Returns to Entrepreneurial Experience over the Business Cycle

Erin McGuire*

November 20, 2019

Abstract

In this paper, I explore business cycle-related dynamics in the returns to entrepreneurial experience. Using time-series geographic variation in economic conditions, I disentangle the effects of shocks to aggregate demand, alternative employment options, and credit availability on differences in firm exit rates between serial and novice entrepreneurs. Weibull survival model estimates indicate that serial entrepreneurs are more likely to endure negative shocks to aggregate income and credit availability, but are relatively more likely to go out of business as slack increases in the labor market. In the second part of the paper, I provide evidence that these dynamics are driven by differences in access to financial resources and business strategies.

JEL classification: L26, M13

Keywords: Business Cycle, Startups, Serial Entrepreneurs

*Current: Scheller College of Business, Georgia Institute of Technology. Former: National Bureau of Economic Research, Cambridge, MA 02138. telephone: +1(720) 402-7162, e-mail: *erin@nber.org*. I thank Price Fishback, Josh Lerner, Tiemen Woutersen, Mo Xiao, and seminar participants at Harvard Business School, University of Arizona, and Moody's Analytics for their comments and suggestions. I am grateful for fellowship support from the Ewing M. Kauffman Foundation grant number 20140669.

Data availability statement

Certain data included herein are derived from the Kauffman Firm Survey release 6.0. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Ewing Marion Kauffman Foundation. The data that support the findings of this study are available from the University of Chicago National Opinion Research Center (NORC) Data Enclave. Restrictions apply to the availability of these data, which were used under license for this study. Data are available from the author with the permission of the Kauffman Foundation and the NORC Data Enclave.

1 Introduction

An often discussed topic in entrepreneurship is the role of founder characteristics in the performance of business ventures. Many investors follow the strategy: "bet on the jockey, not on the horse," meaning that a business's founders are more important than the idea in determining long-term success. Entrepreneurial experience, in particular, has been lauded by investors and the media[1] as an accurate predictor of future venture success. However, current research has not reached a unified conclusion regarding the value of business founding experience.

A growing literature explores differences in success between serial and first-time entrepreneurs and mechanisms behind any differences. Several authors have found that prior experience has a positive effect on future business performance (Parker, 2013; Paik, 2014; Lafontaine and Shaw, 2016). The experience advantage has been attributed to learning, greater access to professional networks and finance, and skill in identifying profitable business opportunities.[2] Another strand of the literature finds mixed or inconclusive evidence that entrepreneurial experience is valuable. Gompers et al. (2010) find that previous successes provide the greatest returns. Parker (2013) presents evidence that entrepreneurs obtain temporary gains from experience, but eventually converge to their innate entrepreneurial ability. Further, previous studies ignore the possibility of dynamics in returns to experience. Are serial entrepreneurs better than nascent entrepreneurs at surviving recessions or taking advantage of economic booms? What are they doing differently that gives them an advantage?

In this paper, I propose that there are dynamics in the returns to past experience that have driven past mixed results. I investigate whether differences in firm exit rates between

[1]See Hull, Patrick, 2012. "Serial Entrepreneurs are More Successful" *Forbes,* December 12. https://www.forbes.com/sites/patrickhull/2012/12/12/serial-entrepreneurs-are-more-successful/#705b38e853c2

[2]For learning, see Baron and Ensley (2006); Lafontaine and Shaw (2016); Shaw and Sorensen (2017). For professional networks and finance, see Ucbasaran, Westhead and Wright (2008); Zhang (2011). For identification of opportunities, see Holmes and Schmitz (1990); Parker (2014); Ucbasaran, Westhead and Wright (2009).

serial and novice entrepreneurs vary over the business cycle. Entrepreneurial experience may change one's appetite for risk, which could influence exit decisions when facing economic downturns. The additional knowledge and skills gained in a prior venture may also be instrumental in weathering a recession or in choosing strategies to take advantage of an economic boom. If experience matters more at low points in the business cycle, previous estimates of the value of experience may be biased downward if the sample time series lacks variation in economic conditions. Thus, this study adds insight into why previous estimates of the value of entrepreneurial experience vary in sign and magnitude.

This paper has two main goals in identifying experience-related dynamics in firm exit. The first goal is to examine the relative variation in exit rates of serial and first-time entrepreneurs and to quantify the variation. The second goal is to understand the mechanisms behind the dynamics in differences in exit rates, specifically by analyzing experience-related differences in business strategies and access to resources.

In order to identify whether the returns to experience vary over the business cycle, I exploit time series geographic variation in economic conditions in the United States. The use of geographic and time-series variation enables me to separate the effect of economic conditions on venture survival from policies and business trends at the national level. The analysis controls for three different measures of economic conditions at the state level: average personal income per capita, unemployment rate, and the home price index. These three measures allow me to disentangle the effects of fluctuations in labor markets, product demand, and credit availability on serial and first-time entrepreneurs. I model survival using a Weibull survival model and a logit model with fixed effects, controlling for the current firm's performance.

I apply this approach to a panel of U.S. firms over the period 2004-2011, and find that the survival gap between serial and first-time entrepreneurs grows as business conditions worsen. At the baseline, firms founded by serial entrepreneurs are 7.52 percentage points more likely to survive than first-time entrepreneurs. As average state personal income per

capita declines, serial entrepreneurs are relatively more likely to remain in business. The gap in firm exit increases by 1.51 percentage points in response to a one percent decline in state personal income per capita. A similar change in relative exit occurs as home prices decline.

However, as the unemployment rate increases, i.e. slack increases in the labor market, serial entrepreneurs are less likely to survive than their novice counterparts. For each percentage point increase in the unemployment rate, the survival gap between first-time and serial entrepreneurs declines by 0.14 percentage points. This is consistent with results in Fairlie (2013) showing that rates of entry into entrepreneurship increase as slack increases in the labor market. Following from Lazear (2004)'s theory that entrepreneurs are "jacks of all trades," I hypothesize that serial entrepreneurs may be less impacted by shifts in labor markets because they have a diverse set of skills that increases their alternative employment options. First-time entrepreneurs may not have as diverse a set of skills, so their alternative employment options are more limited as economic conditions decline.

In the second part of the paper, I provide results supporting two mechanisms behind the business-cycle-related variation in the value of prior entrepreneurial experience: differences in business strategies and differences in access to financial resources.

Following previous arguments that entrepreneurial experience increases the knowledge and skills associated with running a business, I analyze differences in strategies associated with increased likelihood of venture success. If serial entrepreneurs learn about successful strategies from their first business, they will be more likely to use them in a subsequent business. The primary strategy difference present in the results is that serial entrepreneurs are more likely to prioritize research and development. Serial entrepreneurs are more likely to spend any money on R&D and take advantage of slack labor markets to hire additional R&D employees. Increased spending on innovation likely contributes to serial entrepreneurs' success, especially during recessions. Research and development spending has been found to be a vital part of firm growth and long-term viability (Fontana and Nesta, 2009; Garcia-Manjon and Romero-Merino, 2012). Higher levels of spending are also associated with increased

profits during recessions (Srinivasan, Lilien and Sridhar, 2011).

Serial entrepreneurs also adjust their human resources strategies in response to changes in economic conditions. Serial entrepreneurs reduce employment growth relatively more in response to increases in the unemployment rate, but don't reduce aggregate payroll by an equivalent amount. This suggests that serial entrepreneurs may increase the proportion of part-time employees at the firm, rather than implementing mass layoffs. By retaining workers, serial entrepreneurs maintain a high stock of firm-specific human capital. A negative relationship between employee turnover and productivity has been observed in a variety of contexts (Shaw, Gupta and Delery, 2005; Kacmar et al., 2006). Higher stock of firm-specific human capital may lead to higher levels of productivity, leading to greater profits.

As a final analysis of differences in business strategies, I estimate several cross-sectional regressions to determine whether serial entrepreneurs differ in their choice of business legal entity or in their participation in assistance programs. First, serial entrepreneurs are more likely to choose a legal entity that provides them with limited liability. This may lead them to stay in business longer when economic conditions decline because they are not personally liable for business losses. There is also empirical evidence that limited liability companies are more successful in obtaining bank financing (Storey, 1994). Second, previous business founding experience increases the likelihood of participation in assistance programs sponsored by the federal government or nonprofits. These programs may provide them with additional knowledge or connections to resources that are valuable in times of economic duress.

After examining business strategies, I then assess another possible mechanism: differences in access to financial resources. As financial endowments at startup are positively correlated with survival (Bates, 1990), I investigate whether serial entrepreneurs have greater access to credit, are more successful in receiving equity financing, or differ in sources of financing. The results indicate that serial entrepreneurs use less external financing than novice entrepreneurs and their use of financing differs along other dimensions. On average, serial entrepreneurs have 11.2% less external credit than novice entrepreneurs, but invest 11.4% more of their

own money into their businesses. However, serial entrepreneurs more readily obtain external credit as economic conditions decline. If the unemployment rate increases by one percentage point, the relative amount of credit obtained by serial entrepreneurs increases by 25%. Serial entrepreneurs also obtain more financing through equity rather than debt. As many equity financing methods offer limited liability, it is possible that serial entrepreneurs choose less aggregate credit but this affords them more favorable repayment terms. The use of equity rather than debt also likely limits their personal risk if the business fails, as business loans occasionally require the use of personal assets as collateral.

A concern with the above regressions is that I fail to control for unobserved founder heterogeneity. I account for this concern using three methods: two different inverse probability of treatment weighting schemes and analysis using a separate founder dataset. First, I construct weights based on the likelihood that founders are serial entrepreneurs. Second, I show that my main results are robust to weighting based on the likelihood that firms exit in previous years. Third, I include additional analysis from a novel founder panel dataset from Crunchbase, enabling me to account for unobserved heterogeneity in regressions using individual fixed effects. I show with this data that individuals who are more experienced receive more easily obtain financing as economic conditions decline. Experienced founders also are more likely to receive equity over debt financing. Thus the financing results from the Kauffman Firm Survey are similar to those in a model that controls for unobserved static founder heterogeneity.

This study contributes to two separate literatures. The first studies differences in firm performance between first-time and serial entrepreneurs and mechanisms behind any differences. To date, there is no consensus on whether previous entrepreneurial experience is valuable in future business ventures.

Many studies find that entrepreneurial experience increases the performance of future ventures.[3] Researchers have proposed several mechanisms driving the effect. First, serial

[3]See Parker (2013); Paik (2014); Plehn-Dujowich (2010); Lafontaine and Shaw (2016).

entrepreneurs often have greater access to networks and social capital (Ucbasaran, Westhead and Wright, 2008). This likely improves their chances of accessing funding and increases their profile in the market. Second, serial entrepreneurs are more likely to access venture capital (Zhang, 2011), which provides both a greater amount of funding and managerial guidance. Third, entrepreneurial experience may improve the ability to identify profitable business opportunities. Holmes and Schmitz (1990); Parker (2014); Ucbasaran, Westhead and Wright (2009) all find that serial entrepreneurs identify more novel, innovative opportunities than those who have not started a business before.

However, another strand of the literature studying serial entrepreneurship finds mixed or inconclusive evidence that having previous business experience is valuable.[4]. Gompers et al. (2010) find evidence that the only entrepreneurial experience that matters for predicting future IPOs is previous successful IPOS. Parker (2013) also suggests that temporary improvements in entrepreneurial performance are gained from experience, but eventually entrepreneurs converge to their innate ability.

There is evidence that entrepreneurial experience may also alter managerial decision-making, leading to improved outcomes. Goldfarb and Xiao (2011) find that managers with more experience and education tend to enter markets with fewer competitors in a sample from the U.S. telephone market. The results also suggest that more experienced managers choose more profitable markets to enter, so they have a larger chance of survival and have higher revenue conditional on survival. Using an adaptive learning model, Doraszelski, Lewis and Pakes (2018) find that firms heavily weight recent rival behavior in formation of beliefs about rivals' actions. Consequently, those with experience interacting with a rival alter their strategy based on knowledge about their rival. Ucbasaran, Westhead and Wright (2006); Cassar (2014); Stam, Audretsch and Meijaard (2008) also provide evidence of learning by doing in entrepreneurship.

The second literature to which my paper contributes is a growing empirical literature that

[4]See Chen (2013); Parker (2013); Toft-Kehler, Wennberg and Kim (2014); Ucbasaran, Westhead and Wright (2008)

analyzes the interaction between business cycles and entrepreneurship. Much of the empirical evidence on the relation between entrepreneurship and the business cycle has focused on the quantity of entrepreneurship, rather than the quality. There are two competing theories-that recessions push individuals into entrepreneurship due to slack in the labor market, or rather that prosperity in boom times pulls individuals into entrepreneurship. Audretsch and Acs (1994); Grant (1996); Carrasco (1999) all find evidence that entrepreneurship increases in a boom economy. However, several authors have found the opposite effect; the tighter labor markets in boom times lead to decreases in the rate of business creation (Fairlie, 2009, 2013; Loayza and Rigolini, 2011).

