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Posted Date: 12 July 2024

doi: 10.20944/preprints202407.1072.v1

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Article

The Effects of Monitoring activities on Loan Defaults in Group-Based Lending Program: Evidence from Vietnam

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Abstract: The aim of this study is to investigate the impact of delegated monitoring by the group leader and peer monitoring by group members on loan defaults in a group-based lending program in Vietnam. Data used in the study were collected from a questionnaire survey of 675 participants involved in group-based lending program in the Mekong River Delta, Vietnam. The group-based lending program employs a unique monitoring system that involves hiring the group leader to supervise the group and encouraging group members to monitor each other. The empirical findings derived from the Probit model indicated that delegated monitoring significantly reduces loan defaults, but there was no evidence supporting the effectiveness of peer monitoring within the group. Additionally, under the delegated monitoring scheme, group size plays an important role in decreasing loan defaults.

Keywords: Delegated monitoring; group lending; loan defaults; peer monitoring; Vietnam

Classification: D26; D82; G21; G51; O16

1. Introduction

Asymmetric information between borrowers and lenders is known to lead to moral hazard and adverse selection problems (Akerlof, 1970; Stiglitz and Weiss, 1981). These issues are particularly detrimental to credit markets in developing countries, where the poor often lack access to financing due to insufficient collateral. This lack of access can result in lost productive opportunities and is a significant factor contributing to persistent poverty in these regions.

Since the mid-1980s, microfinance institutions (MFIs) such as Grameen Bank in Bangladesh, Banco Sol in Bolivia, and Bank Rakyat in Indonesia have provided small loans to the poor, significantly improving their access to credit. By employing joint-liability lending, MFIs transfer the roles of screening and monitoring to peers, who are well-positioned to evaluate and oversee the activities of their group members (Stiglitz, 1990). The advocates of group lending argue that in joint-liability lending, borrowers are provided with clear incentives to monitor and to screen each other. However, the success of these programs heavily relies on innovative credit contract terms, such as joint liability, dynamic incentives, and leveraging social ties for enforcement (Hermes et al., 2006; de Aghion and Morduch, 2010; Banerjee, 2013).

Despite the initial focus on peer monitoring and screening, there has been a notable shift toward individual-based lending systems (Giné and Karlan, 2014). Even renowned group-based microlenders such as Grameen Bank and Banco Sol have increasingly adopted individual loans without group liability. Concurrently, the rise of information technology has spurred new lending methods such as peer-to-peer (P2P) lending and crowdfunding. Although P2P lending has grown rapidly, it has faced challenges due to a lack of stringent regulations, leading to potential fraud and unethical practices. In contrast, crowdfunding, building on the principles of microfinance, has achieved considerable success. Platforms such as Kiva, Babyloan, and myELEN collaborate with

MFIs, delegating monitoring to local MFIs responsible for disbursing loans and collecting repayments. These local MFIs have cost advantages in producing information about credit risk compared to the crowd (Bouasria et al., 2020; Berns et al., 2021). This delegated monitoring model has been increasingly replicated across various countries due to the success of such credit platforms.

Although traditional joint-liability group lending has become less preferred and individual-based lending more common, the Vietnam Bank for Social Policies (VBSP) has implemented a two-stage delegation scheme in its group-based lending program. In the first stage, the Bank delegates responsibilities to local socio-political organizations (such as the Women's Union, Farmers' Union, War Veterans' Association, or Youth Union) and village heads to screen potential group members. Potential members must be identified as poor or near-poor by these organizations. During group formation meetings, members vote for each other and elect the group leader and deputy leader, typically suggested by these organizations or local commune government. The final list of candidates is sent to the commune government for approval, with groups consisting of up to 60 members. In the second stage, the group leader signs a delegation contract with VBSP, acting as the intermediary between the Bank and the group. The group leader's responsibilities include managing the group's activities, gathering socio-economic information about members, monitoring loan usage, ensuring loans are used for intended purposes, reporting misuse, and enforcing repayment. The leader also liaises between the group and the local authorities. VBSP compensates the group leader with a commission based on a percentage of the interest collected from the group. The deputy leader serves as the secretary during meetings.

Most empirical studies on joint-liability group-based lending programs have focused on the impact of formal screening, social ties, peer monitoring, and peer pressure on repayment performance (Wenner, 1995; Sharma and Zeller, 1997; Zeller, 1998; Wydick, 1999; Al-Azzam et al., 2012). Some studies have involved examining the effect of delegated monitoring on repayment performance (Hung, 2003; Berns et al., 2021). Hermes et al. (2006) were the first to investigate the effects of both delegated monitoring by the group leader and peer monitoring on repayment performance of joint-liability groups. Although the determinants of repayment performance of group-based lending programs have been substantially documented in the literature, to our knowledge, no study on the impact of the delegated monitoring and peer monitoring on repayment performance of group-based lending programs has been conducted for Vietnam.

