Social Capital and Repayment in Microfinance: Evidence from *Bankomunales* in Colombia

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Abstract

Since its inception, microfinance has positioned itself as one of the leading approaches in the fight against poverty. Without a sound economic performance, however, the widespread and continuation of its programs would be at stake. Across the literature, researchers have long sought to study the relevance of social capital to the performance of microfinance programs. Using data from 60 different *Bankomunales* located in Colombia, this study aims at determining the impact of the structural and cognitive dimensions of social capital on these banks' repayment performance. Regarding the structural dimension, this study presents evidence suggesting that larger groups show a better performance. Similarly, longer required residence time in the community decrease the probability of default. By contrast, *Bankomunales* whose members live in closer proximity, another indicator of the structural dimension, are more likely to have incurred in default. After accounting for community fixed effects, these variables do not have a significant impact on repayment performance. The cognitive dimension, as well as the principal components analysis-based indices for the two dimensions do not to exert a significant impact both after including and excluding district fixed effects.

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1 Introduction

The access to credit and saving accounts from formal banking institutions has always been a challenge for the poor sector of the population across the world. Products that fail to meet the needs of low-income individuals, high interest rates, lack of skills, accessibility and cultural barriers are some of the obstacles to the financial inclusion of the most disadvantaged. Considering this issue, the non-governmental organization "Foundation for Rural Finance" (Fundefir) was established in Venezuela in 2000. Taking the village banking model of FINCA International as an inspiration, Fundefir began to establish communal banks across the nation, called *Bankomunales*. Unlike FINCA and other standard microfinance programs, *Bankomunales* grant loans using members' own savings, offer loans for income and non-income generating activities and distribute dividends according to members' proportion of savings in the bank. However, just as with most microfinance programs, *Bankomunales* rely on resources of social nature to guarantee a sound performance. The sum of these resources is commonly referred to as social capital.

Formally, social capital has been defined as "features of social organization, such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated action" (Putnam, Leonardi, and Nanetti 1994, p.167). Recently, the concept has attracted the attention of researchers, who have used it in an attempt to explain diverse economic outcomes. Particularly prominent has been the analysis of social capital on the performance of microfinance services targeted at the very poor. Ranging from individual microcredit borrowers in villages in Southeast Asia (Dufhues et al. 2011; Dufhues, Buchenrieder, and Quoc 2012), to group lending in Central America (Wenner 1995; Wydick 1999) and village banks in Peru (Karlan 2007), researchers have found social capital to exert a positive influence on diverse financial indicators across microfinance programs. These findings arise not only an intrinsic, but also an extrinsic motivation for the study of social capital. Without a sound performance, microfinance programs would not be sustainable. In turn, the impoverished would not be able to enjoy the opportunity of improving their livelihoods and would remain stuck in a poverty trap of limited access to market, lack of education and barriers to healthcare. Further, badly performing financial programs could prevent the generation and promotion of positive externalities. In practice, these externalities range from increased range of businesses across FINCA-villages in Costa Rica (Perez, Gonzalez, and Aaronson 2011), to the use of contraceptive among non-borrower women in Grameen-villages in Bangladesh (Bernasek 2003).

In the light of the importance of social capital for the economy and society as a whole, it seems pertinent to address the concept and study its impact within the specific scenario of the *Bankomunales*. For this purpose, this thesis focuses on a group of *Bankomunales* operating in Cali, Colombia, a city that boasts the highest number of such communal banks. More specifically, this thesis draws upon the dimensions of social capital to analyze these *Bankomunales*' economic performance. First introduced by Nahapiet and Ghoshal (1998), these dimensions are known as the structural, cognitive and relational dimension. In short, the structural dimension relates to network ties and social interactions among individuals. The cognitive dimension of social capital deals with elements pertaining to shared representation, shared values and system of meanings. Lastly, the relational dimension refers to assets rooted in personal relationships, such as trust, respect and friendship, but also norms and sanctions. Although diverse sets of dimensions have been specified across the literature, Nahapiet's and Ghoshal's classification allows for easy measurement and remains one of the most comprehensive within the framework of social capital. As will be explained in more detail in section 4.1, this thesis focuses solely on the structural and cognitive dimensions of social capital. Using data from a group of *Bankomunales* in Cali, this thesis seeks to answer whether the structural and cognitive dimensions of social capital have an effect on these banks' repayment performance. To the best knowledge of the author, the particular *Bankomunales* model has not yet been studied by any other researcher using econometric techniques. This thesis primarily attempts to fill such gap, while also presenting the first ever analysis on the relationship between social capital dimensions and the financial performance of communal banks in Colombia.

To carry out the empirical analysis, this thesis examines a sample of 60 different *Bankomunales* located across 22 districts of Cali, from which 27 are situated in the northern and 33 in the southern districts. To simplify the data collection process, information on the dimensions of social capital and repayment performance are collected from primary sources in the form of a survey. This survey is directed at one representative member from each Bankomunal, who is the chairperson and represents the authority of the bank. For the analysis, this thesis uses a logistic model in order to test the impact of the dimensions of social capital on the probability of default in the studied *Bankomunales*. To correct endogeneity problems common to the research on social capital, the analysis further introduces a fixed effects model to account for unobserved heterogeneity at the community level. Additionally, this study also builds an index for each dimension of social capital by means of a principal component analysis (PCA).

As previously stated, this thesis focuses on the dimensions of social capital as devised by Nahapiet and Ghoshal (1998). To account for them, this thesis draws upon measurements used

by earlier studies and formulates survey questions adapted to the context of the *Bankomunales* model. That is, while it employs proxy indicators put forward by other researchers in order to measure the structural and cognitive dimensions of social capital, this study also introduces proxies that display some of the *Bankomunales*' unique features, as shall be explained in section 3.1.

The results are somewhat consistent with the theory of social capital. In particular, this thesis found the structural dimension of social capital to exert a significant effect on repayment performance across *Bankomunales*. The three significant proxy indicators for this dimension were: residence time in the community, group size and geographical proximity. Specifically, an increase in the required residence time in the community by one month is associated with a decrease in the probability of a default case by 0.7 percentage points. Similarly, an additional member is expected to decrease the probability of a default case by 3.9 percentage points. On the other hand, the probability of a default case is expected to increase by 19.6 percentage points for *Bankomunales* whose members live 1 km or less away from each other.

After accounting for common variation within districts, the variables of residence time, group size and geographical proximity ceased to display significant effects. Similarly, running a PCA did not result in significant results, both after including and excluding district fixed effects. Overall, the cognitive dimension of social capital showed no significant impact on repayment performance.

This thesis contributes to the emerging literature on social capital. Particularly, it uses the concept to study one of the leading concerns in microfinance schemes: repayment performance. Some of the literature in this regard include Zeller (1998), who studies the effect of groups' social cohesion on the repayment rate of different lending programs in Madagascar. Similarly, Wydick (1999) examines the contribution of social ties in the mitigation of asymmetric information issues within borrowing groups from Guatemala. Drawing from a more general measure of social capital, Karlan (2007) analyzes the extent to which geographic proximity and cultural homogeneity influence the repayment performance of a group of village banking associations in Peru. Within this strand of literature, this thesis is one of the few to adopt more specific measures of social capital. More specifically, this thesis stands out from the mentioned studies by formally addressing the impact of the structural and cognitive dimensions of social capital on loan repayment. By this token, and in terms of study design, this thesis draws closer to the approach followed by van Bastelaer and Leathers (2006), Liang et al. (2015), and Yu and Nilsson (2018). For the latter two studies, the authors perform a cross-sectional analysis on a small database of 147 and 60 Chinese farmer cooperatives, respectively. They distributed a

survey directed at the chairperson from each cooperative, with survey questions measuring the structural, cognitive and relational dimensions of social capital. Similar to this thesis' findings, both studies find structural social capital to exert a significant and powerful impact on cooperatives' economic performance. However, unlike this thesis, these studies relied on overwhelmingly subjective information, as questions were designed to solely capture the chairperson's views and opinions. Accounting for this flaw, the present thesis considers both the respondent's perception and measurable elements that do not depend on his or her views. Similarly, van Bastelaer and Leathers (2006) use cross-sectional data gathered from 55 farmer lending groups in southern Zambia to investigate the impact of the structural and the cognitive dimensions of social capital on the repayment rates of these collectively liable groups. As opposed to van Bastelaer's and Leathers', this thesis provides empirical evidence suggesting that group size, an indicator of structural social capital, improves repayment performance. On the other hand, this thesis addresses the issue of endogeneity common to the analysis on social capital by including district fixed effects. Such issue was mentioned but not dealt with in the work of van Bastelaer and Leathers. Furthermore, in contrast with the mentioned literature, this thesis further expands the econometric analysis by reducing the dimensionality of the social capital-related data and building PCA-based indices for the structural and cognitive dimensions. The remainder of the thesis is structured as follows. Section 2 delves into the literature on social capital and default. Section 3 introduces the institutional context and data employed in the study. Section 4 specifies the econometric analysis, while section 5 presents the results. A subsequent discussion is carried in section 6. Finally, section 7 states the concluding remarks.

