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Hermes, C.L.M.; Lensink, B.W.; Mehrteab, H.T.

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PEER MONITORING, SOCIAL TIES AND MORAL HAZARD IN GROUP LENDING PROGRAMMES: EVIDENCE FROM ERITREA

Niels Hermes, Robert Lensink and Habteab Mehrteab Teki*

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Abstract

In this paper, we provide an empirical analysis of the impact of monitoring and social ties within group lending programs on moral hazard behavior of its participants, based on data from an extensive questionnaire held in Eritrea among participants of 102 groups. We find support for the fact that peer monitoring by and social ties of group leaders do help to reduce moral hazard behavior of group members. In contrast, peer monitoring by and social ties of other group members are not related to reducing the occurrence of moral hazard within groups.

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1. INTRODUCTION

In many developing economies the majority of the people live in great poverty. Usually, the poor have no access to loans from the formal banking system, because they cannot put up collateral that is accepted by these banks and because the costs for banks of screening and monitoring the actions of the poor, and of enforcing their contracts are too high to make lending to this group profitable for banks. The lack of having access to external finance is one of the reasons why many people in developing economies remain stuck in poverty. Recently, however, the poor in both rural and urban areas of these economies have succeeded in gaining increased access to loans. An important contribution to make this possible is made by so-called group lending programs. During the past few years, these programs have been introduced in many developing economies.

The basic idea of these group lending programs is that loans are made to individuals who is a member of a borrowing group; yet, all group members are responsible for the repayment of the loan to the program. This creates incentives for individual group members to screen and monitor the other members of the group and to enforce repayment. Thus, the lender no longer has to invest in screening, monitoring and enforcement activities; the group lending structure creates an effective way of screening, monitoring and enforcement of contracts among borrowers. The group lending structure creates its own kind of collateral, which in the literature is referred to as social collateral. One of the expected outcomes of group lending programs is that it reduces moral hazard behavior of the participants.

While this outcome can be shown in theoretical models (see, e.g., Stiglitz, 1990; Varian, 1990), there has been surprisingly little empirical evidence on this issue. This is related to the fact that it is difficult to obtain reliable data on the behavior of participants in group lending programs. In this paper, we provide an empirical analysis of the impact of peer monitoring and social ties within group lending programs on moral hazard behavior of its participants, based on data from an extensive questionnaire held in Eritrea among participants in two group lending programs. It is important to know whether group

lending programs help to mitigate moral hazard behavior, since this may contribute to higher repayment rates, which in turn may improve the sustainability of such programs. The more sustainable these programs are, the more they can contribute to reducing credit constraints of the poor.

One distinguishing feature of the Eritrean programs is the fact that the group leader seems to play a prominent role in the functioning of the group. In our analysis we specifically investigate whether this has consequences for the impact peer monitoring and social ties may have on the occurrence of moral hazard behavior in the group.

The remainder of the paper is organized as follows. Section 2 provides a review of the literature on group lending programs and the related incentive effects on the behavior of group participants, emphasizing moral hazard behavior. Section 3 discusses the two group lending programs in Eritrea and section 4 describes the questionnaire we have conducted and the resulting data set we have used in the empirical part of this paper. Section 5 presents the empirical model we use to investigate moral hazard behavior in the group lending programs in Eritrea. Section 6 discusses the outcomes of the empirical analysis. Section 7 concludes.

2. GROUP LENDING AND MORAL HAZARD: A BRIEF LITERATURE REVIEW

During the past 10 to 20 years micro finance programs as a mechanism to lend to the poor have gained increasing interest from governments, non-government organizations (NGOs) and donor committees, as well as from academic researchers. Such programs have been introduced in many developing economies, and even in some developed countries. At the end of 2001, over 2,000 so-called micro finance programs were established, serving over 30 million people (Daley-Harris, 2002). Several of these programs make use of group lending to provide credit to the poor.

The mechanism of group lending has received great attention, both among policy makers as well as in the academic literature. The attention for these group-lending

programs can be explained from the fact that they are seen by many as a panacea for reducing poverty. Lack of access to credit is considered to be one of the major constraints the poor are confronted with when they are planning to make (small) investments in order to improve their income levels. Group lending may allow the poor to get access to credit, thereby improving their income situation. The optimistic view on the possibilities of group lending to reduce poverty is also stimulated by the apparent success of the Grameen Bank of Bangladesh in reaching the poor and improving their income levels by extending small group loans for investment.

The idea of group lending is simple. Participants in such programs are usually too poor to get access to bank credit. The small size of the loans they need is not commercially viable for banks. The costs of screening, monitoring and enforcing repayments related to such loans are far higher than the returns on them. The standard solution banks use to reduce such costs, i.e. requiring collateral, is not applicable in the case of poor borrowers, since in almost all cases they have no acceptable and/or valuable collateral. This makes lending to them a very risky business.

