Costly Entrepreneurship*

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Abstract

We document the personal costs imposed by the transition to entrepreneurship. Using combined administrative personal and business credit bureau data, we show that entrepreneurs experience an 18.93% increase in personal credit default rates and 38.10% increase in personal bankruptcy filings compared to observably similar non-entrepreneurs after starting a business. We show that business-friendly policies or tax regimes do not reduce the negative effects on personal balance sheets, and neither does the skill of the entrepreneur. Entrepreneurs who protect personal assets through incorporation are 58.33% less likely to go bankrupt. Our results are primarily driven by entrepreneurs that borrow more on their personal accounts than their business accounts. We show that lack of access to small business credit forces small business owners to borrow personal credit. Our results highlight the long-term negative consequences of entrepreneurship on the personal credit of small business owners.

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 small businesses are very high, with 48.9% of small businesses exiting within 5 years of business start (Business Dynamics Statistics)[1]. 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 first document several new correlations between business formation rates and personal credit outcomes. We show that new business starts adversely impacts the personal credit outcomes of the entrepreneur compared to other

[1] https://www.census.gov/data/tables/time-series/econ/bds/bds-tables.html

matched consumers with similar creditworthiness that never started a business.

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 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. 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).[2]

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.

[2]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.

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 face liquidity constraints 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.

Second, we test whether business friendly environments can provide additional support to entrepreneurs and reduce the burdens of running a business. 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.

Finally, 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 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.

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.[3] 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 et al., 2009; Avery et al., 1998; Mann et al., 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.

[3]Source: https://www.fedsmallbusiness.org/medialibrary/FedSmallBusiness/files/2021/2021-sbcs-employer-firms-report

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 how much of the deteriorating personal credit conditions are due to increased leverage, we compare creditworthiness of entrepreneurs to non-entrepreneurs but include contemporaneous changes in total debt-to-income ratio as a control. After controlling for DTI change, entrepreneurs are less likely to be delinquent on their loans. DTI changes also explain 70% of the effect of entrepreneurship on bankruptcy filings.

However, the choice to borrow on the business vs. personal side is endogenous. We address this issue by utilizing quasi-random variation in business financing and the shift to personal credit. We use a credit supply shock that adversely impacts small business credit access. The literature shows that banks reduced lending to small businesses in the aftermath of the 2008 financial crisis (see Chen et al. (2017); Cortés et al. (2020); Gopal and Schnabl (2022)). As small business credit becomes harder to access, entrepreneurs have to finance business investment and growth through personal credit (Fonseca and Wang, 2022). Firstly, we show a decline in business credit approval rates in areas with higher pre-crisis bank shares. Next, we show that in areas with higher pre-crisis bank share, the personal debt of entrepreneurs increases relative to matched non-entrepreneurs at a greater rate after the business start. Thus, we have lower business debt and higher personal debt on the entrepreneur's balance sheet, after the business start, in areas where banks reduce business credit supply. Finally, we note that entrepreneurs have a significantly higher likelihood of being delinquent when their leverage increases. Overall, our paper presents the first evidence of the personal costs of entrepreneurship.

Our paper contributes to three main strands of the literature. Firstly, we contribute 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. We show that lack of access to small business credit forces small business owners to borrow personal credit (in line with contemporaneous work by Fonseca and Wang (2022) and increases default rates of entrepreneurs, even among incorporated businesses.

In light of this, 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 main empirical results. Section 4 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.[4] 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

[4]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.

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 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) 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), 3) home ownership and 4) debt-to-income ratio. 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:

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

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 (α_i), pair-month fixed effects ($\gamma_{p,t}$), and our coefficient of interest is the β 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 IA1), 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.[5] 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 IA2 shows heterogeneity in business starts across gender, race, and 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.

[5]We find similar results using individual instead of household income (Appendix Figure IA2)

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 (α_i), pair-month fixed effects ($\gamma_{p,t}$), and our coefficient of interest is the β 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-enrepreneurs 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.[6] 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.

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.

Finally, in Panels (c)-(f) of Figure 3, we provide trends for other personal credit out-

[6]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.

comes of the entrepreneur. 3c shows that there is a sudden decrease in credit scores for entrepreneurs on business start. In Figure 3d, we observe that the utilization of revolving accounts, which was on a downward trend before the business start, increases significantly for the group of entrepreneurs. This shows that when a consumer starts a business, personal credit is an important source of financing, with increased drawdown by entrepreneurs on their existing accounts. Simultaneously, entrepreneurs are opening new accounts, primarily in the form of new non-mortgage accounts, as seen in Figure 3f, and the leverage of the entrepreneur increase Herkenhoff, Phillips, and Cohen-Cole (2021). These results suggest increased personal borrowing upon business start.

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 Who Struggles After Starting a Business?

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.

$$Y_{i,p,t} = \alpha_i + \beta \text{Entrepreneur}_i \times \text{Post}_t \times \text{Individual Skill}_i + \gamma_{p,t} + \epsilon_{i,p,t} \tag{2}$$

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 (α_i), pair-month fixed effects ($\gamma_{p,t}$), and our coefficient of interest is the β on a dummy variable for *Entrepreneur* interacted with *Post* and the *Skill* of the entrepreneur. We double cluster standard errors by business owner's residence county and incorporation 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.

3.3.2 Cost of Doing Business

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 the Small Business Policy Index scores for each state.[7] 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 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. Higher 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 (α_i), pair-month fixed effects ($\gamma_{p,t}$), and our coefficient

[7] Source: https://sbecouncil.net/wp-content/uploads/2019/05/SBPI2019-Report.pdf

of interest is the β 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 Table 4. We see no difference across entrepreneurs in states with more or less business friendly policies. In fact, the interaction terms suggest that entrepreneurs in business friendly states have higher delinquency and bankruptcy rates (though it is economically insignificant). This suggests that additional support through lower regulation or taxes is not sufficient to offset the negative impact on the personal creditworthiness of the entrepreneur.