2 Social Capital and Default

Literature on the subject of social capital has been growing recently, with its research scope broadening to encompass the fields of political science and economics. However, the notion of social capital is still fairly young. In their book, Making Democracy Work, Putnam, Leonardi and Nanetti (1994) first brought the concept to the public eye. They defined social capital as features of social organizations that improve efficiency and facilitate coordinated action. As noted in their book: "Like other forms of capital, social capital is productive, making possible the achievement of certain ends that would not be attainable in its absence (…)" (p. 167). Since this groundbreaking work, a number of authors have sought to further develop the concept, distinguishing between different dimensions. Here, the literature identifies a wide range of them, such as formal and informal (Pichler and Wallace 2007), bonding, bridging and linking social capital (van Oorschot, Arts, and Gelissen 2006) and strong and weak ties (van Der Gaag and Webber 2008). Yet, some of the most recognized and widely implemented dimensions in the research of social capital were devised by Nahapiet and Ghoshal (1998). These are the structural, cognitive and relational dimensions.

The structural dimension refers to networks of relations. More specifically, it alludes to the pattern of connections between individuals and relates to the existence or lack of social ties among them (Nahapiet and Ghoshal 1998). Given the central role that individuals' social networks play for this dimension, structural social capital is furthermore argued to facilitate the access to diverse parties, allowing them to combine and exchange knowledge. In general, this dimension is considered to be relatively more tangible and externally observable than the cognitive and relational dimensions. On the other hand, the relational dimension describes the kind of relationship individuals have garnered with one another through repeated social interactions (Nahapiet and Ghoshal 1998). In this sense, this dimension pertains to assets that stem from these relationships such as values of trust, respect and friendship (Gooderham 2007; Yu and Nilsson 2018), but also sanctions and norms (Ali-Hassan 2009; Edelman et al. 2009). Finally, the cognitive dimension is embodied in attributes of shared representation, interpretation and system of meanings among groups (Nahapiet and Ghoshal 1998). Overall, these attributes facilitate a common understanding of groups' collective goals and enable the pursue of beneficial collective actions (Tsai and Ghoshal 1998). Thus, most of the existent literature has focused on the extent to which values and vision are shared and pursued by members within groups to measure this dimension (Andrews 2010; Liang et al. 2015).

The specific elements pertaining to each dimension are summarized in Figure 1 of Appendix A. As stated in the introduction, this thesis focuses only on the structural and cognitive dimensions and shall refer solely to them from this point forth.

By its very nature, the concept of social capital and the dimensions attributed to it, has been used to study the formation and performance of organizations that rely primarily on social connections. Although at times not specifically addressed as the structural and cognitive dimensions, a number of authors have long recognized the significance of social capital-related elements that could be classified under each dimension according to the specifications provided above.

Studying a cluster of farmer organizations in Sri Lanka, Uphoff (2000) found that encouraging social interactions and reinforcing shared values of cooperation and solidarity, improved collective action between groups, as well as production and resource usage efficiency. Other researchers have noted the impact of social interactions on individuals' abilities to access resources and/or gain information (Gómez-Limón, Vera-Toscano, and Garrido-Fernández 2014; Tsai and Ghoshal 1998). Similarly, the extent of shared meaning, goals and values has proven successful in improving buyer/supplier performance across firms (Hult, Ketchen, and Slater 2004; Krause, Handfield, and Tyler 2007). As the authors point out, these shared resources facilitate cohesion and effective communication, enabling. collective orientation toward set objectives.

The above documented advantages of social capital have attracted the attention of other authors who have focused on a particular strand of research: the link between social capital and repayment performance among lending groups. In Armenia, Cassar et al. (2007) found that jointly liable groups whose members were connected through weaker social ties (i.e.: acquaintance relationship), were less likely to repay. As remarked by other studies (Dufhues et al. 2011; Hermes, Lensink, and Mehrteab 2006), the existence of strong social ties among members plays a fundamental role in the financial success of their lending groups. Arguably, social ties may be used as a means to compel individuals to honor their debts. For instance, borrower groups whose members are linked through stronger social ties face higher social costs in case of non-repayment. In this case, defaulters would be putting their relationship with other members at risk, damaging or potentially losing it by failing to repay. Similarly, if individuals know one another to a greater extent, they could use this knowledge to exert a more direct pressure on others to pay their debts, thus reducing repayment irregularities (Hermes, Lensink, and Mehrteab 2006).

Across the literature, other studies have focused on geographical proximity and cultural characteristics as representative elements of social capital (Karlan 2007; van Bastelaer and Leathers 2006; Wydick 1999). Using data from FINCA Perú, an organization that offers village banking services, Karlan (2007) found that both geographical proximity and cultural similarities among members increased the probability of loan repayment. These factors facilitate individuals' abilities to monitor other members and enforce punishments within the group. These findings are further supported by Zeller (1998). Zeller showed that social cohesion, as manifested in similar ethnicity, kinship, closer physical proximity and social class, increased repayment rates in a cluster of lending groups across Madagascar. More socially cohesive groups are not only able to monitor members more efficiently, but can also extract sensitive information about peers, which would be difficult to obtain in otherwise socially fragmented clusters. As previously suggested, the costs attached to defaulting are also higher in cohesive groups. Failing to repay triggers utility losses in the form of loss of reputation among other members and limited access to the informal social security network that these individuals represent. The high degree of these losses may prevent events of non-repayment.

Studies of the relationship between social capital and the success of microfinance institutions have shown that successful groups share certain cognitive social capital-related characteristics that ensure their effectiveness. One notable example of such characteristics is the presence of a system of values ingrained or internalized by individuals within a group, particularly in the form of high moral commitment (Seibel, Llanto, and Quiñones 2000). Similarly, other studies have shown that microfinance institutions are more financially successful in less fractionalized societies (Postelnicu and Hermes 2018). That is, these institutions tend to perform better when individuals share a defined set of values and beliefs. As Postelnicu and Hermes suggested, sharing such common assets lowers instability, prevents conflicts and improves repayment.

Drawing from the above-mentioned literature, the present thesis seeks to expand the analysis on social capital and repayment performance by focusing on the lesser-studied *Bankomunales* model. Results are expected to provide valuable insight into the impact of the structural and cognitive dimensions of social capital on default across these banks.

3 Institutional Context and Data

3.1. Bankomunales: the other microfinance

In the year 2000, the non-governmental organization Fundefir established in Venezuela the first *Bankomunal*. The founder, Salomón Raydán, took inspiration from other microfinance organizations that were operating in Latin America, such as FINCA International. While both

FINCA and Fundefir offer community bank services, the *Bankomunales* model represents an innovation of its own. To this day, the model has been successfully implemented in 20 countries. *Bankomunales* serve a highly diverse population across the globe, ranging from clusters of Latin-American emigrants in Spain, to a group of inmates in a prison in Lima, Peru (CAF and Fundefir 2017; Torcat, Rodríguez-Ferrera, and Raydán 2011). Due to the model's rapid widespread, Fundefir has teamed up with other development agencies to jointly promote the creation of *Bankomunales* worldwide. Among its most well-known regional partners are the Development Bank of Latin America (CAF) and the Center for Education and Research for Urban and Rural Community Development (CEDECUR), active in Colombia. Here, it is important to note that neither Fundefir nor its regional partners participate in the operations of the *Bankomunales*, as their task primarily lies in the sole formation of these banks.

To form a *Bankomunal*, Fundefir relies on groups of community advisers (*asesoras comunitarias integrales*). While some advisers are directly hired by Fundefir, others work for Fundefir's regional partner. They are trained in the model's methodology and are tasked with the creation and supervision of *Bankomunales* in the communities where they reside. In essence, interested community residents directly contact these advisors to form a Bankomunal. More specifically, advisors are approached by pre-formed groups of individuals who live in the same community and who might be part of the same organization or guild (e.g.: elderly associations, crafts groups). Besides fulfilling the required number of members to create a bank, individuals must have a certain degree of familiarity with one another. Before establishing the *Bankomunal*, advisors also consider the group's overall average income and whether members are employed in different sectors. Although these are not necessary requirements to form a bank, they do provide an insight into the group's future performance. Once the *Bankomunal* is formed, the advisor supervises the bank's financial operations for a period of six months, providing guidance and solving issues that might arise in the process. Similar to FINCA, when a member is expelled or leaves the bank voluntarily, his or her place is filled by another person through invitation from a current member of the *Bankomunal*. As a result, some banks comprise individuals who might not know each member on a close and personal level.

