Institutions and social capital in group lending

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Abstract

Formal institutions and social capital interact with each other in multiple ways. We argue and show empirically at the cross-country level that in the case of group lending, contract enforcement complements bonding social capital and substitutes for bridging one. It means that payoff to social capital in group lending depends on social capital type and is contingent on the quality of contract enforcement which serves as a sorting factor, working in the opposite directions for different stripes of social capital. These results are robust to various estimations, sets of controls, and social capital measures.

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1. Introduction

Over the last few decades, a vast empirical literature has firmly established the high significance of institutions in determining various economic outcomes (see, e.g., Acemoglu et al., 2001; Easterly, Levine, 2003; Rodrik et al., 2004). On a parallel track, culture, defined as a nexus of norms, values, beliefs and attitudes, has been shown to be another important factor in economic development and social welfare (Greif, 1994; Knack and Keefer, 1997; Algan and Cahuc, 2014).[1] These two factors are linked to each other (see, e.g., Tabellini, 2008a), and their interaction remains a matter of considerable scholarship and debate (surveyed in Alesina and Giuliano, 2015).

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[1] Sometimes culture is treated as special kinds of institutions, when the latter are broadly defined as rules of the game in the society. To avoid ambiguity, in this paper "institutions" mean formal institutions (laws, regulations and enforcement thereof, etc.), as opposed to informal ones, which are blended with culture.

On the one hand, institutions and culture serve similar purposes, both being coordination devices, supplying "rules of the game" for economy and society. This makes one expect that institutions and culture are *substitutes*. Indeed, low trust societies and communities, which lack confidence in their grassroots ability for cooperation and coordination, yearn for greater government regulation (Putnam, 1993; Aghion et al., 2010), and formal institutions are brought in to reduce "the cost of disorder." (Djankov et al., 2003)

On the other hand, the performance of formal institutions depends on cultural attitudes and norms in society. For example, regulation could be ineffective due to cultural reasons, such as tolerance for corruption (Aghion et al., 2010), and insufficient acceptance of, and compliance with, official rules in society (Kumlin, Rothstein, 2005; Algan et al., 2016). Similarly, the efficacy of democracy and the rule of law could be compromised by a lack of civic culture (Weingast, 1997; Nannicini et al., 2013). This suggests that culture and formal institutions could also be *complements,* mutually reinforcing each other and creating valuable synergies.

The interplay between formal institutions and culture is important for the assessment of economic payoffs to either of these factors. This includes measurement of payoff to social capital, commonly defined as a nexus of cultural traits required for cooperation and collective action (Putnam, 1993; Halpern, 2004). Earlier empirical studies attempted to establish an unconditionally positive effect of social capital for growth, welfare and other economic outcomes (see, e.g., Knack and Keefer, 1997), but subsequent research revealed a much more nuanced and context-specific picture. First, social capital is a broad and multi-faceted concept (Bjørnskov, 2006), and its various ingredients and components could be unevenly — in magnitude and even direction — connected with economic indicators. Second, payoff to social capital and its elements could be contingent on institutions. Thus, the impact on growth of trust and morality is more pronounced at the cross-country level when institutions are weak (Ahlerup et al., 2008; James, 2015), which suggests that institutions and social capital are substitutes. At the same time, according to James (2015), within a reduced sample of countries with weaker institutions, social capital complements institutions.

The complexity of the interaction between social capital and institutions calls for further studies, including those of specific sectors and types of collective action, where the linkages of interest are more tangible, and hence easier to identify and conceptualize, than at the macro level. In this paper, we follow such a path by exploring the joint role of institutions and social capital in determining the patterns of lending in microfinance, and explaining the reliance on group lending.

Microfinance institutions (MFI) offer group lending as an alternative to the conventional individual loans, especially when the latter are unavailable to poorer households and small businesses that are unable to pledge collateral against a loan. Secured lending is a well-known means to deal with moral hazard and adverse selection, which would otherwise make lending problematic. To unlock access to finance in the absence of secured lending, microfinance institutions, many of them inspired by the Grameen Bank in Bangladesh, resort to group lending. This financial instrument relies on "social collaterals" (Haldar and Stiglitz, 2016), which substitute for unavailable physical collaterals and offer additional assurance that borrowers will not be delinquent on their loans. Early on since its inception, group lending revealed its advantages in loan repayment and on other

counts, and rapidly proliferated across the world, including developed nations (Huppi and Feder, 1990).

In group lending, borrowers form self-selected teams in which they are jointly liable for each other's personal loans; such liability could include joint responsibility to repay all loans and/or shared reputational consequences if some of the loans are not repaid. More generally, under joint liability, all group members are considered in default, if any of the members fails to repay his/her loan (Besley and Coate, 1995). Social collaterals in such arrangements involve mutual assurance and insurance within a team, peer monitoring and pressure (Laffont and Rey, 2003), cross-screening of team members to keep at bay excessively risky, unreliable or dishonest borrowers (Ghatak, 1999), and other similar mechanisms. Group lending thus makes use of local connectedness, grassroots incentives and information to alleviate the moral hazard and adverse selection problems even if physical collaterals are absent. As such, this model has been promoted in the developing world as a practical alternative to individual lending (Yunus and Weber, 2009), and MFIs usually combine individual and group lending in their loan portfolios (Attanasio et al., 2015; Haldar and Stiglitz, 2016).

Group lending is well suited as a testing ground for theories and hypotheses concerning the interplay of formal institutions and cultural traits, especially those related to social capital. First, obtaining and repaying a group loan is a quintessential *collective* action, and as such, it should be rooted in social capital, which embodies social collateral (similarly to physical capital pledged as a conventional tangible collateral in individual lending). Indeed, mutual trust, shared values, social networks, peer monitoring and other ingredients of social capital are all prominent features and prerequisites of collective lending (Postelnicu et al., 2014; Marconatto et al., 2016; Haldar and Stiglitz, 2016). Second, despite the common perception of group lending as a largely informal financial instrument, owing its popularity to a failure of formal institutions to supply property titles over assets that households and businesses own de facto (De Soto, 2003), institutions maintain a substantial role in group lending, which involves loan agreements subject to third-party enforcement, credit score systems, etc.

We argue that *joint* presence, relevance, and interaction of social capital and institutions could be behind the patchwork of findings reported in the earlier studies of the impact of social capital on group lending, and that heretofore loosely associated and sometimes even contradictory observations from those studies can be integrated into a coherent picture once institutions are factored in. In doing so, we explicitly incorporate in our reasoning the asymmetric information problem essential for lending and borrowing. We retain for our analysis a general measure of *contract enforcement*, representing institutions, and distinguish between bonding and bridging types of social capital (Putnam, 2000). *Bonding social capital* facilitates collective action within smaller close-knit groups, typical for group lending, which makes one expect bonding social capital stock to be positively correlated with the scale of group lending, working on the demand side of such transactions. However, this logic breaks down if groups are formed to defraud lenders, or offload onto lenders all risks of zero-liability borrowing. Bonding social capital, which is often characterized by limited "low-radius" trust and morality (Banfield, 1967; Platteau, 2000; Tabellini, 2008b; Greif and Tabellini, 2017), could accommodate and even encourage such unethical behavior, which

could adversely affect the supply side of group lending, making it too risky for lenders. The latter find greater assurance in *bridging social capital,* when trust and morale are not confined to narrow groups and extend beyond the arm's length (generalized trust and morality, as in Platteau, 2000, Tabellini, 2008; James, 2015); however, such version of social capital in and of itself is less conducive to loan team formation and collective action therein. Hence, different stripes of social capital operate on both demand and supply sides of group lending, and their impact is a priori uncertain.

We outline a conceptual framework, in which the impacts of bonding and bridging social capitals on group lending are conditional on the strength of formal institutions. Our logic is centered on the informational asymmetry in group lending, where both "good" and "bad" collective loan applications could be expected, and lenders cannot tell one from the other, creating a well-known "lemons" problem (Akerlof, 1970). A high share of "lemons" among group loan applications pushes up interest rates due to greater risk premium, which could lead to credit rationing by lenders (Stiglitz and Weiss, 1981). Bonding social capital facilitates both types of applications, whereas bridging one makes "lemons" less likely. We argue that due to such effects bridging social capital and contract enforcement *substitute* for each other in group lending, whereas bonding social capital and contract enforcement are *complements*. We also make specific predictions about the impact of different types of social capital on group lending, depending on the strength of contract enforcement, which agree with case studies reported in the earlier literature.

