

Social capital and entrepreneurial financing choice

May 2021

Evan Dudley¹

Smith School of Business, Queen's University

Abstract

This paper investigates the influence of social capital on young firms' financing arrangements. Using a sample of U.S. start-ups, I find that social capital, as captured by secular norms and social networks in the entrepreneur's county, increases access to outside financing and reduces reliance on owner equity to finance the new venture. Financing to entrepreneurs located in counties with greater social capital involves higher amounts of leverage in the form of outside debt. This finding persists in a difference-in-difference test that controls for unobservable geographic determinants of capital structure.

Keywords: Social capital, capital structure, entrepreneurial finance, small business lending

JEL codes: G32, L26

¹ Email: evan.dudley@queensu.ca. Tel: 613-533-6259. Address: Queen's University, Smith School of Business, Goodes Hall, Kingston, ON, Canada, K7L 2L6. The author acknowledges the **Kauffman Foundation** and the NORC Data Enclave for providing research support and access to the data used in this research. The author also acknowledges funding for this project from the Social Sciences and Humanities Research Council (SSHRC). I would also like to thank an anonymous referee, seminar participants at the HEC-Paris brownbag series, and Pierre Chaigneau for providing helpful and constructive comments. Any errors and misrepresentations are the sole responsibility of the author.

Start-ups are the key to generating growth in jobs and the economy (Haltiwanger, Jarmin, Kulick, and Miranda 2017), yet young firms face significant frictions that impede their ability to survive and grow (Kerr and Nanda 2015). Such frictions may involve information asymmetries whereby owner-operators know more about the venture than potential financiers (Holmstrom 1989), lack of tangible and/or pledgeable assets required to secure bank loans (Hall and Lerner 2010), or the potential for opportunistic behavior on the part of the owner-operator at the expense of other stakeholders.

Recent research across various disciplines suggests that social capital, as captured by social norms and the density of social networks, can reduce such frictions and facilitate economic exchanges by encouraging cooperative behavior (Coleman 1988; Putnam 2000; Fukuyama 1995). Several studies focus on the impact of social capital in a corporate setting. More specifically, firms located in counties with higher levels of social capital enjoy lower audit fees (Jha and Chen 2015), are involved in less tax avoidance (Hasan, Hoi, Wu, and Zhang 2017a), and pay their executives lower levels of compensation (Hoi, Wu, and Zhang 2019).² However, the relation between social capital and the capital structure of new firms is less-well understood. Unlike mature firms, young ventures do not benefit from analyst followings, do not have access to public debt markets, nor do they have large institutional shareholders and experienced creditors to advise and finance them. The absence of these institutional features suggests that informal arrangements and social institutions may play a greater role in explaining these firms' financing choices. Based on these considerations, I explore whether and how social capital affects the capital structure of young firms.

² Social capital is also associated with lower loan spreads in the syndicated loan market (Hasan, Hoi, Wu, and Zhang 2017b; Cheng, Wang, Zhang, and Zhao 2017) as well as the intensity and tightness of loan covenants (Brockman, El Ghoul, Guedhami, and Zheng 2018).

Social capital consists of the strength of norms shaping behavior and the density of the social networks through which norms are communicated and enforced (Coleman 1988). Social capital has the potential to facilitate access to outside capital in start-ups, in particular in firms with less tangible assets and collateral. There are several reasons why this may be the case. First, stronger social networks may reduce information asymmetries between owner-operators and financiers, leading to reduced moral hazard and/or adverse selection problems (Knack and Keefer 1997; Carlin, Dorobantu, and Viswanathan 2009). Second, social capital may act as social collateral in formal and informal lending arrangements. This argument is based on the idea, formalized in Karlan, Mobius, Rosenblat, and Szeidl (2009) (KMRS) and Ambrus, Mobius, and Szeidl (2014), that networks create trust or social collateral between agents. The possibility of losing valuable personal connections can act in the same way as physical collateral and help “secure” informal lending arrangements.

I extend this idea to entrepreneurial financing. This type of financing involves formal lending arrangements, but it often circumvents limited liability as entrepreneurs pledge personal assets and make personal guarantees to secure financing for a new venture. I use the notion of social collateral and expand the lending framework developed in KMRS to formal lending arrangements with violations of limited liability. I show that social capital enhances debt capacity when the entrepreneur’s pledgeable assets would otherwise be insufficient to obtain financing. Based on this model, I conjecture that start-ups located in counties with higher levels of social capital have greater access to outside debt financing and rely less on the owner-operators’ own wealth to finance the start-up.

I test this prediction with the restricted-access version of the Kauffman Firm Survey (KFS). This database surveys U.S start-ups across eight consecutive years beginning in 2004 about their

financing arrangements in addition to related questions regarding revenues, profitability, employees and whether the firm goes out of business. Of particular interest is the level of detail reported on start-ups' financing arrangements. The KFS queries firms about the proportion of owner debt, loans from family and friends, bank debt, owner equity, outside equity and equity from family and friends. This granularity in reported financing choices allows me to isolate the balance sheet channel (e.g. debt vs. equity, inside vs. outside equity or debt) through which social capital operates.

Because social capital is conceptually based on social norms and network strength in the entrepreneur's place of habitation, I employ a measure of social capital developed by the Northeast Regional Center for Rural Development (NRCRD) that captures the relevant dimensions of social capital at the U.S. county level. The measure aggregates both non-religious social norms and social networks. The measure is well established in the literature on social capital, having been used in multiple contexts outside of corporate financing decisions. A confounding issue is that the social capital construct developed by NRCRD reflects economic and cultural practices that also determine entrepreneurial financing choices. Accordingly, I include controls for income, population, political affiliation, religion and the prevalence of bank branches in the county. I also include a range of firm and owner-level controls provided by the KFS ranging from start-up year revenues, the Dun and Bradstreet credit rating, the venture's legal form, and whether the venture has intellectual property, as well as primary-owner race, gender, age and work experience, among others.

I first test the effect of social capital on the entrepreneur's ability to access outside financing. Outside debt consists of any debt not provided by the owner, other shareholders or close friends and family. Specifically, outside debt consists of company credit card balances as well as

bank loans. Based on the KFS dataset, I find a significantly positive association between social capital and the proportion of outside debt to total financial capital. I also find that social capital is negatively related to the proportion of owner equity to total financial capital. The positive relation between social capital and outside debt implies that ventures in counties with higher levels of social capital have weaker balance sheets (i.e. more financial leverage). I also investigate whether social capital affects the extensive margin of outside debt (i.e. whether the firm has this type of debt), and find that social capital increases the likelihood of outside debt as well as total debt in the firm's capital structure.

I next test, using firm fixed effects, whether changes in the level of social capital over the firm's lifetime in the KFS affect the firm's financing choices after the startup year. I find that the changes in social capital have an economic strong effect on the firm as it matures over time. Moving from the 25th percentile to the 75th percentile of social capital during the firm's lifetime increases the proportion of outside debt by 3%, and it reduces the proportion of owner equity by 7.2%.

To exclude potential economic and geographic-based confounders that affect entrepreneurial financing choice, I estimate a difference-in-difference test of the effect of social capital on the proportion of outside debt using the longitudinal version of the KFS. Treated firms belong to counties that experience a large decline in social capital between the 2005 and 2009 survey years. Control firms are in geographically adjacent counties that don't experience such a change. Treated firms experience 6.5% drop in the proportion of outside debt to total capital over this period compared with control firms in neighboring counties, confirming that changes in social capital after the startup year have a significant effect on the capital structure of young firms.

The importance of current levels of social capital to the firm's financing arrangements may decline over time as the entrepreneur's reputational capital with outside stakeholders becomes more established, or because the firm is profitable and able to accumulate more tangible assets. I run my tests year-by-year and find that contemporaneous levels of social capital affect the proportion of new capital the most during the two first years of existence. Social capital also matters in later calendar years when credit constraints are more likely to be binding. I find that the proportions of outside debt and owner equity are more sensitive to current levels of social capital during the last financial crisis in 2007 and 2008.

I also employ an instrumental variable strategy to further isolate the effect of social capital from economic factors that are correlated with both financing outcomes and social capital. Because the effects of social capital are potentially confounded by economic development, I isolate the component of social capital related to cultural traits using an instrumental variables strategy that exploits variation in county-level ancestries. The baseline results are robust to this specification, and the IV-based estimates are similar in magnitude and statistical significance to the uninstrumented estimates.

The final step in the analysis examines whether survival rates differ across firms located in high vs. low social capital counties. Lender rationality implies that firms located in high social capital counties should be less likely to go out of business. Consistent with intuition, firms with levels of social capital above the median level in their start-up year have lower hazard rates and higher survival rates than their low social capital peers. This effect persists with controls for initial credit ratings, firm, and owner characteristics.

My results help understand the factors determining entrepreneurial outcomes. The importance of the banking sector for funding young firms and for the allocative efficiency of

capital on new ventures is well established (Berger and Udell 1990; Haltiwanger et al. 2017). However, the strength of informal institutions, such as the quality of norms and networks at the county level, affect both channels. My findings suggest that social capital may reduce the allocative efficiency of the banking sector when low-ability entrepreneurs reside in high social capital counties.

These results also offer a potential explanation for why entry into entrepreneurship is invariant to the founder's wealth before entry (Hurst and Lusardi 2004) despite theoretical predictions to the contrary (Wang, Wang, and Yang 2012). More specifically, the effects of entrepreneurial wealth on start-up entry may be mitigated by informal arrangements related to social capital prior to start-up.

I also contribute to the literature on financing innovation (Kerr and Nanda 2015). Models of information theory that examine the financing choices of young firms (Karaivanov and Kessler 2018; Ghatak and Guinnane 1999) highlight the role of informal financing. These models predict that new firms have less access to formal financing arrangements, making them (in theory) more reliant on informal financing channels such as borrowing from family and friends. This prediction is not supported in data on U.S. start-ups. These firms rely on bank debt to finance their activities (Robb and Robinson 2014). I find instead that informal channels (i.e. social capital) support new ventures' access to formal debt financing along both the intensive and extensive financing margins.

II. Hypothesis development

Financing entrepreneurship involves both formal and informal lending arrangements. Formal lending arrangements incorporate information asymmetry, liquidity provision, and risk sharing. Stiglitz and Weiss (1981) show how observationally identical start-ups can obtain

differential financing outcomes when there is information asymmetry. Liquidity provision arises when entrepreneurs are unable to finance new ventures for lack of pledgeable assets, potentially leading to inefficient liquidation of profitable projects by creditors (Tirole 2006). Risk sharing arises when the venture has insufficient assets to meet the lender's incentive compatibility constraints, leading the borrower to share some of the downside risk by pledging personal assets (Robb and Robinson 2014).

In contrast, informal lending arrangements exist without legal enforcements of contracts (Karaivanov and Kessler 2018; Lee and Persson 2016). Enforcement of such lending arrangements often depends on peer behavior. For example, external social sanctions and stigmatization by borrower peers can discourage borrower shirking by reducing private benefits. Moral self-concepts and psychic costs of bad behavior (e.g. misrepresenting the venture on the loan application or stealing the funds after the loan is made) can also encourage cooperation through intrinsic channels (Ghatak and Guinnane 1999). Furthermore, personal pledging of "social collateral" can facilitate informal lending arrangements when legal enforcement is absent (Karlan et al. 2009).

Financing entrepreneurship lies somewhere in between formal and informal lending arrangements. Entrepreneurial lending arrangements involve legally enforceable contracts but these arrangements also circumvent limited liability with personal pledges and guarantees by the entrepreneur (Moon 2009; Avery, Bostic, and Samolyk 1998). I argue that social capital can substitute for these pledges and guarantees, and thus enhance borrowing capacity when limited liability would otherwise be circumvented by pledging personal assets. I explore this idea in more detail below.

2.1 Model of formal lending with social capital

Ambrus et al. (2014) define social capital in terms of the density and expansiveness of networks. In a related paper, KMRS formulate the notion of social collateral and show how it can facilitate informal lending arrangements. In this section, I build on the framework developed in KMRS to show that social capital alleviates financing constraints in formal lending arrangements otherwise constrained by limited liability.

Consider a two-period economy in which a borrower s wishes to obtain funds from lender t to invest in an asset with value V . The borrower has assets $A < V$, and thus requires external financing to complete the project. The asset generates cash flow $w(V)$, where w is non-decreasing in V .

Borrower and lender are also linked through a network of individuals belonging to a community, as might be the case in a rural county or a neighborhood of a large city. The loan contract stipulates payments in the case the loan is not paid back (payment x_1 in state 1) and in the case the loan is paid back (payment x_0 in state 0). Assume the asset underlying the loan can be stolen by a third party with probability p after profits w are generated. Alternatively, the entrepreneur can choose to report the asset as stolen after the profits are realized. In this case the entrepreneur sells the asset at a discounted price ϕV where $\phi < 1$, and pockets the proceeds. Assuming the asset is not stolen, total value at the end of the project equals $V + w(V)$. Figure 1 illustrates the timing of events as well as the cash flows to each party to the transaction.

