

# The Dark Side of Entrepreneurship\*

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## Abstract

Using matched business and personal administrative credit bureau data, we document the long-term negative consequences of entrepreneurship on entrepreneurs' personal credit. After starting a business, entrepreneurs experience an 18.93% increase in default rates and a 38.10% increase in personal bankruptcy filings compared to observably similar non-entrepreneurs. However, financially sophisticated entrepreneurs and entrepreneurs who incorporate businesses are less likely to be delinquent on loans or go bankrupt. Lower entry barriers to entrepreneurship through business-friendly state policies are associated with the entry of worse entrepreneurs and higher personal costs for entrepreneurs. The increase in personal borrowing, particularly non-mortgage borrowing, instead of business borrowing is associated with higher personal costs for entrepreneurs. Our results highlight some of the long-term costs of entrepreneurship for entrepreneurs.

**Keywords:** Entrepreneurship, Personal Credit, Bankruptcy

**JEL Classification:** G51, L26, D14, G21

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# 1 Introduction

We study the impact of transition into entrepreneurship on the personal creditworthiness of entrepreneurs. Policymakers and economists largely view entrepreneurship with a positive lens, given that entrepreneurship has been a reliable and robust engine of economic growth and employment (Smith, 1937; King and Levine, 1993). Theoretical work suggests that entrepreneurs have unique human capital, i.e., education, self-confidence, analytical skills, risk taking (Murphy, Shleifer, and Vishny, 1991), and should be compensated for these unique skills (Lucas Jr, 1978; Kihlstrom and Laffont, 1979). However, empirical evidence suggests that the average entrepreneur does not earn more than salaried employees (Hamilton, 2000). Moreover, entrepreneurship is a risky endeavor, and failure rates for new businesses are very high, with 48.9% of businesses exiting within 5 years of business start (Business Dynamics Statistics)<sup>1</sup>. Thus, it is unclear whether a shift to entrepreneurship results in financial benefits for the entrepreneur.

In this paper, we measure one aspect of the entrepreneur's financial condition - their creditworthiness - after they start a business. Individual credit conditions can exacerbate business cycles (Mian, Sufi, and Verner, 2017) and impact household decisions such as labor mobility (Gopalan, Hamilton, Kalda, and Sovich, 2021), employment opportunities (Bos, Breza, and Liberman, 2018), consumption and investment (Mian, Rao, and Sufi, 2013), household investment decisions (Foote, Gerardi, and Willen, 2008) and mortgage defaults (Scharlemann and Shore, 2016).

Our paper provides the first direct evidence of the long-term negative consequences of entrepreneurship on entrepreneurs' personal credit. Using the universe of credit bureau data on business owners' personal credit, we show that new business starts adversely impact the entrepreneur's personal credit outcomes compared to other matched consumers with similar creditworthiness that never started a business. Surprisingly, the skill of the entrepreneurs does not attenuate this effect, and friendly business policies, further exacerbate the negative impact on the personal credit of entrepreneurs. The observed deterioration in the creditworthiness of entrepreneurs is driven by entrepreneurs who increase personal leverage after starting a business. Our results suggest that low-entry barriers attract observably worse individuals towards entrepreneurship and adversely impact their personal outcomes.

For our analysis, we match data on business credit history from the Small Business Finance Exchange (SBFE) to the universe of consumer credit data from Equifax. The anonymized credit bureau data provides information on credit histories of the universe of U.S. consumers, allowing us to compare the personal credit outcomes of entrepreneurs and

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<sup>1</sup><https://www.census.gov/data/tables/time-series/econ/bds/bds-tables.html>

non-entrepreneurs. Entrepreneurs are matched to observably similar non-entrepreneurs in the month before the start of their business. We create matched pairs based on the county of residence, personal income, level and slope of credit scores, age, home ownership and debt-to-income ratio in the month before the start of the business. Our sample includes businesses started between January 2012 and December 2016, and follows entrepreneurs for two years before the start of the business and for five years after business formation.

After matching, we find that the monthly personal credit default rates (90+ days past due) increase by 18.83% and bankruptcy filings increase by 38.10% for entrepreneurs relative to non-entrepreneurs within a year of business start. We show that delinquency and bankruptcy rates remain 36.25% and 66.67% higher respectively compared to the matched non-entrepreneurs even five years after the business start. While our dependent variable captures the act of filing, delinquency and bankruptcy flags remain on credit files for at least seven years and adversely impact the consumer's credit scores and access to credit in long run ([Dobbie, Goldsmith-Pinkham, Mahoney, and Song, 2020](#); [Herkenhoff, Phillips, and Cohen-Cole, 2021](#)).<sup>2</sup>

While on average, we see entrepreneurs struggle after starting a business, the effect could be restricted to entrepreneurs who may start low growth ventures. In turn, the changes to personal creditworthiness could be driven by the entrepreneur's skill, choice of location, or business type. Understanding these differences could have significant policy implications, such as which type of entrepreneurs and ventures to support.

First, we test if an entrepreneur's skill correlates with the impact on their personal creditworthiness. We use three proxies for entrepreneur's skill and sophistication - education (having a college degree), income, and credit score. We find that high skilled entrepreneurs are less likely to be delinquent on personal accounts after business formation. However, surprisingly, skilled entrepreneur are not any less likely to file for bankruptcy after starting their business. This suggests that the worst-case outcome of bankruptcy is similar for both high and low-type entrepreneurs.

Next, we test whether the type of business the entrepreneur operates impacts their personal side costs. When starting their business, entrepreneurs have the choice to either incorporate their business and separate their personal and business balance sheets, or operate an unincorporated business. Many small businesses choose to incorporate to mitigate the downside risk of entrepreneurship, i.e., benefit from limited liability and protect personal assets. Further, incorporating as a C-corporation provides greater access to external funds

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<sup>2</sup>Chapter 7 or Chapter 13 of the U.S. Bankruptcy Code are the most common forms of personal bankruptcy. Credit bureaus are required to remove Chapter 7 bankruptcy flags 10 years after filing and Chapter 13 flags seven years after filing. Furthermore, late payments remain on credit reports for seven years from the original date of the delinquency even if overdue bills are repaid.

but at the expense of double taxation—first at the corporate level, and then at the shareholder level. However, some businesses choose not to incorporate and organize firm as a pass-through to get taxed at the personal level, avoiding the direct costs of incorporation, such as annual fees and the preparation of more detailed financial statements, and indirect agency costs associated with the separation of ownership and control. The additional costs to incorporation, though, protect the business owner. We find that delinquency rates for incorporated entrepreneurs is 77.56% lower than unincorporated entrepreneurs while bankruptcy rates are 58.33% lower. However, the shield from incorporation fades over time. In first two years after business start, incorporated business owners have a 87.69% lower rate of being delinquent on their accounts while it is only 46.46% five years after starting the business.

Third, we test whether business-friendly governmental policies can provide additional support to entrepreneurs and reduce the burdens of running a business. Various theories suggest that liquidity constraints limit entry into entrepreneurship ([Benanke and Gertler, 1989](#); [Kiyotaki and Moore, 1997](#); [Cagetti and De Nardi, 2006](#)). Consistently, considerable empirical research suggests that wealth, in general, helps entry into self-employment ([Evans and Jovanovic, 1989](#); [Evans and Leighton, 1989](#); [Holtz-Eakin, Joufaian, and Rosen, 1994a](#)) and that housing wealth in particular influences both entry into self-employment ([Corradin and Popov, 2015](#); [Schmalz, Sraer, and Thesmar, 2017](#); [Bellon, Cookson, Gilje, and Heimer, 2021](#)) and employment in small firms ([Adelino, Schoar, and Severino, 2015](#)).

To alleviate financial constraints, the governments take various initiatives to foster entrepreneurship.<sup>3</sup> Small businesses and entrepreneurs receive immense support from local governments to drive business and job creation. However, the level of support varies significantly across states in the U.S., with some states being more business-friendly while others impose costs that either directly or indirectly affect entrepreneurship and business growth. For example, [Giroud and Rauh \(2019\)](#) show increase in state taxes adversely impacts the new business formations and number of employees per startup. Similarly, [Fazio, Guzman, and Stern \(2020\)](#) show that state R&D tax credit is positively associated with the number of startups.

We, therefore, study the impact of small business friendly policies on entrepreneur's personal financial outcomes. We use state-level Small Business Policy Index scores provided by Small Business & Entrepreneurship Council. These scores are based on 62 measure of which 27 are tax related, 26 relate to rules and regulations, 6 are related to government spending and debt issues, and the 3 remaining measure the effectiveness of important government undertakings. We find that additional support through lower regulation or taxes is not sufficient to offset the negative impact on the personal creditworthiness of the entrepreneur,

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<sup>3</sup>See [Lerner \(2020\)](#) for a review of government incentives in entrepreneurship

and, in fact, leads to higher personal costs for the entrepreneur.

To understand why business friendly policies could lead to worse financial outcomes for the entrepreneur, we turn to how business friendly policies might affect the choice to enter into entrepreneurship. We find that the average entrepreneur in business-friendly states is observably less skilled and sophisticated with lower credit scores, income and education, and higher levels of debt.

Another form of state support can come through the ability of entrepreneurs to legally protect their home from creditors in case of personal bankruptcy. As we know from previous literature, housing wealth is essential to start a business ([Adelino, Schoar, and Severino, 2015](#); [Schmalz, Sraer, and Thesmar, 2017](#)). In the US, with the homestead exemption, homeowners can legally keep their house outside the bankruptcy process or be reasonably compensated for the loss of their residence. However, the homestead exemption limits vary across states. For example, in 2016 (the last year for the business started in our sample), in Massachusetts, homeowners can save as much as \$500,000 of their home equity, while in Kentucky, they can save only \$5,000 in home equity.

While increased protection during bankruptcy proceedings can provide a safety net for many individuals, insurance can negatively affect business quality. Bankruptcy laws may also create an adverse selection problem. If creditors are aware that borrowers have the protection of bankruptcy laws, they cannot fully discriminate between high-risk and low-risk projects. This could lead to higher interest rates which may cause individuals with low-risk projects to drop out of the pool, leaving only those with high-risk proposals. Thus, exemptions in personal bankruptcy proceedings can be a double-edged sword -encouraging entrepreneurship while at the same time promoting riskier and lower-quality entrepreneurs.

To study the impact of bankruptcy protections on entrepreneur creditworthiness, we use variations in the percentage of home value exempt from personal bankruptcy proceedings by exploiting state-level exemption limits and house price variations within the state. We find that increased protections harm the entrepreneur's creditworthiness after starting a business. Our results are consistent with the arguments that generous state policies are encouraging lower-quality entrepreneurs to start new ventures.

The extremely sticky state business policies and homestead exemption policies during our sample period limits our ability to exploit exogenous changes to state policies. Further, any changes if any, are correlated with factors that could affect the choice into entrepreneurship. Therefore, we exploit variations in house prices. Following a similar strategy as in ([Adelino, Schoar, and Severino, 2015](#); [Schmalz, Sraer, and Thesmar, 2017](#)), we find that increases in home prices lead to observably worse quality entrepreneurs entering and the entry is higher in business-friendly states.

We next turn towards understanding why personal financial conditions of the entrepreneur deteriorate. Perhaps one of the biggest impediments cited for business formation and growth is the ability to raise financing required to start a business. According to the Federal Reserve Bank's Small Business Credit Survey, 66% of small businesses reported facing financing challenges in 2019.<sup>4</sup> In response to these challenges, firms most commonly used personal funds, with 62% using personal funds to address financial challenges. Similarly, Robb and Robinson (2014), find that many start-ups receive debt financing through the personal balance sheets of the entrepreneur. Furthermore, empirical research on small business lending has shown that personal guarantees and personal collateral must often be posted to secure financing for startups (Moon, 2009; Avery, Bostic, and Samolyk, 1998; Mann, 1998). Thus, empirical evidence suggests the personal borrowing capacity of entrepreneurs is important for business formation and continuation.

In our sample, the average entrepreneur's debt-to-income ratio increases by 2.10 ppt relative to non-entrepreneurs after starting their business, or a 5.83% increase in leverage. Both the non-mortgage and mortgage debt of entrepreneurs increase but the majority of the increase is in non-mortgage debt, contributing 75% of the total debt growth. To understand the reasons for why less skilled or sophisticated individuals and entrepreneurs in business-friendly states have worse credit outcomes, we look at whether the level of borrowing on personal balance sheet differs by individual type or location. We do this separately for homeowners and renters so we can study mortgage and non-mortgage debt patterns. We find that entrepreneurs increase the borrowing on their personal balance sheets after business start. However, sophisticated individuals and individuals in less friendly states (who are, on average, higher quality) increase mortgage debt while less sophisticated individuals increase non-mortgage borrowing, which is more expensive. Consistent with this, we find that for a given level of DTI, if the borrowing is through mortgage rather than non-mortgage debt, the likelihood of default and bankruptcy is significantly lower.

Finally, we address why entrepreneurs choose to borrow on their personal balance sheet instead of borrowing business credit, which could protect their personal assets. The choice to borrow on the personal balance sheet could be driven by either the demand from the entrepreneur or the lack of supply of business credit to entrepreneurs. We find that business loan approval rates are higher, as expected, for entrepreneurs with higher credit scores, with a college degree, higher incomes, and lower leverage. Furthermore, entrepreneurs who get denied business loans are more likely to lever up using non-mortgage debt. Thus, the lack of business credit supply leads to larger increases in the level of *costly* non-mortgage debt.

Our paper contributes to three main strands of the literature. Firstly, we contribute

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<sup>4</sup>Source:<https://www.fedsmallbusiness.org/survey>

to the link between personal credit and entrepreneurship. Previous work has shown how personal credit affects entrepreneurship rates, while we focus on the impact of business creation on consumer credit. [Hurst and Pugsley \(2011\)](#) use wealth as a proxy for access to capital markets and show that business entry rates are uncorrelated to personal wealth, except for very wealthy individuals. [Bellon, Cookson, Gilje, and Heimer \(2021\)](#) show that large cash windfalls from shale drilling increase business formation rates but do not affect the duration of business ownership. In a similar vein, increased student debt ([Krishnan and Wang, 2019](#)) and lack of housing collateral ([Adelino, Schoar, and Severino, 2015; Schmalz, Sraer, and Thesmar, 2017](#)) hinders entrepreneurship rates. [Herkenhoff, Phillips, and Cohen-Cole \(2021\)](#) show that bankruptcy flag removal from personal credit files increases access to credit and the likelihood of starting a business. We add to this growing literature by documenting the negative impact of business ownership on personal creditworthiness.

Second, we contribute to the literature on small business financing. A large literature that highlights the importance of access to capital for entrepreneurship ([Evans and Jovanovic, 1989; Holtz-Eakin, Joulfaian, and Rosen, 1994a,b; Hubbard, 1997; Bertrand, Schoar, and Thesmar, 2007; Kerr and Nanda, 2009](#)) and financing (external and internal credit) for growth of small businesses ([Rajan and Petersen, 1994; Hubbard, 1997; Carpenter and Petersen, 2002; Berger, Bouwman, and Kim, 2017](#)). [Robb and Robinson \(2014\)](#) find that many startups receive debt financing through the personal balance sheets of the entrepreneur. Relatedly, we also contribute to the large literature that highlights the importance of access to capital for entrepreneurship ([Evans and Jovanovic, 1989; Holtz-Eakin, Joulfaian, and Rosen, 1994a,b; Hubbard, 1997; Bertrand, Schoar, and Thesmar, 2007; Kerr and Nanda, 2009](#)) and financing (external and internal credit) for growth of small businesses ([Rajan and Petersen, 1994; Hubbard, 1997; Carpenter and Petersen, 2002; Berger, Bouwman, and Kim, 2017](#)). Contemporaneous work by [Fonseca and Wang \(2022\)](#) show that small businesses borrow on personal balance sheets when small business credit conditions tighten.

