of the selection equation augmented with time averages of the FC dummy and of the variables in \( W_f \) as in Mundlak(1978). Alternative in Chamberlain (1980).

Estimate via POLS the outcome equation, augmented with the time averages and with \( \hat{\lambda}_{ft} \).
## FCs and Total Exports

### Table 2

<table>
<thead>
<tr>
<th></th>
<th>In $Exports_{ft}$ POLS (1)</th>
<th>In $Exports_{ft}$ FE (2)</th>
<th>In $Exports_{ft}$ Selection (3)</th>
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</thead>
<tbody>
<tr>
<td>$FC_{ft-1}$</td>
<td><strong>-0.228</strong>*</td>
<td><strong>-0.091</strong>*</td>
<td>-0.062**</td>
</tr>
<tr>
<td>In $Empl_{ft-1}$</td>
<td>0.212***</td>
<td>0.130***</td>
<td>0.030</td>
</tr>
<tr>
<td>In $Age_{ft}$</td>
<td>-0.117***</td>
<td></td>
<td>0.360***</td>
</tr>
<tr>
<td>In $ASSETS_{ft-1}$</td>
<td><strong>0.943</strong>*</td>
<td><strong>0.513</strong>*</td>
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</tr>
<tr>
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<td>Firm FE</td>
<td>No</td>
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**SE clustered at firm-level**

- External funds are needed to cover both fixed and variable costs: constrained firms export second best values
## FCs and Total Exports

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SE clustered at firm-level

- Robust to control for unobserved fixed effects and selection bias
FCs and Total Exports

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</tr>
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</table>

SE clustered at firm-level

- Older, more collaterized and more 'profitable' firms tend to export more
FCs and Product-Country Extensive Margins

### Table 3

<table>
<thead>
<tr>
<th>Selection</th>
<th>(\ln ) #(Countries_{ft})</th>
<th>(\ln ) #(Products_{ft})</th>
</tr>
</thead>
<tbody>
<tr>
<td>(FC_{ft-1})</td>
<td>-0.036***</td>
<td>-0.030***</td>
</tr>
<tr>
<td>(\ln Empl_{ft-1})</td>
<td>0.027***</td>
<td>0.023***</td>
</tr>
<tr>
<td>(\ln Age_{ft})</td>
<td>0.212***</td>
<td>0.109***</td>
</tr>
<tr>
<td>(\ln ASSETS_{ft-1})</td>
<td>0.139***</td>
<td>0.178***</td>
</tr>
<tr>
<td>(\ln GOM_{ft-1})</td>
<td>0.003**</td>
<td>0.004**</td>
</tr>
<tr>
<td>(\hat{\lambda}_{ft-1})</td>
<td>0.008</td>
<td>0.258***</td>
</tr>
</tbody>
</table>

| Firm FE | Yes | Yes |

SE clustered at firm-level

**FCs associate with:**
- a 3.6% reduction in the number of destination countries
- a 3% reduction in the number of exported products
Financial Constraints and Exports: our contribution

1. the relation between FC and export margins when export costs are assumed to vary across firms, products, countries;

2. the dynamics of adding and dropping products and countries from firms’ export portfolio;

3. the relation of financing problems with quantities exported and with prices charged to foreign customers together with the role destination characteristics play in influencing volumes and prices.
A quick look at the dynamics

Setting: decision to export a product to a given country is driven by time varying firm specific characteristics (ability, productivity) and time varying product specific attributes, idiosyncratic across destinations (demand, tastes)

- Shocks to firm’s ability increases the probability of adding products or countries
- Shocks to product or destination attributes induce reallocation of resources within firm

Implication: constrained firms expected to drop more frequently and add less frequently both products and destinations
A quick look at the dynamics

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This is what we observe in our data
Financial Constraints and Exports: our contribution

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3. the relation of financing problems with quantities exported and with prices charged to foreign customers together with the role destination characteristics play in influencing volumes and prices.
Third exercise: quantity, prices and quality

How financial constraints influence quantity and prices across firms performing the same product-country transaction?

Background/Predictions:
- Melitz-Manova: FC firms set higher prices due to inefficiency
- Quality: higher prices are signal of higher quality, but quality also associates with extra costs. Then FC firms will export lower quality goods at lower prices
- FCs and pricing: FC firms have incentives to sustain short term revenues, and they can do so either via setting higher price per unit sold, or via expanding demand through lower prices
Do constrained firms display any specific behaviour in terms of quantity and price per transaction?

\[ \ln Q_{fpct} = \alpha + \gamma \text{FC}_{ft-1} + \beta Z_{ft-1} + c_{pc} + \epsilon_{fpct} \]

\[ \ln UV_{fpct} = \alpha + \gamma \text{FC}_{ft-1} + \beta Z_{ft-1} + c_{pc} + \epsilon_{fpct} \]

where

- \( \ln Q_{fpct} \) is the quantity of the export by firm \( f \) in product \( p \) to country \( c \)
- \( \ln UV_{fpct} \) is the unit value of the export by firm \( f \) in product \( p \) to country \( c \)
- \( c_{pc} \) is the product-country fixed effect
### FCs quantity and price