Consider now the entrepreneur's problem. In order for the borrower not to report the asset stolen, the benefit from not doing so must exceed the reward from reporting it stolen. The borrower's incentive compatibility constraint IC is thus,

$$x_1 - x_0 \geq \phi V - A \quad (IC)$$

Assuming the lender will lend if he breaks even, the promised payments across both states must exceed the loan amount in expectation (the lender's individual rationality constraint).³

$$px_1 + (1 - p)(x_0 + V - A) \geq V - A \quad (IR)$$

Solving for the borrower's minimum transfers x_1 and x_0 yields

$$\begin{aligned} x_0 &= p(1 - \phi)V \\ x_1 &= V[\phi + p(1 - \phi)] - A \quad (1) \end{aligned}$$

Contracts with $x_1 > w(V)$ are not enforceable because of limited liability. To see this, consider the payment x_1 in the case the asset is reported stolen. Limited liability implies that this payment can be legally enforced as long as x_1 is less than the venture's equity net of the value of the asset that is reported stolen, i.e. as long as $x_1 < w(V)$. Otherwise the entrepreneur could declare bankruptcy to avoid payments greater than $w(V)$.

Based on the expression for x_1 in equation (1), limited liability imposes the following constraint on entrepreneurial wealth A for obtaining financing.

$$A \geq V[p + \phi(1 - p)] - w(V) := \bar{A} \quad (2)$$

Entrepreneurs with assets A less than \bar{A} do not obtain financing for their venture.

Suppose now that enforcement of the payments x_i can also arise through the social network linking borrower s to lender t . Not paying back the loan to the lender jeopardizes friendships the borrower has along the links leading from borrower s to lender t . As described in KMRS, the borrowing arrangement involves a publicly known transfer arrangement with all agents in the social network. Each pair of agents (u, v) involved in the transfer arrangement agrees to a transfer of $h_i(u, v)$ from u to v if the borrower fails to repay the loan in state i where i equals 0 or 1. Since there is uncertainty about whether the asset disappears after being used, the arrangement is a set

³ Note that because of (IC), state 1 arises in equilibrium only if the asset is actually stolen by a third party.

of state-contingent payoffs in the two states. The lending contract specifies that the borrower s make payments x_i in state i to the lender t .

Figure 1 of KMRS is reproduced in Figure 2. As shown, the additional agent (u) is good for part of the value of the loan. The amount he is good for is determined by the strength of the relationship between the intermediary and the lender as well as the strength of the relationship between the borrower and the agent. The weakest of these two links determines the additional debt capacity due to the presence of individual u .

Can the value of the social ties between borrower and lender increase financing capacity? KMRS derive the result that for a side-deal proof lending arrangement to exist, it must be the case that flows associated with the arrangement not exceed the maximum flow F^{st} from s to t through the network. Thus, the total flow in the network can serve as an additional collateral pledge in state 1 when limited liability is violated (i.e. when $A < \bar{A}$).

Consider how social capital serves as collateral. Social capital enforces payments x_1 greater than $w(V)$ by up to a maximum amount F^{st} . With social collateral, contracts (x_0, x_1) can be informally enforced as long as

$$x_1 - w(V) \leq F^{st} \quad (3)$$

Using this result and the fact that $x_1 > x_0$, the borrowing constraint is then,

$$A \geq \tilde{A} := V[p + \phi(1 - p)] - w(V) - F^{st} = \bar{A} - F^{st} \quad (4)$$

which is a necessary condition for the entrepreneur to obtain financing. Clearly, $\tilde{A} < \bar{A}$. Thus, social capital increases debt capacity of otherwise constrained entrepreneurs.⁴ This result implies that the minimum amount of entrepreneurial wealth necessary to obtain external financing

⁴ A more rigorous treatment should also demonstrate that the lending arrangement is immune to side deals. See proof of Theorem 2 in Karlan et al. (2009).

is decreasing in social capital F^{st} . Because entrepreneurial wealth is not observed, I reformulate this result in terms of the proportion of outside financing obtained by the entrepreneur. Define the outside debt ratio as the ratio of total loans from lender t to the asset's value V . Then,

$$\begin{aligned} \text{Outside debt ratio} &= \frac{V - A}{V} \\ &\leq \frac{V - (\bar{A} - F^{st})}{V} = \frac{V - \bar{A} + F^{st}}{V} \quad (5) \end{aligned}$$

The proportion of outside debt $(V - A)/V$ is weakly increasing in social capital F^{st} . I test this prediction using the confidential version of the Kauffman Firm Survey (KFS).

III. Data and empirical tests

I base my analysis on the survey of new businesses in the United States performed by the Kauffman Foundation, known as the Kauffman Firm Survey (KFS). This survey collects information on 4,928 firms starting in 2004, and surveys them annually through 2011. The KFS survey is constructed using complex survey designs based on a sampling frame developed by Dun and Bradstreet. The target population is all new businesses started in 2004, including purchases of existing businesses and purchases of franchises in 2004. Excluded are businesses started as a branch or subsidiary of an existing business, businesses that were inherited, or businesses created as a not-for-profit organization. The survey population is stratified based on gender and industrial technology. A more thorough description of the KFS survey sampling methods is provided in Farhat and Robb (2014).

The Kauffman Foundation provides cross-sectional and longitudinal versions of the KFS.⁵ Both versions are based on the same sampling frame and the same set of questions and responses

⁵ Farhat and Robb (2014) describe how the versions are created from the initial KFS.

provided by participants in initial and follow-up questions in each year of the survey. The cross-sectional version of the KFS is comprised of firm-year reports up until the firm drops out of the survey or goes out of business. This version contains 4,928 firms and 34,284 firm-years. The longitudinal version of the database does not allow gaps in reporting, and it is comprised of consecutive firm-year reports for eight years or up until the firm goes out of business, is acquired or combined with another firm. The longitudinal version of the database contains 18,286 firm-year observations. I use one of the two versions of the survey depending on whether I run cross-sectional or longitudinal regressions.

The sample used in the tests is determined by the availability of county-level data on social capital and economic and employment-level data. These data are merged by county, state name and year with the KFS data. In order to account for sampling variance, all of the estimates and standard errors take into account the sampling population of 4,928 firms (cross-sectional) or 18,286 firm-years (longitudinal). Depending on the test, I use survey weights associated with either the cross-sectional or longitudinal versions of the database.

As in Robb and Robinson (2014), I assign geographic regions to each firm based on the primary owner, who is the owner with the largest equity share. For equal equity shares, primary ownership status is based on rankings based on hours worked and other variables (Farhat and Robb 2014). Survey questions on industry, location, intellectual property, revenue, owner age, gender, race, education, previous employment experience, hours worked, and previous start-up experience are provided by the KFS survey. I also use granular information on firms' initial and continuing finance arrangements provided by the respondents' answers to the initial and follow-up questions of the survey.

3.1 Social capital measure

The measure of social capital I use is described in detail in Rupasingha, Goetz, and Freshwater (2006) (RGF).⁶ Summarizing, the social capital index is based on county-year-specific participation in associational and community activities. Specifically, the inputs into the index measure are the number of social and civic associations, the number of nongovernment organizations, voter turnout in presidential elections, and the census response rate in each county and year as the raw input variables. Each of these components is described in more detail in RGF. These components are publicly available from the Northeast Regional Center for Rural Development (NERCRD).⁷ Following RGF, the index of social capital, *Social capital*, is based on the first principal component of these four variables.⁸

County and state-level controls are matched using county and state identifiers provided by the Kauffman Firm Survey (KFS). These controls consist of the natural logarithm of the county population, the natural logarithm of per-capita level county income, the number of bank branches scaled by county population (available from the Federal Deposit Insurance Corporation at <https://banks.data.fdic.gov/docs/>), a measure of religiosity based on the percentage of adherents to a religion in each year and in each county provided by the Association of Religion Data Archives (ARDA), and the relative proportion of Democratic vs. Republican voters in each county (available at www.270towin.com). These variables are measured by county and year. The measure of religiosity (*TotReligion*) is employed in order to control for the effect of religion on economic exchanges (Hilary and Hui 2009). I also include a relative measure of home prices (*HomePriceIndex*) obtained from the Federal Housing and Financing Agency. This measure varies

⁶ I thank Ning Zhang for providing the first principal component of the social capital measure as well as the demographic control variables used in the study.

⁷ The raw data can be accessed at <https://aese.psu.edu/nercrd/community/social-capital-resources>.

⁸ Social capital data is available for the years 1997, 2005, 2009 and 2014. Levels of social capital for intervening years are linearly interpolated.

at the county-year level in order to control for the collateral value of housing as a determinant of entrepreneurial financing (Schmalz, Sraer, and Thesmar 2017).

3.2 Sample characteristics and financing arrangements

Table 1 reports summary statistics on the cross-sectional sample used for the baseline regressions. As reported, there are 2,763 firms in the sample with non-missing data on outside debt, owner equity, start-up year revenues and matching data on county-level social capital and demographic controls. Of these firms less than half do not report whether they obtain equity from sources other than the owner themselves. As in Robb and Robinson (2014), I treat these missing observations as having a value of zero. Of my sample, 1,302 firms report information on equity from insiders, defined as equity from spouse and parents. The average proportion of this source of funds in the capital structure is only 3.1% of total financial capital. As shown in Panel B, only 114 firms report having a non-zero amount of insider equity.

Outside equity consists of equity from government, angels, venture capital and other sources. The average proportion of outside equity in the start-up year is 4.5% of total financial capital. However, only 151 firms report non-zero values of this type of financing. Thus, the owners themselves provide the lion's share of equity in the capital structure of new firms, with 2,499 firms reporting a non-zero value for total equity. The mean proportion of owner equity financing is 59.6% of total financial capital. The average amount of owner equity is a little under \$60,000. The mean proportion of equity from all sources amounts to 63.1% of total financial capital, or \$89,823 as reported in Panel B.

Owner debt, which is based on the owner's personal financial situation and personal credit score, consists of 9.8% of total financial capital. Family and personal loans to owners are an even smaller proportion of total financial capital (6.2%). Debt if any, is made up of outside debt, defined

as financing from personal bank loans, business loans, business credit cards (CC) and government loans, the total of which amounts to 21% of total financial capital. The average dollar amount of this source of financing is \$68,790. These numbers are consistent with Robb and Robinson (2014) who find that a significant amount of start-up year capital is in the form of bank debt. The proportion of debt from all sources on the balance sheet is 37% of total financial capital, or \$82,768 on average. Summarizing, start-ups obtain their capital primarily from two sources: owner equity and outside debt.

Table 2 reports firm and owner characteristics. As shown, the average firm has \$181,000 in annual sales and approximately two full-time or part-time employees. Approximately half of the firms are home based, 36% are sole proprietorships, and 20% report having some form of intellectual property (*Have_IP*). The average Dun and Bradstreet risk rating is 3 (1 is low risk and 5 is high risk). The sample is concentrated in the higher risk ratings, with over 80% of firms ranging between a risk rating of 3 and 4. Primary owners come with substantial work experience, with 11.4 years of prior experience on average. Primary owners have an average age of 44.5 years, and they also have high levels of education. Approximately 70% of primary owners are male and over 83% are white, suggesting that entrepreneurship in this sample is mostly comprised of white males.

Panel C reports summary statistics on county-level social capital and demographic characteristics, along with cross-sectional standard deviations. Of note is the inter-quartile range in social capital (1.31), which I will use below for estimating the economic significance of this variable.

IV. Multivariate estimates

I next test my main hypothesis. This section reports cross-sectional and longitudinal tests of the effect of social capital on entrepreneurial financing choice. The baseline regression testing the effect of social capital on start-up year financing choice is as follows.

$$y_{ijk} = \mu + \beta_0 \text{Social Capital}_k + \beta_1 \text{Owner}_i + \beta_2 \text{Firm}_i + \beta_3 \text{County}_k + \gamma_j + e_{ijk}, \quad (6)$$

where the index i denotes the firm, the index j denotes the industry defined at the 3-digit SIC level, and the index k indicates the county. Estimates of equation (6) are based on the cross-sectional version of the KFS. Regression coefficients and standard errors use the corresponding survey-weights. The dependent variable is the ratio of a source of funds (e.g. outside debt) to total financial capital in the start-up year. The variables Owner_i , Firm_i and County_k are vectors of owner, firm and county controls in the start-up year (year 0) respectively. The term γ_j is an industry dummy, and e_{ijk} is a random disturbance.

