A study of Joint Liability Versus Individual Liability in Micro Finance Institute With Respect to Default rate (Loan repayment)

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Abstract

Microfinance institutes (MFI) have used the individuality scheme for decades however in order to increase the outreach and to overcome the hurdle of non ability of poor individual to provide collateral security joint liability scheme were introduced. Here in the joint liability model the social cohesion is undertaken as the collateral for the provision of the loans. These loans are provided for a group of members who are jointly responsible in case of default by any single member of group. Default rate is measured in order to understand the performance of the loan portfolio of a MFI or lender. The threat of the non provision of further loans have ensured the group members to enforce all the members to repay the instalment and leading to decrease in the default rate.

The joint liability has been explained by various authors majorly in three basic models namely adverse selection, peer monitoring and moral hazard. There have been studies to identify various factors for the both the individual liability and the joint liability with respect to default rate.

This study is an attempt to survey the literature relevant to the individual and joint liability models and build a theoretical driven model in order to understand the factors which impact both joint liability and individual liability in terms of default rate. Loan size, interest rate and cost of operations have been found to be active factors impacting default rate for both the joint liability and individual liability. The research questions are formed on the basis of comparative study of the factors between the joint liability and individual liability and specific relations between factors of liability schemes.

Key words: adverse selection, assortative matching, default rate, Individual liability, joint liability, moral hazard, peer monitoring, social collusion

1. Microfinance

Microfinance has been the one of the common tool that developing economies have put in use in order to provide the financial formal infrastructure to the poverty part of the society. The active organisations have been capitalised by the subsidies and the government in order to provide the various loan products to the clients. However the recent debate over the sustainability of these organisations has made both practitioners and researchers to look into the different alternatives for the better return generation.

The joint liability scheme is one of the alternatives found which could be implemented and has generated mixed results in the terms of success. That is, it has been successful in few locations and has been failure at few locations. Hence this has raised interest in the various researchers to explore and study the factors responsible for both the success and failure of the joint liability schemes around the world. This paper is an attempt to understand the concepts involved in the joint liability scheme and identify the factors which directly or indirectly impact the performance on the repayments. At the same time also find the factors which differentiate the joint liability property from the individual liability.

The joint liability has been successful implemented in the Bangladesh for decades. The target clients had possessed no physical assets in order to provide as collateral for loans to lenders. This has made microfinance institutes to undertake the social cohesion as the collateral for the loans provided. Hence the client's need to form the groups in order to apply for the loans from the lenders where every member would be eligible to undertake a loan, however default of an individual needs to be repaid by rest of the group members in order to continue the relationship with the lender as described by Banerjee, Besley, & Guinnane (1994).

Malgosia Madajewicz (2004) paper explains that the significance of the individual versus joint liability scheme depends also on the level of development of the society. In the poor society the individual would not be eligible for the individual loan scheme as due to the absence of the credit rating and hence would be able access only through the group credit.

Here in the group credit it is the joint liability which is undertaken as the collateral for the loan provision where as in the developed society, an individual would be able to access the higher loan amounts only in individual liability scheme. As the group credit would not be able to meet the requirements like progressive increment in the loan amounts etc.

2. Individual liability

The traditional loan format is the provision of loan to the individual on the basis of credit history of the individual possessed. This process involved in the individual possessing the historical records of the loan repayments. These types of loans have required providing the assets rights of individual to the lender as collateral for a value of loan amount provided. However this elongated process has resulted in the inaccessible of the loan services to the lower part of the society as explained by Aghion & Morduch (2000).

Direct monitoring of individual clients

In the provision of loans to the individual person the monitoring is undertaken by the lender. Lender undertakes the job of evaluation of credibility of the client, monitors the repayments made by the client all through the tenure of the loan.

Regular repayment schedules

The individual loans are provided on the basis of the fixed payment schedule which involves the repayment in the instalments periodically.

Non refinancing threats

The individual are also threatened for non provision of the further loans on partial or full default of the present loan instalments.

Collateral security

These loans include the condition for a client to provide with the valuable assets for the value of partial or full amount of loan as the collateral in order to attain the loan amount.

3. Joint liability

The community development activities have looked in to the possibility of the provision of loans to the lower part of the society in a group or joint liability schemes. This scheme involved in the provision of the loans to the individual on the basis of the surety from the other group members as the collateral. Many of the NGOs and the government organisations in the developing nations have heavily depended on the joint liability to serve the lower part of the society. Hermes & Lensink (2007) paper describes the basic model used which was to provide the loans to the group of people either at once to all the group's members or in parts. However the critical criteria general laid were to non provision of further loans to all the members of the group in case of default by one or more members of the group.

Availability of the local information in the joint liability provides the advantage of lower costs incurred in the monitoring by the lending organisation as explained by Besley & Coate (1991). That is the selection and formation of the groups are self selected by the group members and the monitoring is also done by the members as local information available by the members would make them better at the responsibility of monitoring. At the same time all these activities of the members would lead to the lowering of the costs to the lending organisation as informed by Ghatak (2000).