To fill this gap in the literature, this study involved an investigation of the effects of delegated monitoring by the group leader and peer monitoring by group members on loan defaults of a group-based lending program in Vietnam. This study contributes to the literature in two ways. First, this study provides unique insights into the literature on the impact of delegated monitoring and peer monitoring on loan defaults of group-based lending programs, which, in Vietnam, are not a joint liability financially. The presence of delegated monitoring and absence of joint liability raises questions about the effectiveness of peer monitoring. Chowdhury (2005) emphasized the importance of dynamic incentives in microfinance programs, demonstrating that peer monitoring without additional measures can lead to significant under-monitoring. Second, whereas many previous studies have focused on delegated monitoring by external MFIs, we investigated monitoring motivation from within the group, specifically from the group leader, who is also a member. As an insider, the group leader has cost advantages in producing information about credit risk compared to an external third party and is incentivized by commissions. We hypothesized that the group leader's delegated monitoring motivation would effectively reduce the likelihood of loan defaults.

The remainder of the paper is organized as follows. Section 2 contains a review of theoretical background and empirical literature related to the study. Section 3 covers the details of the group-based lending program of VBSP in Vietnam. Section 4 includes a description of the data and research methodology whereas Section 5 discusses the empirical results of the study. Finally, Section 6 concludes the study.

2. Theoretical Background and Empirical Literature Review

Theoretical models have mostly focussed on how joint-liability lending can overcome problems associated with asymmetric information in financial markets. Specifically, in a business environment where borrowers lack collateral, joint-liability lending has been shown to mitigate the problems of moral hazard (Stiglitz, 1990; Varian, 1990; Banerjee et al. 1994), adverse selection (Ghatak, 2000; Ghatak et al. 2005; Van Tassel, 1999), and strategic default (Besley and Coate, 1995; de Aghion, 1999). Recently, however, several scholars have argued that joint liability is not the only mechanism that may contribute to the success of microfinance in solving the problem of asymmetric information. de Aghion and Morduch (2000, 2010) theoretically pointed out that, in addition to joint liability, other mechanisms such as dynamic incentives play an important role. Chowdhury (2005) stressed the importance of dynamic incentives in microfinance programs and showed that peer monitoring without additional measures would lead to severe under-monitoring.

Many empirical studies in this field have focused on joint-liability group-based lending programs in developing countries and their effects on repayment performance through formal screening, social ties, peer monitoring, and peer pressure. Specifically, Wenner (1995) examined the impact of formal screening on repayment rates of the FINCA group credit program in Costa Rica. The researcher found that screening has a positive impact on repayment performance of the group credit program. Sharma and Zeller (1997) explored the repayment rates of group-based credit programs in Bangladesh. The main finding from this study was that repayment rates of group-based institutions are higher than those of nationalized commercial banks. Interestingly, they found that the repayment rates of groups in poor and remote communities are better than those of other groups. Similarly, Zeller (1998) investigated the effects of program design and community and group characteristics on the repayment performance of a group-based credit program in Madagascar. The empirical results of the study indicated that social cohesion has a positive effect on the repayment rate of groups even in communities with high-risk exposure. Wydick (1999) examined the effect of peer monitoring on the repayment performance of borrowing groups in Guatemala. The researcher reported that peer monitoring has significant effects on the repayment performance of groups through stimulating intra-group insurance. The study also revealed that group pressure has a small effect in deterring moral hazard, whereas social ties among members has no statistically significant effect on the repayment performance of groups. Similarly, Al-Azzam et al. (2012) investigated the effects of screening, peer monitoring, group pressure, and social ties on the repayment behavior of borrowing groups. Their empirical findings confirmed that peer monitoring, group pressure, and social ties have a positive effect on repayment performance. Specifically, they found a positive effect of religion on repayment performance. Noglo and Androuais (2015) explored the determinants of the repayment performance of group-based lending program in Togo. The results obtained from the logit model indicated that peer monitoring, social capital, and informal sources of credit have positive effects on the repayment performance of groups.

