

NEXT  third way
fresh thinking

Rise of the

ANGEL INVESTOR

a challenge to public policy



WHAT'S NEXT?

Companies like Google and Uber leave us with the impression that it's never been a better time to be an entrepreneur. But if you look at [new business starts and access to bank credit](#), there's rarely been a worse time. This is a problem, because young businesses have always been critical to job and wage growth. Clearly, one of the problems is access to credit. Bank loans to large businesses have rebounded nicely since the recession, but loans to small businesses haven't crested 2008 levels. With banks pulling back, is there a new source of funding that can restore business dynamism and help entrepreneurs take flight? Meet the "angel investors."

A new movement of angel investors are a cross between new-fangled crowd-sourcing and old-fashioned venture capital (VC). They are typically groups of high-net-worth individuals who meet regularly to hear entrepreneurs pitch their ideas and decide where and where not to invest. Unlike venture capital firms, which may be more formulaic in their approach, the angels are more like Shark Tank. They invest in fewer firms than VCs, depending less on playing the odds and more on investing wisdom and guidance, as well as capital. Yet, given the growth of the nascent angel investor movement, there has been surprisingly little research on them. Until now.

A new paper by Josh Lerner of the Harvard Business School and Antoinette Schoar of the MIT Sloan School of Management explores the rise of angel investing and compares it to venture capital. Using data from two large angel startup groups, the authors were able to show results that should encourage attention to this mode of financing. First, they find that during the period of study, "the angel group outperformed the venture capital industry overall." Second, they found that "Startups funded by angel investors are 14% to 23% more likely to survive for the next 1.5 to 3 years and grow their employment by 40% relative to non-angel funded startups. Angel funding affects the subsequent likelihood of a successful exit, raising it by 10% to 17%."

Lerner and Schoar explain the positive outcomes of angel investors by arguing that they provide “value added and hands-on improvement ... rather than just access to funds.” Often angel investors include “some of the most sophisticated and active investors in a given region, which might result in superior decision-making.” The paper makes a good case for the use of angel investing as a way of improving the entrepreneurial ecosystem in a region.

“Rise of the Angel Investor: A Challenge to Public Policy,” is the latest in a series of ahead-of-the-curve, groundbreaking pieces published through Third Way’s NEXT initiative. NEXT is made up of in-depth, commissioned academic research papers that look at trends that will shape policy over the coming decades. Each paper dives into one aspect of middle class prosperity—such as education, retirement, achievement, or the safety net. We seek to answer the central domestic policy challenge of the 21st century: how to ensure American middle class prosperity and individual success in an era of ever-intensifying globalization and technological upheaval. And by doing that, we’ll be able to help push the conversation towards a new, more modern understanding of America’s middle class challenges—and spur fresh ideas for a new era.

Jonathan Cowan
President, Third Way

Dr. Elaine C. Kamarck
Resident Scholar, Third Way

RISE OF THE ANGEL INVESTOR: A CHALLENGE TO PUBLIC POLICY

by Josh Lerner and Antoinette Schoar

INTRODUCTION

Over the past 25 years, there has been an explosion of academic research, policy initiatives, and popular discussion about venture capital (VC) and venture capitalists. This interest is easy to understand: despite its relatively modest size, venture capital—consisting of investors who raise third-party money to make equity investments in young, typically privately held firms—have had a disproportionate impact on the U.S. economy. While venture capital-funded start-ups have made up less than one-fifth of 1% of businesses begun in the United States in recent years, the impact of these firms has been profound. For instance, when one compares VC-backed publicly traded companies founded between 1974 and 2014 to non-VC-backed public companies founded in same period, the patterns are striking. As of the end of 2014, VC-backed public companies made up 63% of market capitalization, 38% of total employees, and 85% of total R&D spending of the firms founded during this period.¹

But in the rush to embrace VC investors, there has been a tendency to neglect other entrepreneurial financiers that critically affect the success and growth of new ventures. We focus in this essay on a neglected segment of entrepreneurial finance: angel investments. Angel investors have received much less attention than venture capitalists. But we argue that over the last decade they have become an important seed-stage funding source that is often complimentary to VC investors.

