

# KAUFFMAN DISSERTATION EXECUTIVE SUMMARY

## KAUFFMAN ENTREPRENEURSHIP SCHOLARS

### KAUFFMAN DISSERTATION FELLOWSHIP

Part of the Ewing Marion Kauffman Foundation's Entrepreneurship Scholars initiative, the Kauffman Dissertation Fellowship recognizes exceptional doctoral students and their universities. The annual program awards Dissertation Fellowship grants to Ph.D., D.B.A., or other doctoral students at accredited U.S. universities to support dissertations in the area of entrepreneurship.

Since its establishment in 2003, this program has helped to launch world-class scholars into the exciting and emerging field of entrepreneurship research, thus laying a foundation for future scientific advancement. The findings generated by this effort will be translated into knowledge with immediate application for policymakers, educators, service providers, and entrepreneurs as well as high-quality academic research.

Ewing Marion  
**KAUFFMAN**  
Foundation

[www.kauffman.org/kdf](http://www.kauffman.org/kdf)

Daniel Fehder  
Dissertation Abstract

This dissertation studies the impact of startup accelerators on the performance of firms, regions, and the selection of early-stage projects in the economy. The first essay explores the impact of startup accelerators on early-stage entrepreneurial activity in their region. The second essay explores the relationship between a startup's founding region, accelerator admission and startup performance. The third essay explores the selection mechanisms inside an accelerator program, measuring how variation in the institutional arrangements used in the selection of ideas and ventures impacts how a fixed set of judges evaluate a fixed set of businesses opportunities.

# **Executive Summary of Essays on the Evaluation of Entrepreneurship Programs**

by

Daniel Colin Fehder

## **1.1. BACKGROUND**

My dissertation explores the role that entrepreneurship programs, in particular startup accelerators, play in shaping the performance of startups and, more broadly, the performance of innovation ecosystems. It is well understood that highly successful innovation-driven startups emerge from a complex web of social and economic ties (Shane and Stuart 2002; Klepper and Sleeper 2005). However, it remains an open question as to whether, and to what extent, such ties can be shaped and transformed by systematic intervention.

Startup Accelerators (which I define as fixed-term, cohort-based programs) are a particularly important and interesting type of program that are designed to draw from their local ecosystem to provide a cohort of selected startups access to a menu of resources: financing, mentorship, and education. In the summer of 2005, Paul Graham chose a small batch of early-stage startups to mentor and support with a small stipend. He named his experimental program Y Combinator and described it as a “seed accelerator.” Since then, over 300 startup accelerators have been established in the United States, graduating over 1,600 startups in a wide variety of regions from Silicon Valley and Boston to Cincinnati, OH and Fayetteville, Arkansas.

Participation in these programs is a strategic decision not only for entrepreneurs, but also investors and other ecosystem participants. Accelerators, and other programs like them, provide an opportunity to observe the dynamics that shape entrepreneurship ecosystems. Prior research has also demonstrated cases where catalytic actors in a region to improve its capacity to foster new ventures (Feldman 2001), but startup accelerators (and other formal entrepreneurship programs) provide a concrete and measurable intervention to the regions whose arrival time can be isolated and its impact can be measured at multiple levels including

on individual portfolio firms and on the regions in which they operate. Preliminary research has focused on the impact of accelerators on their portfolio firms, finding large, positive impact on their portfolio companies when compared to a matched set of control firms (Winston Smith, Hannigan, and Gasiorowski 2013; Hallen, Bingham, and Cohen 2014).

Careful evaluation of the impact of an entrepreneurship program requires some form of plausibly random variation in who receives program “treatment” if we are to measure the effect of the program in a meaningful way. Beginning with the Tennessee Star Experiments, labor economists have used both planned and unplanned sources of randomization to make precise causal statements about the effectiveness of education programs (Angrist and Krueger 1999). The “identification revolution” has diffused broadly, but the tools of program evaluation have been used sparingly in the study of entrepreneurship (Kerr, Lerner, and Schoar 2010). The central papers in the program evaluation literature marshal key institutional details of their setting into a useful source of variation for causal inference. My dissertation builds upon this tradition by using a careful exploration of the design details of accelerators to generate theoretically-informed, carefully-identified measurements of various aspects of the accelerator phenomenon.