Finally, we also contribute the literature on returns to entrepreneurship. The early work documents that entrepreneurs do not earn more than their salaried counterparts ([Evans and Leighton, 1989; Hamilton, 2000; Moskowitz and Vissing-Jørgensen, 2002](#)), while [Levine and Rubinstein \(2017\)](#) show that smart entrepreneurs do earn more. However, we show that entrepreneurs experience large increase in personal credit default rates and personal bankruptcy filings compared to observably similar non-entrepreneurs after starting a business.

The rest of the paper proceeds as follows. Section 2 describes our data and empirical methodology. Section 3 presents the results on the impact of business start on personal creditworthiness. Section 4 studies the impact of state policies, Section 5 explores the channels and Section 6 concludes.

## 2 Data and Methodology

### 2.1 Data Sources

We obtain our data from Equifax. All the data are used purely for academic purposes, and they contain completely anonymized information. The credit bureau’s trade line-level data provide comprehensive, anonymized records of the various lines of credit opened by every U.S. consumer (see [Chava, Ganduri, Paradkar, and Zhang \(2021\)](#) for details). Equifax also provides the secretary of state (SoS) business registration records, including business incorporation date. We use bureau-created linkage keys to connect each business to its business owners. We extract the personal credit data from the bureau’s consumer database for these business owner. The personal credit data includes residential zip code, credit score, individual-level credit attributes like total balance, and individual-level performance attributes that measure the consumer’s credit standing like 90 days past due (DPD).

The Small Business Finance Exchange (SBFE) database provides business credit information for small businesses. We use the business incorporation date from SoS to create an monthly panel for all the businesses incorporated between January 2012 to December 2016. We identify unincorporated businesses as those that do not overlap with SOS data and use SBFE’s business start year information.<sup>5</sup> In addition, we observe various business credit data, including business credit card balance and business term loans and firmographic characteristics, including industry (SIC4 code) and location of the business (zip code). Our final dataset includes both incorporated and unincorporated companies observed in SBFE database between January 2012 to December 2016. For these businesses, we observe personal credit data from January 2010 to December 2019 and business credit data from December 2011 to December 2019. For the regression analysis, we use a 10% random sample of our final sample.

### 2.2 Methodology

To test if entrepreneurship can have a long-term impact on business owners’ credit, we match the entrepreneurs’ pre-start personal credit information with non-entrepreneurs’ personal credit information. For all individuals who start businesses between January 2012 to December 2016, we firstly identify non-entrepreneurs who 1) reside in the same county, 2) in

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<sup>5</sup>We only have the year of start in SBFE data. Therefore we randomized the month of start depending on whether the entrepreneur opened the first business credit account in the year of start. So, for example, if an entrepreneur opens a first account in September, we randomly select a month between January and September. Otherwise, we randomly select a month between January and December.

the same income band, 3) have a similar credit score (in same 20 points credit score bin), 4) have similar age (in same 5 years individual age band), and 5) homeownership in the month before incorporation. Then, for these exactly matched entrepreneur-non-entrepreneur pairs, we calculate the Euclidean distance using 1) credit score (a month before business start), 2) slope credit score (-24 to -1 month relative to business start), and 3) debt-to-income ratio (a month before business start). For each entrepreneur, we keep the non-entrepreneurs with the smallest Euclidian distance. This matching strategy helps us control various observable differences in the personal credit of entrepreneurs and non-entrepreneurs before the business starts.

In our tests, we estimate the impact of business start on personal credit outcomes using the following specification:

$$Y_{i,p,t} = \alpha_i + \beta \text{Entrepreneur}_i \times \text{Post}_t + \gamma_{p,t} + \epsilon_{i,p,t} \quad (1)$$

where  $Y$  is personal credit delinquency dummy, equal to 100 if individual (entrepreneur or non-entrepreneur)  $i$  belonging to a pair  $p$  of matched entrepreneur and non-entrepreneur observe 90+ DPD in month  $t$ . Similarly, we define personal bankruptcy dummy. Our sample is based on businesses started between January 2012 and December 2016 and follows the individual in the two years before business start and five years after. We run an event-style regression with a stacked panel where we define the event based on month of business start. We include individual fixed effects ( $\alpha_i$ ), pair-month fixed effects ( $\gamma_{p,t}$ ), and our coefficient of interest is the  $\beta$  on a dummy variable for *Entrepreneur* interacted with *Post*. We double cluster standard errors by business owner's residence county and incorporation event-month.

## 2.3 Summary Statistics

In Table 1, we present personal financial characteristics from the consumer credit panel, both before and after our matching procedure.

Panel A of shows that, on average, entrepreneurs are more creditworthy - higher credit score (725 vs. 696), higher income (\$4,704/mo vs. \$3,600/mo), lower delinquencies (90+DPD) (1.3% vs. 2.4%), lower bankruptcy rates (4.9% vs 6.5%), have higher credit balance (\$193k vs. \$71k), have higher monthly debt (\$1,925 vs. \$864), and higher debt-to-income ratios (0.37 vs. 0.26). These suggest that, in general, entrepreneurs have a stronger financial position than the general population. After matching, however, the observable characteristics across these groups are comparable. This is true not just on credit score, income, age, and debt-to-income on which we matching the groups but also on all other personal characteristics such as DPD, debt balances, number of accounts, etc.

## 3 Results

### 3.1 Who Starts Businesses?

To the best of our knowledge, our paper is the first to combine the universe of business and consumer credit bureau data. Thus, we first provide descriptive statistics on the patterns observed in our novel dataset. We start by documenting the type of individuals that start a new venture followed by the impact of the business start on the individuals' personal outcomes.

Figure 1 plots the number and location of business starts in our merged business-consumer credit panel. Panel A of Figure 1 plots the number of new businesses formed in a year scaled by the number of consumers in the credit panel in that year. As expected, there is sharp decline in number of businesses started during the financial crisis, and business start rates recover after 2015.

Panel B of Figure 1 denotes where entrepreneurs are most active in the U.S. We plot the average annual new business starts in a county scaled by county population. We observe interesting patterns. Unsurprisingly, large cities such as New York City, Los Angeles, Chicago, San Francisco, etc., see high business growth. However, we also see high growth across urban and rural areas in Florida, Colorado, Utah, and Oregon. In the appendix (Figure A1), we show that businesses in the agricultural sector do not drive these results. We also observe very similar patterns in high-tech business starts across the country.

Next, we study how the likelihood of starting a business varies across individuals' characteristics. Figure 2a plots business starts against household income. We see a strong positive correlation between the two - richer households are more likely to start businesses.<sup>6</sup> Figure 2b shows that homeowners have a higher likelihood of starting a business, consistent with the idea that collateral makes borrowing and business start easier (see Schmalz, Sraer, and Thesmar (2017)). In the Appendix Figure, we see that business starts also increase with the mortgage balance. Similarly, Figure 2c shows a strong positive correlation between likelihood of starting a business and the consumer's debt-to-income levels.

Figure 2d and Figure 2e show an inverted U-shaped relationship between business start and consumer credit score and consumer age respectively. Entrepreneur with a credit score between 640-780 are most likely to start a business, with the likelihood dropping at higher and lower scores. Furthermore, we observe the likelihood of starting a business is highest among 35-40 year olds, with business starts dropping strongly among the oldest.

Appendix Figure A2 shows heterogeneity in business starts across gender, race, and

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<sup>6</sup>We find similar results using individual instead of household income (Appendix Figure A2)

education levels. On average, men start more businesses, as do individuals with higher levels of formal education. Interestingly, we notice patterns in business starts across race have flipped in recent years. Before 2014, white individuals were more likely to start a business. Since then, there has been a steady increase in business starts by minorities, with the current rates far exceeding that of white individuals.

### 3.2 Impact of Business Starts on Personal Credit

We start by looking at whether an entrepreneur's personal credit is affected by a business start. With access to detailed credit bureau data that links both the personal and business credit of small business owners, we study the impact of new business start on personal credit outcomes.

Figure 3 presents the personal credit outcomes of entrepreneurs as compared to a matched set of consumers that do not start a business (non-entrepreneurs sample). We follow the two groups two years before the business starts and five years after. Entrepreneurs and non-entrepreneurs are matched on observables in the month before the business start. The consumers who start businesses are matched to non-entrepreneurs on the county, income, age, credit scores, and debt-to-income ratio. Details on the matching are described in Section 2.1.

Figure 3a plots the personal delinquency rates (90+ DPD rate). Before starting the business, we note that both groups of consumers are on a similar path, with credit conditions improving and personal delinquency rates dropping. After the start of the business, the personal DPD of entrepreneurs continues to drop for a few months before increasing. Within a year of business start, entrepreneurs are have a personal higher chance of being delinquent on their loans, and the difference persists even five years after the start of business.

In Table 2 we test this relationship more formally and estimate the following regression specification:

$$Y_{i,p,t} = \alpha_i + \beta \text{Entrepreneur}_i \times \text{Post}_t + \gamma_{p,t} + \epsilon_{i,p,t}$$

where  $Y$  is personal credit delinquency or bankruptcy indicator, equal to 100 if individual (entrepreneur or non-entrepreneur)  $i$  belonging to a pair  $p$  of matched entrepreneur and non-entrepreneur are more than 90 days late on loan payments (90+ DPD) or files for a bankruptcy in month  $t$ . Our sample is based on businesses started between January 2012 and December 2016 and follows the individual in the two years before business start and five years after. We run an event-style regression with a stacked panel where we define the event based on month of business start. We include individual fixed effects ( $\alpha_i$ ), pair-month fixed effects ( $\gamma_{p,t}$ ), and our coefficient of interest is the  $\beta$  on a dummy variable for *Entrepreneur*

interacted with *Post*. We double cluster standard errors by business owner’s residence county and incorporation event-month.

In Panel A, we report results comparing entrepreneurs to the general non-entrepreneur population, while in Panel B, we compare entrepreneurs to their matched non-entrepreneur counterpart. Column 1 of Panel A Table 2 shows that on average, in a given month, after starting a business, entrepreneurs are 0.491 ppt more likely to have a personal account 90 days past due. After matching, the difference between entrepreneurs and non-entrepreneurs after business start is 0.226 ppt (Panel B, Column 1). In the month before the business started, the average DPD level of entrepreneurs was 1.2%, suggesting an average increase of 18.83% for entrepreneurs above non-entrepreneurs following business start.

In Column 2, we study the effect of business start over the years. As our aggregate figure suggests, immediately after the business starts, personal delinquency rates fall, suggesting improved personal outcomes. However, entrepreneurs have higher delinquencies from the second year, with the rate increasing over time. Five years after the business start, entrepreneurs are 0.435 ppt (Panel B) more likely to have personal delinquency, equivalent to 36.25% of the unconditional mean.

To ensure there are no differential pre-trends among the group of entrepreneurs and non-entrepreneurs, we estimate a dynamic version of Equation 1 in Figure 4. We observe no differential pre-trends. In the first two quarters after business start, we observe a significant decline in personal delinquency rates for entrepreneurs compared to the non-entrepreneurs. However, this effect is short-lived. After two quarters, personal delinquency rates of entrepreneurs increases significantly and stays elevated for the next five years.

While days past due capture liquidity constraints of the entrepreneur, they may be temporary.<sup>7</sup> To understand if there are any permanent impairments to credit quality, we turn our attention to personal bankruptcy filings. As shown by [Dobbie, Goldsmith-Pinkham, Mahoney, and Song \(2020\)](#), bankruptcy filings and the presence of bankruptcy flags can have adverse long-term impact on a consumer by reducing access to credit.

Figure 3b shows the rate of filing for personal bankruptcy among entrepreneurs and non-entrepreneurs. We measure the hazard rate, calculated as the share of non-bankrupt individuals who file for bankruptcy in a given month. We see that, as with delinquencies, the hazard rate for bankruptcy drops in the months preceding the business start, but rises for entrepreneurs after the business is formed. New bankruptcy filings for entrepreneurs diverge from non-entrepreneurs after about one year and continue to stay elevated even five years after the business start.

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<sup>7</sup>While the liquidity disruptions may be temporary, delinquencies remain on credit reports for 7 years even if overdue bills are repaid, and can have a long-term impact on access to credit.

Column 3 and 4 of Table 2 look at personal bankruptcy filings. The dependent variable takes a value of 100 if the entrepreneur files for bankruptcy in a given month. On average, in the month before business start, the average rate of making a new bankruptcy filing is 0.021%. Column 3 shows that, on average, the likelihood of making a new bankruptcy filing increases by 0.8bps after a consumer starts a business, equivalent to 38.10% of the pre-business mean. As with delinquencies, Column 4 shows that the likelihood of filing for a bankruptcy increases with time, and by the fifth year, the entrepreneur is 1.4 bps more likely to file for bankruptcy, equivalent to 66.67% of the unconditional mean.

Panel B of Figure 4 provides coefficients from the dynamic version of the regression. We observe no differential pre-trends. In the first year after business start, personal bankruptcy rates for entrepreneurs are similar to the non-entrepreneurs. However, after one year, personal bankruptcy rates of entrepreneurs increases significantly and stays elevated for the duration of our sample.

Thus, overall, we see a worsening of personal credit conditions with increased borrowing from entrepreneurs accompanied by increased delinquency rates and new bankruptcy filings.

### 3.3 Heterogeneity in Individual and Business Type

While on average, we see entrepreneurs struggle after starting a business, the effect could be restricted to entrepreneurs who may start low growth ventures. In turn, the changes to personal creditworthiness could be driven by the entrepreneur's skill, choice of location, or business type. Understanding these differences could have significant policy implications, such as which type of entrepreneurs and ventures to support.

#### 3.3.1 Entrepreneur Skill and Sophistication

First, we examine heterogeneity in entrepreneur delinquency and bankruptcy outcomes based on entrepreneur skill and sophistication. The literature has documented that, on average, entrepreneurs have higher human capital and skills, are smarter and more educated ([Murphy, Shleifer, and Vishny, 1991](#); [Gennaioli, La Porta, Lopez-de Silanes, and Shleifer, 2013](#); [Levine and Rubinstein, 2017](#)). We explore whether these qualities lessen the negative impact of entrepreneurship on personal credit of the owner

Table 3 follows the procedure in Equation 1 but includes an additional interaction term based on entrepreneur sophistication in each column. We use three proxies for entrepreneur skill and sophistication - education, income, and credit score, using the specification below.

$$Y_{i,p,t} = \alpha_i + \beta \text{Entrepreneur}_i \times \text{Post}_t \times \text{Sophistication}_i + \gamma_{p,t} + \epsilon_{i,p,t}$$

where  $Y$  is personal credit delinquency or bankruptcy indicator, equal to 100 if individual (entrepreneur or non-entrepreneur)  $i$  belonging to a pair  $p$  of matched entrepreneur and non-entrepreneur observe 90+ DPD or files for a bankruptcy in month  $t$ . Our sample is based on businesses started between January 2012 and December 2016 and follows the individual in the two years before business start and five years after. We run an event-style regression with a stacked panel where we define the event based on month of business start. We include individual fixed effects ( $\alpha_i$ ), pair-month fixed effects ( $\gamma_{p,t}$ ), and our coefficient of interest is the  $\beta$  on a dummy variable for *Entrepreneur* interacted with *Post* and the *Sophistication* of the entrepreneur. We double cluster standard errors by business owner's residence county and business start event-month.