WHAT ARE ANGEL INVESTORS?

Angel investors are high-net-worth individuals, often (but not exclusively) former entrepreneurs and corporate executives, who make private investments in start-up companies with their own money. While individual angel investors have a long history—for instance, Naomi Lamoreaux and co-authors highlight how Cleveland’s angel investors played a critical role in financing the early electricity and automotive industries²—organized angel groups are a quite recent phenomenon. Beginning in the mid-1990s, angels began forming groups to collectively evaluate and invest in entrepreneurial ventures.

WHO ARE ANGEL INVESTORS?

- Angels are **high-net-worth individuals** who use their personal wealth to make equity investments in private companies.
- Angels typically invest at the **seed funding** stage, making them among the first equity investors in a company beyond its founders.
- Angels often act as **mentors** to the founders of the companies in which they have invested.
- Angels invested a total of **\$24.6 billion** in 2015 with an average deal size of \$345,390, according to the Center for Venture Research.

WHO ARE VENTURE CAPITALISTS?

- VCs are firms who use funding provided by **third parties**, such as pension funds and university endowments, to make equity investments in private companies.
- VCs mostly invest after the seed stage in a series of larger funding rounds. Their goal is to shepherd companies to an **exit**—either an Initial Public Offering (IPO) or the company's sale.
- VCs **actively engage** with the companies in which they have invested, usually taking board seats to influence company decisions.
- VCs invested a total of **\$59.1 billion** in 2015 with an average deal size of \$13.5 million, according to the National Venture Capital Association.

Angel investors are increasingly structured as semi-formal networks. They typically meet at regular intervals (often over a monthly breakfast or dinner) to hear aspiring entrepreneurs pitch their business plans. The angels then decide whether to conduct further due diligence and ultimately whether to invest in some of these deals. Similar to venture capitalists, angel groups often adopt a very hands-on role in the deals they invest in and provide entrepreneurs with advice and contacts.

These groups are seen as having several advantages to their peers who invest alone:

1. Angels can pool their capital to make larger investments than they could otherwise.
2. Each angel can invest smaller amounts in individual ventures, allowing participation in more opportunities and the diversification of investment risks.
3. They can undertake costly due diligence of prospective investments as a group, reducing the burdens for individual members.
4. Angel investor groups are generally more visible to entrepreneurs and thus receive a superior deal flow.
5. Finally, the groups frequently include some of the most sophisticated and active investors in a given region, which might result in superior decision making.

The Angel Capital Association (ACA) lists more than 300 U.S. groups in its database. The average ACA angel group in 2015 had 68 member angels and invested a total of nearly \$2.5 million in 10.3 deals in 2007. At least between 10,000 and 15,000 angels are believed to belong to angel groups in the U.S.³

Angel groups follow mostly similar templates. Entrepreneurs typically begin the process by submitting to the group an application that may also include a copy of their business plan or executive summary. The firms, after an initial screening by the staff, are then invited to give a short presentation to a small group of members, followed by a question-and-answer session. Promising companies are then invited to present at a monthly meeting (often a breakfast or dinner). The presenting companies that generate the greatest interest then enter a due diligence review process by a smaller group of angel members, although the extent to which due diligence and screening leads or follows the formal presentation varies across groups. If all goes well, this process results in an investment one to three months after the presentation. Figure 1 provides a detailed template for one such angel group.

WHAT DO WE KNOW ABOUT ANGEL INVESTORS?