Hermes et al. (2006) was the first to investigate the effects of both delegated monitoring by the group leader and peer monitoring on the repayment performance of joint-liability groups. Using data obtained from a questionnaire survey of 351 members across 102 groups in Eritrea, they found that the social ties of the group leader have a significantly positive effect on the repayment performance of groups, whereas social ties of other group members have no impact on repayment. The researchers also documented that monitoring activities of both the group leader and the other group members have no effects on the repayment performance of groups. Similarly, Al-Azzam et al. (2013) examined the effects of joint liability, screening, monitoring activities, and social ties of both the group leader and other group members on repayment performance in Jordan. Using a negative binomial II model, they found that the higher the joint liability of the group leader, the better repayment performance of the group. Regarding screening, this study revealed that the group leader's knowledge about the rest of the group members' assets and debts reduces days of late repayment, whereas other group members having similar knowledge about each other's assets and debts appears to have no significant impact on late repayment. The social ties of the group leader and group members also have a significant effect on repayment. However, monitoring activities of both the group leader and group members have no effects on repayment rates.

Berns et al. (2021) investigated the effect of delegated monitoring on the repayment rates of MFIs using the data from Kiva, a crowdfunding platform. The findings from this study confirmed that borrowers who are more intensely monitored by MFIs, based on factors such as staff workload and staff salary, are more likely to repay their loans on time. In addition, the effect of monitoring activities on the repayment of individual loans is stronger compared to group-based loans. Finally, they found that monitoring activities has a stronger effect on repayment performance in less competitive lending markets.

In summary, the empirical studies reviewed indicate that the role of the group leader is more significant in increasing group repayment performance compared to the role of group members. However, there is limited evidence that the monitoring efforts of the group leader effectively impacts group repayment performance. In addition, some studies revealed that delegated monitoring plays an important role in reducing credit risk. However, no study provides evidence that the delegated monitoring motivation of the group leader impacts loan defaults, a gap investigated in the current study. Based on the theoretical framework and empirical evidence, we hypothesized that both the delegated monitoring by the group leader and peer monitoring by group members would reduce loan defaults of group-based lending program in Vietnam.

3. Group-Based Lending Program of the VBSP in Vietnam

The VBSP has branches at the district level in all provinces and cities in Vietnam. The group-based lending program of VBSP is designed for the poor or near-poor household who is member of one of the following four socio-political organizations: Women's Union, Farmers' Union, Veterans' Association, or Youth Union. The district branch delegates authority to the village chief or one of the socio-political organizations to select candidates to participate in the borrowing group. The candidate must be a poor or near-poor household living in the village and a member of the specific organization. During the group formation meeting, the list of group members is endorsed and the management board elected. The list of group members must then be approved by the commune People's Committee before being officially accepted by VBSP. The maximum number of members in a group is 60, with a loan amount of up to 100 million VND (approximately 4,000 USD) without collateral and a loan term of up to 120 months, depending on the purpose of the loan application.

The loan process for the program involves specific steps. First, the specific socio-political organization encourages eligible members to prepare and submit loan applications to the group management board. The group management board then collaborates with a specific socio-political organization to hold a meeting to assess the demand and propose a loan amount for the member. The list of all proposed loans is sent to the local commune government and the Bank for approval. The Bank approves the loans and notifies the government, the organization, and the group leader. The group leader then notifies the borrowers about the date of disbursement. The Bank disburses the loans directly to the borrowers at the government office.

After the loans have been disbursed, the group leader, representing the group management board, carries out the tasks outlined in the delegation contract signed with VBSP. The group leader directly monitors the loan use, production and business activities, and income of the group members. They encourage group members to use the loan in accordance with its intended purpose and to repay the loan on time. If a group member encounters difficulties or is unable to repay the loan, the group leader takes measures to assist them in repayment. They promptly inform the Bank and local authorities of any cases where group members misuse the loans. The group leader also proactively urges, advises, and collaborates with the village chief and socio-political organizations to handle cases where members have the means to repay but fail to do so. The Bank and the organizations generally supervise the management board and only intervene with specific group members if misuse of the loan occurs.