Panel A of Table 3 reports results. We use three proxies for entrepreneur skill - whether entrepreneur has a college degree (Column 1), above median income levels (Column 2), or above median credit score (Column 3). We observe that high skilled entrepreneurs are less likely to face liquidity constraints.

However, surprisingly, skilled entrepreneur are not any less likely to file for bankruptcy after starting their business. The interaction term on *Entrepreneur* \* *Post* \* *Sophistication* is statistically insignificant for all our proxies of entrepreneur skill and sophistication. This suggests that the worst-case outcome of bankruptcy is similar for both high and low-type entrepreneurs. Thus entrepreneur skill and sophistication reduces liquidity constraints but not solvency issues.

### 3.3.2 Incorporated vs. Unincorporated Businesses

Federal protections exist to prevent the spillover of burden from business to personal balance sheet of entrepreneurs. By incorporating their business, entrepreneurs can receive personal liability protection, as well as legal and tax benefits. Thus, even if a business fails, the personal assets of the owner are not personally responsible for business debt.<sup>8</sup> However, there are costs to incorporating the business. It could lead to double taxation—first at the corporate level, and then at the shareholder level. Businesses that choose not to incorporate and organize firm as a pass-through get taxed at the personal level. Unincorporated business also avoid the direct costs of incorporation, such as annual fees and the preparation of more detailed financial statements, and indirect agency costs associated with the separation of ownership and control.

In Table 4, we explore the level of protection offered to the entrepreneur's personal balance

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<sup>8</sup>An exception if personal assets have been pledged as collateral to borrow or the entrepreneur has provided personal guarantee for the loan.

sheet from incorporating their business using the specification below.

$$Y_{i,p,t} = \alpha_i + \beta \text{Entrepreneur}_i \times \text{Post}_t \times \text{Incorporated}_i + \gamma_{p,t} + \epsilon_{i,p,t}$$

where  $Y$  is personal credit delinquency or bankruptcy indicator, equal to 100 if individual (entrepreneur or non-entrepreneur)  $i$  belonging to a pair  $p$  of matched entrepreneur and non-entrepreneur observe 90+ DPD or files for a bankruptcy in month  $t$ . Our sample is based on businesses started between January 2012 and December 2016 and follows the individual in the two years before business start and five years after. We run an event-style regression with a stacked panel where we define the event based on month of business start. We include individual fixed effects ( $\alpha_i$ ), pair-month fixed effects ( $\gamma_{p,t}$ ), and our coefficient of interest is the  $\beta$  on a dummy variable for *Entrepreneur* interacted with *Post* and the *Incorporation* status of the business. We double cluster standard errors by business owner's residence county and incorporation event-month.

Table 4 presents the results. In Columns (1) and (2), our outcome of interest in the likelihood of the entrepreneurs accounts being delinquent on any of their credit accounts, while Columns (3) and (4) we look at the likelihood of filing for bankruptcy. As in Table 2, entrepreneurs have a higher delinquency and bankruptcy rate after starting their business. However, incorporated businesses, on average, have lower rates of default. Delinquency rates for incorporated entrepreneurs is 77.56% lower than unincorporated entrepreneurs while bankruptcy rates are 58.33% lower. This is true in every year after the business start. However, the shield from incorporation fades over time. 2 years after business start, incorporated business owners have a 87.69% lower rate of being delinquent on their accounts while it is only 46.46% 5 years after starting the business. We observe similar patterns for bankruptcy filings.

Thus, while incorporation reduces the costs to the personal balance sheet of the entrepreneur, it does not fully offset the negative effects of business formation.

## 4 Barriers to Entrepreneurship and Entrepreneur Creditworthiness

In this section, we study how changing business financial constraints affect the personal balance sheet of entrepreneurs. Various theories suggest that liquidity constraints limit entry into entrepreneurship (Benanke and Gertler, 1989; Kiyotaki and Moore, 1997; Cagetti and De Nardi, 2006). Consistently, considerable empirical research suggests that wealth, in general, helps entry into self-employment (Evans and Jovanovic, 1989; Evans and Leighton,

1989; Holtz-Eakin, Joulfaian, and Rosen, 1994a) and that housing wealth in particular influences both entry into self-employment (Corradin and Popov, 2015; Schmalz, Sraer, and Thesmar, 2017; Bellon, Cookson, Gilje, and Heimer, 2021) and employment in small firms (Adelino, Schoar, and Severino, 2015). To alleviate financial constraints, the governments take various initiatives to foster entrepreneurship.<sup>9</sup>

Therefore, we first test how government policies meant to foster entrepreneurship by reducing the financial burdens of entrepreneurs affect business starts and the personal creditworthiness of the entrepreneur. We look at how differences in state business policies and personal bankruptcy policies may impact the adverse effects of entrepreneurship on the business owner. Finally, we test how lower barriers to entry in terms of higher house price growth impact the credit quality of the entrepreneur.

## 4.1 State Business Policies

One solution to reduce the negative effects of entrepreneurship on the business owner could be to provide additional support to entrepreneurs to reduce the burdens of running a business. In light of this, currently, small businesses and entrepreneurs receive immense support from local governments to drive business and job creation. However, the level of support varies significantly across states in the U.S. with some states being more business-friendly while others impose costs that either directly or indirectly affect entrepreneurship and business growth. Taxes and regulation, for example, reduce investment, distort incentives, and redirect resources away from expanding the business. For example, Giroud and Rauh (2019) show increase in state taxes adversely impacts the new business formations and number of employees per startup. Similarly, Fazio, Guzman, and Stern (2020) show that state R&D tax credit is positively associated with the number of startups. We, therefore, test whether such additional burdens correlate with personal credit costs.

To test if local policies can reduce the burdens of entrepreneurship, we follow the procedure in Equation 1 but include an additional interaction term based on the Small Business Policy Index scores for each state.<sup>10</sup> We use two indices - one aggregate measure of 62 state-level policies supporting businesses and a second measure on the tax policy index for each state. The policy scores are based on 62 measures of which 27 are tax related, 26 relate to rules and regulations, 6 are related to government spending and debt issues, and the 3 remaining measure the effectiveness of important government undertakings. Higher

<sup>9</sup>See Lerner (2020) for a review of government incentives in entrepreneurship.

<sup>10</sup>Source: <https://sbecouncil.net/wp-content/uploads/2019/05/SBPI2019-Report.pdf>

scores indicate the state is less business friendly.

$$Y_{i,p,s,t} = \alpha_i + \beta \text{Entrepreneur}_i \times \text{Post}_t \times \text{Small-Business Policy Index}_s + \gamma_{p,t} + \epsilon_{i,p,t}$$

where  $Y$  is personal credit delinquency or bankruptcy indicator, equal to 100 if individual (entrepreneur or non-entrepreneur)  $i$  belonging to a pair  $p$  of matched entrepreneur and non-entrepreneur in state  $s$  observe 90+ DPD or files for a bankruptcy in month  $t$ . Our sample is based on businesses started between January 2012 and December 2016 and follows the individual in the two years before business start and five years after. We run an event-style regression with a stacked panel where we define the event based on month of business start. We include individual fixed effects ( $\alpha_i$ ), pair-month fixed effects ( $\gamma_{p,t}$ ), and our coefficient of interest is the  $\beta$  on a dummy variable for *Entrepreneur* interacted with *Post* and the *Small-Business Policy Index* of the state. We double cluster standard errors by business owner's residence county and incorporation event-month.

Results are presented in Panel A of Table 5. The interaction terms suggest that entrepreneurs in business friendly states have higher delinquency and bankruptcy rates. A one standard deviation (20 point) increase in business friendly policies leads to a 7.9% increase in personal DPD and a 13.7% increase in bankruptcy rates.

To understand why business-friendly policies could lead to worse financial outcomes for the entrepreneur, we turn to how business-friendly policies might affect the choice to enter into entrepreneurship. As business-friendly states lower the burden of operating a business, the marginal entrepreneur that chooses to enter in these states could differ from entrepreneurs that choose to enter in states with a greater threshold for entry.

Figure 5 explores the relationship between the level of business friendliness of the state and the average quality of an individual who starts a business in these states. On average, business friendly states (lower policy index) have entrepreneurs who have a lower credit score, lower income, lower levels of education, and higher debt-to-income ratios at entry. Thus, the average entrepreneur in business friendly states are observably less skilled and sophisticated than their counterparts who enter in less friendly states.

These observable differences in the type and skill of the entrepreneurs across states could explain the difference in DPD and bankruptcy rates we observed in Panel A of Table 5. In Panel B of Table 5, we control for the characteristics of entrepreneurs and compare observably similar entrepreneurs in more or less business friendly states to test the impact of the policy on personal creditworthiness. We include a matched-group event-month fixed effect to compare individuals in the same income quintile, education level, credit score bin (50 points), and DTI quintile.

Panle B of Table 5 shows that even after controlling for the observable quality of the

entrepreneur, one standard deviation (20 point) increase in business-friendly policies leads to an 8.6% increase in personal DPD and a 13.7% increase in bankruptcy rates. This suggests that entrepreneurs entering states that are more or less business-friendly may differ on dimensions besides observable quality such as the idea for the venture.

## 4.2 Bankruptcy Policies

As we know from previous literature, housing wealth is essential to start a business ([Adelino, Schoar, and Severino, 2015](#); [Schmalz, Sraer, and Thesmar, 2017](#)). Therefore, an entrepreneur's ability to legally protect their home from creditors in case of personal bankruptcy impacts risk-taking and reduces the downside risk of entrepreneurship. In the US, with the homestead exemption, homeowners can legally keep their house outside the bankruptcy process or be reasonably compensated for the loss of their residence. However, the homestead exemption limits vary across states. For example, in 2016 (the last year for the business started in our sample), in Massachusetts, homeowners can save as much as \$500,000 of their home equity, while in Kentucky, they can save only \$5,000 in home equity.

Thus, we study how state-level variations in the level of the homestead exemption for bankruptcy purposes can impact the personal creditworthiness of entrepreneurs after starting a business. Personal bankruptcy policies are interesting because their effect on entrepreneurship is unclear.

While increased protection during bankruptcy proceedings can provide a safety net for many individuals, insurance can negatively affect business quality. Public policies encouraging entrepreneurship by providing insurance against downside risk introduce a moral hazard problem. Since insurance reduces the downside costs, it may lead individuals to start enterprises that are unlikely to succeed and have little upside potential.

Personal bankruptcy laws may also create an adverse selection problem. For example, suppose creditors are aware that borrowers have the protection of bankruptcy laws and cannot fully discriminate between high-risk and low-risk projects. In that case, interest rates will tend to be higher, which may cause individuals with low-risk projects to drop out of the pool, leaving only those with high-risk proposals.

Thus, exemptions in personal bankruptcy proceedings can be a double-edged sword - encouraging entrepreneurship while at the same time promoting riskier and lower-quality entrepreneurs.

We explore this by exploiting cross-sectional variation in level of homestead exemption in a region. While the homestead exemption policy may be set at the state level, house prices vary significantly across regions within a state. Therefore, we have variations in the

percentage of home value that is exempt from bankruptcy proceedings. We use this variation in exemption share to study the impact of the entrepreneur's personal creditworthiness.

In Table 6, we study the impact on the personal delinquency and bankruptcy rates of entrepreneurs after they start their businesses. We further include interactions based on the value of home equity that is protected during bankruptcy proceedings as a share of the median home price in the zip code.

Panel A of Table 6 shows that entrepreneurs have a higher likelihood of DPD and bankruptcy after starting their businesses. Interestingly, though, the likelihood of being delinquent on loans increases by an additional 24.4% for a one standard deviation (0.39) increase in the share of housing equity that is protected during bankruptcy. While statistically insignificant, the likelihood of a new bankruptcy filing also increased by 53.8% for one standard deviation increase in the generosity of bankruptcy policies.

To understand the reason why increased protections could harm the entrepreneur, we turn to which consumers make the transition to entrepreneurship in these states. Figure 6 shows that in regions with higher levels of protection during bankruptcy, the average entrepreneur has a lower credit score, income, and education level at the time of starting their business. Thus, the entrepreneurs in these regions are observably worse which is in line with the negative consequences of providing insurance.

In Panel B of Table 6, we, therefore, control for the observable characteristics using matched-group fixed effect to compare observably similar entrepreneurs across regions. We notice that even observably similar entrepreneurs in states with a more generous insurance policy have a larger negative impact on their personal balance sheet after starting a business. A one standard deviation increase in exemption levels increases observed delinquencies by 29.7% and bankruptcy rates by 65.1%.

Overall, these results suggest that generous state policies are encouraging lower-quality entrepreneurs from pursuing new ventures, then the associated individual and social costs of these negative consequences may be larger than the benefits from encouraging an individual on the margin to pursue a worthwhile project

### 4.3 Housing Collateral

Our previous results suggest that lower barriers to entry leads worse quality entrepreneurs to enter the market. Ideally, to causally study the impact of business friendly policies on entry into entrepreneurship and personal creditworthiness, we would need an exogenous change to state policies. However, state business policies are both extremely sticky, and changes, if any, are correlated with factors that could affect the choice into entrepreneurship.

Therefore, to identify the impact of lowering entry barriers into transition to entrepreneurship, we turn to a well documented source of variation in business start - house prices. [Adelino et al. \(2015\)](#) and [Schmalz et al. \(2017\)](#) document that exogenous variations in house prices in an area leads to increased business start as value of housing collateral increases.

Following a similar strategy, we first document that increases in house prices are correlated to increased entry into entrepreneurship. Column 1 of Table 7 shows that individuals are more likely to start a business in areas that experienced an increase in house prices in the previous year. In Column 2, we focus on just the homeowners in the area and show that the effect is stronger in this group.

Interestingly, Column 3 and 4 show that, on average, this effect is stronger for individuals with a lower credit score and lower income. This suggests that increase in home value and collateral is easing the financing constraints for poorer and more credit constrained individuals.

In Column 5 and 6, we study how state policies interact with the entry into entrepreneurship. We see that as house prices increase, individuals in business-friendly states (lower policy index or states with unlimited homestead exemption) are more likely to transition to entrepreneurship.

Overall, therefore, increases in home prices leads to observably worse quality entrepreneurs entering and the entry is higher in business-friendly states.

## 5 Channels

Thus far, we have established that personal credit conditions of entrepreneurs deteriorate after starting their business. Furthermore, business-friendly policies could have unintended consequences as lowering entry barriers leads to the entry of individuals who face the largest personal costs. We now turn towards understanding why we observe these deteriorating personal financial conditions.