A few studies investigate whether recessions change the quality of new enterprises. Increased slack in the labor market during a recession may decrease the ability of individuals to find wage work, leading to entry into entrepreneurship (Brunjes and Diez, 2013). These individuals, who start a business after a period of unemployment, are described as necessity entrepreneurs. They are often contrasted with opportunity entrepreneurs, who enter entrepreneurship to exploit and opportunity in the market. Consistent with theory, Ghatak, Morelli and Sjostrom (2007) and Perotin (2006) find that the average quality of entrepreneurs decreases in a recession. However, several authors find that businesses started in recessions are more successful, which contradicts other findings that new establishment quality decreases in recessions. Lafontaine and Shaw (2016); Lee and Mukoyama (2015); Stangler and Kedrosky (2010) all find that enterprises started in recessions are more successful than those that began in more prosperous times. Caballero and Hammour (1994) hypothesize that recessions have a cleansing effect on the quality of enterprises, which is why firms founded in recessions have a survival advantage and greater quality.

Another set of papers in the business cycles/entrepreneurship literature finds that recessions hurt entrepreneurs primarily through the financing channel. Klapper and Love (2011) and Klapper, Love and Randall (2015) find that the effect of recessions on the number of new businesses is highest in countries with the highest levels of financial development,

suggesting that businesses who rely more on external financing channels are more hurt by financial crises. Stricter mortgage regulation also often follows downturns, which makes purchasing property more difficult, limiting the amount of collateral entrepreneurs can provide for business loans (Reuschke and Maclennan, 2014).

This study is the first to analyze whether the returns to previous business experience vary with economic conditions and what specifically serial entrepreneurs are doing differently. Prior work shows that there is a large gap in survival due to experience, but the mechanisms behind the gap remain ambiguous. Is it risk attitudes or differences in business strategies? The results of this study also add to the serial entrepreneurship literature by providing evidence that serial and first-time entrepreneurs differ in both business strategies and access to financial resources. The differences in strategies and access to resources vary over the business cycle, likely contributing to the business-cycle-related dynamics in the returns to entrepreneurial experience in firm survival. Finally, this study extends the literature investigating the relationship between various measures of economic conditions and entrepreneurship. Previous studies have examined entry over the business cycle, but an author has yet to examine determinants of exit under different economic conditions.

Along with the additions to the literature on entrepreneurship, this study also aims to provide insight to investors and policymakers. First, the results suggest that serial entrepreneurs are better investments than entrepreneurs who have no previous experience, as their ventures are more likely to remain in operation. I provide quantitative evidence favoring the investment strategy to "bet on the jockey, not on the horse." Not only are serial entrepreneurs more likely to remain in business at the baseline, but their persistence increases during recessions. This means that they are a safer investment for investors when economic conditions are turbulent. This result is not present in any previous studies. As the results are not conditional on the success of past ventures, even having a failed business venture may provide valuable experience that increases the probability of future success. Second, this study provides insight into experience-driven differences in strategies and ac-

cess to finance. Investors who take on an advisory role in their portfolio companies will find it informative to understand which strategies are more effective to ensure that businesses survive recessions. As my results suggest that serial entrepreneurs invest more in research, which plausibly drives differences in business survival, investors may want to encourage their novice entrepreneurs to invest more in research. The finding that serial entrepreneurs obtain more external financing in recessions may be of interest to business finance policymakers. As financial capital has a significant influence on business success, policymakers may want to encourage lending to novice entrepreneurs during recessions if they want to increase the survival rate of first-time businesses.

2 Background

2.1 How do economic fluctuations differentially influence serial entrepreneurs?

To provide intuition for the relationship of entrepreneurial experience with firm survival over the business cycle, I first examine a simple theoretical model of entrepreneurial choice. Combined with previous empirical evidence, several testable predictions can be generated to predict serial-nascent differences in firm survival over the business cycle.

In Evans and Jovanovic (1989)'s model of entrepreneurial choice, an individual chooses between wage work and self-employment. Income from wage work, Y^w, is defined as $Y^w = w + rA$, where the market wage is w and rA is the interest earned on the individual's assets. Self-employment income is defined as $Y^{se} = \theta f(k)\epsilon + r(A - k)$, where θ is entrepreneurial ability, $f(k)$ is the capital production function, ϵ is the random component of production, and finally k is the amount of capital purchased. Self-employment is chosen provided $Y^w \leq Y^{se}$.

Earnings from both wage work and self employment are influenced by dynamics in economic conditions. First, income earned from self employment (Y_{se}) and income from wage work (w) are directly reduced by declines in demand for products and services in a recession.

The reduction in earnings from self-employment may cause earnings from self-employment to drop below the potential earnings from wage work, meaning the entrepreneur may close their business and pursue wage work. Second, individual wealth (A) is also negatively impacted during a recession, which may lower an entrepreneur's ability to weather a period of losses. Home values and home ownership rates declined during my sample time period, which likely had a substantial negative impact on individual wealth. In December 2008, the Case-Shiller home price index had the largest price drop in its history, an 18% drop in home values from the previous year.[5] Foreclosure rates also increased by 81 percent in 2008.[6] Third, investor activity declines during recessions, which makes it more difficult to obtain financing for businesses. During the Great Recession, the number of venture capital deals shrank by 25% Bank lending also declined. Loan growth was strongly negative between 2007 and 2011 and commercial lending standards tightened (Dvorkin and Shell, 2016). The lack of financing likely influences the ability to invest in capital to maintain a competitive advantage and maintain Y_{se} during recessions.

Conversely, several aspects of recessions may increase earnings from self-employment, making it more likely that an entrepreneur will stay in business. The cost of labor and rent declines and interest rates are likely to be lower during recessions. These decrease the operating costs of a business and loans cheaper for borrowers.

How would entrepreneurial experience influence the effects of recessions? In order to determine the effects, I first analyze the relationship between previous entrepreneurial experience and entrepreneurial performance. Seminal models of human capital accumulation by Mincer (1974) and Becker (1975) propose that worker performance or productivity is positively influenced by education and professional experience. Following from results in Parker (2014), entrepreneurs' education and work experience has a significant influence on

[5]See Mantell, Ruth, 2008. "Home prices off record 18% ub past year, Case-Shiller says" *Market Watch,* December 30. https://www.marketwatch.com/story/home-prices-off-record-18-in-past-year-case-shiller-says

[6]See Adler, Lynn, 2009. "Foreclosures soar 81 percent in 2008" *Reuters,* January 15. https://www.reuters.com/article/us-usa-mortgages-foreclosures/foreclosures-soar-81-percent-in-2008-idUSTRE50E1KV20090115

the choice to enter entrepreneurship and on entrepreneurial performance.

Prior entrepreneurial experience endows individuals with human capital skills that are specific to entrepreneurship, such as knowledge of business dynamics, successful identification of business opportunities, and knowledge about management practices for running a firm (Bates, 1990; Ucbasaran, Westhead and Wright, 2008). Empirical evidence predicts that serial entrepreneurs will be more successful than nascent entrepreneurs because they apply the additional knowledge to make their businesses more productive. Becker (1975) also proposes that individuals whose human capital is specific to their job will be less mobile across organizations. Thus, serial entrepreneurs, whose human capital is specific to entrepreneurial activities, will be less likely to leave entrepreneurship and will face higher opportunity costs in transitioning to wage work.

A few predictions are generated when the human capital theory of serial entrepreneurship is combined with the postulated effects of recessions on potential earnings. First, the specific knowledge and skills that serial entrepreneurs gain from previous ventures will lead to serial entrepreneurs being less likely to go out of business in general. Second, serial entrepreneurs may be less impacted by downward shifts in aggregate demand than nascent entrepreneurs due to their additional knowledge of business dynamics. They may pursue strategies that insulate them from losing their market share due to decreases in demand. Third, serial entrepreneurs' additional network connections and knowledge gathered from previous experience will enable them to obtain financing when it is scarce, as in a recession. This will enable them to use that financing to help their firm survive the recession, thus increasing their survival advantage in a recession.

Therefore, I will test experience-related differences in probability of firm exit, access to financial resources, and business strategies. Also it will be useful to separate out the effects of different aspects of the economy: specifically labor market conditions, levels of aggregate demand, and availability of external capital. Following from previous studies, I will proxy for labor market conditions with the unemployment rate, aggregate demand with the average

personal income per capita, and availability of external capital using local property values.

2.2 Geographic variation in economic conditions

My identification strategy relies on geographic variation in business cycles within the United States, thus in this section I discuss evidence regarding geographic variation in economic conditions. Researchers in both macroeconomics and urban economics have focused on this topic. First, Carlino and Sill (2001) find considerable regional variation in dynamics in economic conditions in the United States over the second half of the 20th century. Their results suggest that differences are driven by regional differences in the share of manufacturing in industry, government spending, and monetary policy. Second, Mian and Sufi (2011) find that areas with higher debt-to-income ratios were hit harder by the housing bubble burst in 2008, leading to larger increases in the unemployment rate. Both papers are consistent with evidence in Fogli, Hill and Perri (2012) who find that the West was one of the earliest regions hit by the recession. The construction industry was a large share of industry in the West and residents had high debt-to-income ratios. A third postulated reason behind geographic differences in economic trends is regional differences in local supply of finance (Giuerrieri and Lorenzoni, 2017; Chodorow-Reich, 2014). Evidence supporting this theory is provided by Goetz and Gozzi (2010) and Greenstone, Mas and Nguyen (2018). They find that local shocks to credit constraints for small businesses led to larger employment reductions and wage losses during the Great Recession.

Figure 1 presents evidence consistent with previous studies. In the figures, I plot the trends in personal income, unemployment rate, and home value over my sample period across the different regions of the United States. The West was hit earlier by the Great Recession than the other regions of the United States. The lines also cross, meaning that trends in both the timing and magnitude of the economic decline between 2007 and 2009 and the recovery period afterward differed across regions.

As geographic conditions vary across regions in the United States both in size and magni-

tude, a model exploiting geographic variation will be identified provided that entrepreneurial locational choice is not predicated on regional differences in economic conditions. I present evidence of this in the summary statistics. Results in past studies also suggest that entrepreneurs are more likely to start businesses where they were born (Michelacci and Silva, 2007), so it is unlikely that entrepreneurs would move to start a business due to local economic trends.

3 Data

In order to estimate the returns to serial entrepreneurship at different points in the business cycle, I link confidential data from the Kauffman Firm Survey with data on state-level economic conditions from various sources. The firm data are linked to local economic conditions data based on the location of the firm headquarters.

The Kauffman Firm Survey is a nationally representative panel study of 4,928 businesses founded in 2004 who are tracked each year through 2011. The survey collects information on firm characteristics, firm strategy, firm finances, employee characteristics, and owner characteristics. Firms in the survey were sampled randomly from Dun & Bradstreet's database of new businesses founded in 2004. Selection of businesses for the Kauffman Firm Survey was based on the intensity of research and development employment in the businesses' primary industries. Businesses in high- and medium-tech industries were oversampled. The types of new businesses included were new businesses founded by a person or a team of people, purchases of existing businesses by a new ownership team, and purchases of franchises. Businesses that were wholly-owned subsidiaries of existing businesses, businesses inherited from someone else, and nonprofit organizations were excluded from the sample. The advantage of this survey over other surveys of entrepreneurs is the panel nature of the data and the detailed questions about firm strategy and finances. This enables me to examine dynamics in strategies and access to resources.

I omit several outliers from the KFS sample. First, I drop firms whose average founder age is greater than 65. Older entrepreneurs may differ from other founders, leading to bias in the analysis of dynamics in firm survival. For example, individuals over 65 are over retirement age and are likely eligible for Social Security benefits. Retirement and Social Security benefits may serve as a financial safety net, which could lead to these older founders opening businesses that have a higher likelihood of failure or pursuing more risky business strategies. There are 121 firms that fit this criteria, where the average age is greater than 65 or age is missing for at least one founder. Second, I drop firms with more than ten founders (56 firms). The KFS collects information on the first ten founders of a firm, so the entire set of founders' characteristics cannot be observed when there are more than ten founders. Third, I drop firms whose founders report starting over 20 businesses (21 firms). These entrepreneurs may be pursuing a different strategy than the typical entrepreneur. For example, they may be starting businesses in order to sell them. It is not clear that these entrepreneurs will get the same returns to experience after 20 businesses as an entrepreneur who has experience with one or two previous businesses. After all firms satisfying these criteria are removed, 131 firms in total are removed from the sample.[7] The final dataset contains 30,481 firm-year observations (4,797 unique firms).