Ahlin & Townsend (2007) paper explain Joint liability has been better functioning when the group members who were highly familiar and also ready to punish the member on default. However not every culture would have the same phenomena and hence the group credit with joint liability will be successful only in the communities who would be interested in punish rather than looking at the individual preference. The joint liability scheme also fails when group members find that the other members are defaulting irrespective of monitoring. Then the rest of the members would also defaults as they would be rejected the further loan irrespective of present performance. At the same time in the cases of the presence of the insurance for the loan portfolio would also encourage the clients to involve in the higher risk projects and less concerned towards the repayment of the loans as described by Karlan (2005).

Zeller (1998) has reported that group formation and the monitoring skills need to be inculcated among the client of the micro finance and this needs an investment. As these training program forms the major chunk of investment at the same time the probability of switching by the members to alternative funders might put away the private lending organisations in accepting the first timers.

Ahlin & Townsend (2007) informs that models relating with the Besley and Coate model of social sanctions and Ghatak model of peer monitoring have been found in increment in repayments by the individual in group credit scheme.

The joint liability phenomena is attempted to explain by various number of models by different authors. The major models can be summarized in to the categories using the subjects titled moral hazard, adverse selection and peer pressure as described by Ghatak & Guinnane (1999).

4. Stilglitz model (individual versus joint)

By this model Stiglitz (1990) has provided the analytical analysis of the joint liability versus the individual liability in terms of deriving the interest rates on the basis of type of liability scheme.

- Y be the revenue generated from a business

- C be the amount of loan undertaken

- P is the probability of the business is success full and makes the individual to repay the loan

- R and r are the interest rate amount which can be charged

Case 1: when the loan amount is provided on the basis of individual

$(Y - r) - C > P * (Y - r)$

$\Rightarrow r < Y - (C / (1 - P))$

Case 2: when the loan amount is provided to two individual on the basis of joint liability

$$2 * (Y - R) - 2 * C > P*P * (2 * Y - 2 * R)$$

$\Rightarrow \quad R < Y - (C / (1 - P * P))$

Since $(1 - P) < (1 - P*P)$ {as $0 < P < 1$}

Hence R will be always more than the r

i.e. interest charged in the joint liability would be always higher than the interest rate changed in the individual liability scheme.

Assumptions:

P is probability of success is considered consistent among all the parties

5. Phases of joint liability scheme

The three major steps involved in the process of issuance of loan to the retrieving the instalments are Screening, Monitoring and Enforcement. These steps have got a very significant distinct characteristic in the joint liability scheme as compared to the individual liability scheme. The further section provides the brief introduction of these phases

Screening

Screening process forms the initial step in the loan processing. In this step the evaluation of the prospective and convert the individual into the client. However in the joint liability the plethora of information of an individual is available with all members of group. This leads to the formation of the groups on basis of assortative matching i.e. the generally the like risk people forms the group on providing the option of self-selection of the group members Wenner (1995). The group member's pressure would result in the better loan repayment and this result in attaining the expected profits. The interest rates are also defined on the basis of the credit rating of the total group. Lower credit rating group is generally provided at higher interest rates.

Monitoring

Wenner (1995) also says that since all the group members belong to a particular single location and hence this provides them with both the formal and informal interaction with the other members of the group. This leads to generate lot of information of each individual with all the group members. The information possessed by the group members provides the additional effectiveness in monitoring of the fund utilisation, repayments of an individual by the group members.

Enforcement

Majority of the funding agencies have continuously used termination threat i.e. on partial or total default of the instalment payment by a group member or members would lead to further loan provision to all the members of the group.

The second channel of management of the enforcement of the repayment is by group characteristics establishment as provided by Wenner (1995):

- Social and cultural cohesion formed in the group provides the peer pressure on an individual to repay the instalments without default.

- The leadership of the group leader also impact upon the repayments. As they help in the commitment in the surplus resources by the all the members in case of default scenario.

- Finally the group size also impacts the leadership and the social and cultural cohesion of the total group.

6. Activities undertaken by lenders by MFI's

The specific steps which are generally undertaken by the MFIs especially in joint liability scheme in order to increase the repayments as per the Aghion & Morduch (2000) are:

- The instalment repayment and other transactions by the individuals are conducted in the public in order to provide a social stigma which results in lower defaults

- The joint liability and group credit ensures in information flow of each and every individual and prevent the defaults. At the same time the peer pressure results in on time payments of instalments

- The collection of the instalments are undertaken by the field officers who need to be flexible and provided with the mobile collection centres

- The groups are provided with business venture training which results in the boost up of the entrepreneurial activities by the individual both at the individual and group level

- There has been the higher impact and effective utilisation has been found in the women gender in these schemes

Hypothesis 1

On the basis of the above discussion and also due to the peer monitoring, selection and enforcement steps in the joint liability would lead to lower default rates.

