Comments to Häussler, Harhoff and Muller

"To Be Financed or Not - The Role of Patents for Venture Capital Financing"

Ari Hyytinen

17/10/2008

Starting point

- Empirical questions:
  - Does patenting increase the likelihood that a new venture obtains VC financing (earlier)?
  - Do VCs pay attention to the quality of patents when making their investment decisions?
- Theoretical motivation: signalling, ex ante monitoring
- Data
  - Survey among German and British biotech companies in 2006
    - Responses from 162+118 firms, of which 116+74 used in the analysis
  - Patent data from the EPO
- Method
  - Cox proportional hazard model + Accelerated failure time model (log-log)

Main findings

- Applications / quality of applications
  - Having patent applications increases the likelihood of obtaining VC financing early
- "Anticipated" and "Revealed" patent quality
  - Firms who have patents that are subsequently cited obtain VC financing earlier
  - Oppositions, but not grants, increase the likelihood of obtaining VC financing early

Comment #1: Reverse causality ("selection or nurture")

- The hazard of obtaining VC financing in a given quarter correlates with "Dummy application".
- How do VCs work?
  - VCs observe a constant flow of potential investment targets (deal flow)
  - VCs do a lot of "ex ante monitoring" on the applicants
- Can the documented correlation be due to "pre-investment nurturing", taking place prior to making an investment decision?
  - Ex ante IPR due diligence?

Comment #1: Reverse causality ("selection or nurture"), continued

- In particular, if VCs regard patents important, isn't it likely that they systematically condition their investment decision on the (successful) filing of patents?
- Good reasons to do so
  - "First-to-file" -rule & patent races
  - Existence of "blocking patents"
- If there is pre-investment VC advising, we observe first a patent application and then a VC investment
  - But the direction of causality is from the latter to the former? (i.e. nurture, not selection?)

Comment #2: Timing of explanatory variables and endogeneity

- The timing of the citation variable is claimed to be such that VCs cannot observe the citations when they make their investment decision
  - "They are received in the future."
- In the data, "Av. citations, excl. self." = ratio of citations received / application stock, where citations are counted "from the publication of the application for a period of three years".
- Does this mean that receiving (forward) citations may depend on the event of obtaining VC financing (that is being modelled here)?
  - More generally, does "Av. citations, excl. self" vary over time and if so, what drives the variation?

Comment #2: Timing of explanatory variables and endogeneity, continued

- Obtaining VC finance is a major event, making not only the firm but also its patents (applied and granted) much more salient to competitors and biotech community.
- Can the documented correlation between the hazard of obtaining VC financing and citations be due to the greater salience ("visibility") of the patents of the ventures that attract VC investments?
- If this is true, the direction of causality could be from "obtaining VC finance" to "receiving citations" (i.e. not selection?)
- The same comment applies to the documented correlation between the hazard of obtaining VC financing and oppositions.

Comment #3: Sample selection

- Heckman-type sample selection bias occurs when the availability of the data is affected by a selection process that is related to the value of the dependent variable.
- Only those firms who are judged to "be interested in" VC finance are included in the sample.
- The sample of firms that have "revealed" desire/demand for VC finance does not include "discouraged borrowers" (i.e. those who don't express interest in VC finance because they may for example expect that they are not eligible to it).
- To the extent that VCs regard patents important (e.g. indeed use them as signals) those firms who are not able to patent their technology are, all else equal, "less interested in" VC finance?
- Does this induce a correlation between the mechanism used to construct the sample, the dependent variable, and the key explanatory variables? (=> sample selection bias?)

Comment #4: Smaller comments

- Endogeneity of some other control variables?
    - E.g., "Years to market"?
- Additional references (on VC monitoring and contracting):
    - Kaplan and Strömberg, 2003, "Financial Contracting Theory Meets the Real World: Evidence From Venture Capital Contracts", RES.
    - Kaplan and Strömberg, 2004,"Characteristics, Contracts, and Actions: Evidence From Venture Capitalist Analyses ", JF.

Final remarks

- Very nice idea
- Even nicer data
- Lots of interesting results
- Important implications