The Impact of Angel Investing
Josh Lerner (co-authored with William Kerr, Antoinette Schoar, Stanislav Sokolinski, and Karen Wilson)
Harvard, MIT, and OECD

Welcome!
May 13, 2015

- Use chat to submit questions
- Yes, you’ll get the slides
- We’re recorded, so come back and listen again
Mission:

Fuel the success of angel groups and accredited individuals active in the early-stage landscape

- World's largest trade group for angel investors
  - 220+ angel groups
  - 12,000 accredited investors
  - Voice of accredited individuals, portals, and family offices
- 50 US states + Canada
- Research/education partner

Member Groups & Accredited Platforms

- Golden Seeds
- Lifeline Early Angels
- Nashville Capital Network
- FundersClub
- bandofangels
- AngelList
- alliance of angels
- Launchpad Venture Group
- Tech Coast Angels
- TiE Angels
- Common Angels
- New York Angels
- New Dominion Angels
- Houston Angel Network
- Ohio Tech Angels
- Sierra Angels
- Sand Hill Angels
Our Speaker

Josh Lerner, PhD
Jacob H. Schiff Professor of Investment Banking
Chair, Entrepreneurial Management
Topics We’ll Explore Today

- Angels vs Venture Capitalists
- Neglected Topic
- Our Empirical Approach
- US Study
- Global Study

Rapid Growth

- Last decade saw rapid expansion of “personal” entrepreneurial finance:
  - Angel groups, super angels.
  - Crowd funding.

- Angel activity has spread world-wide:
  - One of oldest forms of outside finance.
  - Venture capital concentrated in a few countries/cities.
  - Active involvement, close social ties may address lack of legal protections or formal capital market:
  - Many policy efforts to encourage development of angel groups.
Angels vs. Venture Capitalists

• Angels share many of the positive features of VCs:
  • Fund early-stage entrepreneurs.
  • Undertake intensive due diligence.
  • Serve as mentors and (sometimes) outside directors for the entrepreneurs.
    • Kaplan and Stromberg, 2003; Wong, Bhatia and Freeman, 2009.

• Since angels invest their own money, less prone to agency problems:
  • Fee-based compensation structures lead to excessive fund raising (Metrick and Yasuda, 2010).
  • Sub-optimal investment and exit decisions (Gompers, 1995).
  • Periods of misvaluation and overfunding:
    • Gompers and Lerner, 1999; Chung, et al., 2012.

Angels vs. Venture Capitalists (2)

• But challenges associated with angels as well:
  • Angels are not professional investors, so entrepreneurs are exposed to funding risk:
    • Angels subject to liquidity shocks.
    • Angels may change their opinions more frequently about what projects to fund.

  • Angels might not be prepared to invest in truly radical high growth projects:
    • More risk averse due to limited diversification.
    • Lack of expertise to evaluate complex ventures.
A Neglected Topic

• Several institutions important in funding entrepreneurial ventures:
  • Personal finance.
  • Banks.
  • Venture capital.
  • Public offerings.
  • Angel finance.

  Particular, and growing importance, in software finance.
  • Andy Bechtolsheim’s $100,000 investment in Google turns into $1.7 billion.
  • Peter Thiel’s $500K investment in Facebook realized >$1 billion.

A Neglected Topic (2)

• Title/abstract search in SSRN in past three years:
  • IPO or initial public offering: 896
  • Venture capital: 886
  • Bank loan or bank lending: >1000.
  • Angel: 100.
    • Moreover, far fewer of the latter papers are empirical.
Explaining the Differential

• Gap is readily explained by data issues.
  • Angel financing estimated at 2X-6X > VC investment dollars ... but understudied:
    • No data collectors (cf., VX, Venture One).
    • Literature is thus mostly survey based:
      • With clear biases and issues.

Our Empirical Approach

• Study angel financing *groups*:
  • Detailed documentation of deal flow, deliberations and venture outcomes.
  • Formal votes and expressions of interest in deals.

• Basic idea: compare ventures that just received funding versus those that just missed.
Angel Group Selection Process

- Entrepreneurs approach angel groups with their b-plans
- Selection funnel of screening and pitches begins
- Angels express interest in deals throughout
- Examine for regularities and break points

**Figure 2**

- Centerpiece of monthly angel meetings
- Several venture pitches in a row with individual evaluation by angels
- Sample evaluation with overall scores
Our Empirical Approach (2)

• Use several econometric approaches:
  • Restriction of sample to deals of similar quality levels.
  • Matched sample approaches.
  • A (fuzzy) regression discontinuity design.

• Several key advantages:
  • By matching to ventures that tried but failed to get funding, we better capture founder motivations.
  • The same investors evaluated the ventures to be comparable at the time of their pitch!

Data for U.S. Study

• Information from two angel groups, 2001-06:
  • Tech Coast Angels (California, 5 chapters).
  • CommonAngels (Boston).

