

FRIENDS, FAMILY, AND FOOLS: CO-SIGNERS AND REPAYMENT RATES IN MICROCREDIT.

Evidence from Italy

Lucia dalla Pellegrina^{*} and Antonio Scollo[♦]

Abstract. We use data of a leading microfinance provider in Italy in the period 2009-2011 in order to investigate the effects of kinship relations between borrowers and co-signers on repayment performance. By carrying out estimates on a pool of 1,078 borrowers – with and without co-signer – we find a negative relationship between having (closely related) co-signers and repayment rates. By concentrating on the sole sample of 591 co-signed loans and instrumenting the strength of the relationship between borrowers and co-signers with a variable measuring the likelihood of finding a next-of-kin potential guarantor we find that results are reverted. We also explore the possibility that this effect is due to either expected or actual co-signers' financial support finding only partial evidence for this hypothesis. A positive relation between borrowers' repayment performance and their proximity to the co-signer may be the expression of the fact that individuals related to the borrower by strong social ties are also likely to exert more credible influence and control than other individuals.

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^{*}Department of Economics (DEMS) University of Milano-Bicocca and Centro Baffi Bocconi University. Corresponding author: lucia.dallapellegrina@unibocconi.it

[♦] School of Economics, Bocconi University.

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1. Introduction

Relationship networks play a fundamental role in credit access. Although measuring the extent and intensity of social relationship may be problematic under several perspectives, such as the mere issue of finding a univocal definition of “intensity”, the microfinance literature is showing growing attention on this topic.

Relatively recently, in fact, microfinance has increasingly departed from the traditional model of group lending in favor of other forms of individual credit which rely more on mechanisms other than standard group-based joint liability in order to enforce repayment. Given the relatively poor environment where micro-lenders operate, however, such mechanisms still need to find substitutes of physical collateral.

Finding and further evaluating the extent of the pressure exerted by various forms of social collateral on borrowers’ performance – where the latter may be conceived as either direct behavior such as effort devoted to the activities financed through microcredit or indirect behavior reflected in repayment rates – is thus becoming increasingly appealing and challenging at the same time. This paper concentrates on co-signed loans.

Loans co-signed by third parties are common in many developed countries and have recently received positive appraisal (see for example Klonner and Rai (2008) on repayment performance in “organized” rotating savings and credit associations, and Karlan et al. (2009a) for an assessment on co-signing mechanisms in microfinance in Peru). Under some circumstances co-signing mechanisms even seem to perform better than traditional and more consolidated forms of group-based micro-lending. Bond and Rai (2006), for example, analyze lending contracts where social sanctions are used to enforce repayment and borrowers differ in their abilities to impose sanctions, finding that co-signed loans are preferred to group-lending when the power of imposing sanctions is unequal among individuals.

In particular, our empirical analysis aims at investigating whether and how the intensity of social ties between borrowers and their co-signers, mainly reflected in closer kinship relations, has some effect on repayment performance.

We draw data on 1,078 loans from PerMicro database in the period 2009-2011. PerMicro is a micro-lending institution operating in Italy since 2007. It grants individual loans for start-up activities, as well as consumer credit to people of several different ethnicities. Loans are normally

extended to new borrowers provided that they are supported by either a co-signer or a network, generally a religious one.

We have detailed information on the kind of relationship linking borrowers and co-signers, as well as the reimbursement schedule describing all payments made by PerMicro customers. Information is available for both borrowers who have extinguished their position with PerMicro (either because they have finished repaying their loan or due to restructuring and default) and those having outstanding loans.

Using standard linear regression techniques on the full sample of borrowers we find that having a co-signer who is more closely related to the borrower by intense kinship worsens repayment rates with respect to repayment exposure (average number of unpaid installments) and average delays. However, concentrating on the sub-sample of borrowers with co-signed loans, and using an instrument which is related to the likelihood of finding closely related co-signers in Italy, our conclusions are reversed. Borrowers having siblings, spouses and next of kin co-signers are more likely to show lower exposure rates and less frequent delays in their installment repayment schedule compared to borrowers being linked to their co-signers by weaker ties.

The paper is organized as follows. In the next section we contextualize the research question with respect to the outstanding literature; in Section 3 we describe the dataset, while in Section 4 we illustrate the empirical analysis. Section 5 concludes.

2. Literature Background

Among the most relevant contributions explaining how credit markets and borrowers' behavior may be influenced by social relationships, Karlan et al. (2009b) show that highly clustered networks tend to create social collateral, which in turn is relevant for having access to credit. Bryan et al. (2012) stress the point of access to lending with attention to co-signed lending, showing that such practice helps those new to the credit market to leverage the assets of their co-signers (often family members) in order to build credit opportunities.

In an asymmetric information perspective, Stiglitz (1990) argues that the practice of co-signing loans increases access to credit since it transfers risk from the bank to the co-signer, thus reducing peer monitoring costs and eventually the cost of borrowing. Besanko and Thakor (1987) also

previously demonstrated that the presence of a co-signer who increases collateral availability always strictly improves borrower welfare, solving adverse selection problems. In a similar vein, Gangopadhyay and Lensink (2005) developed a model that provides economic rationale for co-signing, confirming that banks can solve adverse selection problems by offering a co-signed contracts that induce risky and safe firms to group together.

Besides fostering access to credit markets, it has been observed that co-signing mechanisms can influence credit performance of borrowers who have been admitted to credit programs, although both the sign and the dimension of the associated effects is still under intense investigation.

In this scenario, it is important to stress that the association between a given borrower and a given co-signer is the final outcome of a process involving demand for a guarantor and supply of guarantees. As for the first of these two elements, Karlan et al. (2009a) point out that the evaluation of asking someone to act as co-signer includes a monetary value, such as better credit conditions (i.e. lower interest rate and collateral, and/ or a larger principal), as well as other non-monetary features, such as the psychological cost of asking someone for help. As for the evaluation of the convenience to supply guarantees, the decision of co-signing someone else's loan involves the altruistic benefit to the co-signer from helping the borrower, and the monitoring and enforcement effort exerted by the co-signer herself. For instance, according to Jaunaux and Venet (2009) responsible guarantors would not co-sign a loan if they did not think the applicants were trustworthy and that their businesses would be able to repay the loan. In all these circumstances a number of selection issues are involved. Related to this, another important element that needs to be accounted for is the role of microfinance institutions in selecting borrowers having or not having co-signers, and especially having particular types of co-signers.

With regard to the intensity of the relationship between borrowers and co-signers, evidence is rather lacking and does not lead to univocal conclusions. On the one hand, it is common belief that pressure from family and close neighbors would keep borrowers honest and make them more easily repay their loans. For example, Johnstone and Marcucci (2007) show that fellow borrowers might be particularly appreciated by lenders as co-signers, not necessarily because they are in a position to assume a defaulted obligation or have property that can be confiscated or wages that can be attached, but because they are likely to know the whereabouts of the defaulting borrower. These special co-signers would also be liable, insofar as they could, to help track the defaulting borrower. On the other hand, however, excess-solidarity could potentially undermine lenders' confidence in co-signers' ability to exert effective pressure, so that the threat exerted by the latter may also be deceptive or even end up with adverse outcome. In addition, selection issues may

provide evidence of a negative relationship between the intensity of co-signing practices and repayment performance. Klonner and Rai (2008), for example, show that the number of co-signers is positively correlated with defaults, arguing that this may occur because borrowers who have high default risk are asked for more co-signers.

For such reasons, different types of co-signers are often appraised with regard to the kind or extent of their relationship with the borrower. Karlan et al. (2009a), for instance, carried out a field experiment in two Lima shantytowns to measure the relative importance of the social distance between the borrower and the co-signer. They find that relieving responsibility of the co-signer reduces repayment rates of borrowers guaranteed by direct friends but has no effect when the guarantor is a non-friend, suggesting that different social mechanisms operate between friends and strangers. They also show that repayment rates for loans with fully responsible co-signers are not significantly different when the co-signer is a friend and when the co-signer is an indirect friend, thus concluding that non-friends may be more willing to co-sign safer borrowers, while friends also accept borrowers with lower expected repayment capabilities because of arguments related to social collateral and altruism.

Often kinship is interpreted as having a fundamental role in defining the intensity of the relationship. According to the FHA (Federal Housing Administration), in fact, mortgage eligibility requires that a co-borrower or a co-signer have no financial stake in the transaction. Sellers, builders, or real estate agents, are such an example. Exceptions, however, may be granted if the seller and co-borrowers/co-signers are related to the buyer-borrower by blood, marriage or law, thus reverting in some sense the excess-solidarity paradigm, although leaving the consequences of the intensity of the relationship an open issue.

Most important, it has been argued that some non-monetary components of co-signing should vary with social distance: borrowers presumably find it easier to ask friends and relatives for support rather than asking to strangers. One reason for this preference may be that the non-monetary cost of asking a close relative to co-sign is lower for the borrower. The other reason could have an opportunistic nature, since the borrower feels legitimate to rely on relatives' assets as a buffer in case of default, and therefore exert lower effort in making the loan productive.

However, having closer relatives as co-signers does not necessarily imply that borrowers adopt any harmful behavior expecting that in this way guarantors more easily step in repaying on their behalf. The possibility that a close relative's assets are seized may instead act the other way around. Johnstone and Marcucci (2007), for example, argue that the most direct and prevalent

guarantor of student loans in much of the world is a co-signer, usually a parent or other family member who has assets that can be cost-effectively seized in the event the borrower defaults.

Furthermore, co-signers related to the borrower by strong social ties may exert more credible influence and control than other individuals. In fact, recourse to guarantors is typically equivalent to threaten to harm the reputation of dubious borrowers by making their lack of reliability public (to the neighbors in particular). Leider et al. (2010), for example, support this view arguing that co-signers are likely to behave more altruistically about their friends since owning more information regarding their types and should therefore find it easier to enforce repayment.