### 5.1 Personal Borrowing

Perhaps one of the biggest impediments cited for business formation and growth is the ability to raise the financing required to start a business. Supporting this, [Holtz-Eakin et al. \(1994b\)](#); [Kerr and Nanda \(2009\)](#) show that lack of financing prevents potential entrepreneurs from starting a business. With this in mind, multiple policies support easy access to financing for small businesses - for example, the Community Reinvestment Act (CRA), or the Paycheck Protection Program (PPP) during the COVID-19 crisis.

Yet, according to the Federal Reserve Bank's Small Business Credit Survey, 66% of small businesses reported facing financing challenges in 2019.<sup>11</sup> In response to these challenges, firms most commonly used personal funds, with 62% using personal funds to address financial challenges. Similarly, Robb and Robinson (2014) find that many start-ups receive debt financing through the personal balance sheets of the entrepreneur. Furthermore, empirical research on small business lending has shown that personal guarantees and personal collateral must often be posted to secure financing for startups (Moon, 2009; Avery et al., 1998; Mann, 1998).

Thus, the empirical evidence suggests the importance of personal borrowing capacity of entrepreneurs for business formation and continuation. In our sample too, we observe increased borrowing on entrepreneur's personal balance sheet relative to matched non-entrepreneurs after start of the business. As observed in Figures 7a, 7b, and 7c entrepreneur's personal credit utilization increases along with both mortgage and non-mortgage balance after business start.

We test this formally in Table 8. After starting their business, the average entrepreneur's debt-to-income ratio increases by 2.10 ppt relative to non-entrepreneurs (Column 1). The increase is about 0.64 ppt in the first year and goes up by 3.04 ppt in year five. The average pre-business debt-to-income ratio was 36%, implying a 8.4% increase in leverage. Both the non-mortgage and mortgage debt of entrepreneurs increase but the majority of the increase is business-friendly debt, contributing 75% of the total debt growth.

To understand the reasons for why less skilled or sophisticated individuals and entrepreneurs in business-friendly states have worse credit outcomes, we look at whether the level of borrowing on personal balance sheet differs by individual type or location. We do this separately for homeowners and renters so we can study mortgage and non-mortgage debt patterns.

Table 9 shows that for homeowners, on average, individuals with higher levels of education, income, and credit score increase their mortgage debt borrowing to a greater extent while the lower skill entrepreneurs increase their non-mortgage borrowing. Overall, though, there is no difference in total borrowing by an individual's skill or sophistication.

However, while we do not have pricing information, on average, mortgage debt is cheaper than other non-mortgage accounts which could include expensive personal credit card borrowing.<sup>12</sup> Thus, skilled individuals increase their borrowing to the same extent as their unskilled counterparts. However, they do it by borrowing on *cheaper* mortgage debt. The

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<sup>11</sup>Source: <https://www.fedsmallbusiness.org/mediabinary/FedSmallBusiness/files/2021/2021-sbcs-employer-firms-report>

<sup>12</sup>Personal credit cards are the largest share of non-mortgage borrowings.

extension of expensive credit to unsophisticated borrowers appears to be correlated with higher default rates of these individuals.

Table A1 in appendix also shows the likelihood of default and bankruptcy based on the level and type of leverage an individual accumulates. As expected, more levered individuals face higher default and bankruptcy rates. Interestingly, we observe that for a given level of DTI, if the borrowing is through mortgage rather than non-mortgage debt, the likelihood of default and bankruptcy is significantly lower. As hypothesized in the previous paragraph, less expensive mortgage debt leads to lower default rates, even for the same individual. As skilled entrepreneurs take on more mortgage debt, they also have lower rates of default and bankruptcy.

Similarly, individuals in less business-friendly states increase their mortgage borrowing as opposed to non-mortgage borrowing in friendly states. Finally, as house prices go up, individuals' DTI increases due to increased borrowing against the housing collateral.

On the other hand, renters only have the option of borrowing non-mortgage debt. We see, however, though, that sophisticated individuals with higher education, income, and credit score increase their leverage to a lesser extent after starting their businesses. While the policy variables are statistically insignificant, they suggest that entrepreneurs in less-business states have a smaller increase in leverage after entry into entrepreneurship.

Taken together, these results suggest that entrepreneurs increase the borrowing on their personal balance sheets after the business start. However, sophisticated individuals and individuals in less friendly states (who are on average higher quality) increase mortgage debt while less sophisticated individuals raise expensive non-mortgage borrowing. An increase in non-mortgage debt is correlated with higher personal delinquencies and bankruptcy rates.

## 5.2 Supply of Business Credit

Finally, we address why entrepreneurs choose to borrow on their personal balance sheet instead of borrowing business credit, which could protect their personal assets. The choice to borrow on the personal balance sheet could be driven by either the demand from the entrepreneur or the lack of supply of business credit to entrepreneurs.

In this section, we explore how credit supply varies based on the personal characteristics of the entrepreneurs, and the subsequent impact on the personal leverage of the entrepreneur.

In Panel A of Table 10, we study the differences in business loan approval rates based on the personal characteristics of the entrepreneur. Our dependent variable tries to capture the supply of credit by looking at the share of business loans that an individual applies for that are eventually approved. We measure applications for business credit based on the number

of hard inquiries on the business credit report. Loan approvals are measured based on the number of new loan accounts opened.

Approval rates are higher, as expected, for entrepreneurs with higher credit scores, with a college degree, higher incomes, and lower leverage. There are, reassuringly, however, no differences in approval rates by gender or race.

We then, finally, turn to understanding how business loan approvals or denials affect the personal leverage of the entrepreneur. Entrepreneurs who get denied business loans are more likely to level up on non-mortgage debt as observed in Panel B of Table 10.

As we know from our earlier results, given similar levels of DTI, entrepreneurs with a larger share of non-mortgage debt have higher levels of delinquencies and are more likely to file for bankruptcy. And the lack of business credit supply leads to larger increases in the level of non-mortgage debt of the entrepreneur.

## 6 Conclusion

In this paper, we provide the first direct evidence on how entrepreneurship impact the personal finances of business owners. New business formations help individuals transition from formal employment to self-employment and help create new jobs in the economy. However, we find that entrepreneurs experience increased personal credit default rates and personal bankruptcy rates within a year of incorporating their business, compared to non-entrepreneurs with similar creditworthiness.

The entrepreneur's skill and sophistication, measured by education, income, and credit score do not reduce their probability of filing for bankruptcy after starting a business. We also find that additional support through lower regulation or taxes is not sufficient to offset the negative impact on the personal creditworthiness of the entrepreneur. However, incorporating the business helps reduce the delinquency and bankruptcy rates of entrepreneurs.

We then focus on understanding the channel through which personal creditworthiness of entrepreneurs deteriorate. We demonstrate that entrepreneurs increase their personal borrowing after starting a business. Increased borrowing leads to higher delinquencies and bankruptcy filings. We further show that lack of access to small business credit forces entrepreneurs to shift borrowing to their personal balance sheet and increases entrepreneur defaults.

Overall we document that entrepreneurship can have a long-term negative impact on the personal credit of some small business owners.

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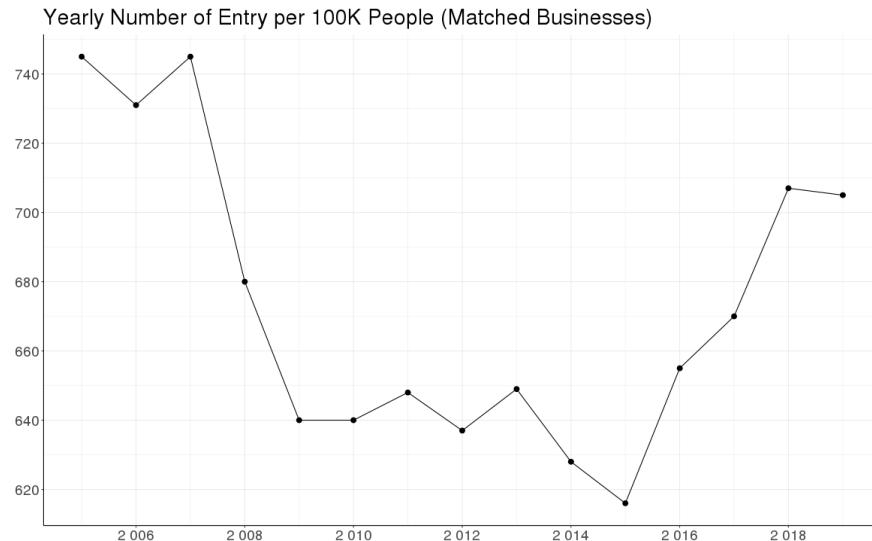
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# Figures

**Figure 1:** Business Start

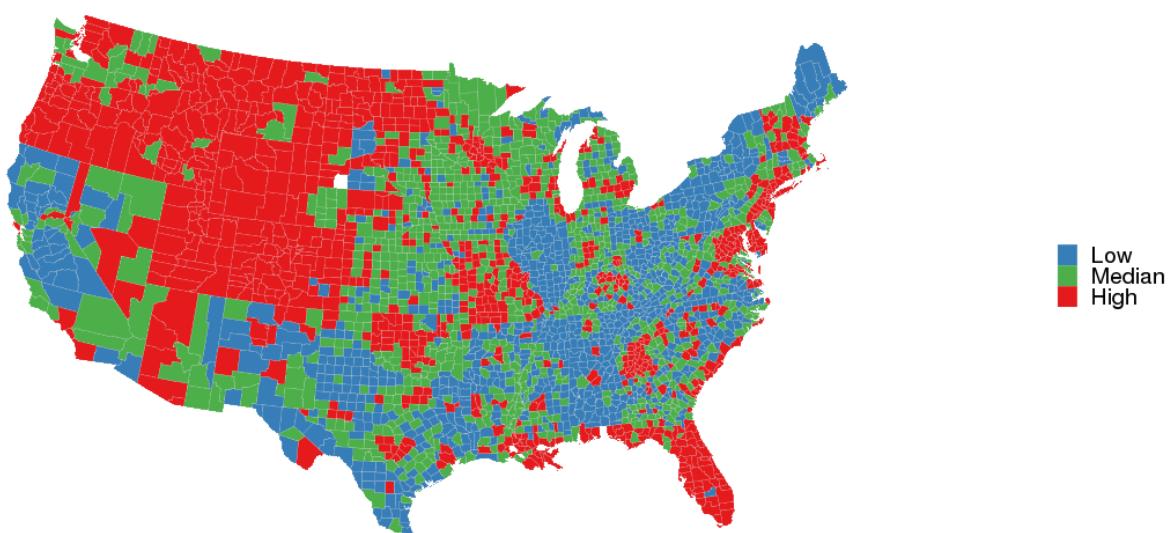
**Panel A -** Business Starts By Year

This figure plots the number of business starts in the merged Equifax business-consumer credit panel scaled by the number of consumers in the credit panel in a given year.



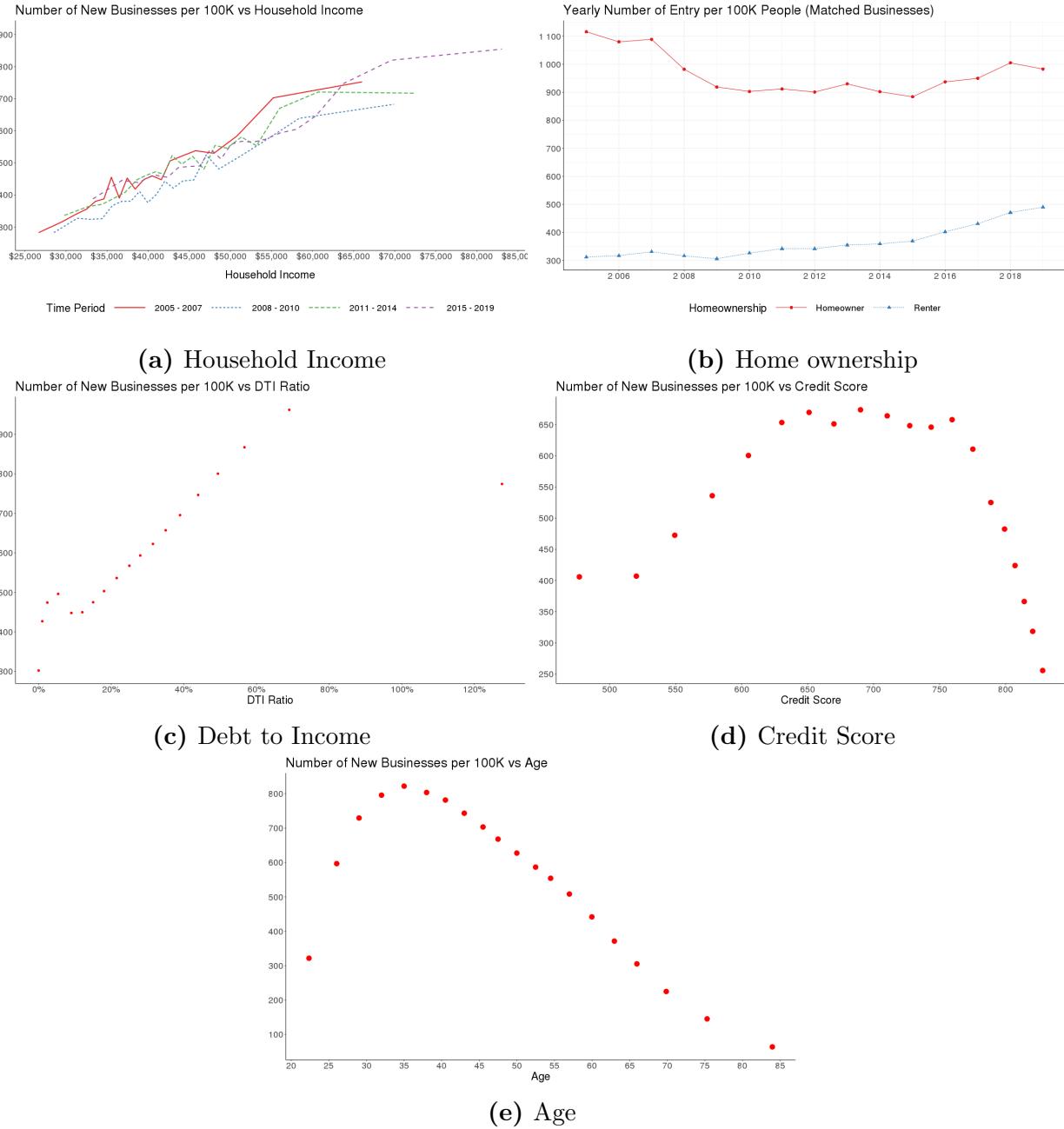
**Panel B -** Business Starts per 100k population

This map plots the average number of business starts in a county between 2005 and 2019 scaled by the county population in 2010. We split the business start rates into terciles.



