Social capital and small informal business productivity: the mediating roles of financing and customer relationships

Christopher Boudreaux ⬤ · George Clarke · Anand Jha

Abstract How does an entrepreneur's social capital improve small informal business productivity? Although studies have investigated this relationship, we still know little about the underlying theoretical mechanisms driving these findings. Using a unique Zambian Business Survey of 1971 entrepreneurs administered by the World Bank, we find an entrepreneur's social capital facilitates small business productivity through the mediating channels of firm financing (i.e., credit from suppliers, credit to customers, loans from friends and family) and customer relationships (i.e., more customers). Our findings, thus, identify specific mechanisms that channel social capital toward an informal business' productivity, which prior studies have overlooked.

Plain English Summary Small informal businesses are more productive when they build relationships with customers, extend credit to customers, and receive credit from suppliers and friends and family. Using a unique survey of 1,971 Zambian entrepreneurs administered by the World Bank, we observe that belonging to a business or social association enables these businesses to extend credit, receive credit, and build relationships. Our findings provide more specific mechanisms that channel social capital toward an informal business' productivity, which prior studies have overlooked. Thus, our main policy recommendation is that entrepreneurs, especially from informal businesses and developing contexts, should focus on networking to foster customer and professional relationships and enhance access to capital, which can help foster firm productivity.

Keywords Entrepreneurship · Financing · Productivity · Small business · Social capital

JEL Classifications D24 · D71 · G21 · L26 · M13

C. Boudreaux (✉)
Department of Economics, Florida Atlantic University, 777 Glades Road, Kaye Hall 145, Boca Raton, FL 33431, USA
e-mail: cboudreaux@fau.edu

G. Clarke
Texas A&M International University, 5201 University Blvd, Laredo, TX 78041, USA
e-mail: george.clarke@tamiu.edu

A. Jha
Mike Ilitch School of Business, Wayne State University, 2771 Woodward Ave, Detroit, MI 48201, USA
e-mail: anand.jha@wayne.edu

1 Introduction

Countries grow faster when small businesses are productive and become larger. Small businesses hold

more capital, provide more jobs, and are more innovative than large firms (Acs & Audretsch, 1988). Small businesses often operate in the shadows in an informal economy that represents more than 50% of a country's gross domestic product (GDP) in emerging economies and about 10 to 15% of GDP in industrialized countries (Schneider & Enste, 2013). Given the important role that small businesses play in the growth of an economy, academics and policymakers are interested in understanding what makes a small business more productive.

Several studies document a positive association between a firm's social capital—measured by the strength of the owner's network—and the firm's productivity (Bosma et al., 2004; Fatoki, 2011; Santarelli & Tran, 2013). Although these studies have investigated the relationship between a firm's social capital and productivity, little is known about the underlying mechanisms driving these findings in small, informal business. Among the few exceptions are, for example, Cooke and Wills (1999), who demonstrate that social capital improves performance by enhancing business knowledge and innovation and reducing transaction costs (Fafchamps & Minten, 2002).

The purpose of our study is to identify specific mechanisms that mediate the relationship between social capital and informal small business. Because credit constraint is a major obstacle to small business success (Berger & Udell, 1995; Cole, 1998), we expect credit access to mediate the relationship between social capital and small business productivity. However, all types of credit are not the same. For example, the costs of bank loans, loans from suppliers, and loans from friends and family can be different. The maturity of these debts and the consequences of not paying them on time can also differ. Access to short-term debt from suppliers may be particularly useful in extending credit to customers (which may be the key to higher sales) because of matching maturity (Deloof & La Rocca, 2015). Therefore, the mediating effect of credit on productivity might differ based on the type of credit. What is more, other factors besides access to credit might mediate social capital's positive effect on productivity. For example, a business owner with a dense network is also more likely to be trusting (Putnam, 2000) and as such may be better at building good customer relationships and increasing the firm's customer base and therefore increasing productivity. While there is a rich discussion of how trade credit can improve small business productivity, a formal test of the mediating effect is lacking, as is discussion and evidence of the possibility that social capital might be associated with more credit to customers and a larger customer base that may lead to higher productivity.

This article fills this gap. Specifically, we investigate whether credit from suppliers, credit to customers, loans from family and friends, loans from banks, and the firm's customer base mediate the association between social capital and productivity. We know of no study that examines the role of these possible mediators of social capital and small informal businesses' productivity.[1]

We hypothesize that entrepreneurs[2] with a high level of social capital have easier access to credit from their suppliers, banks, and family and friends, and this in turn leads to increases in small business productivity. We also hypothesize that entrepreneurs with more social capital are likely to extend more credit to customers and have a larger customer base, both of which mediate the relationship between social capital and small business productivity. We develop our hypotheses using insights from the social capital literature (e.g., Adler & Kwon, 2002; Coleman, 1988; Lin & Zhang, 2009; Putnam, 2000; Woolcock & Narayan, 2000) and the small business financing literature (e.g., Biggs & Shah, 2006; Fafchamps & Minten, 2002).

To test our hypothesis, we use a unique dataset based on the Zambian Business Survey (ZBS) conducted by the World Bank.[3] It provides data on each firm's number of customers and whether a firm extends credit to its customers, which features make it unique and allow us to examine unique channels by which social capital might improve small business productivity. It is important to study this relationship

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[1] However, there are studies showing how the effect of the structural dimension of social capital on firm performance is mediated by relational and resource dimensions (e.g., Castro and Roldán (2013).

[2] Although there are many different definitions of entrepreneurship, we consider these Zambian small business owners entrepreneurs because they are operating their enterprises to maintain or build their business. Although most of these business owners are not high tech or growth oriented, they are all trying to operate in the economy, and many have very high entrepreneurial aspirations. This is consistent with calls to embrace entrepreneurial diversity (Welter et al., 2017).

[3] One of the co-authors was part of the team that wrote the survey instrument.

in a developing economy such as Zambia because social capital matters more when information asymmetries between lenders and borrowers and between customers and the entrepreneur are particularly high, which is often the case in developing countries with underdeveloped financial and regulatory systems (Cestone & White, 2003; Galor & Zeira, 1993). The availability of some unique features in this data, the underdevelopment of the financial market, and poor law enforcement mechanisms make Zambia a good laboratory to examine our hypotheses.

Our results indicate that being a member of an association is associated with a 41% increase in productivity and that these entrepreneurs are more likely to provide credit to customers, obtain credit from friends and family, obtain loans from their suppliers, and have a larger customer base. Our findings extend the literature investigating the challenges of operating as a small, informal business. A long-standing theory in finance suggests that a lack of external capital constrains the productivity of small firms (Kersten et al., 2017). Our study suggests that membership in a business or non-business association positively influences small business productivity, and part of this relationship is because social capital eases credit constraints by increasing the credit supply from family and friends and suppliers.

We are the first to document that a firm's better access to informal credit is associated with credit offered to customers, a higher customer base, and greater productivity. These findings have direct managerial implications that can improve a small informal business' productivity. However, these managerial implications have been notably absent due to data constraints. Among the few exceptions, there are the work of Fafchamps and Minten (2002) and Fafchamps (1997). They identify that social capital increases the likelihood of trade credit from suppliers for informal small businesses but do not link trade credit from suppliers to an extension of credit to customers and productivity. Our study suggests that trade credit from suppliers is also associated with trade credit to customers consistent with the maturity matching principle (Deloof & La Rocca, 2015; Morris, 1976), increasing the customer base and hence sales. In environments where external capital is lacking, not only are small businesses financially constrained, but so are their customers. Providing credit to customers also signals entrepreneurs' confidence in the quality

of their product and reduces information asymmetry inherent in small firms' products (Long et al., 1993). Access to trade credit from suppliers might decrease the marginal cost of extending credit to customers and increase customer base and productivity.