4.1 Baseline regression estimates

Table 3 reports the baseline results. Social capital significantly and economically affects start-up year capital structure. As shown, firms located in counties with higher social capital rely less on owner equity (coefficient of -2.34) and more on outside debt (coefficient of 3.17), measured as a proportion of total financing. These effects are statistically significant at the 5% level of confidence or better. The effect of social capital on gross financial leverage is also significant: the coefficient on total debt is 2.82, significant at the 5% level. Social capital has a significant effect on the proportion of outsider equity, but it has no effect on the proportion of owner debt.⁹

⁹ I don't report the effect on insider debt or insider equity because of the very low frequency of non-zero observations for these variables in the sample (see Table 1).

Panel B reports the economic importance of social capital, measured as the effect of an increase in social capital from the 25th to the 75th percentile, holding all else equal. As shown in column (1), increasing social capital by this amount implies the owner-operators contribute 2.3% less equity to the venture. This same increase in social capital implies an increase of 3.1% in the proportion of outside debt (column 5). These magnitudes are economically significant considering that the mean amount of owner equity is 59.6% and the mean amount of outside debt is 21% measured as a proportion of total financial capital. In terms of dollar amounts, increasing social capital by the inter-quartile range implies \$5,303 less in owner equity and \$7,186 more in outside debt on the firm's balance sheet. Overall, the baseline results show that there exist important variations in the usage of outside debt to fund new ventures due to variations in county-level social capital.¹⁰

The measure of social capital employed in this paper proxies for social trust related to respondents' activities relating to social and civic participation, membership in non-governmental organizations, voter turnout and census response rate. Each of these dimensions of social-capital related activities may also be related to the primary owner's demand for debt financing or personal willingness to borrow. To reduce the likelihood that the effect of social capital on capital structure is related to the owner's personal willingness or ability to borrow, I report estimates on and discuss confidential owner characteristics reported to the KFS, such as primary owner hours worked, age, gender, race, education level, years of work experience and number of previous businesses owned.

The regression results reported in Table 3 measure the impact of each of these variables on the firm's capital structure. Primary owners who work longer hours (*PO_hours*) have more outside

¹⁰ The increased access of young firms with high social capital to bank debt is consistent with findings of the effect of social capital on household finances. Guiso, Sapienza, and Zingales (2004) find that social capital is correlated with financial development, and households in communities with higher social capital are more likely to invest in the stock market (Guiso, Sapienza, and Zingales 2008).

debt and less owner equity, relative to total financial capital. However, owners with more work experience (*PO_work_exp*) contribute more equity to the firm. Male owners (*PO_Gender*) have more access to outside equity and contribute less owner debt than female owners. Neither outside equity nor owner debt are large components of total financial capital (Table 1). White owners (*PO_race*) have both more outsider equity and owner debt than non-white owners. However, race does not have a significant effect on the proportion of outside debt. This result is consistent with Palia (2016) who finds, using a different sample, that minority groups taken as a whole don't have significantly less access to bank debt than white owners.¹¹ Older owners (*PO_age_owner*) have greater proportions of outside financing (either debt or equity) than do younger owners. Education levels are associated with more outside equity at the primary owner level, and more owner equity at the county level.

Additionally, some of the firm-level characteristics are significant determinants of young firms' capital structure. As one might expect, larger firms (measured with *LnRevenue*) have greater proportions of outside debt and lower proportions of owner equity. Entrepreneurs who are home-based borrow more at a personal level and contribute more owner equity, as do sole proprietorships (S- and C- corporations are the omitted category for the firm's legal status).

At the county-level, other than education (*Education*), only the ratio of Democratic to Republican voters (*Polratio*) is both statistically and economically significant in the baseline regression. Based on these regression estimates, firms located in blue states borrow less and have greater proportions of owner equity than firms located in red states. Since all regressions control for the firm's industry, these effects should not be related to differences in industry composition

¹¹ Palia (2016) does find that some specific minority groups have less access to bank debt than white owners.

across blue and red states. Religiosity (*TotReligion*) is not significantly related to young firms' proportion of outside debt, nor is the level of unemployment in the county.

4.2 Social capital and the extensive debt margin

Table 1 shows that the median firm has zero outside debt and \$3,000 total debt in its capital structure. These numbers suggests that not all firms are able to raise outside debt in their startup year. Accordingly, I investigate in this section whether social capital affects debt along the extensive margin, i.e. to what extent does social capital affect the probability of having outside debt in the firm's capital structure?

Table 4 reports Probit estimates of the likelihood of having owner debt, outside debt and any type of debt in the startup year. As shown, the impact of social capital on the proportion of owner debt is small and statistically insignificant. This is not surprising given the small proportions and incidence of this type of debt reported in Table 1. In contrast, social capital is significantly related to the presence of outside debt and total debt in the firm's capital structure. The coefficients on these two outcome variables are statistically and economically significant. The marginal effects analysis (Panel B) shows that increasing social capital from the 25th to the 75th percentile increases the likelihood of financing with outside debt by 5.12%, and the likelihood of any debt (total debt) by 4.98%. Overall, these estimates suggest that social capital affects debt along both the intensive and extensive debt margins.

4.3 Fixed effect estimates

The KFS surveys firms repeatedly over time from 2004 to 2011. The longitudinal aspect of the survey allows me to investigate whether changes in social capital after the startup year affect the proportion of outside debt in the firm's capital structure. Because social capital is measured during this period in 2005 and 2009 (social capital is interpolated during intervening years), I

include the startup year 2004, the years 2005, 2009 and the year 2010 in the analysis. I consider two firm fixed-effect specifications. The first specification has only firm fixed effects, while the second specification includes firm fixed effects and time-varying county-level characteristics.

As shown in Table 5 (Panel A), both owner equity and outside debt proportions are significantly negatively related to changes in social capital. Compared with the baseline cross-sectional estimates, the magnitude of the effect of social capital on the proportions of owner equity and total debt reported in Table 5 are larger. The fixed-effects estimates indicate that an increase in social capital from the 25th to the 75th percentile increases the proportion of outside debt by 3.88% and the proportion of total debt by 7.22%, or \$6,701 and \$12,472, respectively. The same change in social capital decreases the proportion of owner equity by 9.48%, or \$16,368.

Panel B reports similar estimates for the specification with time-varying county-level controls. As shown, social capital remains significant for the proportions of owner equity and total debt but loses its significance for the proportion of outside debt. Additionally, post-startup year changes in county-level variables have a significant effect on capital structure. Increases in religiosity reduce outside debt, as do higher unemployment rates, and higher home prices. However, the effect of political orientation loses its significance relative to the baseline (cross-sectional) estimates.

4.4 Difference-in-Difference test of the effect of social capital

Potential confounders related to unobserved economic conditions at the county or geographic level may affect the interpretation of the cross-sectional regression coefficients. For example, counties with low levels of social capital may have a greater proportion of firms that are financially constrained due to unobservable local credit conditions that persist after controlling for industry, year, and observable county-level data. To control for these factors, I estimate a

difference-in-difference (DiD) regression where treated and control firms are geographically near each other. To increase the power of this test, I employ the longitudinal version of the KFS that restricts observations to firms with uninterrupted survey responses.

Several studies document time-variation in social capital in the U.S. Putnam (1995) was among the first to document a widespread decline in social capital among American communities. More recently, Sander and Putnam (2010) document fluctuations in civic engagement after the 9/11 attacks in 2001, but note sharp divergences in social capital in the ensuing years across different social classes. Accordingly, I define treated firms as firms located in counties that experience a large decline in social capital between the 2005 and 2009 survey years used by RGF to estimate social capital. Firms located in counties with a change in social capital less than the 25th percentile (i.e., with a large in absolute value negative change in social capital) over this period are designated as treated firms. Control firms consist of firms located in adjacent counties to the treated counties that do not experience a change in social capital less than the 25th percentile.¹² The DiD specification controls for firm-level characteristics, as well as industry and credit ratings. By defining control firms as firms located in geographically proximate counties, the DiD alleviates concerns that time-invariant and time-varying unobservable economic factors correlated with social capital but common across adjacent counties affect the regression estimates. The principal limitation of the DiD is that it cannot control for unobserved time-varying differences in financial constraints that are correlated with geographical location but vary across county lines and over time. I verify sample balance and the parallel trends assumption between treatment and control firms in Appendix A.

¹² The identity of neighboring counties is obtained from the U.S. census website (www.census.gov).

Table 6 reports DiD estimates of the effect of social capital on the proportions of owner equity, outside debt and total debt. As shown, the effect of a large decline in social capital (the treatment group) on the change in the proportion of outside debt between the period prior to and after 2009 is significantly negative and economically large. Treated firms have proportions of outside debt 6.5% lower after 2009 than control firms. Column (2) reports the treatment effect after 2009 on the proportion of owner equity. As expected, the effect is positive and economically significant, indicating that treated firms increase the proportion of owner equity by 8.2% relative to control firms over the sample period. The impact of treatment on the proportion of total debt is also large, with this proportion 8.7% lower in the treatment group after 2009. Overall, the DiD estimates indicate that large changes in social capital such as those described in Putnam (2000) have significant effects on the capital structure of young firms.

4.5 Time-variation in the marginal effect of social capital on capital structure

I next examine the impact of contemporaneous levels of social capital on outside debt ratios in years other than the startup year. There are several reasons to expect the effect of social capital to vary over time. First, as the firm becomes more profitable, the amount of internal resources may increase, reducing the need for external finance. Second, the personal trust aspect of the lending relationship may attenuate the effect of community-based social capital in later years of the survey. Third, the survey timeline spans the 2007-2008 financial and the 2010 sovereign debt crisis. It may be the case that social capital has a greater marginal effect on capital structure during times of stress in credit markets.¹³

I investigate whether there is time variation in the effect of contemporaneous social capital with a regression model with year-by-social capital interactions. Specifically, I estimate the

¹³ Lins, Servaes, and Tamayo (2017) find that large, mature public firms perceived as more trustworthy by their investors performed better during the financial crisis than their less trustworthy peers.

coefficients on the interaction terms between year and time-varying levels of social capital and report the evolution of the marginal effects over time.

$$\begin{aligned}
 y_{ijkt} = & \mu + \sum_{t=2004}^{2011} \alpha_t \times \mathbf{1}(\text{year} = t) + \beta_1 \text{Owner}_{it} + \beta_2 \text{Firm}_{it} + \beta_3 \text{County}_{kt} \\
 & + \sum_{t=2004}^{2011} \delta_t \times \mathbf{1}(\text{year} = t) \times \text{Social Capital}_{kt} + \gamma_j + u_{ijkt} \quad (7)
 \end{aligned}$$

Estimates of equation (7) are based on the longitudinal panel. Regression coefficients and standard errors use the corresponding survey-weights. The variables of interest are the interaction terms $\delta_t \times \text{Social Capital}_{it}$, where the variable δ_t equals one in year t and zero otherwise and $\text{Social Capital}_{kt}$ denotes the level of social capital for county k in year t .

Table 7 reports estimation results. As shown, the interaction effects are significant in the start-up year and in 2007-2008 and 2010-2011. Figure 3 plots the corresponding marginal effects of social capital along with 95% confidence intervals. As shown, the marginal effect of social capital on the proportion of outside debt in 2008 equals approximately 3% (significant at the 5% level of confidence), and it has a similar magnitude in 2010 and 2011 (significant at the 10% level of confidence). The effect of social capital on owner equity mirrors that of outside debt, with social capital having a significantly negative effect on the proportion of owner equity in 2008 and 2010-2011.

4.6 Instrumental variables estimate of the effect of social capital on capital structure

Guiso, Sapienza, and Zingales (2006) remark that all work on culture and economic outcomes is confronted with the fact that “causality is likely to work both ways – from culture to economics and economics to culture”. Thus, economic outcomes that affect the success and characteristics of new ventures also shape social capital. The suggested course of action is to focus

on the cultural and inherited dimensions of social capital because these aspects are less likely to vary with local economic conditions. In order to establish a clearer link between social capital (which is influenced by culture) and the capital structure of young firms, I adopt the strategy proposed in their paper and use inherited traits as an instrument for social capital.

The construction and logic of the instrument follows Hoi et al. (2019).¹⁴ U.S. census data on ancestries reported at the county level is used to construct a weighted measure of cultural traits along dimensions identified by Hofstede (1980). National culture indices are provided by *Harzing.com* and supplemented with additional data from *Hofstede-insights.com*. For each county, I compute a weighted average of each trait where the weights are based on US census information on the number of individuals in the county in each ancestry category. The Hofstede indices are based on country-level surveys of respondents' characteristics along six dimensions. I employ the four most populated of these dimensions, namely *power-distance*, *uncertainty avoidance*, *masculinity-femininity*, and *individualism-collectivism*. Counties with ancestries that score high on *power-distance* and *masculinity-femininity* are expected to have lower levels of social capital. Qualities such as tolerance for others and intolerance of inequality (measured by *power-distance*), as well as traits associated with nurturing and caring for others (*masculinity-femininity*) should be positively correlated with social capital. As described in Gargiulo and Benassi (1999) cultures that maintain rigid codes of beliefs and behavior, as measured by *uncertainty avoidance*, are expected to score high on social capital. Cultures and ancestries with less emphasis on norms regulating collective behavior as measured by *individualism-collectivism* are expected to have lower social capital.