A *Bankomunal* can be best described as a community-based organization in which members, usually of low-income, act as both lenders and recipients of credit. In other words, they own the capital used to grant loans among themselves and generate profits derived from interest payments, which are later distributed between members. More specifically, the methodology behind the model is as follows: members invest their savings in the bank and obtain loans. To invest in a *Bankomunal*, members purchase shares in the bank. Any member who purchases a

share is entitled to apply for a loan that cannot exceed five times the amount that member has invested. Loans are then drawn from the pooled savings of the *Bankomunal*'s members. This feature makes the model unique, as it does not rely on outside funding to grant loans to beneficiaries. As previously mentioned, bank's interest payments are accumulated and distributed among members. Thus, everyone who invests money in a *Bankomunal* is able to reap monetary benefits. The simplicity of this procedure makes the model more appealing. After every yearly operation, banks' yields are collected and disbursed. These yields represent the sum of all interest payments borrowers make on their loans, minus any costs incurred by the bank, divided by the total number of shares in the bank. The yields are distributed among members according to the number of shares each one owns. While some *Bankomunales* distribute them at the beginning of each year, others do so on a monthly basis. In this way, a member will receive his or her portion of profits in January of the current year according to the shares purchased by that member in January of the previous year and so on. This disbursement sets the model apart from other microfinance organizations, where accumulated profits are generally used to purchase assets for the organization and not to benefit the individual (Torcat, Rodríguez-Ferrera, and Raydán 2011). Such feature has also a compelling indirect effect: as loan applicants, members would seek low interest rates, but as lenders they would want high rates. This double role balances the effective rate charged and makes it lower than the ones set by other organizations (CAF and Fundefir 2017).

In order to secure the model's proper functioning, every *Bankomunal* must abide by a set of permanent rules, which are explained to all members before they form a bank. Although these permanent rules vary slightly depending on the country, this thesis focuses on those that are enforced in Colombia. In the particular case of Colombia, some of the most important permanent rules stipulate that a bank shall not have fewer than 15 or more than 19 members. Regarding internal structure, every bank must have a board of directors (*junta de directores*) and management board (*junta administrativa*). The former is comprised of a chairperson, secretary and a counsel who represent the bank's authority and are elected by members for at least one-year period. The latter consists of a board in charge of performing the financial operations of the bank. Unlike the board of directors, the administrative board rotates its members in such a way that allows everyone to perform these tasks at least once a year.

Every *Bankomunal* must hold two types of meetings: an operational and an assembly meeting. During the operational meetings, banks' financial transactions (i.e.: deposits, withdrawals, grant loans, loan repayments, interest payments) are performed. They are subsequently saved on Fundefir's electronic database, a free-of-charge service that the organization offers to all

Bankomunales. It is required that all transactions take place in the operational meetings and never outside of them. During the assembly meetings, members vote on key financial decisions such as what interest rates to charge and the length of repayment term. This is particularly important in developing countries, where economic conditions tend to change rather unexpectedly, forcing every *Bankomunal* to adapt to the new situation. In these meetings, both the board of directors and management board are also elected. Although more experienced groups hold them on a bimonthly or quarterly basis, assembly meetings usually occur once a month. Each member has one vote and resolutions are passed by simple majority.

Other permanent rules are set to ensure the economic viability of the model. Some of the state that every member is required to request at least one loan per year and that the amount of loan that can be granted cannot be five times greater the amount a person has in shares. Similarly, a member is only entitled to receive a loan if he or she meets certain conditions. This means that every member must fill out the loan application during the operational meeting and provide the information required for the administrative board to decide whether or not a member can be granted the loan. This information includes loan use and allows the administrative board to gain an overview of borrowers' needs and make decisions on that basis. It is also mandatory for all participants to have at least one loan guarantor who must be a member of the *Bankomunal*.

To prevent possible misuse of power, no member may hold more than 15% of the total shares of a bank. It is also recommended that the value of a share be 10,000 pesos. However, it is up to each bank to establish their own rates. In case of a dropout, members will be deducted from their shares and earnings the debts that are pending with the *Bankomunal*. Finally, a fund of expenses and uncollectible (*incobrables*) must be set aside, each one representing not less than 5% of the total profits of every month. While the fund of expenses is used to cover costs related to celebrations (e.g.: birthdays, festivities) or to purchase office materials (e.g.: calculators, paper), the uncollectible fund acts as a backup in cases of non-repayment. Thus, every bank partially ensures itself against defaulters and prevents complete monetary losses.

Besides a set of permanent rules, *Bankomunales* also follow a number of variable rules. These regulations are tailored to each bank specific needs and preferences and are set out by members prior to the formal establishment of a *Bankomunal*. Throughout the course of a bank's operation, individuals may vote to modify these rules. However, alterations can only be suggested during assembly meetings and shall be decided by majority vote. Variable rules are divided into two categories: organizational rules and financial rules. The former is further subdivided into regulations that pertain to members, assembly meetings, board of directors and operational meetings. Some of these rules stipulate the minimum age for admission and the required

residence time in the community to be eligible as a member. The latter is set by some banks in order to avoid the inclusion of strangers who are unfamiliar with the community. Other variable rules specify the frequency of both the operational and assembly meetings. Here, members also decide on whether sanctions should be applied against members who do not attend assembly meetings. Similarly, the length of term of office on the board of directors and management board is also part of the organizational rules. On the other hand, financial rules regulate the economic transactions of every bank, such as setting the value of each action and the maximum monetary amount to be lent, as well as repayment term and interest rate.

According to Raydán (2017), much of the success and rapid widespread of the *Bankomunales* model is a result of the strong interpersonal relationship among banks' members. The founder specially highlights the importance of trust and social ties among members as decisive factors in the good performance of these communal banks. This thesis will attempt to prove this claim, while also considering other relevant aspects related to the *Bankomunales* model.

3.2. Data and variables

The present analysis employs primary data that were collected from members of *Bankomunales* in the city of Cali, Colombia. Cali was selected as the location of study due to the high number of *Bankomunales* it hosts. Starting from the year 2013, when the first bank was founded, the city now operates 178 *Bankomunales*. These are scattered across the different districts of Cali. For practical reasons, this study drew upon a randomly selected sample of 60 *Bankomunales* located across 22 districts of Cali. In total, 27 are situated in the northern and 33 in the southern districts of the city.

To gather the data, a survey was distributed to the chairperson of each *Bankomunal*. Considering that each bank's chairperson is elected by members of his or her *Bankomunal* and holds this position for at least one-year period, it is reasonable to expect that this induvial would provide a more comprehensive outlook of the group as a whole. A similar approach is followed by other studies (Liang et al. 2015; van Bastelaer and Leathers 2006; Yu and Nilsson 2018). Data collection started in February and was completed in March 2019. As it was impossible for the author to personally distribute the surveys, an online platform was used.

For the analysis, survey questions collected information on the structural, cognitive and relational dimensions of social capital within every *Bankomunal*. In order to avoid false inferences of causation, variables accounting for the latter dimension were later omitted from the analysis, as the observed relationship between this dimension and repayment performance reflected reverse causality.

Survey questions also gathered data on banks' location in order to control for within-district variation. In order to obtain this information, respondents were asked to indicate in which district their *Bankomunal* is located. To simplify the data-collection process, the survey also covered information on the repayment performance of each bank, exploiting the fact that every chairperson has access to the financial database of his or her *Bankomunal*. A detailed summary of all measurements is presented in Table 1. Similarly, Figure 2 of Appendix A shows the used survey questions.

To measure the structural and cognitive dimensions of social capital, this thesis drew upon a set of proxy indicators found in the literature and tailors survey questions according to the specific context of the *Bankomunales* model. In accordance with the theoretical specifications presented in section 2, this study considered social interaction between members as a proxy for the structural dimension. As done by previous researchers (Chiu, Hsu, and Wang 2006; van Bastelaer and Leathers 2006), this study focused on the presence or absence of social interaction ties between *Bankomunales'* members. Considering that the size of a group is a good indicator for the potential social ties an individual can form (Chen, Zhou, and Wan 2016), this thesis examined group size as another proxy for the structural social capital. Recognizing the importance of accessibility to other members and network cohesion in the research of structural social capital (Ansari, Munir, and Gregg 2012; Lefebvre et al. 2016; Nahapiet and Ghoshal 1998), group stability and geographical proximity between members were also used as measures of the structural dimension. Similarly, *Bankomunales*' months in operation were included as another proxy for structural social capital. Intuitively, the longer a bank has been in operation, the longer its members have been interacting and strengthening their ties with one another. The last proxies for the structural dimension are the frequency of assembly meetings and the required residence time in the community to be eligible as member of a *Bankomunal*. These variables are part of the internal variable rules that govern every bank and were selected for two reasons: the social connotations attached to them, and they allow for the analysis of elements unique to *Bankomunales* model that could potentially influence repayment performance. In particular, the inclusion of residence time as a proxy indicator of structural social capital can be justified by examining the literature. For example, Cassar, Crowley and Wydick (2007) examined the impact of participants' fraction of life lived in the area as a determinant of repayment performance in their microfinance experimental games.