Summary statistics for all variables are in Table 1. The first four rows summarize local conditions faced by the firms over the sample period. First, the average personal income per capita is measured in 2017 dollars at the state level and is obtained from the Bureau of Economic Analysis. I take the log of personal income for ease of interpretation in the statistical analysis. Second, the average annual state unemployment rate comes from the Bureau of Labor Statistics. The third measure of economic conditions is the state home price index, which is obtained from the Federal Housing Finance Agency. The price index measures the percentage change in home prices at the state level from the year 2000. Finally, I control for the urbanicity of the firm's location using the 2003 rural-urban continuum codes

[7] 67 firms satisfy multiple of these criteria, i.e. the firm has more than ten founders and some of them are over 65.

from the United States Department of Agriculture Economic Research Service. This code takes into account the population size of the county's metro area and the distance of non-metropolitan counties to the nearest metro area and is measured on a scale from one to nine. A continuum code between one and three represents a county in a metro area, with the code increasing if the population is larger. Continuum codes greater than three represent non-metro counties, ranked in descending order by population. Thus the least urban county (furthest from metro area) with the smallest population is given a continuum code of nine.

The next five rows of Table 1 contain the firm control variables. I observe the number of founders of the firm as well as the founders' races, education levels, genders, and ages. These variables are aggregated to the firm level in order to simplify computation. First, I control for the racial composition of the founders using an indicator variable for all founders white. 88% of all firms have all white founders. Second, I average the education level of the founders. Education is measured on a scale from one to ten, with one indicating education less than 9th grade, and ten indicating professional school or doctorate. The average education level is 5.73, meaning that the average firm's founders have education in between some college (5) and an associate's degree (6). A bachelor's degree is a seven on the KFS scale. Third, I account for gender differences in entrepreneurship by adding in a dummy variable for whether all founders are female or not. All female firms account for 20% of the Kauffman Firm Survey sample. Fourth, I control for life-cycle effects on entrepreneurship by calculating the average age of the firm's founders. As individuals often accumulate wealth and experience throughout their lives that may change choices related to entrepreneurship, it is necessary to control for age of the founders in analysis. The average founder age in the Kauffman Firm Survey is 44.

In the Kauffman Firm Survey, the firm's North American Industry Classification System (NAICS) code is reported. I use the first two digits (NAICS-2) of the NAICS codes to construct the industry fixed effects in analysis. Figure 2 summarizes the distribution of firms across industries. For ease of viewing, I aggregate industries into their NAICS-2 category in

the chart. The most common industries are services (NAICS 54), wholesale trade (NAICS 42), and manufacturing (NAICS 31-33).

Calculated measures of previous business experience are summarized in the third panel of Table 1. The main measure of experience used in analysis is the indicator for whether at least one founder has previously founded a business. About half of firms (48%) in the sample satisfy this criteria and 22% of the founders have previously founded a business in the same industry. I also generate the total previous businesses founded and the total businesses founded in the same industry. As a final measure of experience, I calculate the founding team's average years of previous work experience in the industry. The average founder has about nine years of industry experience.

Table 2 contains the outcome variables of interest for the firms. First, "Out of Business" indicates whether the firm has gone out of business in year t. 2,183 firms are out of business by 2011, 1,066 of which are experienced firms and 1,117 are firms who have founders with no previous entrepreneurial experience. Second, in order to analyze differences in firm strategies, I observe measures of research and development, employment, program participation, and choice of legal entity. There are three main measures of firm research intensity, observed in each wave of the survey. First, the survey includes the total number of patents, copyrights, or trademarks held by the firm. A minority of firms in the sample have a patent, copyright, or trademark; 16% report having at least one in all years of the survey. As another measure of research strategy, I observe the firm's spending on research and development. As many firms in the sample spend nothing on R&D, I quantify R&D intensity using an indicator for any R&D spending and the log of R&D expenditure. 19%of firms have a positive R&D budget, spending an average of \$10,829.[8] Third, the firm reports the number of employees dedicated to research and development in each survey year. The average firm has one employee in their R&D department. Regarding a firm's employment strategies, I observe the total number of employees at a firm and the total payroll. I calculate the change in firm employment in each

[8]There are a smaller number of observations for the actual R&D budget because many firms report ranges of R&D spending rather than the exact amount.

year by subtracting the previous year's number of employees from the current year's number of employees and dividing by the previous year's number of employees. I take the log of total payroll to control for the skewness of the distribution.

The survey additionally asks whether the firm has participated in any programs designed to assist new businesses put on by governments, nonprofits, universities, or private industries. This question was asked in wave four of the survey and not in any other waves. The year of program participation is not asked in the survey, so I am unable to estimate dynamics in program participation. A minority of firms participated in any technical assistance programs, with the largest proportion receiving assistance from a for-profit organization such as an accounting firm (21.5%). Finally, I observe the firm's legal status. The options for legal entity are sole proprietorship, limited liability company, sub-chapter S-Corporation, C-Corporation, general partnership, limited partnership, or other. The majority of companies in the sample are limited liability companies (33%), with sole proprietorship as the second most common legal status (29.6%).

The Kauffman Firm Survey asks detailed questions about each firm's balance sheet, enabling me to observe each firm's access to financial resources. The key measures of finance that I use in analysis are the total external credit available to the firm, the percentage of financing in exchange for equity, the amount of equity held by the founders, and the investment by founders in exchange for equity. The average firm has access to $38,000 in external credit and $15,000 in financing from the founders themselves. Firms favor debt over equity financing; the average proportion of financing from equity is 10%, and founders hold 71% of the equity in their companies.

4 Modeling firm survival over the business cycle

My objective is to investigate the relationship between fluctuations in the business cycle and differences in exit decisions between serial and nascent entrepreneurs. I want to allow

for the possibility that serial entrepreneurs react differently to recessions or to periods of economic growth than those starting their first business. For example, a serial entrepreneur may have weathered a recession while running a previous business may have a better idea of how long to remain operational during a period of low demand. Alternatively, serial entrepreneurs may have learned the signals of impending business failure and thus will exit earlier in a recession than a new entrepreneur.

I model the differential impact of local economic conditions on the exit decisions of serial and nascent entrepreneurs using a survival model. As in previous studies,[9] I model firm exit using a Weibull duration model. The hazard, or risk of going out of business, given that a business has been open for t years, is described by:

$$h(t) = h_o(t)g(X), \text{ where } h_o(t) = \lambda t^{\lambda-1} \tag{1}$$

The shape parameter is denoted λ. If $\lambda < 1$, there is negative duration dependence, meaning that older firms are less likely to go out of business. If $\lambda = 1$, there is no duration dependence, and the model reduces to the Cox model. If $\lambda > 1$, older firms are more likely to go out of business. I put no restrictions on the value of λ in the model.

The hazard that a firm f in industry i and state s exits given that it has survived to year t is written as:

$$\begin{aligned} h(t) = h_o(t)exp(\alpha &+ \beta_1 P_{st} + \beta_2 U_{st} + \beta_3 H_{st} + \beta_4 Exp_f \\ &+ \beta_5 P_{st} \times Exp_f + \beta_6 U_{st} \times Exp_f + \beta_7 H_{st} \times Exp_f \\ &+ X'_{fist}\theta + \eta_i + \mu_s + \epsilon_{fist}), \end{aligned} \tag{2}$$

where P_{st}, U_{st}, and H_{st} are respectively the log of average annual state personal income per capita, the average annual state unemployment rate, and annual state home price index, respectively. These measures capture the effects of local aggregate demand, labor market,

[9] See Mata and Portugal (1994); Thompson (2005).

and capital supply conditions on the likelihood of firm exit. Previous authors have used personal income, home value, and unemployment rate to investigate the effects of economic conditions on rates of entrepreneurship (Parker, 2009; Fairlie, 2013).

Exp_f is an indicator for whether the founders of firm f have any previous entrepreneurial experience, regardless of industry. X'_{fist} is a vector of owner and firm characteristics, such as number of founders, race of founders, founder education levels, founder team gender composition, urbanicity of the firm's location, and the log of the previous year's revenue. η_i and μ_s are respectively industry and state fixed effects. Industry fixed effects absorb cross-industry baseline differences in survival rates, state fixed effects control for fixed conditions within a state that influence firm survival, and finally the year fixed effects control for differences in survival rates across years. The Weibull model accounts for firm age, so it is unnecessary to include firm age fixed effects. Since firm age and year are perfectly collinear in the data set (all firms started in 2004), it is not possible to include year dummies in the model. I cluster standard errors at the industry (NAICS-2) level.

The explanatory variables of central interest are β_5, β_6, and β_7, the interaction terms of founder experience and economic conditions. First, β_5 captures any differences in the effect of local aggregate demand on exit decisions between serial and first-time entrepreneurs. This is because average personal income per capita proxies for local aggregate demand conditions. If $\beta_5 < 0$, this means that the survival gap between serial and nascent entrepreneurs grows as average state personal income per capita declines. Second, β_6 is an estimate of the difference in the effect of local labor market conditions (measured by unemployment rate) between serial and first-time entrepreneurs. The local labor market conditions can be thought of as the value of employment options outside of entrepreneurship. If this coefficient is significant, the value of the outside employment option may differ between serial and first-time entrepreneurs, leading to differential exit decisions. Third, β_7 estimates the moderating effect of access to external capital on the survival gap between serial and novice entrepreneurs. Increases in home prices may increase the amount entrepreneurs can borrow against their homes,

thus increasing the size of the business loan that they can obtain. As discussed in previous sections, serial entrepreneurs may have more network connections, enabling them to access more external capital than novices. A negative estimate of β_7 would be consistent with this hypothesis, as it would imply that serial entrepreneurs are more able to access capital when supply is tight. All specifications are estimated with maximum likelihood estimation (MLE) and robust standard errors clustered at the industry level are reported.

4.1 Potential threats to empirical strategy

Accounting for endogeneity of entry into serial entrepreneurship

Any founder traits correlated with both entrepreneurial experience and firm survival will bias estimates of differences in survival between first-time and serial entrepreneurs. If these traits are also correlated with responses to economic fluctuations, the estimates of dynamics in differences in survival rates over the business cycle will also be biased. If serial entrepreneurs differ from first-time entrepreneurs in some unobservable way, it is likely that they will also differ on some observable statistic. For this reason, I describe my methods to account for this possibility in this section as well as report summary statistics showing that it is not likely a concern.

In order to control for the potential that serial entrepreneurs are significantly different from the novice entrepreneurs in my dataset, I use inverse probability of treatment weighting. To do this, I run two separate logit regressions to predict whether a firm's founders are serial or not. The first logit regression uses no controls. The second predicts the likelihood of a firm having any serial founders using demographic variables (age, education level, racial composition, number of founders) as controls, as well as industry (NAICS-2) and state fixed effects. I then predict whether a firm has serial founders using the estimates from each logit regression. The weights are defined as follows:

$$[Weight|exp = 1] = \frac{P(Exp_f = 1)}{P(Exp_f = 1|X_f)} \tag{3}$$

$$[Weight|exp = 0] = \frac{1 - P(Exp_f = 1)}{1 - P(Exp_f = 1|X_f)} \tag{4}$$

These weights are used in each regression throughout the paper.[10]

Table 3 compares the observable characteristics of serial and first-time entrepreneurs. Specifically, I assess whether serial entrepreneurs are more likely to have a business partner, have higher education or more industry experience, are more likely to be female, older, or white. Serial entrepreneurs do not statistically significantly differ from first-time entrepreneurs on any of these dimensions in the sample.

Another concern for the identification strategy is that serial entrepreneurs differ in their location choices from first time entrepreneurs. Serial entrepreneurs may learn from previous experience to locate their firms in areas with better economic conditions, which will make their businesses more successful. This would bias the estimate of the survival gap between nascent and serial entrepreneurs upward. If areas with better initial economic conditions also have milder business cycles, the estimates of dynamics in serial-first time differences in business survival will also be biased. This is unlikely to be a problem as there is evidence that entrepreneurs prefer to start businesses close to where they live (Michelacci and Silva, 2007).

Table 4 and Figure 3 examine whether serial entrepreneurs locate in different states or in areas with differing urbanicity than those starting businesses for the first time. There is no evidence that experienced entrepreneurs locate in areas with higher average incomes, home values, or lower unemployment rates. In fact, experienced entrepreneurs locate in states with lower average incomes and higher unemployment rates, but none of these measures statistically significantly differ from those faced by first-time entrepreneurs. The urbanicity

[10] I perform a similar weighting exercise to weight whether the firm survived to the previous year of the survey to account for sample selection in later years. I present results of regressions using both weighting schemes for the survival models.

of the firm's headquarters does not differ by experience, but I include controls for urbanicity of the firm's headquarters location in all of my specifications. This accounts for location choice within the state.