Joint liability results in lower default rate as compared to individual liability

7. Agency problem

Agency relationship is a contract in which the decision making is delegated to the agent on behalf of principal. However the agency problem arises when there is a mismatch between the objectives of the principal and agent. In the microfinance the creditor is the principal and the clients are the agents. The loan provided to the agent on the basis of the historical performance of the individual in the individual loans where as in the group credit it is the social relations is undertaken as the collateral at the same time all the group members forms as the agents. The monitoring and contract enforcement costs would be driven upon on the basis of the significance of the agency problem involved as explained by Adams (1995).

8. Peer monitoring (Transaction costs)

Adams (1995) also describes that the transaction costs are increased with the increase in size of the organisation as due to increase in administrative costs, professional skill,

maintenance of records etc. The lower agency problems would lead to lower amounts in transaction costs.

As the group size increases leads to increase in the peer monitoring costs and hence results in the higher cost accumulation especially because of the higher probability in increment in the number of free riders as explained by Armendariz de Aghion (1999).

Higher costs involved in the monitoring increase the performance and returns of the loan portfolio in an individual loan scheme. However after threshold the increase in the interest rates would result in the lowering of the demand of the individual loans and hence results in the overall decrement in the profits. However in the case of the group loans, the increase in the administrative costs is not directly correlated with the returns and hence the increased costs in monitoring by an organisation would not be helpful in increasing the returns. However with the increasing the loan size would lead to lower costs occurrence and results in increase in the profitability of both the individual and joint liability scheme. However in the process of increment in loan size the reach ability would be traded off in the case of the individual loan as informed by Cull, Demirgu¨ç-Kunt, & Morduch (2007).

Zeller (1998) also says that the costs of the information are less especially in the case of socially cohesive groups. That is the monitoring is highly effective in the groups having the collusiveness and at the same time good at the implementing rules and regulations on defaulting member.

Hypothesis 2

Both the agency issues and the group credit would lead to increase in the cost of operations, whereas with the help of peer monitoring and self selection would lead to decrement in cost of operations. However the costs of operations in joint liability would be decreasing with formation of groups and remains same in the case of individual liability.

Costs of operations in joint liability are lower than the individual liability scheme

9. Moral Hazard

The collusion between the group members may lead to the negative impact on the performance of the loan and hence lender could be risk of losing the portfolio. However the lender would be able to make optimum level of returns only when the group credit is provided and the information flow is between the members. At the same time the members need to monitor and enforce the commitment to each member. Hence the group credit would perform better over the individual credit scheme as due to the group skills in monitoring and enforcement in repayments as described by Laffont & Rey (2003).

The below model explains on the three fronts of individual, group without sharing information and group with sharing information.

Individual

- P1 is the probability of success on application of effort by an individual

- P2 is the probability of success without addition of effort

- C is the cost incurred by an individual for addition of effort

- X is entrepreneur share of output

- Z is the output of the business

- r is the cost of funds for the bank

The assumption is on application of additional effort the probability of success raises, hence P2 > P1

So for an individual the return on application of effort is (P1 * X) – C

Whereas without addition of effort is (P2 * X)

So (P1 * X) – C > (P2 * X)

Hence the bank provides the loan only on addition of efforts by the individual, so the function the bank undertakes is

Maximize $P1 * (Z - X) - r$

With two major constraints

$P1*X - C > P2*X$ this is known as incentive constraint ----- > equation 1

$P1*X - C > 0$ this is known as participation constraint ----- > equation 2

From equation 1 $X = C / (P1 - P2)$

Applying the value in equation 2 we get $P2*C / (P1 - P2)$ as the minimum rent which bank has to provide to the client in order to client to involve successfully apply the effort and payback the repayments

Group (when unknown)

In the case non sharing of information

The condition of $(P1 * X) - C > (P2 * X)$ remains same whereas due to the group members and the output to individual share comes to $(P1*X + (1 - P1) * Y)$ with an assumption that the only one person business is successful in a group of two member. (Y is the output share of the second individual)

Since the incentive constraint in this also same as the individual and hence with the non flow information the loan scheme acts as no different from the individual loan scheme.

Group (when known and collusive in behaviour)

X - When both the members success in the project and get the returns to individual share

Y - When only member success the project and get the returns to individual share

The utility is $P1*P1* X + P1* (1-P1) * Y - C$ is when both the members put the effort

When the effort is not applied $P2*P2* X + P2* (1-P2) * Y$

With incentive constraint application $X = C / (P1*P1 - P2*P2)$ and $Y = 0$

And applying the values in the participation constraint $P2*P2*C / (P1*P1 - P2*P2)$ is the amount of rent which bank needs to let go for the members to actively involved in the returns generation in business and provide repayments to the lender.

As the above three sub proofs provide the optimum returns to the group and least rental paid by the lender to individual is in the case of group credit with collusive behaviour.

Hypothesis 3

The above model can be summarised as higher rental are paid by the lender to the clients. This provides the opportunity for the lender to charge the higher interest rate in group credit scheme.

