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*Using binomial logistic analysis, the authors analyze data on 222
credit unions (CUs) drawn from the CU industry in Ghana in the
2008 financial year and find that CUs that have larger size of
management, lower repayment performance, no delinquent loans
over 30 days, better liquidity positions, and have been in the CU
business for a long time, are more likely to adopt group lending.
The findings of this study also show that the gender structure of
a CU does not influence its group lending decision. The authors
argue that CUs adopt group lending to improve their loan repay-
ment performance, consistent with the literature.*

*KEYWORDS   credit union, group lending, management, microfi-
nance, repayment*

INTRODUCTION

Worldwide, microfinance is regarded as a vehicle for extending financial
services to the poor and financially excluded in society. ADB (2000) defines
microfinance as the extension of a broad range of financial services such as
loans, deposits, payment services, money transfers, and insurance to poor
and low-income households and their microenterprises. Microfinance has
been hailed as a "silver bullet" approach to development because of its sup-
posed ability to transform the poor and marginalized (Aach, 2008).

As one type of microfinance institution, credit unions (CUs) have
become an integral part of the world financial economy. CUs provide flexible

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and affordable loans to their members, which are aimed at enhancing members' welfare. However, in providing loans to their clients, CUs are saddled with a dilemma. On one hand, managers of CUs are expected to pursue prudent financial management practices that will mitigate the risk of default because their institutions' financial viability is weakened by high loan default rates and the concomitant cost of loan recovery. On the other hand, as cooperatives, CU operations are driven by a benefit-maximizing objective, which includes the social role of providing loans to help members achieve their standard-of-living goals (Ralston & Wright, 2003). This makes CU lending both cumbersome and problematic. Group lending advocates believe that lenders overcome this by harnessing social connections (Karlan, 2007). Group lending is a widely lauded financial innovation for developing economies (Besley & Coate, 1995). The main premise of group lending is that the rural poor in developing countries are credit constrained, having little or no access to formal sector credit (Coleman, 1999). One of the most distinguishing features of group loan contracts is the aspect of *joint liability* (Tassel, 1999).

The basic idea of group lending is that loans are made to individuals who are members of a borrowing group. This lending methodology makes all group members responsible for the repayment of the loan, which provides incentives for individual group members to screen and monitor the other members of the group and to enforce repayment (Hermes, Lensink, & Habteab, 2005). Thus, the lender no longer has to invest in screening, monitoring, and enforcement activities. Instead, the group lending structure comprises an effective mechanism for screening, monitoring, and enforcing contracts among borrowers. The existence of social ties between group members may also act to boost the effectiveness of screening, monitoring and enforcement (Hermes et al., 2005). Group lending is accordingly often considered a success, fundamentally because of its high repayment rates—usually over 90%—and low-cost delivery system (Coleman, 1999). However, does the prospect of achieving high repayment rate motivate a CU's adoption of the group lending methodology? Are there other factors that influence the decision to adopt group lending in the CU industry in Ghana?

The rest of this article is divided into sections. The next section enunciates the contextual considerations of the study. It is followed by presentation of the results of empirical studies. The hypotheses development section is the next in line, followed by the methodology of the study. The results and a discussion of the findings are provided next, and, finally, the conclusions and limitations of the study are given.

CONTEXTUAL CONSIDERATIONS

Between Ivory Coast and Togo in West Africa lies Ghana, on the Gulf of Guinea. Ghana covers a distance of 672 km from south to north and

540 km from east to west. Ghana has a population of about 23,108,000, divided across 10 regions. Per the 2000 population census, Ghana's population has been growing at the rate of 2.4% per year. Evidence from the census indicates that 69% of Ghanaians are Christians; 15.6% Muslims; 8.5% Traditionalists; and 6.9% others. Furthermore, the census indicates that 43.4% of individuals who are 3 years of age or older have never been to school and 49.9% of the adult population of 15 years or older are totally illiterate. The average household size is 5.1. English is the official language, with Akan, Mole-Dagomba, Ewe, and Ga as the most popular indigenous languages (www.ghanaweb.com).