We take these predictions to empirical testing using Microbank Bulletin dataset comprising 450 MFIs from 44 countries for the period of 2006–2010. Our social capital measures are conventionally drawn from the World Values Survey, and the rule of law index — from the Worldwide Governance Indicators (WGI) for the same period. Estimations of regression models combining data from the above sources fully and robustly support our hypotheses, indicating that the impact of social capital on group lending remains undetermined unless different stripes of social capital are considered separately, and until the strength of contract enforcement, serving as a "sorting factor," is factored in. Furthermore, this sorting factor works in opposite directions for bonding and bridging stripes of social capital.

The paper contributes to the literature by offering a conceptual framework for analysis of the role of different types of social capital in group lending, conditional on the strength of formal institutions. This framework provides a unified explanation of diverse results of earlier empirical studies of group lending, which reflect various combinations of institutions and social capital. We demonstrate qualitatively different roles of bridging and bonding stripes of social capital in the same economic activity, and show that both types of social capital could be either assets or liabilities depending on the quality of institutions. Therefore, the paper generates new insights into the interplay between institutions and culture in the presence of informational asymmetry.

The rest of the paper proceeds as follows. Section 2 provides a brief overview of existing literature, Section 3 outlines the theoretical framework, Section 4 describes the methodology and data used in the analysis, Section 5 presents and discusses the results, and Section 6 concludes.

2. Costs, benefits and performance of group lending

The type of lending provided by MFIs depends on the relative advantages and disadvantages of individual vs. group loans. Other things being equal, small-scale entrepreneurs in developing countries normally prefer to borrow as individuals, just as observed in developed countries, since entrepreneurs typically do not want to be monitored and directed by others and/or be responsible for someone else's performance. However, in the absence of tangible collaterals, or in an environment where collecting on a collateral is prohibitively costly, individual lending becomes problematic, and group lending emerges as a practical alternative. Group lending enables previously excluded borrowers to jointly create "social collateral" and use it to secure otherwise unavailable credit (Conning, 1996).

Group lending received significant attention in the literature, both theoretically and empirically. Theoretical studies highlight comparative advantages and disadvantages of group vs. individual lending, and in particular focus on how "social collaterals" can alleviate the adverse selection and moral hazard problems through team formation and monitoring. Ghatak (1999) stresses an informational advantage of group members who belong to a homogenous close-knit community and hence are better informed about each other's projects than the lender; this mitigates the adverse selection problem and makes possible positive assortative matching in a borrowing team, which lowers borrowing costs, improves loan repayment rates, and ultimately delivers Pareto-superior outcomes. Varian (1990) demonstrates that self-selection and cross-monitoring also reduce moral hazard, leading to lower equilibrium interest rates and higher efforts of the borrowers, and ultimately, once again, to Pareto-improving outcomes.

A number of influential papers address within-group monitoring and enforcement issues and other relational advantages of group lending. Stiglitz (1990) argues that joint liability (cosigning) creates sufficiently strong cross-monitoring incentives, especially in smaller groups, although at the same time it places extra risk on group members, rather than on lenders, who are usually better able to handle risks. This dilemma leads to more homogeneous borrower groups, which are able to obtain credit on better terms. Joint liability could involve the denial of access to future loans if the group as a whole fails to pay its collective due (promise of a stream of future loans if those already extended are repaid is an incentive commonly used in group lending programs offered by MFIs; see Ghatak and Guinnane, 1999). Community members tied by a joint liability are better able than outsiders to ascertain the performance of a borrowing team member, and apply non-financial sanctions if necessary (such as rebuke, stigma, ostracism etc.) even when conventional financial sanctions are unavailable.

Besley and Coate (1995) point to a mutual insurance effect in group lending, whereby successful members help unsuccessful ones when the latter receive poor returns on their projects, making collective repayment more likely, and hence reducing the risk premium in the interest rates. However, the downside of group lending is in the possibility of the group's collective default even when some group members could have repaid their loans under individual lending contracts. In one of the first attempts to explicitly include social capital in group lending analyses, the authors argue that the strength of informal social sanctions that group members impose on their non-performing peers tilts the above tradeoff in

favor of group lending, which due to social collateral delivers higher repayment rates than individual lending.

Overall, comparative advantages of group lending over individual lending summarize as follows:

(i) Group members, being jointly liable for paying back a loan, have an incentive to monitor each other, which they can presumably do better than the lender. This alleviates the moral hazard problem, making fellow group members de facto agents of the lender;

(ii) Group members have an additional incentive to perform lest they lose reputation among their peers, which also contributes to moral hazard mitigation;

(iii) Group members are selected by their peers who have an incentive to keep "black sheep" out, thus addressing the adverse selection problem;

(iv) Group members provide mutual insurance against individual failures that would have resulted in a default in the case of individual lending. This makes group lending preferable and less risky for lenders in the case of judgement proof borrowers.

However, group lending also carries significant disadvantages and additional risks in comparison to individual lending, which are as follows.

(i) Multiplicity of borrowers increases the transaction costs of negotiating and advancing a loan and of collection of what is due to the lender;[2]

(ii) Loan repayment poses a collective action problem, where free riding could be expected;

(iii) Each member is exposed to the risk of additional costs generated by the failure of the other members' projects;

(iv) Individual efforts are "strategic complements"—a lack of efforts by some of the group members makes group loan repayment more problematic, which weakens the performance incentives for others;

(v) Assortative matching in group formation produces a more homogeneous group, but homogeneity (e.g., similarity of skills and types of projects) can make individual risks more correlated, which increases the riskiness of the entire group loan (Paxton et al., 2000).

Reflecting these benefits and costs, numerous empirical studies present a mixed picture of successes and limitations of group lending. Thus, in Mongolia, access to group lending increases consumption and boosts entrepreneurship, whereas access to individual lending has no such effects (Attanasio et al., 2015). In Kenya, Kodongo and Kendi (2013) found that group lending is better in mitigating loan delinquency than individual lending. However, field research in the rural Philippines found no statistical difference in terms of repayment rates between the two types of lending (Giné and Karlan, 2014). Moreover, higher repayment rate at the group level may conceal project failures inside the groups; thus, in India, a significant proportion of group members default on their loans, while groups at large repay their collective obligations (Nandhi, 2012; Haldar and Stiglitz, 2016).

Empirical research is also ambiguous on the profitability of the two types of lending to MFIs. While Cull et al. (2007) found that MFIs that focus on providing

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[2] Notice, however, a countervailing argument made in (Ghatak and Guinnane, 1999) that transaction cost per individual loan project could be lower in the case of collective lending due to the economies of scale.

loans to individuals are more profitable, another study by Kar (2011) shows that MFIs can increase their profitability and self-sufficiency through implementing solidarity-group loan method. Cull et al. (2007) find that the proportion of poor clients and female borrowers in the loan portfolio is lower in MFIs with individual lending than in MFIs that focus on lending to groups. This suggests that individual-based MFIs focus more on wealthier clients, a phenomenon known as "mission drift," and group lending is less prone to such deviation.[3]

Some empirical studies confirm the importance of monitoring and within group enforcement, indicating that social capital stock plays an important role. Wydick (1999) provides evidence that group lending works due to social cohesion and better information exchange, by assessing the incidence of moral hazard within credit groups in Guatemala. However, Hermes et al. (2005) show that peer-to-peer monitoring does little to alleviate moral hazard within credit groups in Eritrea, which is done more effectively by group leaders. Nandhi (2012) shows that in India around 20% of clients defaulted on their loans, and more than 25% of them were willful, or strategic, defaulters. Consequently, a defaulter's loan became a financial burden for other members, which increased their effective interest rate from below 20% to more than 30%, depending on how many defaulters were in the group. Giné et al. (2011) find that the probability of a borrower's default is higher if the fraction of defaulters in a group rises, revealing default complementarity, listed above among disadvantages of group lending. The repaying members exerted peer pressure on those who intended to default, but their ability to do so was limited by tenuous group cohesion. Moreover, the existence of willful defaulters also indicates that enforcement is not always effective.

The above evidence highlights the relevance of institutional and socio-cultural factors for the performance and effectiveness of group lending. In the next section, we outline a conceptual framework, which identifies such factors and generates testable hypotheses about their joint impact for group lending.