In group lending programs screening, monitoring and enforcing repayments problems are solved by providing loans to an individual borrower, who is a member of a borrowing group. The group of borrowers is made responsible for the repayment of the loan: all group members are jointly liable. Non-repayment by the group also means that all borrowers in the group will be denied future access to loans from the program. The principle of joint-liability creates an incentive mechanism in which each group member has an interest in screening and monitoring the other members, and to enforce repayment if necessary, since the non-repayment of one of the other members will be costly for her/him and, additionally, may cut off access to loans in the future. Thus, individual borrowers are stimulated to select credible members to group with, to monitor the other members' activities once the loan is received, and to enforce repayment in case a group member fails to pay her/his obligations. Joint-liability creates its own kind of collateral to reduce such costs. This is referred to as social collateral in the literature. Joint-liability,

therefore, reduces the costs of screening, monitoring and enforcement of repayments for the creditor.

Several theoretical papers have shown the positive contribution of joint-liability programs to reducing screening, monitoring and enforcement costs. Some models focus on group lending and its effects on monitoring and moral hazard behavior of borrowers. Stiglitz (1990) and Varian (1990) are the seminal publications in this area. They present models in which peer monitoring within groups reduces moral hazard behavior of individual group members. Group lending programs delegate costly monitoring activities to group members, reducing the costs of lending, which may be translated into lower interest rates the borrowers have to pay (Varian, 1990) and/or larger loan contracts (Stiglitz, 1990). Banerjee *et al.* (1994) discuss the credit cooperatives that were common in the late nineteenth and early twentieth century in Western Europe. They show that these credit cooperatives created incentive structures similar to the group lending programs, leading to monitoring among borrowers, which helped to reduce moral hazard behavior.

Other models elaborate on the Stiglitz-Varian models, dealing with extensions such as the efficient organization of monitoring within groups (Armendariz de Aghion, 1999) and the importance of repeated loan contracts in order to obtain the benefits from peer monitoring and to prevent free rider problems from occurring within groups (Che, 2001). Still other models relax the assumption of costless peer monitoring implicit in the Stiglitz-Varian models (Conning, 2000; Madajewicz, 1999). Conning (1996) presents a model in which it is shown that group lending will only be used if group members have substantial monitoring and enforcement advantage as compared to outsiders, and if the project returns across borrowers are not highly correlated. The model also discusses the effects collusion among borrowers on group lending efficiency and provides a cost-benefit analysis of group lending.

Some papers focus on the role of social ties between group members in reducing moral hazard behavior by individual members. The importance of social ties is explained

in terms of the consequences of non-repayment of one member for her or his position within an existing social network, since non-repayment will have a negative impact on the other group members' current wealth and future access to loans. Strong social ties may help the process of peer monitoring and peer pressure. It is believed that due to these ties members may have better information to monitor and may more easily pressure for repayment (Floro and Yotopoulos, 1991). Others, however, have indicated that social networks may be counterproductive. Since people know each other very well and have close social ties, they may be less eager to pressure for repayment (Wydick, 1999). For instance, family or friends may be less eager to use pressure for fear of losing family or friends, which in such cases is valued higher than losing money (Conning, 2000).

Finally, some papers stress the importance of using peer pressure to force repayment within groups and reduce moral hazard (Besley and Coate, 1995). A related argument holds that once sufficiently strong and credible threats of the use of social pressure exist, this may stimulate individuals not to pursue moral hazard behavior (Wydick, 1996).

Wydick (2001) presents a model in which several of the abovementioned issues related to the working of group lending are combined. In this model, groups are created based on self-selection but (in contrast with other models) under imperfect information. Next, monitoring takes place, and members help those who have been confronted with adverse external shocks and exclude those who have misused the money they have received by using social sanctions. In the model of Wydick, borrowing groups are described as dynamic peer review committees.

Whereas the theoretical literature on monitoring and moral hazard within group lending programs is quite extensive, there are only very few empirical studies of these phenomena. One possible explanation for this is that it is difficult to obtain reliable data on monitoring and moral hazard behavior of participants in group lending programs. The only substantial empirical study available is carried out by Wydick (1999), who uses information from group lending programs in Guatemala. Wydick analyses the role of peer

monitoring, peer pressure and social ties within these groups in reducing moral hazard behavior of individual group members. His findings show that while peer monitoring and (to a lesser extent) peer pressure help to reduce moral hazard and increase the repayment performance of groups, social ties do not have such effects.¹

3. A DESCRIPTION OF GROUP LENDING IN ERITREA

Currently, two group lending programs are operating in Eritrea. The Saving and Micro Credit program (SMCP) is active since 1996 and is part of the Eritrean Community Development Fund (ECDF), a government related fund. The funding for this program comes from the Eritrean government, the World Bank and from grants from a number of individual donor countries. The Southern Zone Saving and Credit Scheme (SZSCS) started in 1994 and was launched by the Agency for Co-operation and Research in Development (ACORD), a British NGO. SMCP has its activities all over the country, whereas SZSCS concentrates its efforts in the southern part of Eritrea. Both programs are active in rural as well as in urban areas. The borrowers in both programs are active as retailers, farmers, or small-scale producers.