As denoted in section 2, common vision and values within a group are major proxies of the cognitive dimension. Following Andrews' (2010) approach, this thesis considered the extent to which a bank's vision, values and objectives are understood within the group. It also focused

on whether the values honesty, transparency and integrity are shared by members. According to the literature, these factors are expected to facilitate beneficial collective actions.

To assess *Bankomunales*' repayment performance as the dependent variable, this study took into account default cases in the studied banks since the start of their operations.

Table 1. Measurements of repayment performance and social capital.

Variable	Measurement	Evaluation
Repayment performance		
Default	Have there been cases of default in your *Bankomunal*?	Yes = 1 No = 0
Structural social capital		
Social interaction ties	Do most members of your *Bankomunal* engage in sport/religious/political/work-related activities with one another?	Yes = 1 No = 0
Group stability	Does your *Bankomunal* still have all of its original members?	Yes = 1 No = 0
Group size	How many members does your *Bankomunal* have?	-
Geographical proximity	On average, how far do the members of your *Bankomunal* live from one another?	Members live 1 km or less away from each other = 1 Members live more than 1 km away from each other = 0
Meeting frequency	How frequent are the assembly meetings in your *Bankomunal*?	Monthly = 1 Bimonthly or quarterly = 0
Residence time	What is the required time of residence in the community to be eligible as a member of your *Bankomunal*? *(Measured in months)*	-
Months in operation	For how long has your *Bankomunal* been in operation? *(Measured in months)*	-
Cognitive social capital		
Members understand mission, values and objectives	I consider that the mission, values and objectives are clearly and widely understood by all members of my *Bankomunal*	Strongly agree = 1 Agree, neither agree nor disagree, disagree,

		strongly disagree = 0
Members share values of honesty, transparency and integrity	I consider that all members of my *Bankomunal* share the same values of honesty, transparency and integrity	Strongly agree = 1 Agree, neither agree nor disagree, disagree, strongly disagree = 0

Table 2 presents the descriptive results of the data as described above. A closer look at the figures reveals that a mere 25% of all studied *Bankomunales* reported cases of default since their establishment. On its own, such result exposes the model's success. Examining further, some of the key measurements of social capital show that groups have on average 18 members. Although the rule states that banks shall be composed of a minimum of 15 and a maximum of 19 members, the data points out at two exceptions: a *Bankomunal* with 10 and another one with 20 members. While the latter bank represents a special case, allowed by CEDECUR, the former is in a current process of restructuration, waiting for new participants to fill the posts left vacant by former members. Such case is not uncommon, as displayed by the figures on group stability, showing that only 18% of all *Bankomunales* retain all of their original members. Regarding period of existence, the studied banks have been in operation for an average of 27 months. At the time of the survey, the youngest had been active for 4 months, while the oldest had been active for 60 months, being founded exactly a year after the establishment of first *Bankomunal* in Cali. As also presented in Table 2, approximately 53% of all *Bankomunales* reported that their members live 1 km or less away from each other (i.e.: 20 minutes walking distance). This result highlights the close geographical proximity between individuals from a considerable proportion of banks. Affirming the importance of social bonds, *Bankomunales* require all members to have resided in the community for an average of at least 3 years (37 months). However, it is important to note that not every bank sets such a ruling. As displayed by Table 2, some *Bankomunales* impose no time requirement and allow community new-comers to join as members. Last on the structural dimension are the assembly meetings, where members discuss current issues, vote for their representatives and make financial decisions. According to the results, these meetings are held on a monthly basis by 63% of all *Bankomunales*.

Table 2 further depicts descriptive statistics on the variables that constitute the cognitive dimension of social capital. Each variable was built upon a particular statement. In the survey, the *Bankomunal*'s chairperson was required to choose an answer for each statement from a five-

point Likert-type scale. To be able to run the statistical analysis, however, these variables were coded as dummies as depicted in Table 1. The frequencies of the original scales of each variable are included in Table 5 and Table 6 of Appendix B. As Table 2 shows, around 57% of all respondents strongly agreed with the statement saying that all members of their *Bankomunales* understand their bank's mission, values and objectives. On the other hand, approximately 53% of all respondents strongly agreed with the statement that all members of their banks shared the same values of transparency, honesty and integrity. Overall, these figures evidence the strong positive views that chairpersons have on their groups' shared attributes and general understating of the internal mechanisms that govern their banks.

Table 2. Summary statistics on repayment performance, social capital variables.

Variable	Mean	S.D.	Min	Max
Repayment performance				
Default	.25	.44	0	1
Structural social capital				
Social interaction ties	.52	.50	0	1
Group size	18	2	10	20
Group stability	.18	.39	0	1
Geographical proximity	.53	.50	0	1
Meeting frequency	.63	.48	0	1
Residence time	37	26	0	120
Months in operation	27	13	4	60
Cognitive social capital				
Members understand mission, values and objectives	.57	.50	0	1
Members share values of honesty, transparency and integrity	.53	.50	0	1

Note*:* N= 60
S.D.= Standard deviation, Min= Minimum value, Max= Maximum value.

Considering the large set of variables used as proxies for each dimension of social capital, particularly for the structural dimension, the study additionally ran a PCA. Using the Kaiser criterion, only the principal components with eigenvalues greater than 1 were retained. As a result, the analysis retained three components accounting for structural social capital and one component accounting for the cognitive dimension. For the purposes of this study, a single index for each dimension was created using only the first component. This method allows for simplified measurements and is justified on the grounds that the first principal component

accounts for the largest proportion of variability in the data. The same approach is also suggested by authors (Vyas and Kumaranayake 2006) in their review on the construction of PCA-based indices. Table 7 and Table 8 report the proportion of the variability explained by the principal component of structural and cognitive social capital, respectively, as well as their factor loadings. As shown in Table 7, the principal component of structural social capital explains approximately 22% of the variability in the data set. Similarly, Table 8 reports that the component of the cognitive dimension accounts for 83% of the total variability.

4 Econometric analysis

4.1. Model

The described variables are analyzed using the logistic model. This statistical model is specially designed to conduct regressions on binary dependent variables. Unlike discriminant analysis, no restrictions are imposed on the distribution of independent variables. More importantly, the logistic model is one of the most employed approaches in the research on social capital (Cassar, Crowley, and Wydick 2007; Postelnicu, Hermes, and Servin 2018).

The logistic model used in this study is described by the following equation:

$$\Pr\left(Y_i = 1|S_{ij}\right) = \frac{1}{1 + e^{-(\alpha+\sum_{j=1}^{9}\beta_j S_{ij})}} \tag{1}$$

Where Y_i is the dependent variable and captures loan default of *Bankomunal* i, $\Pr\left(Y_i = 1\right)$ represents the probability that *Bankomunal* i has reported at least a case of default since the beginning of its operation, α is the estimated constant term, β_j is the coefficient of interest, while S_{ij} represent social capital independent variables j (j=1, …, 9) from the structural and cognitive dimensions of *Bankomunal* i. Equation (1) serves as the baseline model in the analysis of this thesis. These variables and their connotations will be reused hereafter.

Equation (1) is expanded to include fixed, unobserved characteristics at the district level. This change is captured by equation (2) as follows:

$$\Pr\left(Y_{il} = 1|S_{ijl}, v_l\right) = \frac{1}{1 + e^{-(\alpha+\sum_{j=1}^{9}\beta_j S_{ijl}+v_l)}} \tag{2}$$

Equation (2) accounts for common variation within districts. Here, Y_{il} is the dependent variable and captures loan default of *Bankomunal* i in district l, v_l is district-specific fixed effect, S_{jil}

represent social capital independent variables j (j=1, …, 9) from the structural and cognitive dimensions of *Bankomunal* i in district l.