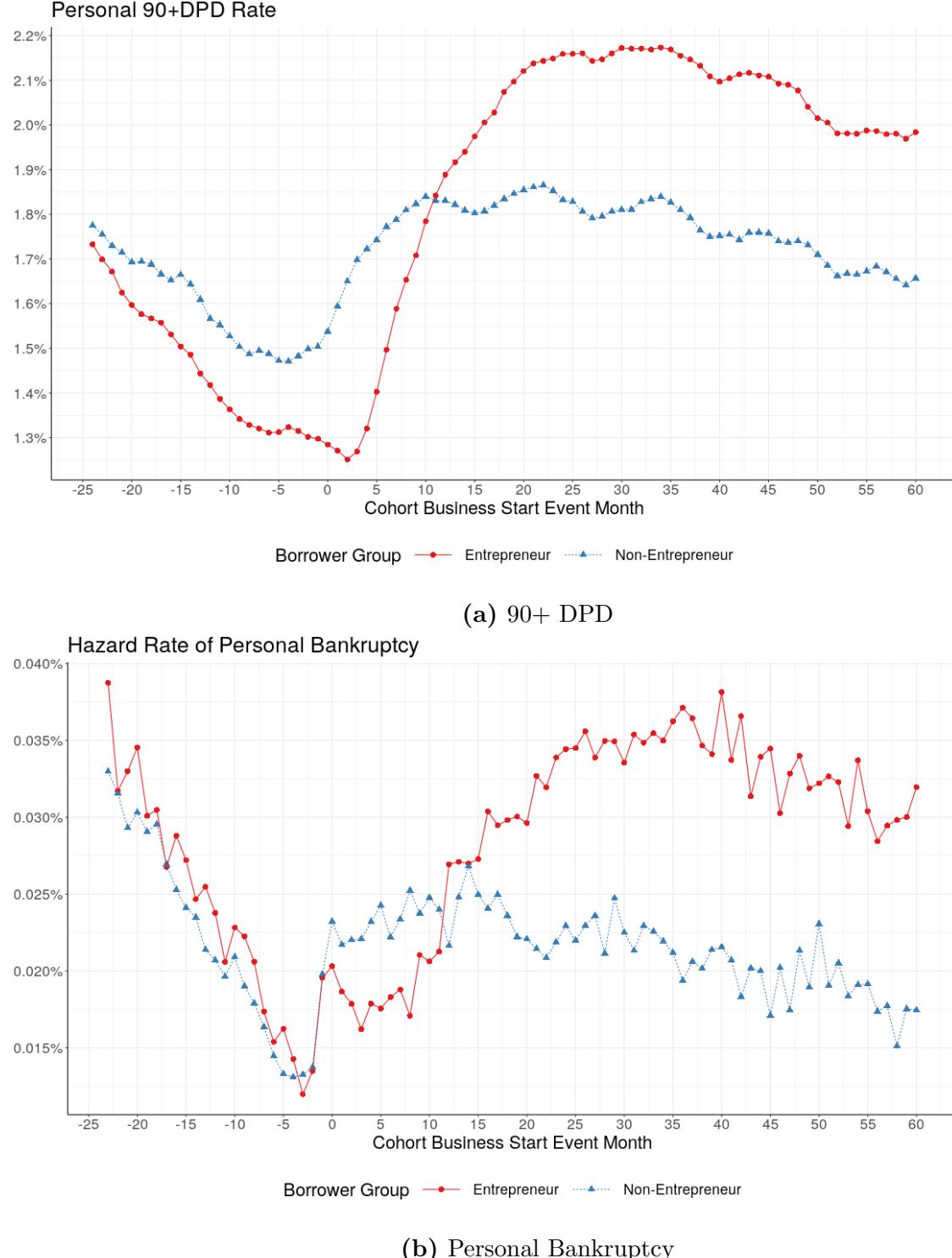
**Figure 2:** Business Starts By Borrower Characteristics

This figure plots the business start rate across borrower characteristics. Household income, home ownership, debt-to-income, credit scores and age are obtained from the Equifax consumer panel.



**Figure 3:** Personal Credit Outcomes of Entrepreneurs and Non Entrepreneurs

This figure plots the average monthly personal 90 days past due (90+DPD, Panel A) and new bankruptcy filings (Panel B) for entrepreneurs and non-entrepreneurs matched as described in Section 2.2. We track the individuals in the two years prior to business start and five years after.



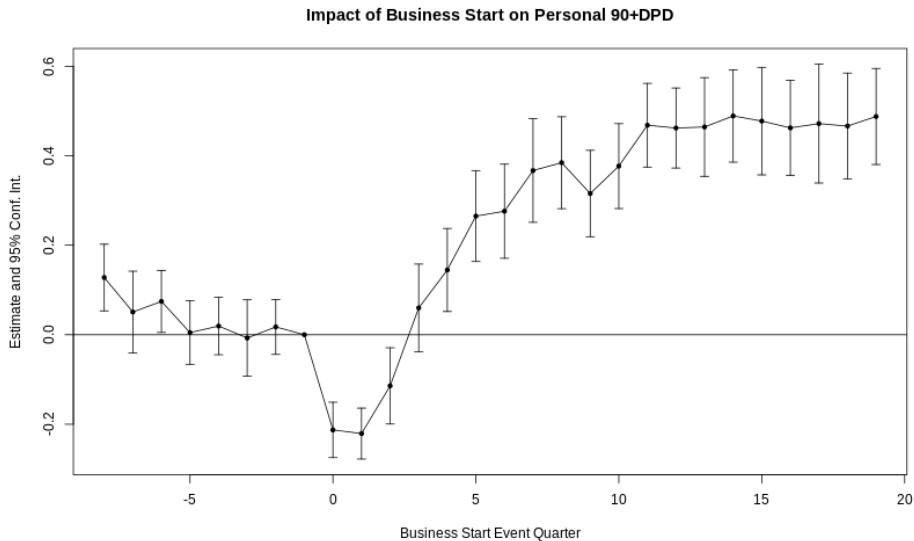
**Figure 4:** Impact of Business Start on Personal Credit

This figure plots the regression coefficients based on

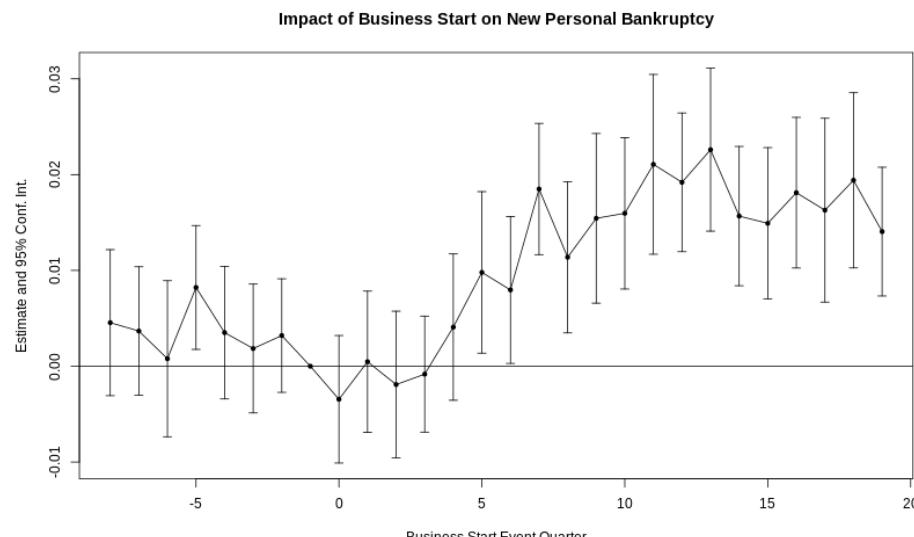
$$Y_{i,p,t} = \alpha_i + \sum_{q=-8}^{q=-2} \beta_q \text{Entrepreneur}_i \times \mathbf{1}_q + \sum_{q=0}^{q=19} \beta_q \text{Entrepreneur}_i \times \mathbf{1}_q + \gamma_{p,t} + \epsilon_{i,p,t}$$

where  $Y$  is personal credit delinquency (Panel A) or bankruptcy (Panel B) indicator, equal to 1 if individual (entrepreneur or non-entrepreneur)  $i$  belonging to a pair  $p$  of matched entrepreneur and non-entrepreneur observe 90+ DPD (Panel A) or new bankruptcy filing (Panel B) in quarter  $q$ . Our sample is based on businesses started between January 2012 and December 2016 and follows the individual in the two years before business start and five years after. We run an event-style regression with a stacked panel where we define the event based on month of business start. We include individual fixed effects ( $\alpha_i$ ), pair-month fixed effects ( $\gamma_{p,t}$ ). We double cluster standard errors by business owner's residence county and incorporation event-month.

**Panel A - 90+ days Past Due**

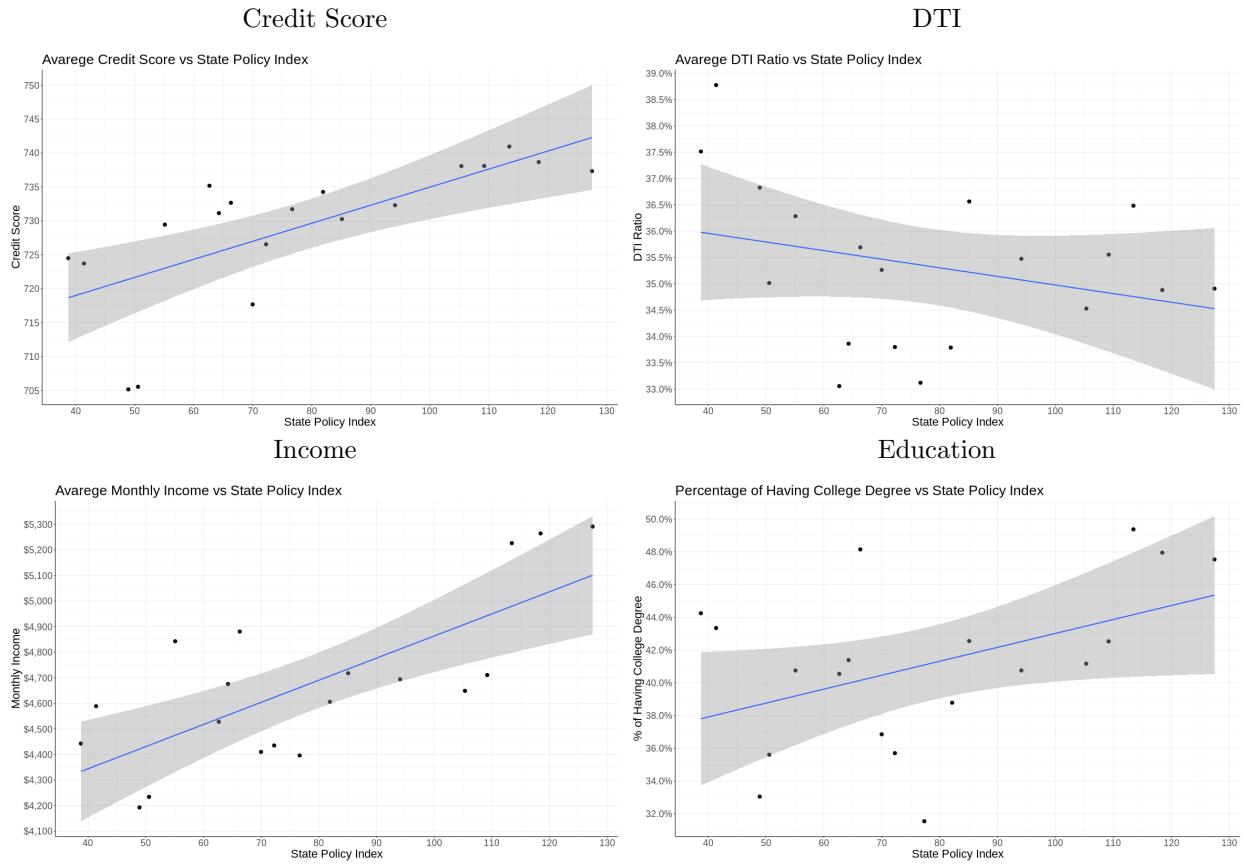


**Panel B - Personal Bankruptcy**



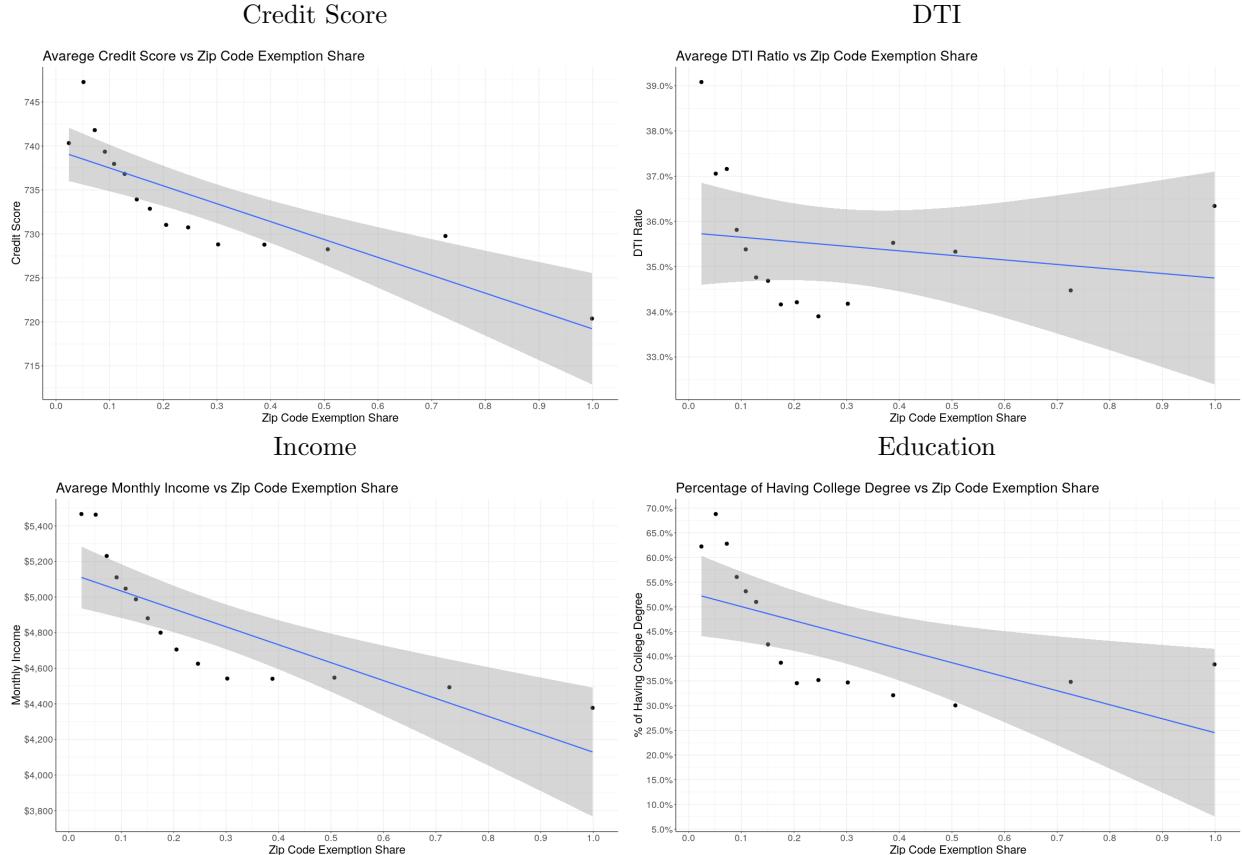
**Figure 5:** Entrepreneur's Characteristics and State-Level Policy Index

This figure plots the average entrepreneur characteristics with state policy index . Credit scores debt-to-income, income and education are obtained from the Equifax consumer panel.