¹⁴ Hoi et al. (2019) examine the effect of social capital on executive compensation.

Table 8 reports first- and second-stage estimation results for the instrumental variables version of the baseline regression model (see equation (6) in the text). Column (1) reports first-stage results in the start-up year (2004) for the full sample. As shown, the Hofstede indices are significantly related to social capital, and three of the four dimensions have the hypothesized sign. The marginal effect of *individualism-collectivism* score is positive which is contrary to intuition. The unexpected sign on this variable may occur because the regression coefficient measures the partial effect after controlling for the three other cultural determinants of social capital.

The first-stage F-statistic that tests the significance of these instruments is 317.5, which is several orders of magnitude higher than the threshold of 10 for strong-instrument criteria recommended by Stock and Yogo (2005). Columns (2)-(4) report second-stage estimation results. As shown, instrumented values of social capital are significantly related to the proportion of outside debt and total debt, but not owner equity, although the sign of the coefficient on social capital in the owner equity regression is consistent with un-instrumented results. The IV regression coefficient estimates are of the same order of magnitude as the un-instrumented regressions in Table 2, which supports the validity of the instrument (Jiang 2017).

The lack of significance of instrumented social capital in the owner-equity regressions is puzzling. One potential explanation is that social capital is correlated with unobserved entrepreneurial wealth, which in turn affects the amount of owner equity that is invested in new ventures.¹⁵ Both Hurst and Lusardi (2004) and Nanda (2008) show that the relation between entry into entrepreneurship and household wealth is flat except for the wealthiest households, which may be more inclined to start larger ventures. Alternatively, the weak significance of social capital

¹⁵ The KFS survey does not report household wealth.

in the owner-equity regressions may occur because the component of social capital that affects the fraction of owner-equity is uncorrelated with the Hofstede social dimensions.

4.7 Social capital and survival rates

New ventures are more likely to fail early in their existence (Kerr, Lerner, and Schoar 2014). Lender rationality implies that firms located in high social capital counties experience lower default rates than their low social capital counterparts, holding all else equal. This section explores this question in the context of a hazard model of going out of business.

I answer this question in three steps. First, I compare exit frequencies across firms classified as being located in either high or low social capital counties, where high and low are measured relative to the median level of social capital in the sample. Second, I compare baseline hazard rates across these two groups of firms. This analysis introduces a time component (therefore controlling for age) but ignores firm, owner and county characteristics. Third, I estimate a hazard model that relates going out-of-business outcomes to the level of social capital in the firm's start-up year, controlling for firm, owner, and county characteristics. All three analyses are based on the longitudinal version of the KFS.

Table 9 reports these estimates. As shown in Panel A, firms in high social capital counties (measured relative to the sample median) are less likely to go out of business. The going-out-of-business frequency for this group of firms is only 38% compared with 44% for the low social capital group. The two types of ventures do not differ in any of the other type of events, with almost identical probabilities of being sold or merged with a competitor.

I next report baseline estimates of the following Cox proportion hazard model,

$$h_t = \lambda_t \exp(\beta_0), \quad (8)$$

where h_t is the time-varying hazard rate. Figure 4 plots h_t over the sample time period for firms with high and low social capital. As shown, hazard rates for low social capital firms jump in years 2 and 4 (zero is the start-up year). The two-year spike in the hazard is consistent with Paravisini (2008) who finds that firms are most likely to default on a bank loan within two years of receiving that loan. The spike in the hazard rate in year four of existence (2008 in calendar year time) coincides with the peak of the 2008-2009 financial crisis.

Although baseline hazard ratios evolve significantly over time, the high social capital group's hazard lies above the low social capital group's hazard in each year of the survey in the subsample of large firms. I test the hypothesis that the two hazards are identical with a Chi-Square test. The test rejects the null of equal distributions at the 5% level of confidence (p-value=0.027), suggesting that the survival rates of high and low social capital firms are different.

Column (2) of Panel B reports Cox proportion hazard models with firm, owner and county controls in the start-up year. The model is

$$h_{ijkt} = \lambda_t \exp(\beta X_{ijk0}), \quad (9)$$

where X_{ijk0} is a vector of firm, owner, and county characteristics in 2004 as well as industry fixed effects for firm i . As shown in column (2), the effect of founding year social capital on failure rates is robust to these controls, confirming the positive effect of social capital on survival rates.

4.8 Robustness test using an alternative measure of social capital

This section examines whether the cross-sectional and longitudinal results are robust to alternative measures of social capital. Because of the complexity and multi-dimensional aspect of social capital, I use Robert Putnam's measure of social capital, described in Putnam (2000). This measure was originally developed by Robert Putnam to quantify the extent of social capital in America, and it is based on state-level surveys of individual participation in clubs, community

projects, volunteering, social visits, and attitudes toward individual trust and honesty. I obtain this index from www.bowlingalone.com. Because this index is conducted at the state level, it is less granular than the county-level index of RGF.

Table 10 estimates the baseline results and the proportional hazard model using the Putnam measure of social capital. To increase the power of the test, the cross-sectional tests use a dummy (*Highputnam*) equal to one when the Putnam index is greater than the 80th percentile, and zero otherwise. As shown, the effect of social capital on the proportion of outside debt is significant at the 10% level in the baseline regression model (column 1). Based on the coefficient estimate, firms located in states with high social capital have 3.3% more outside debt measured as a proportion of total financial capital than firms located in states with low social capital. The effect on owner equity and total debt proportions of Putnam's measure of social capital is not significant.

V. Conclusion

I investigate the effect of social capital on the capital structure of young firms using detailed and confidential survey data on new firms' financing choices from the Kauffman Foundation. Based on a simple model of debt contracting, I argue that social capital substitutes for personal guarantees and personal commitments in entrepreneurial financing where limited liability would otherwise be circumvented. Social capital, defined as the strength of norms and density of networks in a community, is associated with higher proportions of outside debt and lower proportions of owner equity in start-ups' capital structure. I further investigate the effect of social capital using the longitudinal version of the survey in a Difference-in-Difference framework. Firms located in counties that experience a sharp drop in social capital see significant decreases in the

proportion of outside debt to total financial capital relative to a control sample constructed from firms located in neighboring counties.

Firms with higher social capital also have greater access to outside debt financing (e.g. bank lending) during the 2008-2009 financial crisis, and they are less likely to fail in the first eight years of their existence. Overall, social capital reduces financial constraints for firms that require outside financing. These results contribute to our understanding of the capital structure of new ventures, and they highlight the importance of informal institutions in the success and growth of entrepreneurial ventures.

References

- Ambrus, A., M. Mobius, and A. Szeidl. 2014. Consumption risk-sharing in social networks. *American Economic Review* 104: 149-82.
- Avery, R. B., R. W. Bostic, and K. A. Samolyk. 1998. The role of personal wealth in small business finance. *Journal of Banking & Finance* 22: 1019-61.
- Berger, A. N., and G. F. Udell. 1990. Collateral, loan quality, and bank risk. *Journal of Monetary Economics* 25: 21-42.
- Brockman, P., S. El Ghoul, O. Guedhami, and Y. Zheng. 2018. Does Social Trust affect International Contracting? Evidence from Foreign Bond Covenants. *Unpublished manuscript* 1-82.
- Carlin, B. I., F. Dorobantu, and S. Viswanathan. 2009. Public trust, the law, and financial investment. *Journal of Financial Economics* 92: 321-41.
- Cheng, C. S. A., J. Wang, N. Zhang, and S. Zhao. 2017. Bowling Alone, Bowling Together: Is Social Capital Priced in Bank Loans? *Journal of Accounting, Auditing & Finance* 1-31.
- Coleman, J. S. 1988. Social capital in the formation of human capital. *American Journal of Sociology* 94: S95-S120.
- Farhat, J., and A. M. Robb. 2014. Applied survey data analysis using Stata: The Kauffman Firm Survey data. In editor^editors. *The Kauffman Firm Survey*. Ewing Marion Kauffman Foundation.
- Fukuyama, F. 1995. *Trust*. New York: New York: Free Press.
- Gargiulo, M., and M. Benassi. 1999. The dark side of social capital. In *Corporate social capital and liability*. Eds. R. T. A. J. Leenders and S. M. Gabbay. Boston, MA: Springer.
- Ghatak, M., and T. W. Guinnane. 1999. The economics of lending with joint liability: theory and practice. *Journal of Development Economics* 60: 195-228.
- Guiso, L., P. Sapienza, and L. Zingales. 2004. The role of social capital in financial development. *The American Economic Review* 94: 526-56.
- . 2006. Does culture affect economic outcomes? *Journal of Economic Perspectives* 20: 23-48.
- . 2008. Trusting the stock market. *The Journal of Finance* 63: 2557-600.
- Hall, B. H., and J. Lerner. 2010. The Financing of R&D and Innovation. In *Handbook of The Economics of Innovation, Vol. 1*. Eds.
- Haltiwanger, J., R. S. Jarmin, R. Kulick, and J. Miranda. 2017. High growth young firms: Contribution to job, output, and productivity growth. In *Measuring entrepreneurial businesses: Current knowledge and challenges*. Eds. J. Haltiwanger, E. Hurst, J. Miranda and A. Schoar. University of Chicago Press.
- Hasan, I., C.-K. S. Hoi, Q. Wu, and H. A. O. Zhang. 2017a. Does Social Capital Matter in Corporate Decisions? Evidence from Corporate Tax Avoidance. *Journal of Accounting Research* 55: 629-68.
- Hasan, I., C. K. Hoi, Q. Wu, and H. Zhang. 2017b. Social Capital and Debt Contracting: Evidence from Bank Loans and Public Bonds. *Journal of Financial and Quantitative Analysis* 52: 1017-47.
- Hilary, G., and K. W. Hui. 2009. Does religion matter in corporate decision making in America? *Journal of Financial Economics* 93: 455-73.

- Hofstede, G. H. 1980. *Culture's consequences: international differences in work-related values*. Newbury Park, California: SAGE Publications Inc.
- Hoi, C. K., Q. Wu, and H. Zhang. 2019. Does social capital mitigate agency problems? Evidence from Chief Executive Officer (CEO) compensation. *Journal of Financial Economics* 133: 498-519.
- Holmstrom, B. 1989. Agency costs and innovation. *Journal of Economic Behavior and Organization* 12: 305-27.
- Hurst, E., and A. Lusardi. 2004. Liquidity constraints, household wealth, and entrepreneurship. *Journal of Political Economy* 112: 319-47.
- Jha, A., and Y. Chen. 2015. Audit fees and social capital. *The Accounting Review* 90: 611-39.
- Jiang, W. 2017. Have Instrumental Variables Brought Us Closer to the Truth. *The Review of Corporate Finance Studies* 6: 127-40.
- Karaivanov, A., and A. Kessler. 2018. (Dis)advantages of informal loans – Theory and evidence. *European Economic Review* 102: 100-28.
- Karlan, D., M. Mobius, T. Rosenblat, and A. Szeidl. 2009. Trust and social collateral. *The Quarterly Journal of Economics* 1307-61.
- Kerr, W. R., J. Lerner, and A. Schoar. 2014. The Consequences of Entrepreneurial Finance: Evidence from Angel Financings. *Review of Financial Studies* 27: 20-55.
- Kerr, W. R., and R. Nanda. 2015. Financing Innovation. *Annual Review of Financial Economics* 7: 445-62.
- Knack, S., and P. Keefer. 1997. Does social capital have an economic payoff? A cross-country investigation. *Quarterly Journal of Economics* 112: 1251-88.
- Lee, S., and P. Persson. 2016. Financing from Family and Friends. *Review of Financial Studies* 29: 2341-86.
- Lins, K. V., H. Servaes, and A. N. E. Tamayo. 2017. Social Capital, Trust, and Firm Performance: The Value of Corporate Social Responsibility during the Financial Crisis. *The Journal of Finance* 72: 1785-824.
- Moon, J. 2009. Small Business Finance and Personal Assets. *Community Investments* 21: 9-11.
- Nanda, R. 2008. Entrepreneurship and the discipline of external finance. *Unpublished manuscript* 1-36.
- Palia, D. 2016. Differential Access to Capital from Financial Institutions by Minority Entrepreneurs. *Journal of Empirical Legal Studies* 13: 756-85.
- Paravisini, D. 2008. Local bank financial constraints and firm access to external finance. *Journal of Finance* 63: 2161-93.
- Putnam, R. D. 1995. Bowling Alone: America's Declining Social Capital *Journal of Democracy* 6: 65-78.
- Putnam, R. D. 2000. *Bowling alone : The collapse and revival of American community*. New York ;: Simon & Schuster.
- Robb, A. M., and D. T. Robinson. 2014. The capital structure decisions of new firms. *Review of Financial Studies* 27: 153-79.
- Rupasingha, A., S. J. Goetz, and D. Freshwater. 2006. The production of social capital in US counties. *The Journal of Socio-Economics* 35: 83-101.
- Sander, T. H., and R. D. Putnam. 2010. Still bowling alone? The post 9/11 split. *Journal of Democracy* 21: 9-16.
- Schmalz, M. C., D. A. Sraer, and D. Thesmar. 2017. Housing Collateral and Entrepreneurship. *The Journal of Finance* 72: 99-132.