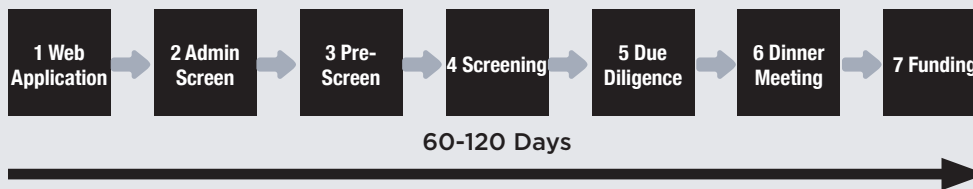
The short answer to this question is “surprisingly little.” Researchers—in large part deterred by the difficulty of getting systematic data about these investors—have shied away from research on this topic. This neglect is unfortunate, as the last decade has seen a rapid expansion and deepening of the types of vehicles that fund start-up firms in the U.S. and worldwide. In particular, we have seen a growing role of angel groups and other more “individualistic” funding options for start-ups, such as super angels or crowdsourcing platforms. This trend has not only been prevalent in the U.S. but also in many other nations.⁴ One could argue that the funding of new ventures by wealthy individuals is one of the oldest forms of outside investment that exists, especially where capital markets and financial institutions are less developed. In this paper, however, we focus on the organized angel market as a growing form of start-up investing that is less formal than the VC market but more professional than receiving funding from friends and family.



TCA ORANGE COUNTY SCREENING OVERVIEW

Figure 1: Tech Coast Angels Investment Process

Welcome to the #1 Angel network in the US. We are pleased you are attending an Orange County screening session. The screening process is an important part of the TCA process. Typically, we have over 300 companies per year apply over the web for TCA funding. Approximately one third of these companies make it to the screening process which you are about to participate in. Although each year varies, we typically fund between 10 and 20 companies per year. TCA consists of 4 chapters, each facilitating the first three steps of the deal flow process a little differently. The overall deal flow process for TCA consists of 7 steps as follows:



1. **Web Application** – Entrepreneurs apply to TCA on the Internet. This process includes filling out a 4 page overview of their startup venture.
2. **Admin Screen** – TCA staff perform a quick screen on the application to insure it is within the target area for a TCA venture. For instance, we typically fund between \$250,000 and \$1 million. If a company is seeking outside this range, typically they are not moved forward to pre-screen.
3. **Pre-Screen** – In Orange County entrepreneurs present a brief overview of their company to 3-7 TCA members. This includes 5 minutes of presentation and 25 minutes of informal questions and discussion with the TCA members. At the conclusion of this session, the prospective company is moved to screening, or given feedback why they might not be a good fit for TCA.

4. **Screening** – Typically 3 companies present at a screening. This consists of 15 minutes of PowerPoint and 15 minutes of Q&A. After the Q&A, we ask the entrepreneurs to leave the room and we discuss the company in private (typically takes 10-15 minutes). The entrepreneurs are invited back into the room, and a designated member provides quick feedback. Typically, the companies present at all 5 chapters. Therefore, it is possible for a company to get little interest at one chapter, but enough interest at another chapter that will allow it to move forward to due diligence. In Orange County we utilize a moderator to facilitate the sessions. This is intended to help balance questions for our members such that a member will not dominate the Q&A time. If you are a prospective member you are welcome to ask questions during the Q&A portion of the presentation.

5. **Due Diligence** – A due diligence team is formed based on the number of interested members who signed up during the screening. A deal lead steps forward and helps coordinate the due diligence activities. Due diligence consists of verifying representations by the venture, customers, agreements, references, backgrounds, etc. The results of the due diligence process are posted on the TCA website (members only section), and if the results are positive, the venture moves forward to dinner meetings.

6. **Dinner Meeting** – Companies that pass due diligence present at monthly dinner meetings at each chapter. This allows them to get in front of members who might not have seen them at screening or were involved in the due diligence process. This is the opportunity for the entrepreneurs to garner enough interest by members to secure funding.

7. **Funding** – Funding occurs after there has been enough interest generated through dinner meetings and internal communication from the entrepreneur and deal lead. Members invest in deals individually, thus only a small percentage of members need to participate for the venture to secure funding. Typically, the minimum investment amount is \$25,000.

The precise measurement of the total size of the angel investment market is difficult to ascertain due to the fact that most angel investments are made on an individual basis and thus typically are not subject to regulatory disclosure requirements. But estimates suggest that the total size of angel investment has long surpassed venture capital investment in the U.S. and increasingly in some other countries as well. For instance, survey estimates suggest the projected size of the total angel market in the U.S. grew from \$17.6 billion in 2009 to \$24.1 billion in 2014.⁵ The estimated capital deployed by angel groups in Europe has almost doubled over the past five years, and in Canada, it almost tripled.⁶ Some estimates suggest that these investors are as important for high-potential start-up investments as venture capital firms.⁷ But despite their rapid growth, we know very little about the role that angels play internationally and the type of firms in which they invest.