Considering the substantial number of variables involved in the measure of both dimensions of social capital, this thesis applies a PCA in order to reduce the dimensionality of the data set. In this case, the variables attached to each dimension are compressed to form a smaller set while retaining most of the information contained in the larger one. The equation including the principal components is specified as:

$$\Pr\left(Y_i = 1|Z_{ik}\right) = \frac{1}{1 + e^{-(\alpha+\sum_{k=1}^{2}\beta_k Z_{ik})}} \tag{3}$$

Where β_k are the coefficients of interest, and Z_{ik} represent the final principal component estimators built by using the first principal components k (k= 1,2) from the structural and cognitive dimension of social capital of *Bankomunal* i.

Finally, and following the same procedure described in equation (2), equation (3) is expanded to include fixed effects at the district level. The result is equation (4), described as follows:

$$\Pr\left(Y_{il} = 1|Z_{ikl}, v_l\right) = \frac{1}{1 + e^{-(\alpha+\sum_{k=1}^{2}\beta_k Z_{ikl}+v_l)}} \tag{4}$$

Once more, Z_{ik} represents the principal component estimator accounting for each dimension of social capital, and v_l captures the fixed effects for the district l.

The results yielded by each of the presented equations are displayed in Table 3. More specifically, the results exhibited in each of the four columns of this table correspond to the estimations generated by the four equations.

4.2. A note on endogeneity and reverse causality

A recurrent concern in the research on social capital, particularly in the estimation of its impact on economic outcomes, is the issue of endogeneity. On the one hand, some groups tend to form on the basis of peer-selection. Thus, part of the econometric results might reflect selection effects based on characteristics unobservable to the researcher (i.e.: omitted-variable bias). On the other hand, the existence of unobserved characteristics within the region of study might also pose a challenge to the researcher, as they could potentially impact individuals across the sample.

The above concern does not imply that the analysis on social capital would not lead to valid results. As the literature suggests, researchers have made improvements tackling the obstacles associated with endogeneity (McEwan and Soderberg 2006; Mouw 2003). This thesis tackles this particular issue in a number of ways. Following previous works (Angrist and Lang 2002; Arcidiacono and Nicholson 2005; Halaby 2004), this thesis runs a fixed effects model to control for fixed, unobserved characteristics at the district level. This is possible, as the study also inquired about *Bankomunales'* location. In the survey, respondents indicated in which of the 22 district of Cali their bank is located. To avoid losing too many degrees of freedom, geographically neighboring districts were grouped together.

Another concern regarding the empirical effects of social capital is the potential influence of wealth and educational levels on repayment performance (Dufhues, Buchenrieder, and Quoc 2012; Postelnicu, Hermes, and Servin 2018). Previous discussions with the coordinator of the *Bankomunales* in Cali leads one to conclude that these biases are not a source of concern for the present study. As she confirmed, the overwhelming majority of *Bankomunales*' members from this Colombian city earn less than the minimum wage, have a similar educational level and are scattered across some of the most deprived areas of Cali's districts. These claims are further corroborated by a survey carried out by CEDECUR, covering a total of 160 *Bankomunales* in Cali and conducted in late 2017. Overall, results showed homogenous and low income and educational levels among banks' members (Peláez, Ramírez, and Escobar 2017). Due to practical and time constraints, this thesis refrained from replicating CEDECUR's analysis. Finally, although this thesis included some of the banks' variable rules it deemed more relevant to the study, it did not account for the entirety of them. Future research on social capital and the *Bankomunales* model may consider a more in-depth study of the effects of the variable rules not covered by this thesis.

A noteworthy issue that arouse during the writing of this thesis was reverse causality. As explained in section 3.2, the analysis originally covered the three dimensions of social capital. However, the proxies used to measure the relational dimension were later found to be problematic. These proxies accounted for the existence of punitive actions against defaulters within *Bankomunales* and were measured by inquiring whether the bank expelled defaulters and whether it took social reprisals against them. The specific survey questions are depicted in Figure 2 of Appendix A. Upon noticing the contradictory results displayed by these variables, the author contacted the coordinator in Cali and was clarified that whenever there is a case of default, the *Bankomunal* calls for a special assembly meeting to decide whether the defaulter shall be expelled. This means that, although members do vote on the matter, it is not a

permanent rule that banks follow. Rather, it is decided on case-by-case basis. Thus, the author decided to omit these variables and, with them, the relational dimension of social capital. This omission does not in any way hinder the analysis, as other researchers have also solely focused on the structural and cognitive dimensions in their studies on social capital (Akram 2013; Uphoff and Wijayaratna 2000; van Bastelaer and Leathers 2006). For this thesis, the omission of the relational dimension implies that the analysis focuses on both the more observable and externalized elements of social capital (i.e.: structural dimension), as well as on the intangible and internal elements of the concept (i.e.: cognitive dimension). As argued in this thesis, the structural and cognitive dimensions alone serve as meaningful representatives of social capital and provide thus a good basis for the study of the concept.

5 Results

Table 3 presents the results from the logistic regression for all the measures used in the analysis. This study followed a stepwise approach. The first model shows the results for the variables measuring the structural and cognitive dimensions of social capital without accounting for fixed, unobserved characteristics at the district level. Next, the full model was re-ran including district fixed effects and displayed in the second column. The same process was repeated for the last two models, whose results are shown in column three and four. For the last two models, however, the dimension reduction technique of PCA was employed. Thus, the estimated principal components of each dimension were used as regressors. While the third model reports the results without including district fixed effects, the fourth model does account for such fixed characteristics. All estimations were done according to the equations outlined in section 4.1.

The results delivered by equation (1) show mixed support for the claim that social capital, as proxied by its dimensions, has an effect on the repayment performance of the studied *Bankomunales* (Table 3, column (1)). As depicted in the first column, the cognitive dimension does not exert a significant impact on default. These results seem to indicate that the rather intangible elements associated with this dimension (i.e.: shared values and vision) do not pose as decisive factors in the repayment performance of the selected *Bankomunales*. With regards to structural social capital, the first column shows that three of the proxy indicators of this dimension exert a statistically significant impact on repayment performance. Group size yields a negative and significant ($p<0.1$) point estimate of -0.039 on default. According to this result, an increase in the group size by one member is expected to decrease the probability of a default case by 3.9 percentage points. Such finding seems to suggest that larger groups perform better than smaller ones. As it will be argued in section 6, this result could be partially explained by

the internal mechanisms on which every bank relies. In the same column, the variable measuring residence time, that is, the required residence time in the community to be eligible as a member of a *Bankomunal*, shows a negative and significant ($p<0.05$) point estimate. Such result justifies the existence of this variable as part of the set of rules of each bank. More importantly, the point estimate of -0.007 supports the assumption that stipulating a longer required residence time in the community decreases the probability of default. Specifically, an increase in the required residence time in the community by one month is expected to decrease the probability of a default case by 0.7 percentage points. By the same token, an increase in the required residence time by one year is expected to decrease the probability of a default case by *approximately* 8.4 percentage points. The variable measuring geographical proximity between members displays a positive and statistically significant ($p<0.1$) point estimate of 0.197. This finding suggests that, compared to banks whose members live more than 1 km away from each other, the probability of a case of default increases by 19.7 percentage points for *Bankomunales* whose group members live 1 km or less away from each other. This result seems counterintuitive. One would expect that banks whose members are geographically closer to one another to be less likely to have experienced cases of default, as geographical proximity reduces the cost of mutual monitoring.

To account for possible unobserved characteristics, equation (1) was extended to include district fixed effects, resulting in equation (2). According to the results, under the fixed effects model, all proxy indicators of social capital fail to exert a significant impact on default (Table 3, column (2)). This means that, once all possible unobserved characteristics within districts are accounted for, the net effect of the predictors is insignificant.

As equation (3) depicts, variables measuring the dimensions of social capital were replaced by two single aggregated indices yielded by a PCA. Results show that using these PCA-based indices as sole regressors does not lead to significant point estimates (Table 3, column (3)).

Similar to the results indicated above, the estimation of equation (4) shows that after including fixed, unobservable district characteristics, PCA-based indices again fail to exert a significant impact on the repayment performance of the studied *Bankomunales* (Table 3, column (4)). Once more, these results seem to suggest that, even after accounting for as much of the variability as possible, a linear combination of the data failed to pick the explanatory power from the original set of independent variables.

Table 3. Logistic regression analysis on default.