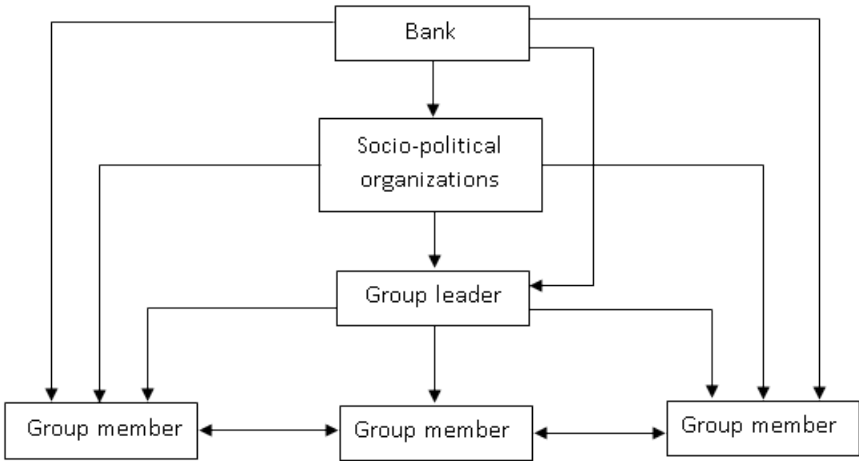


Figure 1. The VBSP monitoring structure

4. Data and Methodology.

4.1. Data Collection Process

The data used in this study were obtained from a direct questionnaire survey conducted from August to October 2022 in rural villages across five provinces in the Mekong River Delta, namely, An Giang, Bac Lieu, Dong Thap, Hau Giang, and Tien Giang. In each province, we selected 45 groups, which participated in 135 interviewees. Totally, 675 interviewees from 225 groups were interviewed, with three members interviewed per group. Of the three, two were ordinary members and one was the group leader. All the interviewees were classified as poor or near-poor according to the Multidimension Poverty Standards. We designed two separate questionnaires for the group leader and ordinary group members. The overlapping part of the questionnaires covered individual socio-economic characteristics, information associated with loans, social ties, and infrastructure in the survey area. The section for the group leader included information regarding the group, monitoring activities, enforcement, commission for the leader, and relationship with the Bank and organization staff. The section for the group members included information about peer monitoring, peer enforcement, and the role of the management board.

4.2. Research Methodology

To investigate the impact of the delegated monitoring and peer monitoring on loan default for the group-based lending program, we employed the Probit model with the form as follows:

$$DefD_i = \alpha + \beta_k DM_{k,i} + \delta_m PM_{m,i} + \gamma_n Ctrl_{n,i} + \varepsilon_i \tag{1}$$

where,

- DefD_i is the loan default of borrower (group member) i. It is a dummy variable, which equals 1 if a borrower was unable to pay loan or interest on time, and 0 if a borrower fulfilled the repayment.
- DM_k is a vector of k variables representing the delegated monitoring by the group leaders; PM_m is a vector of m variables representing the peer monitoring by group members; Ctrl_n is a vector of n control variables. The prefixes L and M denote leader and member respectively. The suffix D denotes a dummy variable. These variables are defined and presented in Table 1.

Table 1. Definitions of independent variables used in the model and expected sign.

Variables	Definition	Expected sign
Delegated monitoring variables		

<i>LCommIncRate</i>	Commission divided by income ratio	Negative
<i>GSize</i>	Number of members of a group	Negative
<i>LYrs</i>	Number of years in charge of leadership of the group leader	Negative
<i>LIncInfoD</i>	Dummy variable, equal to 1 if the group leader has information about income of a group member, 0 otherwise	Negative
<i>LPurInfoD</i>	Dummy variable, equal to 1 if the group leader has information about purpose of using loan of a member, 0 otherwise	Negative
<i>LBizInfoD</i>	Dummy variable, equal to 1 if the group leader has information about business of a group member, 0 otherwise	Negative
<i>LVisitD</i>	Dummy variable, equal to 1 if the group leader comes to a group member's business or house at least once a month, 0 otherwise	Negative
Peer monitoring variables		
<i>MIncInfoD</i>	Dummy variable, equal to 1 if leader has information about income of a group member	Negative
<i>MPurInfoD</i>	Dummy variable, equal to 1 if leader has information about purpose of using loan of a member, 0 otherwise	Negative
<i>MVisitD</i>	Dummy variable, equal to 1 if a group member comes to visit other members' businesses or houses at least once a month, 0 otherwise	Negative
Control variables		
<i>LInc</i>	Yearly income (in thousand VND) of the group leader	Negative
<i>LInc2</i>	squared yearly income of the group leader	Positive
<i>LLoanD</i>	Dummy variable, equal to 1 if the group leader borrows from the program, 0 otherwise	Negative
<i>LLoan</i>	Loan amount (in thousand VND)	Negative
<i>LOthFinD</i>	Dummy variable, equal to 1 if the group leader borrows from other credit sources simultaneously, 0 otherwise	Positive
<i>MLoan</i>	Loan amount (in thousand VND) of a group member	Negative
<i>MIncPerCap</i>	Income per capita (in thousand VND) of a group member	Negative
<i>MOthFinD</i>	Dummy variable, equal to 1 if a group member borrows from other credit sources simultaneously, 0 otherwise	Positive
<i>LDefD</i>	Dummy variable, equal to 1 if the group leader was unable to pay the loan or interest by the due date, 0 otherwise	Negative
<i>LSexD</i>	Dummy variable, equal to 1 if the group leader is male, 0 otherwise	Negative
<i>LAge</i>	Age of the group leader (in years)	Negative
<i>LEdu</i>	Number of years of schooling of the group leader	Negative
<i>MsexD</i>	Dummy variable, equal to 1 if a group member is male, 0 otherwise	Positive
<i>MAge</i>	Age of a group member (in years)	Negative
<i>MEdu</i>	Number of years of schooling of a group member	Negative