The appeal of angel investors is that they share many of the positive features of venture capitalists. They fund early stage entrepreneurs, undertake intensive due diligence of potential investments, and serve as mentors and (sometimes) outside directors for the entrepreneurs.⁸ But because angels invest their own money, they should be less prone to agency problems that have been documented for VC funds: for instance, fee-based compensation structures can lead to excessive fundraising or sub-optimal investment and exit decisions. The consequences of these agency problems may be periods of overfunding in certain sectors.⁹ Active involvement in the investments and close social ties between angels and entrepreneurs may help to overcome the lack of minority shareholder and legal protections that are important for the development of more decentralized capital markets.¹⁰ Reflecting these patterns, governments are increasingly seeking to encourage angel investment, as the OECD reports cited above document. The hope is to encourage alternative mechanisms for funding new ventures and to improve the ecosystem for entrepreneurs.

Estimates suggest that the total size of angel investment has long surpassed venture capital investment in the U.S. and increasingly in some other countries as well.

Relying on an idiosyncratic and decentralized angel investment process, however, might lead to challenges of its own. Since angels are typically not professional investors, there is a worry that entrepreneurs will be exposed to idiosyncratic funding risk, either because angels themselves might be subject to idiosyncratic liquidity shocks or because they might change their opinions more frequently about what projects to fund. Additionally, angels might not be prepared to invest in truly disruptive or high-growth projects, since they are usually more risk averse than institutional investors due to limited diversification. They also might not have the professional expertise to invest in more complex technologies. Finally, there is a concern that in countries lacking the culture or infrastructure to support start-up investments, angels only waste their time and money with no real impact.

Governments are increasingly seeking to encourage angel investment. The hope is to encourage alternative mechanisms for funding new ventures and to improve the ecosystem for entrepreneurs.

INSIGHTS FROM RECENT WORK: THE IMPACT OF ANGELS ON START-UP SUCCESS

In recent work, we have sought to better understand the impact of angel investors, both in the United States and worldwide. The challenge of such an evaluation is to separate the screening function of angels from their role of providing value added to the firms they fund. The former channel relies on the idea that angels might have access to better deals or are good at picking superior firms and, as a result, funded firms have better outcomes than nonfunded ones. In contrast, the second channel asks whether, above and beyond their ability to pick good deals, angels have an incremental impact on improving the performance of their start-ups, for example by mentoring the founders or helping them with introductions to their business network.

In our first paper on this topic, our analysis exploited very detailed, deal-level data of start-ups that pitched to two prominent angel investment groups on the east and west coasts of the U.S. (Tech Coast Angels and CommonAngels) to differentiate the different channels by which angels might affect the success of the firms they invest in. These organizations generously provided us access to confidential records of the companies who approached them, the level of angel interest, the financing decisions made, and the subsequent venture outcomes. The dataset allowed us to compare funded and unfunded ventures that approached the same investor using what economists call “a regression discontinuity approach.”¹¹ Furthermore, we used the interest levels expressed by the angels to form specialized treatment and control groups that have similar qualities.¹²

Several clear patterns emerged from our analysis: First, and not surprisingly, the interest levels expressed by angels in deals were a substantial factor in funding decisions. Second, when we compared firms that received funding to those that did not within a narrow quality range, the funded firms overall look more successful than those that pitched to the angel group but did not receive it: They were 20%-25% more likely to survive for at least four years. They were also 9%-11% more likely to undergo a successful exit (IPO or acquisition) and 16%-19% more likely to have either reached a successful exit or grown to 75 employees by the end of our sample period. Funded companies had 16-20 more employees as of 2010, were 16%-18% more likely to have a granted patent, and are growing faster as measured through web traffic performance. Finally, funded companies were better financed. Overall, they had a 70% higher likelihood of obtaining entrepreneurial finance and had, on average, a little less than two additional financing rounds. These subsequent deals are often syndicated by the angel group with other venture financiers.¹³