Dependent variable:	*Default*

	Model (1)	Model (2)	Model (3)	Model (4)
Structural social capital				
Social interaction ties	-0.016	-0.008		
	(0.11)	(0.04)		
Group size	-0.039*	-0.012		
	(0.02)	(0.02)		
Group stability	-0.035	0.009		
	(0.13)	(0.06)		
Geographical proximity	0.197*	0.065		
	(0.10)	(0.17)		
Meeting frequency	0.136	0.036		
	(0.11)	(0.09)		
Residence time	-0.007**	-0.002		
	(0.00)	(0.00)		
Months in operation	0.005	0.001		
	(0.00)	(0.00)		
Cognitive social capital				
Members understand mission, values and objectives	0.068	0.011		
	(0.12)	(0.04)		
Members share values of honesty, transparency and integrity	0.009	0.019		
	(0.13)	(0.06)		
Principal component analysis				
PC for structural social capital			0.043	0.067
			(0.05)	(0.06)
PC for cognitive social capital			0.017	0.023
			(0.04)	(0.06)
Constant	2.539		-1.121	
Log-likelihood	-25.951	-22.144	-33.198	-29.450
Pseudo R^2	0.231	0.265	0.016	0.022
Observations	60	60	60	60
District fixed effects	No	Yes	No	Yes

Note: PC stands for principal component.
A total of 22 districts were covered. For the analysis, these districts were grouped into northern and southern districts.
Marginal effects; Standard errors in parentheses.
* p<0.1, ** p<0.05, *** p<0.01.

5.1. Robustness check

To test for the robustness of the results, this thesis ran a linear probability model. Results are displayed in Table 4. Just as in the main analysis shown in Table 3, the first column of Table 4 presents the results for the variables measuring the structural and cognitive dimensions without

including district fixed effects. The second column reports the results after accounting for such fixed effects. Finally, the third and fourth column use the principal components of each dimension as regressors. While the third column reports the results without including district fixed effects, the fourth model does so by accounting for these fixed characteristics.

Overall, results remain fairly consistent. As shown in the first column, two of the proxy indicators of structural social capital exert a significant impact on repayment performance (Table 4, column (1)). Similar to the previous analysis, group size yields a negative and significant ($p<0.1$) point estimate of -0.054. This implies that increasing the size of a bank by one member is associated with a 5.4 percentage point decrease in the probability of a default case. Presented in the same column, the variable measuring residence time displays a negative and significant ($p<0.05$) point estimate on default. Here, the point estimate of -0.005 implies that a one month increase in the required residence time to be eligible as a member of a *Bankomunal* is associated with a 0.5 percentage point decrease in the probability of having a default case. As opposed to the results presented in the first column of Table 3, the findings displayed in Table 4 show that geographical proximity between members does not have a significant impact on the repayment performance of the studied *Bankomunales*.

As displayed in the second column, the point estimates of group size and residence time remain both negative and statistically significant after accounting for district fixed effects (Table 4, column (2)). These results are placed in contrast to the ones shown in the second column of Table 3, where the same proxies are found to have no significant effect on default under the fixed effects model.

Similar to the results presented in the third and fourth column of Table 3, the analysis carried out using the principal components of each dimension as regressors did not yield significant results under the linear probability model (Table 4, columns (3) and (4)). In other words, the constructed PCA-based indices for each dimension do not exert a significant impact on repayment performance, both using the baseline model and fixed effects model.

In general, performing the robustness check yielded estimates of similar magnitude and equal direction of association, comparable to the results displayed by the same variables in Table 3. Nevertheless, as indicated above, not all results obtained from the linear probability model resemble the ones derived from the logistic model. Such discrepancies could be attributed to the underlying assumptions and limitations of the linear probability model. These limitations are the reason why this thesis opted for the logistic regression as the main statistical model to analyze the given data. On the one hand, the linear probability model is less likely to present an accurate description of the data when the modeled probabilities are extreme. That is, when

the modeled probabilities lie close to 0 or 1 (Hellevik 2009). As depicted in Table 2, the modeled probability of having a default case is .25. In this case, it could be argued that the logistic model is able to provide more accurate predictions for this study. On the other hand, it is often theoretically more plausible to consider the relationship between a binary dependent variable and a given set of independent variables to be non-linear (Denk and Finkel 1992). Non-linear models may fit the data more accurately than linear models such as the linear probability model.

Notwithstanding the above, both the logistic and linear probability models yield fairly similar and consistent results, even under different underlying assumptions. This provides further evidence of the main model's structural validity.

Table 4. Linear probability model on default.

Dependent variable:	*Default*			
	Model (1)	Model (2)	Model (3)	Model (4)
Structural social capital				
Social interaction ties	-0.001	-0.002		
	(0.12)	(0.12)		
Group size	-0.054*	-0.053*		
	(0.03)	(0.03)		
Group stability	-0.048	-0.016		
	(0.16)	(0.17)		
Geographical proximity	0.160	0.169		
	(0.12)	(0.12)		
Meeting frequency	0.099	0.079		
	(0.13)	(0.13)		
Residence time	-0.005**	-0.005**		
	(0.00)	(0.00)		
Months in operation	0.002	0.002		
	(0.00)	(0.00)		
Cognitive social capital				
Members understand mission, values and objectives	0.071	0.053		
	(0.15)	(0.15)		
Members share values of honesty, transparency and integrity	0.011	0.036		
	(0.15)	(0.16)		
Principal component analysis				
PC for structural social capital			0.045	0.053
			(0.05)	(0.05)

PC for cognitive social capital			0.016	0.017
			(0.04)	(0.05)
Constant	1.158**	1.138*	0.250***	0.250***
	(0.56)	(0.57)	(0.06)	(0.06)
R^2	0.211	0.215	0.018	0.023
Observations	60	60	60	60
District fixed effects	No	Yes	No	Yes

Note: PC stands for principal component.
A total of 22 districts were covered. For the analysis, these districts were grouped into northern and southern districts.
Standard errors in parentheses.
* p<0.1, ** p<0.05, *** p<0.01.

6 Discussion

Put in the context of existing literature on social capital, the results presented in this thesis serve to expand the knowledge on the impact of the dimensions of social capital on the economic performance of group lending. As has been shown, the structural dimension of social capital proved to exert a significant impact on the repayment performance of the studied *Bankomunales*. This significance was displayed by some of the proxy indicators of this dimension in the baseline model (i.e.: excluding district fixed effects).

The found relation between group size and repayment performance, suggesting that larger groups perform better, contradicts results put forward by some researchers (Chen, Zhou, and Wan 2016; van Bastelaer and Leathers 2006). For instance, Chen, Zhou and Wan found that, as the number of members in lending groups grows, the probability of default within those groups increases. The authors argued that, if the group size becomes too large, members would not have enough time to form, nurture and maintain close social relationships with one another. This would increase instability within the group, damage the group's cohesion and decrease the perceived social costs of defaulting. However, it is important to notice that the extent to which group size affects repayment performance remains debatable. Abbink, Irlenbusch, and Renner (2006) showed that larger groups performed at least as good as smaller ones after carrying out a microfinance game. Furthermore, FINCA International, a microfinance organization that pioneered the village banking model and that best resembles *Bankomunales*' basic approach, serves groups comprising 15 to 30 members. Most importantly, FINCA boasts outstanding repayment rates (Soberano 2012). Considering that the size of a group reflects the number of social ties individuals can form, if these social ties are strong, larger groups would merely represent a bigger cluster of individuals closely linked to each other. Within-group instability would decrease, and social cohesion would be the norm. This is clearly the case for the

Bankomunales model, where banks are comprised of members who already know one another to certain extent. In this case, group size acts as a facilitator of effective lending.

The above claims do not suggest that group size should be left unrestricted. As Zeller (1998) argues: "With increasing group size, economies of scope, scale, and risk management can be realized by the group" (p.615). However, he contends that increasing the number of members beyond a manageable limit could backfire, worsening in-group coordination and increasing monitoring costs. This is not likely to be the case here, as all *Bankomunales* must abide by a restriction on the number of members they can take in, set at a maximum of 19 individuals. As displayed in Table 2, the average size of the sample groups is 17 members, so such issues do not pose a concern for this model.