3. Role of institutions and social capital in group lending

As argued in the Introduction, since group lending is a collective undertaking, the capacity for collective action, known as social capital, should be relevant for the success of this MFI instrument. Indeed, the concept of social capital, variously defined and interpreted, features prominently in the microfinance and group lending literature (see, e.g., surveys in Postelnicu et al., 2014; Marconatto et al., 2016; for a general discussion of the role of social capital in group lending see Haldar and Stiglitz, 2016). Various empirical studies provide massive evidence that social connectedness, strength of peer pressure and grassroots sanctions, likelihood of opportunistic behavior and other measures and/or correlates of social capital are essential parts of "social collateral" and hence have significant effect on group lending.

The concept of social capital allows multiple interpretations, which are extensively debated in the literature (see, e.g., Halpern, 2004; Ostrom and Ahn, 2007; Jackson, 2020). There are several traits and features in the stable core of these perspectives and definitions, which include trust and trustworthiness; reciprocity;

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[3] Lending to women was a hallmark of Grameen strategy, contributing both to its viability and poverty alleviation (Haldar and Stiglitz, 2016).

behavioral norms; and social networks (see, e.g., Ostrom, 1990). Social networks maintain bonds, cohesion, information sharing, and mutual support. Norms of behavior, which are parts of social capital, reflect pro-social (other-regarding) preferences and incentives that internalize consequences of individual choices for communities and rule out opportunistic behavior, which, while individually profitable, could cause external costs for other team members. In addition, social capital could cultivate a sense of duty to enforce good conduct across the team and sanction violators (see, e.g., Fehr and Gächter, 2002). As argued earlier, such grassroots social sanctions give group lending a competitive edge over individual loans, when the conventional financial sanctions involving a collateral are unavailable (Ghatak and Guinnane, 1999).

Obviously, all of the above factors facilitate the formation of borrowing teams that are prospective recipients of group loans and increase teams' confidence in accepting collective liability for loan repayment and in the ability to successfully implement projects of team members. This, in its turn, gives lenders additional assurance in loan repayment, true to the spirit of "social collateral."

The literature draws a distinction between different types of social capital as contributing factors to group lending. One important distinction is between "bonding" social capital confined to smaller close-knit communities and ultimately to borrowing groups, and "bridging" one, encompassing large segments of the society (see, e.g., Putnam, 2000). Bonding social capital is characterized by a "low radius of trust" and moral permissiveness of opportunistic behavior against outsiders ("limited morality," according to Platteau, 2000), whereas instances of bridging social capital cooperation and ethical behavior are not limited to close-knit groups ("generalized morality").

One could expect that bonding social capital should have more immediate bearing on group lending, which requires collective action within small teams, and this is indeed what Cassar et al. (2007) demonstrate in an experimental setting, where personal trust between participants in microfinance game was found to be more important for group loan repayment than general trust in the society. However, Postelnicu et al. (2014) stress the importance of external social ties of group borrowers (in the spirit of the "strength of weak ties" concept, due to Granovetter, 1973), as they increase the weight of social collateral by entailing broader and hence heavier social sanctions against dishonest or opportunistic behavior. This observation is consistent with greater success of group lending in rural areas, where social networks are usually denser than in cities and towns. In a similar vein, Wydick (1999, p. 474) cautions that if social ties within groups are too strong, it could weaken peer pressure inside a group, "making threats of expulsion from the group [of non-performing group members] more difficult and less credible." Such effect could defuse grassroots sanctions and thus devalue social collateral.

Furthermore, the payoff to bonding social capital in group lending is uneven across countries and societies. According to Gomez and Santor (2003), in Canada borrowing groups with higher stocks of bonding social capital showed better loan repayment. The opposite effect was observed in Thailand, where Ahlin and Townsend (2007) found negative correlation between the strength of social ties within groups and loan repayment.

A possible explanation of such discrepancy could be in the strength of formal institutions, which affect the payoff to social capital in group lending. According

to Haldar and Stiglitz (2016), both the conventional external enforcement[4] and social capital (due to joint liability) play their roles in collective loan repayment, and excessive reliance on one of these factors and neglect of the other puts group lending in jeopardy. Marconatto et al. (2016) argue that in developing countries with weaker formal institutions "network social capital" is essential for the success of group lending, pointing to substitution between formal institutions and social capital. The same authors, however, find that stronger contract enforcement in common law countries increases the payoff to social capital, which suggests that formal institutions and social capital could also be complements.

The assortment of "fascinating, but somewhat contradictory results" (Cassar et al., 2007, p. F88) of empirical microfinance studies calls for a systematic conceptual framework that would (i) be consistent with the existing evidence from various case studies, and (ii) generate testable hypotheses for a cross-country empirical analysis of the role of social capital in group lending. In developing such a framework, we follow the earlier literature in retaining bonding and bridging stripes of social capital and considering those in conjunction with external contract enforcement, which characterizes formal institutional environment. All of these factors could be operating on the demand and/or supply side of group lending.

Our logic, briefly outlined in the Introduction, elaborates as follows. First, bonding social capital helps in the formation of smaller borrowing groups and in sustaining cooperation inside such groups. This effect makes group members more willing and better able to be engaged in collective undertakings. However, group lending unlocks two types of group applications, first of which are bona fide low-risk (for short—"good") borrowing projects, and the second—high-risk or fraudulent ("bad") projects, comprising "willful defaulters" or excessively risky projects. Bonding social capital is a hatchery for both types of group projects, as it enables collective action and collaboration within smaller groups irrespective of the goal of the collective action. The goals could be either to collectively repay a loan required for a good project (in which case group members monitor and/or assist each other), or just to obtain a loan for a group with a bad project, when group members are aware that the project is too risky or even fraudulent, and collude with each other against the lender. Bonding social capital in and of itself puts no filters to bad projects due to limited morality and low radius of trust within small project groups, so it is possible that group members have no scruples about offloading external costs of collective opportunistic behavior upon outsiders—in the case of collective loans, upon lenders.[5] This is consistent with the above observation by Wydick (1999) that strong in-group social ties could devalue social collateral, when such ties are among those in cahoots against a lender.[6] Co-existence of good and

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[4] A written contract between a lender and a borrower might not be present in microfinance, in which case the contract we refer to could be implicit. Nonetheless, even implicit or unwritten contracts can be enforced via various formal means. Also, the state and judiciary are not the only institutions involved in contract enforcement, which can also be accomplished by other means, e.g., through the system of credit scores.

[5] This illustrates the possible "dark side" of bonding social capital, when group members seek joint benefits at the expense of outsiders (Portes, 1998; Putnam, 2000).

[6] In Wydick's (1999) empirical analysis, the payoff to social ties in group loan repayment is statistically insignificant, supporting our argument that such ties could work to opposite ends in different types of projects. The same paper observes weak payoff to peer pressure (measured by a professed moral obligation to repay and willingness to pressure others to do the same), but finds significant payoff to mutual insurance, which would obviously be limited to good projects, where it would indeed have a positive impact on repayment.

bad group projects facilitated by bonding social capital causes informational asymmetry and creates a "lemons" problem for lenders (Akerlof, 1970).

Higher stock of bonding social capital increases the aggregate demand for group loans, potentially adding more of both good and bad project applications. However, the mix of such increase depends on contract enforcement institutions. If the latter are strong, "lemon" projects would be brought to effective collection, or ruin the credit ratings of applicants, and hence such projects would be less appealing and perhaps altogether avoided, staying "outside the equilibrium path." Therefore, all or nearly all of the demand for group loans increases, fueled by bonding social capital, and would comprise good projects, which lenders would willingly fund. This leads to a conclusion that under strong contract enforcement the incremental contribution of bonding social capital to group lending is *positive,* and this is exactly what was observed by Gomez and Santor (2003) for Canada.

Weaker rule of law makes the marginal effect of bonding social capital for group lending weaker, too. Indeed, laxer contract enforcement increases the appeal of bad projects, since opportunistic borrowing teams stand better chances to get away with those. It means that "lemons" comprise an increasing share of aggregate demand. Lenders respond to greater risks of borrowers' default by raising interest rates to include higher risk premium.[7] This triggers an adverse selection response, whereby bad project applicants stay, being less sensitive or not sensitive at all to higher interest rates, and good ones withdraw their applications, since higher interest rates make the intended repayment increasingly problematic. Such asymmetric response spoils the project mix even further. If this adverse selection effect on the *demand* side is strong enough, the *supply* of group loans by lenders shrinks due to increased riskiness of the loan portfolio (as in Stiglitz and Weiss, 1981), leading to credit rationing. The supply becomes the short side of the market, and its reaction leads to contraction of group lending.