• Outcome data, 2008 to 2010:
  • Venture success: venture alive in 2010? successful exit (IPO or acquisition)? 75+ employees?
  • Venture operations: employment count? patenting? growth in web site traffic?
  • Venture financing: does the venture receive entrepreneurial finance? traits of financing?
### Table 1: Angel group selection funnel

<table>
<thead>
<tr>
<th>Angel group interest level</th>
<th>Number of ventures</th>
<th>Cumulative share of ventures</th>
<th>Share funded by angel group</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td>1640</td>
<td>64%</td>
<td>0.000</td>
</tr>
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<td>1-4</td>
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</tr>
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<td>0.120</td>
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<td>0.381</td>
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<td>0.303</td>
</tr>
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<td>21</td>
<td>98%</td>
<td>0.286</td>
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<td>0.409</td>
</tr>
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## Table 2: Comparison of groups above and below border discontinuity

<table>
<thead>
<tr>
<th>Traits of ventures above and below border discontinuity</th>
<th>Above border</th>
<th>Below border</th>
<th>Two-tailed t-test for equality of means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financing sought ($ thousands)</td>
<td>1683</td>
<td>1306</td>
<td>0.277</td>
</tr>
<tr>
<td>Documents from company</td>
<td>3.0</td>
<td>2.5</td>
<td>0.600</td>
</tr>
<tr>
<td>Management team size</td>
<td>5.8</td>
<td>5.4</td>
<td>0.264</td>
</tr>
<tr>
<td>Employee count</td>
<td>13.4</td>
<td>11.2</td>
<td>0.609</td>
</tr>
<tr>
<td>Primary industry (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biopharma and healthcare</td>
<td>23.9</td>
<td>29.3</td>
<td>0.579</td>
</tr>
<tr>
<td>Computers, electronics, and measurement</td>
<td>15.2</td>
<td>17.1</td>
<td>0.817</td>
</tr>
<tr>
<td>Internet and e-commerce</td>
<td>39.1</td>
<td>39.0</td>
<td>0.992</td>
</tr>
<tr>
<td>Other industries</td>
<td>21.7</td>
<td>14.6</td>
<td>0.395</td>
</tr>
<tr>
<td>Company stage (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good idea</td>
<td>2.2</td>
<td>2.4</td>
<td>0.936</td>
</tr>
<tr>
<td>Initial marketing and product development</td>
<td>34.8</td>
<td>46.3</td>
<td>0.279</td>
</tr>
<tr>
<td>Revenue generating</td>
<td>63.0</td>
<td>51.2</td>
<td>0.272</td>
</tr>
<tr>
<td>Angel group decisions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Documents by angel members</td>
<td>10.5</td>
<td>5.1</td>
<td>0.004</td>
</tr>
<tr>
<td>Discussion items by angel members</td>
<td>12.0</td>
<td>6.7</td>
<td>0.002</td>
</tr>
<tr>
<td>Share funded</td>
<td>63.0</td>
<td>39.0</td>
<td>0.025</td>
</tr>
</tbody>
</table>
Tables 3a, b, and c

• Looks naively at the impact of angel funding:
  • Associated with better performance along many criteria.
  • Sample limited to those near border.
  • But coefficients and significance by be impacted by selection effect.

Basic Outcome Estimates

• Improved venture success:
  ✓ Survival 0.246 (0.083).
  ✓ Successful exit: 0.110 (0.054).
  ✓ Exit or 75+ employees: 0.163 (0.074).

• Improved venture operations:
  ✓ Employee count: 19.3 (6.5).
  ✓ Patent granted: 0.175 (0.084).
  ✓ Improved web performance: 0.162 (0.107).
  ✓ 39% improvement in web rank.
Basic Outcome Estimates (2)

• Improved venture financing:
  ✓ Receives any financing: 0.706 (0.063).
  ✓ Receives later financing: 0.270 (0.090).
  ✓ 1.2 additional financing rounds.
  ✓ Most additional financing involves outsiders.
  ✓ Syndication is often present.

Tables 6a, b, and c: More rigorous outcome estimates

• Improved venture success:
  ✓ Survival: 0.247 (0.095)
  ✓ Successful exit: 0.075 (0.058)
  ✓ Exit or 75+ employees: 0.088 (0.086)

• Improved venture operations:
  ✓ Employee count: 12.4 (7.4)
  ✓ Patent granted: 0.154 (0.089)
  ✓ Improved web performance: 0.232 (0.120)
  ✓ 38% improvement in web rank

• No evidence of better financing.
Table 7

- Might worry that these non-professional investors are using other criteria.

- To address, compare returns of TCA investors with those of VC groups.

- Focus on cash-on-cash multiples—more readily aggregated.
  - Even so, weighting across years poses subtle issues.