Both programs are set up along the lines of the Grameen Bank model. Groups are formed through self-selection. After a group is accepted by one of the two programs, members are required to go through a short training program. Moreover, the group has to select a group leader and (sometimes) a group secretary. The role of the group secretary is to keep the accounts of the group. The group leader is the intermediary between the group and the program staff (i.e. the program's credit officer and/or the village credit committee or bank). He/she has to regularly report to the program's staff on the performance and sustainability of the group. Moreover, he/she has to chair group meetings, collect the install payments from group members and transfer them to the credit officer, visit group members regularly and discusses business and/or group related problems, and call for extra group meetings if repayment problems occur. Being a group leader is a voluntary activity; it does not generate any (financial) remuneration. From the above description it

appears that a group leader may have quite an important role to play as a representative of the group to the program organization and may generate all kinds of activities that may help improve repayment performance of the group he/she represent.

SMCP works through village banks that administer the provision of loans to so-called solidarity groups at the village level. By the end of 2002 the program had established 162 village banks and had almost 14,000 members. This amount has increased quite substantially over the last four years: in 1998 the program had only 6,000 members. Groups in SMCP consist of 3-7 members. Group members may not have family ties. Individuals are only allowed to borrow after they have accumulated mandatory savings equal to 10 per cent of the sum they want to borrow in the previous three months. The village banks typically provide loans to between 35-105 individuals. The size of the loans ranges between USD70 – USD710.² All members of a group are individually liable for repayment of the loan made to the group. Main aim of the use of group lending is that due to the joint liability element, group members may have an incentive to monitor each other and, if necessary, may use pressure to force those members who fail or are unwilling to make repayments on time. Repayments are made on a monthly basis. In October 1999 the program had 6,223 beneficiaries with USD1.4 million of outstanding loans. The repayment rate was 98 per cent (September 1999) (Seltene, 1999).

The organizational structure of SZSCS is slightly different from that of SMCP. SZSCS works through so-called credit and savings committees (CSCs) consisting of representatives of solidarity groups based within the villages. These committees evaluate loan requests from groups and forward them to the program management. Based on the information obtained from the CSCs the program management decides whether or not to give a loan to a group. By 1999 the program had reached 192 villages. Groups in SZSCS consist of 3-7 members. The size of the loans ranges between USD70 – USD570. Initial loans to an individual may be no higher than USD150. Individuals are only allowed to borrow after they have accumulated mandatory savings equal to five per cent of the sum

they want to borrow. For repeat loans the savings requirement may go up to a maximum of 15 per cent of the borrowed sum. Loans are extended for a large range of activities, such as small-scale trading, dairy production, purchase of oxen, irrigated horticulture and other agricultural activities. Some 80 per cent of the borrowers live in rural areas. As in SMCP, in SZSCS all members of a group are individually liable for repayment of the loan made to the group and repayments have to be made on a monthly basis. In 2001 the program had a portfolio of 6,250 loans. The repayment rate was 98 per cent.³

4. DATA DESCRIPTION

During 2000 we conducted a survey among 102 groups, of which 56 were in SMCP and 46 were in SZSCS. Most of these groups were based in small villages and secondary towns of Eritrea. In the survey we asked questions about the socio-economic characteristics of the group members, as well as about the saving and repayment performance of individual group members. In addition, we included questions on the group formation process, the existence of social ties, and on processes of screening, monitoring and enforcement within groups. From each group we selected the group leader and one or more other members to answer the questions. Part of the questions was submitted to both the group leader and the other member(s) of each group; another part of the questions was specifically asked to the group leader. We included separate questions for the group leader, since, as was described in section 3, these group leaders appear to have a quite important role to play as a representative of the group to the programme organisation; in our analysis we specifically investigate whether this has consequences for the impact peer monitoring and social ties may have on the occurrence of moral hazard behavior in the group.

Through the questionnaire we obtained information from 351 group members, of whom 102 were group leaders. Of the total sample of group members, 167 were participating in the SZSCS program and 184 in the SMCP program. Within the sample, 196 borrowers were females (56 per cent) and 155 were males. The majority (68 per cent)

of the respondents had no or only primary education. The average monthly income of group members was approximately USD75. Trade (63 per cent) and farming (17 per cent) were the main occupations of group members; many of them usually had two (or more) occupations at the same time.

On average groups were composed of 4.5 members, with a median of 4, ranging from a minimum of three to a maximum of seven members. The amount of loan cycles (or loan rounds) groups had completed up to the interview ranged from a minimum of two to a maximum of seven with an average of 3.6 cycles. Group savings were approximately USD155, ranging from just USD20 to USD500. Group loans ranged from USD54 to USD607 with mean and median loan size of USD282 and USD250, respectively. Loan terms varied from three to 24 months. Group members mainly used the loans for working capital purposes. In some cases, the money was used to buy livestock and raw materials. Only 18 respondents reported they had other sources of credit, such as banks (5), money lenders (2) and relatives (6), next to the loan from the group lending program. Most respondents (337) had never even applied for a bank loan. Of the total sample, 17 per cent of the group members responded they have had repayment problems in the past at least once.