Nevertheless, in the economic literature there is still small and incomplete evidence about the effect of closely related co-signers vs. more socially distant ones on the borrower's credit performance. There is also scarce attention towards separating the effects of demand and supply of guarantees, and, even more frequently, towards accounting for the process of borrower selection exerted by both micro-lenders and potential guarantors. The result is that empirical analyses are conducted in presence of such (often contrasting) elements, which may lead to inconclusive outcomes. The main objective of this paper is trying to shed light on some of these issues using micro-level data on loans provided by a well-established microfinance operator in Italy.

3. Data

Data have been drawn from a database of 1,078 individuals who have been customers of PerMicro in the period from September 1, 2009 to May 31, 2011 (observation date). These are the universe of PerMicro borrowers who have either finished repaying their loan, or have an outstanding loan on which they have paid at least 12 installments. We start investigating on the full sample of borrowers, although we will concentrate most part of the analysis on a sub-sample of 591 of them having a co-signer.

The lending activity is carried out by twelve branches unselectively located in the North Central area of the country. All agencies operate through individual lending and in 40 per cent of the cases they are located in the town where the borrower lives (*same_town* in Table 2).

Loans are repaid through a variable number of monthly installments (*l_install_nr*) with a minimum of 12 and a maximum of 60. More in detail, 408 (37 per cent of the cases) credit agreements have been extinguished, either because the borrower has repaid on a regular basis (140 cases), or she has finished paying installments before the due date (78 loans), or even because the previous contract has been closed in order to open a new one, often involving a larger principal (190 cases). In 45 cases debt have been fully (21) or partially (24) restructured, while 93 are defaults, 34 of which have been passed to recovery by means of a specific legal procedure. Details are reported in Table 1.

Table 1 - Loan state: extinguished, outstanding, default

	Freq.	Percent	Cum.
Extinguished in advance	78	7.24	7.24
Extinguished regularly	140	12.99	20.2
Extinguished for refinancing	190	17.63	37.9
Outstanding	532	49.35	87.2
Fully restructured	21	1.95	89.2
Partially restructured	24	2.23	91.4
Legal recovery procedure	34	3.15	94.5
Default	59	5.47	100

Source: PerMicro database, 2009-2011

As reported in Table 2, the loan average principal (*l_gross*) is euro 4,983, with a minimum of euro 876 and a maximum of euro 26,500. The average amount of installments (*l_install_amount*) is euro 190. Expenditure amounts to about 3 per cent of the gross amount lent (*l_exp*), while the interest rate (*l_irate*) ranges from 6 to 16 per cent depending on the declared purpose of the loan and other characteristics of the borrower. Most of the loans are accorded 12 per cent interest rate. Collateral is never required.

Table 2 – Summary statistics on the full sample of borrowers

Variable: description	Variable: label	Obs	Mean	Std. Dev.	Min	Max
Year of birth	<i>birth_year</i>	1078	1970	10	1937	1992
Gender (male=1)	<i>gender</i>	1078	0.46	0.50	0	1
Education (5=BA; 4=A;	<i>edu</i>	1078	3.41	1.15	0	5

3=technical; 4=secondary; 1=primary, 0=no)						
Marital status (dummy: married=1)	<i>d_married</i>	1033	0.40	0.28	0	1
Number of children	<i>n_child</i>	1055	1.29	1.31	0	8
House (dummy: ownership=1)	<i>d_house_own</i>	1009	0.14	0.34	0	1
Length of staying in Italy (normalized: 1=Italian)	<i>it_since</i>	1078	0.92	0.14	0.1	1
Knowledge of Italian language (4=mother; 3=very good 2=good; 1=basic, 0=no)	<i>it_lang</i>	1078	2.45	0.93	0	4
Monthly wage (euro)	<i>wage</i>	1059	834.70	468.47	0	2600
Other income (euro)	<i>other_inc</i>	1059	223.27	287.16	0	2500
Send money home (dummy: yes=1)	<i>money_home</i>	1078	0.53	0.50	0	1
Monthly savings (euro)	<i>savings</i>	1050	646.41	1098.51	0	29878
Loan: type (dummy: 1=production purposes)	<i>l_type</i>	1033	0.20	0.40	0	1.00
Loan: principal (euro)	<i>l_gross</i>	1059	4983.32	2944.35	876	26500
Loan: interest rate (%)	<i>l_irate</i>	1021	11.78	1.37	6	16
Loan: other expenditure (euro)	<i>l_exp</i>	1021	148.80	94.83	14.62	842.16
Date loan starts (normalized, in days)	<i>l_start</i>	1021	390	166	0	655
Installments: number	<i>l_install_nr</i>	1033	29.37	12.22	12	60
Installments: amount (euro)	<i>l_install_amount</i>	1059	189.60	78.65	20	596
Network guarantee (dummy: yes=1)	<i>net</i>	1078	0.31	0.46	0	1
Borrower and PerMicro agency are in the same town (dummy: yes=1)	<i>same_town</i>	1078	0.40	0.49	0	1
Borrower is self-employed (dummy: yes=1)	<i>d_job_aut</i>	1058	0.19	0.39	0	1
Borrower has permanent work (dummy: yes=1)	<i>d_contr_indet</i>	1056	0.76	0.43	0	1
Borrower has a co-signer (dummy: yes=1)	<i>d_co_yes</i>	1078	0.55	0.50	0	1
Co-signer type (see Table 3 for classification)	<i>co_type</i>	1078	1.27	1.59	0	5
Borrower has a close co-signer (dummy: yes=1)	<i>d_co_type_close</i>	1078	0.22	.41	0	1
Co-signer: CRIF (1=bad; 2=mid; 3=good)	<i>co_crif</i>	548	2.33	0.55	1	3
Co-signer: income (euro)	<i>co_income</i>	567	1048.89	509.72	130	5787

Source: PerMicro database, 2009-2011

Guarantees may be of two types: co-signers and networks. The most substantial difference between the two is that the former is jointly liable with the borrower in case of default. Co-signers are also required to pay late charges, fines, and penalties if the original borrower fails to do so. Community networks, instead, only provide an informal guarantee that the borrower has sound social background, given that she belongs to a, normally publicly esteemed, community.

Co-signers are normally required by lenders when their customers are borrowing for the first time. First-time borrowers are typically not endowed with any officially shared credit rating (CRIF in Italy) because they have no credit history for the bank to rely on. It is implicit then, that co-signers' credit rating (*co_crif*) is always checked and considered in the loan-acceptance stage. On the other hand, potential borrowers having a low CRIF are refused a loan, while others may freely choose whether presenting a co-signer or not. Normally the latter option is chosen when the amount needed is higher than what is expected to be accorded by the lender, although it is not excluded that borrowers may ask a co-signer for strategic purposes (i.e. they intentionally default on the loan betting on repayment by the co-signer). Generally, when co-signers are provided on a voluntary basis, lenders are more frequently willing to relax credit constraints and/or grant better terms and conditions. In our dataset, for example, we have observed that PerMicro accords higher principal to loans guaranteed by co-signers. Apart from this feature, however, PerMicro does not accord any other facilities on co-signed loans (see below).

We have information regarding both the share of co-signed loans (55 per cent) and the kinship relation between each borrower and her co-signers. Co-signers are classified in five categories 1) friends and neighbors; 2) relatives; 3) siblings; 4) spouses; 5) next of kin (parents, daughters and sons). This information has been first converted into a dummy taking value one when a co-signer is present (*d_co_yes*). Then a rough measure of the strength of the borrower-co-signer relationship has also been constructed (*co_type*) by ranking co-signers in the order provided above, such as that higher scores should reflect stronger kinship relations. This is a proxy of the extent to which solidarity and mutual assistance can take place and will be discussed more in detail in the remainder of the paper. We considered a second binary variable indicating whether the kinship relation between borrowers and co-signers is a strong one. This dummy (*d_co_type_close*) takes value 1 when co-signers are either siblings, spouses, or next of kin.

A variable indicating the involvement of other guarantees has also been considered. This dummy (*net*) takes value one when a religious or ethnic community, or another kind of socially recognized association has provided informal guarantees regarding the borrower's reliability.

Table 3 – Repayment exposure and delays by co-signers

Average repayment exposure (expos_aver)						
Variable	variable code	Obs	Mean	Std. Dev.	Min	Max
<i>d_co_yes</i>	0 (no co-signer)	487	0.46	1.07	0	9.95
	1 (borrower has a co-signer)	591	0.59	1.28	0	11.92
<i>co_type</i>	0 (no co-signer)	487	0.46	1.07	0	9.95
	1 (friends and neighbors)	284	0.48	1.10	0	7.36
	2 (other relatives)	72	0.49	1.12	0	5.69
	3 (siblings)	57	0.81	1.05	0	4.54
	4 (spouses)	119	0.63	1.40	0	10.17
	5 (next of kin)	59	0.90	2.02	0	11.92
<i>d_co_type_close</i>	0 (no co-signer, friends and neighbors or other relatives)	843	0.47	1.08	0	9.95
<i>d_co_type_close</i>	1 (co-signers are next of kin, spouses, or siblings)	235	0.74	1.51	0	11.92
Average repayment delay (delays_aver)						
Variable	variable code	Obs	Mean	Std. Dev.	Min	Max
<i>d_co_yes</i>	0 (no co-signer)	487	0.12	0.18	0	0.95
	1 (borrower has a co-signer)	591	0.13	0.19	0	0.93
<i>co_type</i>	0 (no co-signer)	487	0.12	0.18	0	0.95
	1 (friends and neighbors)	284	0.12	0.18	0	0.93
	2 (other relatives)	72	0.11	0.20	0	0.85
	3 (siblings)	57	0.20	0.19	0	0.67
	4 (spouses)	119	0.16	0.24	0	0.92
	5 (next of kin)	59	0.14	0.19	0	0.92
<i>d_co_type_close</i>	0 (no co-signer, friends and neighbors or other relatives)	843	0.12	0.18	0	0.95
<i>d_co_type_close</i>	1 (co-signers are next of kin, spouses, or siblings)	235	0.16	0.20	0	0.92

Source: PerMicro database, 2009-2011

We built two measures of repayment performance: average repayment exposure (*expos_aver*) and average repayment delay (*delays_aver*). The first is computed as the average number of pending installments in the observation period. The second is the average number of installments not repaid at due date in the observation period¹.