On the other hand, 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.[8] 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 5, we explore the level of protection offered to the entrepreneur 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

[8] An exception if personal assets have been pledged as collateral to borrow or the entrepreneur has provided personal guarantee for the loan.

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 (α_i), pair-month fixed effects ($\gamma_{p,t}$), and our coefficient of interest is the β 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 5 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.

3.4 Channels

Overall, thus far, we have established that personal credit conditions of entrepreneurs deteriorate after starting their business . We now turn towards understanding why we observe these deteriorating financial conditions.

Perhaps one of the biggest impediments cited for business formation and growth is the ability to raise 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.[9] 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 et al., 2009; Avery et al., 1998; Mann et al., 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 3d, 3f, entrepreneur's personal credit utilization increases along with both mortgage and non-mortgage balances.

We test this formally in Panel A of Table 6. 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 in non-mortgage debt, contributing 75% of the total debt growth.

To understand how much of the deteriorating personal credit conditions are due to increased leverage, we repeat the exercise in Table 2 but include contemporaneous changes in total debt-to-income ratio as a control. Thus, we compare changes to personal creditworthiness of entrepreneurs and non-entrepreneurs after controlling for any accompanying changes to DTI.

[9]Source: https://www.fedsmallbusiness.org/medialibrary/FedSmallBusiness/files/2021/2021-sbcs-employer-firms-report

The results in Panel B Table 6, we see that after controlling for DTI change, entrepreneurs are less likely to be delinquent on their loans. Comparing the results to Table 2, DTI changes explain 70% of the effect of entrepreneurship on bankruptcy filings.

Overall, these results suggest that the negative impact of business start is correlated with increased personal borrowing by the business owner.

However, business owners can borrow either business credit or personal credit to finance the start and growth of a small business and the choice to borrow on the business vs. personal side is endogenous. We are concerned that business feasibility or individual entrepreneur ability or skill may impact the composition of personal and business debt as well as personal credit outcomes. For example, low-skill entrepreneurs may not understand the benefit of borrowing on their business balance sheet and at the same time be more likely to default on personal loans.

To address this issue, we need a quasi-random variation in entrepreneur's choice to borrow on their personal balance sheet. For this purpose, we use a credit supply shock that impacts the small business credit access. As documented in the literature (see for example, Chen et al. (2017); Cortés et al. (2020); Gopal and Schnabl (2022)), banks reduced lending to small businesses in the aftermath of the 2008 financial crisis. As small business credit becomes harder to access, entrepreneurs have to finance business investment and growth through personal credit (Fonseca and Wang (2022)). We use this variation is business credit access to study the impact on personal credit outcomes.

First, following Gopal and Schnabl (2022), we establish that small business loan supply is lower in areas with higher pre-financial crisis reliance on bank loans. Panel A of Figure 5 plots the average business loan approval rate in a county between 2012 and 2016 on the area's pre-financial crisis bank dependence. We calculate loan approval as the number of new accounts that are opened for every new hard enquiry on a business's accounts. Before a new loan can be approved, a lender makes a hard enquiry to gather information on the credit score and financial conditions of the business. If a new loan is approved, we would see

both the hard enquiry and new loan account. If the account, however, is not approved, we would see the hard enquiry but no new account. Applying for a new loan and loan demand is captured by the hard enquiry, while supply is captured in the actual new loans originated.

Panel A of Figure 5 shows that business credit approval is lower in areas with higher pre-crisis bank shares, validating our measure. Furthermore, in areas with higher pre-crisis bank share, Panel B of Figure 5 shows that personal debt of entrepreneurs increases relative to matched non-entrepreneurs at greater rate after business start. Thus, we have lower business debt and higher personal debt on entrepreneurs balance sheet, after business start, in areas where banks reduce business credit supply.

To understand the impact of this shift in composition of debt, we study the impact on entrepreneur's personal creditworthiness. Particularly, we look at business shocks spillover to the personal balance sheet of entrepreneurs that rely on personal debt. We plan to recreate the specification in Table 6 by substituting for an entrepreneurs personal DTI growth with the pre-financial crisis bank share of the entrepreneur's business county.

4 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, incor-

porating 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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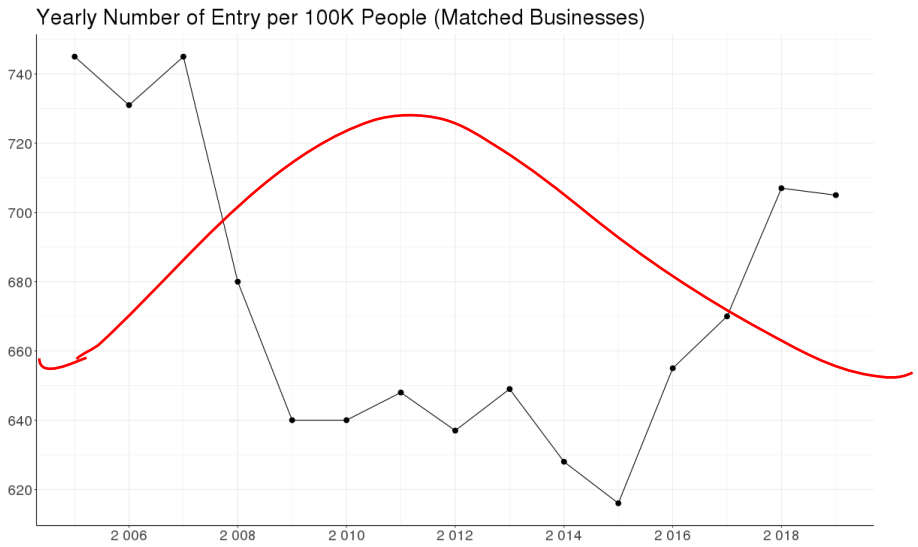
Figures

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.