As mentioned, the focus of this paper is on moral hazard behavior and the role of peer monitoring within groups in reducing such behavior. In order to investigate this, we need a measure of moral hazard behavior within groups. Following the empirical work by Wydick (1999) we included a question on the instances of misuse of borrowed money by group members. In order to get a clear picture of such instances, we decided to ask the question to only one person in a group to avoid getting conflicting information on this issue. We concluded that the best person to ask this question is the group leader, since he/she is responsible to report about the performance and sustainability of the group to the program staff and he/she has several other responsibilities within the group that make him/her the most reliable source for information about loan abuses. Since we have 102

group leaders in our sample we also have the same amount of observations on the instances of misuse of borrowed money.

Of the 102 group leaders, 46 were in a group in the SZSCS program and 56 in a group of the SMCP program; 54 of them were males (53 per cent) and 48 were females. Group leaders income was similar (USD72) to the average income level of all group members in the sample. They were also very similar to the average group member in terms of occupation: 61 per cent of them were active in trade, whereas 15 per cent were active in farming.

5. THE EMPIRICAL MODEL

As pointed out in the literature review, monitoring and social ties may affect the occurrence of moral hazard within groups. In the empirical analysis we investigate whether peer monitoring and social ties play a role in mitigating moral hazard problems in the context of the two Eritrean group lending programs.

The dependent variable in the analysis is *ABUSES*, a dummy variable that may be 0 or 1, and which measures the occurrence of moral hazard behavior within a group. In particular, *ABUSES* = 1 if the group leader indicates that at least one member has ever misused a loan. We use a logit model to estimate the effects of a number of independent variables measuring social ties and peer monitoring within groups in reducing moral hazard behavior of group members. In our data set we have information on these variables; the available information allows us to distinguish between group leaders and other group members with respect to their opportunities for monitoring and the existence of social ties they may have with the other members of the group.

From the survey we were able to use a number of (dummy) variables to measure whether monitoring may take place within groups. In particular, we have used the following variables to measure monitoring:

- *KNACTDUM* = 1 if the group member knows the activities of the other group members;

- *KNSELDUM* = 1 if the group member knows the monthly sales of the other group members;
- *DISTANCE* = average distance (in meters) between the group member and the other members of the group;
- *VISITDUM* = 1 if the group member regularly visits the other group members.

These four variables hold information about the extent to which group members (group leaders or other members) hold information about each other, giving them the opportunity to monitor each other. For *KNACTDUM*, *KNSELDUM* and *VISIT* we expect a negative sign of the coefficient: if these dummies are equal to 1, the probability of moral hazard occurring in a group falls: if group members know about each others sales and activities and if they visit each other regularly, they will also be better equipped to monitor each others behavior. For *DISTANCE* we expect a positive sign of the coefficient: if the distance between group members increases monitoring becomes more difficult and thus the probability of moral hazard increases.

Next, we have a number of dummy variables to measure the existence of social ties. In particular, we have used the following variables:

- *BOGROUP* = 1 if the group member is born in the same area where the survey was held;
- *KNMEDUM* = 1 if the group member knows the other group members before forming the group;
- *CHGRDUM* = 1 if the group member has ever been member of another group.

All three variables hold information about the extent to which individuals within a group are related to each other. Such relations may influence the use of peer monitoring and/or peer pressure within the group. For *BOGROUP* and *KNMEDUM* we expect a negative sign of the coefficient: if these dummies are equal to 1, this means that group members know each other, which is assumed to indicate the existence of social ties, leading the probability of moral hazard occurring in a group to fall. For *CHGRDUM* we expect a positive sign of the coefficient: if this dummy is equal to 1, the probability of moral

hazard occurring in a group increases, since the switching between groups is assumed to reduce social ties and the knowledge the group member will have of the other group members.

Next to these variables measuring social ties and peer monitoring within groups, we also use a number of variables measuring personal characteristics of group members and a number of other variables. These two sets of variables are used in the empirical analysis as control variables. In particular, we have used the following variables to measure personal characteristics (again, we have information on these variables for group leaders and other group members separately):

- *AGE* = age of the group member (years);
- *GENDUM* = 1 if the group member is a male;
- *EDUCATION* indicates the educational background of the group member, ranging from 1 (= illiterate) to 4 (= secondary schooling);
- *MOSDUM* = 1 if the group member is a Moslem;
- *MARDUM* = 1 if the group member is married;
- *INCOME* = monthly income of the group member (in Nakfas)

The reason why we include these variables in our analysis is that personal characteristics might influence moral hazard behavior in groups. We have no explicit expectations on the signs of each of the variables, however.