In particular, since the numerator of *expos_aver* consists of the number of overdue installments at each repayment date, it turns that this measure penalizes longer delays in the regularization of the repayment plan (which may be done either by borrowers or their co-signers). As opposite, *delays_aver* does not account for any delayed reimbursement of overdue installments. This is crucial since it only cares about the borrower's behavior in terms of punctuality in repayment. In other words, this measure does not consider co-signers' eventual intervention since PerMicro contacts them only after (at least) one month from the borrower's delay. Furthermore, such measure penalizes the borrower's schizophrenic behavior in repayment of overdue installments.

Suppose for example, two borrowers both having a repayment schedule of euro 400 in four installments of equal amount. Borrower A does not repay the first two installments, but while she repays euro 300 at the third date and does not repay the fourth installment. Borrower B only repays euro 200 at the third repayment date and repays the last installment. The two borrowers' profile is different in terms of average delay. Borrower A, in fact, exhibits 1 overdue installment in the first period, and 2, 0, and 1 in the following periods, thus recording $delays_aver = 3/4$. Borrower B, instead, exhibits 1 overdue installment in the first period, and 2, 1, and 1 at the next maturities. Both borrowers have paid a sum of euro 300 to the lender at the end. As opposite to the A, however, B does not record any delay in the last repayment date, since her behavior is interpreted as rolling-over the first or second overdue installment until loan maturity. Thus she realizes $delays_aver = 2/3$. Using our measure of average repayment exposure, instead, the situation ends up being the opposite since $expos_aver=4/4$ for Borrower A, while $expos_aver=5/4$ for Borrower B. However, regardless these differences, the correlation between the two measures of repayment performance is 0.86 (0.87 on the restricted sample of co-signed loans).

¹ We also computed a variable expressing the share of overdue installments at the observation rate. However, this measure has meaning only for those borrowers who have finished repaying their loan. It is also highly correlated (0.93 and 0.81 per cent with *expos_aver* and *delays_aver* respectively) with *expos_aver* and *delays_aver*, so that we decided not to discuss results estimates that use this as a dependent variable.

Table 4 - Borrowers by job sector

	Freq.	Percent	Cum.
Farmer	4	0.37	0.4
Shopkeeper	12	1.11	1.5
Driver	16	1.48	3.0
Social services	457	42.39	45.4
Trade	53	4.91	50.3
Waiter	45	4.17	54.4
Accountant	47	4.36	58.8
Own firm	136	12.62	71.4
Teacher	9	0.83	72.2
Health	9	0.83	73.1
Hand worker	246	22.82	95.9
Retired	12	1.11	97.0
Other	28	2.6	99.6
Student	4	0.37	100.0

Source: PerMicro database, 2009-2011

For the purposes of this paper, it may be useful to combine information on co-signers and borrowers' repayment performance. In particular, Table 3 reports computed values of average exposure and delays, separating between different types of co-signers. At first glance, what is interesting to observe (see figures in italics) is that co-signed loans seem to behave worse in terms of repayment performance compared to loans without co-signers. Second, having co-signers with a close relationship with the borrower versus having co-signers with a weaker relationship (or not having a co-signer at all) appears more relevant than simply having a co-signer versus not having a co-signer². However, univariate statistics may not account for important components such as the fact that borrowers have several different characteristics like, for example, wealth, age, education, and experience, which may be correlated with the likelihood of being required a co-signer. Most important, they do not account for causality and endogenous mechanisms which may drive such correlations.

As for customers' other characteristics, summary statistics in Table 2 show that 19 per cent of the borrowers are engaged in self-employed (*d_job_out*) activities while 76 per cent have permanent working positions (*d_contr_indet*), normally consisting of an open-ended agreement. A detailed breakdown of the borrowers' working activities shows that most of them (457) operate in the social services (mainly as domestic workers), manual workers (246), while 136 generally declare

² We refer to relevance in terms of mean polarization around 0 and 1.

to own a firm. Others (in smaller shares) are farmers, drivers, shopkeepers, traders, doctors and nurseries, accountants, waiters, teachers, students, and retired (Table 4).

From information regarding loan use (Table 5) it emerges that PerMicro supports home/consumption expenditure to a large extent. In particular, about 60 per cent of loans are for personal use (consumption/house), while 14 per cent are for productive purposes, such as equipment purchase and other expenditure related to customers' job. The final destination of the remaining 26 per cent share of loans cannot be easily inferred since, for example, one may not be confident about the fact that cars are bought for work rather than for personal use. In order to account for differences in terms of loan destination we consider fixed-effects reflecting the declared purpose of the loan. In addition we have built a dummy variable (*l_type*) taking the value of 0 in case PerMicro classifies the loan as "consumer credit" (see Table 2).

Among the other variables that may affect repayment performance, income is to a large extent the most important. To this purpose we consider two continuous variables reflecting *wage*, which is euro 835 on average, and other income (*other_inc*), which amounts to euro 223. In relation to this, average monthly *savings* and whether the borrower sends money to relatives in her country (*money_home*) are also accounted for.

Table 5 – Purpose (declared use) of the loan

	Freq.	Percent	Cum.
Equipment	71	6.59	6.59
Other job expenditure	81	7.51	14.1
Home: rent, purchase	64	5.94	20.04
Consumption expenditure	590	54.73	74.77
Car/Truck	116	10.76	85.53
Furniture	57	5.29	90.82
Debt/Taxes	65	6.03	96.85
Other	34	3.15	100

Source: PerMicro database, 2009-2011

The dataset also includes personal information on the borrower, such as the year of birth (*birth_year*) which is 1971 on average, *gender* (46 per cent male) and education (*edu*) of the household head and spouse. The latter, in particular, has been constructed associating an increasing value to higher levels of education, with the result that 3.41 is the average score in an interval 0 (no education)-5 (graduate). Borrowers' marital status (*d_married*), number of children

(*n_child*), house ownership (*d_house_own*), length of their staying in Italy (*it_since*), and knowledge of the language (*it_lang*), are also used as controls. In addition, we have data on co-signers' income (*co_income*), which is, as expected, higher than the sum of borrowers' average wage and other income. Details on these variables are summarized in Table 2.

Table 6 - Summary statistics on the sample of borrowers with co-signers

Variable	Obs	Mean	Std. Dev.	Min	Max
<i>birth_year</i>	591	1970.94	10.96	1937	1992
<i>gender</i>	591	0.48	0.50	0	1
<i>edu</i>	591	3.40	1.03	0	5
<i>d_married</i>	591	0.39	0.29	0	1
<i>n_child</i>	591	1.28	1.24	0	8
<i>d_house_own</i>	591	0.12	0.32	0	1
<i>it_since</i>	591	0.93	0.11	0.002449	1
<i>it_lang</i>	591	2.31	0.83	1	4
<i>wage</i>	591	766.20	488.27	0	2600
<i>other_inc</i>	591	236.65	311.34	0	2500
<i>money_home</i>	591	0.54	0.48	0	1
<i>savings</i>	591	711.14	1429.47	0	29878
<i>l_type</i>	591	0.25	0.44	0	1
<i>l_gross</i>	591	6017.72	3246.65	876.08	26500
<i>l_irate</i>	591	11.86	0.95	6	16
<i>l_exp</i>	591	182.99	109.85	27.79632	842.16
<i>l_start</i>	591	383	161.57	0	641
<i>l_install_nr</i>	591	32.71	12.81	12	60
<i>l_install~t</i>	591	214.70	85.56	18.57	596.72
<i>net</i>	591	0.19	0.39	0	1
<i>same_town</i>	591	0.40	0.49	0	1
<i>d_job_aut</i>	591	0.26	0.44	0	1
<i>d_contr_in~t</i>	591	0.67	0.47	0	1
<i>co_type</i>	591	2.31	1.47	1	5
<i>d_co_type_close</i>	591	0.39	0.48	0	1
<i>co_crif</i>	591	2.31	0.54	1	3
<i>co_inc</i>	591	1021.74	519.28	0	5787

Source: PerMicro database, 2009-2011

We tackle the problem of missing values by filling not available data by the mean of the available observations. Missing information is in fact jeopardized. In particular, several borrowers did not provide information on one feature (most typically personal characteristics) although exhaustively submitting all other data. Under such conditions, fully dropping observations regarding such borrowers from the dataset seemed worthless unless ending up with a substantially reduced sample. Such practice would also shape a bias on the basis of the choice of the set of controls.

Finally, Table 6 reports statistics on the sub sample of borrowers having a co-signer. There is no substantial discrepancy between the average values of the variables included in two samples to a great extent. Differences only concern monthly savings, loan principal, and features related to borrowers' working position. Comparing mean values across the two samples, it is worth noting that, on average, a considerably higher principal (euro 1,000) is accorded to borrowers having a co-signer while we did not find any differences in terms of interest rates and other expenditures.

4. Empirical Analysis

We estimate the following equation:

$$perf_{ij} = \alpha + X_{ij}\beta + co_{-ij} \gamma + \mu_j + \varepsilon_{ij} \quad (1)$$

where i identifies the individual borrower, and j refers to several types of fixed effects (see below). $perf_{ij}$ represents the two measures of credit repayment performance (alternatively *expos_aver* and *delay_aver*), while co_{-ij} are the three variables related to the role of co-signers (*d_co_yes*, *d_co_type_close*, *co_type*). All dependent and independent variables are alternatively included in a set of different equations.

The parameter γ , which is our main concern, can be interpreted as the additional average exposition or average delay induced by not having a co-signer versus having one, regardless any kinship relation (*d_co_yes*). Alternatively, it measures either the additional average exposition when switching from not having a co-signer or having one who is weakly related to the borrower (*d_co_type_close*) to close kinship, or from shifting from a co-signer who has a weaker

relationship with the borrower to another who is next-upper classified in terms of closeness (*co_type*).