Higher interest rates are charged in joint liability scheme than in the individual liability

10.   Adverse selection

The two parties involved in the loan process are the lender and borrower. The lender would be implementing the conditions in the contract which would be optimum for the returns earned on the loan amount, where as the borrower would accept only on the have capability of generating the residual earning (amount left after the repayment). At the same time earning the returns by borrower which are in line with the individual objective would result in the incentive and hence motivates to put in the higher hard work into the business (where the loaned amount is invested).

The previous paragraph briefed the loan process but the information about the utilization of the loaned amount by the borrower forms the major bottleneck in the process. Three scenarios can occur on the basis of information availability to the lender.

 In case 1 the information is available then the lender has the lower risk of default of the repayment and hence the interest rates provided is at lower end (the costs incurred in collecting information is zero is assumed).

In case 2 the information is not available or public and hence the borrower could move to the projects with higher risk resulting higher defaults and hence the lender prefers to provide the loans at higher costs.

However in case 3 the monitoring is undertaken by the lender on the borrower and hence incurs high costs resulting in provision of loans at high costs. Where as in the joint liability scheme the monitoring undertaken by the group members and hence the costs are lowered. At the same time the all the members would be held responsible for the default of any single member and hence the default rate in joint liability is very low.

There are two major factors involved in the joint liability for a lender to consider understanding and overcoming the adverse selection. Firstly is to find the *type of group* i.e. whether the group belongs to high risk or lower risk. Secondly the *formation of the group* whether risk is heterogeneous or risk is homogeneous among group members. The interest rates charged would be depending on the riskiness of the group. Higher the group riskiness higher interest rates are charged. Hence the safe members would be inclined towards the formation of the group with the safe members than with the risk members in order to prevent from paying the instalments of defaulting members. This leads to the risky individual to form the group with the risky individual and hence the interest rates charged is higher.

Laffont (2003) paper finds that the with the provision of the communication and information flow between the group members would lead to the optimum levels of rental paid by the banks to the members at the same time would be able successfully overcome the adverse selection problems provides right interest rates to group loans. However in the absence of the information flow due to lack of social collusiveness would lead to the performance which will be no different from the performance of an individual loan scheme.

11.   Assortative matching

The low risk project members would be forming the group with the low risk members as due to the high conformity of certain cash flows in the projects and hence the regular repayments whereas in the case of the risky members the probability of failure of the

projects is high and hence the group members have high risk in repayment of the instalments. However in the case of risky projects, returns are high and hence the successful member would be ready to pay higher repayments. Hence there is clear formation of the same risk customers in the same group. This would help in providing the lower risk groups with lower interest rates and higher risk group with higher interest rates as detailed by Ghatak (1999). Ghatak (2000) adds a point that the formation of the groups on the basis of homogeneous risk is also said as the positive assortative matching.

Hypothesis 4

The adverse selection which in turn leads to the assortative matching would result in the groups to be formed on the basis homogeneity (in terms of risk, income levels).

Joint liability would ensure in the formation of homogeneous customers into groups

12.   Factors of Joint liability

The study of different factors impacting the joint liability is required to understand and apply the same in the real time. Various authors have undertaken both the theoretical and empirical to identify the factors. The literature survey provides these following factors

Size

The size of the group is found to be major impact on the social relationship. As the increment in the size it leads to diversification of the risk at the same time the contribution levels are decreased. Abbink, Irlenbusch, & Renner (2002) Paper has lower pro towards the higher size leading to lower risk. There is always the trade-off between the larger group size (which results) free riding to the lower group size (lower monitoring, lower information asymmetry) as supported by Armendariz de Aghion (1999). Gomez & Santor (2003) paper found the size forms the important factor in the peer monitored loans.

Cull, et al., (2007) explains that with the increment in size the profitability of the portfolio is increases however would not increase in the costs and hence the joint liability works more efficiently in increasing the loan size.

Gender

The gender has got the impact on the performance of the loan repayment and it is generally found that the women have high will in maintenance in good track record of the repayment of loan in group as informed by Abbink, et al. (2002).

Familiarity

The higher the familiarity, lower is the default rate as it seems to be that the stronger relationship is less in acceptance of the free riding. However Abbink, et al. (2002) paper finds very less difference between the performance of the groups with familiar member group and non familiar member groups.

A social tie with the punishing culture has only successful in increasing the repayment rates where as the failed in the societies where the strict isolation punishment is not imposed as supported by Ahlin & Townsend (2007). Wydick (1999) explains the familiarity in the each other members business performance would result in the better monitoring and hence results in the increase in the performance of the repayment.

Homogenous

Karlan (2005) explains that with the increase in the homogeneousness would lead to increase in the better observation of the group members, monitor and effectively undertake the commitment in the loan repayment. However there is also negative side all the group members could form a collusive behaviour and act against the organisation objective. Zeller (1998) paper finds that the individual with the similar risk would form a group.