Our third set of findings considered ventures just above and below the funding threshold. It confirmed several of our prior findings: ventures just above the threshold are more likely to survive and have superior operations in terms of employee counts, patenting, and web traffic growth.¹⁴

Interestingly, we did not find an impact of angel funding on follow-on financing when using the regression discontinuity approach. This difference to the estimates, based on a simple comparison between funded and nonfunded firms, may suggest that access to additional financing may not be essential for the success of angel-funded firms just above the threshold. But when looking at the full distribution of funded versus nonfunded ventures, the positive selection bias of receiving angel funding translate into a higher likelihood of follow-on funding. This result might also underline that, in the time period we studied in the U.S., prior angel financing was not an essential prerequisite to accessing follow-on funding. We believe that this result also underlines that the market for start-up capital during that time was very deep and liquid, and thus even ventures turned down by our angel groups found alternative funding mechanisms.

In a final step, we compared the returns of the venture capital industry to that of one of the angel groups. A natural concern is that these investments are by angels who are not professional investors, and thus their decisions and voting may be shaped by factors other than economic considerations (e.g., the joy of working with start-up companies). While our project focused on the consequences of financing for start-up ventures, this additional analysis helps confirm that the investments were warranted for the angel group as a whole. We found that the angel group outperformed the venture capital industry overall during the period of study.

Thus, this paper provided new evidence about an essential question in entrepreneurial finance. We were able to quantify the positive impact that these two angel groups had on the companies that they fund by simultaneously exploiting novel, rich micro-data and addressing concerns about unobserved heterogeneity. We should note, however, that the angel groups that we worked with for this project were two of the largest and most established groups in the country. They were both professionally managed, and at least one group outperformed the venture industry as a whole during the period we studied. Given the substantial heterogeneity across angel investors, the magnitude of the impact that we estimate is likely to be at the upper end of the angel population.

We found that the angel group outperformed the venture capital industry overall during the period of study.

INTERNATIONAL ANGEL GROUPS

In a second, more recent analysis, we looked at angel investors globally.¹⁵ This paper seeks to understand the differences in the nature and consequences of angel investments across a variety of geographies that differ in the development in their venture capital markets and other forms of risk capital. We first ask whether angel investors improve the outcomes and performance of the start-ups in which they invest. Furthermore, we ask whether and how the types of firms that seek angel funding vary with the overall entrepreneurial ecosystem in a country. For example, does the pool of start-ups that apply for angel funding differ in their risk profile, development stage or industry concentration in places where the entrepreneurial ecosystem is less friendly?

For that purpose, we examine the records of 13 angel investment groups based in 12 nations and with applicants for financing transactions from 21 nations, examining both the applicants that were considered and rejected and those that were funded. To differentiate the value added of angel groups from their ability to select good investments, we employ the type of regression discontinuity analysis we used in the analysis of U.S. angel groups (described in endnote #11). We use discontinuities in the funding likelihood of start-ups that are based on a cumulative level of interest around the deal on the part of the angel groups. This allows us to examine not only whether angel investors add value to the companies in which they invest in general, but also how their impact and the types of transactions undertaken varies with the development of the venture markets in these nations.

Our key findings from the analysis of angel investing around the globe are twofold. First, angel investors have a positive impact on the growth of firms they fund, both in terms of their performance and survival. Start-ups funded by angel investors are 14% to 23% more likely to survive for the next 1.5 to 3 years and grow their employment by 40% relative to non-angel-funded start-ups. Angel funding affects the subsequent likelihood of a successful exit, raising it by 10% to 17%. Having angel funding also seems to matter significantly for the ability of a firm to obtain follow-on financing. This last result differs from the findings in our earlier paper, which showed that angel investments in the U.S. boost start-ups' survival and performance but do not impact their likelihood of future fundraising. This result suggests that angel groups outside the U.S. serve as an important accreditation or gateway for follow-on funding. Risk capital in the U.S. may be more abundant, and therefore start-ups have many different avenues of obtaining their initial seed funding, including venture capitalists. As a result, U.S. firms do not necessarily have to raise an angel round before getting funding from larger players.