4.2 Survival model results

Table 5 reports estimates from the Weibull model using the full sample of firms. Each column contains the results of a different combination of controls and economic conditions. The first column presents baseline results where all measures of state-level economic conditions are omitted from the regression. The second column controls for the vector of firm characteristics,[11] an indicator for any founder having past entrepreneurship experience, average state personal income per capita, and the interaction between experience and personal income. The third column replaces personal income with the state home price index and the fourth column replaces personal income with the state unemployment rate. The column of central interest is the fifth column, as it includes all proxies for economic conditions and their interactions with entrepreneurial experience.

As the coefficients of the Weibull model are not directly interpretable, I report the estimated average marginal effects on the hazard of the firm closing in Table 5. Each entry in the table corresponds to an estimate of the marginal effect of a one-unit increase in the variable of interest on the probability that the firm is still operating in year t. For example, the estimate -0.0123 in the first row, first column of the table means that a serial entrepreneur is 0.012 percentage points less likely to close in any year than a novice entrepreneur.

Serial entrepreneurs' estimated survival advantage over nascent entrepreneurs is consistent with previous literature. The first row of the fifth column, first row of Table 5 implies that serial entrepreneurs are 11.5 percentage points more likely to remain operating in any year than those starting a business for the first time. The magnitude of the estimated

[11]The firm controls are the log of the previous year's revenue, urbanicity of the headquarters, average founder age, education level, number of founders, an indicator for all founders female, and an indicator for all founders white.

survival advantage of serial entrepreneurs over novice entrepreneurs changes depending on which vector of controls is used, but the sign of the estimate remains consistent across all columns.

The dynamics in exit also differ depending on local economic conditions. First, the likelihood of firm exit in general decreases in response to increases in aggregate demand (measured by annual state average personal income per capita). If state personal income per capita increases by one percent, the likelihood of firm exit declines by 31.1 percent. However, serial entrepreneurs are relatively less likely to exit when aggregate demand drops. If average state personal income per capita declines by one percent, the gap in survival between serial and first time entrepreneurs grows by 1.5 percentage points. This implies that serial entrepreneurs are less likely to exit in response to negative fluctuations in demand, which could be driven by different business strategies or additional access to financial resources. Experience-related differences in access to resources and in business strategies will be examined in the next section of the paper.

Second, fluctuations in labor market conditions also have a statistically significant influence on firm survival and the gap in firm survival between serial and first-time entrepreneurs. Consistent with results in Fairlie (2013), increases in the state unemployment rate increase the likelihood of firm survival (1 percentage point increase in the likelihood of survival for every percentage point increase in the unemployment rate). This is likely the result of a decline in the quality of the outside employment option for entrepreneurs. Increases in the unemployment rate also lead to decreases in the survival gap between serial and first-time entrepreneurs. For each percentage point increase in the unemployment rate, the difference in survival rates between first-time and serial entrepreneurs decreases by 0.14 percentage points. Thus, serial entrepreneurs are relatively more likely to exit in a tighter labor market. This could be driven by a slower degradation of the outside employment option for serial entrepreneurs than that of first-time entrepreneurs as the labor market tightens.

Third, fluctuations in the availability of outside capital statistically significantly influence

both firm survival in general and the survival gap between first-time and serial entrepreneurs. Decreases in the home price index lead to increases in the likelihood of firm failure; a decline in the state home price index of one percent leads to a 0.04 percent increase in the likelihood a firm goes out of business. The relative likelihood that serial entrepreneurs go out of business is not influenced by changes in the state home price index.

Finally, the fit of the Weibull model to the data is examined in Figure 4. In the figure, I plot the predicted proportion of firms out of business and the actual proportion of firms out of business in each sample year. The actual values are within the 95% confidence interval of the estimates, meaning that the Weibull model accurately models the probability that a firm exits in any year.

4.3 Robustness 1: are the dynamics driven by differential responses to firm performance?

One possible mechanism behind the business-cycle related dynamics in exit rates between serial and nascent entrepreneurs is that the two groups respond differently to losses. Experienced entrepreneurs may place a greater value on the non-pecuniary benefits of entrepreneurship, and may be willing to cope with losses for longer time periods. This would lead them to be less likely to exit at times when aggregate demand is low. Alternatively, serial entrepreneurs may find it easier to start new businesses, and thus would be more likely to leave a business at the first sign of hard times. This would lead the survival gap to decrease in times of recessions, as serial entrepreneurs will be relatively more likely to exit.

In order to test these hypotheses, I add an interaction of last year's revenue with the indicator for entrepreneurial experience in the Weibull model. If the estimated hazard ratio last year's profit is statistically significant and positive, this means that higher revenue levels from the previous year increase the chance that an entrepreneur's firm will still be in business in the current year. Further, if the estimate of the interaction term is negative, meaning that when faced with the same revenue, serial entrepreneurs will be more likely to exit. This

would imply that the second story is true, that serial entrepreneurs prefer to leave a business to start a new one at the first sign of hard times.

Column 2 of Table 6 contains the results of the Weibull specification including an interaction term of experience with the log of last year's revenue. The primary results remain unchanged and the interaction term of revenue and experience is statistically insignificant. This suggests that serial entrepreneurs do not react differently to losses than novices.

4.4 Robustness 2: industry experience vs. entrepreneurial experience

Which is more important, previous entrepreneurial experience or industry experience? In this section, I consider the possibility that previous industry experience is what helps entrepreneurs weather recessions, rather than previous entrepreneurial experience. To explore this hypothesis, I include an indicator for whether the founding team has any work experience in their firm's industry in equation (1). I also include interactions of the indicator with economic conditions variables in order to determine whether this experience changes value over the business cycle.

Table 6 contains results of the survival model including the industry experience terms. The third column is the primary column of interest. The second column reprints the main results from the previous section for comparison purposes. The results suggest that previous industry experience is not the primary variable influencing differences in exit rates, as the majority of the entrepreneurial experience estimates remain statistically significant and similar in magnitude. This can be observed by comparing columns (1) and (3) in Table 6. The industry experience interaction terms are the same signs as the entrepreneurial experience terms, suggesting that industry experience has similar effects on firm survival. Additional industry experience leads to improved performance as average state personal income per capita drops. If state personal income per capita drops by 1%, an entrepreneur with one additional year of experience will be 1.07 percent less likely to go out of business.

More experienced industry professionals are also more likely to leave their business as the unemployment rate increases. A similar argument may hold for this effect to the interaction effect between entrepreneurial experience and the unemployment rate; the degradation of the outside employment option is slower for more experienced individuals as the labor market tightens. It may be easier for someone with more years of industry experience to find a job when the unemployment rate is high.

4.5 Robustness 3: focus on Great Recession

I check whether my results are robust to controlling for long-run trends in firm performance and economic conditions using a different specification to model firm survival. I estimate a logit specification using an indicator for whether the firm has survived to 2010 (5 year survival rate), controlling for the average revenue between 2004 and 2010, average economic conditions, and the full vector of firm controls similar to the Weibull model. As I average the revenues and the economic conditions over the first five years of a firm's life, this will even out any random blips in firm performance or in state economic conditions. This regression also answers the question whether serial entrepreneurs are more likely to survive the Great Recession than novice entrepreneurs.

Table 7 presents these results. The first four columns weight observations based on experience and the next four columns weight observations based on the probability that they survived to 2008. Overall, similar dynamic effects are present as in the Weibull regression; the relative likelihood of exit changes in response to economic conditions. The magnitudes of the estimates are slightly smaller because this model has less variation in economic conditions and exit is only observed at the five year mark, but the directions of the estimated effects remain the same. First, experienced entrepreneurs are more likely to exit under worse labor market conditions (3.1 percentage points more likely to close for each one percentage point increase in the unemployment rate). Second, the sign and magnitude of the home price index results also remains the same as in the Weibull regression. Increases in the state home price

index lead to decreases in the five year survival gap between novice and serial entrepreneurs. For each 1 percentage point increase in the home price index, the gap decreases by 0.002 percentage points.

In the fifth-eighth columns of Table 7, I account for the concern that there is attrition bias in examining the subsample of firms who survived at least until the four year mark. I re-weight the estimates by the likelihood that the firm has remained in business up to 2009. The signs of the coefficient estimates remain the same, but all that remains significant is the home price index result.

It is possible that the loss of all significant results other than the home price result in the specifications including all of the economic conditions proxies may be because the Great Recession began with the collapse of the housing market. The loss of all time series variation in economic conditions in the cross-sectional logit model also makes these three measures quite correlated and more difficult to disentangle the separate effects of aggregate demand, labor market conditions, and availability of external capital. Exit of firms is also observed only in 2010, which removes substantial variation in exit conditions and characteristics of the exiting firms.

5 Differences in business strategies

Having established that serial entrepreneurs are more likely to remain in business than novice entrepreneurs as economic conditions decline, this section examines possible mechanisms behind the advantage. I first consider differences in business strategies between serial and novice entrepreneurs under different economic conditions. Serial entrepreneurs may pursue strategies that help their business retain a competitive advantage or remain profitable as economic conditions decline. The specific strategies that I focus on are differences in research and development, employment, and initial choice of business legal structure.

I model dynamics in choices of business strategies using a fixed effects, linear regression.

Selection into serial entrepreneurship is corrected for using inverse probability of treatment weighting, as in the earlier survival models. The regression is as follows:

$$\begin{aligned} Strategy_{fist} = \alpha &+ \beta_1 P_{st} + \beta_2 U_{st} + \beta_3 H_{st} + \beta_4 Exp_f \\ &+ \beta_5 P_{st} \times Exp_f + \beta_6 U_{st} \times Exp_f + \beta_7 H_{st} \times Exp_f \\ &+ X'_{fist}\theta + \eta_i + \mu_s + \tau_t + \epsilon_{fist}), \end{aligned} \tag{5}$$

where $Strategy_{fist}$ is a measure of the firm f in industry i and state s's chosen strategy in year t. P, U, H are proxies for state level economic conditions- average personal income per capita, unemployment rate, and home price index, respectively. The control variables are the number of firm founders, an indicator for all founders white, an indicator for all founders female, a measure of urbanicity in the firm's zip code, and log(revenue) for the previous year. I also control for time-invariant industry and state factors as well as year fixed effects to control for economic trends at the national level.

The results of the regression estimations are presented in Tables 8-10. Each column represents a different regression, with outcomes varying across regressions. I start with the impact of entrepreneurial experience and economic conditions on research and development, the exposit my results on employment and salary, and finally discuss the impact of entrepreneurial experience on the choice of business legal entity and participation in assistance programs.

5.1 Research and development

Table 8 presents estimates of the influence of entrepreneurial experience on research strategies as state economic conditions change. There is substantial evidence that research by the firm improves chances of survival,[12] which suggests that serial entrepreneurs' additional research and development investment may contribute to their survival advantage. I

[12]See Fontana and Nesta (2009); Wagner and Cockburn (2010); Coad and Rao-Nicholson (2008); Shane (2001); Nerkar and Shane (2003); Christensen and Bower (1996); Gans and Stern (2003).

investigate differences in the propensity to hold patents, propensity to spend any money on research and development, amount of research and development spending, and finally hiring decisions for R&D employees. First, I do not find any experience-related differences in patent-holding, but as patent approval takes an average of 22 months (USPTO, 2019), it is also useful to directly examine dynamics in research and development spending.

Second, columns two and three contain estimates of the influence of experience on spending any money on R&D and how much is spent given any R&D spending, respectively. Serial entrepreneurs are more likely to spend any money on R&D and spend more as economic conditions decline. At the baseline, serial entrepreneurs are 8.22 percentage points more likely to spend any money on R&D than novice entrepreneurs. If personal income per capita declines by 1 percent, serial entrepreneurs are an additional 2.62 percentage points more likely to spend any money on R&D. As the unemployment rate increases, serial entrepreneurs also spend more on R&D. For each percentage point increase in the unemployment rate, serial entrepreneurs spend 8.9 percentage points more money on R&D. Finally, I find that serial entrepreneurs devote relatively more funds to R&D when the state home price index increases. It is possible that this is driven by differences in property holdings between serial and novice entrepreneurs. If serial entrepreneurs have more money invested in property, they will get a greater benefit from increases in property values than novices, and may invest that money back into their business.

I finally investigate within-firm R&D employment in column four. As the unemployment rate increases, the number of employees devoted to R&D increases at firms founded by serial entrepreneurs relative to novice entrepreneurs. For each percentage point increase in the unemployment rate, the number of R&D employees hired by serial entrepreneurs increases by 0.089. Consistent with the result that R&D spending increases with home price index, R&D hiring also increases as home price index increases. Thus serial entrepreneurs spend more on R&D when their access to capital increases (through property value channel) and they increase hiring as slack increases in the labor market. Both of these effects may lead to

firms founded by serial entrepreneurs having more robust R&D departments, contributing to a competitive advantage over other firms in the market.