At the end of 2008, Ghana's external debt–to–gross domestic product (GDP) ratio was 26.8%. Her poverty headcount index was 29% as at the end of 2006, having dropped from 52% in 1992 (www.worldbank.org/ida). Estimates of sector growth in 2005 indicate that the agricultural sector grew by 46.7%, industry by 22.1%, and services by 24.3% (www.businessghana. com). Ghana's GDP growth at constant prices at the end of 2009 was 3.514%, while GDP per capita was US$ 671.33. At the end of July 2010, Ghana's inflation rate stood at 9.46%.

Informal and formal sectors can be perceived as "dual economies" of African countries (Spring, 2009). According to the 2000 population census, about 80% of Ghana's population operates in the informal sector. Not coincidentally, most microfinance institutions also operate in the informal sector.

Microfinance institutions operating in Ghana are of three broad categories: formal, semiformal, and informal. The formal suppliers comprise rural and community banks (RCBs), savings and loans companies, and commercial banks. The semiformal suppliers consist of CUs, financial nongovernment organizations (FNGOs), and cooperatives. The informal suppliers comprise "Susu" collectors and clubs, rotating and accumulating savings and credit associations (ROSCAs and ASCAs), traders, moneylenders, and other individuals.

A study undertaken by Aboagye (2009) reports that RCBs and CUs have performed reasonably well. He further reports that both RCBs and CUs have a good potential for long-term survival. However, CUs appear to be better positioned for long-term survival. People who access microfinance loans use them for purposes such as housing, petty trading, and farming. Evidence abounds that microfinance institutions in Ghana grant loans to groups consisting of a number of borrowers for collective enterprises such as construction of irrigation pumps, sanitary latrines, and power looms or for leasing markets or leasing land for cooperative farming (Asiama & Osei, 2007).

CUs as semi-formal suppliers of microfinance began in Ghana in 1955 when the first CU was established by missionaries at Jirapa in the northwestern part of Ghana. Subsequently, teachers and trade unionists spread the concept to the southern regions of Ghana. However, as the concept spread to the southern regions membership structure changed from parish members to wage earners, with the result that, currently, CUs in Ghana can be categorized into three types: parish, workplace and community CUs. Statistics from the

Credit Union Association (CUA) in Ghana (2008) show that as at the end of the 2007 financial year there were 405 CUs, with a total membership of 242,687.

EMPIRICAL STUDIES

The avalanche of studies on group lending is indicative of its popularity in the intellectual community. Results from a study conducted by Wydick (2001) show that through peer monitoring, the threat of group expulsion, and the safety net of intragroup credit insurance, group lending reduces some risky investment behavior that would otherwise occur under an individual borrowing contract. The credible threat of social sanctions against group members who misallocate borrowed capital further reduces instances of such behavior (Wydick, 2001).

Ghatak (2000) shows that by lending to self-selected groups of borrowers and making them jointly liable for each other's loan repayment, a lender can achieve high repayment rates even when these borrowers cannot offer any collateral. Using empirical results from first-hand field research on Guatemalan borrowing groups, Bbink, Irlenbusch, and Renner (2006) develop a simple game-theoretic model of group lending. They investigate group size and social ties effects and observe robust high repayment rates. They conclude that group lending outshines individual lending. Self-selected groups exhibit high but less stable contributions.

According to Wydick (1999), the ability it provides for an institution to reduce asymmetric information problems in credit markets accounts for the success of group lending in developing countries. In his study, Wydick reports empirical tests on borrowing group data from Guatemala that indicate that peer monitoring significantly affects borrowing group performance by stimulating intragroup insurance. He finds group pressure to have a small effect in dissuading moral hazard, while the effect of social ties among members is statistically insignificant (Wydick, 1999).

Impavido (1998) argues that group lending provides a possible means to relax rationing and improve efficiency when physical collateral is not available. He analyzes optimal size of groups as a function of social factors. He discovers that groups can be neither too small nor too large because in both cases the effectiveness of social sanctions on behavior is too low to counteract the negative effect on effort caused by profit sharing and free riding. Among his findings, Impavido notes that individual sensitivity to social sanctions is a crucial element in determining whether groups are formed.