**Figure 6:** Entrepreneur's Characteristics and State-Level Homestead Exemption

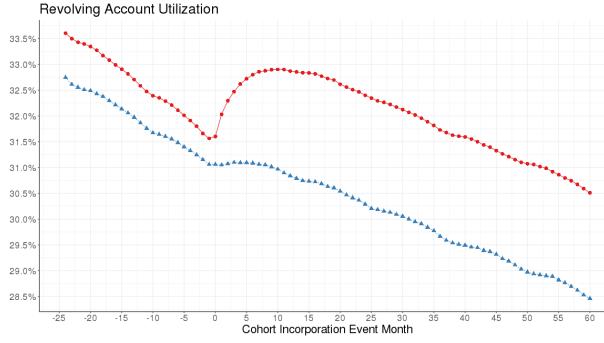
This figure plots the average entrepreneur characteristics against the share of home value exempt from bankruptcy proceedings. Exempt share is calculated as the fraction of the median zip code house price scaled by the level of the homestead exemption in the state. Credit scores debt-to-income, income and education are obtained from the Equifax consumer panel.



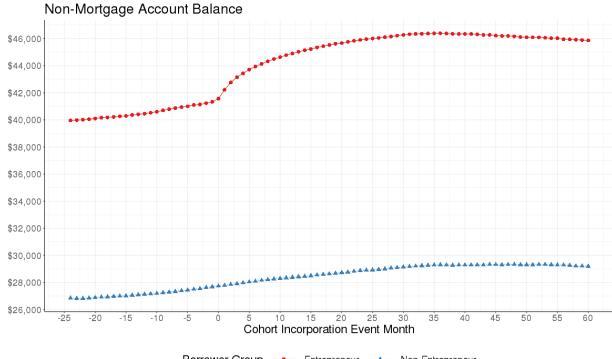
**Figure 7:** Entrepreneur vs. Non Entrepreneur Borrowing

This figure plots the average monthly credit utilization, non-mortgage balance, number of open mortgage accounts, and debt-to-income ratio (DTI) for entrepreneurs and non-entrepreneurs matched as described in Section 2.2. We track the individuals in the two years prior to business start and five years after.

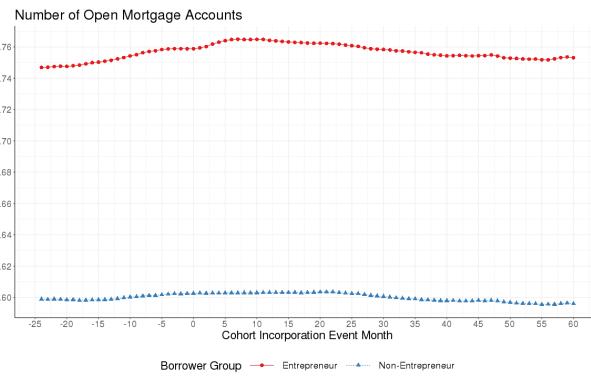
(a) Credit Utilization



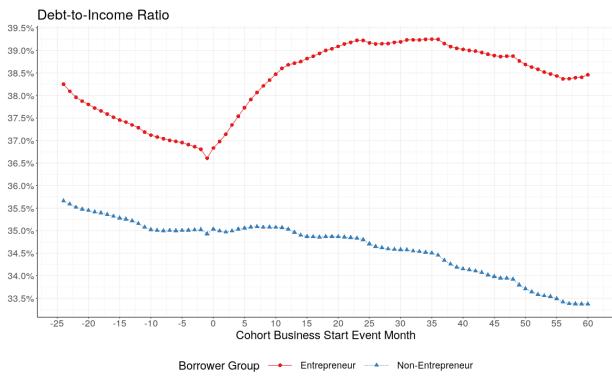
(b) Non-mortgage Balance



(c) Mortgage Accounts



(d) DTI



# Tables

**Table 1:** Personal Financial Condition - Entrepreneur vs Non-Entrepreneur

This table presents personal credit characteristics between January 2012 and December 2016. Columns 1 and 2 provide the means before matching and Column 3 and 4 compare the individuals after matching (matching procedure described in Section 2.2). In Panel A, we compare entrepreneurs to individuals who did not start a business (non-entrepreneur). We use a 1% random sample of non-entrepreneurs before matching to generate statistics for the Column 2.

	Before Matching		After Matching	
	Entrepreneur (1)	Non-Entrepreneur (2)	Entrepreneur (3)	Non-Entrepreneur (4)
Number of Observations	2,172,826	133,018,600	1,984,326	1,984,326
<i>Matched Characteristics</i>				
Credit Score	725	696	730	730
Monthly Income	4,704	3,600	4,832	4,546
Debt-to-Income Ratio	0.37	0.26	0.36	0.34
Borrower Age	46	52	46	46
Homeowner Indicator	0.71	0.52	0.74	0.74
<i>Other Characteristics</i>				
Personal 90+DPD	0.013	0.024	0.012	0.014
Personal Bankruptcy	0.049	0.065	0.043	0.039
# Mortgage Accounts	0.71	0.38	0.76	0.72
# Non-Mortgage Accounts	7	4.7	7.4	6.7
Revolving Utilization	0.29	0.29	0.29	0.31
Total Balance	193,289	71,079	207,641	173,402
Monthly Debt	1,925	864	2,049	1,779
College Indicator	0.42	0.24	0.43	0.4
Male Indicator	0.65	0.46	0.65	0.48
White Indicator	0.72	0.79	0.73	0.62
Married Indicator	0.61	0.59	0.62	0.65

**Table 2:** Impact of Business Start on Personal Credit

This table presents the results based on Equation 1. The data are stacked event-month panel between January 2010 and December 2019, and contain information in the two years before and five years after business start. *Entrepreneur* is a dummy that takes a value of one if an individual starts a new business between January 2012 and December 2016. *Post* takes a value of one in the months after the business start and is zero otherwise. The dependent variable in Columns 1 and 2 are 100 if the consumer has an account that is 90 days past due (90+DPD). In Columns 3 and 4, the dependent variable is 100 if there is a bankruptcy filing observed on the individual's credit file. Standard errors are double clustered at the business owner's residence county and incorporation event-month level. In Panel A, the control group is a random 1% sample of non-entrepreneurs. In Panel B, the control group is the set of non-entrepreneurs matched to entrepreneurs on observable characteristics as described in Section 2.2

**Panel A - Unmatched Sample**

	Personal 90+DPD (1)	90+DPD (2)	New Personal Bankruptcy (3)	New Personal Bankruptcy (4)
Entrepreneur × Post	0.491*** (0.043)		0.011*** (0.002)	
Entrepreneur × 1 Year Post		0.036 (0.024)		-0.002** (0.001)
Entrepreneur × 2 Year Post		0.594*** (0.049)		0.012*** (0.002)
Entrepreneur × 3 Year Post		0.656*** (0.055)		0.013*** (0.002)
Entrepreneur × 4 Year Post		0.627*** (0.061)		0.017*** (0.003)
Entrepreneur × 5 Year Post		0.648*** (0.053)		0.017*** (0.003)
Adjusted R <sup>2</sup>	0.143	0.143	-0.000	-0.000
Observations	25,762,450	25,762,450	27,839,037	27,839,037
Individual fixed effects	✓	✓	✓	✓
Event Month fixed effects	✓	✓	✓	✓

Impact of Business Start on Personal Credit - Continued

**Panel B** - Matched Sample

	Personal 90+DPD (1)	Personal 90+DPD (2)	New Personal Bankruptcy (3)	New Personal Bankruptcy (4)
Entrepreneur × Post	0.226*** (0.026)		0.008*** (0.001)	
Entrepreneur × 1 Year Post		-0.165*** (0.023)		-0.005*** (0.002)
Entrepreneur × 2 Year Post		0.227*** (0.038)		0.007*** (0.002)
Entrepreneur × 3 Year Post		0.350*** (0.032)		0.013*** (0.002)
Entrepreneur × 4 Year Post		0.437*** (0.040)		0.015*** (0.002)
Entrepreneur × 5 Year Post		0.435*** (0.047)		0.014*** (0.002)
Adjusted R <sup>2</sup>	0.173	0.173	-0.006	-0.006
Observations	30,927,244	30,927,244	31,845,077	31,845,077
Individual fixed effects	✓	✓	✓	✓
Cohort × Event Month fixed effects	✓	✓	✓	✓

**Table 3:** Impact of Business Start on Personal Credit - Borrower Sophistication

This table presents the results based on Equation 3.3.1. The data are stacked event-month panel between January 2010 and December 2019, and contain information in the two years before and five years after business start. *Entrepreneur* is a dummy that takes a value of one if an individual starts a new business between January 2012 and December 2016. *Post* takes a value of one in the months after the business start and is zero otherwise. In Panel A, the dependent variable is 100 if the consumer has an account that is 90 days past due (90+DPD). In Panel B, the dependent variable is 100 if there is a bankruptcy filing observed on the individual's credit file. *High Income* borrowers are individuals with above median income. We classify individuals with a college degree as *College*. *High Credit Score* borrowers are individuals with a credit-score above. We include individual as well as cohort-event-month fixed effect where the event is the start of the business and a cohort is a pair of matched entrepreneurs and non-entrepreneurs (details in Section 2.2). Standard errors are double clustered at the business owner's residence county and incorporation event-month level.

**Panel A - 90+ DPD**

	Personal 90+DPD		
	(1)	(2)	(3)
Entrepreneur × Post	0.297*** (0.041)	0.283*** (0.047)	0.325*** (0.053)
Entrepreneur × Post × College	-0.153*** (0.057)		
Entrepreneur × Post × High Income		-0.105** (0.050)	
Entrepreneur × Post × High Credit Score			-0.192*** (0.054)
Adjusted R <sup>2</sup>	0.173	0.173	0.173
Observations	30,906,410	30,927,244	30,927,244
Individual fixed effects	✓	✓	✓
Cohort × Event Month fixed effects	✓	✓	✓

**Panel B - New Bankruptcy Filings**

	New Personal Bankruptcy		
	(1)	(2)	(3)
Entrepreneur × Post	0.009*** (0.002)	0.006** (0.002)	0.009*** (0.002)
Entrepreneur × Post × College	-0.002 (0.003)		
Entrepreneur × Post × High Income		0.003 (0.003)	
Entrepreneur × Post × High Credit Score			-0.003 (0.002)
Adjusted R <sup>2</sup>	-0.006	-0.006	-0.006
Observations	31,823,474	31,845,077	31,845,077
Individual fixed effects	✓	✓	✓
Cohort × Event Month fixed effects	✓	✓	✓

**Table 4:** Impact of Business Start on Personal Credit - Business Incorporation

This table presents the results based on Equation 3.3.2. The data are stacked event-month panel between January 2010 and December 2019, and contain information in the two years before and five years after business start. *Entrepreneur* is a dummy that takes a value of one if an individual starts a new business between January 2012 and December 2016. *Post* takes a value of one in the months after the business start and is zero otherwise. *Incorporation* takes a value of 1 if the business is incorporated. In Columns (1) and (2), the dependent variable is 100 if the consumer has an account that is 90 days past due (90+DPD). In Columns (3) and (4), the dependent variable is 100 if there is a bankruptcy filing observed on the individual's credit file. We include individual as well as cohort-event-month fixed effect where the event is the start of the business and a cohort is a pair of matched entrepreneurs and non-entrepreneurs (details in Section 2.2). Standard errors are double clustered at the business owner's residence county and incorporation event-month level.

	Personal 90+DPD (1)	Personal 90+DPD (2)	New Personal Bankruptcy (3)	New Personal Bankruptcy (4)
Entrepreneur × Post	0.410*** (0.031)		0.012*** (0.002)	
Entrepreneur × Post × Incorporated	-0.318*** (0.041)		-0.007*** (0.002)	
Entrepreneur × 1 Year Post		-0.088*** (0.027)		-0.001 (0.002)
Entrepreneur × 1 Year Post × Incorporated		-0.132*** (0.048)		-0.006** (0.003)
Entrepreneur × 2 Year Post		0.463*** (0.045)		0.013*** (0.002)
Entrepreneur × 2 Year Post × Incorporated		-0.406*** (0.051)		-0.010** (0.004)
Entrepreneur × 3 Year Post		0.591*** (0.040)		0.017*** (0.003)
Entrepreneur × 3 Year Post × Incorporated		-0.414*** (0.047)		-0.008* (0.004)
Entrepreneur × 4 Year Post		0.638*** (0.042)		0.019*** (0.003)
Entrepreneur × 4 Year Post × Incorporated		-0.350*** (0.059)		-0.007 (0.004)
Entrepreneur × 5 Year Post		0.594*** (0.061)		0.014*** (0.003)
Entrepreneur × 5 Year Post × Incorporated		-0.276*** (0.082)		0.000 (0.004)
Adjusted R <sup>2</sup>	0.173	0.173	-0.006	-0.006
Observations	30,927,244	30,927,244	31,845,077	31,845,077
Individual fixed effects	✓	✓	✓	✓
Cohort × Event Month fixed effects	✓	✓	✓	✓

**Table 5:** Impact of Business Start on Personal Credit - State Policies

This table presents the results based on Equation 4.1. The data are stacked event-month panel between January 2010 and December 2019, and contain information in the two years before and five years after business start. *Entrepreneur* is a dummy that takes a value of one if an individual starts a new business between January 2012 and December 2016. *Post* takes a value of one in the months after the business start and is zero otherwise. *Policy Index* and *Tax Policy* are the average score for the state's burden on small business including all policies and just tax policies respectively. A higher policy score indicates greater burden on business. In Columns (1) and (2), the dependent variable is 100 if the consumer has an account that is 90 days past due (90+DPD). In Columns (3) and (4), the dependent variable is 100 if there is a bankruptcy filing observed on the individual's credit file. We include individual as well as cohort-event-month fixed effect where the event is the start of the business and a cohort is a pair of matched entrepreneurs and non-entrepreneurs (details in Section 2.2). In Panel B, we include a matched-group event-month fixed effect to compare individuals in the same income quintile, education level, credit score bin (50 points), and DTI quintile. Standard errors are double clustered at the business owner's residence county and incorporation event-month level.