Finally, we use the following set of other control variables:

- *PROVISIT* = 1 if a representative of the credit program regularly visits the group;
- *GAGREEDUM* = 1 if the group members use informal rules on how to behave within the group;
- *VFACCESS* indicates the value a group member attaches to having access to loans from the credit program in the future, ranging from 1 (= very high value) to 4 (= very low value)
- *SAMESEX* = 1 if all group members are of the same sex;

- *LEADERRESP* = 1 if the other group members agree with the statement that their group leader shows high responsibility.

The variables *PROVISIT*, *GAGREEDUM* and *SAMESEX* refer to the group as a whole (*i.e.* including the group leader and the other group members). For *PROVISIT* and *GAGREEDUM* we expect to find a negative sign: if a representative regularly visits the group and if groups use informal rules this will reduce the probability of moral hazard behavior. For *VFACCESS* we also expect to find a negative sign: if group members attach a high value to future access to loans from the program, this will encourage them to behave prudently, thus reducing the probability of moral hazard behavior occurring. The *LEADERRESP* variable refers to the other group members only. We have no explicit expectations on the signs of this variable and of the *SAMESEX* variable.

6. EMPIRICAL RESULTS

As was indicated above, the empirical analysis focuses on testing whether peer monitoring and the existence of social ties in groups do play a role in mitigating misuse of loans by group members. The analysis is carried out as follows. We start by estimating the complete model, which includes all our measures of peer monitoring, social ties, individual characteristics and other variables as discussed in section 5. Next, we delete variables from the model for which we do not find significant coefficients until we find the best fitting model, *i.e.* the model including only significant coefficients. In this way, we are able to test for the robustness of the variables for which we do find significant coefficients.

We test the model for two types of group members, *i.e.* group leaders and other group members. This approach is inspired by the fact that in the Eritrean programs the group leader seems to play a prominent role in the functioning of the group. In our analysis we specifically investigate whether this distinguishing feature has consequences for the impact peer monitoring and social ties have on the occurrence of moral hazard behavior in a group. We have 102 observations to estimate the model. For the model

focusing on the group leaders we use the information from the questionnaire provided by 102 group leaders. For the model focusing on the other group members (249 observations) we use the averages of variables of the other group members of each of the 102 groups.

Tables 1a and 1b provide descriptive statistics of all the variables used in the empirical investigation for both the group leaders and the other group members. The Tables show that the statistics for most of the variables included in the empirical model do not differ much when comparing group leaders with the other group members. The only significant differences appear to be with respect to *INCOME*, *EDUCATION* and *DISTANCE*. Group leaders appear to have a higher income, they are somewhat higher educated and the distance between them and the other group members is higher as compared to the averages of these three variables of the other group members. Moreover, it appears that among group leaders men are more dominant than among the other group members (*GENDUM*).

<INSERT TABLES 1a AND 1b HERE>

Table 2 provides the results of the empirical analysis. In the table Z-statistics are given in parentheses. Equation 2-1 in the Table shows the results of the complete model using information for the other group members. Interestingly, none of the peer monitoring and social ties variables and most of the other variables have a statistically significant coefficient, indicating that peer monitoring and social ties of other group members do not play a role in mitigating misuse of loans by group members.

Yet, if we concentrate on the group leaders only, then we find support for the fact that peer monitoring by and social ties of group leaders do play a role in mitigating moral hazard problems within groups (equations 2-2 to 2-5). In particular, the Table shows that in the complete model (equation 2-2) we find statistically significant coefficients for two of the four peer monitoring variables (*DISTANCE* and *VISITDUM*) and two of the three

social ties variables (*KNMEDUM* and *CHGRDUM*). All four variables have the expected sign. Of the control variables we find statistically significant coefficients for *INCOME*, *VFACCESS* and *SAMESEX*.

With respect to peer monitoring the results suggest that if the group leader regularly visits the other group members, the probability of moral hazard occurring is reduced. Moreover, if the distance between the group leader and the other members increases, the probability of moral hazard occurring increases. With respect to social ties, the results show that if the group leader knows the other group members before forming the group, this reduces the probability of moral hazard occurring. Moreover, if the group leader has been member of at least one other group in the past, this increases the probability of moral hazard occurring, since switching between groups is assumed to reduce social ties and the knowledge the group leader will have of the other group members.

The results for the importance of peer monitoring and social ties of the group leader seem to be robust. The coefficients for *DISTANCE*, *VISITDUM*, *KNMEDUM* and *CHGRDUM* remain to be statistically significant and keep having the right sign, even after three consecutive rounds of deleting variables; in the first two rounds we delete those variables for which the Z-statistic of the coefficient is less than one (equations 2-3 and 2-4), in the last round we delete all variables that remain to be statistically insignificant, i.e. having a Z-statistic of less than 1.64 (equation 2-5). Moreover, the value of the coefficients of three of the four variables remains relatively stable,⁴ again suggesting that the results we have found are robust.