Using data from FINCA-Peru, Karlan (2007) exploits a quasi-random group formation process to find evidence of peers successfully monitoring and enforcing joint-liability loans. Karlan argues that individuals who exhibit stronger social connections to their fellow group members (i.e., either living closer or being of a similar culture) have higher repayment and higher savings rates. Furthermore, he observes direct evidence that relationships

become sour after default, and that through effective monitoring, individuals know who to sanction and who not to sanction after default.

Dunford (2009) reports that over the past 15 years, the experience of CUs in francophone West Africa, Ecuador, Madagascar, and the Philippines and rural banks in Ghana has shown that integrating group-based microfinance (village banking) into existing, locally owned financial institutions in provincial towns is a lower-cost, effective, and sustainable alternative to building microfinance institutions for extending microfinance to poorer women (many of them so poor that their families are chronically hungry), especially in rural areas.

Using Tobit analysis, Sharma and Zeller (1997) study the repayment performance in group-based credit programs in Bangladesh and conclude that if lenders adhere to basic principles of prudential banking, repayment rates can be good even in poor and remote communities. In other words, group lending can be effective irrespective of where it is practiced, provided the basic principles of prudential banking are followed.

Notwithstanding the glowing picture of group lending painted above, there are also studies that unlock the negative side of the lending methodology. Montgomery (1996), for instance, employs case studies from Bangladesh and Sri Lanka to study one disadvantage of group lending schemes: the unnecessary social costs of repayment pressure. He argues that lending credit and meeting the needs of the poor need not be incompatible activities. In his view, the poor can be insulated from socially damaging peer pressure lending practices through flexible repayment schedules, savings facilities, and short-term, high-interest consumption loans.

Joining the voice of Montgomery are Besley and Coate (1995), who find that group lending schemes have both positive and negative effects on repayment rates. The positive effect is that successful group members may be motivated to repay the loans of group members whose projects have produced insufficient returns to repay their loans. The negative effect occurs when the whole group defaults; if they had borrowed under individual lending, some would have repaid their loans.

The above-mentioned studies have mostly concentrated on the effects of group lending on loan repayment and the dynamics of group formation. Conspicuously missing from the literature are firm-level predictors of group lending methodology in the microfinance industry. Additionally, studies on financial institutions in Ghana (see, for example, Aboagye, 2009; Blankson, Mbah, & Owusu-Frempong, 2009; Blankson, Omar, & Cheng, 2009) appear to have neglected credit unions and their lending practices. Filling this knowledge gap is the aim of the current study.

HYPOTHESES DEVELOPMENT

This section provides the grounds upon which variables have been included in the model of the study as well as the hypotheses to be tested by the model.

Size of Management

Hermes et al. (2005) argue that group lenders do not have to invest in screening, monitoring, and enforcement activities because the group lending structure provides an effective way of screening, monitoring, and enforcing contracts among borrowers. The presence of social ties between group members may add impetus to screening, monitoring, and enforcement, making them more effective (Hermes et al., 2005). This assumes that all things being equal, a CU that practices group lending should have a smaller number of persons in managerial positions than a CU that does not. Therefore, we use the size of management as one of the independent variables that predict the decision to adopt group lending. This leads to the following hypothesis:

> H1: A CU with smaller size of management is more likely to practice group lending than are CUs with larger management.

Repayment

The proponents of group lending methodology tout its ability to foster high repayments among microfinance borrowers (Coleman, 1999). Ghatak (2000) shows that by lending to self-selected groups of borrowers and making them jointly liable for each other's loan repayment, a lender can achieve high repayment rates even when these borrowers cannot offer any collateral. Repayment rate is, therefore, included in the model as an independent variable to test its relationship with group lending decisions. We also include loans that have been delinquent for more than 30 days as one of the variables. Consequently, the study proposes to test the following hypotheses:

> H2: CUs with higher repayment rates are unlikely to adopt group lending.
> H3: CUs that record no delinquent loans that are more than 30 days old are unlikely to adopt group lending methodology.