2 Hypotheses development

2.1 Definition of social capital

Following the literature, we define social capital as the networks that facilitate collective action (Fafchamps & Minten, 2002; Granovetter, 2018). An individual with high social capital is likely to have a larger network and more friends and is more likely to have norms that facilitate working together, such as trusting others.[4] Norms and networks are related: participation in an organization develops norms conducive to cooperation such as trust in others, and these norms facilitate participation in networks (Fukuyama, 1995). Tsai and Ghoshal (1998) prove that "social interaction, a manifestation of the structural dimension of social capital, and trust, a manifestation of its relational dimension, were significantly related" (p. 464). Lyon (2000) summarizes the value of the network in the context of social capital as follows:

> Networks are the most visible and clearly definable part of social capital and for this reason they have received most attention in studies on social capital. Many analyses, especially those that attempt to quantify social capital, concentrate on formal networks and groups with an assumption that the quality and quantity of associational life can be used as a proxy for social capital (p. 676).

2.2 Social capital and productivity

We posit that entrepreneurs' social capital positively affects small business productivity because they are likely to enjoy greater trust from stakeholders such as lenders and customers and, therefore, have a lower

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[4] Fafchamps and Minten (2002) discuss in more detail how the norms and network dimension of social capital are related.

cost of raising capital. Entrepreneurs with more social capital also have a lower turnover of employees and good relationships with suppliers.

Empirical evidence supports this view. Using data from Madagascar, Fafchamps and Minten (2002) posit that social capital facilitates human interaction and reduces the costs of transactions with other traders, lenders, and family members, making the firm more productive. Fafchamps and Minten go on to write,

> The strength and robustness of social capital variables stands in sharp contrast with the less robust and partly counterintuitive results obtained with human capital variables such as years of schooling, years of experience as a trader, and the ability to speak more than one language. Although this does not imply that human capital is unimportant, it suggests that social capital might be as, if not more, important for efficiency in economies characterized by high transaction costs and poor market institutions. (Fafchamps & Minten, 2001, p. 203)

Leana and Pil (2006) demonstrate that internal social capital (relations among teachers) and external social capital (relations between the principal and external shareholders) are positively associated with students' better performance in reading and mathematics. These researchers' logic is that a healthy relationship facilitates greater trust, lowers fear of opportunistic behavior, and enables greater sharing of information.

Following theses lines of thought, we argue that an entrepreneur with high social capital will likely have better relations with stakeholders such as creditors and customers, which will in turn improve productivity. In addition to better relationships with stakeholders, social capital enables entrepreneurs to gather useful information that can be used to cut costs and hire and retain good employees, leading to higher productivity. Therefore, it is not surprising that Stam et al. (2014) conducted a meta-analysis of the association between entrepreneurs and a small firm's performance and find the link positive and significant. Based on these studies, we hypothesize the following:

Hypothesis 1: Entrepreneurs' social capital is positively associated with small business productivity.

2.3 The mediating role of credit from suppliers

There are two types of trade credits: accounts receivable—the supply side of trade credit—and accounts payable—the demand side of trade credit. Both these types of credit are useful for small enterprises.

Small businesses rely heavily on accounts payable because they cannot issue stocks and bonds in the external market and have only two sources of external finance: banks and credit from suppliers. According to the U.S. small business administration, approximately 20% of small businesses in the U.S. do not receive financing from banks and rely on credits from suppliers.[5] Berger and Udell (1998) note that a typical small business has an almost equal amount of debt from banks as it has from suppliers. The credit from suppliers is likely to be even higher in developing economies such as Zambia where access to banks is much more difficult and where there is greater information asymmetry between lenders and borrowers. These countries do not have credit scores for individuals.

The importance of credit from suppliers is well established in the small business literature. For example, Wilner (2000) notes that access to credit from suppliers is particularly useful when a firm faces an unexpected financial constraint. Cunat (2007) echoes the same findings: suppliers of a firm can be a source of mitigating financial constraints when the firm faces temporal liquidity shocks threatening its survival. In a sample consisting of approximately 200,000 small and medium-sized enterprises spanning 13 European countries, McGuinness et al. (2018) reveal that higher levels of accounts payable during financially difficult times are associated with higher survival rates. Ogawa et al. (2013) show that credit from a supplier is associated with higher profitability for small businesses.

There are also theoretical underpinnings for linking access to credit from a supplier to a firm's productivity. Agostino and Trivieri (2019) argue that credit from a supplier helps "to smooth out the production process and avoid inventory shortages and the associated interruptions or inefficiencies in production" (p. 577). It makes it easier to verify the product's quality before payment, making it easier to return defective products (Long et al., 1993). Trade credit from suppliers also improves efficiency because it makes possible agreements that stagger the payment and deliveries over time, making it easier for the firm

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[5] https://www.sba.gov/advocacy/bank-credit-trade-credit-or-no-credit-evidence-surveys-small-business-finances

to handle its working capital (Ferris, 1981; Fisman, 2001; Schwartz, 1974).

We posit that the high social capital of the entrepreneur increases the likelihood of an owner obtaining supplies on credit. Credit from suppliers does not depend upon how much collateral the small business has but rather on trust and reputation (Fafchamps, 1997), and suppliers have higher trust in clients with high social capital. They expect ethical behavior from their clients and expect repayment on time. Research shows that individuals with high social capital are less likely to commit a crime (Buonanno et al., 2009). Experimental studies also show that individuals with high social capital are more likely to repay their debt (Karlan, 2005). Because suppliers are in closer relations with their clients compared to banks, they are better able to consider soft information like trust.

Firms with greater access to supplier credit may be better positioned to extend credit to customers. The maturity matching principle states that ideally, a firm should finance current assets with short-term liabilities and fixed assets with long-term liabilities because it reduces risk (Morris, 1976). The idea is that it is easier for a business owner to repay the debt when the amounts of accounts payable and accounts receivable mature the same time. In addition, the high interest rates that entrepreneurs pay on accounts payable are offset by the high interest rate they receive on accounts receivable. Several studies show evidence for this principle. For example, Demirgüç-Kunt and Maksimovic (1999) indicate that a high ratio of net fixed assets to total assets is positively associated with the ratio of long-term debt to assets. The ratio of sales to fixed assets is positively associated with high ratios of short-term debt to assets.

Deloof and La Rocca (2015), who examined small businesses in Italy, demonstrate that a firm's amount of long-term debt has no association with its accounts receivable, but access to short-term credit is associated with more credit to customers in the form of accounts receivable.

What is more, the lower marginal cost of extending credit may help build a customer base that is financially constrained and unsure about the quality of product offered by the firm. The research on accounts receivable shows that this is an effective tool in establishing reputation when there is more

significant information asymmetry about the firm type and the quality of the firm's product (Long et al., 1993). For a small business, accounts receivable may be a particularly effective tool to increase its customer base. Therefore, we hypothesize the following:

Hypothesis 2a: Credit from suppliers mediates the association between social capital and small business productivity through the number of customers.

Hypothesis 2b: Credit from suppliers mediates the association between social capital and small business productivity through credit to customers and the number of customers.

2.4 The mediating role of credit to customers

While better access to credit from suppliers helps small businesses with their financing needs, extending credit to customers also offers many advantages. The value of extending credit is summarized in the following excerpt from Wilson and Summers (2002):

> Trade credit is also an important tool for relationship building and management. Thus, on the supply side trade credit [accounts receivable] can be a multi-faceted and important strategic or competitive tool that plays a role in capturing new business, in building supplier customer relationships (developing an implicit equity stake in the customer), in signaling product quality, 'reputation' and financial health, and in price competition and price discrimination. (p. 317)

Building a customer base by providing accounts receivable to the right customers is vital for small business success. Martínez-Sola et al. (2014) examined over 10,000 manufacturing small and medium enterprises from Spain and show that a higher proportion of accounts receivable is associated with higher profitability. Moreover, they demonstrate that providing credit to customers is particularly useful in situations with variable demand because it can smooth demand, lower operating costs, and enhance productivity.