Monotonic increase of the marginal effect of bonding social capital in the strength of contract enforcement means that these two factors *complement* each other in group lending. Whether this complementarity is pronounced enough to pull the marginal effect of bonding social capital in the negative territory when contact enforcement is poor, is a priori unclear, but evidence from some developing countries, including the aforementioned study of Thailand (Ahlin and Townsend, 2007), indicates that this might well be the case.

We now turn to bridging social capital, which is based on broadly applicable ethical norms, trust, and reciprocity, extending beyond smaller groups, and which reduces the likelihood of opportunistic behavior even against socially distant victims, including lenders. Such cultural traits give lenders extra assurance that borrowers would be implementing their projects in good faith and do not intend to defraud lenders and/or take advantage of zero (tangible) liability and select excessively risky projects. Thus, bridging social capital affects the supply side of unsecured lending, where its role is similar to formal contract enforcements, making these two factors *substitutes.*[8]

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[7] Recall that according to Nandhi (2012) the presence of "willful defaulters" pushes up interest rates in group lending.

[8] This prediction is consistent with the findings of macro level cross-country analyses, revealing substitution between general trust and trustworthiness, which are the key ingredients of bridging social capital, and institutions as factors of economic growth (Ahlerup et al., 2008; James, 2015).

This means that, in agreement with the literature reviewed above, social capital could be, depending on its type, either the substitute of, or complement to, formal institutions. In both cases payoff to social capital monotonically depends on the strength of contract enforcement, making the latter a sorting factor in relation between social capital and group borrowing, but such a factor works in the opposite directions for bonding and bridging types of social capital.

To gain better insight into the impact of bridging social capital, conditional on the strength of institutions, consider first the case of weak contract enforcement. In such an environment, general morale and trust of bridging social capital are the only assurance devices against the "lemons," and as such facilitate group lending. A high stock of bridging social capital greatly reduces the lending risks, making good projects predominant in the loan portfolio, and suppresses the adverse selection effect that would otherwise put limits to group lending. Low-risk portfolio pulls down interest rates, which further increases the number of good applications with little if any rise of bad ones, and the group loan portfolio expands. Therefore, against the backdrop of weak contract enforcement, bridging social capital makes a *positive* contribution to group lending (which mirrors its role at the macro level, as established in Ahlerup et al., 2008; James, 2015).

Substitution between the rule of law and bridging social capital makes one expect that as contract enforcement grows stronger, the significance of bridging social capital should be declining. Again, it is an empirical question whether the payoff to bridging social capital turns negative over the higher range of contract enforcement—this could be expected if bridging social capital helps eliminate the few remaining "lemons," which lenders were willing to tolerate in predominantly low-risk loan portfolios.

The above discussion summarizes to the following testable hypotheses.

Hypothesis BO1. Bonding social capital and contract enforcement are *complements* is group lending.

Hypothesis BO2. When contract enforcement is strong, bonding social capital has a *positive* marginal impact for group lending. When contract enforcement is weak, the sign of the bonding social capital's impact is theoretically uncertain, but is expected to be negative.

Hypothesis BR1. Bridging social capital and contract enforcement are *substitutes* in group lending.

Hypothesis BR2. When contract enforcement is weak, bridging social capital has a *positive* marginal impact for group lending. When contract enforcement is strong, the sign of the bridging social capital's impact is ambiguous in theory but is expected to be negative.

It is noteworthy that individual lending should be much less sensitive to social capital stocks than a group lending. This is particularly clear in the case of bonding social capital, which by definition facilitates collective action in small groups, and as such is idled in individual lending. Bridging social capital, in its turn, affects social collateral, essential for group lending, but has no bearing on physical collateral, which underpins individual lending, and therefore the latter is less affected by bridging social capital as well. This means that the above hypotheses about the impact of social capital of both types on group lending should also hold for *shares* of group lending in MFI portfolios (the rest of portfo-

lios comprise individual loans). We make use of such extension in the empirical analysis that follows.

In contrast, formal institutions should be expected to be relevant both for group and individual lending. One channel of such influence is the ease of obtaining property titles on assets owned de facto, that would allow for the pledging of such assets as tangible collaterals for individual loans. It is well known since de Soto (2003) that excessive red tape and onerous regulation of entry leave massive assets in the informal sector and obstruct access to finance (to which group lending could be an institutional response). Furthermore, streamlined contract enforcement increases the efficacy of secured lending. It is plausible that all else being equal, individual entrepreneurs tend to prefer obtaining loans by themselves. If this is the case, as opportunities for individual lending improve due to stronger formal institutions, the scale of individual lending should increase at the expense of shrinking group lending segment. However, due to the aforementioned interaction between institutions and social capital as factors of group lending, such "crowding out" of group loans by individual ones in response to better contract enforcement should be conditional on the size of social capital stocks.

While some of the above hypotheses find occasional support in the cases presented in the earlier literature, our paper brings them together in a systematic and coherent way. We now turn to testing these hypotheses directly at the cross-country level. Such sample selection is determined by the nature of our research question, i.e., to study the joint impact on group lending of institutions and social capital. While the former can exhibit significant variations between various communities and localities, the latter varies between larger jurisdictional units, in particular across countries, which in the next section are our observations.

4. Data

Our main variable of interest is a measure of group lending by MFIs. There are three basic models of lending employed by such institutions: solidarity group, village banking and individual loans. We lump solidarity group and village banking in the group lending category, whereas the balance is individual lending. Data on lending methodology employed by MFIs come from Microbank Bulletin (MBB). Information is provided for 450 MFIs from 71 countries for the period of 2006-2010. Unfortunately, our data source does not provide information on the volume of group lending, and we focus instead on the proportion of MFIs in a given country that deal in group lending. This variable (hereafter *Group*) in fact reflects the *relative* scale of group lending vs. individual loans, but as explained at the end of the previous section, it is suitable for testing our hypotheses on the role of social capital, conditional on formal institutions, in group lending. Our data is insufficient for a well-balanced panel, and we instead resort to cross-sectional analysis at the country level. Limitations of the data on independent variables introduced below leave a sample of 44 countries, listed in the Appendix A.

We conventionally use World Values Survey (WVS) data to evaluate social capital in different countries. This global research project explores people's values and beliefs and provides information on trust, integrity, tolerance, solidarity, attitudes

to community life and government institutions, etc. Theoretical descriptions of bonding and bridging social capital by Szreter and Woolcock (2004) have been employed to identify thirteen WVS survey questions to measure different dimensions of social capital.

To gauge bonding social capital, we use three questions that are related to trust within various close-knit groups, including trust in people respondents know personally and in people within their family and neighborhood (1 — trust completely, 2 — somewhat, 3 — not very much, 4 — no trust at all).

To measure bridging social capital, we select ten questions related to general social trust, reciprocity and civic responsibility. Some questions ask respondents to evaluate their trust in people that they met for the first time, people of another nationality and people of another religion. Responses to these questions use a 4-point scale (from 1 — trust completely to 4 — not trust at all). Another question, "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?," particularly popular in empirical social capital studies (Knack and Keefer, 1997; Ahlerup et al., 2008; Algan and Cahuc, 2014), uses a binary response scale (1 — most people can be trusted, 2 — need to be very careful). The question "Most people would try to take advantage of you if they got a chance or would they try to be fair?" which characterizes trustworthiness, has a 10-point response scale (1 — would take advantage, 10 — try to be fair). Other questions ask participants to mention groups from a list that they would not like to have as neighbors: people of a different religion, people who speak another language, people of a different race, and immigrants. Based on how many of these four groups are mentioned by the respondent (0 — no, 1 — yes), we create a score between 0 and 4.

To measure adherence to moral norms, we select four questions related to the acceptance of some forms of unethical or unlawful behavior, such as: cheating on taxes if you have a chance; dodging a fare on public transport; claiming government benefits to which you are not entitled; and accepting a bribe in the course of someone's duties. James (2015) used these questions to calculate a generalized morality index. We list the WVS questions selected for our analysis and the technical details in Appendix B.

We aggregated the answers to the above questions into three variables — *Narrow Trust* (*NT*), *General Trust* (*GT*), and *Integrity* (*IN*) — using conventional factor analysis described in Appendix B. Narrow trust serves as a proxy for bonding capital while general trust and integrity reflect different aspects of bridging social capital.