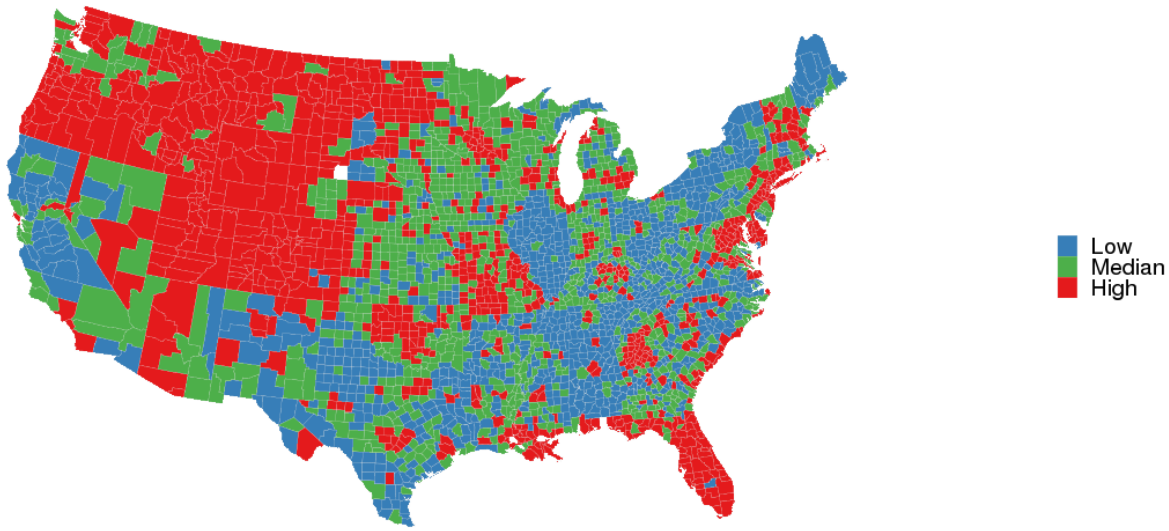
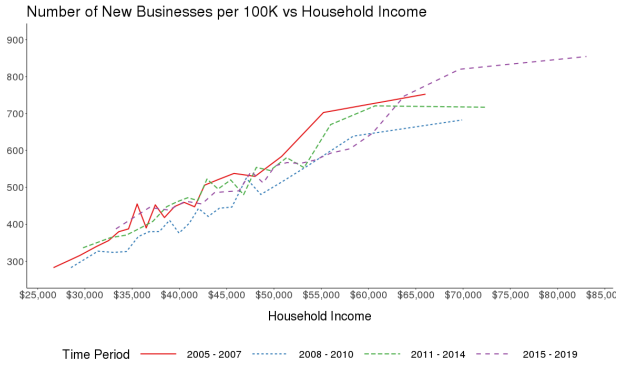
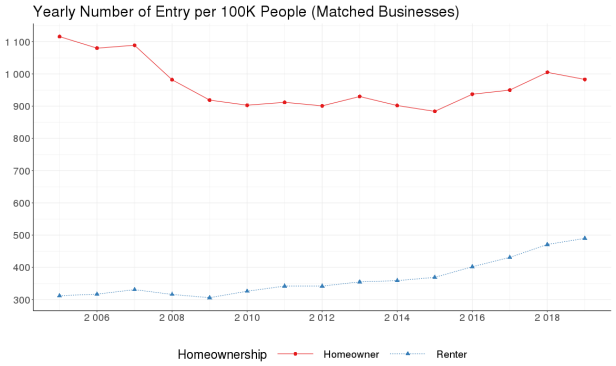


Figure 2: Business Starts By Borrower Characteristics

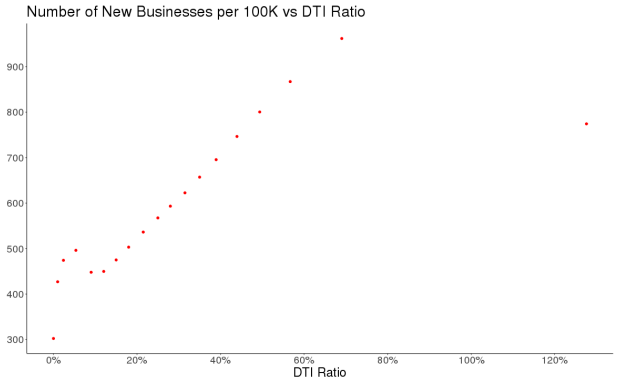
This figure plots the business start rate across borrower characteristics. Household income, home ownership, debt-to-income, credit scores and age are obtained from the Equifax consumer panel.