**Panel A - Unconditional on Borrower -Type**

	Personal 90+DPD (1)	Personal 90+DPD (2)	New Personal Bankruptcy (3)	New Personal Bankruptcy (4)
Entrepreneur × Post	0.3571*** (0.0747)	0.3291*** (0.0572)	0.0145*** (0.0039)	0.0117*** (0.0029)
Entrepreneur × Post × Policy Index	-0.0014* (0.0008)		-0.0001*** (0.0000)	
Entrepreneur × Post × Tax Index		-0.0018** (0.0009)		-0.0001** (0.0000)
R <sup>2</sup>	0.6099	0.6099	0.5149	0.5149
Observations	30,833,775	30,833,775	31,750,633	31,750,633
Individual fixed effects	✓	✓	✓	✓
Cohort × Event Month fixed effects	✓	✓	✓	✓

**Panel B - Conditional on Borrower -Type**

	Personal 90+DPD (1)	Personal 90+DPD (2)	New Personal Bankruptcy (3)	New Personal Bankruptcy (4)
Entrepreneur × Post	0.4390*** (0.0761)	0.3956*** (0.0572)	0.0145*** (0.0039)	0.0115*** (0.0030)
Entrepreneur × Post × Policy Index	-0.0019** (0.0008)		-0.0001*** (0.0000)	
Entrepreneur × Post × Tax Index		-0.0023** (0.0009)		-0.0001*** (0.0000)
R <sup>2</sup>	0.1504	0.1504	0.0159	0.0159
Observations	30,811,233	30,811,233	31,727,521	31,727,521
Individual fixed effects	✓	✓	✓	✓
Matched Group × Event Month fixed effects	✓	✓	✓	✓
State × Calendar Year-Month fixed effects	✓	✓	✓	✓

**Table 6:** Impact of Business Start on Personal Credit: Homestead Exemption Policies

This table presents the results based on Equation 4.1. The data are stacked event-month panel between January 2010 and December 2019, and contain information in the two years before and five years after business start. *Entrepreneur* is a dummy that takes a value of one if an individual starts a new business between January 2012 and December 2016. *Post* takes a value of one in the months after the business start and is zero otherwise. *Exempt share* is calculated as the fraction of the median zip code house price scaled by the level of the homestead exemption in the state. A higher exempt share indicates greater house protection in case of personal bankruptcy. In Columns (1) and (2), the dependent variable is 100 if the consumer has an account that is 90 days past due (90+DPD). In Columns (3) and (4), the dependent variable is 100 if there is a bankruptcy filing observed on the individual's credit file. We include individual as well as cohort-event-month fixed effect where the event is the start of the business and a cohort is a pair of matched entrepreneurs and non-entrepreneurs (details in Section 2.2). In Panel B, we include a matched-group event-month fixed effect to compare individuals in the same income quintile, education level, credit score bin (50 points), and DTI quintile. Standard errors are double clustered at the business owner's residence county and incorporation event-month level.

**Panel A - Unconditional on Borrower -Type**

	Personal 90+DPD (1)	New Personal Bankruptcy (2)
Entrepreneur × Post	0.1917*** (0.0308)	0.0037** (0.0016)
Entrepreneur × Post × Exemption Share	0.1197** (0.0522)	0.0051 (0.0034)
R <sup>2</sup>	0.6338	0.5455
Observations	28,318,933	29,151,064
Individual fixed effects	✓	✓
Cohort × Event Month fixed effects	✓	✓

**Panel B - Conditional on Borrower -Type**

	Personal 90+DPD (1)	Personal 90+DPD (2)	New Personal Bankruptcy (3)	New Personal Bankruptcy (4)
Entrepreneur × Post	0.2098*** (0.0289)	0.2105*** (0.0289)	0.0033** (0.0015)	0.0033** (0.0015)
Entrepreneur × Post × Exemption Share	0.1598*** (0.0504)	0.1564*** (0.0505)	0.0055* (0.0031)	0.0055* (0.0031)
Adjusted R <sup>2</sup>	0.1383	0.1385	0.0026	0.0027
Observations	28,299,475	28,299,475	29,131,178	29,131,178
Individual fixed effects	✓	✓	✓	✓
Matched Group × Event Month fixed effects	✓	✓	✓	✓
State × Calendar Month fixed effects		✓		✓

**Table 7:** House Price Changes and Business Start

This table presents the likelihood of new business start on changes in home prices in the region in the year before. The dependent variable is a dummy that takes a value of one if an individual starts a new business in a given month. *Credit Score* is the Equifax credit-score of the individual in the previous month. *Monthly Income* is the individual's monthly income in the previous month. *Policy Index* is the average score for the state's burden on small business including all policies. We classify states as *Unlimited Homestead* if the state has unlimited homestead exemption for bankruptcy proceedings. Standard errors are double clustered at the business owner's residence county and calendar-month level.

	Business Start					
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta$ Home Price	0.2241*** (0.0451)	0.2958*** (0.0735)	5.7541*** (0.5119)	21.4251*** (1.5120)	0.9030*** (0.1977)	0.2229*** (0.0761)
$\Delta$ Home Price $\times$ Credit Score			-0.0075*** (0.0007)			
$\Delta$ Home Price $\times$ Log(Monthly Income)				-2.5041*** (0.1815)		
$\Delta$ Home Price $\times$ Policy Index					-0.0069*** (0.0021)	
$\Delta$ Home Price $\times$ Unlimited Homestead						0.6459*** (0.1694)
Adjusted R <sup>2</sup>	-0.0108	-0.0103	-0.0066	-0.0067	-0.0103	-0.0103
Observations	24,482,536	13,051,227	11,709,775	11,641,697	13,051,227	13,051,227
Individual FE	✓	✓	✓	✓	✓	✓
Calendar Year-Month FE	✓	✓	✓	✓	✓	✓

**Table 8:** Impact of Business Start on Personal Credit - Leverage

The table studies the impact of entrepreneurship on debt growth and creditworthiness. The data are stacked event-month panel between January 2010 and December 2019, and contain information in the two years before and five years after business start. *Entrepreneur* is a dummy that takes a value of one if an individual starts a new business between January 2012 and December 2016. *Post* takes a value of one in the months after the business start and is zero otherwise. The dependent variable in Panel A is the debt-to-income ratio for each individual in the first year after business start. Columns (1) and (2) are total DTI, (3) and (4) are mortgage DTI, and Columns (5) and (6) are non-mortgage DTI. Standard errors are double clustered at the business owner's residence county and incorporation event-month level.

	Total DTI Ratio (1)	MTG DTI Ratio (2)	Non-MTG DTI Ratio (3)	Non-MTG DTI Ratio (4)	Non-MTG DTI Ratio (5)	Non-MTG DTI Ratio (6)
Entrepreneur × Post	2.095*** (0.135)		0.381*** (0.093)		1.579*** (0.056)	
Entrepreneur × 1 Year Post		0.639*** (0.083)		-0.108** (0.051)		0.770*** (0.044)
Entrepreneur × 2 Year Post			2.018*** (0.138)	0.217*** (0.081)		1.663*** (0.071)
Entrepreneur × 3 Year Post			2.574*** (0.171)	0.446*** (0.120)		1.919*** (0.069)
Entrepreneur × 4 Year Post			2.862*** (0.195)	0.711*** (0.135)		1.941*** (0.067)
Entrepreneur × 5 Year Post			3.038*** (0.206)	0.966*** (0.153)		1.876*** (0.063)
Adjusted R <sup>2</sup>	0.668	0.668	0.716	0.716	0.658	0.659
Observations	30,934,282	30,934,282	30,934,282	30,934,282	30,934,282	30,934,282
Individual fixed effects	✓	✓	✓	✓	✓	✓
Cohort × Event Month fixed effects	✓	✓	✓	✓	✓	✓

**Table 9:** Impact of Business Start on Personal Credit - Individual Type and Location

The table studies the impact of entrepreneurship on debt growth and creditworthiness based on type of individual and state policies. The data are stacked event-month panel between January 2010 and December 2019, and contain information in the two years before and five years after business start. *Entrepreneur* is a dummy that takes a value of one if an individual starts a new business between January 2012 and December 2016. *Post* takes a value of one in the months after the business start and is zero otherwise. *High Income* borrowers are individuals with above median income. We classify individuals with a college degree as *College*. *High Credit Score* borrowers are individuals with a credit-score above. *Policy Index* and *Tax Index* are the average scores for the state's burden on small business including all policies and tax policies, respectively.  $\Delta$ Home Price (-13, -1) measures the house price growth in the zip code during the last 12 months before the start of a business. The dependent variable in Panel A is the mortgage debt-to-income ratio for homeowner who start businesses. Panel B present results for Non-MTG DTI Ratio for entrepreneurs with home. Panel C, dependent variable is total DTI for homeowner who start businesses. Panel D present results with total DTI for renters in our entrepreneur sample.

**Panel A - Mortgage DTI - Homeowners**

	(1)	(2)	MTG DTI Ratio			
	(3)	(4)	(5)	(6)		
Entrepreneur $\times$ Post	-0.121 (0.127)	-0.341* (0.181)	0.013 (0.144)	-0.296 (0.221)	-0.086 (0.160)	0.076 (0.107)
Entrepreneur $\times$ Post $\times$ College	0.851*** (0.155)					
Entrepreneur $\times$ Post $\times$ High Income		0.909*** (0.179)				
Entrepreneur $\times$ Post $\times$ High Credit Score			0.448*** (0.128)			
Entrepreneur $\times$ Post $\times$ Policy Index				0.007** (0.003)		
Entrepreneur $\times$ Post $\times$ Tax Index					0.007** (0.004)	
Entrepreneur $\times$ Post $\times$ $\Delta$ Home Price (-13, -1)						3.836*** (1.247)
Adjusted R <sup>2</sup>	0.668	0.668	0.668	0.668	0.668	0.667
Observations	23,165,217	23,165,978	23,165,978	23,118,627	23,118,627	22,483,110
Individual fixed effects	✓	✓	✓	✓	✓	✓
Cohort $\times$ Event Month fixed effects	✓	✓	✓	✓	✓	✓

**Panel B - Non-mortgage DTI - Homeowners**

	(1)	(2)	Non-MTG DTI Ratio			
	(3)	(4)	(5)	(6)		
Entrepreneur $\times$ Post	1.610*** (0.062)	2.032*** (0.108)	1.854*** (0.096)	1.954*** (0.122)	1.789*** (0.093)	1.345*** (0.059)
Entrepreneur $\times$ Post $\times$ College	-0.499*** (0.088)					
Entrepreneur $\times$ Post $\times$ High Income		-0.911*** (0.122)				
Entrepreneur $\times$ Post $\times$ High Credit Score			-0.844*** (0.100)			
Entrepreneur $\times$ Post $\times$ Policy Index				-0.007*** (0.001)		
Entrepreneur $\times$ Post $\times$ Tax Index					-0.008*** (0.001)	
Entrepreneur $\times$ Post $\times$ $\Delta$ Home Price (-13, -1)						1.175 (0.769)
Adjusted R <sup>2</sup>	0.665	0.665	0.665	0.665	0.665	0.665
Observations	23,165,217	23,165,978	23,165,978	23,118,627	23,118,627	22,483,110
Individual fixed effects	✓	✓	✓	✓	✓	✓
Cohort $\times$ Event Month fixed effects	✓	✓	✓	✓	✓	✓

### Panel C - Total DTI - Homeowners

	(1)	(2)	Total DTI Ratio		
	(3)	(4)	(5)	(6)	
Entrepreneur $\times$ Post	1.497*** (0.166)	1.716*** (0.272)	1.889*** (0.195)	1.741*** (0.305)	1.785*** (0.223)
Entrepreneur $\times$ Post $\times$ College	0.478** (0.189)				1.465*** (0.139)
Entrepreneur $\times$ Post $\times$ High Income		0.057 (0.262)			
Entrepreneur $\times$ Post $\times$ High Credit Score			-0.321* (0.180)		
Entrepreneur $\times$ Post $\times$ Policy Index				-0.000 (0.004)	
Entrepreneur $\times$ Post $\times$ Tax Index					-0.001 (0.004)
Entrepreneur $\times$ Post $\times$ $\Delta$ Home Price (-13, -1)					5.410*** (1.511)
Adjusted R <sup>2</sup>	0.661	0.661	0.661	0.661	0.661
Observations	23,165,217	23,165,978	23,165,978	23,118,627	23,118,627
Individual fixed effects	✓	✓	✓	✓	✓
Cohort $\times$ Event Month fixed effects	✓	✓	✓	✓	✓

### Panel D - Total DTI - Renters

	(1)	(2)	Total DTI Ratio		
	(3)	(4)	(5)	(6)	
Entrepreneur $\times$ Post	3.904*** (0.230)	3.439*** (0.181)	4.110*** (0.212)	3.525*** (0.472)	3.513*** (0.325)
Entrepreneur $\times$ Post $\times$ College	-1.605*** (0.285)				3.164*** (0.184)
Entrepreneur $\times$ Post $\times$ High Income		-2.242*** (0.617)			
Entrepreneur $\times$ Post $\times$ High Credit Score			-2.015*** (0.201)		
Entrepreneur $\times$ Post $\times$ Policy Index				-0.003 (0.007)	
Entrepreneur $\times$ Post $\times$ Tax Index					-0.004 (0.008)
Entrepreneur $\times$ Post $\times$ $\Delta$ Home Price (-13, -1)					2.733 (1.640)
Adjusted R <sup>2</sup>	0.548	0.548	0.548	0.549	0.549
Observations	7,767,912	7,768,304	7,768,304	7,745,025	7,745,025
Individual fixed effects	✓	✓	✓	✓	✓
Cohort $\times$ Event Month fixed effects	✓	✓	✓	✓	✓

**Table 10:** Business Loan Account Approval Rates

Panel A studies the likelihood of business loan approvals and Panel B studies the impact of business loan approval on the personal leverage of the entrepreneur. Business loan approval is measured as the number of new accounts opened as a share of the number of hard inquiries against the business credit report. The sample is the set of entrepreneurs that start businesses between January 2012 and December 2016. Personal *Credit Score*, whether the individual has a *College Degree*, the *Monthly Income*, and non-mortgage debt-to-income ratio as measured in the month before the business start. In Panel B, the dependent variable is the change in the average level of total debt-to-income (DTI) (Column 1), mortgage DTI (Column 2) and non-mortgage DTI (Column 3) between the post-business start and pre-business start months. The sample tracks entrepreneurs for two years before the business start and five years after they start their business. Standard errors are double clustered at the business owner's residence county and incorporation event-month level.

