

KAUFFMAN DISSERTATION EXECUTIVE SUMMARY

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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.

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My dissertation uses a business registration records and predictive analytics to develop a novel approach to define and measure entrepreneurial quality. It then uses this estimate to analyze three questions of interest: the variation of quality across geography and business cycle, the distribution of quality across gender and its role in differences in entrepreneurial outcomes, and the role of the quality and quantity of firms in a region in startup migration. Findings and implications are discussed.

RESEARCH STATEMENT

I am a researcher on the economics of entrepreneurship and entrepreneurial strategy. With the support of the Kauffman Foundation's Dissertation Fellowship (KDFP), I have been able to develop an agenda using novel methods at the intersection of 'Big Data' (developing large, tractable datasets) and machine learning (using many observables per observation) to study how new firms are created, their impact on the economy, their growth dynamics, and the determinants of their performance. This research statement provides an overview of the key areas I have worked on, which are five: entrepreneurial quality measurement, entrepreneurship and macroeconomic policy, entrepreneurial migration, entrepreneurial finance, and gender and entrepreneurship.

Entrepreneurial Quality Measurement. My research output begins with, and is anchored around, a novel approach for measuring of entrepreneurial quality. Though the possibility that firms differ at founding had been sometimes acknowledged in sociology and economics (e.g., the population ecology view), the bulk of the economic profession has simply assumed that differences in the growth rates of firms is a result of random growth, a phenomenon formalized

under ‘Gibrat’s Law’. In Guzman and Stern (2015), and Guzman and Stern (2017), we highlight that entrepreneurs make observable choices at the time of founding (such as whether to register as a corporation vs an LLC or in Delaware vs the local jurisdiction) based on their own intention and perceived potential for the firm. If these early choices are observed in a sample of firms, and success is measured for a non-biased sub-sample, then we can use a predictive analytics approach to predict the likelihood of a firm’s future success based on at-founding characteristics—its entrepreneurial quality. Using all business registrants (i.e. all corporations, LLCs, and partnerships) for Massachusetts and California and a logit model, we find using a few observables of corporate governance, IP, name choices, and industry, can be strikingly informative: in out of sample tests, 70% of all firms that achieve an equity growth outcome (IPO or acquisition) are in the top 5% of our predicted quality distribution, and over 50% of these in the top 1%. This offers a new perspective on the extent on which firms differ in potential at-founding, and creates a powerful tool for research designs that can control for differences in firm quality in a systematic way.

Entrepreneurship and Macroeconomic Policy. The first application of entrepreneurial quality estimates is to study the production of entrepreneurship for US regions across time and place. In Guzman and Stern (2016) we develop a dataset covering all business registrants for 34 U.S. states, representing 83% of US GDP from 1988 to 2014, and we use this to study the quality-adjusted quantity of entrepreneurship across the US and its relationship to GDP changes. In contrast to a view of a quantity-based ‘secular decline’ in entrepreneurship (Decker et al, 2014), we find a nuanced pattern with ups and downs, sensitive to economic and capital market conditions. The performance of the US ecosystem relative to underlying quality has declined

substantively up to cohorts born in 2008, though there is some indication it could be improving. Consistent with a view of investment cycles, we find MSA entrepreneurial quality predicts GDP growth in the next 10 years. Finally, US entrepreneurial quality responds positively to increases in the GDP growth rate.

This research has been presented to the NSF, the European Central Bank, the White House, and a series of regional and country governments¹, creating much interest. The core insights are reported in two distinct policy reports (Fazio et al, 2016; Fazio et al, 2017). It also forms the basis for the measurement approach we use in the MIT Regional Entrepreneurship Acceleration Program (which works with regions around the world). It is also the basis for a new project, the Startup Cartography Project, which seeks to measure entrepreneurship at the individual address level across the complete US (see www.startupmaps.us).

Entrepreneurial Migration. My third area of research studies the migration of startups across regions and its implications for firm strategy and economic policy. This agenda is born from a realization that, while economic geography has long shown that people move, the basic assumption in entrepreneurship is that startups do not. Yet, press conversation on high growth entrepreneurs quite often discusses migration to startup hubs such as Silicon Valley, and examples of successful migrants are easy to find (e.g. Microsoft, Facebook). To study this question, I use business registration records to track the location changes of companies across states, and entrepreneurial quality to measure the firm (before migration), and the source and destination ecosystems. In my first paper (Guzman 2017a), I present some basic facts on the migration of startups, and document which are the destination MSA characteristics that influence

¹ Scott presented it in Copenhagen, Milan, Alaska, Norway, Perú, and South Korea. I presented it in Buenos Aires, Mannheim (Germany), and Córdoba (Argentina).

the rate of (inward) startup migration. Though many theories exist, most of the variation in migration rates is accounted for by city fixed effects. After fixed-effects, only two measures remain predictive of migration into an MSA: the quality-adjusted quantity of *local* startups, and (to a lesser extent) the local supply of venture capital.