Following earlier literature (e.g., Nunn, 2007), we use World Governance Indicators' (WGI) Rule of Law index as a proxy for the strength of contract enforcement (*CE*) and property rights protection. The Worldwide Governance Indicators aggregate a large number of surveys and other cross-country assessments of governance. Rule of Law captures "perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence" (Kaufmann et al., 2009).

To test the hypotheses listed in the previous section, we use the above measures of social capital and contract enforcement, and interactions thereof, as

independent variables in regression models with the share of group lending as the dependent variable. We include in our regressions different sets of control variables with potential relevance for group lending. Thus, MFI portfolios could be affected by the overall performance of the country's financial sector (Rajan and Zingales, 2003). Financial development reflects how easily funds are accessible for any entrepreneur with a sound project, as well as the confidence of investors in earning an adequate return. Conventional financial sector could compete with MFIs, especially for larger borrowers or borrowers with a previous relationship with the MFI, and hence a measure of financial development is a natural control variable in our analysis. We use information on financial development from the World Bank Financial Development Database, which includes measures of depth, access, efficiency, and stability of financial systems.

Another control variable, the Gini coefficient, measures income inequality in the country, and thus reflects the degree of poverty, which is relevant to the availability of collateral and, therefore, might play a role in the choice of lending methodology. We employ World Bank estimates of the Gini coefficients expressed in percent. In addition, we use the World Bank data on real per capita GDP, which also reflects the availability of collateral, and more generally, accounts for differences in the degree of development across countries.

Finally, we control for Legal Origin (1 for common law, 0 otherwise) to account for different approaches to property and contracts, which is a convention in comparative institutional analyses.

Since the data on lending methodology employed by MFIs is provided for the period of 2006–2010, the data on financial development, Gini coefficient and per capita GDP are also averaged for the same period. Per capita GDP is calculated based on purchasing power parity and 2011 dollars were used to convert current dollars. For social capital data, we calculate measures of the bonding and bridging social capital by averaging the relevant data from several waves of the World Values Survey (1990–2014), which is justifiable by slow changes in cultural indexes (Roland, 2004).

Full descriptions of main variables and their sources, and the descriptive statistics are presented in Appendix C.

5. Empirical results

In order to test the hypotheses formulated in Section 3, we need to model the non-linear relationship between group lending and our main variables. We do this by introducing pairwise interactions between Contract Enforcement and different components of social capital: Integrity, General Trust and Narrow Trust. Specifically, we estimate the following regressions:

$$Group = \beta_0 + \beta_1 CE + \beta_2 GT + \beta_3 IN + \beta_4 NT + \beta_4 CE \times GT +$$
$$+ \beta_5 CE \times IN + \beta_6 CE \times NT + \gamma X + \varepsilon, \qquad (1)$$

where *Group* denotes the share of group lending in the country; *CE*, *GT*, *IN*, and *NT* stand for Contract Enforcement, General Trust, Integrity, and Narrow Trust, respectively; and *X* is a vector of control variables described in the previous section.

The use of interactions between institutions and social capital is essential to properly estimate their effects. This is because according to our hypotheses, the effects of social capital have opposite signs, depending on the strength of formal contract enforcement. Therefore, in a simple linear regression the coefficients might be insignificant because the effects of social capital at different levels of formal rule of law would be canceling each other and their signs would be theoretically indeterminate. This is precisely what we observe in a model without interaction terms where the coefficients of our main variables of interest are statistically insignificant (see Appendix E).

Employing the interaction terms between the measures of social capital and the rule of law naturally allows for the empirical tests of our hypotheses. For example, in order to test hypothesis BO1, we need to evaluate the coefficient of the product of the bonding capital measure (NT) and the measure of formal contract enforcement (CE). Since we hypothesize that bonding capital and the rule of law are complements, we expect the coefficient of their product to be positive, implying that stronger formal contract enforcement increases the positive effect of Narrow Trust on the propensity of MFIs to engage in group lending.

Our second hypothesis, BO2, states that the impact of Narrow Trust on group lending depends on the strength of contract enforcement. When the latter is strong, Narrow Trust positively affects the propensity for group lending. Conversely, when the rule of law is weak, the effect of Narrow Trust becomes theoretically uncertain, but, as we argued earlier, it is most likely negative. Therefore, to test this hypothesis we need to use an empirical specification that allows for the dependence of the marginal effect of Narrow Trust, $\left[\frac{\partial(Group)}{\partial(NT)} \right]$, on the strength of formal contract enforcement. This is accomplished by the formulation in (1) where

$$\frac{\partial(Group)}{\partial(NT)} = \beta_4 + \beta_7 CE. \tag{2}$$

For the marginal effect in (2) to be positive for high values of CE and negative for low ones, requires that $\beta_4 < 0$ and β_7 to be sufficiently highly positive (specifically, $\beta_7 \widehat{CE} \gg \beta_4$, where $\widehat{CE}$ denotes maximum possible value of contract enforcement). Similar considerations apply to our expectations of the signs of other coefficients implied by hypotheses BR1 and BR2. Namely, we expect β_2 and β_3 to be positive while β_5 and β_6 to be sufficiently strongly negative, implying that bridging capital and formal contract enforcement are substitutes and making marginal effects of bridging capital change signs from positive to negative as formal contract enforcement increases. The estimates presented below strongly support all of our hypotheses.[9]

We estimate equation (1) using OLS and Tobit. The latter is a more appropriate specification because MFIs in five of our 44 countries do not use group lending, implying that we have a significant share of observations of the dependent variable bunched at one of the extremes.

Estimation results of the above equation are reported in Table 1. These results fully support Hypotheses BO1 and BR1: bonding (bridging) social capital and

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[9] We use Stata's margins procedure to calculate these marginal effects and their standard errors.

Table 1
Estimation results.

Variables	OLS			Tobit		
	(1)	(2)	(3)	(4)	(5)	(6)
Contract enforcement	1.201	1.564*	0.859	1.978**	2.809***	2.076***
	(0.162)	(0.088)	(0.205)	(0.029)	(0.001)	(0.000)
General trust	0.915**	0.705	0.649	1.559***	1.707***	1.598***
	(0.035)	(0.157)	(0.129)	(0.003)	(0.001)	(0.000)
Contract enforcement × General trust	−3.091**	−2.821**	−2.610**	−5.315***	−6.325***	−5.921***
	(0.010)	(0.045)	(0.028)	(0.001)	(0.000)	(0.000)
Integrity	0.804*	0.903**	0.559	1.351**	1.727***	1.328***
	(0.082)	(0.030)	(0.104)	(0.023)	(0.000)	(0.000)
Contract enforcement × Integrity	−2.422*	−2.774**	−1.703*	−4.158**	−5.200***	−4.000***
	(0.057)	(0.028)	(0.096)	(0.015)	(0.000)	(0.000)
Narrow trust	−0.830	−0.843	−0.597	−1.491**	−1.726***	−1.424***
	(0.113)	(0.109)	(0.169)	(0.022)	(0.001)	(0.000)
Contract enforcement × Narrow trust	3.300**	3.180**	2.750**	5.637***	6.440***	5.805***
	(0.031)	(0.031)	(0.020)	(0.010)	(0.000)	(0.000)
Logarithm of per capita GDP		−0.149***	−0.097**		−0.214***	−0.155***
		(0.004)	(0.036)		(0.000)	(0.001)
Gini coefficient		−0.002	−0.003		0.002	0.000
		(0.728)	(0.492)		(0.761)	(0.978)
Financial development		0.209	0.047		0.456	0.259
		(0.495)	(0.855)		(0.125)	(0.241)
UK legal origin			0.296***			0.286***
			(0.000)			(0.000)
Constant	−0.242	1.080**	0.813*	−0.521**	0.945*	0.665*
	(0.221)	(0.049)	(0.067)	(0.024)	(0.065)	(0.082)
R-squared	0.264	0.422	0.582			

Notes: Robust *p*-values are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All regressions are based on 44 observations.
Source: Authors' calculations.

contract enforcement are complements (substitutes) for group lending. Across all specifications, coefficients of interaction terms are significant and positive for the narrow trust index, which proxies bridging social capital, and negative for both proxies of bridging social capital—general trust and integrity. The statistical significance of interactions is particularly high—almost always at the 1% level—for Tobit specifications, more appropriate in our case.