	Business Financial Account Approvals						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Credit Score	0.230*** (0.026)						0.221*** (0.031)
College Degree		10.337*** (3.800)					4.522 (3.906)
Log(Monthly Income)			21.269*** (4.389)				2.786 (4.639)
Non-MTG DTI Ratio				-37.278*** (13.450)			6.744 (14.912)
Male					4.044 (4.132)		3.812 (4.053)
White						5.349 (5.276)	2.776 (5.434)
R <sup>2</sup>	0.717	0.712	0.713	0.712	0.713	0.712	0.718
Observations	36,148	36,117	36,148	36,148	35,936	36,143	35,901
County × Start Year-Month fixed effects	✓	✓	✓	✓	✓	✓	✓
SIC4 × Start Year-Month fixed effects	✓	✓	✓	✓	✓	✓	✓

**Panel B - Impact on Leverage**

	ΔDTI Ratio (1)	ΔMTG DTI Ratio (2)	ΔNon-MTG DTI Ratio (3)
Business Financial Account Approvals	-0.147 (0.259)	0.178 (0.238)	-0.291** (0.126)
R <sup>2</sup>	0.639	0.625	0.683
Observations	36,141	36,141	36,141
County × Start Year-Month fixed effects	✓	✓	✓
SIC4 × Start Year-Month fixed effects	✓	✓	✓

## **Appendix for Costly Entrepreneurship**

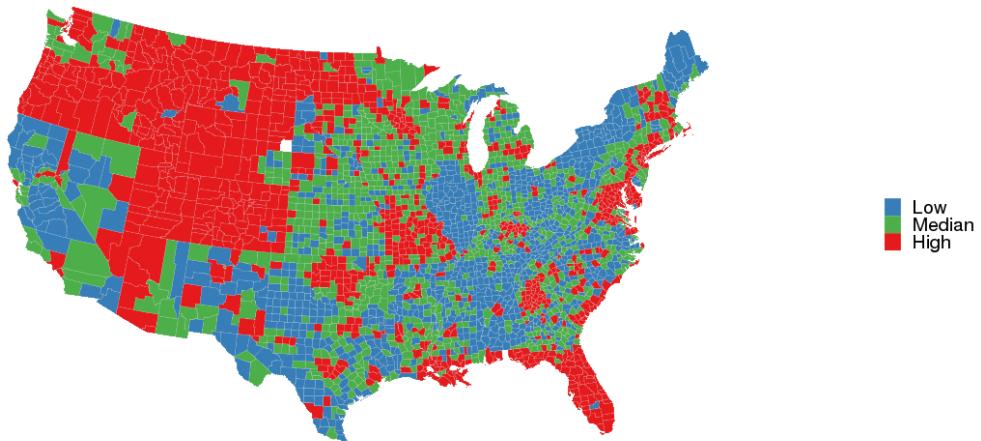
### **Chava, Gopal, Singh, and Zhang**

**In this appendix, we provide evidence supporting our main results reported in the paper.**

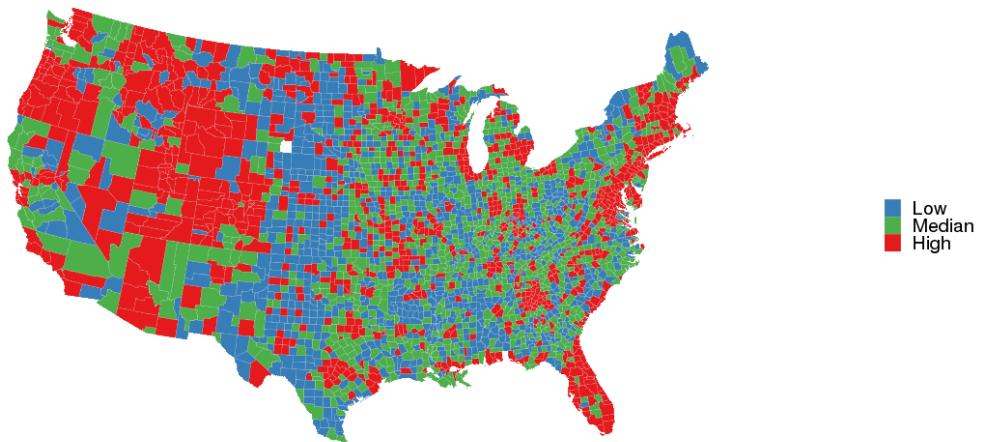
# Figures

**Figure A1:** Business Starts

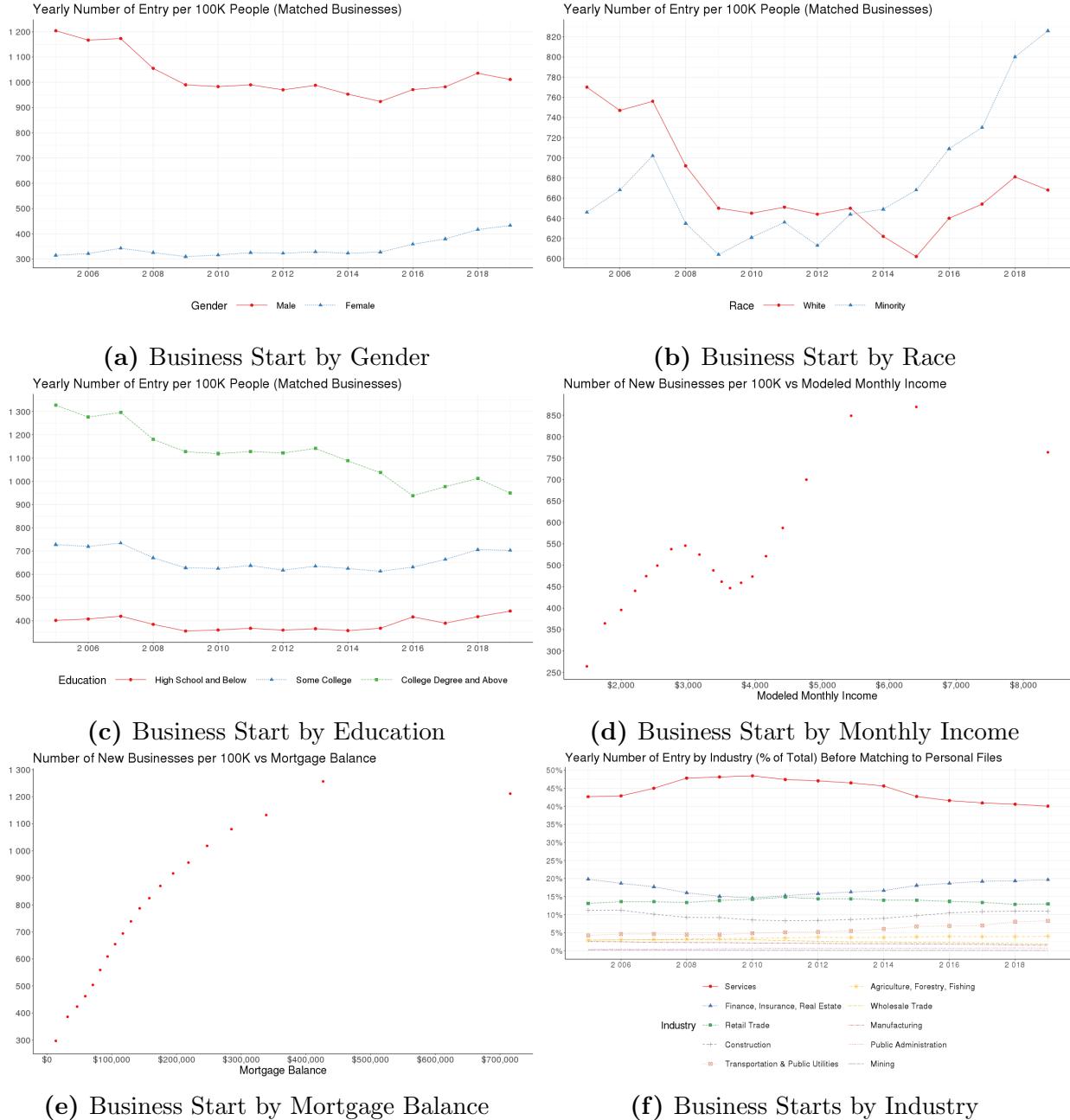
Yearly Number of Entry per 100K People Excluding Agriculture Industries (2005 - 2019)



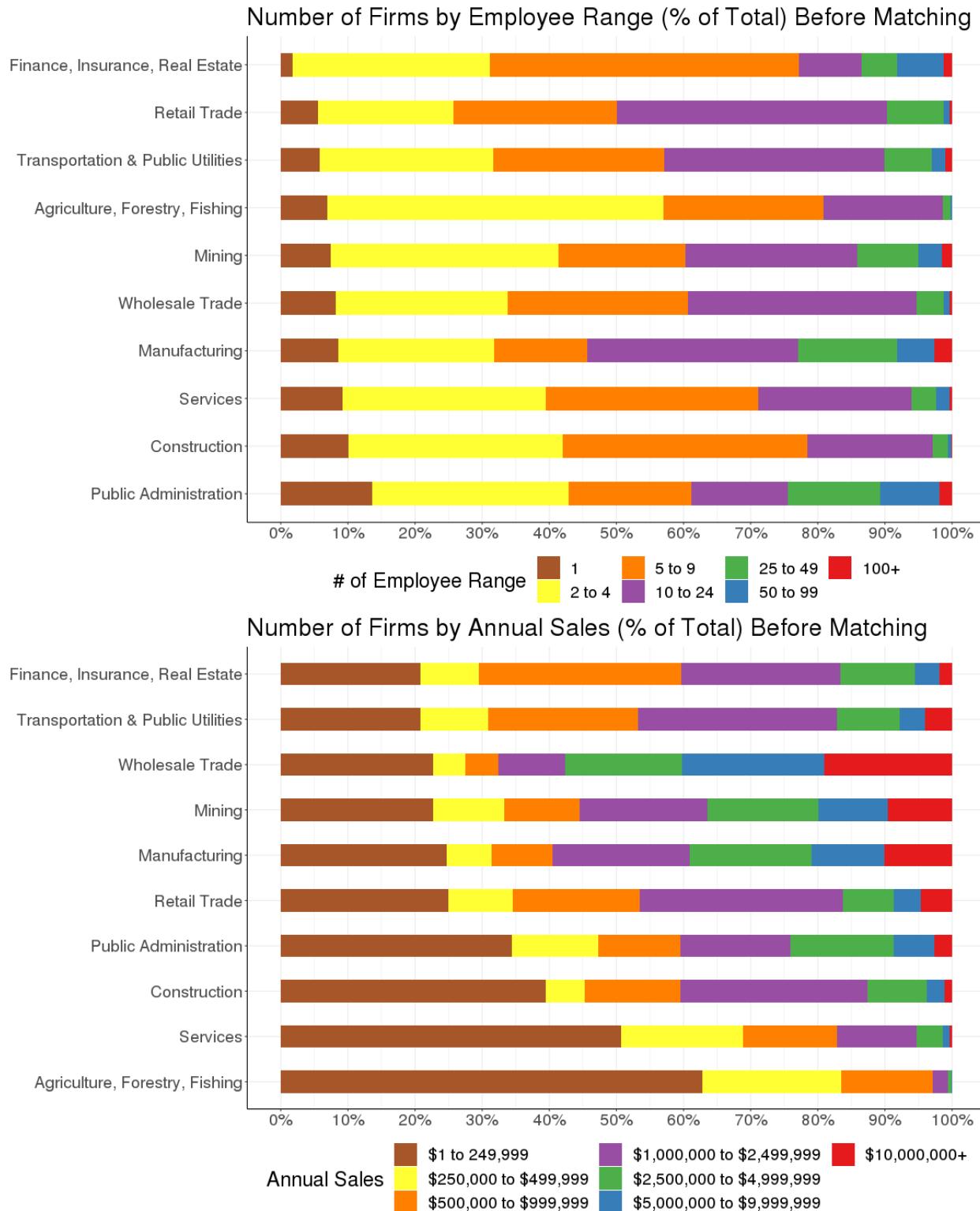
Yearly Number of Entry per 100K People in High Tech Industries (2005 - 2019)



**Figure A2:** Business Starts by Borrower Characteristics

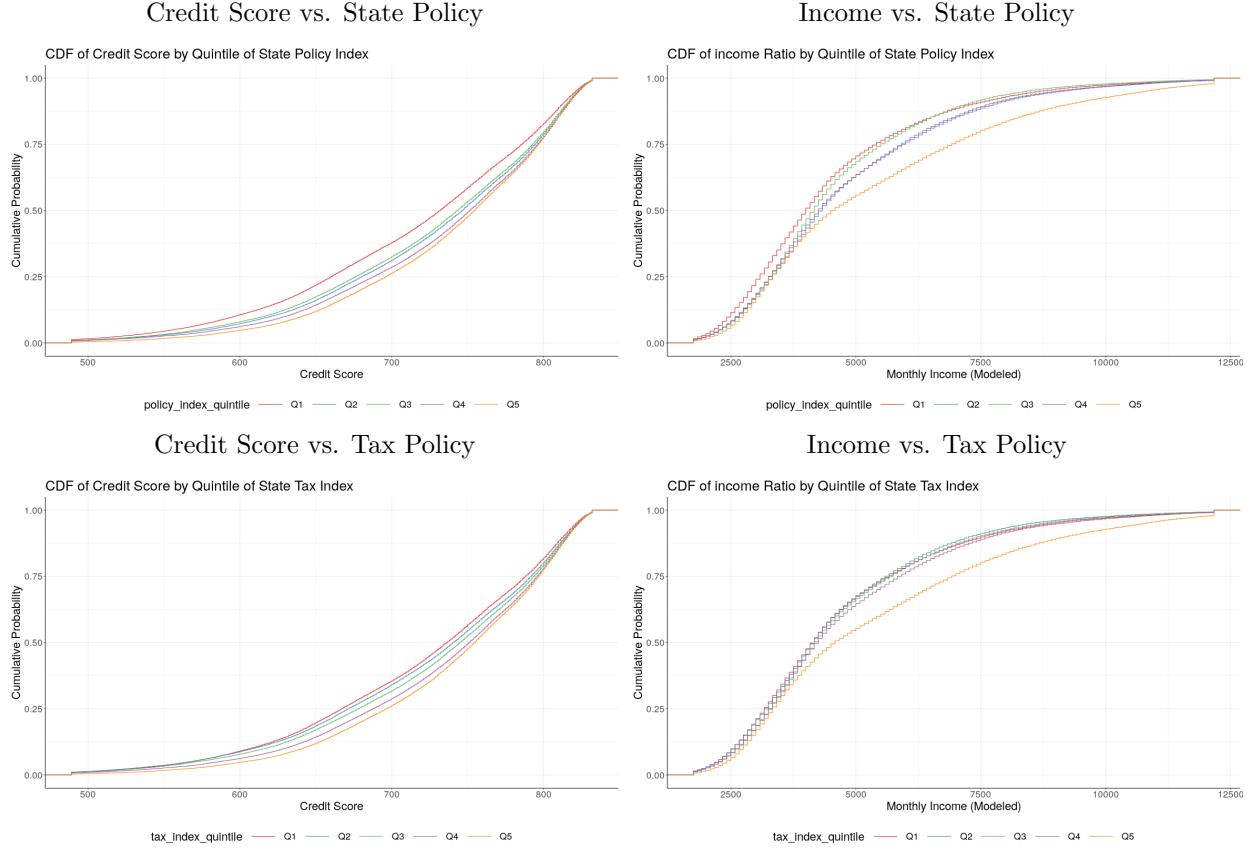


**Figure A3:** Business Starts by Firm Size



**Figure A4:** Entrepreneur's Characteristics and State-Level Policy Indices - Cumulative Distribution

This figure plots the average entrepreneur characteristics with state policy index . Credit scores debt-to-income, income and education are obtained from the Equifax consumer panel.



# Tables

**Table A1:** Effect of Level and Composition of Leverage on DPD and Bankruptcy

This table studies the impact of level and composition of leverage on the personal delinquency and bankruptcy rates of entrepreneurs. The sample is entrepreneurs who start businesses between January 2012 and December 2016 and data is stacked in an event-month panel for two years before the business starts and five years after the business starts.

	Personal 90+DPD			New Personal Bankruptcy		
	(1)	(2)	(3)	(4)	(5)	(6)
Total DTI Ratio	19.132*** (0.364)	19.105*** (0.359)	19.163*** (0.372)	0.187*** (0.011)	0.185*** (0.011)	0.184*** (0.012)
MTG/Total DTI Ratio	-6.471*** (0.135)	-6.448*** (0.134)	-6.536*** (0.136)	-0.021*** (0.006)	-0.020*** (0.006)	-0.019*** (0.006)
R <sup>2</sup>	0.216	0.225	0.251	0.015	0.025	0.058
Observations	8,535,121	8,558,857	8,535,121	8,771,191	8,771,191	8,771,191
Individual fixed effects	✓	✓	✓	✓	✓	✓
SIC4 × Calendar Year-Month fixed effects		✓	✓		✓	✓
County × Calendar Year-Month fixed effects			✓			✓