On the Economic Performance of Nascent Entrepreneurs

Dora Gicheva and Albert N. Link
Outline of the Presentation

• Genesis of the topic
• Purpose of our paper
• Framework for analysis
• Data and key variables
• Empirical model and findings
• Punchline
• Possible next steps
Genesis of the Topic

• Literature on Nascency
  – individual considering starting a new firm
  – decision to become a nascent entrepreneur

• Literature on Entrepreneurship
  – behavior/performance and firm size
Purpose of Our Paper

• We compare technology-based performance among nascent and established firms
  – policy continues to focus on technology/innovation-based economic growth while also emphasizing the importance of entrepreneurship as a key driver
  • “Entrepreneurship plays an essential role in generating innovation and stimulating U.S. economic growth. New firms account for most net job growth, and small businesses employ 30% of high-tech workers.” (National Economic Council, 2011)
Framework for Analysis

- Uncertainty in the *ex-post* value of R&D ($Y_i$).
- *Ex-ante* firm $i$ knows that the value $Y_i$ of a new R&D project with distribution $F_i(Y)$, with known mean ($m_i$), and with dispersion ($s_i$)
- Firms: nascent ($i=0$) or established ($i=1$)
- Projects by nascent firms are inherently riskier, $s_0 > s_1$
- Unconditional expected value $m_0 > m_1$
- Failure occurs when the value of the R&D project $Y_i$ falls below a certain threshold level $\tilde{Y}$
Data and Key Variables

• 2005 NRC database of Phase II SBIR projects funded b/w 1992 - 2001
  – 6408 projects from DoD, NIH, DOE, NASA, and NSF
    → 1878 random projects

• Key Variables
  – Phase II project technology commercialized by 2005
  – Nascent firm founded because of the SBIR Phase II award and the number of previous Phase II awards was zero
  – Failure if Phase II project discontinued by 2005
# Data Set

National Research Council Survey of Phase II Awards

<table>
<thead>
<tr>
<th>Agency</th>
<th>Phase II Sample Size</th>
<th>Respondents</th>
<th>Response Rate</th>
<th>Random Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>DoD</td>
<td>3,055</td>
<td>920</td>
<td>30%</td>
<td>891</td>
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<tr>
<td>NIH</td>
<td>1,678</td>
<td>496</td>
<td>30%</td>
<td>495</td>
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<tr>
<td>NASA</td>
<td>779</td>
<td>181</td>
<td>23%</td>
<td>177</td>
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<tr>
<td>NSF</td>
<td>457</td>
<td>162</td>
<td>35%</td>
<td>154</td>
</tr>
<tr>
<td>DOE</td>
<td>439</td>
<td>157</td>
<td>36%</td>
<td>161</td>
</tr>
<tr>
<td></td>
<td>6,408</td>
<td>1,916</td>
<td></td>
<td>1,878</td>
</tr>
</tbody>
</table>
Data and Key Variables

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Empirical Model and Findings

We estimated a probit model with sample selection, in which commercialization is only observed for the projects that did not fail:

$$not\, fail_i = (z_i \gamma + u_{2i} > 0)$$

and

$$commer_i = (x_i \beta + u_{1i} > 0 | u_{2i} > -z_i \gamma).$$

The error terms $u_{1i}$ and $u_{2i}$ are assumed to be jointly normally distributed.
## Project Failure

### Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Project That Did Not Fail (n=988)</th>
<th>Project That Failed (n=541)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
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<tr>
<td>commer</td>
<td>0.64</td>
<td>0.48</td>
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<tr>
<td>nascent</td>
<td>0.12</td>
<td>0.32</td>
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<tr>
<td>breadthexp</td>
<td>1.23</td>
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<tr>
<td>privexp</td>
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<tr>
<td>univexp</td>
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<td>govtexp</td>
<td>0.08</td>
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<td>prevphII</td>
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<td>0.45</td>
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<tr>
<td>$addlfund</td>
<td>1.61</td>
<td>6.96</td>
</tr>
</tbody>
</table>

Note: Of the 1,878 projects in the NRC database, information on all of the variables in this table was available for only 1,529 projects.
Conditional Commercialization

• While nascent firms have a greater likelihood of project failure, those that do not fail have a greater probability of commercialization – 11 percentage points higher.

• Given that a project did not fail, larger firms have a greater probability of commercialization.

• Additional funding (0/1) rather than the amount of additional funding ($) to support the technology developed during the Phase II project increases the probability of commercialization.
Punchline

- We have shown that nascent technology-based firms that receive a Phase II SBIR R&D award are more likely to fail, but those that do not fail have a higher probability of commercialization.
Possible Next Steps

• Might it be in society’s best interest to place an emphasis on supporting technology-based nascent entrepreneurs rather than legacy entrepreneurs?

THANK YOU
anlink@uncg.edu