<INSERT TABLE 2 HERE>

The results presented in Table 2 lend support to the hypothesis that, since the group leader in the Eritrean programs does seem to play a prominent role in the functioning of the group, this has consequences for the impact of peer monitoring by and social ties of

the group leader vis-à-vis monitoring and social ties of other group members on the probability of moral hazard occurring in the group. Peer monitoring and social ties of other group members does not seem to have such consequences.

The results may have either one of the two following interpretations.⁵ First, they may indicate that only group leaders really do monitor and have social ties, which then have a mitigating effect on moral hazard behavior among group members. This means that for instance in the case of the peer monitoring variable *VISITDUM* if the group leader visits the other group members this leads to peer monitoring, whereas if other group members visit other members this does not lead to peer monitoring. Similar interpretations hold for the other peer monitoring and social ties variables. Put differently, in case of the group leaders the monitoring and social ties variables really do measure peer monitoring activities and social ties, whereas in case of the other group members they do not. This may be true if group members free ride on the efforts made by their group leader to reduce the occurrence of moral hazard. As described in section 3, in the Eritrean programs a group leader has quite an important role to play as a representative of the group to the program organization and he/she may generate all kinds of activities that may help improve repayment performance of the group he/she represents. This may leave little incentives for other group members to put much effort into monitoring of group members, especially since these efforts may be costly and time consuming.

Alternatively, the results may indicate that monitoring and social ties of group leaders is efficient in reducing moral hazard behavior, whereas monitoring and social ties of other group members is not. Thus, for instance in the case of *VISITDUM*, if the group leader visits other group members and this leads to monitoring activities this reduces the probability of moral hazard occurring, whereas if other group members visit other members and this leads to monitoring this does not reduce the probability of moral hazard occurring. Apparently, group members only feel pressured to behave prudently when the group leader monitors, perhaps because he/she may have more means to sanction moral

hazard behavior by group members due to his/her role as the representative of the group to the program organization.

One important issue that remains to be clarified is the question why an individual would be willing to become the group leader, given the fact that this position may be quite burdensome and responsible, it does not generate any (financial) remuneration, and that other group members may try to free ride on the monitoring efforts of the group leader? Again, there may be two alternative interpretations for this. First, individuals may attach a high value to becoming a group leader, although it does not generate a formal reward. Being a group leader and carrying out the responsible task of representing the group to the program organization generates a stock of (non-financial) obligations of the other group members to the group leader, which he/she may claim at a later date (Warning and Sadoulet, 1998). Thus, if an individual takes up the task of group leader, he/she may be compensated by future support from one or more other group members in constructing his/her house or in harvesting his/her crops. In a rural society with underdeveloped markets and institutions such non-financial obligations may play an important role in the survival strategy of individuals.

Alternatively, the results of our empirical analysis may also give at least a partial answer to the question why individuals seem to be willing to become group leader. One of the control variables, *VFACCESS*, indicates the value a group member attaches to having access to loans from the credit program in the future; a higher value for this variable indicates that an individual attaches a lower value to having loans from the program in the future. This variable appears to be insignificant in the estimations for the other group members (equation 2-1); yet, it is significant and it has a positive sign in the estimations for the group leaders (equation 2-2 to 2-5). So, it appears that if group leaders attach a high value to having future access to loans from the programme, this reduces the probability of moral hazard occurring. This relationship does not exist for the other group members. Our interpretation of this result is that group leaders may be those individuals who have the strongest incentives to repay the current loans, because they, more than the

other group members, want to have future access through the program. This in turn may give them incentives to take the lead in making the group in which they participate repay the current loan.

7. CONCLUSIONS

This paper has investigated whether peer monitoring and social ties reduce the occurrence of moral hazard in the setting of two group lending programs in Eritrea. More specifically, in our analysis we have looked at peer monitoring and social ties of two types of group members: the group leader and the other group members. We find support for the fact that peer monitoring by and social ties of the group leader may help to reduce moral hazard behavior of group members. In particular, our results indicate that regular contact and short distance between the group leader and the other group members helps to reduce misuse of loans by individual group members. Moreover, if the group leader knows the other group members before forming the group and if he/she did not change group in the past this reduces the probability of moral hazard from occurring in the group. We find no link between peer monitoring and social ties on the one hand and the occurrence of moral hazard on the other hand if we use data for the other group members. To the best of our knowledge, this study is the first attempt to investigate the different impact of monitoring efforts and social ties of different types of group members.

The analysis in this paper could be extended in a number of ways. First of all, we need to elaborate on the theoretical foundation explaining why an individual would be willing to become the group leader, given the fact that this position may be quite burdensome and responsible and that other group members may try to free ride on the monitoring efforts of the group leader. Second, and closely related to this, further research is needed on how group leaders in Eritrean credit programs are chosen and why individuals may be willing to take up the burdensome tasks of a group leader. Third, we need to investigate whether the difference in the impact of peer monitoring by and social ties of group leaders vis-à-vis other group members on the probability of moral hazard

occurring in groups is also found elsewhere, *i.e.* in group lending programs outside Eritrea.