X_{ij} is a vector of general characteristics of the borrower, such as age, gender, education and other personal traits. Additional variables seizing on the relationship network of the borrower, like length of her staying in Italy and knowledge of the language are also included. We also account for additional information explaining credit repayment performance, such as income, savings, whether sums are sent to home-country, terms of loans (interest rate, other expenditures, number and amount of installments, repayment stage, etc.), and all other variables listed in Table 2.

For the sake of completeness we account for the presence of other forms of guarantees, namely community nets. Most important, we include in X_{ij} both co-signers' income and their credit rating (CRIF). These measures, which (as expected) will turn highly significant in explaining repayment performance (see further on), are available for co-signed loans only, a fact that adds importance to concentrate on this sub-sample of loans.

We alternatively account for several types of fixed-effects summarized in μ_j , where j may alternatively refer to several specificities. First, j may capture the position of the individual borrower with PerMicro, that is whether she has finished repaying the loan (different dummies capturing if there has been regular repayment, anticipated repayment, etc.), or the loan is still outstanding, been restructured, or there has been default. Second, j can indicate one of the twelve branches of PerMicro. The reason for including branch fixed-effects is that offices may differ in terms of quality of the employees selecting borrowers, ability of the staff soliciting for repayment in case of delay, along with a number of geographical features affecting the probability of repaying on a regular basis.

The third and fourth sets of fixed-effects expressed by j are related to borrowers' personal characteristics. On the one hand we consider the type of job carried out by the borrower. On the other hand we contemplate possible specificities stemming from the intentions of the borrower with regard to the use of the loan, although these are only ex-ante statements made by the borrower, thus not necessarily implying that the latter complies with her initial purposes.

Finally, ε_{ij} are idiosyncratic errors, such as $E(\varepsilon_{ij} | X_{ij}, co_{-ij}, \mu_j) = 0$. Standard errors are clustered at country (borrowers' nationality) level. Statistics describing the distribution of borrowers' origin are reported in Table A1 in the Appendix.

4.1 Selection process and possible endogeneity

The specification proposed in (1) leaves room to possible bias mainly because of the borrower selection process which leads PerMicro, like any other lender working with co-signed loans, to require a co-signer to borrowers on which there is no past credit history or, (even though less frequently) having had bad repayment performance in the past. From this pattern of lending procedures, then, it becomes natural to expect a negative relationship between the likelihood of having, or being required a co-signer, and repayment performance. This translates in an expected positive sign of the parameter γ associated to average exposure and average delay in equation (1).

Furthermore, even though one is able to manage the selection problem described above, there are still features – most typically personal characteristics of the borrower related to both repayment performance and the likelihood of finding a particular category of co-signer – which may represent important sources of potential bias.

Such elements need to be managed through a comprehensive set of covariates which help limiting at best the possible correlation between co-signer related variables and some unmeasurable components of the repayment performance. Thus, it becomes crucial to control for features such as borrowers' income, savings, social relations, which may reflect “capabilities”. Once having taken care of including such explanatory features, still intrinsic abilities of the borrower could undermine the reliability of the main relation one is investigating. Instruments may therefore help disentangling such bias left unaddressed.

We use an instrument which, conditional on all other controls included in X_{ij} should be uncorrelated with unmeasurable elements of repayment performance which are left in ε_{ij} . The instrument adopted aims at explaining the likelihood of finding a close relative, plausibly a next-of-kin, who acts as co-signer. In particular, we have information regarding the number of times that the borrower visits her home-country within a year (*country_back*). Summary statistics concerning the instrument are reported in Table 7 for both the full sample of borrowers and for the sub-sample with co-signed loans.

Conditional on the borrower's income, savings, nationality, occupation, and all other personal traits that will not fall in ε_{ij} , we can be confident, up to a certain extent, that the instrumented closeness between borrowers and co-signers should not be correlated to unmeasurable features explaining repayment performance.

Table 7 - Instrument: summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
<i>country_back</i>	1078	0.43	0.17	0	1
	591	0.45	0.15	0	1

Source: PerMicro database, 2009-2011

In particular, the choice of this specific instrument relies on three conditions: *i*) sufficiently high correlation between the instrument and the variables measuring the intensity of kinship relations between borrowers and co-signers; *ii*) absence of correlation between the instrument and the dependent variables related to repayment performance; *iii*) viability of the instrument in weakness tests.

- i) Sufficiently high correlation between the instrument and the variables measuring the intensity of kinship relations between borrowers and co-signers.*

Correlation coefficients between instrument and variables related to both the existence of a co-signer and the intensity of her kinship relation with the borrower herself are reported in Table 8A and 8B, respectively for the full sample of borrowers and the sub-sample of those having a co-signer. All correlations are relatively high when limiting to the sub-sample of co-signed loans. Correlations between the instrument and the dummy variable reflecting the presence of a close co-signer-borrower kinship is -0.17, while it is -0.20 when dealing with the discrete variable ranking kinship intensity.

- ii) Absence of correlation between the instrument and the dependent variables related to repayment performance*

As one can see from the figures reported in Table 9, the correlation is approximately zero for all the variables at stake, indicating that there should be no evidence for a significant contribution of the instrument in explaining repayment rates.

Point *iii*) will be discussed in the next sub-section.

Table 8 - Correlation between the instrument and variables measuring the intensity of kinship relations between borrowers and co-signers

A full sample				
(obs=1078)	<i>country_back</i>	<i>d_co_yes</i>	<i>d_co_type_close</i>	<i>co_type</i>
<i>country_back</i>	1			
<i>d_co_yes</i>	0.09	1		
<i>d_co_type_close</i>	-0.05	0.48	1	
<i>co_type</i>	-0.02	0.73	0.91	1
B sample of co-signed loans				
(obs=591)	<i>country_back</i>	<i>d_co_yes</i>	<i>d_co_type_close</i>	<i>co_type</i>
<i>country_back</i>	1			
<i>d_co_yes</i>	.	1		
<i>d_co_type_close</i>	-0.17	.	1	
<i>co_type</i>	-0.20	.	0.93	1

Source: PerMicro database, 2009-2011

Table 9 - Correlation between dependent variables and the instrument

A full sample			
(obs=1078)	<i>expos_aver</i>	<i>delays_aver</i>	<i>country_back</i>
<i>expos_aver</i>	1		
<i>delays_aver</i>	0.863	1	
<i>country_back</i>	0.013	0.02	1
B sample of co-signed loans			
(obs=591)	<i>expos_aver</i>	<i>delays_aver</i>	<i>country_back</i>
<i>expos_aver</i>	1		
<i>delays_aver</i>	0.871	1	
<i>country_back</i>	0.008	0.044	1

Source: PerMicro database, 2009-2011

4.2 Results

Estimates of equation (1) using OLS are presented in Tables 10-12 for the full sample of 1,078 borrowers. More in detail, in Table 10 the dependent variables *expos_aver* and *delay_aver* are explained by the dummy variable *d_co_yes*, expressing whether the loan is co-signed or not, and other covariates. In this case we observe a weak positive relationship between the two. The most significant parameters are observed in presence of fixed-effects related to either the position of

the borrower with PerMicro (first and fifth columns) and for branch fixed-effect (second and sixth columns).

In Table 11 the main independent variable is again binary (d_co_close), now expressing whether the co-signer is a close relative (sibling, spouse, next of kin) vs. other relatives, friends, and the absence of a co-signer. What turns interesting using this definition of the independent variable is that the related parameter considerably gains significance while preserving the positive sign.

In Table 12 the measure of co-signed loans takes the form of an ordered discrete variable, expressing the intensity of kinship relations with the co-signer (co_type), as illustrated in Section 3. Apart from changing the scale of the parameter due to the different nature of the independent variable, previous results are confirmed.

Preliminary evidence stemming from these basic linear specifications is twofold. First, the positive sign of the main estimated parameters seems to support the view that co-signed loans perform worse than loans without co-signers. As discussed in Section 2, there might be several rationales for this, going from the excess-solidarity paradigm to a borrower selection process operated by some micro-lenders, consisting of denying credit to new borrowers or borrowers whose credit rating is low. Second, estimates suggest that, although simply having a co-signed loan has a weak significant effect on borrowers repayment behavior, the true difference is made by having a loan co-signed by a close relative versus any other kind of loan (non-co-signed or co-signed by someone who does not have a close relationship with the borrower).

In order to investigate more deeply such effects we confine our attention to the sub sample of borrowers having/being required a co-signer (i.e. whenever $d_co_yes=1$)³. Estimates are reported in Tables 13 and 14, respectively using the explanatory variables d_co_close and co_type . In this case we do not find any systematic evidence indicating that having a co-signer has a significant relationship, neither on borrowers' installment exposure nor on delays. Parameters' lack of significance suggests that the previous apparent penalizing effect of having (strongly related) co-signers was quite plausibly due to lenders' selection practice of relieving more virtuous customers from the duty of providing additional guarantees.

Turning to the use of instrumental variables, regression outputs provide evidence in contrast to our initial predictions. In fact, in Tables 15 and 16 (parallel to Table 13 and 14) the parameters associated to repayment performance are now negative and significant in the second stage

³ Guttman (2007) previously used a similar reduced-sample approach in the study of the repayment performance in microfinance programs. As opposite to our study, in that case only borrowers without co-signed loans were considered.

regressions. Such reverted evidence seems supportive of the idea that co-signers related to the borrower by strong social ties are likely to exert more credible influence and control than other individuals⁴.

Looking at first stage regressions, one can observe that as expected the parameter associated to the instrument *country_back* exhibits negative sign, indicating that the frequency with which an individual visits her home-country is a good predictor of the difficulty of finding a next-of-kin co-signer in Italy.