Monitoring is a labor-intensive task and involves activities that are not directly observable. Researchers have used different proxies to measure the monitoring intensity of a financial institution. In some studies, the salary expense share of a financial institution was used as a proxy for monitoring

intensity, based on the assumption that higher remuneration incentivizes the institution's staff to exert greater monitoring efforts (Coleman et al., 2006; Lee and Sharpe, 2009; Berns et al., 2021). Furthermore, Berns et al. (2021) added one more proxy variable for monitoring intensity: the number of borrowers per loan officer at each MFI (workload of loan officers). The assumption for this choice is that as the number of borrowers per loan officer increases, a loan officer's ability to monitor borrowers' activities declines.

The monitoring system of VBSP's lending program is a two-tier system. The first task is delegated to the group leader, and the second task involves peer monitoring among group members. Regarding the monitoring activities of group leader (i.e., delegated monitoring) we chose proxies for delegated monitoring motivation as Berns et al. (2021) did. They used two proxies: the number of borrowers per loan officer and the average salary divided by GDP per capita of MFI staff to measure monitoring intensity, demonstrating that MFIs have a cost advantage over the crowd in producing information about credit risk. However, we introduced two new proxy variables for delegated monitoring: (LCommIncRate) and group size (GSize-workload of group leader). These variables measure the financial benefit from the program and the workload of the group leader more directly, impacting the quality and quantity of the group leader's monitoring efforts. This ratio implies that the received commission is relatively important to a group leader, incentivizing the group leader to enhance their monitoring efforts. We labeled these two variables as delegated monitoring motivation variables.

Because the group leaders are directly delegated by the Bank, we adjusted the salary share to commission divided by income variable (LCommIncRate). This ratio implies that the received commission is relatively important to a group leader, incentivizing them to enhance their monitoring efforts. Another adjustment was using group sizes (GSize) instead of the workload of MFI's officers. In this lending program, the group leader is a member of the group and directly manages, monitors, and enforces the group members' loan usage. Therefore, the number of borrowers within a group may impact the intensity of monitoring by the group leader. Theory suggests that the larger the group size, the higher the probability that members will support each other within a group, leading to higher repayment rate (Zeller, 1994).

We distinguished the variables between the group leader and the group members with respect to their opportunities for monitoring. These variables acted as proxies, referring to the information an individual has about their group members and their activities and behaviors. For the group leader, the variables included LYrs, LIncInfoD, LPurInfoD, LBizInfoD, and LVisitD. For the group members, the variables included MIncInfoD, MPurInfoD, and MVisitD. We expected that these variables would have negative effects on loan default. In other words, the more information available about someone, the easier it is to monitor them, which helps reduce loan defaults within the group.

We controlled variables related to the individual characteristics of the group leaders as well as the group members. The individual characteristics were divided into two subsets: personal and socio-economic characteristics. The group of personal characteristics variables consisted of (LSexD, MSexD), age (Lage, MAge), and education (LEdu, MEdu). Extant literature suggests that female borrowers have a better repayment history than their male counterparts. Given this backdrop, we expected that loan default would be positively associated with male borrowers. For the age and number of years of schooling variables, we assumed that they would have negative impacts on loan default, implying that literate or older borrowers are more likely to adhere to stated obligations than illiterate or younger members.

We included LInc and LInc2 as variables for why an individual may become a group leader, based on the idea that the local government and socio-political organizations tend to select someone with a high income for this role. In rural areas, individuals with higher incomes are often more respected. Using LInc and LInc2 simultaneously, we assumed that if the group leader's income is too high, they may become very busy with their business activities. Furthermore, if their income is excessively high, the group leader may no longer see the incentives received from the group as significant. Consequently, their efforts for monitoring may decrease. The two variables, LLoanD and LLoan, were expected to have a negative correlation with loan defaults because, as a borrower, the

group leader is incentivized to monitor the proper use of loans by group members to maintain their position as leader and to receive a commission that helps them repay their loans. In essence, the motivation to oversee loan utilization arises from the dual benefits of preserving leadership status and securing financial rewards. The loan size variable (LLoan) functions in the same way. If the loan size is large enough, it enables the group leader to support both their business and personal needs, reducing the need to borrow from other informal sources with higher interest rates and shorter terms. On the other hand, LOthFinD was expected to have a positive sign of the coefficient. Accessing multiple credit sources simultaneously can indeed increase the risk of over-indebtedness, especially when loans have differing terms and repayment schedules. This complexity can lead to financial strain and difficulty in managing repayments, increasing the likelihood of default. The group leader, an individual delegated by the Bank to manage and monitor the group, has a significant influence on the repayment attitudes of the group members. Thus, the repayment problems of the leader (LDefD) will negatively impact the repayment behavior of the group members.