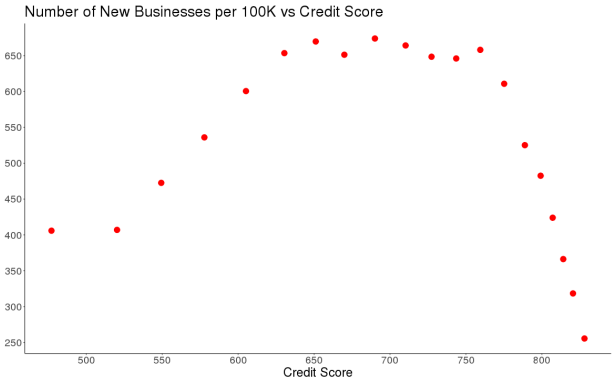
(a) Household Income



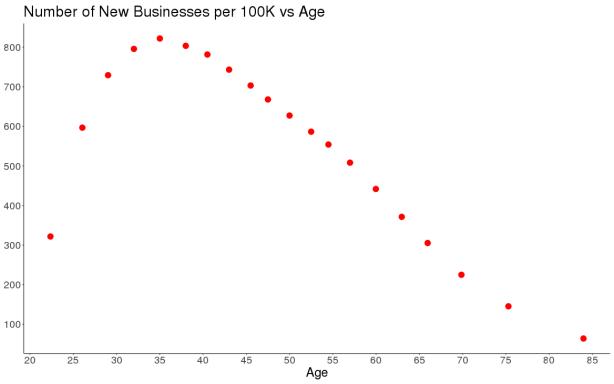
(b) Home ownership



(c) Debt to Income



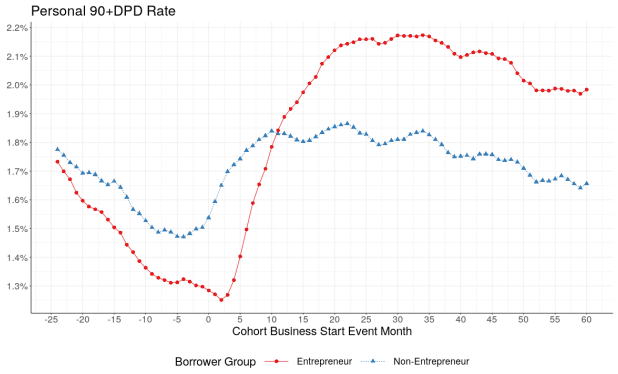
(d) Credit Score



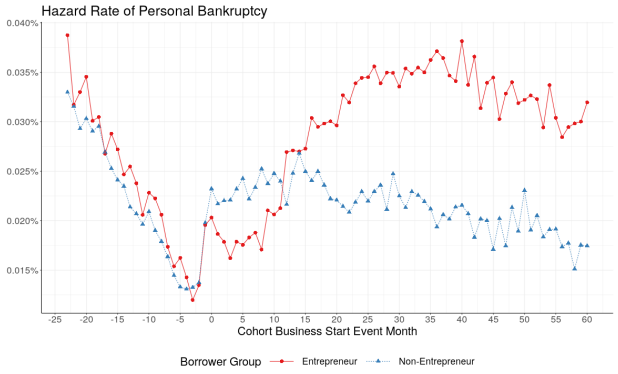
(e) Age

Figure 3: Personal Credit Outcomes of Entrepreneurs and Non Entrepreneurs

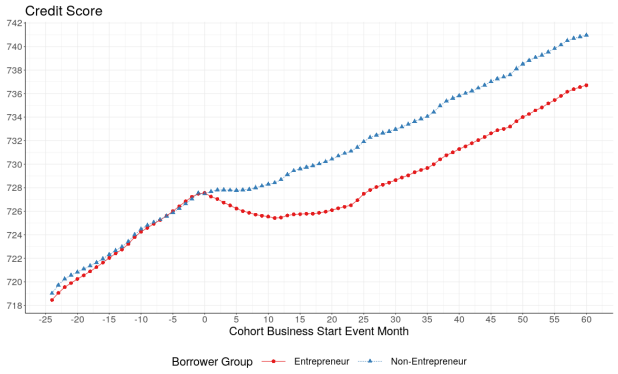
This figure plots the average monthly personal 90 days past due (90+DPD, Panel A) and new bankruptcy filings (Panel B) for entrepreneurs and non-entrepreneurs matched as described in Section 2.2. We track the individuals in the two years prior to business start and five years after.