The results for marginal effects of all three measures of social capital are presented in Figs. 1–3.

Again, we find strong confirmation of our hypotheses. Indeed, according to Fig. 1, the (marginal) impact of bonding social capital on group lending is positive when contract enforcement is strong but turns negative under weak contract enforcement. This is exactly what Hypothesis BO2 predicts, including the role of contract enforcement as a sorting factor in determining the role of bonding social capital.

We observe mirror reflection pictures for both measures of bridging social capital (Figs. 2 and 3), which is in accordance to Hypothesis BR2. The impact of bridging social capital for group lending is positive and significant for low levels of contract enforcement (for both measures of bridging social capital, echoing, resp., Ahlerup et al., 2008, and James, 2015), but turns negative, and also significant, when contract enforcement improves. In these cases, contract enforcement
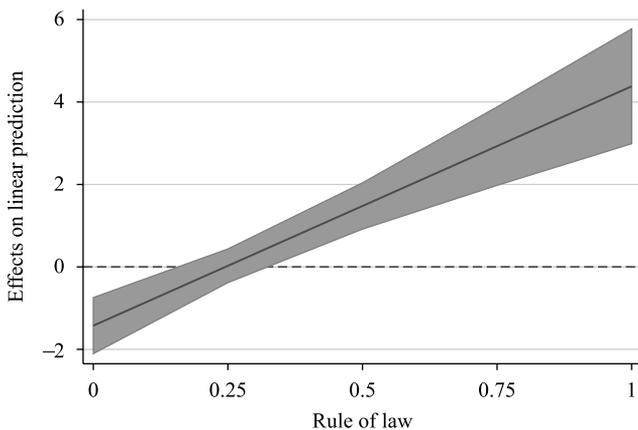
Fig. 1. Marginal effect of narrow trust on group lending.
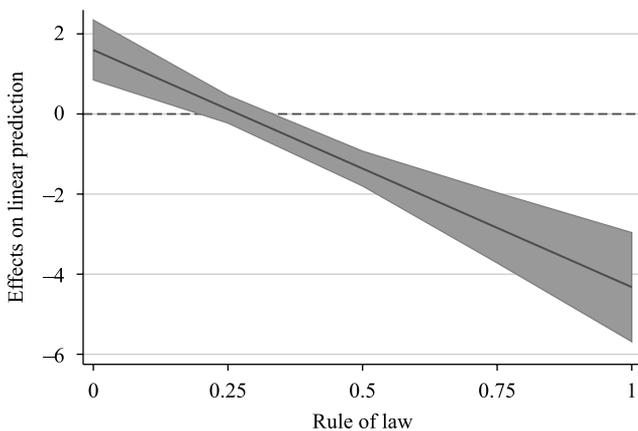*Source:* Authors' calculations.

Fig. 2. Marginal effect of general trust on group lending.
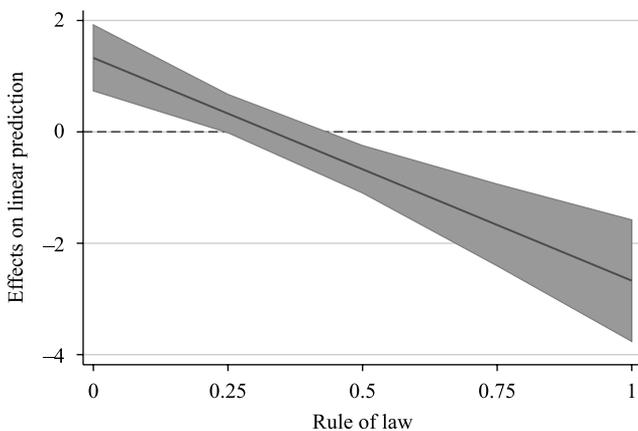*Source:* Authors' calculations.

Fig. 3. Marginal effect of integrity on group lending.
Source: Authors' calculations.

remains a sorting factor, but it now works in the opposite direction, as predicted by our conceptual analysis.

The coefficients of our main variables of interest and their marginal effects are robust to the inclusion of several other control variables. As another robustness checks, we replace the principal components used as social capital measures by answers to specific questions from the World Values Survey, that appear to be most representative for the broad categories of narrow trust, general trust, and integrity. To this end, we retain the following questions for the above categories: "Trust people known personally" for narrow trust; "Most people can be trusted" for general trust; and "Not justified to claim government benefits to which you are not entitled" for integrity. The results shown in Appendix D are qualitatively indistinguishable from those based on the principal components. In particular, they also strongly support our hypotheses.

The above empirical analysis demonstrates high degree of robustness of our findings and conclusions to variations in controls, estimation techniques and social capital measurement.

6. Conclusions

Group lending has been a significant institutional innovation that allowed MFIs to service clients without tangible collateral, thus sidestepping a major obstacle to secure finance and ultimately to economic development. Group lending relies on social collaterals as a palliative means to deal with moral hazard and adverse selection, inherent in credit markets. As such, it is based both on cultural traits, especially those relevant for collective action, and institutions inherent to lending and borrowing. Hence, group lending presents a natural case for analysis of the interplay between institutions and social capital. Furthermore, it allows to isolate the impacts of bonding and bridging stripes of social capital and show that they are contingent on the quality of contract enforcement.

Bonding and bridging social capitals play different roles in group lending—the former facilitates the formation of borrowing groups and cooperation therein but gives no assurance against moral hazard that concerns the lender, whereas the latter provides such assurance by upholding integrity and universal morality that straddle over group boundaries and make moral hazard less likely. These effects operate on different sides of financial markets, affecting, respectively, demand for and supply of group loans. Contract enforcement is an alternative third party means to prevent opportunistic behavior and keep moral hazard in check, and as such, it substitutes for bridging social capital, which is embedded in norms and values and serves a similar purpose in group lending. Therefore, contract enforcement and bridging social capital substitute for each other, which can be clearly seen in the data. On the other hand, contract enforcement reinforces the payoff to bonding social capital in group lending, by allowing to make use of the capacity for collective action within small borrowing teams, while putting roadblocks to "lemon" projects, to which bonding social capital alone is not a filter.

These arguments are rather general and can be applied to other markets and types of collective action, where teams are engaged in various transactions with outside counterparts. One specific example would be a team of workers contracting with a customer for a small construction project such as replacing

a roof or building a deck, where the customer pre-pays for a substantial portion of the work. Another example is coproduction of urban infrastructures in Brazil described in Ostrom (1996). In this arrangement, citizens participate in the design and construction of the ''condominial'' feeder lines linked to a larger trunk line of the sewage system, and then commit to paying the maintenance and operating fees after the system is completed. Whether the citizens would actually live up to this commitment presumably depends on both social capital and formal contract enforcement. In all such instances, patterns of interactions between social capital and formal institutions similar to those reported in this paper can be expected. Empirical verification of such predictions in cases other than group lending is beyond the scope of this paper and is left to future research.

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Appendix A. List of countries

Argentina	Ethiopia	Mexico	Russia
Armenia	Georgia	Moldova	Rwanda
Azerbaijan	Ghana	Montenegro	Serbia
Brazil	Haiti	Morocco	South Africa
Bulgaria	India	Nigeria	Tunisia
Burkina Faso	Indonesia	Pakistan	Turkey
Chile	Jordan	Palestine	Ukraine
China	Kazakhstan	Peru	Uruguay
Colombia	Kyrgyzstan	Philippines	Uzbekistan
Ecuador	Malaysia	Poland	Vietnam
Egypt	Mali	Romania	Zambia

Appendix B. Derivation of narrow trust, general trust and integrity measures

We use the following WVS questions to construct our main variables.
Bonding social capital
- Trust people in neighborhood
- Trust people in family
- Trust people known personally

Bridging social capital
- Trust people met for the first time
- Trust people of another nationality
- Trust people of another religion
- Most people can be trusted
- Most people try to be fair
- Would not mind having as neighbors: people of different race, different religion, different language, immigrants
- Not justified to claim government benefits to which you are not entitled
- Not justified to avoid a fare on public transport
- Not justified to cheat on taxes if you have the chance
- Not justified to accept a bribe
- Due to opposite order of responses to different questions, some of the responses were reversed so that higher scores always reflect higher social capital.