We posit that high social capital is associated with a greater extension of credit to customers because an owner who is more trusting of others is more willing to be vulnerable to his customer defaulting. Research shows that the extent to which one trusts others affects whether one

parts with one's cash and invests. For example, Guiso et al. (2004) indicate that high social capital individuals hold less cash, use more checks, and participate more in the financial market. Moreover, when owners have a high level of social capital, they are more likely to have better relationships with customers, which can reduce default rates for two reasons: With better relationships comes more accurate information, which owners can use to extend credit to only worthy customers. Second, better relations increase the customers' cost of defaulting. Field experiments suggest that clients are also less likely to default when there is higher personal trust (Cassar et al., 2007).

In developing economies where clients are credit constrained, the inability to provide credit to customers may mean losing customers. Most customers prefer the flexibility of obtaining goods on credit because it makes their financial planning easier. Schwartz (1974) considers this an "integral part of a firm's pricing policy" (p. 644). Schwartz and Whitcomb (1977) theorize that firms can use credit to customers to disguise price discrimination by charging clients that delay payment at a slightly higher price. Wilson and Summers (2002) note that extending credit to customers may also help build customer loyalty. It is also a tool to signal to customers that they are financially sound. The following quote is illustrative of theoretical reasons why providing customers goods on credit might enhance productivity:

> Small firms which are startups or have aims for growth also face problems of reputation when entering new markets. They may need to use trade credit as a signal of reputation and commitment, and as a marketing tool. This latter influence has some echo in Petersen and Rajan's (1997) finding that there is a 'greater extension of credit by firms with negative income and negative sales growth', where they suggest trade credit is used as a signal of financial health and to boost sales. (p. 318)

Therefore, we hypothesize the following:

Hypothesis 3: Credit to customers mediates the association between social capital and small business productivity through a larger customer base.

2.5 The mediating role of loans from friends and family

S. Lee and Persson (2016) note that several million small businesses from 42 countries raised approximately \$600 billion from informal investors, and some rely exclusively on this type of finance. They also posit that most informal financing comes from family and friends. Although many entrepreneurs may not prefer to borrow from family and friends for fear of straining social ties, in poor economies, this may be the only option since getting a loan is difficult. Moreover, borrowing costs are lower when borrowing from friends and family, partly because the classic problem of moral hazard and adverse selection is lower (Banerjee et al., 1994; Stiglitz, 1990). Because of their reputation and participation in various networks, entrepreneurs with high social capital are more likely to obtain loans from family and friends, increasing the size of the customer base and enhancing productivity. Because credit constraints are a serious concern for small businesses in poor developing economies (Fafchamps, 1997), financial help from family and friends might provide funds to buy machinery, reach new markets, and expand when opportunities arise. Hence, we hypothesize the following:

Hypothesis 4: Loans from friends and family mediate the association between social capital and small business productivity through the customer base.

2.6 The mediating role of loans from banks

The literature on small business lending, social capital, and small business performance suggests that access to bank loans might mediate the association between social capital and small business productivity. Pham and Talavera (2018) examine micro-, small-, and medium-sized firms in Vietnam and demonstrate that owners who have larger networks are likely to have better access to loans from banks. They argue that participation in social networks increases access to loans because it allows banks to gather more information (Le & Nguyen, 2009). Talavera et al. (2012) note that small business owners who are more altruistic, measured by whether they contributed to a charity in the past, are more likely to have their loan application approved. Talavera et al. (2012)'s argument is similar: individuals who contribute to charity are embedded in networks, reducing the transaction cost of private information sharing among lenders and borrowers (Boot, 2000; Uzzi,

1999). Hernández-Cánovas and Martínez-Solano (2010) analyze the relationship between banks and small businesses in Europe and indicate that trust between the firm and bank improves access to finance and borrowing costs. Hence, we hypothesize the following:

Hypothesis 5: Loans from banks mediate the association between social capital and small business productivity.

2.6.1 The mediating role of customer base

Customer service is important for firms desiring to increase their number of customers. Research sponsored by Zendesk, a customer service company, shows that 58% of respondents stopped buying from a company after they experienced bad service, and 52% told others not to buy from the firm.[6]

Entrepreneurs with more social capital are likely to be cooperative and trusting of others, which are likely to build better relationships with customers, provide better service, and therefore, create a larger customer base. Owners of small businesses who are more trusting may offer better services and, hence, increase their customer base. Merlo et al. (2006) examine customer service in retail firms in the U.S. and note, unsurprisingly, that a trusting culture is associated with greater customer satisfaction.

There are other ways in which social capital increases customer bases. Yli-Renko et al. (2001) argue and provide empirical support for their idea that the social network dimension of social capital helps owners to acquire knowledge from various sources including the customers, and that this knowledge can be exploited for comparative advantage and increasing sales. For example, they may be better at distinguishing between customers that are worthy of extending credit to. Fafchamps and Minten (2002) examine the returns to social networks among agricultural traders in Madagascar and document how traders with larger networks, measured by the number of other traders they know, have better sales performance. They argue that this is due to a lower transaction cost of finding other traders. Entrepreneurs who have a larger network may identify potential

customers or acquire knowledge that could help differentiate their products to attract more customers, and this in turn increases small business productivity. Moreover, because they are relatively less credit constrained themselves, they may be in a better position to extend credit to customers. Thus, we propose the following hypothesis:

Hypothesis 6: The size of the customer base mediates the relationship between social capital and productivity.

3 Data and empirical model

This paper uses data from the nationally representative ZBS. The survey, which Finmark and the World Bank conducted in late 2008, includes 4801 small businesses with 50 or fewer workers.[7] However, because we exclude agricultural firms, we are left with approximately 2000 businesses in our sample.

4 Data and summary statistics

4.1 Sample

The ZBS covers commercial firms that produce goods or services that are sold to people or firms outside the owner's household. The survey firm (Steadman Research Services) selected firms using area

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[6] https://www.zendesk.com/resources/customer-service-and-lifetime-customer-value/

[7] One common concern for papers that use data from a single source is common method variance (Podsakoff et al., 2003). Although it is difficult to rule out this problem entirely, it might not be a major concern in this case because the main dependent and independent variables, including the measures of firm performance and social capital are measured in objective terms. The productivity measure is based on the number of workers the firm has and the firm's sales. The social capital variable is based on whether the firm's owner belongs to any business or non-business associations. Fact-based data are generally seen as less susceptible to common method variance than perception or attitudinal variables are (Brannick et al., 2010; Chang et al., 2010). In addition, the variables use different scales, the questions are relatively straightforward, and the topics are not overly sensitive. Finally, the questions are spread out over a long (35 page), broad survey about the business environment.

sampling.[8] First, the survey firm randomly selected 320 enumeration areas from a stratified list based on the 2000 census. Once the survey firm had selected the enumeration areas, they listed all houses and other buildings in the area and checked whether the buildings contained people who owned and ran their own businesses. They used this information to make a list from which they randomly selected people. Therefore, the sample includes small, home-based firms as well as formal businesses.

The study focuses on non-agricultural firms.[9] We exclude farms for two reasons: First, many small farms are not commercial firms; they are subsistence farms that sell excess production. Second, it is difficult to measure how much these farms produce. To determine how much a farm produces, farmers must estimate how much their family consumes and how much their consumption is worth. These imprecise estimates mean that it is difficult to estimate the productivity of subsistence farms.[10]

Approximately 75% of the firms in the sample are small shops. The remaining firms are in manufacturing (10% of firms); services (15%); and other areas such as mining, health, and electricity (1%). Although the sampling frame includes firms with up to 50 workers, few are this large. The firms have an average of 1.8 paid workers (including the owner) and 1.7 unpaid workers (often family members). However, the sample is skewed. Approximately 78% of the firms have no paid workers except the owner, and 57% have no paid or unpaid workers except the owner. Only 10% of firms have more than five workers (paid or unpaid), and only 5% have more than 10 workers (paid or unpaid).