Second, we find that the selection of firms that apply for angel funding is different across countries. In countries that have a less conducive entrepreneurial environment, companies seeking angel funding appear to be more established and are usually already revenue generating, compared to applicants in more entrepreneurship-friendly countries. Yet despite their apparent greater maturity, the firms in these markets seek smaller amounts of funding. We proxy for the entrepreneur-friendliness of a country with (1) the depth of the VC market as a fraction of GDP and (2) the number of regulatory procedures while incorporating a firm, taken from Djankov, et al. (2002). Given that these are countries with a less developed ecosystem for risk capital, it is difficult to believe that entrepreneurs in these countries have many other sources of capital. Instead, the results suggest that firms seem to “self-censor” when they apply to angel groups in the less venture-friendly markets, reflecting the fact that the angel investors themselves are more risk averse or less experienced in assessing very early stage investments. So despite being at a mature stage of their development, these firms receive less funding from the angels, which underscores the less favorable entrepreneurial investment climate in these countries.

Start-ups funded by angel investors are 14% to 23% more likely to survive for the next 1.5 to 3 years and grow their employment by 40% relative to non-angel-funded start-ups.

CONCLUSION

This work suggests a variety of avenues for future research to better understand these important new investors. First, we have suggested that one way in which angel investors adapt to the changing investment environment across nations is by attracting and selecting different types of transactions. It would be interesting to examine whether angel groups also adjust in different ways, whether by varying the contracts they write with the entrepreneurs they fund (as we document that venture capital and private equity funds do in our earlier work) or by adjusting the intensity of oversight provided. In addition, we would like to understand better how these differences in the funding environment affects the selection of people who choose to be entrepreneurs. Another fertile area for research would be to examine how angel groups reacted to the rapid emergence and professionalization of venture capital funds, as has happened recently, for instance, in China and India.

We believe that our results on angel groups might also speak to some of the more recent innovation in crowdfunding platforms and the idea of providing a broader access to start-up investments to a broader public, where individual retail investors could participate in angel funding. This democratization of access has been a success in other industries: for instance, ridesharing platforms, apartment rental, etc. But our results strike a somewhat cautionary note for the application to seed-stage investing. First, even our results from some of the premier angel groups in the country show that there is a lot of risk and skewness in the returns to these groups. So investors have to be able to sustain such an investment profile. Second, and more importantly in our context, the major impact of angel groups lies in the value added and hands-on improvement that they provide to their start-ups rather than just access to funds. It will not be easy to replicate these impacts on a decentralized funding platform. In crowdfunding, investors are miniscule and are not in a position to provide the same value added to the investments. In fact, several crowdfunding platforms (for example, AngelList) have realized this and are experimenting with innovative funding structures where a few select investors act as syndicate partners, directing the investments of other (smaller) investors on the platform. The idea is precisely to facilitate the provision of value added service even in the decentralized online environment. There are several innovative new approaches being tested at the moment, but the jury is still out how investors will fare from these investments.

The major impact of angel groups lies in the value added and hands-on improvement that they provide to their start ups rather than just access to funds.

ABOUT THE AUTHORS

JOSH LERNER

Josh Lerner is the Jacob H. Schiff Professor of Investment Banking at Harvard Business School, and head of the Entrepreneurial Management unit. He graduated from Yale College with a special divisional major that combined physics with the history of technology. He worked for several years on issues concerning technological innovation and public policy at the Brookings Institution, for a public-private task force in Chicago, and on Capitol Hill. He then earned a Ph.D. from Harvard's Economics Department.