The group of the economic characteristics for the group members consisted of variables MLoan, MOthFinD, and MOthGrpD. Similar to LLoan and LOthFinD, MLoan and MOthFinD were expected to have negative and positive coefficients, respectively. For MOthGrpD, we expected a positive coefficient. If a group member was previously a member of another group, it suggests that they do not have long-standing relationships within the current group. This lack of long-term involvement is assumed to weaken social ties and reduce the group leader’s depth of knowledge about the group members or the relationships among the group members, which can negatively impact the group’s cohesion and increase the likelihood of loan defaults.

5. Empirical Results

5.1. Descriptive Statistics of the Sample

Based on the data obtained from 675 participants involved in the group-based lending program in the Mekong River Delta, the descriptive statistics of dependent and independent variables are as calculated and summarized in Table 2.

Table 2. Summary statistics of the sample.

Variables	Obs.	Mean	Min.	Max.	Std. dev.
DefD	675	0.20	0.00	1.00	0.40
LCommIncRate	225	16.21	2.12	84.55	13.10
GSize	225	45.76	23.00	60.00	9.64
LYrs	225	10.02	3.00	24.00	3.68
LIncInfoD	225	0.39	0.00	1.00	0.49
LPurInfoD	225	0.97	0.00	1.00	0.16
LBizInfoD	225	0.65	0.00	1.00	0.48
LVisitD	225	0.46	0.00	1.00	0.50
MIncInfoD	450	0.13	0.00	1.00	0.34
MPurInfoD	450	0.31	0.00	1.00	0.46
MVisitD	450	0.32	0.00	1.00	0.47
LInc	225	99375.95	12000.00	336000.00	56371.72

<i>LLoanD</i>	225	0.88	0.00	1.00	0.33
<i>LLoan</i>	225	13453.33	0.00	50000.00	9535.94
<i>LOthFinD</i>	225	0.27	0.00	1.00	0.44
<i>MLoan</i>	225	11228.44	2000.00	100000.00	9241.82
<i>MIncPerCap</i>	225	14412.83	1599.60	84000.00	10391.74
<i>MOthFinD</i>	225	0.25	0.00	1.00	0.44
<i>LDefD</i>	225	0.20	0.00	1.00	0.40
<i>LSexD</i>	450	0.75	0.00	1.00	0.43
<i>LAge</i>	450	52.01	27	80	10.69
<i>LEdu</i>	450	8.23	3	16	2.88
<i>MsexD</i>	450	0.64	0.00	1.00	0.48
<i>MAge</i>	450	49.25	23	82	12.14
<i>MEdu</i>	450	5.67	0	15	3.01

Source: Own calculation on the data obtained from the survey.

The table shows that 35.0% of borrowing households in the sample had experienced repayment problems. For the delegated monitoring variables, the average commission rate on business income for the group leader was 16.2%. The smallest rate was 3.1%, whereas the largest was nearly 85.0%. On average, each group had about 46 members, with the smallest group consisting of 23 members and the largest having 60 members, the maximum allowed by the program. Group leaders had held their roles for an average of 10.02 years, with the longest tenure being 24 years and the shortest being 3 years. Group leaders were aware of the loan purposes of their members at a rate of 97.0%. However, only 65.0% and 39.0% of the group leaders were well-informed about the business activities and income of their members, respectively. In addition, only 46.0% of group leaders regularly visited the homes or business premises of their members.

Regarding peer monitoring variables, the percentages of members who were aware of other members' incomes and borrowing purposes were much lower than those of the group leaders, at 13.0% and 31.0%, respectively. In addition, 32.0% of the members regularly visited other members' homes or business premises of group members.

The control variables were personal variables of the group leaders and members. The average income of group leaders was 99.4 million VND per household. A significant disparity in income was found among group leaders, with the lowest income being only 12.0 million VND per household, whereas the highest was 336.0 million VND per household. Eighty-eight percent of group leaders had loans from the program, with an average debt of 13.5 million VND and the highest loan amounting to 50.0 million VND per leader. Twenty-seven percent of group leaders had other sources of credit besides the program loans. Only 80.0% of group leaders successfully fulfilled their debt and interest repayment obligations. The majority of group leaders (75%) were male. The youngest leader was 27 years old, whereas the oldest was 80 years old, with an average age of 52. The education level of group leaders ranged from the third grade to university graduation, with an average of eighth grade.