Few firms use sophisticated production methods. Only 18% have electricity, 14% have water from a public source, and 2% use a fixed line phone. Approximately 43% of firms have or use a calculator, about 5% have or use a car, and only 2% have or use factory machinery. In addition, only approximately 14% of the firms use a business bank account, and only 6% of firm owners use a personal bank account.

Most firms are also informal; only 15% of owners said they have registered their firm with any government agency. Furthermore, most have only registered with their local government. Only 5% have done so with the national tax authority (Zambia Revenue Authority) and only 8% with the company registrar (Patents and Companies Registration Office).[11]

Therefore, the ZBS is different from other Zambian surveys such as the Regional Program for Enterprise Development (RPED) surveys and the World Bank's Enterprise Surveys (WBES) that have focused on larger formal firms. The 2013 WBES, for example, explicitly excluded informal enterprises (WorldBank, 2009).[12] As a result, the firms are far larger than those in the ZBS; the mean and median number of employees are 54 and 15, respectively. Only 10% of ZBS firms have more than five employees, which is the minimum size for the WBES. The earlier RPED survey also focused on larger enterprises; the mean and median numbers of employees are 85 and 23, respectively (Van Biesebroeck, 2005).[13] Although the RPED survey included a few informal enterprises, the survey did not sample them systematically.[14]

4.1.1 The Zambian context

Zambia is a low-income country characterized by high rates of self-employment and entrepreneurial aspirations.[15] According to a Global Entrepreneurship Monitor 2013 Global Report, in 2013, 40% of individuals were involved in total early-stage entrepreneurial activity, but less than half that number (16.6%) actually established a business. This suggests that much of the entrepreneurship in Zambia is informal. Although there is some variation over

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[8] See Clarke et al. (2010) for a more detailed description of the survey.

[9] The data in this section refer to the non-agricultural firms in the survey that the empirical work focuses on.

[10] Consistent with the idea that the estimates are imprecise, most estimated that self-consumption was a round number. Almost half said either 20, 30 or 40% of output.

[11] Moreover, because this information is self-reported, it probably overestimates registration.

[12] Moreover, the sample is based on a sampling frame given by the Zambia Central Statistical Office, which also implicitly excludes informal firms.

[13] Biggs and Shah (2006), for example, use these data.

[14] Van Biesebroeck (2005) reports that the "selection of informal firms was generally left to the interviewers" (p. 549).

[15] https://www.gemconsortium.org/economy-profiles/zambia

time, the long-term trends are relatively stable. According to the Observatory of Economic Complexity,[16] two of Zambia's largest trading partners are South Africa and the Democratic Republic of Congo. However, Zambia has even larger trading relationships with Switzerland and China. As a result, there is significant intraregional trade, but trading relationships do extend beyond the continent. Zambia's largest export is copper, both raw and refined, but Zambia also exports raw tobacco and postage stamps. According to the Global Entrepreneurship Index 2018 report,[17] Zambia also ranks 102 out of 137 countries, which places it in the bottom quartile of the rankings. Zambia's GDP is approximately 70 billion in US dollars, and its GDP per capita in 2017 dollars is approximately \$4000 (in terms of purchasing power parity (PPP)). Based on 2015 data, 54.4% of the population are below poverty.[18] Furthermore, according to most estimates,[19] Zambia's informal sector employs approximately 90% of its labor force. For these reasons, Zambia is a good laboratory to study the relationship between social capital and productivity because social capital matters more when information asymmetries between lenders and borrowers and between customers and the entrepreneur are particularly high, which is often the case in developing countries with underdeveloped financial and regulatory systems (Cestone & White, 2003; Galor & Zeira, 1993).

4.1.2 Measuring social capital

We consider entrepreneurs to have high social capital if they are members of an association. Our operationalization of social capital is consistent with the literature. For example, Benson and Clay (2004) use the frequency of church attendance and marital status as measures of social capital. Many other studies use the size of the network as a measure of social capital (e.g., Fafchamps & Minten, 2002; Granovetter, 2018;

Kreiser et al., 2013). For Stam et al. (2014), who conducted a meta-analysis of 61 independent samples to examine the effect of social capital on performance, the measure for social capital is the size and intensity of networks.

The variables that most interest us measure the owners' social capital. We measure social capital using a dummy, *Any association,* coded 1 if the owner belongs to any association and 0 otherwise. Associations can be business or non-business associations.[20] Non-business associations include churches, religious groups, political parties, women's or men's groups, social clubs, and sports clubs. Owners who belong to these might use them to meet potential customers or employees or people who can help them with commercial or technical issues. Owners who belong to these groups might also meet people who can help them obtain trade or bank credit.

Approximately 67% of the firm owners belong to social groups, while only about 5% belong to business associations. Owners who belong to business associations are more likely to also belong to a social group than other owners (86% compared with 66%).

Table 1 reports the summary statistics. Approximately 6.6% of the firms in our sample obtain credit from suppliers, and approximately 31.2% provide credit to customers. Less than 3% obtain a loan from banks, and approximately 5.6% obtain loans from family and friends.

Firms with owners who belong to business associations and social groups are 3.2% more likely to have received loans from friends and family than firms with owners who did not belong to such groups. The difference is statistically significant at a 5% significance level. Firms with owners who belong to business associations and social groups are also 6.8% more likely to provide credit to customers, are 2.5% more likely to receive credit from suppliers, and have 5.9 more customers on average when compared to firms with owners who do not belong to such groups. These differences are statistically significant at a 5% significance level, but there is no statistical difference between these firms for bank loans.

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[16] https://oec.world/en/profile/country/zmb/

[17] https://thegedi.org/downloads/

[18] https://www.cia.gov/library/publications/the-world-factbook/geos/za.html

[19] https://www.theigc.org/wp-content/uploads/2012/06/Kedia-Shah-2012-Working-Paper.pdf

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[20] In additional robustness checks, we separate this variable into business and non-business associations. Both measures are dummy coded (1 = yes; 0 = no).

Table 1 Sample means for dependent and independent variables

	Mean	Std. Dev	Min	Max
Productivity				
Labor Productivity (log)	14.6	1.8	3.5	23.6
Social capital				
Any association (dummy)	0.680	0.466	0.000	1.000
Non-business association (dummy)	0.670	0.470	0.000	1.000
Business association (dummy)	0.051	0.219	0.000	1.000
Mediators				
Number of customers (log)	4.1	1.2	1.6	6.9
Obtains credit from suppliers (dummy)	0.066	0.249	0.000	1.000
Provides credit to customers (dummy)	0.312	0.463	0.000	1.000
Loan from bank (dummy)	0.024	0.153	0.000	1.000
Loan from friends/family (dummy)	0.056	0.231	0.000	1.000
Firm characteristics				
Founder has university education (dummy)	0.069	0.254	0.000	1.000
Founder has vocational education (dummy)	0.064	0.244	0.000	1.000
Founder has secondary education (dummy)	0.513	0.500	0.000	1.000
Firm age (log)	1.6	0.9	0.0	4.6
Firm is in urban area of district (dummy)	0.457	0.498	0.000	1.000
Age of entrepreneur (log)	3.6	0.3	2.8	4.5
Has bank account (dummy)	0.056	0.231	0.000	1.000
District characteristics				
Population density (log)	4.3	2.2	1.1	8.5
Illiteracy rate (percent of population)	30.4	14.0	10.7	66.4
Sectors				
Retail trade (dummy)	0.745	0.436	0.000	1.000
Manufacturing (dummy)	0.096	0.294	0.000	1.000
Other services	0.151	0.358	0.000	1.000
Other (dummy)	0.008	0.089	0.000	1.000

Data are weighted sample means and standard deviations

Owners who belong to a business association or social group are also more likely to provide customers with credit and to receive credit from suppliers. Approximately 36% of members provide credit to customers, and 8% of members receive credit from suppliers. In comparison, only 31% of non-members offer credit, and only 5% receive credit. The differences are statistically significant. In contrast, firms with owners who are members do not have more customers than firms whose owners are not. The median firm in both groups reported between 11 and 50 customers in a month.[21]

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[21] Owners responded with ranges rather than exact numbers. The ranges are 0 customers, 1 to 5 customers, 6 to 10 customers, 11 to 50 customers, 51 to 100 customers, 101 to 500 customers, 501 to 1,000 customers, and over 1,000 customers.