Liquidity

Liquidity is at the heart of CU operations. This explains why it is one of the components of PEARLS, the framework of the World Council of Credit Unions (WOCCU) for assessing the financial performance of CUs. Lack of liquidity can bring the operations of a CU to a standstill and can even result in its extinction. The liquidity position of a CU is improved if its loan recovery performance is high. It is, therefore, expected that a CU with poor liquidity performance is likely to adopt group lending to improve its liquidity. The

study, therefore, includes liquidity as one of the variables. This leads to the following hypothesis:

> H4: CUs with higher liquidity positions are less likely to adopt group lending than those with low liquidity.

Years in Business

Expertise has generally been defined as number of years of experience or practice in a domain (Bedard & Chi, 1993). Andersson (2004) has found experience to be a relevant factor in lending decisions. As a CU continues to lend to its members, it learns from its previous mistakes and should, therefore, be able to make wise decisions. This, in turn, should drastically improve its repayment performance. Thus, all things being equal, that CU may not have an incentive to adopt group lending. This leads to the following hypothesis:

> H5: CUs that have been in business for a long time are less likely to adopt group lending methodology.

Gender

A collective belief has emerged that women's repayment rates are typically far superior to those of men (Cheston & Kuhn, 2002). Women are considered to be ideal targets of microfinance because of their proven high loan repayment rates compared to men (Dyar, Harduar, Koenig, & Reyes, 2006). D'Espallier, Guérin, and Mersland (2009) analyze gender differences with respect to microfinance repayment rates using a global dataset covering 350 microfinance institutions in 70 countries and report that microfinance institutions with more women clients exhibit *lower* portfolio-at-risk, lower write-offs, and lower credit-loss provisions, all things being equal. Armendariz and Morduch (2005) report that Grameen Bank shifted their focus from men to women due to repayment problems they encountered with the former. Hossain (1988) reports that in Bangladesh 81% of women encountered no repayment problems compared to 74% of men. Khandker, Khalily, and Kahn (1995) also present findings that favor women. In their study, they find that 15.3% of Grameen's male borrowers had repayment problems, compared to only 1.3% of women. Reports from countries such as Malawi and Guatemala also confirm women as superior to men in terms of loan repayment (Hulme, 1991; Kevane & Wydick, 2001). This study, therefore, argues that CUs with more active female members should be less likely to adopt group lending than CUs with more active male members. Consequently, the following hypothesis is to be tested:

> H6: CUs with more active female members are less likely to adopt group lending than CUs with more active male members.

METHODOLOGY

This section chronicles how the study was undertaken. It describes the econometric model employed, sample size, data source, and data collection procedures.

Econometric Model of CU's Group Lending Decision

The appropriate econometric tool for analyzing the dichotomous decision of CUs of whether to adopt group lending is a binomial logit model based on discrete choice theory. Discrete choice theory is the study of behavior in situations where decision-making units must choose from a defined/finite set of alternatives (Kim & Yoon, 2004). The theory argues that an individual is likely to prefer an alternative to other alternatives if the level of utility to him or her is greater than the utility of other alternatives. The factors that influence the decision of a CU about whether to adopt group lending are divided into choice-specific factors (attributes of group lending)—repayment and loan delinquency—and CU-specific factors—years in business, liquidity, gender distribution of active members, and size of management. Then, the level of utility (benefit) that the *n*th CU obtains from either adopting group lending or not adopting group lending can be expressed as the following direct utility (benefit) function in terms of z_{jn} (group lending attributes, jε(group lending, no group lending), and s_n(CU-specific attributes)

$$U_{jn} = U(z_{jn}, S_n)(j \in \{\text{group lending, no group lending}) \qquad (1)$$

The direct utility in Equation (1) can be divided into observed part V_{jn} and unobserved part (e_{jn}):

$$U_{jn} = V_{jn} + e_{jn} \qquad (2)$$

The probability of the *n*th CU adopting group lending, derived by making the level of utility (benefit) achieved from adopting group lending greater than that from not adopting group lending, can be expressed as follows:

$$\Pr(\text{Group lending}/j) = \Pr\left(U_{\text{Group lending}, n} > U_{\text{No group lending}, n}\right) \qquad (3)$$

If the unobserved part, e_{jn}, is identically and independently distributed following a logistic distribution, the revealed utility and the probability of adopting group lending are related by a binomial logit (Kim & Yoon, 2004).

