Financial Constraints, Firms' Supply Chains and Internationalization

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Motivation

Production increasingly structured along domestic, international supply chains (design, production, distribution, marketing).

Globally, >50% of manufactured imports intermediate goods (primary goods, components, semi-finished products); >70% of services imports intermediate services.

Length supply chains significantly increased from mid-nineties (De Backer and Miroudot, 2013).

Fragmentation of production boosts firm efficiency, competitiveness: different phases production perfomed by firms, in locations, with strongest comparative advantage.

Supply chains not only for organizing production, but also as key channel whereby firms borrow liquidity one from the other.

Motivation (cont.)

In a supply chain, upstream firm can finance downstream firm through trade credit (sale goods or services with delayed payment).

Accounts receivable and payables, chain of financial claims within supply chain.

During financial crisis, some decrease in length of supply chains, tendency of domestic part of supply chains to increase relative to foreign component.

Despite large descriptive and anecdotal evidence, wealth of case studies, very little hard evidence on impact of financial factors on firms' decisions to participate in supply chains.

This paper

Is firms' access to credit market important determinant of firms' choice to participate in supply chains? Hence, do financial constraints affect structure of production activities, besides production volumes and decisions? Which financial factors and supply chain characteristics drive this choice?

Use unique, rich sample of Italian firms. Investigate effects of firms' financial constraints on firms' participation in domestic, international supply chains.

Survey ideal testing ground: rich information on firms' participation in supply chains, suppliers and buyers, and other details on supply chains.
Precise questions about firms' access to credit markets: credit rationiong, number and length of relationships with banks.

Results Preview

- Firms more exposed to credit rationing and with less stable (shorter, more fragmented) relationships with banks, more likely to participate in supply chains (to overcome liquidity shortages).

- Firms especially rely on supply chains as alternative source of short-term liquidity (e.g., working capital funding) rather than for long-term investment funding.

- Benefits of supply chains as sources of liquidity stronger when firms establish long-term relationships with large suppliers.

- Little or no evidence credit aspects affect exact position in supply chain

Overall, supply chains appear to effectively act as a substitute source of external finance for firms facing obstacles in accessing financial markets.

Results Preview

Results carry through both with OLS and IV estimation method.

Control for battery of relevant characteristics of firms and local environment. Still, potential endogeneity issues: unobserved factors might drive both firms' financial status and their participation in supply chains. And reverse causality problems might also be an issue (e.g., participation in supply chains might send signal to creditors).

Construct instruments capturing exogenous shocks to structure of Italian banking system. Exploit merger among four Italian banks occurred in 2007, measures of relative presence of merged banks in local (provincial) credit market as proxy for intensity of merger shock on firms' access to credit and firms-banks' relationships.

Supply Chains in Italian context

In recent years, increasing role of domestic, international supply chains in Italy.

During the recent financial crisis, Italian supply chains exhibited reduction in turnover (in 2009 less than 80% compared to 2007). In 2014 firms were still far from recovering their pre-crisis level of profitability.

Participation of Italian firms in GVCs relatively high in comparison with countries with similar level of economic development and industrial structure:

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    1. Import content of production in IT and DE around 30% (Breda & Cappariello 2012);
    2. Foreign content of gross exports almost 40% in IT, DE, FR and ES (Cappariello and Felettigh 2015);
    3. Share of total turnover made up by sales of produced-to-order goods to foreign firms is higher in IT and FR (more than 40%) than in DE and ES (23%) (Accetturo et al. 2013).

Italian financial system

Bank-based system: capitalization Italian stock market relatively low compared to other advanced economies.

- Firms' access to credit highly heterogeneous across provinces: due to regulatory restrictions on lending and branching, development of Italian credit markets has differed markedly across localities as small as provinces (Sapienza, 2002; Guiso, Sapienza and Zingales, 2003).
  Large presence of local bank branches is critical for firms' access to credit: distance matters in banks' collection of information and provision of funds (Petersen and Rajan, 2002; Guiso, Sapienza and Zingales, 2004).
  Pronounced informational disadvantages of distant lenders: higher loan default rate for banks entering new markets without having a branch on site (Bofondi and Gobbi, 2006).