4.1.3 Measuring productivity

We measure productivity as the ratio of sales to the number of workers. This measure is a simple, elegant, and legitimate measure of productivity. Bloom et al. (2010) use the ratio of sales to the number of workers to understand why productivity is lower among manufacturing firms in developing economies. Because of its simplicity and understandability, this is a common measure of productivity (Mahmood, 2008). In additional robustness checks (Table A2 in the online appendix), we show that different assumptions regarding how to treat part-time and unpaid workers do not affect the results. Our results are robust when excluding firms with any part-time workers or any unpaid workers as well as counting each part-time worker as half a worker.

Table 2 Sample pairwise correlations for main variables

	Labor Prod	Any assoc	Business assoc	Non-bus assoc	Number of customers	Credit from suppliers	Credit to customers	Loan from bank	Loan from friends	Founder has univ. ed
Labor productivity (log)	1.000									
Any association (dummy)	0.113***	1.000								
Business association (dummy)	−0.034	0.164***	1.000							
Non-business association (dummy)	0.118***	0.980***	0.069***	1.000						
Number of customers	0.174***	0.078***	0.026	0.069***	1.000					
Obtains credit from suppliers (dummy)	0.046*	0.051**	0.103***	0.043*	−0.021	1.000				
Provides credit to customers (dummy)	0.081***	0.055**	0.033	0.047**	0.088***	0.192***	1.000			
Loan from bank (dummy)	0.066***	0.029	0.172***	0.013	0.047*	0.082***	0.038*	1.000		
Loan from friends/family (dummy)	−0.029	0.052**	0.058***	0.055**	0.038	0.019	−0.011	0.039*	1.000	
Founder has university education (dummy)	0.144***	0.093***	0.092***	0.077***	0.045*	0.045**	−0.023	0.210***	−0.003	1.000
Founder has vocational education (dummy)	0.046*	0.029	0.079***	0.016	0.011	0.065***	−0.045**	0.057***	0.033	−0.077***
Founder has secondary education (dummy)	0.092***	−0.001	−0.055**	0.012	0.057**	0.016	0.043**	−0.079***	−0.040*	−0.300***
Firm age (log)	0.027	0.086***	0.057**	0.074***	−0.021	0.046**	−0.023	−0.014	−0.014	−0.057**
Firm is in urban area of district (dummy)	0.209***	0.117***	−0.001	0.117***	0.075***	0.067***	0.034*	0.065***	0.011	0.123***
Age of entrepreneur (log)	−0.044*	−0.000	0.021	−0.005	−0.109***	0.017	−0.058***	0.027	−0.024	0.012
Has bank account (dummy)	0.048**	0.06***	−0.003	0.063***	0.045*	0.008	−0.046**	0.067***	−0.001	0.218***
Population density (log)	0.192***	−0.018	−0.024	−0.016	0.117***	−0.001	0.143***	0.045**	−0.024	0.054***
Illiteracy rate (percent of population)	−0.231***	0.120***	0.075***	0.125***	−0.064***	0.009	−0.171***	−0.022	0.003	−0.020
Retail trade (dummy)	0.027	0.009	−0.099***	0.020	0.173***	−0.010***	0.003	−0.142***	−0.008	−0.117***
Manufacturing (dummy)	−0.031	−0.072***	−0.009	−0.070***	−0.112***	0.036	−0.009	0.000	−0.001	−0.040*
Other services (dummy)	−0.024	0.017	0.036*	0.012	−0.035	0.071***	0.025	0.025	0.019	0.090**
Other (dummy)	0.000	0.043**	0.117***	0.030	−0.106***	0.070***	−0.005	0.166***	0.006	0.139***

Table 2 (continued)

	Founder has voc. ed	Founder has sec. ed	Age of entre	Has bank account	Population density	Illiteracy rate	Retail trade	Manufact	Other services	Other
Founder has vocational education (dummy)	1.000									
Founder has secondary education (dummy)	−0.237***	1.000								
Firm age (log)	0.023	−0.078***								
Firm is in urban area of district (dummy)	0.073***	0.091***								
Age of entrepreneur (log)	0.0659***	−0.1277***	1.0000							
Has bank account (dummy)	0.0986***	−0.0232	0.0388*	1.0000						
Population density (log)	0.0344	−0.0044	−0.0162	−0.0224	1.0000					
Illiteracy rate (percent of population)	−0.0144	−0.0224	0.0244	0.0654***	−0.7342***	1.0000				
Retail trade (dummy)	−0.1107***	0.102***	−0.0593***	−0.0531**	−0.0333	0.0262	1.0000			
Manufacturing (dummy)	−0.0103	−0.0429**	0.0589***	0.0067	−0.0418**	−0.0107	−0.5491***	1.0000		
Other services (dummy)	−0.0287	−0.0153	0.0368*	0.0224	0.0004	−0.0014	−0.189***	−0.0388*	1.0000	
Other (dummy)	0.1534***	−0.082***	0.0121	0.0531***	0.078***	−0.0266	−0.7051***	−0.1447***	−0.0498**	1.0000

***, **, *Sign at 1%, 5%, and 10% levels

4.1.4 Control variables

We include several variables to control for characteristics of the owner, the firm, and the community where the firm operates. We control for the age, experience, and education of the owner. *Age of entrepreneur* is measured as the natural log of the business owner's age. Firms with older owners might perform better if the age of the owner is a reasonable proxy for experience. Previous studies using enterprise-level data for Sub-Saharan Africa indicate that firms perform better when the owner is better educated (Biggs et al., 1998; Ramachandran & Shah, 1999). Therefore, we include measures of the owner's education. *University education* is coded 1 if the owner has a university education and 0 otherwise. *Vocational education* is coded 1 if the owner has a vocational education and 0 otherwise. *Secondary education* is 1 if the owner has a secondary education and 0 otherwise. The omitted category is primary education or less. *Has bank account* is coded 1 if the owner has a personal bank account and 0 otherwise. Possessing a personal bank account is a signal that the manager is financially sophisticated, which should hopefully translate to better firm management. We include the age of the firm as another control. *Firm age* is measured as the natural logarithm of the age of the firm.

For our mediating analysis, we also include firm financing variables and information on the customer base. *Number of customers* is measured as the natural logarithm of the firm's number of customers. *Obtains credit from suppliers* is coded 1 if credit is received from suppliers and 0 otherwise. *Provides credit to customers* is coded 1 if the business provides credit to customers and 0 otherwise. *Loan from bank* is coded 1 if the firm has received a loan from a bank and 0 otherwise. *Loans from friends and family* is coded 1 if the firm has received a loan from a friend or family member and 0 otherwise.

In addition to owner and organization attributes, it is important to capture regional variation that might influence small business performance. We include several regional-level variables to control for agglomeration effects. *Firm is in urban area of district* is coded 1 if the region is categorized as either urban or peri-urban and 0 otherwise. This designation is based on the classification in the 2000 census, which was used for sampling. This is used as a proxy for the potential presence of economies associated with agglomeration (e.g., Audretsch et al. (2015). *Population density* is measured as the population per square kilometer. The population density is included as an additional measure of the agglomeration effects. When firms are close to customers, workers and

suppliers, they might find it easier to share knowledge or pool capital, intermediate inputs, and labor. Agglomeration could also improve matching between firms and their customers, suppliers, and workers. *Illiteracy rate* is the measured rate of illiteracy. It is included because it might potentially affect knowledge sharing. Finally, we included several dummy variables for information on sectors: retail, manufacturing, services, and other.