The results of this thesis also placed residence time in the community to be eligible as a member of a *Bankomunal* as positive factor in the repayment performance the studied banks. This result does not strike as surprising. There is a consensus among relevant literature on social capital, that the length of time spent in the area where the lending group operates has a significant and positive impact on these groups' financial performance (Cassar, Crowley, and Wydick 2007; Hermes, Lensink, and Mehrteab 2006; van Bastelaer and Leathers 2006). Intuitively, the longer group members have been residing in the same locality, the less likely they are to incur in default. There are several explanations to this result. As long-time residents, these members have already established their own public image and are well-known figures in the community. Thus, the utility losses attached to defaulting are higher for group members that have lived in the community for longer time. Such losses come in the form of damage of reputation not only within coborrowers, but also within the community as a whole. Furthermore, since these members are more likely to remain in the community, the threat of reputation damage is undesirable, as these individuals will have continued and direct contact with other coborrowers and community residents. Similarly, by failing to honor their financial commitments, these defaulters might also risk losing access to the informal social security network they have been building throughout the years. Specially in markedly deprived areas, individuals cannot afford yet further socio-economic disadvantages by losing access to this network and the potential resources embedded in them. Examined from another perspective, since the same required residence time in the community is imposed to all members within a *Bankomunal*, the longer the required time, the stronger social ties the coborrowers in a bank will have developed with one another over time. Social ties lead to improved repayment performance by reducing the costs of gathering information about peers' indebtedness, wealth and reputation (monitoring) (Al-Azzam, Carter Hill, and Sarangi 2012; Zeller 1998). Parallelly, members' social ties could

be exploited by making use of sentiments of altruism (Karlan 2007). That is, members will feel obliged to repay as a show of good will and camaraderie toward their coborrowers. These sentiments are magnified in the case for *Bankomunales*, where loans are granted using members' savings without relying on external capital. Thus, defaulting increases in severity, as it would mean the loss of all members' savings.

Remarkably, this thesis found geographical proximity to increase the probability of default. This result stands in contrast with some literature on social capital, which finds the closeness of the social network to improve group lending's performance. Living in close proximity to other members facilitates monitoring, decreasing the probability of moral hazard (Hermes, Lensink, and Mehrteab 2005; Karlan 2007). Close geographical proximity allows members to cheaply track their coborrowers' business and life outcomes, particularly their financial standing and health situation. With this information in hand, members can prevent potential defaults. Nevertheless, other authors have also found that the longer the distance between group lending members' homes, the better the repayment performance in these groups (Cassar, Crowley, and Wydick 2007). These authors contend that the closer geographical proximity is not critical for lessening the incidence of adverse behavior in group lending. This thesis draws closer to these authors' claims. As supported by the results shown in Table 3 and discussed in this section, other social capital-related elements play a more decisive and positive role in the repayment performance of the studied *Bankomunales*. Notwithstanding these considerations, this thesis contributes to the literature, as it goes one step further than Cassar, Crowley, and Wydick. Specifically, this thesis further included district fixed effects in order to account for possible omitted variables, which are unobservable to the researcher but posing a potential bias to overall results. Notably, such approach has been largely neglected by a large body of literature on the effects of social capital. Here, the analysis accounted for common variation within districts with the inclusion of districts fixed effects. Thus, these fixed effects account for unobservable heterogeneity expressed, among others, in the form of economic, safety, health and infrastructure conditions at the district level. While this thesis found close geographical proximity, required residence time in the community and group size to be significantly associated with default likelihood across *Bankomunales*, it could not establish a similar significant relationship after the introduction of within district characteristics. According to the analysis, all estimates yielded by the proxy indicators of the structural and cognitive dimensions are statistically insignificant under the fixed effects model.

Results also show that using these PCA-based indices as sole regressors does not lead to significant point estimates. As shown in section 5, this statistically insignificance remains for

the models excluding and including district fixed effects. Such findings are consistent with the claims that grouping the dimensions of social capital into representative indices might weaken the substance of the concept and thus diminish the explanatory power of the original set of independent variables (Akram 2013; Franke 2002). The insignificance of these results does not imply, however, that building single indicators for social capital dimensions is statistically futile. Other authors have followed the same dimension-reduction approach and found that social capital indices significantly impact socio-economic outcomes (Krishna and Uphoff 1999; Sabatini 2006).

As the results of this thesis showed, the cognitive dimension of social capital appears to be irrelevant for repayment performance in the sample of *Bankomunales*. This finding stands in sharp contrast with the belief that the extent to which common values and vision are understood and shared within a group is expected to promote collective responsibility and discourage selfish or malicious behavior (Tsai and Ghoshal 1998). The case could be made that a common understanding of the rules, objectives and values within a *Bankomunal* is not sufficient condition to ensure good economic performance. Insofar as shared values of honesty, transparency and integrity could discourage non-repayment, this thesis did not find evidence to support these alleged benefits. These findings contradict the held view that cognitive elements predispose individuals to behave cooperatively in order to achieve mutually beneficial goals (Krishna 2000). More specifically, these results contrast with findings presented by other researches on social capital and financial performance. For instance, Postelnicu and Hermes (2018) found that microfinance institutions achieve worse-off financial performance in fractionalized societies, where there is no prevailing set of shared values and beliefs.

Considering the above, it is nonetheless important to note that the lack of evidence of an effect should not be interpreted as evidence of the inexistence of such effect. Further underlying factors may be affecting the accuracy of the sample estimates. For instance, one limitation of this study is the rather restricted sample size due to time and resource constraint. Smaller sample size decreases the likelihood of detecting an effect when there is in fact a true effect to be detected. Future research on *Bankomunales* and social capital should be supported by a larger sample size in order to reduce variability and tighten confidence intervals.

7 Conclusion

This thesis examined a sample of 60 *Bankomunales* from different districts of Cali, Colombia. The analysis was set out to assess the impact of the structural and cognitive dimensions of social capital on the repayment performance of the studied banks. A logistic regression analysis was carried out to test such impact. The findings showed that some proxy indicators of the structural dimension exert a significant effect on repayment performance. Specifically, required residence time in the community and group size exerted a significant and positive impact on repayment performance. By contrast, closer geographical proximity among banks' members had a negative impact on repayment performance. However, these variables displayed no significance after accounting for district fixed effects. Further, the cognitive dimension and the PCA-based indices of the structural and cognitive social capital failed to yield a significant influence on repayment performance after both excluding and including fixed effects.

Notwithstanding the above, this thesis' findings offer support to the notion that social capital represents an integral element in the economic viability and sustainability of microfinance programs. In particular, this study put to test the importance of resources of social nature, which lie at the very core of the *Bankomunales* model.

This thesis expects to redirect the discussions on microfinance programs toward the conception of more innovative approaches to aid the most underprivileged. The uniqueness of the *Bankomunales* model and the hereby proved effects of social capital on their financial performance calls for greater attention to this and similar emerging microfinance initiatives. Specially in Latin America, where poverty alleviation strategies have largely revolved around conditional transfers and externally funded programs, future measures should exploit the full benefits of social capital by placing more emphasis on community-driven initiatives. Precisely, the *Bankomunales* model positions itself as a whole movement that promotes self-financing as a new way of doing microfinance, based on network of relations that also ensure its continuation.

Given the time constraint and geological restrictions faced by the author, the present analysis was limited to a relatively small sample of *Bankomunales* over a short period of time. Thus, further research should be undertaken to encompass a wider population, while also interacting with participants in the studied environment.

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9 Appendix

Appendix A: Figures

Figure 1. Overview of the dimensions of social capital and their related elements.