The Model

The model predicts the group lending decision of a CU; more specifically, it is about whether a CU will adopt group lending methodology. The variable GLDECISION is a dummy variable. Therefore, it is set to "1" if the CU practices

group lending and to "0" if the CU does not practise group lending. Description of variables used in the study is given in Table 1. The following binomial logit model is constructed to relate the probability of a CU adopting group lending to explanatory factors: size of management, liquidity, repayment, delinquency, years in business, and gender. Summarily, the model is expressed as:

$$\Pi_{jn} = F\left(X'_{jn}\beta\right), \tag{4}$$

where Π_{jn} is the probability that nth credit union will adopt group lending, X'_{jn} is a vector of explanatory variables, β is a vector of coefficients to be estimated, and F represents the cumulative logistic distribution function. Expanding Equation (4), the logistic regression equation becomes:

$$\Pi\ GLDECISION_{CU} = \alpha + \beta_1 MGTSIZE$$
$$+ \beta_2 DELINQUENCY + B_3 REPAYMENT + B_4 LIQUIDITY$$
$$+ B_5 YRSINBUS + \beta_6 GENDER + \mu \tag{5}$$

where Π *GLDECISION$_{CU}$= probability of a CU's decision to adopt group lending, MGTSIZE = size of management of CU, DELINQUENCY = delinquency rate of CU, REPAYMENT = repayment rate of CU, LIQUIDITY = liquidity of CU, YRSINBUS = number of years CU has been in business, GENDER = gender distribution of CU's active members, μ = error term, and α and β = constant and regression coefficient, respectively.*

TABLE 1 Description of Variables

Variable	Description
Dummy for group lending decision (GLDECISION): Dependent variable	=1: if CU practices group lending =0: if CU does not practice group lending
Size of management (MGTSIZE)	=Continuous data; defined as the number of persons in managerial positions
Dummy for delinquency (DELINQUENCY)	=1: if CU records delinquent loans over 30 days =0: if CU records no delinquent loans over 30 days
Dummy for repayment performance (REPAYMENT)	=1: if CU reports 50% or more repayment ratio =0: if CU reports less than 50% loan repayment ratio
Liquidity of CU (LIQUIDITY)	=ratio data; defined as liquid funds/total assets of CU
Dummy for years in business (YRSINBUS)	=1: if CU is 10 years or older =0: if CU is less than 10 years old
Dummy for gender distribution of active members (GENDER)	=1: if CU has more active female members than male active members. *Note:* An active member of a CU is defined as one who has borrowed money from the CU. =0: Otherwise

Note: A 5% significance level is assumed.

Sample and Data Source

The study used cross-sectional data from 222 of the 299 CUs that submitted data on their 2008 financial year operations to the CUA of Ghana. The data covered the critical dimensions of the CUs' operations. The nature of the study required that the data be edited for completeness because, upon inspection, some data were incomplete and needed to be excluded from the study. After editing the data using the variables needed for analysis as the criteria, 222 CUs were found to be suitable for the study and were, therefore, used. The choice of 2008 financial year data was informed by the fact that, as at the time of the study, they were the latest data CUA had compiled on active CUs in Ghana.

RESULTS AND DISCUSSION

The explanatory power of the model is between 21% and 28% using Cox & Snell R^2 and Nagelkerke R^2 measures. The results in Table 2 show that the group lending decision of a CU is positively associated with its size of management. This implies that as the size of management of a CU increases, it is more likely that it will opt for group lending methodology. The statistical significance of this association warrants the rejection of hypothesis H1. The effectiveness of group lending to combat poor loan repayment of a microfinance institution is documented in the literature (Coleman, 1999; Impavido, 1998; Sharma & Zeller, 1997). It appears that as a CU in Ghana grows in size and appoints more managers, sustaining it through prudent financial management becomes paramount. To this end, the CU resorts to group lending.