Loan officer

The effectiveness of the loan officer has impact upon the joint liability efforts. Higher the activeness of the loan officer and number of group meetings conducted by the officer would directly impact the repayment of the group members. The increased meetings in the public would lead to the stigma of individual member to pay the instalment at the same time make all members to active monitor each other performance as explained by Gomez & Santor (2003).

Interest rate

Ahlin & Townsend (2007) in paper finds that the increase in the interest rate has negative correlation with the joint liability. It has been observed the increase in the interest rates resulted in good customers (low risk clients) to move out of the portfolio and increase in the higher risk customers. However this would result in increased revenues to the lender and also increases the sustainability.

Insurance

The involvement of the insurance or limited liability has observed to significant impact upon the group members behaviour on the performance of the repayment of instalments. This insurance has introduced the inefficiencies into the joint liability scheme.

Income

Even in the income of the family has an impact on the repayment of the loans. Zeller (1998) has found that the loans were repaid when the harvests were good and performed bad in the case of failure of crop. They have also outperformed the individual loans performance in the time of good crop as supported by Zeller (1998). That is the certainty of cash flow from the income would result in the better repayments of loans in the case of joint liability.

The wealth of individual would lead to the motivation of members to look out for the incentive obtained in the joint liability scheme. Laffont (2003) found that the higher wealth lowers the interest in the incentives obtained in the joint liability scheme. At the same time it also found that the individual would be more interested in investing loan from individual loans in the better business prospects and simple business prospects are fulfilled with joint liability scheme.

Distance

Wydick (1999) says that the distance in literal terms between the members would hold inverse relation with the repayment. That is the higher the distance between the members location would result in the lower performance in the repayment of the loans.

Hypothesis 5

On the basis of the discussion on the various factors of joint liability it can be summarised as the joint liability is efficient only when lower loan size are involved. That is the lower income level and higher social collusiveness in the lower part of the society would enforce successfully in joint liability scheme for the repayment of the loans.

Joint liability scheme has lower default rate when loan size is lower than the individual loan size

Hypothesis 6

On the basis of hypothesis 1, 2, 3 and 5 the inter relation between the default rate and the cost of operation, loan size and Interest rates is to be known

Loan sizes (LS), interest rate (IR) and cost of operation (CO) have a impact on the default rate

Hypothesis 6a

Increase in the size of the loans increases the instalment size for repayment and also in increment in the tenure. Hence there is increased rate in the un-certainty and hence results in increment in the default rate

Increment in the loan size result in higher default rates

Hypothesis 6b

Higher interest rates to higher risk customers and this in turn results in the increment in the default rates

Increment in interest rates leads to the higher default rates

Hypothesis 6c

Increase in the cost of operation in an MFI or by a any lender would lead to the better selection and monitoring and hence leads to the lower default rate.

Increment in the cost of operations leads to lower default rates

Hypothesis 7

The discussion in the hypothesis 6 specifies that there is a mutual interaction between the interest rates charged, size of the loan and the cost of operations.

High correlation exists between the interest rate, loan size and cost of operations

13. Factors of individual liability

The individual liability loans have been provided for a long period of time in the history. This long process has led to clearly refine the number of factors which directly impact the provision of individual liability and also the performance of the repayment of the loans.

Historical records: the credibility of the individual is evaluated on the basis of historical performance in the previous loans.

Income level: the income of individual also defines the eligibility criteria and loan size. At same time the type of income, which is whether the business income or the consistent income level also impacts the eligibility of individual liability loan.

Wealth: personal wealth level also acts a major factor for the individual liability which indirectly reflects the individual financial solvency position.

Collateral security: the value of assets which has provided as the collateral security for the obtaining of the loan also defines the eligibility and size of the loan.

All these above variables forms the important factors for the individual liability loan scheme and also plays a vital role in the default rate in the loan repayment.

14. Benefits to joint liability

Few of the benefits by the joint liability are cost sharing, commitment and joint responsibility as explained by Armendariz de Aghion (1999).

Cost sharing: the costs are shared by the both the lenders and the borrowers. Lenders would gain in terms of monetary (by saving selection and monitoring costs) and borrowers would paying in terms of non monetary that is by selection of members, monitoring the

members utilisation of the loan amount and enforcement in the repayment of the instalments to the lender. Hence all these activities undertaken by the group members results in lowering the operational costs incurred by the lender.

Commitment: the monitoring and enforcement by the group members over each other would increase the seriousness in the loan utilisation for the productive activities. At the same time it also ensures the members to have better performance in the repayment of the loans.

Joint responsibility: this characteristic would help the group members to form groups and undertake activities which would benefit not only individual but also all the group members. This kind of group responsibility would increase the familiarity between the group members and also help them to improve their financial literacy about the day to day financial planning.

Positive assortative matching: would lead to the higher interest rates charged to the high risk groups. This process would lead to the high supply of loans to the high risk groups by the microfinance organisation as due to break even of costs and sustainability. This would lead to the safe groups to be out of loans but the same would be invited to the formal markets which are available outside as explained by Ghatak (2000).