- Stiglitz, J. E., and A. Weiss. 1981. Credit rationing in markets with imperfect information. *The American Economic Review* 71: 393-410.
- Stock, J. H., and M. Yogo. 2005. Testing for weak instruments in linear IV regression. In *Andrews DWK Identification and Inference for Econometric Models*. Eds. New York: Cambridge University Press.
- Tirole, J. 2006. *The Theory of Corporate Finance*. Princeton, New Jersey: Princeton University Press.
- Wang, C., N. Wang, and J. Yang. 2012. A unified model of entrepreneurship dynamics. *Journal of Financial Economics* 106: 1-23.

Appendix A: Balance and parallel trends tests for Difference-in-Difference

Table A1: Sample balance between control and treatment groups

This table compares firm characteristics in the startup year between treatment group and control group firms. Treatment group firms include firms located in social counties with a change in social capital between the 2005 and 2009 survey years below the 25th percentile. Control firms consist of firms located in neighboring counties change in social capital above the 25th percentile. Means and t-statistics account for survey sampling weights.

Variable	Variable type	N = 519	N=594	T-stat (diff.)
		Mean (treated)	Mean (control)	
Outside debt	Proportion	22.60	19.05	1.57
Ln(Revenue)	Ln(dollar amount)	7.48	7.16	0.90
PO_hours	Nb. Hours	43.18	43.20	-0.02
Home_Based	Categorical	0.54	0.47	1.91
Sole_Proprietorship	Categorical	0.351	0.326	0.74
Partnership	Categorical	0.047	0.053	-0.36
LLC	Categorical	0.378	0.339	1.15
Comp_advantage	Categorical	0.655	0.633	0.63
Have_IP	Categorical	0.199	0.216	-0.59
PO_education	Years	6.098	6.145	-0.32
PO_work_exp	Years	11.787	11.718	0.09
PO_age_owner	Years	44.879	45.079	-0.27
PO_oth_bus_owner	Ordinal	0.789	0.811	-0.26
PO_gender	Categorical (Male = 1)	0.742	0.697	1.39
PO_race	Categorical (Race = white)	0.916	0.858	2.60
LnPop	Ln(nb of inhabitants in county)	12.404	12.892	-5.18
LnIncome	Ln(dollars)	9.788	9.771	1.08
Scalebranch	Nb. Branches scaled by population (county-level)	0.016	0.014	1.15
Education	Categorical (county-level proportion graduate or professional diploma)	0.288	0.269	2.78
TotReligion	Proportion (county level)	0.508	0.469	4.08
Unemploy	Percentage (county level)	5.317	5.589	-2.73
Poliratio	Ratio (county level)	0.970	0.990	-1.00
HomePriceIndex	FHSA home price index (1986 = baseline)	4.349	4.595	-1.61

Table A2: Parallel trends test for proportion of outside debt

This table verifies the parallel trends assumption between treatment group and control group firms prior to the event year (2009). Treatment group firms include firms located in social counties with a change in social capital between the 2005 and 2009 survey years below the 25th percentile. Control firms consist of firms located in neighboring counties without a marked decline in social capital. Reported standard errors are clustered by firm and they account for survey sampling weights. Estimates are based on the longitudinal version of the KFS. The regression contains firm and county controls from Table 3, credit rating FE, and industry FE (not reported).

Dependent variable:	Outside debt
TreatmentX2004	2.645 (2.200)
TreatmentX2005	0.405 (1.813)
TreatmentX2006	-1.145 (2.252)
TreatmentX2007	-5.121** (2.256)
TreatmentX2008	-1.354 (2.389)
TreatmentX2009	-6.996*** (2.451)
TreatmentX2010	-9.262*** (2.401)
TreatmentX2011	-6.464** (2.511)
Year(2005)	-2.371 (1.881)
Year(2006)	0.522 (2.180)
Year(2007)	1.698 (2.220)
Year(2008)	-0.83 (2.274)
Year(2009)	-0.067 (2.707)
Year(2010)	-1.016 (2.794)
Year(2011)	-4.016 (2.674)
Survey sample size	18286
Nb. Observations	7405
Firm & County controls	Yes
Industry fixed effects	Yes
Credit rating fixed effects	Yes

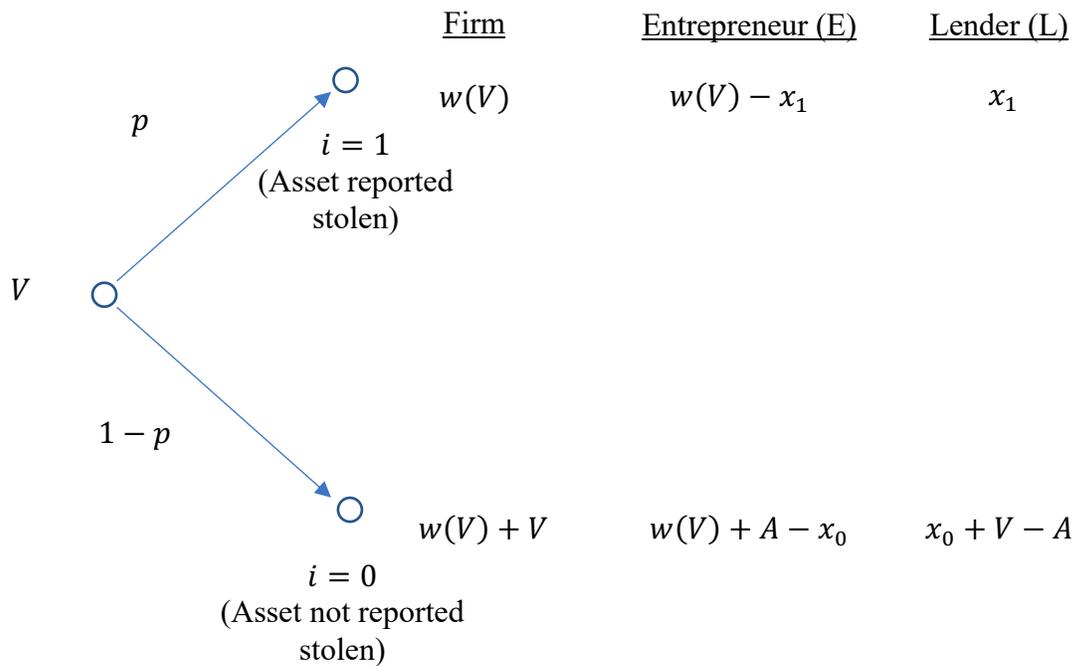


Figure 1. Model of borrowing with social capital. The figure depicts a firm worth V at time zero that borrows $(V - A)$ from a bank. The asset generates cash flow $w(V)$ in time period 1. At time 1, the asset can be reported as stolen. The entrepreneur must make payments x_i to the lender in state i , in addition to returning the loan principal $(V - A)$ in the event the asset is not reported stolen. With social capital, the maximum payment in state 1 that the borrower can pledge to the lender is $w(V) + F^{st}$, where F^{st} is the total amount of social collateral in the borrower's network.

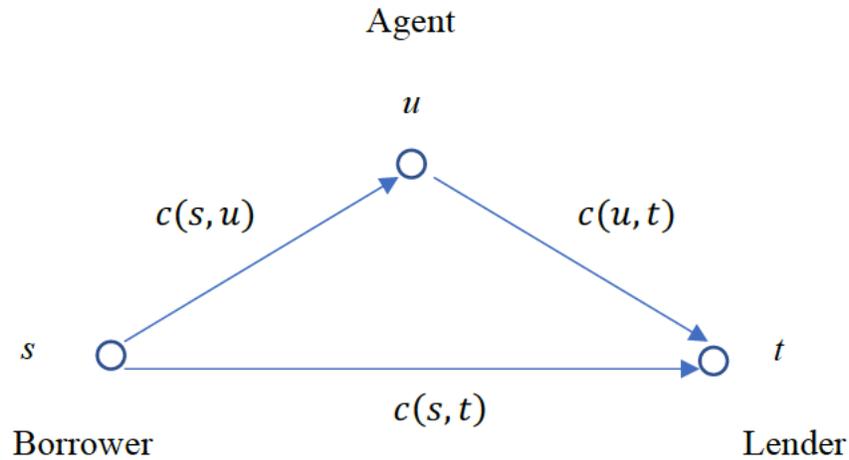


Figure 2. Social capital as social collateral. This figure replicates Figure 1 of Karlan et al. (2009). The loan contract and limited liability imply maximum transfers from s to t of $w(V)$ if the asset is reported stolen (state 1), where $w(V)$ is the project's cash flow at time 1. Let $c(i, j)$ be the value of the relationship between individuals i and j in the network. Agent u can vouch for part of the payment in state 1 of up to $\min(c(s, u), c(u, t))$, because the value of his relation with lender t is worth $c(u, t)$ and the value of his relationship with borrower s is worth $c(s, u)$. Likewise, defaulting costs the borrower $c(s, t)$, the value of his personal relationship with the lender. The social network increases total pledgeable income by $c(s, t) + \min(c(s, u), c(u, t))$.

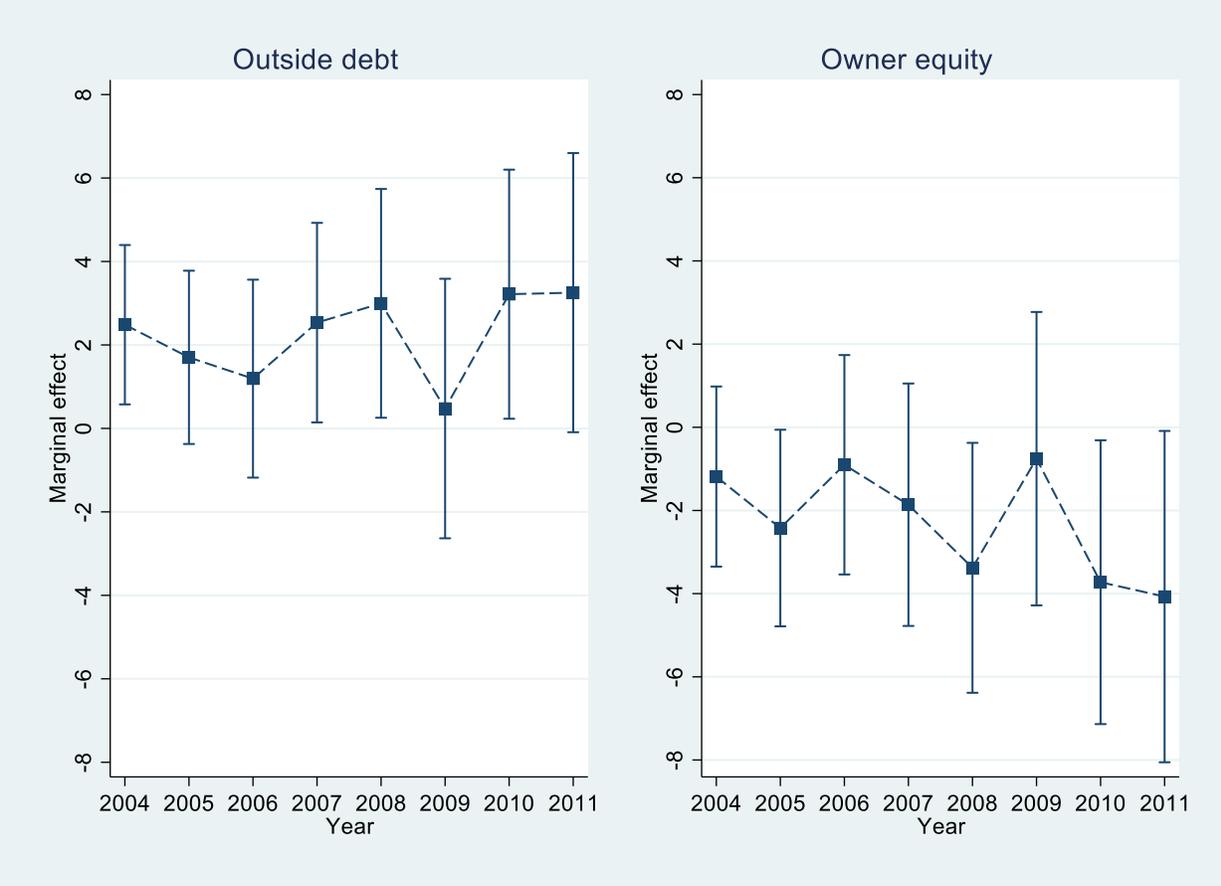


Figure 3. Marginal effects of social capital. This figure reports the marginal effects in percentage points of total financial capital of social capital on capital structure over time. Estimates are based on the longitudinal panel. Marginal effects measure the effect of contemporaneous social capital on capital structure for each year of the sample. The vertical lines represent 95% confidence level intervals around each coefficient estimate. Corresponding regression tables are reported in Table 7.