- Substantial outperformance across all approaches!

### Table 7: Analysis of angel group portfolio investment returns

<table>
<thead>
<tr>
<th>Fund year</th>
<th>Sample size</th>
<th>Total VC funds raised (in $B)</th>
<th>Capital weighted average: DPI</th>
<th>Capital weighted average: TVPI</th>
<th>$ Invested (in $B)</th>
<th>Distributed capital (in $B)</th>
<th>Capital value (in $B)</th>
<th>DPI</th>
<th>TVPI</th>
<th>Net of fee</th>
<th>Net of fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>64</td>
<td>19.8</td>
<td>2.31</td>
<td>2.37</td>
<td>$1,150,000</td>
<td>$18,630,000</td>
<td>$16,630,000</td>
<td>0.10</td>
<td>1.19</td>
<td>11.39</td>
<td>11.39</td>
</tr>
<tr>
<td>1998</td>
<td>78</td>
<td>30.0</td>
<td>1.20</td>
<td>1.72</td>
<td>$6,285,510</td>
<td>$262,342</td>
<td>$3,130,342</td>
<td>0.00</td>
<td>0.50</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>1999</td>
<td>103</td>
<td>35.7</td>
<td>0.65</td>
<td>0.74</td>
<td>$16,311,044</td>
<td>$16,366,749</td>
<td>$13,118,256</td>
<td>0.00</td>
<td>0.55</td>
<td>0.57</td>
<td>0.70</td>
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<tr>
<td>2000</td>
<td>122</td>
<td>104.5</td>
<td>0.48</td>
<td>1.03</td>
<td>$12,810,029</td>
<td>$5,848,458</td>
<td>$13,815,428</td>
<td>0.00</td>
<td>0.38</td>
<td>0.95</td>
<td>0.95</td>
</tr>
<tr>
<td>2001</td>
<td>95</td>
<td>38.9</td>
<td>0.56</td>
<td>1.16</td>
<td>$6,563,790</td>
<td>$2,077,084</td>
<td>$3,394,216</td>
<td>0.00</td>
<td>1.37</td>
<td>0.57</td>
<td>4.68</td>
</tr>
<tr>
<td>2002</td>
<td>20</td>
<td>9.4</td>
<td>0.21</td>
<td>0.40</td>
<td>$3,761,465</td>
<td>$1,218,194</td>
<td>$5,977,797</td>
<td>0.00</td>
<td>0.29</td>
<td>0.94</td>
<td>0.94</td>
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<tr>
<td>2003</td>
<td>17</td>
<td>11.6</td>
<td>0.34</td>
<td>1.11</td>
<td>$4,251,019</td>
<td>$914,039</td>
<td>$6,987,136</td>
<td>0.00</td>
<td>1.91</td>
<td>0.44</td>
<td>0.44</td>
</tr>
<tr>
<td>2004</td>
<td>23</td>
<td>19.8</td>
<td>0.24</td>
<td>1.04</td>
<td>$7,146,029</td>
<td>$615,813</td>
<td>$9,615,736</td>
<td>0.00</td>
<td>1.09</td>
<td>0.77</td>
<td>1.14</td>
</tr>
<tr>
<td>2005</td>
<td>21</td>
<td>29.0</td>
<td>0.11</td>
<td>1.02</td>
<td>$14,075,089</td>
<td>$310,099</td>
<td>$17,975,228</td>
<td>0.00</td>
<td>1.28</td>
<td>0.75</td>
<td>1.15</td>
</tr>
<tr>
<td>2006</td>
<td>38</td>
<td>22.0</td>
<td>0.11</td>
<td>0.96</td>
<td>$11,567,778</td>
<td>$1,025,059</td>
<td>$16,185,856</td>
<td>0.00</td>
<td>0.81</td>
<td>0.79</td>
<td>0.81</td>
</tr>
<tr>
<td>2007</td>
<td>26</td>
<td>36.1</td>
<td>0.03</td>
<td>0.94</td>
<td>$9,649,772</td>
<td>$9</td>
<td>$7,538,890</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2008</td>
<td>12</td>
<td>28.5</td>
<td>0.00</td>
<td>0.85</td>
<td>$6,527,993</td>
<td>$9</td>
<td>$5,421,499</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Note: Table compares performance of an angel group fund to the entire venture capital industry as a whole. Weights used in the first weighted industry average statistics are based on cumulative VC-dollar raised. Weights used in the second weighted industry average employ the same year distribution as the angel group’s investments. Net of fee assumes 20% of difference between distributed and invested capital, deducted from distributed capital or total value. Industry data from Thomson Reuters.
Conclusions from U.S. Study

• Angel investments and entrepreneurial finance are important for venture success.

• Additional analysis shows that one of our groups performs as well as or better than VC industry.