Similar to group leaders, the majority of group members were male (64.0%). The average age of group members was lower than that of group leaders, about 49 years, with the youngest being 23 years old and the oldest 82. The education level of group members was also lower than that of group leaders, averaging 5.7 years of schooling, with some members being illiterate and the highest level of

education being college. The average debt of group members was lower than that of group leaders, but the highest loan amount was higher, reaching up to 100.0 million VND. The average per capita income of group members was 14.4 million VND per person per year (approximately 580 USD). A significant variation was found in per capita income, ranging from 2 million VND to 100 million VND per person per year. About 25.0% of the group members had additional sources of credit besides the program loans.

5.2. Estimated Results of the Probit Model

As presented above, we employed the Probit model to estimate the effects of the delegated monitoring peer monitoring on loan default of the group-based lending program. The results of the Probit model are shown in Table 3.

Table 3. Estimated results of the Probit model.

Variables	Coefficients	z-statistics
Delegated monitoring variables		
<i>LCommIncRate</i>	-0.03919	-4.09***
<i>GSize</i>	-0.01401	-1.87*
<i>LYrs</i>	0.02178	1.18
<i>LIncInfoD</i>	-0.41762	-2.20**
<i>LPurInfoD</i>	-0.07507	-0.20
<i>LBizInfoD</i>	0.25898	1.47
<i>LVisitD</i>	0.05767	0.33
Peer monitoring variables		
<i>MPurInfoD</i>	-0.05389	-0.32
<i>MIncInfoD</i>	-0.13181	-0.59
<i>MVisitD</i>	-0.01128	-0.07
Control variables		
<i>LInc</i>	-0.00001	-2.47**
<i>LInc2</i>	3.09e-11	2.13**
<i>LLoanD</i>	-0.73188	-3.59**
<i>LLoan</i>	1.00e-06	0.13
<i>LOthFinD</i>	-0.04887	-0.31
<i>MLoan</i>	-9.00e-06	-1.15
<i>MIncPerCap</i>	9.00e-06	1.68*
<i>MOthFinD</i>	0.87247	5.53***
<i>LDefD</i>	0.92515	5.27***
<i>LSexD</i>	-0.362653	-2.09**
<i>LAge</i>	-0.000154	-0.02
<i>LEdu</i>	-0.00996	-0.38
<i>MSexD</i>	0.19632	1.41
<i>MAge</i>	-0.00109	-0.20
<i>MEdu</i>	-0.11173	-4.62***
Constant	2.30014	2.56**
Number of observations	648	
Pseudo R ²	0.3169	

LR

270.37***

***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

The estimated results of the Probit model indicated that the delegated monitoring by the group leader has positive effects on the repayment performance of the group-based lending program. In other words, the delegated monitoring reduces loan defaults of the group members. It is important to note that in this study commission on income rate (LCommIncRate) represented delegated motivation monitoring efforts of group leaders. The commission on income showed a negative impact on loan defaults at the 1% level of significance, implying an increase in commissions leads to a decrease in the likelihood of loan default among group members. This finding aligns with previous findings of Berns et al. (2021) that higher average salaries for MFI staff is associated with higher loan repayment rates. In the context of Vietnam, this finding can be explained by the fact that the group leaders' income from their business activities is low, thus significant commissions strongly stimulate their monitoring efforts. Another proxy variable for the intensive delegated monitoring effort of the group leader was group size (GSize), which was statistically significant at 10% significance level. Group size was negatively associated with loan defaults, indicating that larger group sizes decrease the likelihood of loan defaults. This evidence is in line with finding of Zeller (1998), implying that larger group sizes could ensure maximum surplus for the group leader, compensating their monitoring efforts through commissions. Table 3 revealed that LIncInfoD, a proxy for the detailed income information that group leaders have about their members, was negatively associated with loan defaults of borrowers. This relationship was statistically significant at the 5% level. The evidence is consistent with the finding of Al-Azzam et al. (2013), implying that when group leaders have detailed information about members' incomes, delinquency rates decrease. Knowing borrowers' income enables timely collection of debts and interest by leaders and support borrowers in meeting their repayment obligations when incomes are unfavorable.

Regarding the peer monitoring between group members, we found no evidence to support the hypothesis that the peer monitoring reduce loan defaults of borrowers. This finding is contrary to previous findings of Wydick (1999), Al-Azzam et al. (2012), and Noglo and Androuais (2015) that peer monitoring has a positive effect on repayment performance, but it is in line with the finding of Hermes et al. (2006). There are some reasons for our findings. First, the Bank publicly hires the group leader as a delegator to supervise the group. The group members may think that monitoring activities are subject to the group leaders' role. Second, this lending program is non-joint liability, all group members are not sanctioned by any administrative or financial obligation. Hence, they are a free ride from monitoring, or enforcing activities, which are costly for them. Third, the success of group-based lending depends on dynamic incentives practices, not on peer monitoring (Chowdhury, 2005; de Aghion and Morduch, 2010).