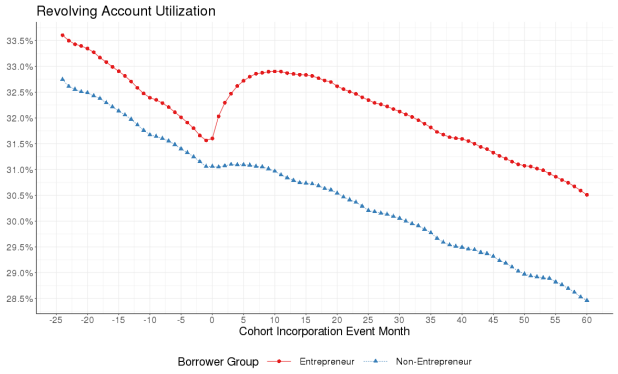
(a) 90+ DPD



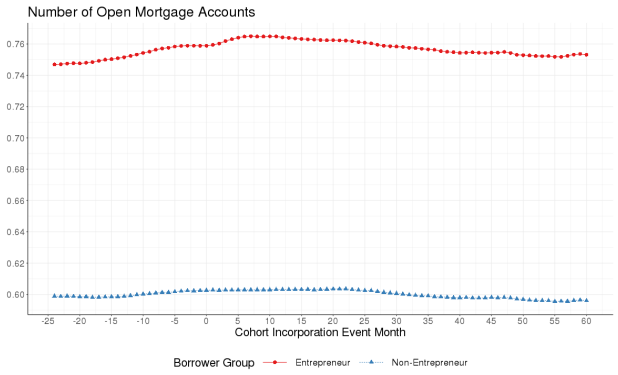
(b) Personal Bankruptcy



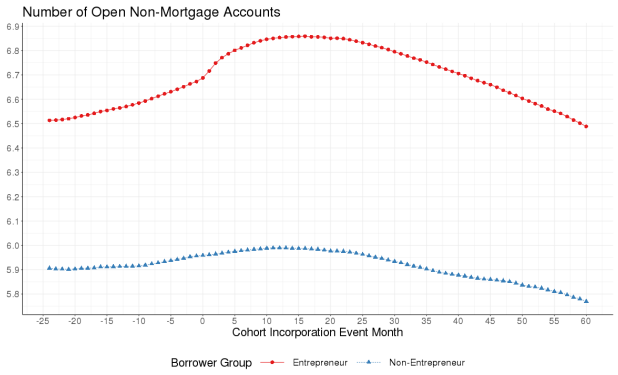
(c) Credit Score



(d) Revolving Utilization Rate



(e) Open Mortgage Accounts



(f) Open Non-Mortgage Balance

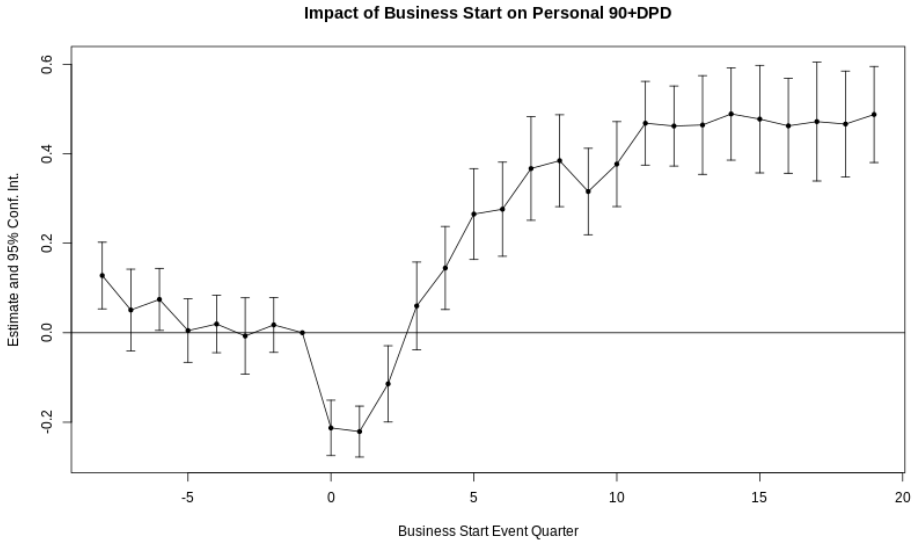
Figure 4: Impact of Business Start on Personal Credit

This figure plots the regression coefficients based on

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

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 (α_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

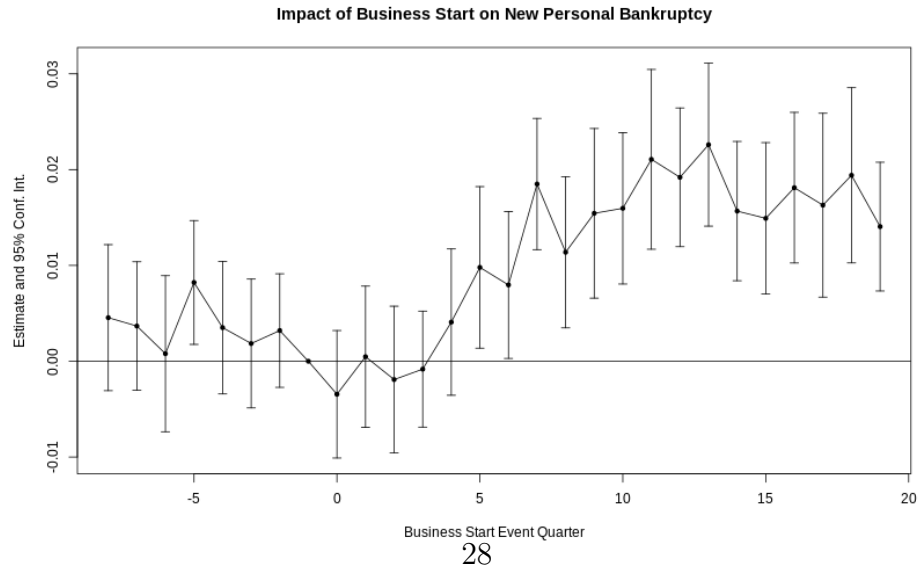
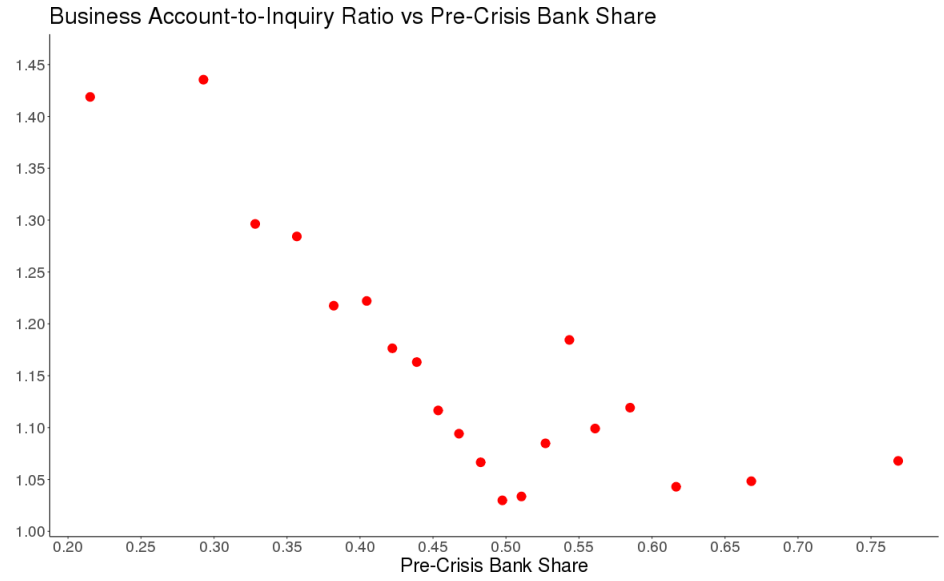
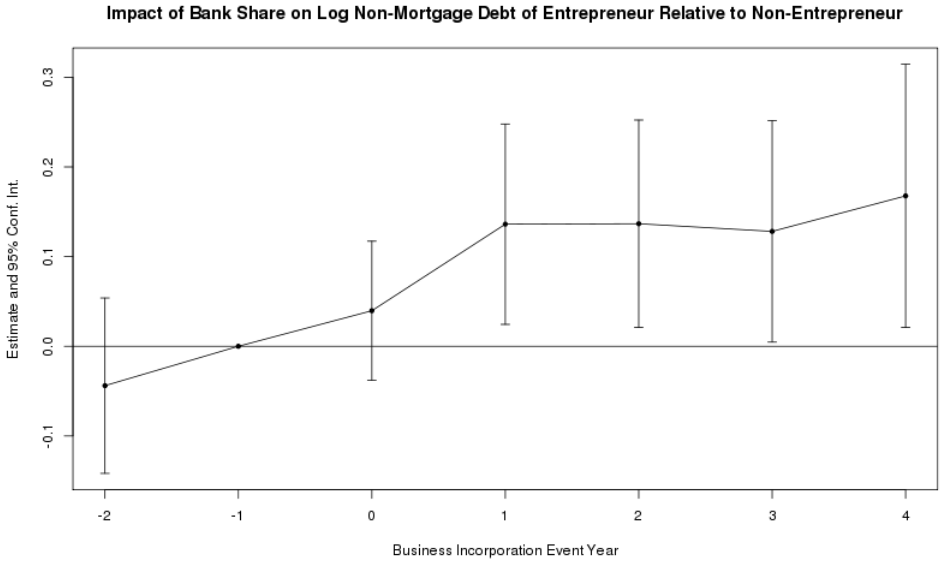