• Limitations of analysis
  • Methodology: inferred RDD discontinuities.
  • Our angel groups are professionally managed:
    • Representative of angels as a whole?

The Global Study

• 13 angel groups in 11 countries from Europe, Asia Pacific, Latin America and North America, with applicants from 21 nations.
  • Wide differences in legal, tax, and VC environment, as well as experience of angel groups.

• Identified through:
  • Personal connections: e.g., former students.
  • Alumni contacts suggested by liaisons at Harvard and MIT.
  • Associations and informal consortia of angels, such as the Angel Capital Association.
Requirements for Participation

- Participating angel groups needed to:
  - Have been active investors for at least two years.
  - Have (or be able to compile) records both on applicants that were funded and those that were considered and rejected.
  - Have records about the degree of angel interest in potential transactions.
    - Beyond these, considerable heterogeneity in sponsorship, membership, rules, etc.

Supplemental Data Collection

- Small, privately held status, incomplete record-keeping by the angel groups, meant need for extensive work:
  - Angel groups: Tracked key information about the firms that they had funded, but unfunded much poorer.
  - Internet searches: Looked at URLs provided at the time the companies sought financing, as well as web searches (language issues!).
  - Corporate and financing databases: CapitalIQ and Bureau van Dijk’s Orbis for profiles; Thomson Reuters IPO and acquisition databases.
Supplemental Data Collection (2)

- News stories: Factiva database.
- Direct contacts: Email and cellular phone (information from the angel groups).
- Focus on small set of outcomes as of 2014, due to these limitations.

Table 7

Impact of angel financing on firm outcomes:
- Again, use border sample.
- In Table 6, whether the firm above the funding discontinuity is the key independent variable.
- In each case, the angel-funded (or more likely to be funded) ventures are more likely to...
  - Survive.
  - Have a successful exit
  - Raise subsequent financing, and
  - (More weakly) hire additional employees.
Based on Table 7, but adding independent variables measuring national environment, as well as interaction with discontinuity measure:

- As before, increased likelihood of angel financing has a strongly positive impact on outcomes.
- More entrepreneur-friendly environment $\rightarrow$ greater probability of survival and of subsequent financing.
- More venture capital activity $\rightarrow$ greater probability of subsequent financing, but lower chance of survival.
- **In all but two regressions, the interaction between the environment and being above the cutoff is insignificant.**
  
  - Suggests the positive impact of angel financing on the firm development remains consistent across the nations under study.
• Do the criteria for funding employed by angels vary with the national setting?
  
  • Examine first all 1682 firms which were considered by the angel groups:
    
    • In environments that were less entrepreneur friendly or where the venture market was less developed, firms seeking funding...
      
      • Had more employees.
      
      • Were less likely to be in the early stages of development.
      
      • Were seeking a smaller amount of funding.
      
  • Similar patterns in border sample.
Table 10

- Similar results in regression analyses:
  - While the companies funded by angels show distinct patterns across nations, this reflects the companies applying to seek angel financing, rather than choices within the applicants.
  - In countries with a less conducive entrepreneurial environment...
    - Applicants larger and already revenue generating, but seek smaller amounts of funding.
    - Firms “self-censor” when they apply to angel groups.

Conclusions from Global Study

- Angel investors have positive impact on the growth and survival of the firms they fund:
  - Impact regardless of national features.

- Unlike in the U.S., angels globally also matter in the ability to obtain follow-on financing:
  - Suggests play important accreditation function for follow-on funding in thinner VC markets.

- Selection of firms that apply for angel funding is different across countries.
Audience Resources

Josh Lerner
Unit Head, Entrepreneurial Management
Harvard Business School
Boston, MA 02163 USA
1-617-495-6065

josh@hbs.edu
www.people.hbs.edu/jlerner
@joshlerner

Thank you!
Audience Questions

June 10, 2015: How Angel Syndicates are Changing the Playing Field, Brad Feld, Foundry Group. Noon – 1:00 p.m. ET
June 24, 2015: Accelerators and Angels: A Perfect Match, Patrick Riley, Global Accelerator Network. Noon-1:00 p.m. ET

Webinar programs archived at:
www.angelcapitalassociation.org/events/webinars/
Additional Resources

Forbes
Marianne Hudson
Executive Director
Angel Capital Association
http://www.angelcapitalassociation.org/news-forbes/

Inc.
Christopher Mirabile
Managing Director, Launchpad;
Vice Chair, Angel Capital Association
http://www.angelcapitalassociation.org/news-inc/

Upcoming ACA Events

May 20, 2015 - Veterans & Angels - Washington, DC
June 2-3, 2015 - Northwest Regional Meeting - Vancouver B.C.
October 23, 2015 - Southwest Regional Meeting - Tucson, AZ
November 9 – 10, 2015 – ACA Fall Workshop, New Orleans, LA
http://www.angelcapitalassociation.org/events/