5.2 Hiring and payroll

I now investigate serial-novice differences in hiring and salary strategies. The results in column one of Table 9 suggest that serial entrepreneurs retain relatively less employees as economic conditions decline. The growth rate in employment at firms founded by serial entrepreneurs declines by 1.30 percentage points more than at novice firms as the unemployment rate increases by one percentage point.

Turning to column 2, Serial entrepreneurs also pay their employees less at the baseline, but adjust payment schemes more as economic conditions change. If personal income declines by one percentage point, serial entrepreneurs pay their employees 1.9 percent less. However, if unemployment rate increases, the payment gap between serial and novice entrepreneurs declines. Serial entrepreneurs pay their employees 11 percent more if unemployment rate increases by one percentage point. When put together, this suggests that serial entrepreneurs adjust their labor inputs differently than novice entrepreneurs upon experiencing an economic downturn. As labor is often the most costly firm input, keeping these costs down when aggregate demand drops in a downturn may contribute to increased chances of firm survival. This suggests that serial entrepreneurs may increase the proportion of part-time employees at the firm, rather than implementing mass layoffs. This would allow them to retain a high stock of firm-specific human capital. Higher stock of firm-specific human capital may lead to higher levels of productivity within the firm, leading to greater profits. A negative relationship between employee turnover and productivity has been observed in a variety of contexts (Shaw, Gupta and Delery, 2005; Kacmar et al., 2006).

5.3 Choice of legal entity and participation in assistance programs

Another strategy that I investigate is the choice of business legal entity. It is possible that if an entrepreneur has limited liability in his business, he will be more likely to take out additional loans to help save the business as he won't be liable to pay them if the business fails. Thus, I focus on explaining the choice between legal forms of business that provide limited liability and those that do not. As this is a decision made at firm startup, I cannot look at the dynamics in this decision. I find that serial entrepreneurs are 5.8 percentage points more likely to choose legal forms of business that provide them with limited liability. Storey (1994) finds that limited companies (rather than sole proprietorships or partnerships) are more likely to obtain bank loans. Thus if serial entrepreneurs are less likely to choose limited forms of business entity, they may be able to access more capital and remain in business longer.

I finally find that serial entrepreneurs are more likely to participate in assistance programs run by nonprofits or by the federal government (other than the SBA). From columns (2) and (3) of Table 10, serial entrepreneurs are 1.3 percentage points more likely to participate in federal government assistance programs and 4 percentage points more likely to participate in assistance programs sponsored by nonprofits. This means that they are more likely to seek out these assistance programs and thus may be more resourceful or have more previous knowledge of these programs from their last business.

6 Access to resources

Table 11 considers the hypothesis that the knowledge, skills, and connections gained in previous entrepreneurial ventures change entrepreneurs' access to finance. Each column in the table examines the impact of entrepreneurial experience and its interaction with economic conditions on a different measure of access to finance. The regression specifications are similar to those in the business strategies section. I estimate a linear fixed effects regression

including entrepreneurial experience, economic conditions, their interaction terms, and firm control variables, including the logarithm of last year's revenue and the urbanicity of the firm's headquarters. I include state, year, and industry (NAICS-2) fixed effects.

The first column estimates the effect of entrepreneurial experience and economic conditions on the total external credit available to a firm. At the baseline, serial entrepreneurs have on average 11.26% less total external credit, but this can be reconciled with the result in column 4 that they invest 11.40% more of their own money into their business. As aggregate demand increases, serial entrepreneurs obtain more external credit. From column 1, row 5, an increase in average state personal income per capita of 1% will increase the total external credit available to serial entrepreneurs by 2%. This may be driven by the fact that as demand increases, the supply of external capital increases, and the terms for loans and equity financing become more favorable. Thus serial entrepreneurs are more likely to apply for external financing when the terms are more favorable. This is consistent with the results in the other columns that suggest serial entrepreneurs shift more towards debt financing and away from self-investment as state personal income increases. As the unemployment rate increases, serial entrepreneurs are also more likely to obtain external financing. For each percentage point increase in the unemployment rate, serial entrepreneurs obtain 25.7% more external financing. This may be because serial entrepreneurs have larger professional networks than their novice counterparts, meaning that they have more connections to financing as markets tighten, consistent with results in Ucbasaran, Westhead and Wright (2008).

Results in the second column of Table 11 suggest that there are differences in the methods used by serial and first-time entrepreneurs to finance their businesses. At the baseline, serial entrepreneurs have 0.914 percentage points more financing through equity than novice entrepreneurs. This may mean that serial entrepreneurs take a hit on aggregate external financing in order to avoid having a monthly loan payment. The difference in proportion of financing through equity increases in response to declines in state personal income and home prices. If state personal income decreases by 1%, the proportion of financing serial

entrepreneurs have from equity relative to novices increases by 0.21 percentage points. If the home price index decreases by 1%, the difference increases by 0.001 percentage points. This implies that serial entrepreneurs have a greater advantage in obtaining equity financing as economic conditions decline.

Conversely, as the unemployment rate increases, the serial-novice difference in the proportion of financing from equity decreases. This may be driven by increased probability of exit by serial entrepreneurs as labor market conditions decline (shown in the Weibull survival model results). Serial entrepreneurs who are more likely to exit are less likely to go through the process of obtaining financing from investors.

The results in column (3) suggest that serial entrepreneurs hold 0.687 percentage points more equity in their business than novice entrepreneurs. When combined with the estimates in column (1), this indicates that serial entrepreneurs retain control over their businesses. As serial entrepreneurs hold more equity in their business, they may have more motivation to make the business profitable. Previous authors have found that managerial ownership stakes have a positive or an inverse-U relationship with firm returns (McConnell and Servaes, 1990). As aggregate demand increases, serial entrepreneurs hold less equity in their own businesses. The result in the fifth row of column (3) suggests that if aggregate income increases by 1%, serial entrepreneurs give out 3 percentage points more equity. This may be because as aggregate demand increases, serial entrepreneurs seek out more external financing (column 1) and therefore have to issue equity or debt to their new investors. Self investment by serial entrepreneurs also decreases relatively more than investment by novice entrepreneurs when state personal income increases (column 4), providing further evidence that serial entrepreneurs substitute away from self financing as economic conditions improve.

The difference between self financing by serial entrepreneurs and credit available to novice entrepreneurs increases in response to increases in the home price index (column 4). It is possible that this is because serial entrepreneurs either are more willing to put up their home as collateral for a loan or have more money invested in property. This implies that

when home prices increase, it is easier for serial entrepreneurs to obtain debt financing. Both debt and equity financing increases relatively more for serial entrepreneurs than novice entrepreneurs in response to increases in the state home price index.

7 Controlling for unobserved founder heterogeneity: evidence from Crunchbase

It is possible that the inverse probability of treatment weighting used in the previous results fails to control for unobserved founder characteristics correlated with both business outcomes and the likelihood of becoming a serial entrepreneur. Thus, in this section I turn to a novel founder-level panel dataset created with data scraped from Crunchbase. The founder panel data enables me to control for unobserved time-invariant founder heterogeneity using individual fixed effects. Essentially, in analysis I compare founder performance over time across the companies they founded. Unfortunately, as firm exit is imperfectly measured in the data, the only analysis I can do with the data is analysis of the amount and types of funding that the firm receives. The funding data is verified independently by news articles or SEC documentation, but exit data is entirely self-reported.

To create the founder-firm dataset, I scraped each personal profile on Crunchbase to get the founder's name and the names of all companies they founded. I then merge the company names with information about the companies (other founders, funding information) from the company's Crunchbase profiles. I drop funding data from all companies founded before 2007 to avoid selective backfilling of the data, but retain the information that the founders of these companies have previous experience. The final dataset contains 29,864 founders of 15,829 companies.

Table 12 presents summary statistics for the panel dataset. The only variables that I observe from the Crunchbase company profiles are the founding year, the dates of the funding rounds, the identities of the other founders, the industry (categorized using Crunchbase

defined categories), and the location of the firm headquarters. As Crunchbase primarily has technology startups on its site, it is unsurprising that the majority of the firms are less than five years old with more external financing than any firm in the Kauffman Firm Survey.

My estimation approach of access to finance controlling for static founder heterogeneity is built on the following base specification:

Let Exp_{ift} indicate whether founder i of firm f in founding year t, state s, and industry n has previously founded a business (other than firm f). I take the maximum over all founders of the firm (set I_f) to calculate a similar experience measure to what I used with the Kauffman Firm Survey.

$$Exp_{fsnt} = \max_{i \in I_f}(Exp_{ifsnt}) \tag{6}$$

$$\begin{aligned} ln(funding_{ifsnt}) = \alpha + Exp_{fsnt} + \beta_1 P_{st} + \beta_2 U_{st} + \beta_3 H_{st} \\ + \beta_4 Exp_{fsnt} + \beta_5 P_{st} \times Exp_{fsnt} + \beta_6 U_{st} \times Exp_{fsnt} \\ + \beta_7 H_{st} \times Exp_{fsnt} + X'_{fisnt}\theta + \gamma_i + \tau_t + \eta_s + \psi_n + \epsilon_{iftsn} \end{aligned} \tag{7}$$

where log funding is the log of total funding received by the firm, γ_i are individual fixed effects, τ_t are year fixed effects for the founding year of the firm, η_s are state fixed effects, and ψ_n are industry fixed effects.

7.1 Results: aggregate funding and equity vs. debt financing

Table 13 presents the estimated relationship between the total funding received by a firm and entrepreneurial experience of the founders. Each column represents the results of a separate regression, varying the proxy for economic conditions across columns. All regressions presented control for firm age and the number of founders, as well as time, industry, state, and individual fixed effects. Consistent with previous results, I find that the experience premium increases as economics conditions decline.

From column (1), an increase in per capita state personal income by 1% decreases the extra total funding received by an experienced entrepreneur team by 1.43%. The sign and magnitude is similar for the home price index in column (3); if the state home price index increases by 1 percentage point (i.e. capital is easier to obtain through a home equity loan), the gap in total funding decreases by 0.008%. Consistent with intuition, the sign flips for the regression when unemployment rate serves as a proxy for economic conditions. If unemployment rate increases by 1 percentage point, the experience premium in external funding increases by 5.30%. In the fourth column, when all the proxies are included, only the home price index effect remains statistically significant. It is possible that this is driven by lack of geographic variation in the Crunchbase dataset (the vast majority of firms are in California or New England). The lack of geographic variation decreases the amount of variation in timing and magnitude of economic shocks, which makes it harder to distinguish effects of changes in different aspects of the economy.

The regressions produce similar results when the outcome variable is changed to an indicator for equity financing. Conditional on receiving financing, experienced entrepreneurs are more likely to obtain equity over debt financing as economic conditions decline. These results are available on request.

8 Conclusion

The media has long debated whether serial entrepreneurs are more successful than novices, leading to a growing literature focusing on analyzing whether there are returns to business founding experience. While several prior studies have documented that serial entrepreneurs perform better than those starting their first business, other researchers have found mixed or negative correlations between entrepreneurial experience and venture performance. Further, the mechanisms behind any serial entrepreneur advantages are less understood. This paper addresses both of these gaps in the literature.

I examine whether previous mixed results have been driven by dynamics in the value of experience. In particular, I try to understand whether previous business experience increases the likelihood of firm survival during economic downturns. I further analyze whether experience-related dynamics in firm survival are through access to financial resources or differing managerial strategies. This paper is the first to try to identify whether the returns to experience differ over the business cycle, and the mechanisms behind any variation in returns.

In analysis, I make use of confidential data from the Kauffman Firm Survey, which enables me to exploit geographic variation in economic conditions in order to compare the survival of experienced entrepreneurs to inexperienced entrepreneurs. I find that firms founded by entrepreneurs with business experience are more likely to survive at the baseline and this gap in survival increases as economic conditions worsen. I argue that the dynamics in the experienced-inexperienced survival gap are driven by greater availability of financial resources to serial entrepreneurs. Serial entrepreneurs are more likely to self-finance, give up less equity in their firms, and use a greater proportion of financing through equity. This enables them to maximize their liquidity and minimize financial liability in times of crisis. These results are robust to analysis in a separate founder panel dataset that controls for static founder heterogeneity.

The results also support the claim that serial entrepreneurs differ from novice entrepreneurs in their business strategies. Serial entrepreneurs are more likely to spend any money on research and development. This likely improves their chances of survival, as R&D spending is associated with increased probability of firm survival (Fontana and Nesta, 2009; Garcia-Manjon and Romero-Merino, 2012). They are also adjust hiring and payroll in response to economic fluctuations, are more likely to choose legal entities that provide them with limited liability, and are more likely to participate in assistance programs. These differences in strategies likely provide them with extra flexibility and protection, increasing the chances of success in the long-run.