Figure 5: Credit Supply Shock - First Stage

Panel A plots the average business loan approval rate in a county between 2012 and 2016 on the area's pre-financial crisis bank dependence. We calculate loan approval as the number of new accounts that are opened for every new hard enquiry on a business's accounts. Before a new loan can be approved, a lender makes a hard enquiry to gather information on the credit score and financial conditions of the business. Panel B plots changes in personal non-mortgage debt of entrepreneurs relative to matched non-entrepreneurs after business start for businesses located in areas with higher pre-crisis bank shares relative to low bank shares.



(a) Business Loan Approval Rate



(b) Personal Debt

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
Matched Characteristics				
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
Other Characteristics				
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
Homeowner Indicator	0.71	0.52	0.74	0.74
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-entreprenuers. 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		New Personal Bankruptcy	
	(1)	(2)	(3)	(4)
Entrepreneur × Post	0.491***		0.011***	
	(0.043)		(0.002)	
Entrepreneur × 1 Year Post		0.036		-0.002**
		(0.024)		(0.001)
Entrepreneur × 2 Year Post		0.594***		0.012***
		(0.049)		(0.002)
Entrepreneur × 3 Year Post		0.656***		0.013***
		(0.055)		(0.002)
Entrepreneur × 4 Year Post		0.627***		0.017***
		(0.061)		(0.003)
Entrepreneur × 5 Year Post		0.648***		0.017***
		(0.053)		(0.003)
Adjusted R^2	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		New Personal Bankruptcy	
	(1)	(2)	(3)	(4)
Entrepreneur × Post	0.226***		0.008***	
	(0.026)		(0.001)	
Entrepreneur × 1 Year Post		-0.165***		-0.005***
		(0.023)		(0.002)
Entrepreneur × 2 Year Post		0.227***		0.007***
		(0.038)		(0.002)
Entrepreneur × 3 Year Post		0.350***		0.013***
		(0.032)		(0.002)
Entrepreneur × 4 Year Post		0.437***		0.015***
		(0.040)		(0.002)
Entrepreneur × 5 Year Post		0.435***		0.014***
		(0.047)		(0.002)
Adjusted R^2	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 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. 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***	0.283***	0.325***
	(0.041)	(0.047)	(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^2	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***	0.006**	0.009***
	(0.002)	(0.002)	(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^2	-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 - Cost of Doing Business

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. *Policy Index* and *Tax Policy* are the average score for the state's burden on small business including all policies and just tax policies respecitively. 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).Standard errors are double clustered at the business owner's residence county and incorporation event-month level.

	Personal 90+DPD		New Personal Bankruptcy	
	(1)	(2)	(3)	(4)
Entrepreneur × Post	0.3527***	0.3259***	0.0134***	0.0108***
	(0.0740)	(0.0566)	(0.0039)	(0.0030)
Entrepreneur × Post × Policy Index	-0.0014*		-0.0001**	
	(0.0007)		(0.0000)	
Entrepreneur × Post × Tax Index		-0.0017**		-0.0001**
		(0.0008)		(0.0000)
Adjusted R^2	0.1721	0.1721	0.0007	0.0007
Observations	30,835,605	30,835,605	31,752,538	31,752,538
Individual fixed effects	✓	✓	✓	✓
Cohort × Event Month fixed effects	✓	✓	✓	✓

Table 5: 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		New Personal Bankruptcy	
	(1)	(2)	(3)	(4)
Entrepreneur × Post	0.410***		0.012***	
	(0.031)		(0.002)	
Entrepreneur × Post × Incorporated	-0.318***		-0.007***	
	(0.041)		(0.002)	
Entrepreneur × 1 Year Post		-0.088***		-0.001
		(0.027)		(0.002)
Entrepreneur × 1 Year Post × Incorporated		-0.132***		-0.006**
		(0.048)		(0.003)
Entrepreneur × 2 Year Post		0.463***		0.013***
		(0.045)		(0.002)
Entrepreneur × 2 Year Post × Incorporated		-0.406***		-0.010**
		(0.051)		(0.004)
Entrepreneur × 3 Year Post		0.591***		0.017***
		(0.040)		(0.003)
Entrepreneur × 3 Year Post × Incorporated		-0.414***		-0.008*
		(0.047)		(0.004)
Entrepreneur × 4 Year Post		0.638***		0.019***
		(0.042)		(0.003)
Entrepreneur × 4 Year Post × Incorporated		-0.350***		-0.007
		(0.059)		(0.004)
Entrepreneur × 5 Year Post		0.594***		0.014***
		(0.061)		(0.003)
Entrepreneur × 5 Year Post × Incorporated		-0.276***		0.000
		(0.082)		(0.004)
Adjusted R^2	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 6: 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 change in debt-to-income ratio for each individual in the first year after business start. Columns (1) and (2) are total DTI change, (3) and (4) are change in mortgage DTI, and Columns (5) and (6) are the change in non-mortgage DTI. In Panel B 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. Standard errors are double clustered at the business owner's residence county and incorporation event-month level.