Additionally, income (Linc) and squared income from business activities of the group leader (LInc2) had statistically significant effects on the loan defaults at the 5% and 10% significance levels, respectively. The negative and positive coefficients of these variables indicated a U-shaped relationship between the income of group leaders and loan default likelihood. These findings suggest that the business income of the group leader's household reduces loan defaults up to a certain point (VND 210 million per household per year, equivalent to USD 8,400), beyond which the effect reverses. Besides, LLoanD was significant at the 1% level, with a negative coefficient, indicating that group leaders monitor more effectively if they borrow from the program. This vigilance helps ensure future loans and commissions, suggesting that these leaders' households are classified as poor or near-poor, according to multidimensional poverty standards. The loan default of the group leader (LDefD) was positively associated with loan defaults of the group members. This result implies that when the leader defaults, other group members are also likely to default in loan repayment. The results of the Probit model also indicated that male leaders supervise the group more effectively than their female counterparts.

As shown in Table 3, the borrower's involvement in other credit sources (MOthFinD) increases the likelihood of loan defaults. This finding implies that the availability of other credit sources causes

a burden for the borrowers on repayment. Moreover, this finding could be explained by the fact that the borrower has other credit opportunities and they value future access to loans from the program less important. Regarding the group member's characteristics, the results of the Probit model indicated that higher-educated borrowers adhere to their financial obligations better.

6. Conclusions

This study was an empirical investigation of the effects of both the delegated monitoring by the group leader and peer monitoring by group members on loan default in the group-based lending program in Vietnam. The empirical findings of the Probit model confirmed that that delegated monitoring by the group leader is negatively associated with loan defaults. Specifically, an increase in commissions of the group leader leads to a decrease in the likelihood of loan default by the group members. In addition, group size and the detailed income information that group leaders have about their members have a significant positive effects on loan repayment of the group members. However, we found no evidence on the effect of peer monitoring on loan defaults of borrowers. Moreover, income, loan default, sex, program participation of the group leader and education and involvement in other credit sources of the group members are determinants of loan defaults by the borrowers.

Based on the empirical findings, some implication can be drawn for the BVSP and local authorities. In practice, the Bank tends to select group leaders based on their social prestige, often choosing individuals who are successful in business and have high incomes. However, our findings suggest that the group leader should not necessarily be a high-income earner. The group leader's business income exhibited a U-shaped relationship with loan default, implying that higher business income beyond a certain threshold adversely affects loan default. This relationship may be due to high-income earners having limited time to manage the group or placing less value on the loan or group leader position. Additionally, the group leader should have a high level of education and be native to the area where the group is located, providing them with an advantage in collecting information about other group members. The Bank may maintain large group sizes to provide incentives for group leaders through commissions to enhance repayment rates. Besides, because peer monitoring has no impact on loan default by borrowers, we suggest that with the presence of delegated monitoring, there is no need for group members to monitor each other. Based on the evidence that higher education levels among group members are associated with lower loan defaults, local authorities should encourage illiterate or lowly literate borrowers to participate in evening adult education classes available in many communes.

Although this study provides some important insights for our understanding of the delegated monitoring and peer monitoring in group-based lending programs without joint liability, it still has limitations that can be addressed in future research. First, though we employed a large sample, we only interviewed people in rural areas of five provinces in the Mekong Delta region because we conducted the survey during the COVID-19 pandemic. Second, travel restrictions during the pandemic could have impacted the ability of group leaders and group members to gather related information for monitoring. Therefore, future studies should revisit this topic and expand the research area to the whole country to obtain a more comprehensive view of the effects of delegated monitoring and peer monitoring on the repayment performance of the group-based lending programs in Vietnam.

Author Contributions: Conceptualization, T.B.T.; methodology T.B.T, L.D.T.; software, T.B.T., T.P.P.; formal analysis, T.B.T., T.P.P.; resources, T.B.T.; data curation, T.B.T.; writing—original draft preparation, T.B.T., L.D.T and H.S.F.; writing—review and editing, L.D.T and H.S.F.; project administration, T.B.T. All authors have read and agreed to the published version of the manuscript.

Funding : This research received no external funding.

Data Availability Statement: The data that support the findings of this research are available from the corresponding author upon request.

Conflicts of Interest: The authors declare no conflict of interest.

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