Understanding the effects of entrepreneurial experience on the likelihood of firm survival under different economic conditions is important because entrepreneurs play a large role in innovation and job creation (Haltiwanger, Jarmin and Miranda, 2013). Researchers have studied entry over the business cycle (Parker, 2009; Fairlie, 2013), but there are still gaps in our knowledge about firm exit. An understanding of exit during recessions can inform business policy in order to minimize job destruction during recessions. The findings presented here that businesses founded by first-time entrepreneurs are more likely to fail due to differences in strategies and access to resources suggests that it may be useful to target policy at first-time entrepreneurs in order to educate them about effective strategy and improve access to finance.

References

Audretsch, D. B., and Z.J. Acs. 1994. "New firm start-ups, technology, and macroeconomic fluctuations." *Small Business Economics*, 6: 439–49.

Baron, Robert, and Michael D. Ensley. 2006. "Opportunity Recognition as the Detection of Meaningful Patters: Evidence from Comparisons of Novice and Experienced Entrepreneurs." *Management Science*, 52(9): 1331–1344.

Bates, Timothy. 1990. "Entrepreneur Human Capital Inputs and Small Business Longevity." *The Review of Economics and Statistics*, 72(4): 551–59.

Becker, Gary. 1975. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education, Second Edition.* National Bureau of Economic Research.

Brunjes, J., and J.R. Diez. 2013. "'Recession-push' and 'prosperity-pull' entrepreneurship in a rural developing context." *Entrepreneurship & Regional Development*, 25(3-4): 251–71.

Caballero, Ricardo J., and Mohamad L. Hammour. 1994. "The Cleansing Effect of Recessions." *American Economic Review*, 84(5): 1350–1369.

Carlino, Gerald, and Keith Sill. 2001. "Regional Income Fluctuations: Common Trends and Common Cycles." *The Review of Economics and Statistics*, 83(3): 446–456.

Carrasco, R. 1999. "Transitions to and from self-employment in Spain: an empirical analysis." *Oxford Bulletin of Economics and Statistics*, 61: 315–41.

Cassar, G. 2014. "Industry and startup experience on entrepreneur forecast performance in new firms." *Journal of Business Venturing*, 29: 137–51.

Chen, J. 2013. "Selection and serial entrepreneurs." *Journal of Economics and Management Strategy*, 22(2): 281–311.

Chodorow-Reich, Gabriel. 2014. "The Employment Effects of Credit Market Disruptions: Firm-level Evidence from the 2008-09 Financial Crisis." *Quarterly Journal of Economics*, 129(1): 1–59.

Christensen, Clayton M., and Joseph L. Bower. 1996. "Customer Power, Strategic Investment, and the Failure of Leading Firms." *Strategic Management Journal*, 17(3): 197–218.

Coad, Alex, and Rekha Rao-Nicholson. 2008. "Innovation and Firm Growth in High-Tech Sectors: A Quantile Regression Approach." *Research Policy*, 37(4): 633–648.

Doraszelski, Ulrich, Gregory Lewis, and Ariel Pakes. 2018. "Just Starting Out: Learning and Equilibrium in a New Market." *American Economic Review*, 108(3): 565–615.

Dvorkin, Maximiliano A., and Hannah G. Shell. 2016. "Bank Lending During Recessions." *Economic Synopses*, , (2).

Evans, David S., and Boyan Jovanovic. 1989. "An Estimated Model of Entrepreneurial Choice Under Liquidity Constraints." *Journal of Political Economy*, 97(4): 808–827.

Fairlie, Robert. 2013. "Entrepreneurship, Economic Conditions, and the Great Recession." *Journal of Economics and Management Strategy*, 22(2).

Fairlie, R.W. 2009. *Kauffman Index of Entrepreneurial Activity.* Kansas City, MO:Kauffman Foundation.

Fogli, Alessandra, Enoch Hill, and Fabrizio Perri. 2012. "The Geography of the Great Recession." In *NBER International Seminar on Macroeconomics 2012. NBER Chapters*, 305–331. National Bureau of Economic Research, Inc.

Fontana, Roberto, and Lionel Nesta. 2009. "Product Innovation and Survival in a High-Tech Industry." *Review of Industrial Organization*, 34(4): 287–306.

Gans, Joshua S., and Scott Stern. 2003. "The Product Market and the Market for "Ideas": Commercialization Strategies for Technology Entrepreneurs." *Research Policy*, 32: 333–350.

Garcia-Manjon, Juan V., and M. Elena Romero-Merino. 2012. "Research, Development, and Firm Growth. Empirical Evidence from European Top R&D Spending Firms." *Research Policy*, 41(6): 1084–1092.

Ghatak, M., M. Morelli, and T. Sjostrom. 2007. "Entrepreneurial talent, occupational choice, and trickle up policies." *Journal of Economic Theory*, 137: 27–48.

Giuerrieri, Veronica, and Guido Lorenzoni. 2017. "Credit Crises, Precautionary Savings, and the Liquidity Trap." *Quarterly Journal of Economics*, 132(3): 1427–1467.

Goetz, Martin Richard, and Juan Carlos Gozzi. 2010. "Liquidity Shocks, Local Banks, and Economic Activity: Evidence from the 2007-2009 Crisis." Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1709677.

Goldfarb, Avi, and Mo Xiao. 2011. "Who Thinks about the Competition? Managerial Ability and Strategic Entry in US Local Telephone Markets." *American Economic Review*, 101(7): 3130–61.

Gompers, Paul, Anna Kovner, Josh Lerner, and David Scharfstein. 2010. "Performance Persistence in Entrepreneurship." *Journal of Financial Economics*, 96: 18–32.

Grant, D. 1996. "The political economy of new business formation across the American states, 1970-1985." *Social Science Quarterly*, 77: 28–42.

Greenstone, Michael, Alexandre Mas, and Hoai-Luu Nguyen. 2018. "Do Credit Market Shocks Affect the Real Economy? Quasi-Experimental Evidence from the Great Recession and 'Normal' Economic Times." Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2187521.

Haltiwanger, John, Ron S. Jarmin, and Javier Miranda. 2013. "Who Creates Jobs? Small versus Large versus Young." *The Review of Economics and Statistics*, 95(2): 347–361.

Holmes, T. J., and J. A. Schmitz. 1990. "A theory of entrepreneurship and its application to the study of business transfers." *Journal of Political Economy*, 98: 265–94.

Kacmar, K. Michele, Martha C. Andrews, David L. Van Rooy, R. Chris Steilberg, and Stephen Cerrone. 2006. "Sure Everyone Can Be Replaced... but at What Cost? Turnover as a Predictor of Unit-Level Performance." *Academy of Management Journal*, 49(1): 133–144.

Klapper, L.F., and I. Love. 2011. "The iimpact of the financial crisis on new firm registration." *Economics Letters*, 113: 1–4.

Klapper, L.F., I. Love, and D. Randall. 2015. "New firm registration and the business cycle." *International Entrepreneurship & Management Journal*, 11: 287–306.

Lafontaine, Francine, and Kathryn L. Shaw. 2016. "Serial Entrepreneurship: Learning by Doing?" *Journal of Labor Economics*, 34(2): 217–254.

Lazear, Edward P. 2004. "Balanced Skills and Entrepreneurship." *American Economic Review Papers and Proceedings*, 94(2): 208–211.

Lee, Yoonsoo, and Toshihiko Mukoyama. 2015. "Entry and Exit of Manufacturing Plants over the Business Cycle." *European Economic Review*, 77(C): 20–27.

Loayza, N.V., and J. Rigolini. 2011. "Informal employment: safety net or growth engine?" *World Development*, 39(9): 1503–15.

Mata, Jose, and Pedro Portugal. 1994. "Life Duration of New Firms." *Journal of Industrial Economics*, 42(3): 227–45.

McConnell, John J., and Henri Servaes. 1990. "Additional Evidence on Equity Ownership and Corporate Value." *Journal of Financial Economics*, 27: 595–612.

Mian, Atif, and Amir Sufi. 2011. "House Prices, Home Equity-Based Borrowing, and the US Household Leverage Crisis." *American Economic Review*, 101(5): 2132–56.

Michelacci, Claudio, and Olmo Silva. 2007. "Why So Many Local Entrepreneurs." *The Review of Economics and Statistics*, 89(4): 615–633.

Mincer, Jacob. 1974. *Schooling, Experience, and Earnings.* National Bureau of Economic Research.

Nerkar, Atul, and Scott Shane. 2003. "When do Start-ups that Exploit Patented Academic Knowledge Survive?" *International Journal of Industrial Organization*, 21(9): 1391–1410.

Paik, Y. 2014. "Serial entrepreneurs and venture survival: evidence from US venture-capital-financed semiconductor firms." *Strategic Entrepreneurship Journal*, 8: 254–68.

Parker, S.C. 2013. "The performance trajectories of serial entrepreneurs." *Journal of Business Venturing*, 28(6): 652–66.

Parker, S.C. 2014. "Who become serial and portfolio entrepreneurs?" *Small Business Economics*, 43: 887–98.

Parker, Simon C. 2009. *The Economics of Entrepreneurship.* Cambridge: Cambridge University Press.

Perotin, V. 2006. "Entry, exit, and the business cycle: are cooperatives different?" *Journal of Comparative Economics*, 34: 295–316.

Plehn-Dujowich, J. 2010. "A theory of serial entrepreneurship." *Small Business Economics*, 35(4): 377–98.

Reuschke, D., and D. Maclennan. 2014. "Housing assets and small business investment: exploring links for theory and policy." *Regional Studies*, 48(4): 744–57.

Shane, Scott. 2001. "Technological Opportunities and New Firm Creation." *Management Science*, 47(2): 205–220.

Shaw, Jason D., Nina Gupta, and John E. Delery. 2005. "Alternative Conceptualizations of the Relationship between Voluntary Turnover and Organizational Performance." *Academy of Management Journal*, 48(1): 50–68.

Shaw, Kathryn L., and Anders Sorensen. 2017. "The Productivity Advantage of Serial Entrepreneurs." NBER Working Paper No. 23320 http://www.nber.org/papers/w23320.

Srinivasan, Raji, Gary L. Lilien, and Shrihari Sridhar. 2011. "Should Firms Spend More on Research and Development and Advertising during Recessions?" *Journal of Marketing*, 75: 49–65.

Stam, E., D. B. Audretsch, and J. Meijaard. 2008. "Renascent entrepreneurship." *Journal of Evolutionary Economics*, 18(493-507).

Stangler, Dane, and Paul Kedrosky. 2010. "Exploring Firm Formation: Why is the Number of New Firms Constant?" Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1585380.

Storey, D. J. 1994. "The role of legal status in influencing bank financing and new firm growth." *Applied Economics*, 26(2): 129–136.

Thompson, Peter. 2005. "Selection and Firm Survival: Evidence from the Shipbuilding Industry, 1825-1914." *The Review of Economics and Statistics*, 87(1): 26–36.

Toft-Kehler, R., K. Wennberg, and P.H. Kim. 2014. "Practice makes perfect: entrepreneurial-experience curves and venture performance." *Journal of Business Venturing*, 29: 453–70.

Ucbasaran, D., P. Westhead, and M. Wright. 2006. "The Oxford Handbook of Entrepreneurship." , ed. M. Casson, Chapter Habitual entrepreneurs, 461–83. Oxford:Oxford University Press.

Ucbasaran, D., P. Westhead, and M. Wright. 2008. "Habitual entrepreneurs." *Foundations & Trends in Entrepreneurship*, 4(4): 309–450.

Ucbasaran, D., P. Westhead, and M. Wright. 2009. "The extent and nature of opportunity identification by experienced entrepreneurs." *Journal of Business Venturing*, 25(6): 541–55.

Wagner, Stefan, and Iain Cockburn. 2010. "Patents and the Survival of Internet-related IPOs." *Research Policy*, 9(2): 214–228.

Zhang, J. 2011. "The advantage of experienced start-up founders in venture capital acquisition: evidence from serial entrepreneurs." *Small Business Economics*, 36(2): 187–208.