We observe several relationships in the data according to the correlation matrix in Table 2. We observe that our measure of social capital, *any association*, is positively correlated with labor productivity. However, the correlation appears to be driven by the non-business association rather than by membership in a business association. Firms that have more customers also appear to be more productive, and all measures of financing except for bank loans are positively correlated with labor productivity. We also observe a positive correlation between business associations and non-business associations, but it is small in magnitude (r=0.069). This suggests that those who belong to one type of association are more likely to belong to the other, but there is also variation in the data.

The empirical model can be formally stated as follows:

$$DV = \beta_0 + \beta_1 SC + \sum_{i=1}^{7} \gamma_i FC_i + \sum_{j=1}^{2} \delta_j DC_j + \mu_k + \varepsilon \tag{1}$$

where DV denotes the dependent variable (provides credit to customers, gets credit from suppliers, loan from friends/family, loan from bank, number of customers (log), labor productivity), SC denotes the measure of social capital, FC is a vector of firm characteristics (owner has university education, owner has vocational education, owner has secondary education, firm age (log), firm is in urban area, age of entrepreneur, firm has bank account), DC is a vector of district characteristics (population density, illiteracy rate), μ is a set of industry fixed effects, and ε is the stochastic error term. Depending on the dependent variable, the regression model is either estimated by probit regression, interval regression, or ordinary least-squares (OLS) regression. For models with binary-dependent variables (i.e., provides credit to customers, gets credit from suppliers, receives loan from friends/family, receives loan from bank), we estimate the model using probit regression. For the model with the number of customers (log), we estimate the model using interval regression, and for labor productivity, we use OLS regression.

5 Results and discussion

5.1 Regression results

Representing the beginning of the empirical analysis, Table 3 presents the main findings with respect to the financing variables—credit to customers (Model 1), credit from suppliers (Model 2), loans from friends and family (Model 3), and loans from banks (Model 4)—as well as the number of customers (Model 5) and labor productivity (Model 6). Except for bank loans, social capital has a positive and statistically significant coefficient in all models. The findings in Table 2 indicate that founders who belong to associations are more likely to provide credit to customers ($\beta=0.196$; $p<0.01$), receive credit from suppliers ($\beta=0.203$; $p<0.05$), receive loans from friends and family ($\beta=0.278$; $p<0.01$), have more customers ($\beta=0.155$; $p<0.05$), and have higher labor productivity ($\beta=0.350$; $p<0.01$). In contrast, belonging to an association does not affect one's likelihood of receiving a bank loan ($\beta=-0.05$; $p>0.10$). Because we include several control variables in our reduced form analysis, we conclude that these relationships are highly robust. For example, these relationships are robust to the inclusion of several firm characteristics including the entrepreneur's level of education—university, vocation, or secondary—as well as the age of the firm, the age of the entrepreneur, and whether or not the firm is located in an urban area. These findings are also robust to the inclusion of district characteristics—population density and the illiteracy rate—as well as industry fixed effects.

More than merely statistical significance, we also observe large effect sizes for most of these relationships. The results (summarized in Table A1 in the online appendix) suggest that compared to those who do not belong to an association, those who belong to an association are 6.8% more likely to provide credit to customers, 2.5% more likely to receive credit from suppliers, and 3.2% more likely to receive loans from friends and family and have 5.9 more customers on average.

5.2 Structural equation modeling (SEM) analysis

Our results establish that social capital affects credit from suppliers, credit to customers, loans from friends and family, the number of customers, and labor productivity. We now turn our attention to the main contribution of our study: investigation of the possible mediating channels of firm financing and the customer base.

Table 3 Social capital, financing and customer base mediators, and labor productivity

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation method	Probit	Probit	Probit	Probit	Interval	OLS
Dependent variable	Provides credit to customers	Gets credit from suppliers	Loan from friends/ family	Loan from bank	Number of customers (log)	Labor Productivity
Social capital						
Any association	0.196***	0.203**	0.278***	−0.050	0.155**	0.350***
	(3.11)	(2.01)	(2.81)	(−0.37)	(2.20)	(4.22)
Firm characteristics						
Owner has university education (dummy)	−0.188	0.239	−0.146	0.859***	0.372***	1.059***
	(−1.54)	(1.36)	(−0.83)	(4.54)	(2.84)	(6.58)
Owner has vocational education (dummy)	−0.223	0.435**	0.119	0.346	0.268*	0.635***
	(− 1.53)	(2.32)	(0.64)	(1.43)	(1.75)	(3.36)
Owner has secondary education (dummy)	0.042	0.237**	−0.239**	−0.013	0.198***	0.475***
	(0.63)	(2.19)	(−2.38)	(−0.08)	(2.65)	(5.43)
Firm age (log)	0.003	0.091*	−0.034	−0.006	0.069*	0.154***
	(0.08)	(1.81)	(−0.68)	(−0.09)	(1.85)	(3.50)
Firm is in urban area (dummy)	−0.026	0.255***	0.088	0.307**	−0.062	0.497***
	(−0.39)	(2.58)	(0.88)	(2.16)	(−0.83)	(5.58)
Age of entrepreneur (log)	−0.236**	−0.078	−0.196	0.014	−0.538***	−0.363**
	(− 2.12)	(−0.45)	(− 1.15)	(0.06)	(− 4.33)	(− 2.48)
Has bank account	−0.155	−0.085	0.039	0.076	0.393***	0.037
	(−1.10)	(−0.44)	(0.20)	(0.35)	(2.69)	(0.21)
District characteristics						
Population density	0.025	−0.040	−0.076**	0.021	0.089***	−0.052*
	(1.10)	(−1.18)	(−2.16)	(0.47)	(3.52)	(−1.68)
Illiteracy rate	−0.016***	−0.002	−0.007	0.002	−0.001	−0.035***
	(−4.59)	(−0.42)	(−1.41)	(0.28)	(−0.18)	(−7.99)
Constant	0.634	−1.642**	−0.359	−2.606***	5.017***	16.306***
	(1.45)	(−2.42)	(−0.54)	(−2.80)	(10.34)	(28.31)
Sector (industry) dummies	Yes	Yes	Yes	Yes	Yes	Yes
observations	1,954	1,844	1,971	1,971	1,539	1,609
R-squared	0.0363	0.0477	0.0227	0.154	--	0.150