To aggregate the relevant questions from WVS into composite indexes, we begin with data compression by exploratory factor analysis (EFA) using principal component extraction with promax rotation. This is a standard approach to identify latent constructs from a larger set of correlated variables (Finch and West, 1997; Fabrigar and Petty, 2001; Norris and Lecavalier, 2010).

Next, we employ confirmatory factor analysis (CFA) to test the consistency of the factors with the nature of the proposed construct. The aim of conducting the CFA is to test the fit of the data and hypothesized research model (Pituch and Stevens 2015), i.e. the CFA is conducted to confirm the validity and reliability of latent variables (factors). Prior to factor analysis, we perform Bartlett's test for sphericity and the Kaiser–Meyer–Olkin (KMO) Measure of Sampling Adequacy to ensure appropriateness of such aggregation approach. Both tests confirm this, with p-value = 0.000 for Bartlett test and KMO = 0.898 being higher than 0.5, both safely within the conventional limits.

Next, we turn to exploratory principal factor analysis, using scree plot of eigenvalues (Fig. B1).

Initially, there are four factors above the eigenvalue 1 threshold. Pituch and Stevens (2015) recommend retaining factors with loadings higher than 0.4. Moreover, the difference in factor loadings should be greater than 0.2 in order for them to be unique. After analyzing factor loadings for all items, the following variables are dropped from subsequent analysis:
- Trust people of another religion
- Would not mind having as neighbors: people of different race, different religion, different language, immigrants
- Most people try to be fair

Next, we perform factor analysis on the remaining ten items with consequent oblique rotation of factors assuming that constructs would be correlated. As
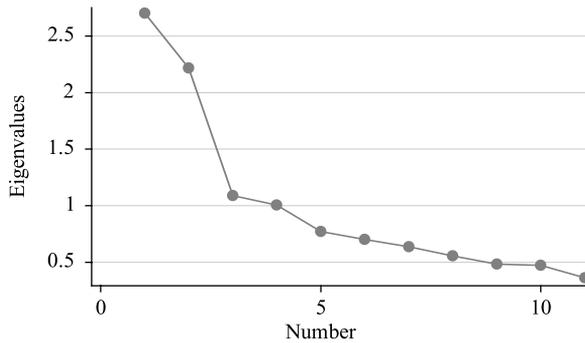
Fig. B1. Scree plot of eigenvalues.

Source: Authors' calculations.

Table B1
Rotated factor loadings (pattern matrix).

Item	Narrow trust	General trust	Integrity
Trust people in family	0.875		
Trust people in neighborhood	0.657		
Trust people known personally	0.513		
Most people can be trusted		0.648	
Trust people met for the first time		0.792	
Trust people of another nationality		0.752	
Not justified to claim government benefits to which you are not entitled			0.748
Not justified to avoid a fare on public transport			0.786
Not justified to cheat on taxes if you have the chance			0.825
Not justified to accept a bribe			0.804

Source: Authors' calculations.

Table B2
Cronbach alpha coefficient.

Factor	Scale reliability Cronbach alpha coefficient
Narrow Trust	0.69
General Trust	0.74
Integrity	0.79

Source: Authors' calculations.

a result, we retain three factors, interpreted as Narrow Trust, General Trust, and Integrity. Narrow Trust social capital includes various measures of trust within a smaller group (such as family, neighbors, friends, etc.), while General Trust reflects trust in people outside of such groups. Integrity reflects rejection of un-lawful/unethical behavior even against socially distant parties such as the state. Rotated factor loadings are as follows (Table B1).

Next, we calculate Cronbach's alpha coefficients for each factor to measure the reliability of factors and their internal consistency, that is, how closely the items within a factor are related to each other (Table B2).

Pituch and Stevens (2015) suggest that in exploratory factor analysis the values of Cronbach alpha coefficient be greater than 0.7. Based on that recommendation, variables in all factors are sufficiently closely related as a group and, therefore, could be carried on for further analysis.

Appendix C. Main variables

Table C1
Definitions and sources of variables.

Variables	Definition
Group lending	Proportion of MFIs in the country that employ group lending. Source: The MIX platform (https://www.themix.org/) and authors' calculations.
Contract enforcement	Rule of Law index. Source: World Governance Indicators: https://databank.worldbank.org/source/worldwide-governance-indicators
Integrity	Social capital aspects related to attitude toward civic duty and responsibility. Source: World Values Survey (http://www.worldvaluessurvey.org/WVSDocumentationWVL.jsp) and authors' calculations.
Narrow trust	Social capital aspects that reflect aspects of trust within a group (might include a family, neighbors, friends, etc.). Source: World Values Survey (http://www.worldvaluessurvey.org/WVSDocumentationWVL.jsp) and authors' calculations.
General trust	Social capital aspects reflecting trust for people outside of own group. Source: World Values Survey (http://www.worldvaluessurvey.org/WVSDocumentationWVL.jsp) and authors' calculations.
Financial development	Composite index of financial development. Source: World Bank Financial Development Database (https://databank.worldbank.org/source/global-financial-development).
Gini coefficient	Gini coefficient measures income inequality in the country. Source: World Development Indicators (https://datacatalog.worldbank.org/dataset/world-development-indicators).
Per capita GDP	Real per capita GDP in PPP terms in 2011 U.S. dollars. Source: World Development Indicators (https://datacatalog.worldbank.org/dataset/world-development-indicators).
UK legal origin	A dummy variable that takes on a value of 1 for common law countries (British legal origin), and 0 otherwise. Source: La Poprta et al. (1999).

Table C1
Descriptive statistics.

Variable	Descriptive statistics			
	Mean	Std. dev.	Min	Max
Group lending	0.566	0.314	0	1
Descriptive statistics for individual survey questions				
Most people can be trusted	1.264	0.441	1	2
Not justified to claim government benefits to which you are not entitled	8.427	2.481	1	10
Not justified to avoid a fare on public transport	8.437	2.426	1	10
Not justified to cheat on taxes if you have the chance	8.728	2.237	1	10
Not justified to accept a bribe	9.180	1.830	1	10
Trust people in family	3.801	0.491	1	4
Trust people in neighborhood	2.883	0.815	1	4
Trust people known personally	2.983	0.783	1	4
Trust people met for the first time	1.961	0.789	1	4
Trust people of another nationality	2.210	0.859	1	4
Descriptive statistics for factors generated by factor analysis				
Integrity	−0.070	0.487	−1.725	0.523
General trust	−0.168	0.307	−1.006	0.414
Narrow trust	−0.050	0.422	−1.690	0.692
Integrity (standardized)	0.736	0.217	0	1
General trust (standardized)	0.590	0.216	0	1
Narrow trust (standardized)	0.688	0.177	0	1

Table C1 *(continued)*

Variable	Descriptive statistics			
	Mean	Std. dev.	Min	Max
Descriptive statistics for other variables				
Contract enforcement	−0.403	0.550	−1.343	1.301
Contract enforcement (standardized)	0.356	0.208	0	1
Financial development	0.357	0.157	0.061	0.641
Gini	43.653	10.297	26.700	63.200
Ln(GDP)	8.151	0.905	5.693	9.366
UK legal origin	0.159	0.370	0	1

Source: Authors' calculations.

Appendix D. Regression results based on single questions

In this Appendix, rather than using principal components, we present the estimates based on answers to single questions in the WVS. We present both OLS and Tobit regressions (Table D1). As in the regressions using principal components, we find strong confirmations of Hypotheses BO1 and BR1: contract enforcement and narrow trust are complements, whereas general trust and integrity substitute for contract enforcement. Marginal effects of social capital measures, shown in Appendix D, also follow the predicted patterns and are qualitatively undistinguishable from Fig. D1 (based on the estimates in Table D1), re-confirming Hypotheses BO2 and BR2.

Table D1
Results for group lending with interaction terms (based on single questions).