Tables and figures

Figure 1: Trends in economic conditions

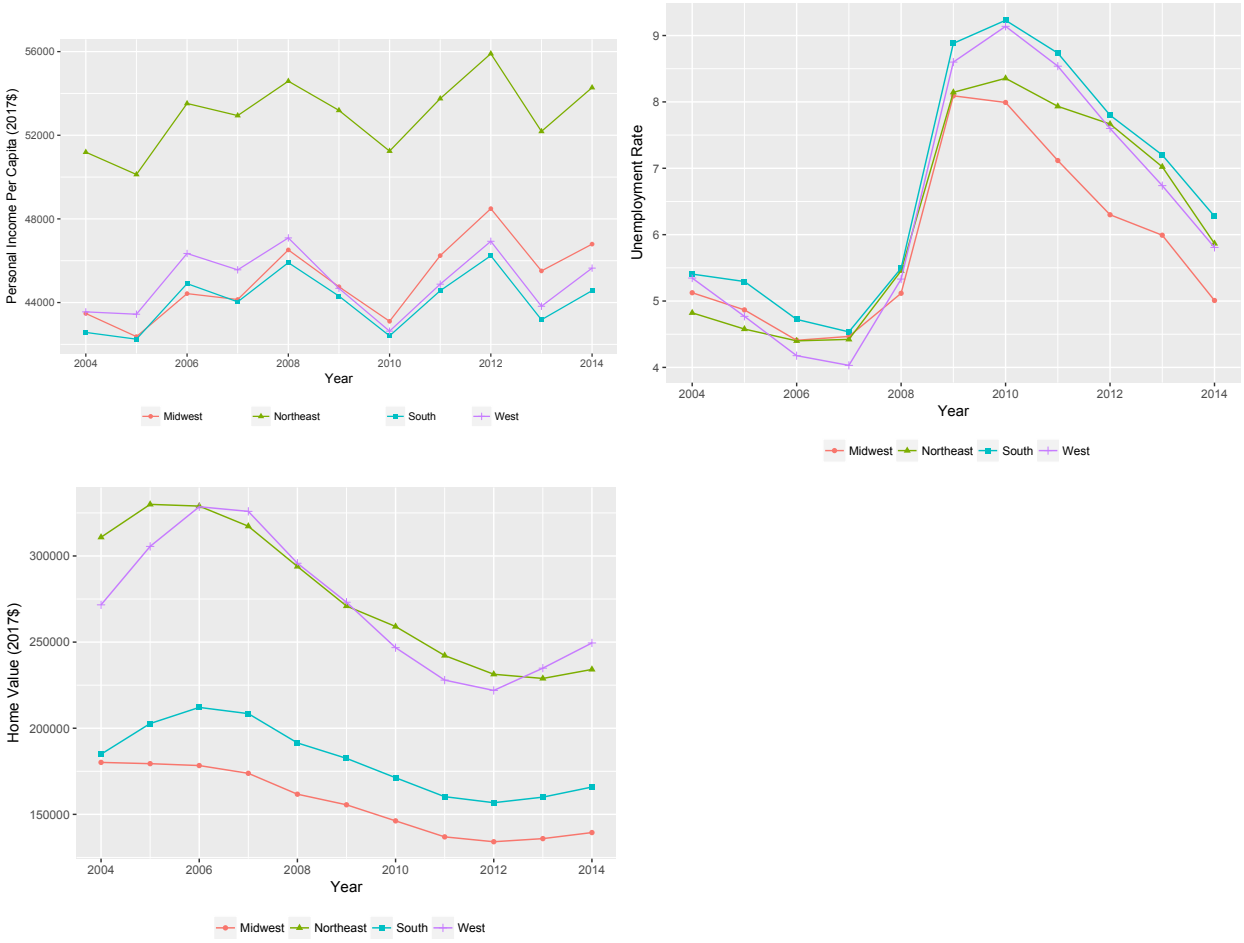

Figure 2: Industry composition of sample

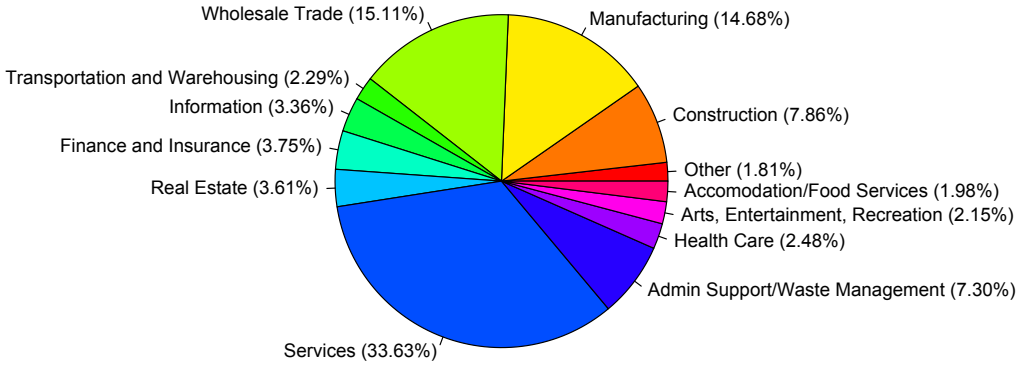

Figure 3: Location choices of first-time (left) and serial (right) entrepreneurs

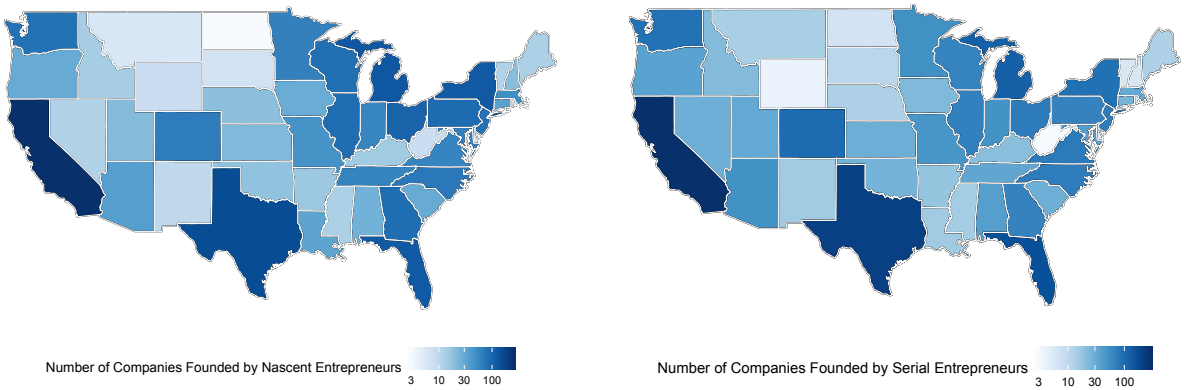

Table 1: Kauffman Firm Survey summary statistics

	N	Mean	SD
Economic Conditions:			
Log(State personal income per capita) (2017 $USD)	18,732	3.82	0.13
State unemployment rate	18,732	6.36	2.30
Home Price Index	18,732	144.12	29.65
Log(Urbanicity range)	18,732	0.39	0.61
Firm Characteristics:			
Number founders	18,732	1.60	1.10
All founders white	18,732	0.88	0.33
Average education	18,732	5.73	2.22
All founders female	18,732	0.20	0.40
Average founder age	18,732	43.89	10.97
Log(revenue)	18,732	9.40	4.76
Measures of Experience:			
At least one serial founder	18,732	0.50	0.50
Serial founder, same industry	18,732	0.22	0.42
Total past businesses	18,732	1.20	2.04
Total past businesses, same industry	18,732	0.25	0.51
Average years industry experience	18,732	8.92	9.74

† There is one observation per firm per year from 2004 to 2011. Observations are dropped for the years after the firm goes out of business.

Table 2: Kauffman Firm Survey firm outcomes

	N	Mean	SD
Outcomes:			
Out of business	30,481	0.07	0.25
Out of business by 2010	3,918		
Strategies:			
Any Patents	18,732	0.164	0.371
Any R&D	18,732	0.189	0.392
Log(R&D Spending) — R&D >0	1,927	9.293	2.197
Number R&D Employees	1,927	1.02	1.91
Number Employees	15,611	3.58	11.22
Log(Total Payroll)	15,611	3.461	5.229
Legal Entity:			
Sole Proprietorship	4,927	0.332	0.471
LLC	4,927	0.316	0.465
S-Corp	4,927	0.211	0.408
C-Corp	4,927	0.090	0.286
General Partnership	4,927	0.035	0.182
Limited Partnership	4,927	0.015	0.122
Other	4,927	0.002	0.047
Participation in Assistance Programs:			
Government	3,918	0.10	0.31
Nonprofit	3,918	0.14	0.35
For-profit	3,918	0.14	0.35
Other	3,918	0.02	0.15
Resources:			
Log(Total Credit)	18,732	3.64	5.33
Percent Equity Financing	18,732	0.10	0.29
Owner Equity	18,732	71.00	43.32
Log(Owner Investment for equity)	18,732	2.77	4.34

† There is one observation per firm per year from 2004 to 2011. Observations are dropped for the years after the firm goes out of business.

Table 3: Characteristics of serial and first-time entrepreneurs

	First-Time	Serial	Difference
Number of founders	1.37	1.84	-0.47
	(0.80)	(1.31)	(2.11)
All founders white	0.87	0.87	0
	(0.32)	(0.32)	(0.64)
Average education level	5.71	5.75	-0.04
	(2.21)	(2.22)	(4.43)
All founders female	0.24	0.15	0.09
	(0.42)	(0.36)	(0.78)
Average founder age	43.15	44.66	-1.51
	(10.59)	(11.30)	(21.89)
Average industry experience (years)	8.71	9.13	-0.42
	(9.54)	(9.95)	(19.49)
Number of previous businesses	0	2.48	
	(0)	(2.32)	
Number of previous businesses in same industry	0	0.52	
	(0)	(0.63)	
Average industry experience (years)	8.72	9.14	-0.42
	(9.54)	(9.95)	(19.09)
N	2,446	2,456	

† Observations are at the firm level, averaged over all survey years.

Table 4: Economic conditions faced by serial and first-time entrepreneurs

	First-Time	Serial	Difference
Log(state personal income)	3.83	3.81	0.02
	(0.13)	(0.12)	(0.25)
State home price index	144.0	144.24	-0.24
	(29.18)	(30.10)	(59.28)
State unemployment rate	6.40	6.43	-0.03
	(2.39)	(2.45)	(4.84)
Log(urbanicity)	0.44	0.43	0.01
	(0.63)	(0.62)	(1.25)
N	9,419	9,330	

† Each observation is a firm-year observation.

Table 5: Weibull model results

	Marginal effects on P(exit) reported				
	(1)	(2)	(3)	(4)	(5)
Experience	-0.0123	-6.157***	-3.039	-0.701***	-7.522***
	(0.0757)	(2.313)	(2.201)	(0.266)	(2.689)
Log(PI)		-0.419			-31.23***
		(2.467)			(2.328)
UR			-0.566***		-1.068***
			(0.0334)		(0.0470)
HPI				0.0276***	-0.0248***
				(0.00543)	(0.00507)
Experience × Log(PI)		1.613***			1.509**
		(0.603)			(0.726)
× UR			0.108***		0.133***
			(0.0378)		(0.0405)
× HPI				0.00372	0.00634
				(0.00286)	(0.00386)
Log(revenue)	-0.0978***	-0.0973***	-0.0903***	-0.0818***	-0.0783***
	(0.0123)	(0.0126)	(0.0149)	(0.0147)	(0.0110)
Log(urbanicity)	-28.55***	-28.53***	-26.76***	-28.15***	-27.59***
	(0.123)	(0.123)	(0.124)	(0.123)	(0.122)
Average founder education	-0.0612***	-0.0606***	-0.0566***	-0.0521**	-0.0418**
	(0.0197)	(0.0199)	(0.0218)	(0.0246)	(0.0207)
All founders female	0.00667	0.00935	0.00117	0.0285	0.0401
	(0.100)	(0.101)	(0.108)	(0.101)	(0.0889)
Average founder age	0.00217	0.00186	0.000770	0.00142	0.00450
	(0.00557)	(0.00574)	(0.00626)	(0.00608)	(0.00500)
All founders white	-5.350***	-5.237***	-5.176***	-5.249***	-5.250***
	(1.001)	(1.001)	(1.001)	(1.000)	(1.000)
Number Founders	0.000	0.002	0.003	0.010	0.018
	(0.105)	(0.102)	(0.117)	(0.120)	(0.098)
N	18732	18732	18732	18732	18732
State fixed effects	x	x	x	x	x
Industry fixed effects	x	x	x	x	x

† Robust standard errors in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

Table 6: Weibull model robustness checks

	Marginal effects on P(exit) reported		
	(1)	(2)	(3)
Specification:	Main Result	Add Revenue Interaction	Industry Experience
Experience	-7.522***	-7.445***	-5.987**
	(2.689)	(2.652)	(2.550)
Years industry experience			-330.1***
			(99.85)
Log(PI)	-31.23***	-31.19***	-29.87***
	(2.328)	(2.289)	(1.959)
UR	-1.068***	-1.086***	-1.068***
	(0.0470)	(0.0488)	(0.0489)
HPI	-0.0248***	-0.0249***	-0.0298***
	(0.00507)	(0.00511)	(0.00404)
Experience× log(PI)	1.509**	1.472**	1.397*
	(0.726)	(0.724)	(0.717)
× UR	0.133***	0.133***	0.0594*
	(0.0405)	(0.0375)	(0.0316)
× HPI	0.00634	0.00647	0.00375
	(0.00386)	(0.00396)	(0.00306)
× Log(Revenue)		0.009	
		(0.0179)	
Years industry experience × log(PI)			106.1***
			(7.056)
× UR			5.368***
			(1.233)
× HPI			-0.273
			(0.168)
N	18,732	18,732	18,732
State fixed effects	x	x	x
Industry fixed effects	x	x	x
Firm Characteristics	x	x	x