Much of his research focuses on venture capital and private equity organizations. (This research is collected in three books, *The Venture Capital Cycle*, *The Money of Invention*, and *Boulevard of Broken Dreams*.) He also examines policies on innovation and how they impact firm strategies. (That research is discussed in the books *Innovation and Its Discontents*, *The Comingled Code*, and *the Architecture of Innovation*.) He co-directs the National Bureau of Economic Research's Productivity, Innovation, and Entrepreneurship Program and serves as co-editor of their publication, *Innovation Policy and the Economy*. He founded and runs the Private Capital Research Institute, a nonprofit devoted to encouraging access to data and research about venture capital and private equity, and serves as vice-chair of the World Economic Forum's Global Agenda Council on the Future of Investing.

Among other recognitions, he is the winner of the Swedish government's Global Entrepreneurship Research Award. He has recently been named one of the 100 most influential people in private equity over the past decade by Private Equity International magazine and one of the ten most influential academics in the institutional investing world by Asset International's Chief Investment Officer magazine. He currently serves as Vice Chair of the World Economic Forum's Global Agenda Council on the Future of Investing.

ANTOINETTE SCHOAR

Antoinette Schoar is the Michael M. Koerner ('49) Professor of Entrepreneurial Finance at the MIT Sloan School of Management and the Chair of the MIT Sloan finance department. She holds a PhD in Economics from the University of Chicago and an undergraduate degree from the University of Cologne, Germany. She is an associate editor of the *Journal of Finance* and the co-chair of the NBER Entrepreneurship group. Her research interests span from entrepreneurship and financing of small businesses in emerging markets to household finance and intermediation in retail financial markets.

She received several awards including the Brattle Prize for best paper in the *Journal of Finance* and the Kauffman Prize Medal for Distinguished Research in Entrepreneurship in 2009. She has published numerous papers in the *Journal of Finance*, *Journal of Financial Economics*, the *Quarterly Journal of Economics* and others. Her work has been featured in the *Economist*, the *Financial Times*, the *New York Times* and the *Wall Street Journal*. She also is the cofounder of ideas42 a non-profit organization that uses insights from behavioral economics and psychology to solve social problems.

ENDNOTES

- 1 Will Gornall and Ilya A. Strebulaev, “The Economic Impact of Venture Capital: Evidence from Public Companies,” (November 1, 2015). Stanford University Graduate School of Business Research Paper No. 15-55. Available at SSRN: <http://ssrn.com/abstract=2681841> or <http://dx.doi.org/10.2139/ssrn.2681841>
- 2 Lamoreaux, N., Levenstein, M., and Sokoloff, K. 2004. Financing invention during the second industrial revolution: Cleveland, Ohio, 1870-1920. Working paper no. 10923, National Bureau of Economic Research.
- 3 Statistics are based on <http://www.angelcapitalassociation.org/data/Documents/2015ACAMemberDemographics07-20-15.pdf> (accessed July 30, 2016).
- 4 See, for instance, Organisation for Economic Cooperation and Development, (2011), *Financing High-Growth Firms: The Role of Angel Investors*, Paris: OECD; Organisation for Economic Cooperation and Development, (2016), *Financing SMEs and Entrepreneurs Scoreboard*, Paris: OECD; and Wilson, Karen E., (2015), “Policy Lessons from Financing Young Innovative Firms”, Science, Technology and Innovation Directorate Policy Paper #24, Paris: OECD.
- 5 These estimates are by Jeffery Sohl and the University of New Hampshire’s Center for Venture Research: http://paulcollege.unh.edu/sites/paulcollege.unh.edu/files/2009_Analysis_Report.pdf and <https://paulcollege.unh.edu/sites/paulcollege.unh.edu/files/webform/2014%20Analysis%20Report.pdf>.
- 6 According to data presented in reports from EBAN in Europe and NACO in Canada, which is collected from angel groups via surveys.
- 7 Examples include Shane, S. 2008. The importance of angel investing in financing the growth of entrepreneurial ventures. Unpublished working paper, U.S. Small Business Administration, Office of Advocacy. Sudek, R., Mitteness, C., and Baucus, M. 2008. Betting on the horse or the jockey: The impact of expertise on angel investing. *Academy of Management Best Paper Proceedings*.
- 8 Kaplan, Steven N. and Per Strömberg, (2003), “Financial Contracting Meets the Real World: Evidence from Venture Capital Contracts,” *Review of Economic Studies*, 70, pp. 281–315; Wong, Andrew, Mihir Bhatia, and Zachary Freeman, (2009), “Angel Finance: The Other Venture Capital.” *Strategic Change*. 18 (7-8), pp. 221-230.
- 9 For a discussion of these issues, please see Chung, Ji-Woong, Berk A. Sensoy, Léa Stern, and Michael S. Weisbach, (2012), “Pay for Performance from Future Fund Flows: The Case of Private Equity,” *Review of Financial Studies*, 25, pp. 3259-3304; Gompers, Paul, (1996), “Grandstanding in the Venture Capital Industry,” *Journal of Financial Economics*, 42, pp. 133–156; Gompers, Paul and Josh Lerner, (1999), “Money Chasing Deals?: The Impact of Fund Inflows on the Valuation of Private Equity Investments,” *Journal of Financial Economics*, 55, pp. 281-325; and Metrick, Andrew and Ayako Yasuda, (2010), “The Economics of Private Equity Funds,” *Review of Financial Studies*, 23, pp. 2303-2341.
- 10 See, for example, La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, (1998), “Law and Finance,” *Journal of Political Economy* 106 pp. 1133–1155 and La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, (2002), “Investor Protection and Corporate Valuation,” *Journal of Finance* 57, pp. 1147–1170.