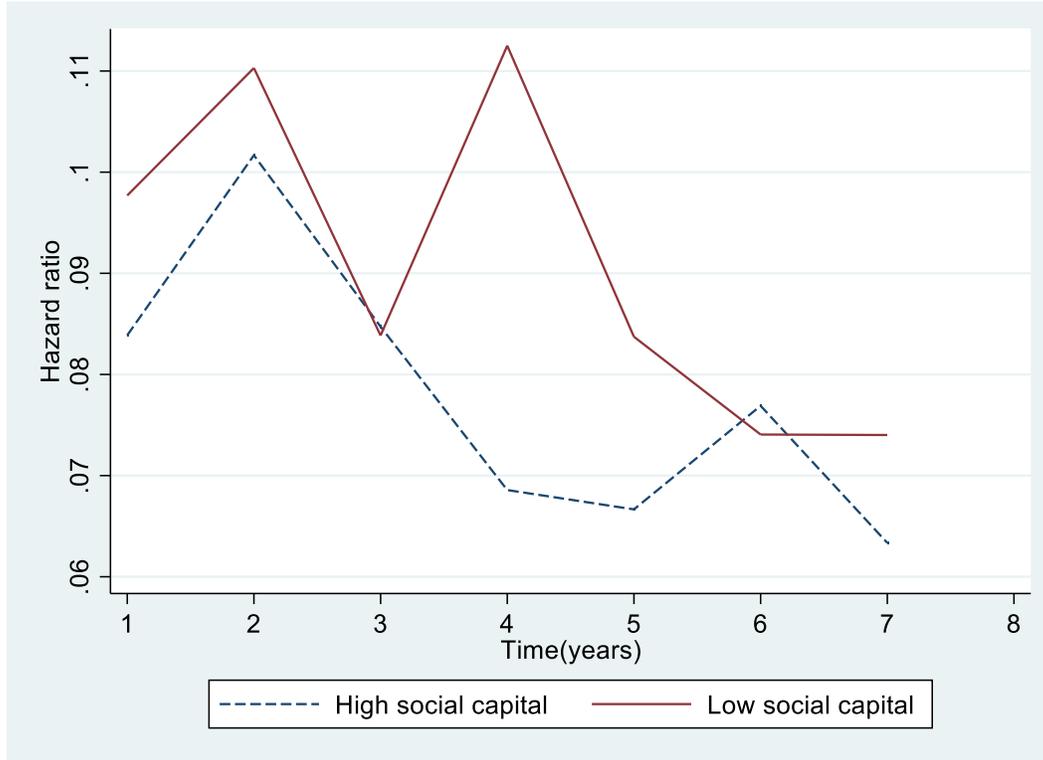


Figure 4. Baseline hazard ratio estimates. This figure reports baseline hazard estimates of equation (9) in the text. The sample is split into two subgroups based on whether the firm is in a high (*High SC*) or low social capital (*Low SC*) group relative to the sample median. Baseline hazard estimates assume a proportion Cox model. The Chi-square tests for the equality in hazard rates across *High SC* and *Low SC* firms equals 4.91 (p-value = 0.027).

Table 1: Capital structure in start-up year – Kauffman restricted access survey of small firms

This table reports summary characteristics for sample firms based on the Kauffman Firm Survey (KFS). All values are measured in the start-up year (2004). Panel A reports financing arrangements in percentage points of total financial capital. Total financial capital is the sum of owner equity, owner debt, outside debt and outside equity, and inside equity and inside debt. Panel B reports dollar amounts. The headings StdDev, p25 and p75 denote the standard deviation, the 25th, and the 75th percentile, respectively.

Panel A: Capital structure proportions in start-up year

Category	Funding source	Mean	Median	StdDev	p25	p75	N
Owner equity	Equity from all owner-operators	59.6	66.7	38.9	20.0	100.0	2763
Insider equity	Equity from spouse and parents	3.1	0.0	12.0	0.0	0.0	1302
Outsider equity	Equity from government, angels, venture capital, other companies	4.5	0.0	16.2	0.0	0.0	1296
Total equity	All equity	63.1	72.2	37.9	29.1	100.0	2763
Owner debt	Personal CC balances of owner-operators	9.8	0.0	22.1	0.0	6.5	2728
Insider debt	Family and personal loans to owners, business loans owed to owners, family or employees	6.2	0.0	18.7	0.0	0.0	2715
Outsider debt	Personal bank loans, business bank loans, business CC, government loan	21.0	0.0	32.5	0.0	37.5	2763
Total debt	All debt	36.8	27.3	37.9	0.0	70.8	2763

Panel B: Capital structure dollar amounts in start-up year

Category	Funding source	Mean	Median	StdDev	p25	p75	Mean if > 0	Count if > 0
Owner equity	Equity from all owner-operators	\$59,915	\$10,000	\$1,344,880	\$2,000	\$30,000	\$67,491	2458
Insider equity	Equity from spouse and parents	\$4,552	\$0	\$31,119	\$0	\$0	\$46,453	114
Outsider equity	Equity from government, angels, venture capital, other companies	\$60,997	\$0	\$735,198	\$0	\$0	\$586,202	151
Total equity	All equity	\$89,823	\$10,000	\$1,447,061	\$2,500	\$35,000	\$99,938	2499
Owner debt	Personal CC balances of owner-operators	\$4,879	\$0	\$27,970	\$0	\$2,000	\$14,541	896
Insider debt	Family and personal loans to owners, business loans owed to owners, family or employees	\$9,325	\$0	\$78,221	\$0	\$0	\$63,640	368

Outsider debt	Personal bank loans, business bank loans, business CC, government loan	\$68,790	\$0	\$593,704	\$0	\$13,750	\$166,710	1123
Total debt	All debt	\$82,768	\$3,000	\$610,558	\$0	\$33,000	\$131,814	1694
<u>Total financial capital</u>	<u>Sum across all funding sources</u>	<u>\$172,638</u>	<u>\$21,000</u>	<u>\$1,646,446</u>	<u>\$6,000</u>	<u>\$90,000</u>		

Table 2: Firm and county characteristics in start-up year – Kauffman restricted access survey of small firms

This table reports summary characteristics for sample firms based on the Kauffman Firm Survey (KFS). All values are measured in the start-up year (2004). Panel A reports firm characteristics based on the survey responses in the start-up year. *Home_Based* equals one if the venture is based out of one of the owners' homes, *Sole_proprietorship* equals one if there is only one owner, whereas *Partnership*, *Corporation* and *LLC* designate other legal structures. *Comp_advantage* equals one if the firm has a comparative advantage, zero otherwise, and *Have_IP* equals one if the firm has intellectual property, and zero otherwise. *PO_hours* equals number of hours worked per week of the primary owner, *PO_education*, is a ranking from 1 to 10 of owner education level, *PO_work_exp* is the number of years of work experience of the primary owner, *PO_age_owner* is the age of the primary owner in years, *PO_oth_bus_owner* is the number of other owners in the firm. *PO_gender* equals one if the primary owner is male, and zero otherwise. *PO_race* equals one if the primary owner is white and zero otherwise. *CredRisk* is the Dun & Bradstreet risk rating where 1 is low risk and 5 is high risk of default. *SD* denotes the cross-sectional standard deviation. Panel B reports social capital and demographic characteristics for the panel in the start-up year. The construction of *Social capital* and the other demographic and geographic controls is described in the text. The columns labelled p25 and p75 report the 25th and 75th percentiles respectively.

Panel A: Firm characteristics in the start-up year

Characteristic	Description	Mean	Median	StdDev	p25	p75	N
Revenue	Annual sales	\$181,808	\$12,000	\$2,765,796	\$0	\$75,000	2763
PO_hours	Primary owner hours per week of work	43.564	45.000	23.591	25.0	60.0	2763
Home_Based	Home based	0.488	0.000	0.500	0.0	1.0	2763
Sole_Proprietorship	Sole proprietorship	0.361	0.000	0.480	0.0	1.0	2763
Partnership	General or limited partnership	0.051	0.000	0.219	0.0	0.0	2763
Corporation	S-Corp or C-Corp	0.275	0.000	0.447	0.0	1.0	2763
LLC	Limited liability company	0.311	0.000	0.463	0.0	1.0	2763
Comp_advantage	Competitive advantage	0.644	1.000	0.479	0.0	1.0	2763
Have_IP	Intellectual property	0.196	0.000	0.397	0.0	0.0	2763
PO_education	Primary owner level of education: 1(less than 9th grade) - 10(professional or doctorate)	6.119	6.000	2.084	5.000	7.000	2763
PO_work_exp	Primary owner years of work experience	11.402	9.000	10.347	3.000	18.000	2763
PO_age_owner	Primary owner age in years	44.482	44.000	10.821	36.000	52.000	2763
PO_oth_bus_owner	Nb. Of previous business run by primary owner	0.790	0.000	1.247	0.0	1.0	2763
PO_gender	Primary owner is male	0.692	1.000	0.462	0.0	1.0	2763
PO_race	Primary owner is white	0.836	1.000	0.370	1.0	1.0	2763
Full time employees	Nb. of full-time employees	1.276	0.000	4.524	0.0	1.0	2708
Total employees	Nb. of full- and part-time employees	2.033	0.000	6.029	0.000	2.000	2717

Dummy: Credrisk = 1	D&B credit risk score = 1 (Low)	0.006	0.000	0.080	0.0	0.0	2763
Dummy: Credrisk = 2	D&B = 2	0.071	0.000	0.257	0.0	0.0	2763
Dummy: Credrisk = 3	D&B = 3	0.470	0.000	0.499	0.0	1.0	2763
Dummy: Credrisk = 4	D&B = 4	0.386	0.000	0.487	0.0	1.0	2763
Dummy: Credrisk = 5	D&B credit risk score = 5 (High)	0.067	0.000	0.250	0.0	0.0	2763

Panel B: Social capital and demographics in start-up year (N=2763)

Variable	Description	Mean	Median	StdDev	p25	p75
Social capital	Social capital. See text for further details. Source NERCD.	-0.470	-0.456	0.984	-1.141	0.171
LnPop	ln(county population) by county-year. Source: BEA.	12.792	13.000	1.490	11.753	3.749
LnIncome	ln(income per capita) for each county-year. Source: BEA.	9.774	9.749	0.235	9.617	9.913
Scalebranch	County nb. bank branches / county population by year. Source: FDIC.	0.016	0.005	0.030	0.002	0.015
Education	The proportion of college graduates in each year for each county. Data based on surveys in 2000, 2010, and 2011. Data for years in between is linearly interpolated. Source BEA.	0.272	0.265	0.098	0.193	0.329
TotReligion	Proportion of religious adherents by county. Data based on survey years 2000, 2010, and 2012. Observations for non-survey years are linearly interpolated. Source: ARDA.	0.487	0.474	0.126	0.392	0.560
Unemploy	Unemployment rate (pct.) per county-year. Source: BLS.	5.496	5.300	1.400	4.500	6.200
Poliratio	Ratio of Democratic to Republican voters by state. Data based on surveys done in 2004, 2008, and 2012. Data for non-survey years is linearly interpolated. Source: www.270towin.com.	0.993	0.959	0.566	0.748	1.158
HomePriceIndex	Federal Housing Financing Agency Home Price Index (1986=base year) by county-year divided by 100. Source FHFA.	4.558	3.906	2.342	2.998	5.652

Table 3: Baseline regression results

Panel A reports coefficient estimates of a cross-sectional regression in the start-up year of capital structure ratios on social capital, firm characteristics and county-level demographics. All specifications include industry and credit rating fixed effects. Regressions incorporate cross-sectional survey weights. Variable definitions are reported in Table 1. The number of observations used in each regression is reported below the survey size. Both numbers are taken into account in the estimates of the coefficients and standard errors. Robust standard errors that incorporate survey sampling variance are reported in parentheses. Panel B reports the economic significance of social capital, equal to the product of the regression coefficient and the inter-quartile range of this variable.