In its methodological approach, this dissertation connects the programmatic evaluation of accelerators to a broader literature on the role of innovation and entrepreneurship in regional context of economic growth (Delgado, Porter, and Stern 2012; Chatterji, Glaeser, and Kerr 2013). It provides some key facts about the role of accelerators on the performance of regional entrepreneurial ecosystems as well as the role these regions play on the performance of firms admitted to accelerators. In addition, it attempts to consider how startup accelerators, as increasingly important waypoints on an entrepreneur's journey, shape the selection of new projects into the economy through their admission procedures.

## **1.2. OVERVIEW OF THE DISSERTATION ESSAYS**

There is a long and storied history of state-sponsored intervention into entrepreneurship, often with little effect (Lerner 2009). The three essays of my dissertation attempt to characterize the impact of startup accelerators in three separate but interrelated

ways by asking the following questions: (1) Can programmatic interventions (i.e. accelerators) change the aggregate level of entrepreneurial activity in a region (2) Do accelerators improve individual firm performance and how is that related to the level of entrepreneurial activity in their founding region? and (3) Can accelerators develop and implement judging procedures (used to admit startup firms) that meaningfully shift the types of firms that are admitted into these programs compared to more traditional practices (potentially improving their life chances)?

Each of these questions helps uncover whether and how the creation, selection, and evolution of nascent ventures can be positively impacted by programmatic interventions like startup accelerators. Nonetheless, they pose key empirical challenges: It is difficult to disentangle the choices made by entrepreneurs, their underlying entrepreneurial capacity, and the impact of a program. By using rich data, causal identification methods, and a deep understanding of the institutional details of these programs, I attempt to tease apart each of these elements.

### ***1.2.1. Accelerators and the Regional Supply of Venture Capital Investment***

This essay, co-authored with Yael Hochberg, provides the first systematic evidence of the impact of accelerators on the level of entrepreneurial activity in the regions in which they are founded. Existing research on accelerator programs has focused entirely on their impact on portfolio firms, but these programs are frequently supported, either explicitly or implicitly, by state and local governments. Thus, it is reasonable to ask if accelerators can act as useful policy levers to increase the performance of a regions entrepreneurship ecosystem.

We attempt to measure the impact of the arrival of accelerators in a region by estimating a series of matched-sample difference-in-differences models. Building on prior work measuring the impact of local institutional features (Autor 2003), we carefully match Metropolitan Statistical Areas (MSAs) that are ‘treated’ with an accelerator program to other MSAs that are very similar in terms of pre-treatment trends in the entrepreneurial ecosystem. We then employ a fixed effects difference-in-differences model, augmented by linear time trends to capture any pre-trends in funding patterns that might not be fully captured in the matching process. In our difference-in-differences model with a strictly matched sample,

fixed effects and linear time trends, the arrival of an accelerator associated with an annual increase of 104% in the number of seed and early stage VC deals in the MSA, an increase of 289% in the log total \$\$ amount of seed and early stage funding provided in the region, and a 97% increase in the number of distinct investors investing in the region. This increase in the number of distinct investors comes primarily from an increase in nearby investment groups, rather than from entry of additional investors from outside the region. Our results contribute to a growing literature exploring the effects of regional features and initiatives on entrepreneurial activity.

### ***1.2.2. Startup Accelerators and Ecosystems: Complements or Substitutes?***

Accelerators help startups acquire critical resources that are otherwise difficult to access in those regions. Surprisingly given that explanation, the highest density of accelerators is in Silicon Valley, Boston, and New York, all entrepreneurship-dense and resource-rich areas. In this paper, I explore the relationship between a startup's founding region, accelerator admission and startup performance. Entrepreneurs combine resources from numerous sources as they build their firms but are constrained by their social and geographic proximity to these resources. I use this insight as a starting point to explore whether accelerators act as a complement or substitute for initial location. Using data from MassChallenge, a leading startup accelerator in Boston, I use a regression discontinuity framework to evaluate both the overall impact of the program on its portfolio of startups and its heterogeneity based on: 1) the level of entrepreneurship resources in a startup's founding region and 2) their ability to access those resources.