I then study the implications of this migration for startup performance in my job market paper ‘Go West Young Firm’ (Guzman 2017b). Using machine learning and entrepreneurial quality, I find migrants perform better than strikingly similar non-migrants born in the same time and place, a result that is also robust to instrumental variables in the distance to the destination. Though many other things matter, seems to be able to explain a portion of the differences in high growth startup performance.

Entrepreneurial Finance. We then adapt the entrepreneurial quality approach, to study the process of venture capital financing. With Christian Catalini and Scott Stern (Catalini et al, 2017), we use the fact that VCs are informed investors maximizing firm equity growth to create quality measures of the ‘value’ of a firm to a VC, and then study how good are firms that grow without VC in this measure. Our results are intriguing. In contrast to a ‘dollar and a dream’ view of entrepreneurship, where any firm has the potential to grow, we find that non venture-backed firms that grow are quite similar at birth to VC-backed firms: while VC-backed firms only represent a small portion of the economy, research on VC-backed firms is a representative subsample of most growth firms in the economy. Using this measure of quality to control for firm differences, we then find a meaningful value-add of VC in the performance of firms, corroborating some prior estimates.

Gender and Entrepreneurship. The last area of my research is the intersection of gender and entrepreneurship. In Guzman and Kacperczyk (2016) we use estimates of quality to perform a decomposition, and estimate how the differences in the likelihood of raising VC between women and men can be accounted for by differences in firm quality. At least two-thirds of the outcomes can be accounted for by our observable measures, though one third remains unexplained. Through a variety of tests, we find evidence consistent with a ‘statistical discrimination’ story where VCs are less likely to invest in women because they cannot fully evaluate the true potential of the firm, and hence rely on gender. My hope is to soon expand this work to understand better how entrepreneurial strategy should then vary by gender (where we already have early results), as well as learn more about differences across minority groups such as Latinos, immigrants, and others.

I hope this research statement has given you a detailed understanding of my research interests, and that you are able to see in them the importance that I do. I am very thankful for the support of the Kauffman Foundation in this process—the value of their support to carry our field forward is immeasurable. As I start my career as an entrepreneurship scholar, I am sure being a Kauffman Scholar will always be a big asset, and the community of scholars will be one of the most valuable to belong to.

Thank you.

Jorge Guzman.

APPENDIX: LIST OF ALL ARTICLES.

Refereed Publications

- Guzman, Jorge and Scott Stern. 2015. “Where is Silicon Valley?” *Science*. 347(6222): 606-609

Conference Volumes

- Guzman, Jorge and Scott Stern. 2016. “Nowcasting and Placecasting Entrepreneurial Quality and Performance”. *Measuring Entrepreneurial Businesses: Current Knowledge and Challenges*. Eds. John Haltiwanger, Erik Hurst, Javier Miranda, and Antoinette Schoar. University of Chicago Press. 1st Edition. *Forthcoming*.

Policy Reports

- Fazio, Cathy, Jorge Guzman, Fiona Murray and Scott Stern. 2016. “A New View of the Skew: A Quantitative Assessment of the Quality of American Entrepreneurship”. MIT Innovation Initiative Laboratory for Innovation Science and Policy. Policy Report.

Working Papers

- Guzman, Jorge. 2017. “Entrepreneurial Migration”. SSRN Working Paper # 2916446. *Under Review at American Economic Journal: Economic Policy*
- Guzman, Jorge and Scott Stern. 2016. “The State of American Entrepreneurship? New Estimates of the Quantity and Quality of Entrepreneurship for 15 US States, 1988-2014” NBER Working Paper #22095. *Under Review at American Economic Journal: Economic Policy*
- Guzman, Jorge and Aleksandra (Olenka) Kacperczyk. 2016. “Gender Gap in Entrepreneurship” MIT Working Paper.

- Catalini, Christian, Jorge Guzman and Scott Stern. 2017. “Venture Capital Selection and Startup Growth”. MIT Working Paper.
- Guzman, Jorge. 2017. “Go West Young Firm” Working Paper. *Job Market Paper*.