Empirical model

The probability that firm i participates in a supply chain can be written as

$$P(SupplyChain_i = 1 | R_i, Z_i) = \Phi\left(\alpha_1 + R_i\beta_1 + Z_i\gamma_1\right)$$

- R_i measures firm i's access to credit
  1. whether the firm is credit rationed or not
  2. the number of banks from which the firm borrows
  3. the length of the bank-firm relationships)

- Z_i is a vector of controls for firm characteristics that may affect firm i's supply chain decision, as well as controls for regional differences.

Endogeneity problems

- Unobserved factors might drive both firms' financial status and their participation in supply chains.

- Reverse causality could be an issue since participation in supply chains might send a signal to creditors, faciliating the extension of credit.

- To control for possible endogeneity of firms' access to credit, we complement OLS estimated with IV estimates. Use following instruments:

  1. The share of branches of the banks involved in the 2007 bank merger, relative to the total number of branches in the province
  2. The difference between the share of branches of the two main banks involved in the merger, Unicredit and Capitalia

Data

- Main source of information: VIII UniCredit Survey on medium and small businesses. Conducted in 2011, refers to 2010.

- Every year survey gathers data on a sample of Italian firms, customers of the bank. 2011 wave gathers data on 6,025 small firms and 1,408 medium-sized firms. Sample representative of the UniCredit bank's portfolio, whose composition well diversified by sector, given large dimension of the bank in terms of loans, deposits and branches. Effectively representative of Italian business sector.

- Main strength of database very detailed information on individual firms. In particular:

  1. ownership structure, organizational structure and number of employees;
  2. participation in supply chains, and details on supply chains;
  3. extent of internationalization and exports;
  4. financial structure and relationships with the banking system.

Dependent variables

- *Supply chain*, a dummy variable taking value 1 if the firm is part in a supply chain; 0 otherwise.

- *Subcontracting*, a dummy variable taking value 1 whether the firms produce or buy in subcontracting; 0 otherwise.

- In our sample, 52.8% of the firms participate in a supply chain. 16.2% are in an upstream position (purchase raw materials and produce an intermediate good), 10.2% are in the middle (use and produce semi-finished intermediate goods), and 26.4% are at the end of the supply chain (use semi-finished intermediate goods and produce final goods).

- In our sample, 10.8% of the firms produce or buy in subcontracting. In particular, 5.8% of the firms are subcontractors of a foreign firm, and 1.3% of the firms are subcontractors only for domestic firms.

Financial variables

- Three main measures of access to the credit market:
  1. Credit rationing;
  2. The number of relationships with banks
  3. The duration of the relationship with the main bank.

- Measure of credit rationing based on the following question in the survey: "In 2010, would the firm have liked to obtain more credit at the market interest rate?". Dummy variable that treats as rationed the firms that responded "yes" to this question. Using this definition, 37.6% of the firms in the sample are credit rationed.

Instrumental Variables

- To control for possible endogeneity we construct instruments capturing exogenous shocks to the structure of the Italian banking system.

- For this purpose, we exploit the merger among four Italian banks, organized in two banking groups (UniCredit and Capitalia) occurred in 2007. We use measures of the relative presence of the merged banks in the provincial credit market, as well asymmetry in their presence, as a proxy for the intensity of the merger shock on firms' access to credit and firms-banks' relationships.

- We also experiment with alternative instrumental variables, such as the change in the share of branches of the banks involved in the merger between 2007 and 2008.

Control Variables

- We include a comprehensive range of explanatory variables as controls in the regressions.
- In particular, as firm characteristics, we use:
    1. Age (years from inception);

- We further control for heterogenous local socio-economic conditions by inserting:

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    5. Industry dummies.
- We further control for heterogenous local socio-economic conditions by inserting:
    1. Area dummies;
    2. Provincial branch density.