Panel A - Growth in Debt

	Total DTI Ratio		MTG DTI Ratio		Non-MTG DTI Ratio	
	(1)	(2)	(3)	(4)	(5)	(6)
Entrepreneur × Post	2.095***		0.381***		1.579***	
	(0.135)		(0.093)		(0.056)	
Entrepreneur × 1 Year Post		0.639***		-0.108**		0.770***
		(0.083)		(0.051)		(0.044)
Entrepreneur × 2 Year Post		2.018***		0.217***		1.663***
		(0.138)		(0.081)		(0.071)
Entrepreneur × 3 Year Post		2.574***		0.446***		1.919***
		(0.171)		(0.120)		(0.069)
Entrepreneur × 4 Year Post		2.862***		0.711***		1.941***
		(0.195)		(0.135)		(0.067)
Entrepreneur × 5 Year Post		3.038***		0.966***		1.876***
		(0.206)		(0.153)		(0.063)
Adjusted R^2	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	✓	✓	✓	✓	✓	✓

Panel B - Impact of Leverage

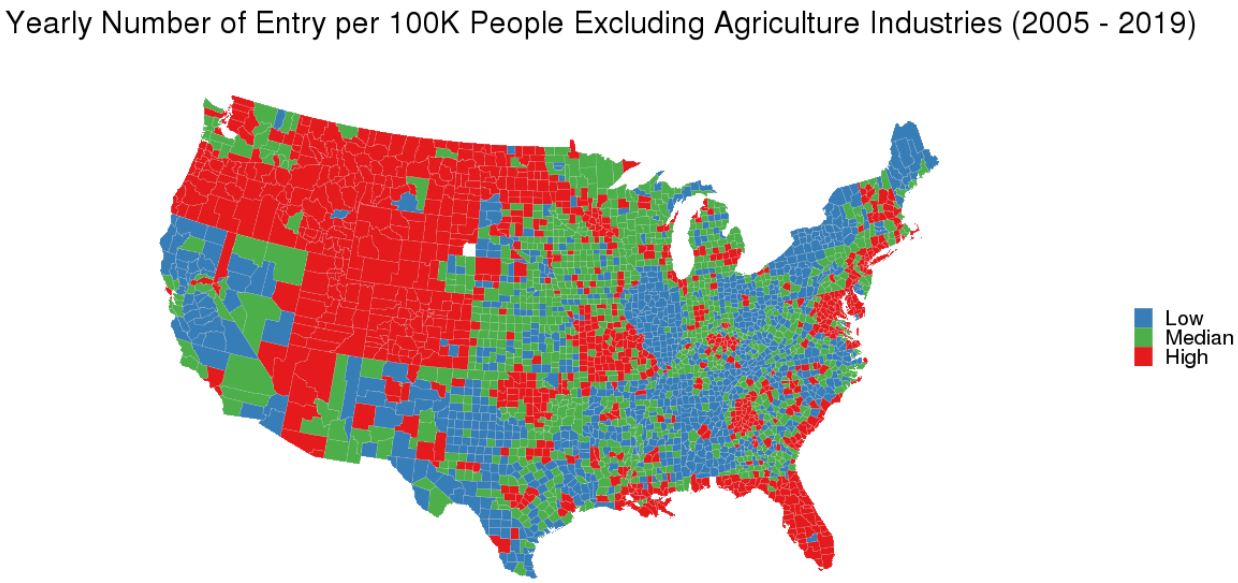
	Personal 90+DPD		New Personal Bankruptcy	
	(1)	(2)	(3)	(4)
Entrepreneur × Post	-0.110***		0.003***	
	(0.024)		(0.001)	
Entrepreneur × 1 Year Post		-0.250***		-0.003**
		(0.023)		(0.002)
Entrepreneur × 2 Year Post		-0.088***		0.002
		(0.026)		(0.002)
Entrepreneur × 3 Year Post		-0.011		0.006***
		(0.035)		(0.002)
Entrepreneur × 4 Year Post		-0.079**		0.008***
		(0.038)		(0.002)
Entrepreneur × 5 Year Post		-0.085**		0.006***
		(0.035)		(0.002)
Adjusted R^2	0.236	0.236	0.039	0.039
Observations	30,279,442	30,279,442	30,920,392	30,920,392
Individual fixed effects	✓	✓	✓	✓
Cohort × Event Month fixed effects	✓	✓	✓	✓
Contemporaneous Total DTI Ratio	✓	✓	✓	✓