This table presents the reduced form regressions. Columns 1–4 report estimates from a probit model. In column 1, the dependent variable is *Provides credit to customers,* an indicator variable that is equal to one if the owner provides credit to customers and zero otherwise. In column 2, the dependent variable is *Gets credit from suppliers*, which is equal to one when the owners get credit from suppliers and zero otherwise. In column 3, the dependent variable is *Loan from friends/ famil*y, which is equal to one when the owners get credit from family and friends and zero otherwise. In column 4, the dependent variable is *Loan from bank*, which is equal to one when the owners get loans from banks and zero otherwise. Column 5 reports coefficients of interval regression. The dependent variable is the *Number of customers (log)*, the natural logarithm of the number of customers. In the survey, the number of customers is reported as a range. As a result, we estimate the model as an interval regression, which is generalization of the Tobit model (Stata, 2007). We use the command 'intreg' in Stata, which is described in detail in the Stata base reference manual. Column 6 reports the coefficient of OLS regression where the dependent variable is *Labor Productivity*, the natural log of ratio of sales to the number of workers. *Any association,* coded one if the owner belongs to any association and 0 otherwise. *Owner has university education (dummy)* is one if the owners have a university education and zero otherwise. *Owner has vocational education (dummy)* is one if the owner has vocation education and zero otherwise. *Owner has secondary education (dummy)* is one if the owner has secondary education and zero otherwise. Firm Age (log) is the natural logarithm of the firm's age. *Firm is in urban area (dummy)* is one if the firm is in an urban area and zero otherwise. *Age of entrepreneur (log)* is the natural logarithm of the age of the entrepreneur. *Has Bank Account* is one if the entrepreneur has a bank account. *Population density* is measured as the population per square kilometer of the district in which the firm is located. *Illiteracy rate* is the illiteracy rate of the district. In parentheses are t-statistics based on robust standard error. The ***, **, * denote significances at the 1%, 5%, and 10% levels, respectively
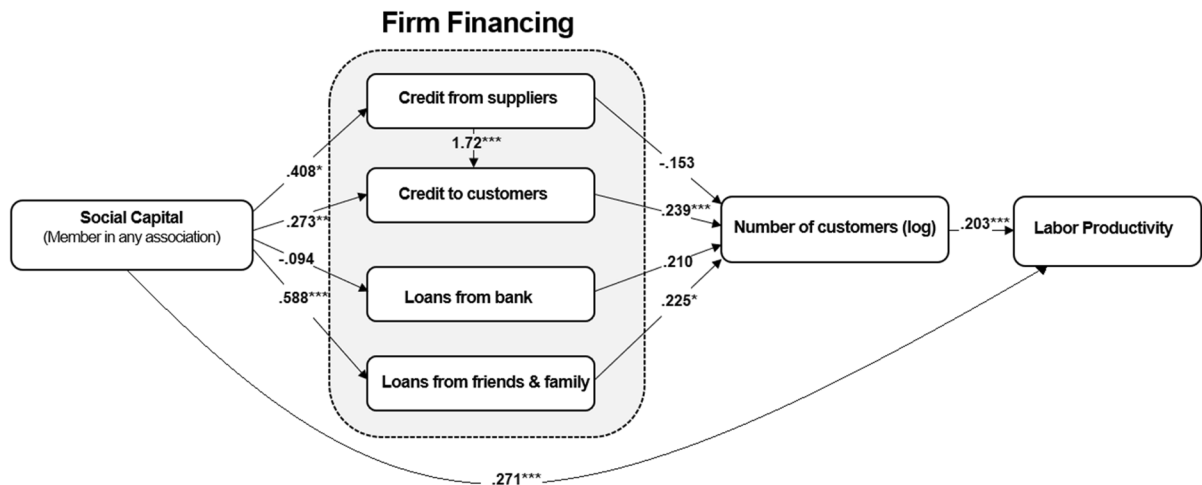
Fig. 1 SEM Model. *Note.* The model includes all basic controls from Table 2 and was estimated using Stata's GSEM command using maximum likelihood $N = 1,971$. ***$p < .01$. **$p < .05$. *$p < .10$

To test our mediating hypotheses, we use SEM analysis to investigate the multiple channels through which social capital can influence labor productivity. SEM is useful because it allows for investigation of both the direct and indirect effects in a model (Hoyle, 1995), and it allows for the errors in the structural equations to be correlated with each other (Shaver, 2005). In this analysis, we examine a direct path from social capital to labor productivity as well as an indirect path via financing channels and the firm's customer base. SEM allows us to examine whether and to what extent these indirect paths mediate the relationship between social capital and labor productivity. In the SEM analysis, we include but do not report all control variables from Table 3. In addition, to ease interpretation, we standardize all coefficients in the SEM analysis (see Fig. 1 and Table 4).[22]

The results provide strong support for many of the hypothesized relationships. First, there is a direct relationship between social capital and labor productivity ($\beta = 0.271$; $p < 0.01$). Second, there is an indirect relationship that runs from social capital to firm financing, which in turn affects the number of customers and ultimately labor productivity. More specifically, social capital positively affects credit from suppliers ($\beta = 0.408$; $p < 0.10$), credit to customers ($\beta = 0.273$; $p < 0.05$), and loans from friends and family ($\beta = 0.588$; $p < 0.01$). Consistent with the results in Table 2, we do not observe any relationship between social capital and bank loans ($\beta = -0.094$; $p > 0.10$). Next, credit from suppliers has a positive effect on credit provided to customers ($\beta = 1.72$; $p < 0.01$). In turn, credit provided to customers ($\beta = 0.239$; $p < 0.01$) and loans from friends and family ($\beta = 0.255$; $p < 0.10$) both positively influence the number of customers. Finally, the number of customers positively influences labor productivity ($\beta = 0.203$; $p < 0.01$).

In the SEM model, we have to include the number of customers as a continuous variable rather than a range (i.e., as an interval). In the main results, we use the top of the range as the variable. In practice, however, the results are not highly sensitive to other points in the range. In particular, the results are similar in terms of size and significance of the results if we use the bottom of the range instead of the top.

Table 4 summarizes the direct and indirect channels through which social capital influences firm labor

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[22] We use the GSEM command in Stata because several important dependent variables including social capital are binary. This means that we cannot present standard goodness of fit measures. The main problem is that Stata does not calculate standard goodness of fit statistics for GSEM models because many standard goodness of fit measures are inappropriate for models with binary variables. Most notably, the chi-squared statistic assumes multivariate normality, which is violated in models with binary variables. When we estimate the model ignoring that many dependent variables are not continuous, however, the simpler model produces similar results to our main model. For this model, we can calculate several goodness of fit measures. Despite the obvious specification problems due to assuming continuity, the model performs relatively well. The root mean square residual is 0.03, the comparative fit index is 0.982, and the standard root mean square residual is 0.01. The Tucker-Lewis index, however, falls a little short of standard benchmarks (0.78).

productivity. The largest indirect effect[23] runs (β=0.034) from social capital to credit from suppliers, which in turn influences the credit given to customers, which then influences the number of customers and ultimately labor productivity. This indirect channel accounts for 9.4% (0.034/0.362) of the total effect. We also observe an indirect effect running from social capital to credit to customers, which then influences the number of customers and ultimately labor productivity. This indirect channel accounts for 4% (0.013/0.362) of the total effect. Next, we observe an indirect effect running from social capital to loans from friends and family, which in turn influences the number of customers and ultimately labor productivity. This indirect channel accounts for 7% (0.027/0.362) of the total effect of social capital.

We find no evidence that loans from banks mediate the association between social capital and productivity. One explanation is that while banks rely on soft information, they also need some level of hard information. For example, they are likely to ensure the business is registered with the government. As previously indicated, only 15% of owners are registered with any government agencies. Therefore, it is not surprising that less than 4% of owners have a bank loan. It is possible that those who are members of a business organization are more likely to be registered. Indeed, the supplemental analysis (available in the online appendix) indicates that when owners are members of a business organization, they are significantly more likely to receive a loan.

Our results also suggest that the mediating effect of accounts payable comes mainly from increasing the likelihood of extending credit to consumers. To calculate the proportion mediated, we follow Alwin and Hauser (1975) and the literature on "inconsistent" mediation (i.e., when paths have opposite signs), such as that by MacKinnon et al. (2007). This literature suggests that researchers take the absolute value of all path coefficients prior to summation.[24] Overall, 25.14% of

the relationship between social capital and labor productivity is mediated by these financing and customer channels.[25]

5.3 Robustness checks

We conduct a variety of robustness tests to check the sensitivity of the association between social capital and labor productivity. We present these results in an online appendix but briefly summarize them here. Our first check is to assess whether treating the relationship between social capital and productivity as endogenous affects our results. The results using the instrumental variable approach are quantitatively similar to the OLS results.

The instruments we use for social capital are the percentage of the district's business owners who speak the same main language as the owner and the percentage of the district's business owners who belong to business and non-business groups. Owners who speak the same language as other business owners in the same district might be more likely to join these organizations than other owners are. Similarly, owners might be more likely to join groups when other owners in the same district also belong to these groups. We do not expect that these instruments, which are based on other firms in the district rather than the specific firm, directly affect the firm's productivity.[26]

Hypothesis tests suggest the instruments work well; they are strongly correlated with social capital and uncorrelated with productivity. The first-stage partial F-stat is 200.7—much larger than the 5% critical value of 19.93—suggesting the instruments are strong. Additionally, because we have two instruments, we could test the over-identifying assumption. The Sargan $\chi2(1)$ is 0.01 (p-value=0.92), meaning that we cannot reject the null hypothesis that the instruments are valid. An additional test

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[23] Indirect effects are calculated by multiplying all coefficients along the path of analysis. For example, we calculate the indirect effect of social capital on labor productivity *through the channel of loans from family and friends* as follows: $(.588 \times .225 \times .203) = 0.027$.