In addition, the instrument shows:

- iii) *Viability according to weakness tests.* Underidentification test (Kleibergen-Paap rk LM statistic are reported at the bottom of Tables 12 and 13) and Weak identification test (Kleibergen Paap Wald rk F statistic are also reported at the bottom of Tables 12 and 13), suggest that the instrument is significant in explaining the different extent of borrower-co-signer relationship. In particular, the Kleibergen-Paap rk Wald F statistic always lays above the Stock-Yogo weak ID test critical values (25% maximal IV size, in most cases performing even better).

Finally, it seems worthwhile trying to investigate whether there is evidence that having the loan co-signed by a close relative actually stimulates the borrower's commitment towards repayment or it is instead the relative who steps in repaying on her behalf. We attempt shedding light on this important issue by introducing a variable indicating the expectation of co-signers' intervention⁵. It consists of a measure of the extent to which co-signers' income exceeds the extra-saving remaining to the borrower after having repaid the monthly installment:

$$\frac{\text{co-signer's income} - (\text{borrower's monthly savings} - \text{installment amount})}{\text{co-signer's income}}$$

Parameters associated to *e_co_pay* are not significant in Tables 17-18. However, they do not exhibit very large standard errors. Furthermore, the presence of the expected co-signer's intervention has some role since it affects the parameters of the borrower-co-signer relationship. The latter, in fact, show lower significance and reduced magnitude compared to estimates reported in Tables 15-16. In particular, significance of parameters associated to delays still

⁴ We also carried out estimations where "spouse" and "next-of-kin" categories have been switched in the definition of the variable *co_type*. Results are quite close to those reported even if parameters associated to *co_type* are slightly less significant. We believe this is due to the fact that even spouses may be considered closer to the borrower compared to parents, their resources could be directly used to pay installments, so as not to determine any delay.

⁵ This measure has been suggested by experts at PerMicro.

remains noteworthy. This should be indicative of the fact that borrowers' attitude is likely to improve, especially in terms of punctuality in repaying installments at due date without excluding co-signers' intervention. Such an effect is better captured when co-signers are ranked on the basis of kinship proximity to the borrower⁶.

There is also some additional evidence from the estimated parameters associated to other covariates. Among personal features of the borrower education is to a great extent the most significant. It exhibits a negative sign indicating that more educated borrowers tend to realize better repayment performance compared to less educated ones. Although the evidence is not systematic, sometimes the length of staying in Italy and a better knowledge of the language provide negative significant parameters indicating that being more familiar with the Italian culture also increases the likelihood of being good payers. Other parameters related to personal traits of the borrower are not reported in the output tables since they are rarely significant.

Other characteristics of the borrower, such as wage, other income, and savings, show negative expected signs where significant, indicating that a higher availability of financial resources improves both the capability to repay and the punctuality in repayment of the sums due.

Furthermore, as far as the characteristics of the loan are concerned, the loan starting date indicates that the more recent the loan the better repayment performance. It is worth noting, however, that the probability of cumulating overdue installments and delays plausibly increases with the length of the loan (the parameter associated to the variable *l_start*, measuring the length of the loan period, is negative), so that this turns being a control feature without any substantial economic meaning. Repayment rates worsen when interest rates increase, suggesting that there may be a negative relationship between the former and the quality of the borrower.

On the other hand, being informally guaranteed by a community network has no relationship with repayment performance, although the causal effects related to this variable have not been addressed in this paper.

Finally, the interpretation of the negative signs associated to co-signers' income and co-signers' credit scores are indicative of the fact that either wealthier and more reliable co-signers are likely to match more virtuous borrowers, or richer and better co-signers are more likely to pay on behalf of their co-signees.

⁶ Regressions that use the binary variable *d_co_type_close* (Table 17) exhibit both weakly significant parameters in the second stage (particularly as far as exposure is concerned) and weak instruments (see Kleibergen-Paap statistics at the bottom of the table).

Table 10 – Effect of having a co-signer on loan repayment performance- Full sample of borrowers

Dep. Variable	expos_aver	expos_aver	expos_aver	expos_aver	delays_aver	delays_aver	delays_aver	delays_aver
edu	-0.050*	-0.086**	-0.064	-0.069*	-0.006	-0.012**	-0.007	-0.008
	(0.027)	(0.043)	(0.042)	(0.040)	(0.004)	(0.006)	(0.005)	(0.005)
it_since	0.145	0.648	0.137	0.184	0.011	0.070	0.000	0.007
	(0.112)	(0.406)	(0.168)	(0.177)	(0.021)	(0.047)	(0.022)	(0.020)
it_lang	-0.052*	0.014	-0.054	-0.048	-0.007	0.002	-0.009	-0.007
	(0.030)	(0.041)	(0.075)	(0.064)	(0.005)	(0.006)	(0.010)	(0.009)
wage	-0.000	0.000	-0.000	-0.000	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
other_inc	0.000	0.000	-0.000	-0.000	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
savings	-0.000**	-0.000	-0.000	-0.000	-0.000*	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
l_type	0.059	0.235	-0.203	-0.072	0.021	0.042	-0.013	0.005
	(0.118)	(0.225)	(0.164)	(0.231)	(0.021)	(0.034)	(0.023)	(0.036)
l_gross	0.000**	0.000	0.000	0.000	0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
l_exp	-0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
l_irate	-0.003	0.034*	0.020	0.027*	0.002	0.009***	0.005*	0.007***
	(0.015)	(0.017)	(0.017)	(0.014)	(0.002)	(0.003)	(0.003)	(0.002)
l_start	-0.001***	-0.001***	-0.000	-0.000	-0.000***	-0.000***	-0.000	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
l_install_nr	-0.009**	-0.007	-0.001	-0.007	-0.000	0.001	0.001	0.000
	(0.003)	(0.006)	(0.004)	(0.005)	(0.001)	(0.001)	(0.001)	(0.001)
l_install_amount	-0.002**	-0.001	-0.001	-0.001	-0.000	0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
co_inc	-0.000**	-0.000*	-0.000**	-0.000**	-0.000**	-0.000	-0.000*	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
co_crif	-0.081	-0.060	-0.080	-0.071	-0.016**	-0.017*	-0.019**	-0.018**
	(0.060)	(0.074)	(0.072)	(0.073)	(0.006)	(0.009)	(0.008)	(0.008)
net	-0.029	-0.064	-0.067	-0.056	-0.007	-0.010	-0.002	-0.001
	(0.059)	(0.102)	(0.127)	(0.107)	(0.010)	(0.014)	(0.019)	(0.016)
d_co_yes	0.337*	0.316	0.393	0.362	0.055**	0.050	0.067*	0.062*
	(0.181)	(0.222)	(0.241)	(0.240)	(0.023)	(0.032)	(0.036)	(0.034)
Position F-E	YES	NO	NO	NO	YES	NO	NO	NO
Branch F-E	NO	YES	NO	NO	NO	YES	NO	NO
Job F-E	NO	NO	YES	NO	NO	NO	YES	NO
Loan use F-E	NO	NO	NO	YES	NO	NO	NO	YES
R ²	0.50	0.44	0.38	0.39	0.48	0.43	0.38	0.37

OLS estimates. 1,078 observations. Standard errors in brackets clustered at country level. *significant at 10%; ** significant at 5%; *** significant at 1%.

Other covariates included in the regressions: *birth_year, gender, d_married, n_child, d_house_own, money_home, same_town, d_job_aut, d_contr_indet, constant.*

Table 11 – Effect of having a close-kinship related co-signer on loan repayment performance- Full sample of borrowers

Dep. Variable	expos_aver	expos_aver	expos_aver	expos_aver	delays_aver	delays_aver	delays_aver	delays_aver
edu	-0.049*	-0.087*	-0.062	-0.068	-0.006	-0.012*	-0.006	-0.007
	(0.029)	(0.045)	(0.043)	(0.041)	(0.004)	(0.006)	(0.005)	(0.005)
it_since	0.152	0.651	0.132	0.185	0.012	0.070	-0.001	0.007
	(0.115)	(0.405)	(0.166)	(0.178)	(0.021)	(0.047)	(0.023)	(0.022)
it_lang	-0.060*	0.003	-0.063	-0.058	-0.008*	0.001	-0.010	-0.009
	(0.032)	(0.042)	(0.077)	(0.066)	(0.005)	(0.006)	(0.010)	(0.009)
wage	-0.000	0.000	-0.000	-0.000	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
other_inc	0.000	0.000	-0.000	-0.000	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
savings	-0.000**	-0.000	-0.000	-0.000	-0.000*	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
l_type	0.050	0.224	-0.215	-0.077	0.019	0.040	-0.015	0.004
	(0.120)	(0.224)	(0.169)	(0.235)	(0.021)	(0.034)	(0.023)	(0.037)
l_gross	0.000**	0.000	0.000	0.000	-0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
l_exp	-0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
l_irate	-0.004	0.033*	0.019	0.026*	0.002	0.009***	0.005*	0.006***
	(0.015)	(0.018)	(0.018)	(0.015)	(0.003)	(0.003)	(0.003)	(0.002)
l_start	-0.001***	-0.001***	-0.000	-0.000	-0.000***	-0.000***	-0.000	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
l_install_nr	-0.008**	-0.006	-0.000	-0.006	-0.000	0.001	0.001	0.000
	(0.003)	(0.006)	(0.004)	(0.005)	(0.001)	(0.001)	(0.001)	(0.001)
l_install_amount	-0.001**	-0.001	-0.000	-0.001	-0.000	0.000	0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
co_inc	-0.000	-0.000	-0.000	-0.000	-0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
co_crif	-0.024	-0.013	-0.014	-0.015	-0.006	-0.009	-0.007	-0.008
	(0.032)	(0.041)	(0.040)	(0.041)	(0.006)	(0.006)	(0.007)	(0.007)
net	-0.057	-0.091	-0.099	-0.089	-0.003	-0.014	-0.007	-0.005
	(0.060)	(0.091)	(0.122)	(0.100)	(0.009)	(0.013)	(0.017)	(0.015)
d_co_type_close	0.210***	0.238***	0.238***	0.259***	0.030***	0.034***	0.033***	0.038***
	(0.066)	(0.074)	(0.071)	(0.076)	(0.010)	(0.011)	(0.012)	(0.013)
Position F-E	YES	NO	NO	NO	YES	NO	NO	NO
Branch F-E	NO	YES	NO	NO	NO	YES	NO	NO
Job F-E	NO	NO	YES	NO	NO	NO	YES	NO
Loan use F-E	NO	NO	NO	YES	NO	NO	NO	YES
R ²	0.50	0.34	0.39	0.39	0.38	0.33	0.38	0.37

OLS estimates. 1,078 observations. Standard errors in brackets clustered at country level. *significant at 10%; ** significant at 5%; *** significant at 1%.