15.   Negative side of joint liability

The joint liability has also been observed to possess the negative impact upon the client segment. The researchers have constantly debated upon the fate of the defaulters of the loan in the joint liability scheme. The following are few of them undertaken from the literature:

Social isolation leading to further degradation

The social isolation leads to further degradation of the life standards and results are against the objectives of the microfinance. Montgomery (1996) suggests that social isolation should be replaced with flexible repayment schedules – that is providing the changed instalment amount and the dates, savings facilities – found to be effective increase of the performance

of the individuals in repayments and increasing the number or customising the products like short-term, high-interest consumption loans so as to reach the actual requirements of the client.

Group credit would not be able to meet the client requirement as for progressive increment: The clients who have established the business on the basis of the loans would be looking out for higher amount of loan in every subsequent loan as the requirement rises with increase in the business size. However this would not be able to fulfil by the group credit as the different members would be requiring different amounts.

Incentive to the good member: Zeller (1998) informs that the timely repayment by the good customer would however lose the incentive as due to the joint liability i.e. the default by a risky member or free rider would also punish the good customer.

Free riding: free riding is the term used in many of the papers especially in order to refer to the member of the group who would be dependent on the other members for the repayment. That is would be enjoying the group benefits without contributing to the benefits to the group. The other group members would be undertake the extra burden in order to prevent the criteria of default which would result in ineligibility for the further loans in future as explained by Armendariz de Aghion (1999).

16.   Research Methodology

Karlan (2001) paper guides the researchers to understand the different biases which are to be unbiased in order to perform the cross sectional impact assessments. These biases mainly on the drop out of an individual from a loan program in an MFI in terms of attrition bias and incomplete sample bias. The critical part is to include the dropout candidates with the existing client base in order to understand the impact of program and then be compared with the same unbiased data of other programs. The paper also speaks about the wealth biased-ness created in the peer selection and hence the longitudinal studies need to consider before the further research is undertaken.

A questionnaire is designed and survey is undertaken with the organisations where both the individual and group credit schemes are executed. A total of above 300 samples is planned to be collected from each type of liability scheme.

A theoretical driven model is built relating the joint liability and individual liability with the factors identified in the literature survey (please find the figure of model in section 19). The hypothesis 1, 2, 3, 5, 6 and 7 are formed on the basis of the model built. Hypothesis 4 is built upon theory of assortative matching and other related literature.

Hypothesis 1

Joint liability results in lower default rate as compared to individual liability

T test is undertaken on default rate of both the schemes to test statistically significant difference.

Hypothesis 2

Costs of operations in joint liability are lower than the individual liability scheme

T test is undertaken on default rate of both the schemes to test statistically significant difference.

Hypothesis 3

Higher interest rates are charged in joint liability scheme than in the individual liability

ANOVA test is undertaken on default rate of both the schemes to test statistically significant difference

However control variables are used with the respect to income level, wealth

Hypothesis 4

Joint liability would ensure in the formation of homogeneous customers into group

Assumption: self-selection of group members is done and these groups are formed with the objective attaining a loan from a lender with joint liability as collateral security

(Distinguishable on the basis of the default rate and accordingly provide the interest rates to each group, business risk, income levels etc)

Hypothesis 5

Joint liability scheme has lower default rate when loan size is lower than the individual loan size

ANOVA test is undertaken on default rate, loan size of both the schemes to test statistically significant difference with respect to the loan size

Hypothesis 6

The levels of loan size (LS), interest rates (IR) and cost of operation (CO) would result optimum default rate (DR)

$$DR = a (LS) + b (IR) + c (CO) + e$$

A regression analysis is undertaken the find the values of the coefficients a, b, c and error e

Hypothesis 6(a)

There exists a direct relation between the loan size and the default rate

Increment in the loan size result in higher default rates

$$DR = a_1 (LS) + e_1$$

Hypothesis 6(b)

There exists a direct relation between the interest rate and the default rate

Increment in interest rates leads to the higher default rates

$$DR = b_1 (IR) + e_2$$

Hypothesis 6(c)

There exists a direct relation between the cost of operations and the default rate

Increment in the cost of operations leads to lower default rates

DR = c1 (CO) + e3

Multiple time regression analysis is conducted in order to get the values of the coefficients 11, b1, c1, e1, e2 and e3

All the analysis is conducted for the joint liability group level data.

Hypothesis 7

The discussion in the hypothesis 6 specifies that there is a mutual interaction between the interest rates charged, size of the loan and the cost of operations.

High correlation exists between the interest rate, loan size and cost of operations

A correlation matrix is generated and exploratory study is undertaken.