Finally, further analysis is needed to find out whether the structure of group lending in Eritrea, in which group leaders do seem to contribute most to the reduction of the probability of moral hazard occurring, is effective in terms of improving repayment performance of groups. On the one hand, this structure seems to put much emphasis on the role of only one individual, *i.e.* the group leader, while the rest of the group members is free riding on his/her efforts. This may not be informationally efficient. On the other hand, although the literature explaining monitoring within groups normally assumes that everybody is monitoring everybody else, some papers have pointed out that this may also not be informationally efficient, since the costs of monitoring become too high in such a model. These papers have suggested other group structures to carry out monitoring (see, *e.g.*, Armendariz de Aghion, 1999). The group structure that seems to work in the Eritrean group lending programs may be just one of such alternatives; it remains to be seen whether this structure is a good alternative (in terms of repayment performance) for the ‘standard’ model of monitoring described in most of the literature.

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**Table 1a: Descriptive Statistics of the Variables Used in the Empirical Analysis,
Group Leaders**

<i>Group Leaders</i>					
	Mean	Median	Max	Min	Std Dev
<i>ABUSES*</i>	0.23	0	1	0	0.42
<i>KNACTDUM</i>	0.90	1	1	0	0.30
<i>KNSELDUM</i>	0.04	0	1	0	0.20
<i>DISTANCE</i>	630.1	325	5,000	5	1,056.4
<i>VISITDUM</i>	0.71	1	1	0	0.46
<i>BOGROUPE</i>	0.55	1	1	0	0.50
<i>KNMEDUM</i>	0.84	1	1	0	0.37
<i>CHGRDUM</i>	0.09	0	1	0	0.29
<i>AGE</i>	45.5	44.5	75	22	11.75
<i>GENDUM</i>	0.53	1	1	0	0.50
<i>EDUCATION</i>	2.2	2	4	1	0.87
<i>MOSDUM</i>	0.25	0	1	0	0.44
<i>MARDUM</i>	0.80	1	1	0	0.40
<i>INCOME</i>	1,108.8	1,000	2,000	600	385.1
<i>PROVISIT*</i>	0.84	1	1	0	0.37
<i>GAGREEDUM*</i>	0.28	0	1	0	0.45
<i>VFACCESS</i>	1.26	1	4	1	0.56
<i>SAMESEX*</i>	0.58	1	1	0	0.50
<i>LEADERRESP**</i>	–	–	–	–	–

Notes:

* These variables refer to the group as a whole (i.e. including both the group leader and the other group members). Therefore, the figures in the table are similar for both group leaders and other group members.

** This variable is only relevant for the other group members; the question related to this variable was only asked to the other group members.

**Table 1b: Descriptive Statistics of the Variables Used in the Empirical Analysis,
Other Group Members**

<i>Other group members</i>					
	Mean	Median	Max	Min	Std Dev
<i>ABUSES*</i>	0.23	0	1	0	0.42
<i>KNACTDUM</i>	0.90	1	1	0	0.21
<i>KNSELDUM</i>	0.05	0	1	0	0.18
<i>DISTANCE</i>	377.1	240	2,766.7	5	444.4
<i>VISITDUM</i>	0.77	1	1	0	0.34
<i>BOGROUPE</i>	0.54	0.5	1	0	0.43
<i>KNMEDUM</i>	0.82	1	1	0	0.30
<i>CHGRDUM</i>	0.10	0	1	0	0.22
<i>AGE</i>	46.5	47.5	68.5	22	9.11
<i>GENDUM</i>	0.45	0.33	1	0	0.43
<i>EDUCATION</i>	1.8	2	3	1	0.61
<i>MOSDUM</i>	0.28	0	1	0	0.43
<i>MARDUM</i>	0.80	1	1	0	0.32
<i>INCOME</i>	957.6	900	7,250	350	697.7
<i>PROVISIT*</i>	0.84	1	1	0	0.37
<i>GAGREEDUM*</i>	0.28	0	1	0	0.45
<i>VFACCESS</i>	1.44	1.33	5	1	0.60
<i>SAMESEX*</i>	0.58	1	1	0	0.50
<i>LEADERRESP**</i>	1.53	1.5	3	1	0.45

Notes:

* These variables refer to the group as a whole (i.e. including both the group leader and the other group members). Therefore, the figures in the table are similar for both group leaders and other group members.

** This variable is only relevant for the other group members; the question related to this variable was only asked to the other group members.