Other covariates included in the regressions: *birth_year, gender, d_married, n_child, d_house_own, money_home, same_town, d_job_aut, d_contr_indet, constant.*

Table 12 – Effect of kinship-ranked co-signers on loan repayment performance- Full sample of borrowers

Dep. Variable	expos_aver	expos_aver	expos_aver	expos_aver	delays_aver	delays_aver	delays_aver	delays_aver
edu	-0.049* (0.029)	-0.086* (0.045)	-0.062 (0.044)	-0.067 (0.041)	-0.006 (0.004)	-0.011* (0.006)	-0.006 (0.005)	-0.007 (0.005)
it_since	0.151 (0.116)	0.649 (0.406)	0.135 (0.168)	0.185 (0.179)	0.011 (0.021)	0.069 (0.047)	-0.001 (0.022)	0.006 (0.021)
it_lang	-0.059* (0.032)	0.004 (0.042)	-0.062 (0.077)	-0.057 (0.065)	-0.008* (0.005)	0.001 (0.006)	-0.010 (0.010)	-0.009 (0.009)
wage	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
other_inc	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
savings	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
l_type	0.053 (0.121)	0.226 (0.227)	-0.211 (0.166)	-0.070 (0.234)	0.020 (0.021)	0.040 (0.035)	-0.015 (0.023)	0.004 (0.037)
l_gross	0.000** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
l_exp	-0.000 (0.000)	0.000 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
l_irate	-0.004 (0.015)	0.032* (0.018)	0.019 (0.018)	0.026* (0.015)	0.002 (0.003)	0.009*** (0.003)	0.005* (0.003)	0.006*** (0.002)
l_start	-0.001*** (0.000)	-0.001*** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000*** (0.000)
l_install_nr	-0.008** (0.003)	-0.006 (0.006)	-0.000 (0.004)	-0.006 (0.005)	-0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
l_install_amount	-0.001** (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
co_inc	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
co_crif	-0.039 (0.032)	-0.029 (0.041)	-0.036 (0.041)	-0.037 (0.043)	-0.007 (0.006)	-0.010 (0.006)	-0.009 (0.007)	-0.010 (0.007)
net	-0.049 (0.060)	-0.081 (0.091)	-0.090 (0.122)	-0.078 (0.100)	-0.003 (0.009)	-0.013 (0.013)	-0.006 (0.017)	-0.004 (0.015)
co_type	0.062*** (0.020)	0.069*** (0.024)	0.076*** (0.024)	0.082*** (0.025)	0.007** (0.003)	0.008** (0.003)	0.009** (0.003)	0.010*** (0.003)
Position F-E	YES	NO	NO	NO	YES	NO	NO	NO
Branch F-E	NO	YES	NO	NO	NO	YES	NO	NO
Job F-E	NO	NO	YES	NO	NO	NO	YES	NO
Loan use F-E	NO	NO	NO	YES	NO	NO	NO	YES
R ²	0.50	0.44	0.39	0.39	0.38	0.43	0.38	0.37

OLS estimates. 1,078 observations. Standard errors in brackets clustered at country level. *significant at 10%; ** significant at 5%; *** significant at 1%.

Other covariates included in the regressions: *birth_year, gender, d_married, n_child, d_house_own, money_home, same_town, d_job_aut, d_contr_indet, constant.*

Table 13 – Effect of having a close-kinship related co-signer on loan repayment performance- Sample of co-signed loans

Dep. Variable	expos_aver	expos_aver	expos_aver	expos_aver	delays_aver	delays_aver	delays_aver	delays_aver
edu	-0.056* (0.030)	-0.134** (0.058)	-0.112* (0.058)	-0.108* (0.054)	-0.005 (0.005)	-0.016* (0.009)	-0.012 (0.008)	-0.012 (0.008)
it_since	-0.329* (0.192)	0.731 (0.462)	0.068 (0.408)	0.122 (0.278)	-0.085* (0.049)	0.048 (0.080)	-0.035 (0.073)	-0.032 (0.058)
it_lang	-0.076** (0.034)	0.056 (0.060)	-0.021 (0.087)	-0.029 (0.067)	-0.011 (0.008)	0.007 (0.011)	-0.004 (0.014)	-0.004 (0.011)
wage	-0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000* (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
other_inc	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
savings	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
l_type	0.052 (0.173)	0.286 (0.194)	-0.274 (0.273)	-0.120 (0.306)	0.040* (0.024)	0.065* (0.035)	-0.000 (0.034)	0.013 (0.040)
l_gross	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
l_exp	-0.000 (0.000)	0.000 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
l_irate	0.008 (0.031)	0.050 (0.042)	0.054 (0.044)	0.052 (0.036)	0.006 (0.006)	0.015** (0.007)	0.013* (0.008)	0.014** (0.006)
l_start	-0.001*** (0.000)	-0.001** (0.000)	-0.000 (0.000)	-0.001* (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000** (0.000)
l_install_nr	-0.006 (0.005)	-0.004 (0.008)	0.000 (0.005)	-0.003 (0.005)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)
l_install_amount	-0.001 (0.001)	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
co_inc	-0.000** (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
co_crif	-0.062 (0.059)	-0.034 (0.086)	-0.049 (0.075)	-0.046 (0.073)	-0.014* (0.008)	-0.014 (0.011)	-0.015 (0.009)	-0.015* (0.008)
net	-0.021 (0.063)	-0.073 (0.153)	-0.040 (0.160)	-0.064 (0.138)	-0.009 (0.013)	-0.011 (0.021)	-0.002 (0.022)	-0.003 (0.019)
d_co_type_close	0.167*** (0.053)	0.208** (0.085)	0.202** (0.085)	0.241*** (0.085)	0.023** (0.010)	0.029** (0.014)	0.026* (0.014)	0.033** (0.014)
Position F-E	YES	NO	NO	NO	YES	NO	NO	NO
Branch F-E	NO	YES	NO	NO	NO	YES	NO	NO
Job F-E	NO	NO	YES	NO	NO	NO	YES	NO
Loan use F-E	NO	NO	NO	YES	NO	NO	NO	YES
R ²	0.56	0.47	0.41	0.43	0.46	0.46	0.41	0.41

OLS estimates. 591 observations. Standard errors in brackets clustered at country level. *significant at 10%; ** significant at 5%; *** significant at 1%.

Other covariates included in the regressions: *birth_year, gender, d_married, n_child, d_house_own, money_home, same_town, d_job_aut, d_contr_indet, constant.*

Table 14 – Effect of kinship-ranked co-signers on loan repayment performance- Sample of co-signed loans

Dep. Variable	expos_aver	expos_aver	expos_aver	expos_aver	delays_aver	delays_aver	delays_aver	delays_aver
edu	-0.056* (0.030)	-0.133** (0.058)	-0.111* (0.059)	-0.107* (0.055)	-0.005 (0.005)	-0.016* (0.009)	-0.012 (0.008)	-0.012 (0.008)
it_since	-0.337* (0.190)	0.722 (0.463)	0.072 (0.413)	0.118 (0.282)	-0.088* (0.048)	0.046 (0.079)	-0.036 (0.072)	-0.034 (0.057)
it_lang	-0.075** (0.035)	0.057 (0.061)	-0.021 (0.088)	-0.030 (0.069)	-0.011 (0.008)	0.008 (0.011)	-0.004 (0.014)	-0.004 (0.011)
wage	-0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000* (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
other_inc	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
savings	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
l_type	0.053 (0.173)	0.287 (0.199)	-0.273 (0.269)	-0.115 (0.303)	0.041* (0.024)	0.066* (0.036)	0.000 (0.034)	0.013 (0.040)
l_gross	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
l_exp	-0.000 (0.000)	0.000 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
l_irate	0.006 (0.031)	0.048 (0.042)	0.053 (0.045)	0.050 (0.036)	0.006 (0.006)	0.014* (0.007)	0.013* (0.008)	0.013** (0.006)
l_start	-0.001*** (0.000)	-0.001** (0.000)	-0.000 (0.000)	-0.001* (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000** (0.000)
l_install_nr	-0.006 (0.005)	-0.004 (0.008)	0.000 (0.005)	-0.003 (0.005)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)
l_install_amount	-0.002 (0.001)	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
co_inc	-0.000** (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000* (0.000)	-0.000* (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000 (0.000)
co_crif	-0.064 (0.059)	-0.036 (0.084)	-0.051 (0.074)	-0.049 (0.072)	-0.015* (0.008)	-0.015 (0.011)	-0.015* (0.009)	-0.016* (0.008)
net	-0.029 (0.065)	-0.063 (0.149)	-0.034 (0.159)	-0.055 (0.136)	-0.011 (0.014)	-0.009 (0.021)	-0.003 (0.022)	-0.001 (0.019)
co_type	0.044** (0.018)	0.057** (0.025)	0.066** (0.025)	0.078*** (0.027)	0.003 (0.003)	0.005 (0.004)	0.005 (0.004)	0.007** (0.004)
Position F-E	YES	NO	NO	NO	YES	NO	NO	NO
Branch F-E	NO	YES	NO	NO	NO	YES	NO	NO
Job F-E	NO	NO	YES	NO	NO	NO	YES	NO
Loan use F-E	NO	NO	NO	YES	NO	NO	NO	YES
R ²	0.56	0.47	0.41	0.43	0.46	0.46	0.41	0.40

OLS estimates. 591 observations. Standard errors in brackets clustered at country level. *significant at 10%; ** significant at 5%; *** significant at 1%.