Internet Appendix for Costly Entrepreneurship
Chava, Gopal, Singh, and Zhang

Online Publication Only

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

Figure IA1: Business Starts



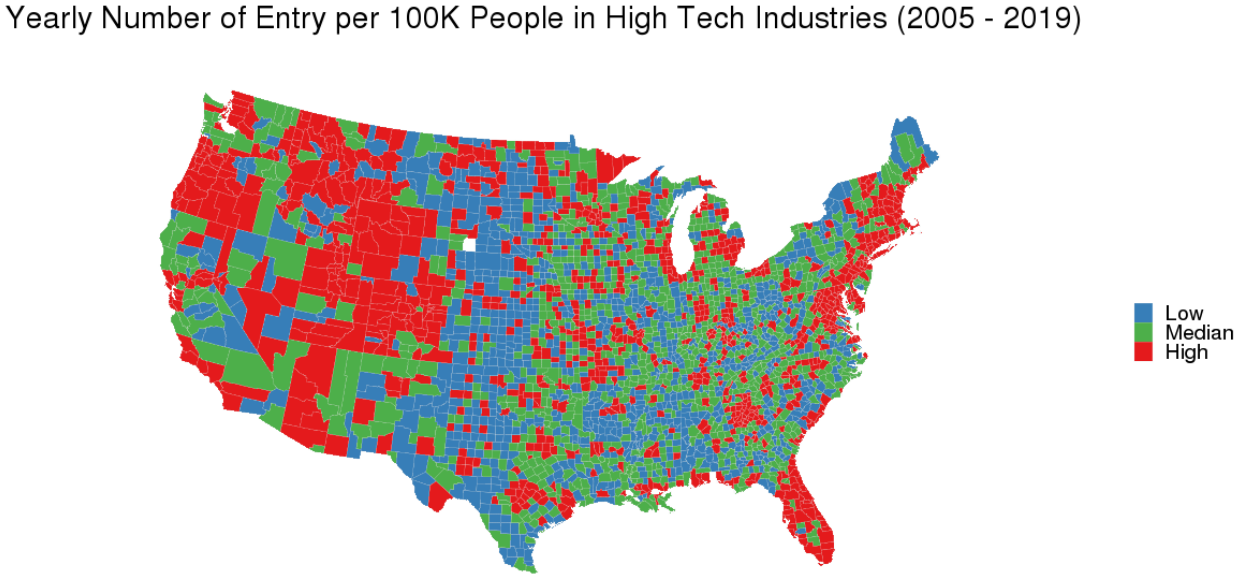
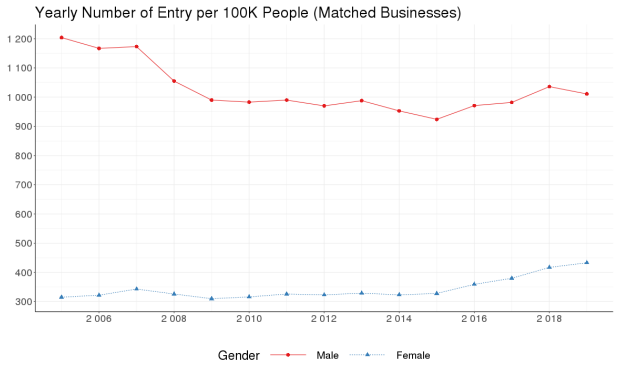
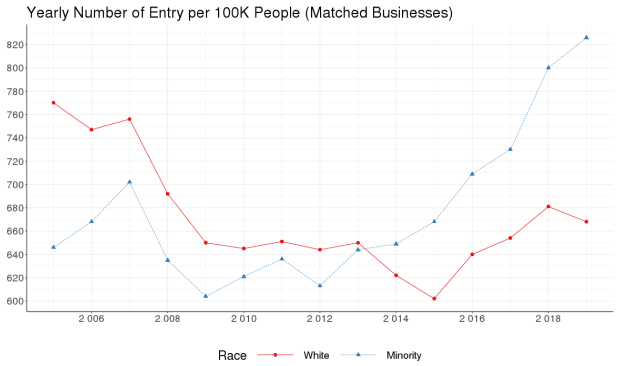


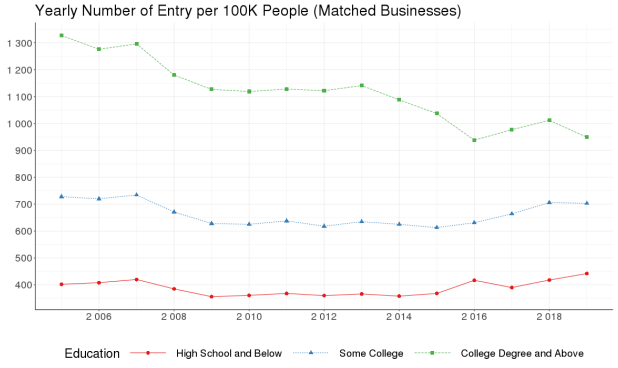
Figure IA2: Business Starts by Borrower Characteristics



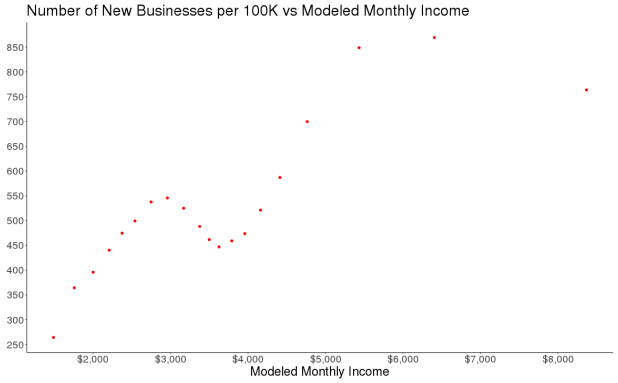
(a) Business Start by Gender



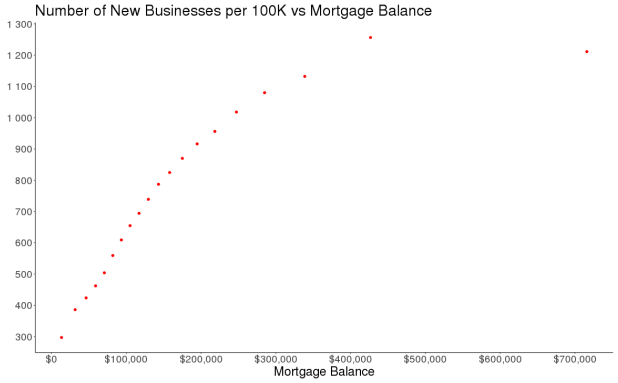
(b) Business Start by Race



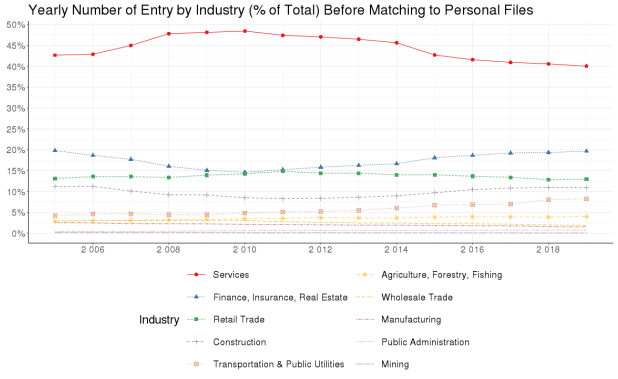
(c) Business Start by Education



(d) Business Start by Monthly Income



(e) Business Start by Mortgage Balance



(f) Business Starts by Industry

Figure IA3: Business Starts by Firm Size