Our results suggest that participant startups in the program experience significant variation in the impact of the program depending on the characteristics of the home region in which they were founded. Using a novel measure of entrepreneurial social capital, I find that startups that were initially founded in regions with strong levels of entrepreneurial networking opportunities experience a larger benefit to the MassChallenge program in terms of reaching key early milestones. Similarly, I find that startups that were founded in regions with higher levels of early stage investors benefitted more from the program.

### ***1.2.3. Evaluation of Early-Stage Ventures: Bias across Different Evaluation Regimes***

This paper (joint work with Fiona Murray) explores the impact that different evaluation procedures have on the projects that might be selected by investors and startup programs. This is particularly important given the biases that seem to characterize many such early stage selection processes in uncertain environments.

Early stage ideas are difficult to evaluate, and individuals use a variety of social cues to resolve the inherent uncertainty of a startup's quality. Despite the difficulties inherent in evaluation, the decisions of key individuals and committees can have far-reaching consequences by determining who receives access to key resources. Thus, any biases present in the decision making of groups and individuals can have far-reaching consequences, potentially reifying existing inequality in the access to opportunity in entrepreneurial ecosystems. This paper builds upon prior work exploring the biases in the evaluation of entrepreneurs to explore the consequences of different decision structures in alleviating or exacerbating bias in the evaluation of early-stage firms (Murray et al. 2014).

We use detailed judging data from MassChallenge across four years of their program. Every year MassChallenge evaluates thousands of firms from more than ten countries. We use these detailed administrative data to explore a number of key questions: 1) whether groups make more or less-biased decisions than individuals with respect to the evaluation of early-stage entrepreneurs? and 2) Whether the composition of the group impact the bias of decisions. We demonstrate strong differences in the way in which projects are evaluated by individuals versus groups. Judges in committees make decisions differently and they also seem to make higher quality decisions. Judges in the committee regime are more likely to use the characteristics of the project team (as well as those of the project) in making their score determination than they are in the paper-based regime. We also find evidence that the decision-making process of judges is different in the committee regime; demonstrating clear signs of convergence across judges in score determination that does not exist in the paper-based regime. Next, we observe clear performance implications in our comparisons of the paper-based versus committee-based judging: our evidence suggests that judges in the committee regimes are more likely to predict ex post realizations of quality when they judge with others than when they judge individually

### 1.3. FUTURE DIRECTIONS AND CONCLUSIONS

Entrepreneurship programs are an increasingly important component of the landscape of entrepreneurial ecosystems whether they are dense and active or aspirational and emerging. The policy goals of these programs, including startup accelerators, are often quite clear: to improve the individual performance of firms and thereby improve the economic health of a region. The evidence supporting the impact of these programs is scant and often unconvincing. Part of my future research will be to expand the evidence available for which programmatic interventions work and why. Perhaps more importantly, however, entrepreneurship programs provide a context in which researchers can push forward our theoretical understanding of nascent ventures.

While researchers and policy officials have increasingly called for careful evaluation of the treatment effect of entrepreneurial programs (Chatterji, Glaeser, and Kerr 2013), simple measures of a treatment effect for programs as complex as seed accelerators do not provide all of the concrete, actionable information required by entrepreneurs or policy makers. Accelerators vary greatly their design including their industry focus and the ways in which they connect their portfolio companies to mentors, investors, and potential customers. By understanding the treatment effect of key design parameters within accelerators, we can provide guidance to both improve current accelerators and imagine the design of other types of programs.

A series of future studies will attempt to disentangle the separate impact of key aspects of accelerator programs beginning with the provision of mentorship and entrepreneurship education. While previous research suggests that mentorship is a pervasive element of entrepreneurial firms (Ruef 2010), the impact of external advisors on startup firms has not been well characterized. Working with MassChallenge, one study will attempt to measure the impact of mentor choice and the intensity of mentorship on entrepreneurial performance. Similarly, prior work has suggested that the acquisition of managerial capital is an essential input to the performance of nascent firms in developing countries (Bruhn and Zia 2011) but not a U.S. context (Fairlie, Karlan, and Zinman 2012) despite it being a core component of most startup accelerators. A planned study will measure the impact of short, high-intensity

entrepreneurship training on the performance of early-stage firms through a randomized control trial conducted in a number of incubators and co-working spaces across the United States.

