Financial barriers and sources of funding for innovation in Colombia

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Outline

- Research justification
- Literature Background
- “Gap” in the literature
- Research design and proposed outcomes
- Results
- Concluding remarks

Research justification

- Financial systems, financial barriers and funding of R&D private expenditure in OECD countries
- Financial barriers inhibit innovation activities (Small, young and high tech firms)
- There are no researches about innovation financial barriers in Colombia
- Past researches are not linked to the financial sources of firms
- Results of research in the European Union can not necessarily be extrapolated to countries like Colombia
- We found in past researches with microdata that there is a positive relationship between public funding and financial barriers

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Literature background:

Market failures

- Asymmetric information
- Adverse selection
- Private benefits appropriation impossibility

- Financial barriers
  - Investment Cash Flow Sensibility (ICFS)
  - Microdata (SME's, young and high tech firms. Arundel effect)

- Source funds: (Cash flow, banks-bonds, venture capital, trade markets and public funding. **Hierarchic Theory**)

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The “Gap”

The effect of interaction between financial barriers and founding sources has not been researched yet

Main research questions

Which are the main characteristics of firms facing financial barriers in Colombia?

How funding sources interact with financial barriers in the case of innovative firms in Colombia?

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Methodology and proposed outcomes

The data used for this research comes from Colombia's national innovation survey for the 2007-2008 period (only for manufacture firms)

Selection bias
(Arundel, 1997)

7.683 firms

2.907 innovative firms

Non innovative firms seems to have less barriers to develop innovative activities (less experience in innovation activities)

Hypothesis

Empirical analysis

H1: Small firms in Colombia perceive higher financial barriers for innovation than large firms

H2: Belonging to a high tech industry in Colombia raise the likelihood of perceive more financial barriers

H3: Firms developing product innovation in Colombia have higher perception of financial barriers

H4: Funding sources for innovation have a negative relationship with the perception of financial barriers

Empirical analysis

Two types of models were proposed

Probit models: Their main objective is to measure the existence of a strong financial barrier against firm characteristics, types of innovation and sources of funding for innovation. Dependent variables were internal and external financial barriers dummies, and a combined form of those two variables

Counting Models: Their main objective is to measure the intensity of financial barriers (from no barriers to strong barriers) against firm characteristics, types of innovation and sources of funding for innovation (Negative binomial and poisson regressions). Dependent variables were the intensity of internal and external financial barriers and a combined form of those variables

Covariates included in both types of models and expected results (1/2)

HighMediumTech: Belonging to a high-medium manufacture technology industry - Binary (+)

ExEqt: The firm has international equity - Binary (-)

LogSize: The log of the number of employees (-)

Types of innovation: 4 binary variables measuring if a company developed product, process, organizational or marketing innovation (+)

Control Dummies: Variables for each industry were included

Covariates included in both types of models and expected results (2/2)

Financial sources for innovation (Separately or Jointly)

Separately forms: Cash flow, group, public, bank, other firms, equity or cooperation funding

Jointly form 1: Internal funding (Cash flow and group funding) and external funding (public, bank, other firms, equity or cooperation funding).

Jointly form 2: The sum of the funding sources used for a firm

Each way of financial source is included separately in probit and counting models

For all models, we expected a negative relationship of sources with financial barriers (i.e. the more a firm obtains funding of any source, the less the financial barriers for innovation)

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Results:

- For all models, contrary to was expected, a firm in high-medium technology is less likely to have financial barriers. The highest marginal effects (-16% in average for probit models and -0.406 for counting models)
- The origin of societal equity has no relationship with financial barriers.
- Small firms are more likely to have internal and external financial barriers and have the highest intensity of financial barriers.
- The marginal effects of size were higher for external financial barriers. Small firms seems to have more problems attracting external funding

Results:

- Firms developing product innovation are likeliest to suffer strong financial barriers, especially, external barriers. For those firms, intensity of barriers were higher
- Process and organizational innovation have significant relationship with strong barriers, but less intensity than product innovation firms
- Marketing innovation has no relationship with financial barriers
- Group, equity, other firms and cooperation funding, seems to have no relationship with financial barriers in Colombia

Results:

- Contrary to expected, bank and chash flow funding have **positive relationship** with financial barriers, i.e. firms using those sources have more barriers. A learning process of experimented firms?
- Bank funding has a positive relationship with barriers with the second highest marginal effects (an average of 11.2% for probit models and 0,31 for intensity counting models)
- Cash flow funding was positive related with internal strong financial barriers, but was no important to explain external barriers or the intensity of any barrier
- Public funding has no relationship with any type of barriers

Results:

- External funding (jointly form) has a positive relationship with all type of financial barriers, however, external barriers are better explained by external funding
- Internal funding is positive related with internal barriers, but has no relationship with other types of barriers or their intensity
- The quantity of sources used for a company has a positive relationship with strong barriers and the intensity of them, i.e. a firm using more financial sources is likeliest to believe it has more restrictions. A learning process of experimented firms?

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Concluding remarks

- For Colombia, the small firms have a higher perception of financial barriers just like it was founded in literature background
- The unexpected sign of the belonging to high and medium technology sectors could be caused for a manufacture selection bias (it needs to be proved)
- Product innovation firms seems to have higher perception of barriers
- The active use of bank and cash flow funding, elevates the perception of financial barriers. Firms with a better experience looking for funds are those with a higher perception of financial barriers (The same result encountered in Mendez 2013 for public funding in Spain)

Concluding remarks

- Public funding has no relationship with financial barriers. Public policy for funding does not affect the perception of financial barriers in firms in Colombia

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