Data type and source

Factor	Type of information	Methodology and Data source
Default rate	number of delayed installment repayment	secondary data
	total amount repaid / (total loan amount+interest amount)	secondary data
	number of installments	secondary data
	period of installment	secondary data
Interest rate	cost of capital (debt,equity, subsidies etc)	Primary and secondary
	credit history (interest rate offered in previous cycle)	primary (questionnaire)
	risk of client (questionnaire on typical betting games)	primary (questionnaire)
Loan size	wealth level of individual	primary (questionnaire)
	income level of individual	primary (questionnaire)
	collateral security	primary (questionnaire)
	number of previous cycles participated	primary and secondary
Cost of operations	group formation cost	secondary
	Meeting	secondary
	travel expenses by field officer	secondary
	referral check expenses etc	secondary
	collection expenses	secondary
	recording expenses	secondary
	application expenses	secondary

Table 1: Type of data and methodology of the variables to be collected

Table 1 provides the information of the variables to be collected in order to measure the factors. The primary data is to be collected by questionnaire in case of subjective variables data and the secondary data source is to be used to collect the objective variables data.

17.   Empirical findings of previous studies

This section provides the various paper empirical findings in regards to the variable used in the model building.

Result of empirical analysis in the Wenner (1995) paper indicates that there is direct relation between the introduction of monitoring and selection leads to lower default rate or increase in the repayment performance. The increment in the monitoring and selection leads to decrement in the cost of operations of a lender.

Sharma & Zeller (1997) Paper says that the introduction of more number of relatives in the group would lead to the higher default rate. This is due to the lenient monitoring by the team members. In this case the cost of operations is lower for the lender but the default rate is higher. The paper has also found that the self selection process leads to the better repayment of loans.

Zeller (1998) paper with the empirical analysis states that the implementation of internal rules and regulations by the group members would lead to the better repayment performance that is decrement in the cost of operations of the lender and decrement in the default rate.

The increment in literal distance between the group members would lead to increment in the default rate and flow of information of the other member group members would lead to decrement in the default rate. As obtained from the empirical results by the Wydick (1999). Hence these activities lead to the decrement in costs of operations resulting in the increment in the repayment performance.

The empirical result obtained by Paxton, Graham, & Thraen (2000) paper states that the increment in the homogeneity of the group would lead to higher default rate. That is the

same risk members forming a group would be less interested in monitoring and enforcement and hence results in the higher default rate.

Alessandra, Luke, & Bruce (2007) paper says that the empirical test in regards to the default rate and the homogeneity and found the direct relationship. That is the increment in the homogeneity of the group members would lead to the higher repayment.

Hermes, Lensink, & Mehrteab (2005) Paper finds empirically that the role of leadership in the group leads to the lowering or preventing moral hazard and hence results in the lower default rate.

Karlan (2005) conducted one of the largest surveys and had undertaken the empirical analysis which consisted of 2000 surveys. It has been found that the individual with strong social interaction with both inter and intra members of the group would have higher repayment rate. Implies that the effectiveness of the peer monitoring in the joint liability schemes leading to lower default rate

Xavier & Dean (2009) Paper found empirically that the comparatively individual liability to joint liability has no significant difference. There has been found the peer monitoring etc led to higher repayment rates.

Chowdhury (2003) Paper has empirical result stating that removal of group liability has been found that the increment in the monitoring activities leading to the higher cost of operations in order to contain the default rate.

The empirical analysis of the Ahlin & Townsend (2007) paper states that the variation of the income of individual or lower the average wealth at village level would lead to higher default rate.

Margaret Madajewicz (1999) empirical analysis undertaken in Bangladesh results reflect that the increase in wealth leads to the size of the loan in the individual and where as constant levels in the group loans. Group's loans have been found more productive in the lower income levels than the higher income levels this *be*cause the higher income members would undertake individual loan to invest in better return enterprise.

Karlan (2005) empirical states that increase in the social ties and peer monitoring leads to the lowering of cost of operations of a lender, At the same time it also increases the repayment performance of the group members.

Empirical results of the Gomez & Santor (2003) paper finds that the implementation of joint liability leads to the decrement in the lower default rates to a lender. The paper also provides the results specifying the significance of relationship between the default rate and loan size, social collusion, trust between the members.

All the above results have reinforced relationships used to build the model for the study of individual versus joint liability schemes on the characteristics of the loan size, interest rate and cost of operations and their impact upon default rate.

18.   Summary

Paper introduces with the literature on the microfinance, individual liability and joint liability. The absence of assets for collateral security by poverty part society has forced to search for the alternatives and joint liability is one among those. Joint liability has the social collusion as the collateral in order to obtain the loan amounts. However these loans are obtained on the group level and not preffered in individual level.

The joint liability has been explained by the various models naming moral hazard, peer monitoring and adverse selection. The self selection, monitoring and enforcement by the group members lead to decrement in both the costs of operations of lender and also the default rate. This resulted in the huge success of the joint liability scheme in the developing nations. That is joint liability has not only increased the outreach but also improve the quality of the portfolio.

The study has also identified factors for the joint liability from the literature. i.e. loan size, interest rates, insurance, cost of operations, social collusion, distance etc where as in the individual liability was impacted by the historical credibility, loan amount, income, wealth etc. The literature supports the joint liability on the both the sides. That is the joint liability has increased outreach, empowerment, lowering costs of operation etc but at the same time the social isolation leading to further degradation of life index of poor, non ability to

provide the progressive loan amounts, non ability reward the good member among poor peers etc.