In another series of studies building on my exploration of the regional impact of accelerators, I will further explore the role of accelerators in facilitating the emergence of an entrepreneurial ecosystem in a local region. In one proposed study will use similar methodologies as the second chapter of this dissertation to explore the broader impact of accelerators on the local economy, by examining standard regional development outcomes measures as well as STEM employment. Another study will explore the linkage between accelerators and local industry clusters, and explore the effects of programs that specialize in industry verticals adjacent to the local industry clusters versus those that generalize across industry verticals or choose to focus on industry verticals that are unrelated to the local industry clusters. These studies are intended to provide insight to policy makers and other interested in establishing programs and initiatives in this area.

In conclusion, the overarching ambition of this research is to more deeply understand what are the critical inputs to the performance of early stage ventures and how entrepreneurship programs, like startup accelerators, can shape access to these resources. This agenda will continue to triangulate the answers to these questions through a mixture of empirical strategies focused on at least two levels of analysis: individual firm performance and the level of entrepreneurial activity in a region. My hope is that this dissertation and continuing research will deepen our understanding of how early-stage firm grow and how their regional location shapes this growth process.

## 1.4. REFERENCES

- Angrist, J. D, and A. B Krueger. 1999. "Empirical Strategies in Labor Economics." *Handbook of Labor Economics* 3: 1277–1366.
- Autor, David H. 2003. "Outsourcing at Will: The Contribution of Unjust Dismissal Doctrine to the Growth of Employment Outsourcing." *J. Labor Econ.* 21 (1): 1–42.
- Bruhn, M., and B. Zia. 2011. "Stimulating Managerial Capital in Emerging Markets: The Impact of Business and Financial Literacy for Young Entrepreneurs." *World Bank Policy Research Working Paper Series, Vol.*  
[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1824959](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1824959).
- Chatterji, A, E. L. Glaeser, and W.R. Kerr. 2013. "Clusters of Entrepreneurship and Innovation." Working Paper 19013. NBER.
- Delgado, M., M. Porter, and S. Stern. 2012. "Clusters, Convergence, and Economic Performance."
- Fairlie, Robert W., Dean Karlan, and Jonathan Zinman. 2012. "Behind the GATE Experiment: Evidence on Effects of and Rationales for Subsidized Entrepreneurship Training." Working Paper 17804. National Bureau of Economic Research.  
<http://www.nber.org/papers/w17804>.
- Feldman, Maryann. 2001. "The Entrepreneurial Event Revisited: Firm Formation in a Regional Context." *Industrial and Corporate Change* 10 (4): 861–91.
- Hallen, Ben, Chris Bingham, and Susan Cohen. 2014. "Do Accelerators Accelerate?" Accessible from author: [scohen2@richmond.edu](mailto:scohen2@richmond.edu).
- Kerr, W.R., J. Lerner, and A. Schoar. 2010. "The Consequences of Entrepreneurial Finance: A Regression Discontinuity Analysis." NBER.
- Klepper, Steven, and Sally Sleeper. 2005. "Entry by Spinoffs." *Management Science* 51 (8): 1291–1306.
- Lerner, J. 2009. *Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed—and What to Do about It*. Princeton Univ Pr.
- Lerner, J, and Ulrike Malmendier. 2013. "With a Little Help from My (Random) Friends: Success and Failure in Post-Business School Entrepreneurship." *Review of Financial Studies*, June, hht024. doi:10.1093/rfs/hht024.
- Murray, Fiona E., Laura Huang, Alison Wood Brooks, and Sarah Wood Kearney. 2014. "Investors Prefer Entrepreneurial Ventures Pitched by Attractive Men." *Proceedings of the National Academy of Sciences* 111 (12): 4427–31.
- Ruef, M. 2010. *The Entrepreneurial Group*. Princeton University Press.
- Shane, Scott, and Toby Stuart. 2002. "Organizational Endowments and the Performance of University Start-Ups." *Management Science* 48 (1): 154–70.
- Winston Smith, Sheryl, T. J. Hannigan, and Laura L. Gasiorowski. 2013. "Accelerators and Crowd-Funding: Complementarity, Competition, or Convergence in the Earliest Stages of Financing New Ventures?" *Temple Working Paper*.