Table 2: Results of the Logit Estimation of Determinants of Misuse of Loans by Group Members

	2-1	2-2	2-3	2-4	2-5
	Other group members	Group leaders	Group leaders	Group leaders	Group leaders
PEER MONITORING					
<i>KNACTDUM</i>	-1.473 (-1.09)	-0.791 (-0.73)			
<i>KNSELDUM</i>	1.229 (0.94)	1.602 (1.25)	1.141 (0.95)		
<i>DISTANCE</i>	0.0001 (0.22)	0.001** (2.51)	0.001*** (2.77)	0.001*** (2.89)	0.001*** (3.06)
<i>VISITDUM</i>	-0.543 (-0.74)	-1.499* (-1.74)	-1.310* (-1.76)	-1.170* (-1.71)	-1.343** (-2.03)
SOCIAL TIES					
<i>BOGROUP</i>	-0.505 (-0.76)	0.542 (0.78)			
<i>KNMEDUM</i>	0.602 (0.47)	-2.506** (-2.40)	-2.176** (-2.38)	-1.922** (-2.32)	-1.709** (-2.34)
<i>CHGRDUM</i>	-0.101 (-0.08)	2.34** (2.06)	2.011* (1.97)	1.985** (2.04)	1.345* (1.64)
PERSONAL CHARACTERISTICS					
<i>AGE</i>	-0.069* (-1.70)	-0.006 (-1.56)			
<i>GENDUM</i>	1.345 (1.12)	-0.203 (-0.18)			
<i>EDUCATION</i>	0.488 (1.04)	-0.518 (-0.69)			
<i>MOSDUM</i>	0.033 (0.04)	0.144 (0.14)			
<i>MARDUM</i>	0.484 (0.48)	1.342 (1.44)	1.039 (1.50)	1.017 (1.51)	
<i>INCOME</i>	-0.001 (-1.36)	0.002* (1.66)	0.002* (1.79)	0.002* (1.90)	0.002* (1.81)
OTHER VARIABLES					
<i>PROVISIT</i>	-0.332 (-0.38)	1.837 (1.07)	1.457 (1.16)	1.409 (1.17)	

<i>GAGREEDUM</i>	0.645 (1.10)	0.986 (1.02)	0.627 (0.87)		
<i>VFACCESS</i>	-0.433 (-0.85)	1.027* (1.79)	1.073** (1.99)	1.180** (2.17)	0.769** (2.00)
<i>SAMESEX</i>	1.575** (2.56)	1.980** (2.45)	2.272*** (3.04)	2.145*** (3.11)	1.811*** (3.18)
<i>LEADERRESP</i>		0.987 (1.23)	0.907 (1.15)	0.934 (1.23)	
<i>CONSTANT</i>	2.230 (0.68)	-7.36* (-1.72)	-8.455** (-2.25)	-8.686** (-2.34)	-3.659** (-2.48)
Number of observations	102	102	102	102	102
Observations with dependent = 0	79	79	79	79	79
Probability (LR statistic)	0.752	0.003	0.0001	0.0001	0.0001

Note: Z-statistics are given between parentheses.

* Niels Hermes (corresponding author) is at the Faculty of Management and Organisation, University of Groningen, PO BOX 800, 9700AV Groningen, The Netherlands. Telephone: +31-50-363-4863 or 7082. Fax: +31-50-363-7356. Email: C.L.M.Hermes@bdk.rug.nl. Robert Lensink is at the Faculty of Economics, University of Groningen, PO BOX 800, 9700AV Groningen, The Netherlands and is external credit fellow, Department of Economics, University of Nottingham, UK. Email: B.W.Lensink@eco.rug.nl. Habteab Mehrteab is at the Faculty of Economics, University of Groningen, PO BOX 800, 9700AV Groningen, The Netherlands and at the College of Business and Economics, University of Asmara, Eritrea. Email: Habteab@econ.uoa.edu.er.

¹ A few other studies have looked at monitoring and moral hazard, but they generally lack rigorous econometric analyses. Mondal and Tune (1993) use information from the Good Faith Fund in the United States. They describe that weak social ties lead to adverse repayment performance, since group borrowers are not willing to support other group members in case of default. Van Tassel (2000) provides a descriptive analysis of the group lending programme run by the BancoSol in La Paz, Bolivia. The questionnaire he used for his research contained a question asking whether individual group members gave business advice to other group members. 75 per cent of the interviewed borrowers responded to this question affirmatively. Van Tassel argues that this is indicative evidence for the fact monitoring takes place within groups.

² We converted all data on income, loan size, etc, which in the original data set are given in Nakfa, the official currency of Eritrea, into US dollars (USD) using an exchange rate of USD1 = 14 Nakfas. This was the official exchange rate at the time the data for this research were gathered.

³ All data on SZSCS are obtained from the ACORD website, and in particular from the page providing information on SZSCS: www.acord.org.uk/h-ert4.htm (consulted on 6 February 2003).

⁴ Only the coefficient for *CHGRDUM* drops significantly, from 2.34 in equation 2-2 to 1.34 in equation 2-5.

⁵ Unfortunately, our analysis does not allow us to decide which of the two interpretations is most likely to hold in practice. Future research should address this question.