In this paper a theoretical driven model is built relating the joint liability and individual liability with the factors identified in the literature survey. At the same time their mutual and composite impact towards the default rate. The hypotheses are built upon the comparative study of the joint liability and individual liability with identified factors. At the same time also included with the hypothesis regarding the understanding of the mutual interaction between the factors. A hypothesis related to the homogeneity of the members in group is also designed (not included in model).

The survey of findings of various papers have reinforced relationships used to build the model for the study of individual versus joint liability schemes on the characteristics of the loan size, interest rate and cost of operations and their impact upon default rate. However as the results are highly contextual and time specific, the significance of impact are varied in all the most of relations of the factors. This raises a necessity to undertake the research in the Indian context to understand the characteristics of the relations built in the model in specific to Indian environment.

19.   Diagram of Model (theoretical driven)
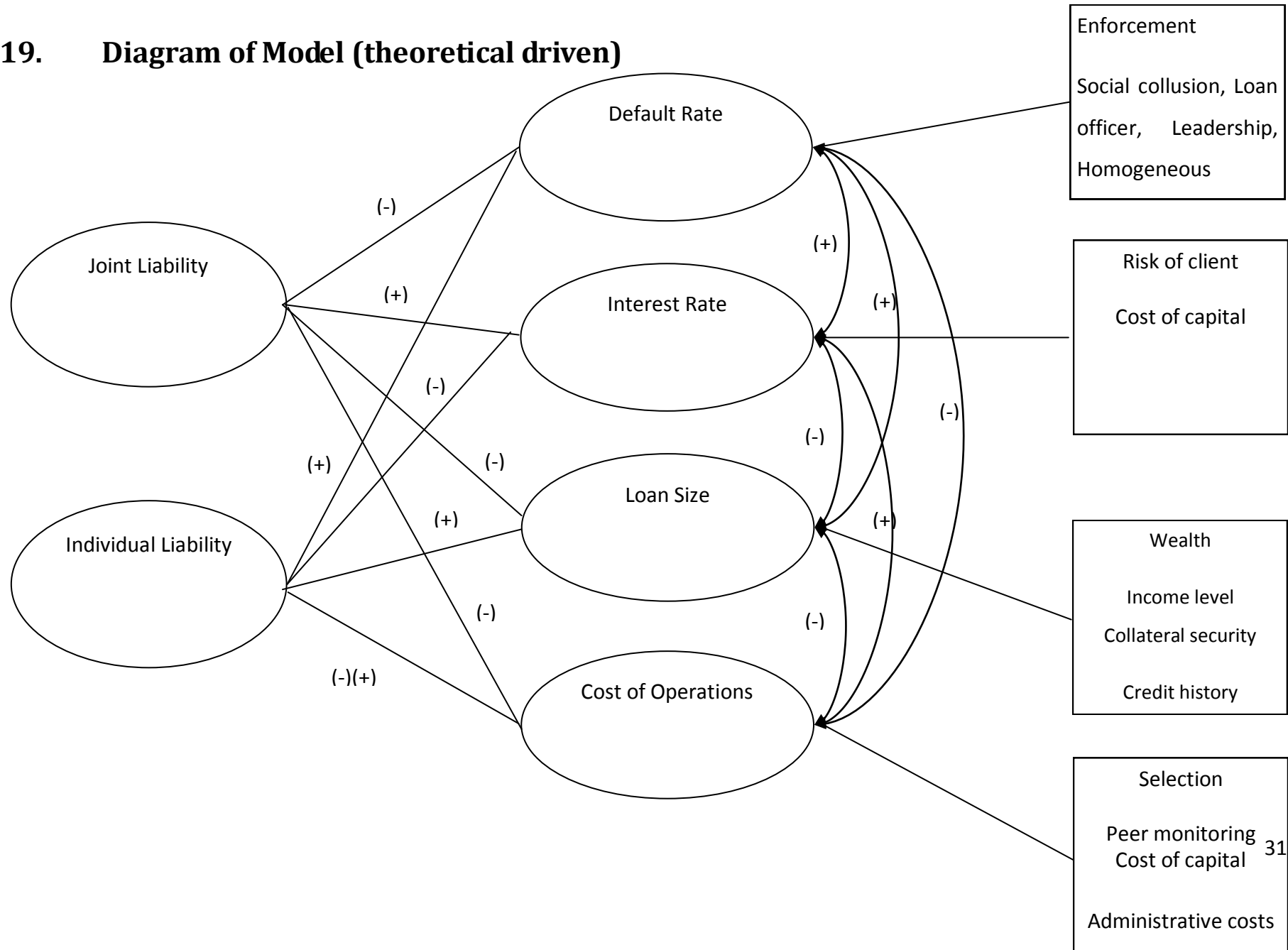
20.   Reference

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