Evidence in Table 2 supports the assertion that there is a statistically significant negativeassociation between the repayment performance of a CU and its group lending methodology decision. A CU that records a higher loan repayment rate is not likely to adopt group lending. Thus, proposition H2 is accepted. This strikes a chord with the position of the group lending literature, which finds that the main appeal of group lending is its potential to accomplish high repayment success (Coleman, 1999; Ghatak, 2000). Similarly,

TABLE 2 Logistic Regression Analysis of CU Group Lending Decision

Variable	B	S.E.	Wald	*df*	Significance	Exp(B)
MGTSIZE	0.319	0.112	8.105	1	.004	1.375
DELINQUENCY	−1.549	0.377	16.899	1	.000	0.213
REPAYMENT%	−1.065	0.379	7.910	1	.005	0.345
LIQUIDITY %	0.020	0.009	4.974	1	.026	1.020
YRSINBUS	1.219	0.324	14.193	1	.000	3.384
GENDER	0.016	0.357	0.002	1	.964	1.016
CONSTANT	−2.519	0.787	10.249	1	.001	0.081

a CU that records no delinquent loans more than 30 days old is not likely to adopt group lending methodology. Thus, hypothesis H3 is supported.

Evidence adduced in Table 2 lends credence to the argument that as the liquidity position of a CU in Ghana increases, it is more likely to adopt group lending. This contradicts hypothesis H4; therefore, H4 is rejected. Since the association between liquidity and the group lending decision is statistically significant, it is logical for us to argue that liquidity is one of the predictors of a group lending decision in the CU industry in Ghana.

A statistically significant and perfectly positive association has been found between the number of years of CU operations and group lending decisions. As a CU gets older, it is more likely to adopt group lending. Hypothesis H5 is, therefore, rejected. The implication is that new CUs in the CU industry in Ghana are not likely to adopt group lending methodology. This hints of limited appreciation of group lending methodology among the players in the microfinance industry in Ghana, which calls for action. Given the findings from studies on group lending (see, for example, Coleman, 1999), it is imperative for CUA to take up the challenge of sensitizing its members to the benefits of adopting group lending at the beginning of CU operations. Not only would this campaign help CUs in Ghana avoid drudgery and the huge investment inherent in loan screening, monitoring, and enforcement activities (Hermes et al., 2005) but it would also facilitate the sustainability of the CU industry as one of the avenues for making credit accessible to the poor and financially excluded for productive ventures.

The microfinance literature argues that women are better borrowers than men in terms of repayment performance (Armendariz & Morduch, 2005; Cheston & Kuhn, 2002; D'Espallier, Guérin, & Mersland, 2009; Dyar, Harduar, Koenig, & Reyes, 2006; Hossain, 1988; Hulme, 1991; Kevane & Wydick, 2001; Khandker et al., 1995). It is, therefore, expected that a CU that has more active female members should have higher repayment performance and should be less likely to adopt group lending. However, as demonstrated in Table 2, CUs in Ghana with more active female members are rather more likely to adopt group lending methodology than their counterparts with more male members, but this is statistically insignificant. Thus, it is logical to argue that gender structure of active members of a CU in Ghana is not likely to influence its decision to adopt group lending.

CONCLUSIONS AND LIMITATIONS

On the strength of these findings, we are inclined to conclude that CUs that have a larger size of management, poor repayment performance, no delinquent loans over 30 days, and better liquidity positions, and that have been in the CU business for a long time are more likely to adopt group lending than their counterparts. We can also conclude that the gender structure of a CU does

not influence its group lending decision, and argue that CUs adopt group lending to improve their loan repayment performance, consistent with the literature.

The study is limited in the sense that data from only one financial year were used. Thus, there is the need for future researchers to test the model using future financial data. Further, this research is limited to data from a single Sub-Saharan African country. Future researchers may replicate this study in other Sub-Saharan African countries such as Nigeria and Senegal for more insights. These limitations notwithstanding, the results of the current study are likely to reinforce the growing interest in group lending methodology in Ghana.

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