- 11 The idea in a regression discontinuity approach is to use semi-random differences in the likelihood that a deal gets funded as a way to form treatment and control groups. Where does this difference come from? Our data allows us to show that there are distinct jumps in deal funding due to the voting process of the group of angels. We show that there are discrete jumps in the probability of a venture being funded due to small differences in the number of angels interested in the deal. In other words, for the really great or bad deals, we see very clear patterns of a large majority of angels either in favor or against the deal. But for the marginal deals the difference between having one more angel either in favor or against makes the difference between being funded versus not. We identify from the data the threshold where a critical mass of angels emerges around a deal. Our approach compares firms that fall just above this threshold with the firms that fall just below. The underlying identification relies on firms around the cut-off level having very similar ex ante characteristics, in which case we can confirm the causal effect of obtaining angel financing. After showing the comparability of the ventures in the border region prior to pitching to the angel groups, we examine differences in their long-run performance. In this way, we can employ micro-data on firm outcomes, while further minimizing the problem of unobserved heterogeneity between the funded and rejected transactions.
- 12 Thus, our work encompasses many of the matching traits used by prior work—industry, employment levels and growth rates, age, etc.—but also captures better the motivations of entrepreneurs (i.e., the control group also approached the investor at the same time as the treatment group) and the underlying qualities of the ventures (i.e., the angels rated the ventures comparably at the time of their pitch). To illustrate these gains more graphically, consider the case of Twitter (which is not part of our sample). Researchers can observe that Twitter is ten years old, has approximately 3800 employees (<http://twitter.com/about>, accessed July 30, 2016), is growing rapidly in terms of employment but not revenue, is located in Silicon Valley, and so on. But even with this information set, it is very hard to identify companies to which one should compare Twitter. Our data allow us to compare funded ventures to others that the same sophisticated investors thought comparable at the time of the investment pitch.
- 13 These results were developed using ventures that fall within a narrow quality range. We also demonstrated that the impact of angel funding on firm outcomes would be overstated if we look at the full distribution of ventures that approach the angel groups, since there is a clear correlation between initial venture quality and likelihood of funding. Using several techniques (e.g., matched samples, modeling angel interest as a covariate), we estimate that one would overstate the measured effects by about 25% if using the full distribution of deals that approached the investors. This emphasizes the importance and challenge of creating proper control groups in entrepreneurial finance studies.
- 14 Here we used the regression discontinuity methodology, which removes the endogeneity of funding and other omitted variable biases if ventures just below and above the funding threshold are otherwise very similar
- 15 Josh Lerner, Antoinette Schoar, Stanislav Sokolinski, and Karen Wilson, “The Globalization of Angel Investments: Evidence Across Countries,” Working Paper 21808, National Bureau of Economic Research.