Other covariates included in the regressions: *birth_year, gender, d_married, n_child, d_house_own, money_home, same_town, d_job_aut, d_contr_indet, constant.*

Table 15 – Effect of having a close-kinship related co-signer on loan repayment performance- Sample of co-signed loans - Two-Stage Least Squares

Dep. Variable	expos_aver	expos_aver	expos_aver	expos_aver	delays_aver	delays_aver	delays_aver	delays_aver
d_co_type_close	-0.701 (0.470)	-2.080 (1.325)	-2.370* (1.236)	-1.465 (0.995)	-0.219* (0.113)	-0.446* (0.257)	-0.493** (0.218)	-0.344* (0.188)
edu	-0.064** (0.029)	-0.134** (0.053)	-0.130** (0.066)	-0.119** (0.055)	-0.007 (0.007)	-0.016 (0.010)	-0.016 (0.012)	-0.015 (0.011)
it_since	-0.518** (0.245)	0.489 (0.488)	-0.259 (0.509)	-0.190 (0.369)	-0.138** (0.055)	-0.002 (0.086)	-0.101 (0.099)	-0.100 (0.074)
it_lang	-0.038 (0.044)	0.185 (0.121)	0.083 (0.114)	0.046 (0.093)	-0.001 (0.013)	0.034 (0.025)	0.017 (0.022)	0.013 (0.019)
wage	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
other_inc	-0.000 (0.000)	-0.000** (0.000)	-0.000* (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000* (0.000)	-0.000** (0.000)
savings	-0.000*** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
l_type	0.054 (0.192)	0.386 (0.312)	-0.240 (0.347)	-0.184 (0.332)	0.041 (0.031)	0.086 (0.062)	0.007 (0.052)	-0.001 (0.049)
l_gross	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
l_exp	0.000 (0.000)	0.001 (0.001)	0.000 (0.001)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
l_irate	-0.020 (0.030)	-0.020 (0.067)	-0.029 (0.077)	0.003 (0.058)	-0.002 (0.007)	0.000 (0.012)	-0.004 (0.014)	0.003 (0.011)
l_start	-0.001*** (0.000)	-0.001** (0.000)	-0.001 (0.000)	-0.001 (0.000)	-0.000*** (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000** (0.000)
l_install_nr	-0.007 (0.005)	-0.002 (0.013)	-0.001 (0.013)	-0.002 (0.009)	0.000 (0.001)	0.002 (0.002)	0.002 (0.002)	0.001 (0.002)
l_install_amount	-0.002*** (0.001)	-0.002 (0.002)	-0.002 (0.003)	-0.002 (0.002)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
co_inc	-0.000*** (0.000)	-0.000* (0.000)	-0.001** (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000** (0.000)
co_crif	-0.078 (0.052)	-0.060 (0.090)	-0.097 (0.086)	-0.076 (0.073)	-0.019** (0.008)	-0.020 (0.015)	-0.025* (0.015)	-0.022* (0.012)
net	-0.135 (0.117)	-0.202 (0.223)	-0.281 (0.272)	-0.169 (0.221)	-0.041 (0.028)	-0.046 (0.039)	-0.066 (0.047)	-0.048 (0.038)
Position F-E	YES	NO	NO	NO	YES	NO	NO	NO
Branch F-E	NO	YES	NO	NO	NO	YES	NO	NO
Job F-E	NO	NO	YES	NO	NO	NO	YES	NO
Loan use F-E	NO	NO	NO	YES	NO	NO	NO	YES
country_back †	-0.427** 0.173	-0.380** 0.186	-0.411** 0.163	-0.431** 0.167	-0.427** 0.173	-0.380** 0.186	-0.411** 0.163	-0.431** 0.167
Kleibergen-Paap rk	6.72	6.10	6.34	6.79	6.72	6.10	6.34	6.79
LM statistic								
Kleibergen-Paap rk	6.29	5.55	5.75	6.24	6.29	5.55	5.75	6.24
Wald rk F								

2SLS estimates. 591 observations. Standard errors in brackets clustered at country level. *significant at 10%; ** significant at 5%; *** significant at 1%. †First-stage estimates: dependent variable is *d_co_type_close*
Other covariates included in the regressions: *birth_year, gender, d_married, n_child, d_house_own, money_home, same_town, d_job_aut, d_contr_indet, constant*.

Table 16 – Effect of kinship-ranked co-signers on loan repayment performance- Sample of co-signed loans - Two-Stage Least Squares

Dep. Variable	expos_aver	expos_aver	expos_aver	expos_aver	delays_aver	delays_aver	delays_aver	delays_aver
co_type	-0.181 (0.121)	-0.522** (0.265)	-0.625** (0.283)	-0.390* (0.236)	-0.057** (0.025)	-0.112** (0.049)	-0.130*** (0.046)	-0.092** (0.040)
edu	-0.065** (0.027)	-0.145*** (0.049)	-0.133** (0.056)	-0.122** (0.050)	-0.008 (0.006)	-0.018** (0.009)	-0.017 (0.010)	-0.016 (0.010)
it_since	-0.483** (0.218)	0.590 (0.440)	-0.237 (0.466)	-0.118 (0.324)	-0.127*** (0.048)	0.019 (0.074)	-0.097 (0.091)	-0.084 (0.063)
it_lang	-0.043 (0.038)	0.166** (0.084)	0.064 (0.090)	0.039 (0.076)	-0.002 (0.010)	0.030* (0.017)	0.013 (0.016)	0.011 (0.015)
wage	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
other_inc	-0.000 (0.000)	-0.000*** (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000*** (0.000)	-0.000** (0.000)	-0.000** (0.000)
savings	-0.000*** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
l_type	0.050 (0.191)	0.374 (0.239)	-0.261 (0.363)	-0.198 (0.336)	0.040 (0.029)	0.083* (0.046)	0.002 (0.054)	-0.004 (0.047)
l_gross	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
l_exp	0.000 (0.000)	0.001 (0.001)	0.000 (0.001)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
l_irate	-0.012 (0.028)	0.006 (0.057)	-0.001 (0.067)	0.019 (0.052)	0.001 (0.006)	0.006 (0.009)	0.002 (0.012)	0.007 (0.009)
l_start	-0.001*** (0.000)	-0.001* (0.000)	-0.000 (0.000)	-0.001 (0.000)	-0.000*** (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000* (0.000)
l_install_nr	-0.006 (0.005)	-0.002 (0.011)	0.001 (0.010)	-0.001 (0.008)	0.001 (0.001)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)
l_install_amount	-0.002** (0.001)	-0.001 (0.002)	-0.002 (0.002)	-0.001 (0.002)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
co_inc	-0.000*** (0.000)	-0.000** (0.000)	-0.001*** (0.000)	-0.000** (0.000)	-0.000*** (0.000)	-0.000* (0.000)	-0.000*** (0.000)	-0.000** (0.000)
co_crif	-0.069 (0.053)	-0.037 (0.087)	-0.066 (0.077)	-0.057 (0.070)	-0.016** (0.008)	-0.015 (0.014)	-0.018 (0.012)	-0.017* (0.010)
net	-0.100 (0.088)	-0.091 (0.154)	-0.163 (0.202)	-0.092 (0.165)	-0.030 (0.020)	-0.022 (0.023)	-0.042 (0.033)	-0.030 (0.026)
Position F-E	YES	NO	NO	NO	YES	NO	NO	NO
Branch F-E	NO	YES	NO	NO	NO	YES	NO	NO
Job F-E	NO	NO	YES	NO	NO	NO	YES	NO
Loan use F-E	NO	NO	NO	YES	NO	NO	NO	YES
country_back [†]	-1.653*** 0.495	-1.521*** 0.533	-1.558*** 0.493	-1.621*** 0.458	-1.653*** 0.495	-1.521*** 0.533	-1.558*** 0.493	-1.621*** 0.458
Kleibergen-Paap rk	7.56	6.35	6.41	6.96	7.56	6.35	6.41	6.96
LM statistic								
Kleibergen-Paap	7.06	5.76	6.00	6.39	7.06	5.76	6.00	6.39
Wald rk F								

2SLS estimates. 591 observations. Standard errors in brackets clustered at country level. *significant at 10%; ** significant at 5%; *** significant at 1%. [†]First-stage estimates: dependent variable is *co_type*
Other covariates included in the regressions: *birth_year, gender, d_married, n_child, d_house_own, money_home, same_town, d_job_aut, d_contr_indet, constant*.