Variables	OLS			Tobit		
	(1)	(2)	(3)	(4)	(5)	(6)
Contract enforcement	0.680	0.835	0.540	0.800	0.924[*]	0.637[*]
	(0.200)	(0.183)	(0.238)	(0.119)	(0.081)	(0.092)
General trust	0.989[***]	0.999[***]	0.847[***]	1.194[***]	1.195[***]	1.035[***]
	(0.004)	(0.005)	(0.005)	(0.001)	(0.000)	(0.000)
Contract enforcement × General trust	−3.960[***]	−3.907[***]	−3.265[***]	−4.881[***]	−4.872[***]	−4.178[***]
	(0.001)	(0.003)	(0.002)	(0.000)	(0.000)	(0.000)
Integrity	0.557[*]	0.638[**]	0.328	0.821[***]	0.955[***]	0.601[**]
	(0.059)	(0.026)	(0.194)	(0.008)	(0.001)	(0.021)
Contract enforcement × Integrity	−1.988[***]	−2.020[**]	−1.443[**]	−2.997[***]	−3.091[***]	−2.385[***]
	(0.009)	(0.013)	(0.023)	(0.001)	(0.000)	(0.000)
Narrow trust	−0.410[*]	−0.577[**]	−0.418[*]	−0.653[***]	−0.843[***]	−0.653[***]
	(0.076)	(0.015)	(0.078)	(0.007)	(0.000)	(0.003)
Contract enforcement × Narrow trust	2.659[***]	2.549[***]	2.092[***]	3.803[***]	3.686[***]	3.108[***]
	(0.000)	(0.001)	(0.002)	(0.000)	(0.000)	(0.000)
Logarithm of per capita GDP		−0.117[**]	−0.075[*]		−0.153[***]	−0.105[**]
		(0.015)	(0.092)		(0.002)	(0.020)
Gini coefficient		−0.002	−0.005		−0.002	−0.005
		(0.602)	(0.263)		(0.694)	(0.274)
Financial development		0.315	0.141		0.592[*]	0.383
		(0.311)	(0.577)		(0.081)	(0.152)
UK legal origin			0.271[***]			0.267[***]
			(0.002)			(0.001)
Constant	−0.086	0.952[**]	0.863[*]	−0.147	1.112[**]	0.987[**]
	(0.573)	(0.049)	(0.053)	(0.316)	(0.019)	(0.022)

Note: Robust *p*-values are in parentheses; [***] $p < 0.01$, [**] $p < 0.05$, [*] $p < 0.1$. All regressions are based on 44 observations.
Source: Authors' calculations.

(a) "Trust people known personally"

(b) "People can be trusted"

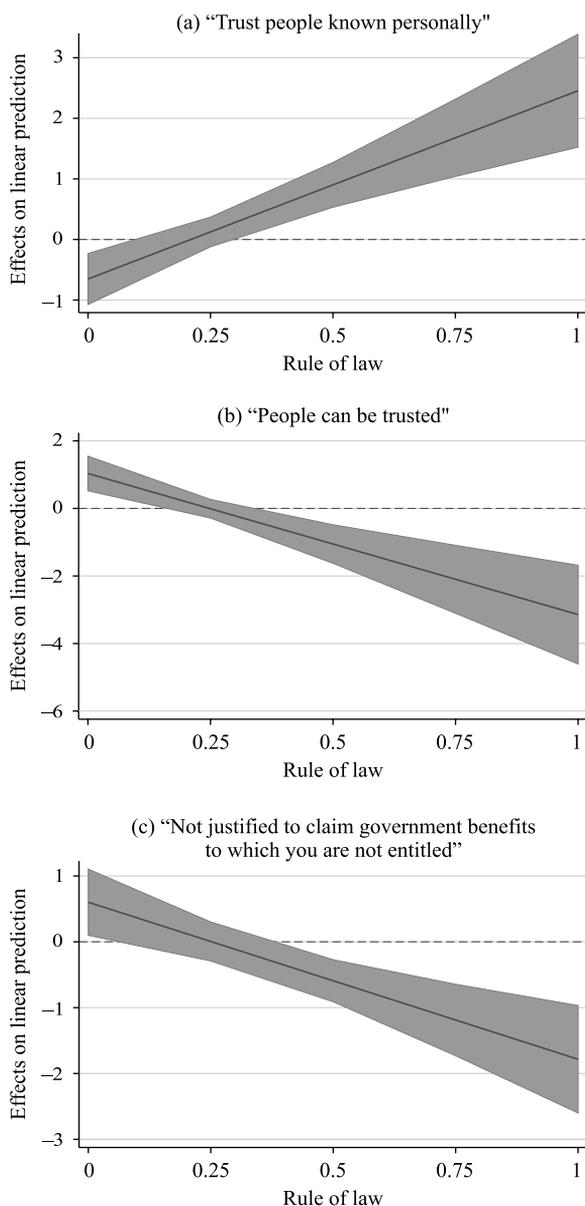(c) "Not justified to claim government benefits to which you are not entitled"

Fig. D1. Marginal effect of integrity on group lending.

Source: Authors' calculations.

Appendix E. Regression results without interaction terms

In this Appendix, we present the results of regressions without interaction terms using both the principal components (Table E1) and single questions data (Table E2). Specifically, we estimate the following regressions specification:

$$Group = \beta_0 + \beta_1 CE + \beta_2 GT + \beta_3 IN + \beta_4 NT + \gamma X + \varepsilon. \tag{E1}$$

As noted in the main text, the coefficients of the institutional and social capital variables are not statistically significant at 5% confidence level.

Table E1
Estimation results for the principal components data (no interaction terms).

Variables	OLS			Tobit		
	(1)	(2)	(3)	(4)	(5)	(6)
Contract enforcement	−0.123	0.002	−0.063	−0.184	−0.112	−0.164
	(0.558)	(0.994)	(0.698)	(0.419)	(0.582)	(0.337)
General trust	−0.248	−0.362	−0.328	−0.317	−0.439*	−0.397*
	(0.248)	(0.103)	(0.107)	(0.196)	(0.072)	(0.063)
Integrity	−0.086	−0.071	−0.078	−0.097	−0.020	−0.044
	(0.701)	(0.711)	(0.649)	(0.723)	(0.930)	(0.824)
Narrow trust	0.440	0.357	0.359	0.519	0.431	0.427
	(0.142)	(0.232)	(0.180)	(0.146)	(0.203)	(0.145)
Logarithm of per capita GDP		−0.168***	−0.115***		−0.207***	−0.146***
		(0.001)	(0.010)		(0.000)	(0.004)
Gini coefficient		−0.002	−0.005		−0.001	−0.004
		(0.628)	(0.302)		(0.902)	(0.461)
Financial development		0.473	0.250		0.711*	0.445
		(0.172)	(0.323)		(0.084)	(0.125)
UK legal origin			0.327***			0.341***
			(0.002)			(0.001)
Constant	0.217*	1.717***	1.379***	0.218	1.897***	1.529***
	(0.084)	(0.000)	(0.001)	(0.107)	(0.000)	(0.000)
R-squared	0.066	0.241	0.461			

Note: Robust *p*-values are in parentheses; *** *p* < 0.01, ** *p* < 0.05, * *p* < 0.1. All regressions are based on 44 observations.
Source: Authors' calculations.

Table E2
Estimation results based on single questions (no interaction terms).

Variables	OLS			Tobit		
	(1)	(2)	(3)	(4)	(5)	(6)
Contract enforcement	−0.118	−0.072	−0.089	−0.175	−0.186	−0.188
	(0.589)	(0.728)	(0.595)	(0.455)	(0.397)	(0.286)
General trust	−0.212	−0.201	−0.136	−0.263	−0.266	−0.191
	(0.278)	(0.388)	(0.481)	(0.211)	(0.272)	(0.323)
Integrity	−0.228	−0.137	−0.261	−0.296	−0.171	−0.303
	(0.300)	(0.546)	(0.141)	(0.228)	(0.466)	(0.104)
Narrow trust	0.466**	0.268	0.262	0.552**	0.336	0.324
	(0.027)	(0.295)	(0.230)	(0.023)	(0.233)	(0.164)
Logarithm of per capita GDP		−0.126**	−0.071		−0.154***	−0.092*
		(0.015)	(0.169)		(0.008)	(0.092)
Gini coefficient		−0.002	−0.005		−0.001	−0.005
		(0.694)	(0.302)		(0.846)	(0.359)
Financial development		0.458	0.188		0.688	0.374
		(0.222)	(0.477)		(0.121)	(0.217)
UK legal origin			0.347***			0.363***
			(0.001)			(0.001)
Constant	0.251**	1.331***	1.095**	0.266**	1.499***	1.230**
	(0.020)	(0.007)	(0.038)	(0.020)	(0.006)	(0.027)
R-squared	0.131	0.213	0.449			

Note: Robust *p*-values are in parentheses; *** *p* < 0.01, ** *p* < 0.05, * *p* < 0.1. All regressions are based on 44 observations.
Source: Authors' calculations.