Panel A: Multivariate regression estimates

	Owner equity (1)	Outsider equity (2)	Total equity (3)	Owner debt (4)	Outside debt (5)	Total debt (6)
Social capital	-2.340** (1.162)	-1.251* (0.759)	-2.849** (1.144)	0.191 (0.601)	3.171*** (1.021)	2.823** (1.145)
LnRevenue	-0.420** (0.176)	0.002 (0.113)	-0.443*** (0.172)	0.119 (0.099)	0.290* (0.149)	0.440** (0.172)
PO_hours	-0.130*** (0.039)	0.012 (0.025)	-0.121*** (0.037)	0.032 (0.022)	0.031 (0.032)	0.119*** (0.037)
Home_Based	5.776*** (1.872)	-1.468 (1.029)	3.667** (1.839)	3.818*** (1.124)	-3.594** (1.506)	-3.682** (1.837)
Sole_Proprietorship	5.159** (2.252)		1.065 (2.227)	2.709** (1.338)	-6.881*** (1.895)	-1.23 (2.226)
Partnership	6.402 (3.961)	-0.579 (1.678)	9.319** (3.633)	-2.227 (1.885)	-6.119* (3.146)	-9.328** (3.630)
LLC	2.092 (2.146)	-0.065 (1.065)	2.503 (2.087)	-1.508 (1.154)	-1.426 (1.855)	-2.515 (2.088)
Comp_advantage	2.213 (1.866)	-2.291* (1.216)	1.122 (1.833)	-0.845 (1.089)	-0.021 (1.564)	-1.18 (1.833)
Have_IP	1.073 (2.043)	1.813 (1.278)	3.257 (1.987)	-1.119 (1.136)	-1.44 (1.670)	-3.221 (1.987)
PO_education	0.196 (0.447)	0.563** (0.254)	0.401 (0.446)	0.038 (0.270)	-0.13 (0.384)	-0.421 (0.446)

PO_work_exp	0.270*** (0.088)	-0.037 (0.061)	0.256*** (0.086)	-0.083* (0.048)	-0.117 (0.077)	-0.256*** (0.086)
PO_age_owner	0.034 (0.084)	0.108** (0.050)	0.012 (0.081)	-0.061 (0.050)	0.177*** (0.067)	-0.005 (0.081)
PO_oth_bus_owner	-0.245 (0.697)	0.089 (0.452)	-0.09 (0.671)	0.311 (0.350)	-0.339 (0.590)	0.08 (0.671)
PO_Gender	-0.455 (1.962)	2.539** (1.066)	0.436 (1.926)	-1.971* (1.147)	1.857 (1.656)	-0.538 (1.927)
PO_Race	-2.746 (2.323)	2.452** (0.990)	-1.204 (2.294)	3.446*** (1.239)	1.206 (1.911)	1.108 (2.295)
LnPop	0.584 (1.065)	-0.88 (0.625)	-0.05 (1.046)	0.619 (0.571)	-0.532 (0.914)	0.065 (1.046)
LnIncome	-6.393 (6.871)	5.341 (4.304)	-2.982 (6.784)	-2.759 (3.490)	0.18 (5.918)	3.173 (6.785)
Scalebranch	2.546 (38.119)	-13.283 (17.971)	-0.18 (38.182)	-29.411 (18.437)	18.126 (33.962)	1.79 (38.159)
Education	24.903* (14.473)	8.684 (7.386)	25.322* (14.251)	-3.584 (8.545)	-14.9 (12.531)	-25.472* (14.247)
TotReligion	-7.861 (6.694)	1.844 (3.625)	-6.771 (6.549)	1.75 (4.056)	8.867 (5.600)	6.697 (6.549)
Unemploy	-0.465 (0.724)	0.293 (0.448)	-0.313 (0.711)	-0.142 (0.365)	0.465 (0.606)	0.303 (0.712)
Poliratio	3.871*** (1.302)	1.748 (2.975)	4.430*** (0.967)	-0.296 (2.410)	-3.982*** (0.762)	-4.697*** (0.926)
HomePriceIndex	-0.400 (0.518)	-0.508 (0.407)	-0.279 (0.503)	-0.217 (0.286)	0.337 (0.430)	0.302 (0.502)
CredRisk(=2)	22.243** (9.739)	-17.088* (9.527)	9.673 (11.785)	4.647** (1.917)	-7.767 (11.532)	-9.789 (11.746)
CredRisk(=3)	21.490** (9.344)	-14.661 (9.477)	8.83 (11.459)	7.269*** (1.653)	-10.203 (11.241)	-8.78 (11.417)
CredRisk(=4)	25.857***	-14.943	12.618	7.911***	-13.496	-12.521

	(9.377)	(9.517)	(11.482)	(1.809)	(11.242)	(11.440)
CredRisk(=5)	26.592***	-16.817*	14.361	6.345**	-13.25	-14.165
	(9.814)	(9.647)	(11.822)	(2.513)	(11.515)	(11.781)
Survey sample size	4928	4928	4928	4928	4928	4928
Nb. Observations	2763	1244	2763	2660	2763	2763

Panel B: Economic significance

	Owner equity	Outsider equity	Total equity	Owner debt	Outside debt	Total debt
X inter-quartile range (%)	-3.07	-1.64	-3.74	0.25	4.16	3.71
Of total FC (\$)	-\$5,303	-\$2,835	-\$6,456	\$433	\$7,186	\$6,397

Table 4: Probit estimates of the effect of social capital on capital structure in the startup year

This table reports coefficient estimates of a probit cross-sectional regression of the presence of different types of debt in the firm's capital structure in the startup year. All specifications include credit rating fixed effects. Industry fixed effects are omitted due in order to preserve the sample size (some industry variables uniquely predict the outcome variable). Standard errors are reported in parentheses. Regressions errors incorporate cross-sectional survey weights. Panel B reports the economic significance of social capital in terms of the inter-quartile range effect on the likelihood of each outcome.

Panel A: Probit estimation results

	Owner debt (1)	Outside debt (3)	Total debt (4)
Social capital	0.009 (0.042)	0.101** (0.040)	0.101** (0.040)
LnRevenue	0.012** (0.006)	0.016*** (0.006)	0.015*** (0.006)
PO_hours	0.008*** (0.001)	0.005*** (0.001)	0.008*** (0.001)
Home_Based	0.023 (0.064)	-0.230*** (0.061)	-0.217*** (0.063)
Sole_Proprietorship	0.096 (0.077)	-0.383*** (0.076)	-0.088 (0.076)
Partnership	-0.016 (0.144)	-0.332** (0.137)	-0.137 (0.140)
LLC	0.016 (0.076)	-0.091 (0.072)	-0.053 (0.074)
Comp_advantage	0.008 (0.065)	0.061 (0.063)	0.037 (0.062)
Have_IP	-0.077 (0.075)	-0.008 (0.073)	-0.142* (0.073)
PO_education	0.005 (0.015)	0.005 (0.015)	-0.005 (0.015)
PO_work_exp	-0.011*** (0.003)	-0.012*** (0.003)	-0.013*** (0.003)
PO_age_owner	-0.003 (0.003)	0.007** (0.003)	-0.001 (0.003)
PO_oth_bus_owner	0.021 (0.025)	-0.003 (0.024)	0.034 (0.025)
PO_Gender	-0.128* (0.067)	0.083 (0.067)	-0.049 (0.066)
PO_Race	0.05 (0.085)	0.072 (0.083)	0.003 (0.082)
LnPop	0.03	-0.019	0.001

	(0.037)	(0.037)	(0.037)
LnIncome	-0.263	-0.076	-0.142
	(0.241)	(0.238)	(0.233)
Scalebranch	-1.372	1.313	-0.376
	(1.433)	(1.289)	(1.358)
Education	0.121	-0.265	-0.174
	(0.530)	(0.512)	(0.497)
TotReligion	-0.167	0.203	0.191
	(0.243)	(0.227)	(0.232)
Unemploy	0.006	0.023	0.021
	(0.026)	(0.025)	(0.025)
Poliratio	0.049	-0.145**	-0.141**
	(0.147)	(0.062)	(0.056)
HomePriceIndex	-0.009	0.028	0.021
	(0.020)	(0.019)	(0.018)
Survey sample size	4914	4928	4928
Nb. Observations	2646	2763	2763

Panel B: Economic significance of social capital

	Owner debt	Outside debt	Total debt
dy / dx	0.003	0.039	0.038
dy/dx X inter-quartile range (%)	0.44%	5.12%	4.98%

Table 5: Fixed-effect estimates of entrepreneurial financing choice

This regression reports fixed effect (FE) regressions of financing ratios on social capital. All dependent variables are scaled by total financial capital. The sample includes survey years 2004, 2005, 2009 and 2010. Social capital is measured in 1997, 2005, 2009 and 2014. Levels of this variable in 2004 and 2010 are interpolated. Standard errors reported in parentheses are clustered by firm and longitudinal survey weights are used in the estimation. Panel A reports FE regression without county controls. Panel B reports FE regressions with county-level controls.

Panel A: Fixed-effect regressions

Dependent variable:	Owner equity (1)	Outside equity (2)	Owner debt (3)	Outside debt (4)	Total debt (5)
Social capital	-7.223*** (2.293)	2.031* (1.060)	1.465 (1.142)	2.957* (1.776)	5.504** (2.213)
Nb. Observations	6258	2567	6033	6258	6258
Nb. Firms	2634	1136	2600	2634	2634
R2 within	0.425%	0.251%	0.062%	0.104%	0.262%
R2 overall	0.050%	0.033%	0.007%	0.121%	0.062%
R2 between	0.000%	0.149%	0.002%	0.094%	0.010%

Panel B: Fixed-effect regression with (time-varying) county controls

Dependent variable:	Owner equity (1)	Outside equity (2)	Owner debt (3)	Outside debt (4)	Total debt (5)
Social capital	-5.453** (2.638)	0.221 (1.461)	1.63 (1.342)	1.913 (2.320)	4.264* (2.513)
LnPop	-3.813* (2.227)	0.748 (1.607)	0.126 (1.534)	0.701 (1.912)	2.691 (2.161)
LnIncome	23.473 (15.091)	-14.176 (10.251)	3.514 (7.272)	-18.215 (11.521)	-20.445 (14.572)
Scalebranch	83.373 (62.200)	13.615 (28.777)	-9.75 (25.828)	-47.959 (46.824)	-79.126 (59.241)

Education	31.775 (31.370)	13.727 (21.421)	-42.222* (23.796)	48.882* (25.841)	-23.08 (32.222)
TotReligion	4.711 (20.848)	40.082** (19.788)	8.856 (12.109)	-28.788* (15.516)	-25.477 (19.324)
Unemploy	1.998*** (0.317)	-0.668*** (0.214)	-0.177 (0.155)	-0.948*** (0.292)	-1.774*** (0.305)
Poliratio	0.74 (2.471)	1.109 (0.742)	-0.94 (0.987)	-0.322 (1.231)	-1.077 (1.945)
HomePriceIndex	2.852*** (0.908)	-0.512 (0.513)	0.095 (0.522)	-2.252*** (0.686)	-2.553*** (0.886)
N	6258	2567	6033	6258	6258
N Firms	2634	1136	2600	2634	2634
R2 within	3.666%	2.801%	0.769%	1.158%	2.989%
R2 overall	1.082%	0.040%	0.174%	0.020%	0.948%
R2 between	0.520%	0.095%	0.043%	0.005%	0.488%

Table 6: Difference-in-Difference test of social capital

This table reports DiD estimates for the effect of a social capital on the proportions of owner equity, outside debt and total debt to total financial capital. Treatment group firms include firms located in counties with a change in social capital between the 2005 and 2009 survey years below the 25th percentile (i.e., a large in absolute value negative change in social capital). Control firms consist of firms located in neighboring counties with a change in social capital greater than the 25th percentile of the distribution. Regression estimates and standard errors account for survey sampling weights. Firm-years cover 2004-2011. The variable post equals 1 for years after 2009 and zero otherwise. Standard errors (clustered by firm) are reported in parentheses. Estimates are based on the longitudinal version of the KFS. Startup-year credit ratings, year and industry fixed effects are included but not reported.