[24] Indirect effect = 0.091 = 0.034 + 0.013 + |−0.013| + |−0.004| + 0.027; total effect = 0.362 = 0.271 + 0.091.

[25] Proportion mediated = indirect effect / total effect (i.e., 25.14% = 0.091 / 0.362).

[26] One remaining concern is that the percentage of other business owners in the same ethnic group might serve as a proxy for ethnicity. If ethnicity affects firm performance due to ethnic business networks, this could be a problem. However, the OLS and 2SLS results are robust to the inclusion of ethnicity dummies or to dropping the percentage of firms in the district with owners of the same ethnicity as an instrument (see the online appendix).

Table 4 Summary of direct and indirect effects

Direct effect	
Social capital → labor productivity	0.271
Indirect effect	
Social capital → credit from suppliers → credit to customers → number of customers → labor productivity	0.034
Social capital → credit to customers → number of customers → labor productivity	0.013
Social capital → credit from suppliers → number of customers → labor productivity	−0.013
Social capital → loans from bank → number of customers → labor productivity	−0.004
Social capital → loans from friends & family → number of customers → labor productivity	0.027
Total Indirect Effect (Σ |Indirect effects |)[a,b]	
Social capital → labor productivity	0.091
Total Effect (Direct + indirect)[c]	
Social capital → labor productivity	0.362
Percent mediated by indirect effects[d]	25.14%

Results based on SEM model from Fig. 1. respectively

[a]We follow Alwin and Hauser (1975) and the literature on "inconsistent" mediation MacKinnon et al. (2007), which suggests researchers use the absolute value of effect sizes when calculating the proportion mediated when some paths have opposite signs

[b]$0.091 = 0.034 + 0.013 + |-0.013| + |-0.004| + 0.027$

[c]$0.362 = 0.271 + 0.091$

[d]$25.14\% = 0.091/0.362$. The ***, **, * denote significances at the 1%, 5%, and 10% levels

of the over-identifying restrictions, the Basmann $\chi 2$ test, produces similar results ($\chi 2(1) = 0.01$, p-value = 0.92).

A Wu-Hausman test fails to reject the null hypothesis that social capital is exogenous (p-value = 0.12). This favors the more efficient OLS estimates over the two stage least-squares (2SLS) estimates. One explanation of why we cannot reject the null hypothesis that social capital is exogenous is that although more successful owners might be more likely to join business groups, they might not be more likely to join social groups. Because more owners belong to social groups than business associations and almost all owners who belong to business associations also belong to social groups, social capital mostly measures social group membership. It might therefore not be endogenous.

The relationship between social capital and labor productivity is also robust to alternative modeling methods, including estimating a least absolute deviations model rather than linear regression. The results in all models are very similar. We estimate our model using paid and unpaid workers together in one model as well as separately. The results are similar either way. Finally, in additional robustness checks, we include ethnic dummies for the founder's ethnicity

following Biggs and Shah (2006). We also include additional sector, industry, and district dummies as well as different categories of firms including informal firms only, microenterprises, retail only, and informal enterprises with no workers. In all models, we observe a positive and statistically significant effect of social capital on labor productivity. While these sensitivity checks say little about the mediating relationships, they suggest that social capital positively influences small business productivity are not sensitive to the modeling methods, sample, and measure of productivity.

6 Conclusion

In this study, we investigate the underlying theoretical mechanisms that mediate the relationship between an entrepreneur's social capital and small business productivity. Using the owner's membership in an association as a measure of social capital, we find that an entrepreneur's social capital improves the productivity of these enterprises in several ways. First, social capital increases access to credit from suppliers and loans from family and friends. Second, social capital increases the likelihood of providing credit to

customers and the size of the firm's customer base. Third, entrepreneurs with more social capital are more likely to receive credit from suppliers, which in turn makes them more likely to extend credit to customers. Thus, social capital can facilitate the acquisition of customers and ultimately productivity by operating through the channels of firm financing. Finally, we find no evidence that membership in associations makes one more likely to receive a bank loan.

6.1 Managerial and policy implications

Our study has several managerial and policy implications. One managerial implication of the study is that entrepreneurs might want to become actively involved in various organizations and associations. Doing so might build social capital, increase access to financing, and attract a larger customer base, all of which might increase small business productivity. Related to this, these social capital effects work in tandem. Investing in one's social capital might benefit entrepreneurs because it affords them greater access to financing through loans from friends and family and trade credit. In turn, this credit could be extended to more customers to expand the firm's customer base. A policy implication is that local governments and organizations might look to encourage greater networking among small business owners and local entrepreneurs. The results suggest that encouraging people to participate in associations can increase small business productivity by allowing better access to credit and building better customer relations. Social capital is generally low in many developing countries. Even developed countries such as the U.S. (Putnam, 2000) have experienced a decline in social capital the last several decades. Therefore, local policymakers must think of new ways to attract individuals from both similar and different backgrounds.

6.2 Contributions to the firm financing literature

This study's important takeaway is how social capital improves informal small business productivity in developing countries by facilitating everyday financing (i.e., from friends, family, and suppliers) but not formal funding (i.e., bank loans). The literature alludes to this possibility because institutions are weak in these countries, and informal business owners often lack the sophistication necessary to obtain loans (Qian & Strahan, 2007). However, we do not know of any formal test that links social capital, informal financial financing, and productivity.

Our work also complements that of Biggs and Shah (2006), who indicate that enterprises owned by people of Asian or European origin are more productive. They use a sample that mostly comprises large formal firms in sub-Saharan Africa. The authors argue that these firms have better access to supplier credit, presumably from their networks, and start as significantly larger enterprises. Our study extends their work by documenting that one does not need to be a member of a specific ethnic group to perform better; membership in any type of association also confers advantages to people regardless of their ethnicity. In our sample, only approximately 3% of firms are owned by people who belong to Asian and European ethnic groups, and our results are robust when we control for this or when we remove such firms from our sample.

6.3 Contributions to the entrepreneurship literature

This article contributes to the literature on social networks and entrepreneurship. This literature documents a strong link between an entrepreneur's social network and the identification of new opportunities (Arenius & De Clercq, 2005; Deller et al., 2018; Elfring & Hulsink, 2003; Ellis & Pecotich, 2001), access to foreign markets (Ellis, 2000; Zhou et al., 2007), firm entry (Bastié et al., 2013; Kim et al., 2006), the accumulation of knowledge and knowledge spillovers (Hayter, 2013; Sapienza et al., 2005), and new venture performance (Brüderl & Preisendörfer, 1998; Cooke & Wills, 1999; Santarelli & Tran, 2013; Westlund & Bolton, 2003). Our study complements these studies. We document how an entrepreneur's social network facilitates small business productivity through the mediating channels of obtaining credit from suppliers, receiving loans from friends and family, increasing the likelihood of extending credit to customers, and increasing the customer base.

More broadly, our study contributes to the social capital literature related to small businesses by documenting the channels by which social capital boosts business development and entrepreneurship (Adler & Kwon, 2002; Bosma et al., 2004; Boudreaux et al., 2018; H. S. Lee, 2017; Ramachandran & Shah, 1999; Ramcharran, 2017; Motta, 2020; Owalla et al., 2019).

While this literature documents that social capital encourages firm performance, we dig deeper into this relationship to uncover the specific mechanisms underlying these relationships.

6.4 Limitations and suggestions for future research

As with any other study, our study has a few limitations that should be addressed by future research. One limitation is its external validity. It is important to note that though our findings rely on data from entrepreneurs in Zambia, they are probably not unique to Zambia and likely extend to other developing economies, but this is left to future research.

This study also raises the possibility of testing other mediating variables. The mediating variables we examine explain approximately 25% of social capital's effect on labor productivity. It is possible that other mediating variables, such as employee turnover, selection, and retention also play a role. Analyzing these additional mediating channels is beyond the scope of our study because of data constraints but would add to our understanding of how social capital improves a small business's productivity.

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