<table>
<thead>
<tr>
<th></th>
<th>$\ln Q_{fpct}$</th>
<th>$\ln UV_{fpct}$</th>
<th>$\ln Q_{fpct}$</th>
<th>$\ln UV_{fpct}$</th>
</tr>
</thead>
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<tr>
<td></td>
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</tr>
<tr>
<td>$\ln Age_{ft}$</td>
<td>-0.007</td>
<td>-0.002</td>
<td>-0.006</td>
<td>-0.005</td>
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<tr>
<td>$\ln ASSETS_{ft-1}$</td>
<td>0.136***</td>
<td>-0.056***</td>
<td>0.161***</td>
<td>-0.048***</td>
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<tr>
<td>$\ln GOM_{ft-1}$</td>
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<td>-0.004</td>
<td>0.034***</td>
<td>-0.004</td>
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<tr>
<td>$\ln dist_c$</td>
<td>-0.157***</td>
<td>0.158***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\ln gdp_{ct-1}$</td>
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<td>0.028***</td>
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<thead>
<tr>
<th></th>
<th>Yes</th>
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<tbody>
<tr>
<td>Product FE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product-Country FE</td>
<td>No</td>
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<td>Yes</td>
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</table>

SE clustered at firm-level

- Transactions of constrained firms involve a 11-13% reduction in the quantity exported
FCs quantity and price

Table 6

<table>
<thead>
<tr>
<th></th>
<th>ln $Q_{fpct}$</th>
<th>ln $UV_{fpct}$</th>
<th>ln $Q_{fpct}$</th>
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<td></td>
</tr>
</tbody>
</table>

Product FE | Yes | Yes | No | No
Product-Country FE | No | No | Yes | Yes

SE clustered at firm-level

- Constrained firms charge higher prices compared to unconstrained firms
“Testing” quality via input prices

- Constrained firms that set higher export prices purchase more costly inputs?

\[
\ln UVImp_{fpct} = \alpha + \gamma FC_{ft-1} + \delta \text{Avg} \ln UV_{ft} + \beta Z_{ft-1} + c_{pc} + \epsilon_{fpct}
\]

where
- \(\ln UVImp_{fpct}\) is the unit value of import
- \(\text{Avg} \ln UV_{ft}\) is the firm’s average unit value of exports across products and destinations
- \(c_{pc}\) is product-country fixed effect
### FCs and export-input prices

Table 6

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
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</thead>
<tbody>
<tr>
<td>$\ln UVImp_{ft-1}$</td>
<td>0.022</td>
</tr>
<tr>
<td>$\ln Emp_{ft-1}$</td>
<td>0.039***</td>
</tr>
<tr>
<td>$\ln Age_{ft}$</td>
<td>0.010</td>
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<td>$\text{avg} \ln UV_f$</td>
<td>0.182***</td>
</tr>
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- The prices of imported inputs do not have any significant association with FCs

SE clusterd at firm-level
Work in progress, i.e. problems not yet solved

- Selection is likely to affect also the last fpc-level regressions

- Apply the same 2-stage procedure is unfeasible:
  - even after conditioning on being an exporter we have more than 270,000 pc combinations for several thousands of firms;
  - there is also a problem with the zeros

- We can use a Tobit selection equation, no need of the exclusion restriction

- A possibility is to work at sectoral level
  - interesting from an economic point of view
  - difficult to summarize and interpret the results
Work in progress, *i.e.* problems not yet solved

\[
\ln UVImp_{fpct} = \alpha + \gamma FC_{ft-1} + \delta \text{Avg} \ln UV_{ft} + \beta Z_{ft-1} + \text{TobRes} + \varepsilon_{fpct}
\]
Preliminary conclusions

The work points out that financial constraints play a statistical robust role in shaping firms’ export activities. FC firms

- are less likely to export;

- when they export, they seem to export second best values in a narrower range of products and destinations;

- are less (more) likely to increase (reduce) the number of products they export and the number of destination they serve;

- export lower quantities at higher prices; this does not seem to be related with quality issues;

- seem to be sensitive to destination country characteristics.
Control Variables

Following background and a vast literature on FCs and firm dynamics (Fazzari et al., 1988; Kaplan and Zingales, 2000; Cabral and Mata, 2003; Almeida et al., 2004; Angelini and Generale, 2008)

- Smaller and younger firms tend to be more prone to financing problems
  - Size and Age

- Firms’ able to generate more internal funds are less likely to need external finance
  - Gross Operating Margin (GOM)

- The availability of collateral is required by potential lenders as a pre-condition which can ease the access to and reduce the cost of external financing
  - Total Assets