Table 17 – Effect of having a close-kinship related co-signer and expected co-signer intervention on loan repayment performance- Two-Stage Least Squares

Dep. Variable	expos_aver	expos_aver	expos_aver	expos_aver	delays_aver	delays_aver	delays_aver	delays_aver
d_co_type_close	-0.725 (0.768)	-3.101 (2.611)	-3.972 (2.865)	-2.362 (1.924)	-0.292* (0.165)	-0.657* (0.362)	-0.808* (0.449)	-0.549* (0.308)
edu	-0.067** (0.029)	-0.114* (0.064)	-0.108 (0.084)	-0.107* (0.064)	-0.008 (0.008)	-0.012 (0.013)	-0.012 (0.016)	-0.012 (0.013)
it_since	-0.528* (0.296)	0.317 (0.594)	-0.473 (0.655)	-0.385 (0.525)	-0.157** (0.070)	-0.037 (0.112)	-0.145 (0.131)	-0.146 (0.105)
it_lang	-0.033 (0.048)	0.239 (0.191)	0.151 (0.172)	0.093 (0.134)	0.003 (0.015)	0.045 (0.039)	0.030 (0.033)	0.023 (0.029)
wage	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
other_inc	-0.000 (0.000)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000* (0.000)
savings	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
l_type	0.075 (0.176)	0.484 (0.439)	-0.081 (0.428)	-0.105 (0.375)	0.048 (0.035)	0.107 (0.089)	0.036 (0.075)	0.015 (0.064)
l_gross	0.000* (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
l_exp	0.000 (0.000)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
l_irate	-0.021 (0.045)	-0.086 (0.130)	-0.105 (0.152)	-0.042 (0.098)	-0.006 (0.010)	-0.014 (0.023)	-0.019 (0.026)	-0.008 (0.018)
l_start	-0.001** (0.000)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.000** (0.000)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)
l_install_nr	-0.015* (0.009)	0.007 (0.015)	0.005 (0.018)	0.001 (0.012)	-0.001 (0.001)	0.003 (0.003)	0.002 (0.004)	0.001 (0.003)
l_install_amount	-0.003** (0.001)	-0.001 (0.002)	-0.002 (0.003)	-0.002 (0.002)	-0.001*** (0.000)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.000)
co_inc	-0.000*** (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000* (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000 (0.000)
co_crif	-0.084 (0.053)	-0.030 (0.097)	-0.065 (0.099)	-0.055 (0.078)	-0.019** (0.009)	-0.014 (0.019)	-0.019 (0.020)	-0.017 (0.015)
e_co_pay	-0.033 (0.358)	-1.032 (1.148)	-1.574 (1.377)	-0.934 (0.897)	-0.073 (0.093)	-0.215 (0.214)	-0.306 (0.237)	-0.208 (0.163)
net	0.146 (0.134)	0.277 (0.364)	0.404 (0.431)	0.231 (0.312)	0.046 (0.036)	0.063 (0.067)	0.091 (0.077)	0.062 (0.058)
Position F-E	YES	NO	NO	NO	YES	NO	NO	NO
Branch F-E	NO	YES	NO	NO	NO	YES	NO	NO
Job F-E	NO	NO	YES	NO	NO	NO	YES	NO
Loan use F-E	NO	NO	NO	YES	NO	NO	NO	YES
country_back †	-0.267** 0.125	-0.246* 0.177	-0.250** 0.126	-0.272** 0.134	-0.267** 0.125	-0.246* 0.177	-0.250** 0.126	-0.272** 0.134
K.-P. rk LM statistic	4.00	3.55	2.93	3.65	4.00	3.55	2.93	3.65
K.-P. Wald rk F stat.	3.63	3.17	2.59	3.28	3.63	3.17	2.59	3.28

2SLS estimates. 591 observations. Standard errors in brackets clustered at country level. *significant at 10%; ** significant at 5%; *** significant at 1%. † First-stage estimates: dependent variable is *d_co_type_close*

Other covariates included in the regressions: *birth_year, gender, d_married, n_child, d_house_own, money_home, same_town, d_job_aut, d_contr_indet, constant.*

Table 18 – Effect of kinship-ranked co-signers and expected co-signer intervention on loan repayment performance- Two-Stage Least Squares

Dep. Variable	expos_aver	expos_aver	expos_aver	expos_aver	delays_aver	delays_aver	delays_aver	delays_aver
co_type	-0.169 (0.162)	-0.656* (0.391)	-0.899* (0.495)	-0.549* (0.302)	-0.065** (0.033)	-0.141** (0.070)	-0.182** (0.078)	-0.126** (0.060)
edu	-0.065** (0.027)	-0.138*** (0.050)	-0.120* (0.062)	-0.115** (0.054)	-0.007 (0.007)	-0.017* (0.010)	-0.014 (0.012)	-0.014 (0.011)
it_since	-0.473** (0.235)	0.503 (0.462)	-0.374 (0.544)	-0.226 (0.393)	-0.134** (0.052)	0.000 (0.082)	-0.123 (0.109)	-0.107 (0.077)
it_lang	-0.045 (0.038)	0.189* (0.105)	0.100 (0.103)	0.068 (0.090)	-0.001 (0.010)	0.035* (0.021)	0.020 (0.019)	0.017 (0.018)
wage	-0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
other_inc	-0.000 (0.000)	-0.001* (0.000)	-0.001* (0.000)	-0.001* (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.000** (0.000)
savings	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
l_type	0.046 (0.186)	0.429 (0.274)	-0.158 (0.398)	-0.143 (0.350)	0.042 (0.030)	0.095* (0.054)	0.022 (0.063)	0.008 (0.053)
l_gross	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
l_exp	0.000 (0.000)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
l_irate	-0.010 (0.036)	-0.022 (0.072)	-0.038 (0.097)	-0.005 (0.069)	-0.000 (0.007)	-0.000 (0.011)	-0.005 (0.016)	0.001 (0.011)
l_start	-0.001*** (0.000)	-0.001* (0.000)	-0.001 (0.001)	-0.001 (0.001)	-0.000*** (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000* (0.000)
l_install_nr	-0.007 (0.005)	0.002 (0.012)	0.007 (0.012)	0.003 (0.009)	0.001 (0.001)	0.003 (0.002)	0.003 (0.002)	0.003 (0.002)
l_install_amount	-0.002** (0.001)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.001)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
co_inc	-0.000*** (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000* (0.000)
co_crif	-0.071 (0.051)	-0.014 (0.092)	-0.029 (0.084)	-0.033 (0.075)	-0.015* (0.008)	-0.010 (0.016)	-0.011 (0.016)	-0.012 (0.012)
e_co_pay	0.049 (0.252)	-0.554 (0.567)	-1.028 (0.796)	-0.623 (0.561)	-0.035 (0.050)	-0.119 (0.099)	-0.197 (0.128)	-0.137 (0.092)
net	-0.099 (0.090)	-0.106 (0.179)	-0.193 (0.242)	-0.103 (0.187)	-0.030 (0.021)	-0.026 (0.029)	-0.048 (0.041)	-0.033 (0.031)
Position F-E	YES	NO	NO	NO	YES	NO	NO	NO
Branch F-E	NO	YES	NO	NO	NO	YES	NO	NO
Job F-E	NO	NO	YES	NO	NO	NO	YES	NO
Loan use F-E	NO	NO	NO	YES	NO	NO	NO	YES
country_back †	-1.204** 0.492	-1.134** 0.508	-1.095** 0.494	-1.170** 0.437	-1.204** 0.492	-1.134** 0.508	-1.095** 0.494	-1.170** 0.437
K.-P. rk LM statistic	7.30	5.78	6.30	6.98	7.30	5.78	6.30	6.98
K.-P. Wald rk F stat.	6.63	5.17	5.57	6.28	6.63	5.17	5.57	6.28

2SLS estimates. 591 observations. Standard errors in brackets clustered at country level. *significant at 10%; ** significant at 5%; *** significant at 1%. First-stage estimates: dependent variable is *co_type*

Other covariates included in the regressions: *birth_year, gender, d_married, n_child, d_house_own, money_home, same_town, d_job_aut, d_contr_indet, constant.*

5. Concluding Remarks

Although the present study is at its early stage, we can provide some preliminary evidence from the empirical analysis we have conducted on both samples of all borrowers and on the restricted sample of co-signed loans. First, comparing borrowers having a co-signer with those without guarantees we observe that a strong selection effect takes place due to the fact that several micro-lenders, as it seems the case of PerMicro, are likely to provide access to credit without co-signers to borrowers whose credit rating is sufficiently high, while asking for a co-signer to other borrowers. However, we are not in a position to assess to what extent borrowers having low credit scores are either admitted with co-signers or excluded.

However, concentrating on the sole pool of borrowers to whom a guarantee is required and instrumenting the main variables of interest with a measure expressing the likelihood of finding a close-kinship related guarantor, we have found that those related to the co-signer by stronger kinship are less likely to exhibit bad repayment performance in terms of both delays and installment exposure.

We also provide evidence that associating co-signers who are more closely related to the borrower by kinship the latter's attitude towards repayment is likely to improve, regardless possible co-signers' intervention in the repayment of the due sums.

Finally, similar to what has been previously observed by Karlan et al. (2009a) this paper suggests that co-signer-based microfinance programs should pay considerable attention to the effects of different social relationships between guarantors and borrowers in order to maximize repayment rates.

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Appendix

Table A1 - Borrowers by nationality

Nation	Freq.	Percent	Nation	Freq.	Percent
Afghanistan	1	0.09	Iran	1	0.09
Albania	10	0.93	Israel	1	0.09
Algeria	2	0.19	Italy	167	15.49
Argentina	1	0.09	Yugoslavia (former)	3	0.28
Australia	1	0.09	Kenya	1	0.09
Bangladesh	55	5.1	Kosovo	1	0.09
Belarus	1	0.09	Kuwait	1	0.09
Bolivia	5	0.46	Liberia	1	0.09
Bosnia	1	0.09	Macedonia	4	0.37
Brazil	8	0.74	Mali	2	0.19
Bulgaria	4	0.37	Mauritius	1	0.09
Burkina Faso	2	0.19	Moldavia	29	2.69
Cameron	4	0.37	Morocco	36	3.34
China	1	0.09	Nigeria	15	1.39
Colombia	1	0.09	Other	45	4.17
Congo	3	0.28	Pakistan	14	1.3
Costa Rica	1	0.09	Peru	50	4.64
Côte d'Ivoire	6	0.56	Philippines	224	20.78
Croatia	1	0.09	Poland	6	0.56
Cuba	3	0.28	Portugal	1	0.09
Czech Republic	1	0.09	Romania	142	13.17
Dominican Rep.	5	0.46	Russia	1	0.09
Egypt	5	0.46	Santo Domingo	2	0.19
El Salvador	3	0.28	Senegal	38	3.53
Ecuador	41	3.8	Somalia	1	0.09
Ethiopia	1	0.09	Spain	1	0.09
Georgia	40	3.71	Sri Lanka	11	1.02
Ghana	1	0.09	Sudan	4	0.37
Guatemala	2	0.19	Switzerland	1	0.09
Guinea	3	0.28	Tunisia	4	0.37
Honduras	1	0.09	Ukraine	56	5.19

Source: PerMicro database, 2009-2011