† Robust standard errors in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

Figure 4: Fit of Weibull model

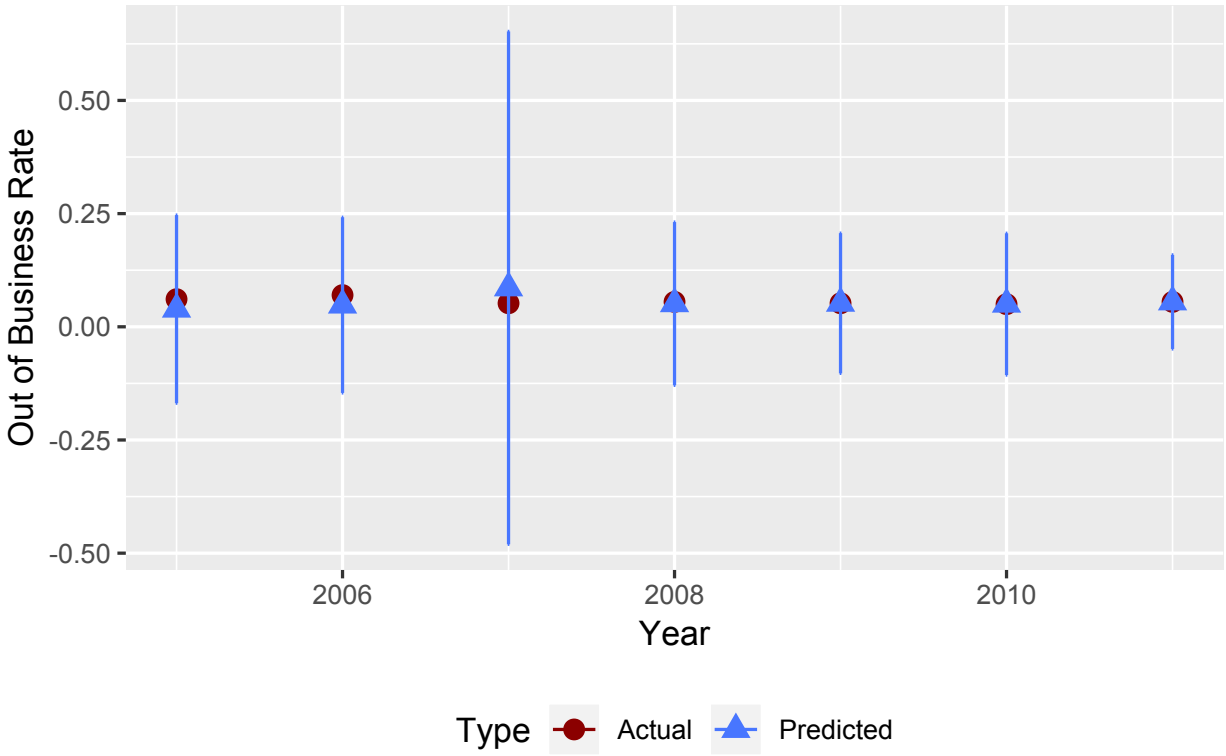

Table 7: Logit regression - focus on Great Recession

	Marginal Effects on P(exit) Reported							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Experience	-1.890*	-0.040	-0.133**	0.792	-0.384	-0.266*	-0.258***	-2.293*
	(0.987)	(0.076)	(0.059)	(1.018)	(1.563)	(0.160)	(0.101)	(1.319)
Experience× log(PI)	0.216*			0.126	0.464			0.330***
	(0.112)			(0.124)	(0.180)			(0.155)
× UR		0.010		0.014		0.049*		0.025
		(0.012)		(0.011)		(0.025)		(0.023)
× HPI			0.001**	0.002***			0.002**	0.003***
			(0.0004)	(0.001)			(0.001)	(0.001)
Log(revenue)	-0.032***	-0.007***	-0.004***	-0.007***	-0.002	-0.003	-0.003	-0.002
	(0.003)	(0.001)	(0.001)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Log(urbanicity)	0.017*	-0.001	0.001	-0.001	0.016	0.015	0.017	-0.017
	(0.010)	(0.009)	(0.008)	(0.008)	(0.013)	(0.013)	(0.012)	(0.013)
Average founder education	0.010	-0.003	-0.002	-0.003	-0.006	-0.002	-0.002	-0.006
	(0.006)	(0.004)	(0.003)	(0.004)	(0.007)	(0.001)	(0.001)	(0.007)
All founders female	-0.017	0.001	0.003	0.002	-0.002	-0.003	-0.002	-0.000
	(0.022)	(0.014)	(0.012)	(0.013)	(0.022)	(0.022)	(0.023)	(0.027)
Average founder age	0.003***	-0.001*	-0.001*	-0.001*	-0.002	-0.002	-0.002	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
All founders white	0.003	0.000	0.010	-0.000	-0.007	-0.009	-0.008	-0.007
	(0.030)	(0.019)	(0.018)	(0.019)	(0.037)	(0.037)	(0.037)	(0.033)
N	2,869	2,869	2,869	2,869	1,544	1,544	1,544	1,544
State fixed effects	x	x	x	x	x	x	x	x
Industry fixed effects	x	x	x	x	x	x	x	x
Weighting Scheme	Experience	Experience	Experience	Experience	Survival08	Survival08	Survival08	Survival08

† Robust standard errors in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

Table 8: Differences in business strategies - research and development

	IP Protection	*Innovation*		*Expansion*
	(1)	(2)	(3)	(4)
Outcome Variable:	Any Patents	Any R&D	Log(R&D Spending)	(R&D Employees | R&D >0)
Experience	0.420	8.221***	0.444	-0.342
	(0.573)	(2.185)	(4.657)	(3.575)
Log(PI)	0.240	6.786**	10.719***	9.242
	(0.502)	(2.872)	(3.057)	(6.607)
UR	-0.013	0.210	0.047	0.067
	(0.007)	(0.053)	(0.152)	(0.105)
HPI	-0.002	-0.021**	-0.026***	-0.005*
	(0.002)	(0.009)	(0.006)	(0.003)
Experience× log(PI)	-0.154	-2.615***	-0.850	-0.389
	(0.184)	(0.715)	(1.404)	(0.956)
× UR	0.002	0.010	0.089**	0.083*
	(0.003)	(0.019)	(0.032)	(0.043)
× HPI	0.001	0.014***	0.020***	0.010***
	(0.001)	(0.005)	(0.0.006)	(0.003)
Number Employees				0.005**
				(0.0.002)
Log(revenue)	0.008***	0.019**	0.028	
	(0.002)	(0.010)	(0.014)	(0.033)
R-squared	0.124	0.185	0.502	0.125
N	18,652	15,512	1,505	2,116
Firm characteristics	x	x	x	x
Survey year fixed effects	x	x	x	x
Industry fixed effects	x	x	x	x
State fixed effects	x	x	x	x

† Robust standard errors in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

Table 9: Differences in business strategies - employment and wages

Outcome Variable:	(1) Log(employees)	(2) Employment Growth	(3) Log(payroll)
Experience	0.022	0.305	-4.860*
	(1.340)	(0.243)	(2.921)
Log(PI)	1.403	0.905*	-5.998
	(1.065)	(0.473)	(2.921)
UR	0.050	0.028	-0.360***
	(0.045)	(0.018)	(0.117)
HPI	-0.0004**	-0.001**	1.180
	(0.0002)	(0.001)	(1.161)
Experience× log(PI)	0.093	-0.086	1.921*
	(0.354)	(0.068)	(1.086)
× UR	-0.030*	-0.013*	0.110**
	(0.015)	(0.007)	(0.0491)
× HPI	-0.000	0.001	-0.461
	(0.000)	(0.001)	(0.463)
Number Employees, t-1		-0.003	0.0609**
		(0.002)	(0.0142)
Revenue	0.066***	0.022***	0.570***
	(0.008)	(0.002)	(0.020)
R-squared	0.621	0.044	0.364
N	10,898	15,464	11,759
Firm characteristics	x	x	x
Survey year fixed effects	x	x	x
Industry fixed effects	x	x	x
State fixed effects	x	x	x

† Robust standard errors in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

Table 10: Differences in business decisions

Outcome Variable:	(1) Limited Liability	(2) Federal Gvt Programs	(3) Nonprofit Programs
Experience	0.058***	0.013***	0.040***
	(0.009)	(0.005)	(0.011)
Log(urbanicity)	-0.078***	0.003	-0.018*
	(0.007)	(0.005)	(0.011)
Number founders	0.320***	-0.004	0.019***
	(0.012)	(0.003)	(0.007)
All founders white	0.012	-0.028***	-0.006
	(0.018)	(0.009)	(0.032)
Average founder education	0.027***	0.004**	0.013***
	(0.002)	(0.002)	(0.003)
All founders female	-0.070***	-0.018*	0.069**
	(0.012)	(0.010)	(0.060)
Average founder age	-0.002***	0.000	-0.001**
	(0.000)	(0.000)	(0.001)
N	4,224	1,969	1,969
Industry fixed effects	x	x	x
State fixed effects	x	x	x

† Robust standard errors in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

Table 11: Differences in access to resources

Outcome Variable:	(1) Log(external credit)	(2) % Equity Financing	(3) Own Equity	(4) Log(founder investment)
Experience	-11.257**	0.914***	0.687***	11.403**
	(3.974)	(0.440)	(0.192)	(4.230)
Log(PI)	-5.133*	0.178	-0.405**	-2.390
	(2.711)	(0.209)	(0.156)	(2.332)
UR	-0.176*	-0.294*	0.007	-0.153
	(0.156)	(0.004)	(0.005)	(0.121)
HPI	-0.007	0.000	-0.001***	-0.011
	(0.007)	(0.000)	(0.000)	(0.008)
Experience× log(PI)	2.007*	-0.205*	-3.556**	-2.671***
	(1.039)	(0.117)	(0.080)	(1.370)
× UR	0.257**	-0.010**	0.001	0.071
	(0.100)	(0.004)	(0.003)	(0.041)
× HPI	0.020	-0.001**	0.001	0.014*
	(0.014)	(0.000)	(0.001)	(0.008)
R-squared	0.163	0.104	0.284	0.071
N	18,557	18,557	18,557	18,557
Firm characteristics, inc revenue	x	x	x	x
Survey year fixed effects	x	x	x	x
Industry fixed effects	x	x	x	x
State fixed effects	x	x	x	x

† Robust standard errors in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

Table 12: Crunchbase summary statistics

	(1)					
	N	Mean	Median	SD	Min	Max
Log(total funding)	138,384	10.46	14.08	7.38	0	24
Exp	138,384	0.23	0.00	0.42	0	1
Log(PI)	100,433	10.96	11.00	0.13	11	11
UR	100,514	6.12	5.48	2.06	2	14
HPI	100,514	160.55	158.08	30.35	83	326
Number Founders	106134	2.58	2.00	1.31	1	14
Firm Age	106,134	2.84	2.00	1.92	1	11
Founded Year	138,384	2012	2012	2.50	2008	2019
Funding Year	106,134	2015	2015	2.34	2009	2019

† There is one observation per firm per funding round.

Table 13: Crunchbase: total funding results

	(1)	(2)	(3)	(4)
Experience	1.154	0.700**	2.237***	-1.106
	(6.814)	(0.319)	(0.422)	(13.982)
Log(PI)	2.294**			2.732**
	(0.966)			(1.233)
UR		0.001		0.106**
		(0.034)		(0.046)
HPI			0.005**	0.007**
			(0.002)	(0.003)
Experience × log(PI)	-1.432**			0.340
	(0.724)			(1.256)
× UR		0.053**		-0.029
		(0.024)		(0.051)
× HPI			-0.008***	-0.010**
			(0.002)	(0.004)
Number Founders	0.367***	0.379***	0.376***	0.374***
	(0.073)	(0.087)	(0.086)	(0.086)
Firm Age	0.357***	0.296***	0.288***	0.294***
	(0.045)	(0.055)	(0.054)	(0.054)
N	82893	82893	82947	82893
Founder Fixed Effects	x	x	x	x
State Fixed Effects	x	x	x	x
Industry Fixed Effects	x	x	x	x
Year Fixed Effects	x	x	x	x

† Robust standard errors in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)