Dependent variable:	Outside debt (1)	Owner equity (2)	Total debt (3)
Treatment	-1.37 (0.937)	0.16 (1.085)	-0.592 (1.062)
Treatment X Post	-6.522*** (1.951)	8.158*** (2.271)	-8.654*** (2.211)
LnRevenue	0.630*** (0.091)	-0.583*** (0.110)	0.602*** (0.106)
PO_hours	0.064*** (0.018)	-0.092*** (0.022)	0.095*** (0.021)
Home_Based	-2.814*** (0.906)	3.415*** (1.083)	-2.633** (1.059)
Sole_Proprietorship	-6.461*** (1.106)	6.237*** (1.314)	-4.702*** (1.296)
Partnership	-7.936*** (2.262)	8.047*** (2.819)	-9.372*** (2.684)
LLC	-2.147* (1.108)	1.751 (1.248)	-2.042* (1.222)
Comp_advantage	0.404 (0.883)	-0.552 (1.018)	0.879 (0.995)
Have_IP	-0.432 (1.010)	-1.832 (1.210)	-0.004 (1.182)
PO_education	-0.802*** (0.215)	1.295*** (0.255)	-1.339*** (0.250)
PO_work_exp	-0.095** (0.043)	0.169*** (0.048)	-0.143*** (0.047)
PO_age_owner	0.01 (0.043)	0.035 (0.050)	-0.026 (0.049)
PO_oth_bus_owner	-0.867*** (0.335)	0.285 (0.402)	-0.915** (0.381)
PO_gender	1.204 (0.981)	-0.918 (1.138)	0.518 (1.117)
PO_race	-0.764	2.078	-2.910*

	(1.309)	(1.527)	(1.497)
LnPop	-0.775	1.155**	-1.064**
	(0.477)	(0.542)	(0.529)
LnIncome	8.380**	-10.343**	9.295**
	(3.530)	(4.091)	(3.974)
Scalebranch	6.949	8.773	-4.096
	(16.260)	(17.207)	(16.968)
Education	-2.999	7.369	-8.814
	(7.153)	(8.190)	(8.030)
TotReligion	7.337**	-8.969**	8.485**
	(3.296)	(3.928)	(3.859)
Unemploy	-0.043	0.024	-0.165
	(0.307)	(0.352)	(0.340)
Poliratio	-1.587	0.681	-1.428
	(1.513)	(1.852)	(1.767)
HomePriceIndex	-0.343	0.313	-0.248
	(0.227)	(0.267)	(0.260)
Survey sample size	18286	18286	18286
Nb. Observations	7405	7405	7405

Table 7: Marginal effect of social capital over time

This table reports the effect of contemporaneous social capital on debt structure over time. All specifications include firm, owner and county-level controls as well as industry fixed effects at the 3-digit SIC code level and credit risk ratings. The number of observations is reported below the survey size. Estimates are based on the longitudinal version of the KFS. Coefficients and standard errors incorporate survey sampling variation. Robust standard errors with clustering by firm are reported in parentheses.

Dep. Variable:	Outside debt (1)	Owner equity (2)	Total debt (3)
(Year=2004)Xsocialcap	2.485** (0.974)	-1.185 (1.105)	1.645 (1.091)
(Year=2005)Xsocialcap	1.703 (1.059)	-2.423** (1.206)	2.478** (1.188)
(Year=2006)Xsocialcap	1.192 (1.210)	-0.901 (1.346)	1.593 (1.301)
(Year=2007)Xsocialcap	2.535** (1.220)	-1.862 (1.487)	2.849** (1.431)
(Year=2008)Xsocialcap	2.997** (1.399)	-3.379** (1.533)	3.769*** (1.450)
(Year=2009)Xsocialcap	0.476 (1.586)	-0.755 (1.800)	0.478 (1.778)
(Year=2010)Xsocialcap	3.216** (1.523)	-3.725** (1.741)	3.761** (1.706)
(Year=2011)Xsocialcap	3.254* (1.706)	-4.071** (2.032)	4.348** (1.965)
Year=2005	-3.518** (1.383)	11.058*** (1.598)	-9.662*** (1.568)
Year=2006	-2.309 (1.556)	12.143*** (1.752)	-10.480*** (1.718)
Year=2007	-2.647 (1.611)	12.458*** (1.884)	-10.465*** (1.839)
Year=2008	-3.319* (1.721)	14.119*** (1.940)	-12.285*** (1.878)
Year=2009	-6.266*** (2.030)	15.058*** (2.393)	-12.848*** (2.368)
Year=2010	-6.329*** (2.067)	16.831*** (2.425)	-14.228*** (2.372)
Year=2011	-7.604*** (2.115)	18.720*** (2.484)	-16.169*** (2.438)
LnRevenue	0.503*** (0.087)	-0.506*** (0.103)	0.510*** (0.100)
PO_hours	0.072*** (0.017)	-0.118*** (0.021)	0.122*** (0.020)

Home_Based	-1.769** (0.850)	2.115** (1.018)	-1.06 (0.996)
Sole_Proprietorship	-8.351*** (1.011)	8.431*** (1.195)	-6.380*** (1.176)
Partnership	-8.767*** (2.081)	10.785*** (2.573)	-11.344*** (2.492)
LLC	-3.309*** (1.039)	4.945*** (1.166)	-5.137*** (1.133)
Comp_advantage	1.002 (0.820)	-0.672 (0.962)	0.849 (0.938)
Have_IP	-1.123 (0.947)	-0.833 (1.133)	-1.389 (1.094)
PO_education	-0.498** (0.215)	0.601** (0.253)	-0.724*** (0.250)
PO_work_exp	-0.068* (0.040)	0.162*** (0.046)	-0.124*** (0.045)
PO_age_owner	-0.054 (0.040)	0.157*** (0.047)	-0.137*** (0.046)
PO_oth_bus_owner	0.122 (0.318)	-0.541 (0.372)	0.281 (0.357)
PO_Gender	1.957** (0.884)	-0.385 (1.057)	0.105 (1.037)
PO_Race	-1.649 (1.197)	1.703 (1.429)	-2.072 (1.411)
LnPop	0.343 (0.468)	-0.379 (0.539)	0.444 (0.524)
LnIncome	0.836 (2.941)	-2.576 (3.360)	2.921 (3.293)
Scalebranch	20.799 (13.434)	-2.724 (14.692)	4.297 (14.439)
Education	-7.27 (6.691)	16.917** (7.686)	-21.427*** (7.485)
TotReligion	9.011*** (3.068)	-8.980** (3.692)	8.631** (3.618)
Unemploy	-0.075 (0.261)	0.294 (0.308)	-0.389 (0.299)
Poliratio	-2.722*** (0.479)	2.695*** (0.639)	-2.948*** (0.638)
HomePriceIndex	0.024 (0.193)	0.122 (0.227)	0.057 (0.222)
Survey sample size	18286	18286	18286
Nb. Observations	8295	8295	8295

Nb. Firms

1813

1813

1813

Table 8: Instrumental variable estimates of the effect of social capital on capital structure

This table reports first- and second-stage Instrumental Variable (IV) estimates of the effect of social capital on capital structure. Estimates are based on start-up year measures of social capital and capital structure as reported in the cross-sectional version of the survey. Column 1 reports the first stage regression. The instruments for social capital are based on the Hofstede cultural indices weighted according to county-level ancestry reported to the U.S. Census Bureau: *Power Distance*, *Uncertainty Avoidance*, *Masculinity-Femininity*, and *Individualism-Collectivism*. Columns (2), (3) and (4) report second-stage regressions for the proportions of outside debt, owner equity and total debt to total financial capital, respectively. All regressions control for startup-year firm and county-level characteristics, and industry fixed effects. Regression estimates and standard errors incorporate cross-sectional survey weights. Robust and clustered standard errors are reported in parentheses.

Dependent variable	First-stage	Second-stage		
	Social capital	Outside debt	Owner equity	Total debt
	(1)	(2)	(3)	(4)
Power distance	-0.136*** (0.010)			
Uncertainty avoidance	0.122*** (0.007)			
Masculinity-Femininity	-0.036*** (0.005)			
Individualism-Collectivism	0.044*** (0.004)			
Social capital		4.301** (1.828)	-1.952 (2.046)	4.225** (2.001)
Firm and county controls	Yes	Yes	Yes	Yes
Industry and rating FE	Yes	Yes	Yes	Yes
Survey size	4928	4928	4928	4928
Nb. Observations	2763	2763	2763	2763
First-stage F-test of IV	317.5			

Table 9: Social capital and new venture failure rates

Panel A reports the frequency of going out of business for firm grouped according to whether the level of social capital in the start-up year is above (High social capital) or below (Low social capital) the median in 2004. Panel B reports Cox proportional hazard estimates of going out of business. All independent variables are measured in the startup year. Failure is defined as going out of business for firms that report every year of the survey up until failure or 2011 (the last year of the survey). All specifications include industry fixed effects, defined at the 3-digit SIC code. *High SC* equals 1 when social capital in the start-up year is above the sample median in 2004, and zero otherwise. Regression estimates and standard errors incorporate longitudinal survey weights and sampling variance. Robust clustered standard errors are reported in parentheses. All variables are defined in Tables 1 and 2.

Panel A: Outcome frequencies and social capital

Event type	All firms		High social capital		Low social capital	
	Nb.	Frequency	Nb.	Frequency	Nb.	Frequency
No event	956	52.7	539	56.0	417	49.1
Sold, merged or temp. stopped	122	6.7	63	6.5	59	6.9
Out of Business	735	40.5	361	37.5	374	44.0
Total	1,813	100.0	963	100.0	850	100.0

Panel B: Hazard ratio estimates

	Model 1 (1)	Model 2 (2)
High SC	-0.241*** (0.079)	-0.217** (0.095)
LnRevenue		-0.017** (0.008)
PO_hours		-0.003 (0.002)
Home_Based		-0.027 (0.090)
Sole_Proprietorship		-0.245** (0.103)
Partnership		(0.167) (0.206)
LLC		-0.185* (0.106)
Comp_advantage		0.042 (0.086)
Have_IP		-0.122 (0.105)
PO_Education		-0.081***

		(0.022)
PO_work_exp		-0.016***
		(0.004)
PO_age_owner		0.003
		(0.004)
PO_oth_bus		-0.012
		(0.035)
PO_gender		-0.142
		(0.086)
PO_race		-0.113
		(0.115)
Lnpop		0.011
		(0.046)
Lnincome		-0.139
		(0.305)
Scalebranch		-2.558
		(1.595)
Education		0.026
		(0.694)
Totreligion		-0.195
		(0.321)
Unemploy		-0.045
		(0.035)
Poliratio		0.064
		(0.078)
HomePriceIndex		-0.016
		(0.025)
Survey sample size	18286	18286
Nb. Observations	10558	10558
Nb. Firms	1813	1813

Table 10: Robustness test using an alternative measure of social capital

This table reports cross-sectional estimates of the effect of social capital on the proportion of outside debt in the startup year, where social capital is measured using Robert Putnam's index of social capital. The variable *Highputnam* equals 1 when the Putnam index of social capital exceeds the 80th percentile, and zero otherwise. The Putnam index is measured at the state level and based on social data collected by Robert Putnam as described in Putnam (2000). The tests employ the same set of controls as in Table 3, including firm and county-level controls and industry fixed effects. Estimates are based on the cross-sectional version of the survey in the start-up year (2004). Standard errors reported in parentheses are robust and account for survey variation.

Dep. Variable:	Outside debt (1)	Owner equity (2)	Total debt (3)
Highputnam	3.316* (1.996)	-0.959 (2.321)	2.756 (2.275)
LnRevenue	0.298** (0.150)	-0.426** (0.177)	0.449*** (0.173)
PO_hours	0.028 (0.032)	-0.128*** (0.039)	0.116*** (0.038)
Home_Based	-3.737** (1.518)	5.876*** (1.884)	-3.855** (1.850)
Sole_Proprietorship	-6.803*** (1.900)	5.195** (2.255)	-1.191 (2.230)
Partnership	-6.275** (3.149)	6.507 (3.965)	-9.467*** (3.642)
LLC	-1.216 (1.863)	1.887 (2.161)	-2.293 (2.105)
Comp_advantage	-0.06 (1.576)	2.417 (1.874)	-1.243 (1.843)
Have_IP	-1.498 (1.680)	1.006 (2.055)	-3.251 (1.998)
PO_education	-0.142 (0.386)	0.209 (0.448)	-0.427 (0.448)
PO_work_exp	-0.109 (0.077)	0.262*** (0.088)	-0.249*** (0.087)
PO_age_owner	0.175*** (0.068)	0.034 (0.084)	-0.006 (0.082)
PO_oth_bus_owner	-0.401 (0.594)	-0.209 (0.705)	0.008 (0.679)
PO_Gender	2.06 (1.665)	-0.44 (1.972)	-0.384 (1.936)
PO_Race	1.496 (1.926)	-2.826 (2.337)	1.345 (2.313)
LnPop	-1.638** (0.810)	1.548 (0.953)	-0.927 (0.936)

LnIncome	5.726 (5.811)	-9.485 (6.714)	7.773 (6.630)
Scalebranch	12.391 (34.476)	13.989 (38.869)	-4.723 (39.017)
Education	-10.182 (12.710)	19.386 (14.515)	-20.643 (14.334)
TotReligion	10.250* (5.672)	-9.367 (6.692)	8.062 (6.572)
Unemploy	0.428 (0.606)	-0.385 (0.731)	0.253 (0.716)
Poliratio	-3.516 (3.340)	0.952 (4.082)	-3.419 (3.928)
HomePriceIndex	0.111 (0.494)	-0.089 (0.577)	0.048 (0.566)
Survey sample size	4928	4928	4928
Nb. Observations	2755	2755	2755