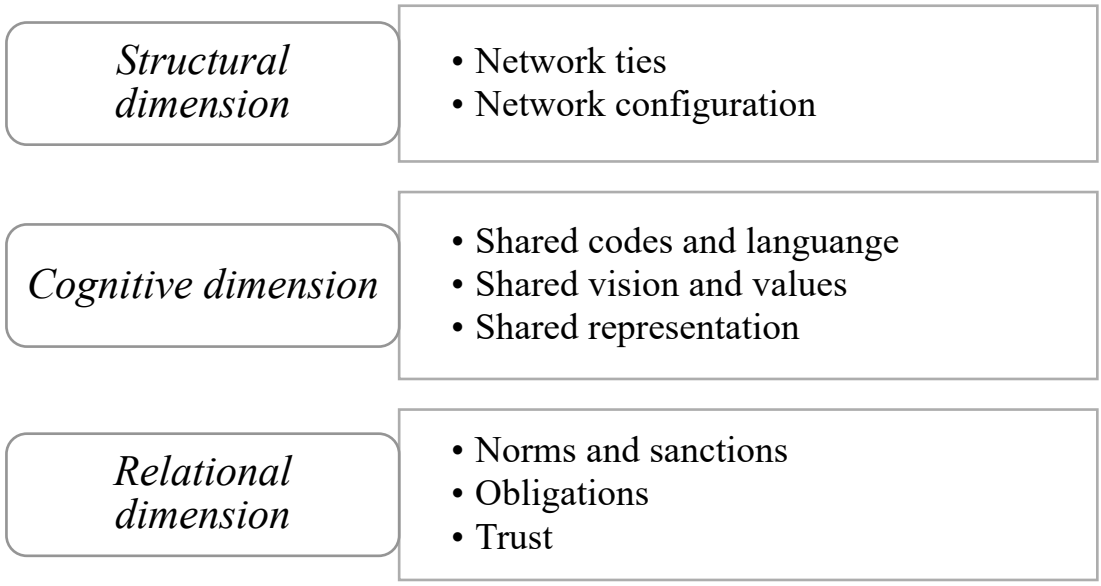
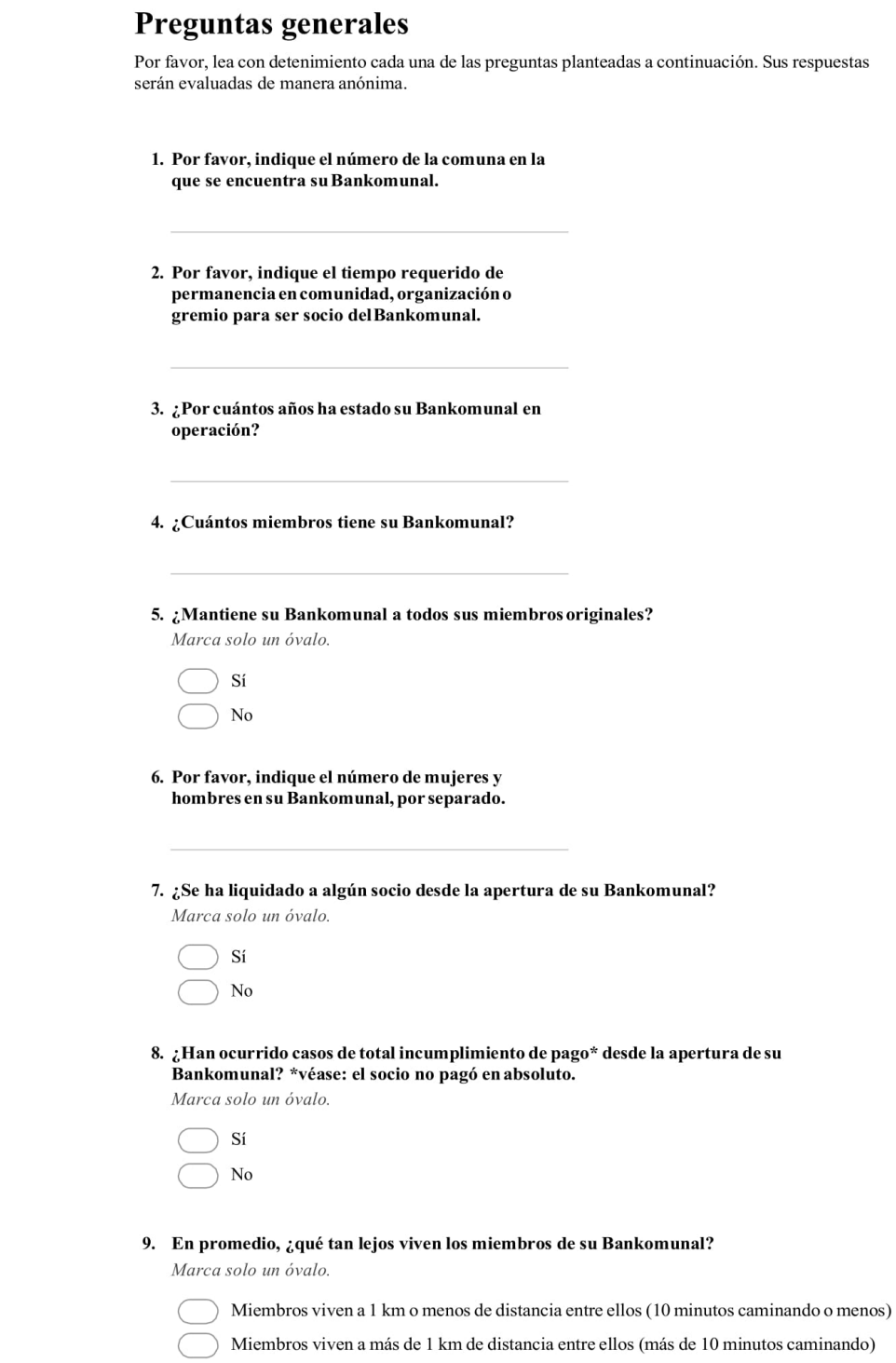


Figure 2. Distributed survey collecting information on social capital and repayment performance in the studied *Bankomunales*.



Preguntas generales

Por favor, lea con detenimiento cada una de las preguntas planteadas a continuación. Sus respuestas serán evaluadas de manera anónima.

1. **Por favor, indique el número de la comuna en la que se encuentra su Bankomunal.**

2. **Por favor, indique el tiempo requerido de permanencia en comunidad, organización o gremio para ser socio del Bankomunal.**

3. **¿Por cuántos años ha estado su Bankomunal en operación?**

4. **¿Cuántos miembros tiene su Bankomunal?**

5. **¿Mantiene su Bankomunal a todos sus miembros originales?**
   Marca solo un óvalo.
   - Sí
   - No

6. **Por favor, indique el número de mujeres y hombres en su Bankomunal, por separado.**

7. **¿Se ha liquidado a algún socio desde la apertura de su Bankomunal?**
   Marca solo un óvalo.
   - Sí
   - No

8. **¿Han ocurrido casos de total incumplimiento de pago* desde la apertura de su Bankomunal? *véase: el socio no pagó en absoluto.**
   Marca solo un óvalo.
   - Sí
   - No

9. **En promedio, ¿qué tan lejos viven los miembros de su Bankomunal?**
   Marca solo un óvalo.
   - Miembros viven a 1 km o menos de distancia entre ellos (10 minutos caminando o menos)
   - Miembros viven a más de 1 km de distancia entre ellos (más de 10 minutos caminando)

10. ¿Qué tan frecuentes son las asambleas?
Marca solo un óvalo.

- ◯ Una vez al mes
- ◯ Cada dos o tres meses

11. ¿Participa la mayoría de los miembros de su Bankomunal en actividades deportivas y/o políticas y/o religiosas con otros miembros del Bankomunal?
Marca solo un óvalo.

- ◯ Sí
- ◯ No

12. ¿Expulsa el Bankomunal a miembros que no hayan pagado (en absoluto) por sus préstamos?
Marca solo un óvalo.

- ◯ Sí
- ◯ No

13. Aplica el Bankomunal represalias sociales* contra socios que no hayan pagado (en absoluto) por sus préstamos? *véase: escribir sus nombres en lista de infractores, rehusarse a actuar como fiadores, rehusar préstamos monetarios fuera del Bankomunal, deterioro de relaciones sociales.
Marca solo un óvalo.

- ◯ Sí
- ◯ No

Valoración personal

Por favor, responda lo más sincera y francamente posible a las siguientes declaraciones.

14. Yo considero que todos los miembros comprenden claramente la misión, valores y objetivos de mi Bankomunal.
Marca solo un óvalo.

- ◯ Totalmente de acuerdo
- ◯ De acuerdo
- ◯ Ni en acuerdo ni en desacuerdo
- ◯ En desacuerdo
- ◯ Totalmente en desacuerdo

15. Yo considero que todos los miembros de mi Bankomunal comparten los mismos valores de honestidad, transparencia e integridad.
Marca solo un óvalo.

- ◯ Totalmente de acuerdo
- ◯ De acuerdo
- ◯ Ni en acuerdo ni en desacuerdo
- ◯ En desacuerdo
- ◯ Totalmente en desacuerdo

Note: questions 12 and 13 comprising the relational dimension of social capital were omitted from the study, due to issues arousing from the statistical analysis.

Appendix B: Tables

Table 5. Cumulative frequency distribution of the variable *Members understand mission, values and objectives*.

Scale	Frequency	Percent	Cumulative
Strongly disagree = 1	1	1.67	1.67
Disagree = 2	2	3.33	5.00
Neither agree nor disagree = 3	1	1.67	6.67
Agree = 4	22	36.67	43.33
Strongly agree = 5	34	56.67	100.00
Total	60	100.00	

Table 6. Cumulative frequency distribution of the variable *Members share values of honesty, transparency and integrity*.

Scale	Frequency	Percent	Cumulative
Disagree = 2	2	3.33	3.33
Agree = 4	23	38.33	41.67
Strongly agree = 5	35	58.33	100.00
Total	60	100.00	

Table 7. Factor loadings of principal component of structural social capital.

	Component 1
Social interaction ties	.310
Group size	.389
Group stability	.489
Geographical proximity	.414
Meeting frequency	-.0162
Residence time	-.195
Months in operation	-.550

Proportion of variability explained by the component = 0.221

Table 8. Factor loadings of principal component of cognitive social capital.

	Component 1
Members understand mission, values and objectives	.707
Members share values of honesty, transparency and integrity	.707

Proportion of variability explained by the component = 0.832