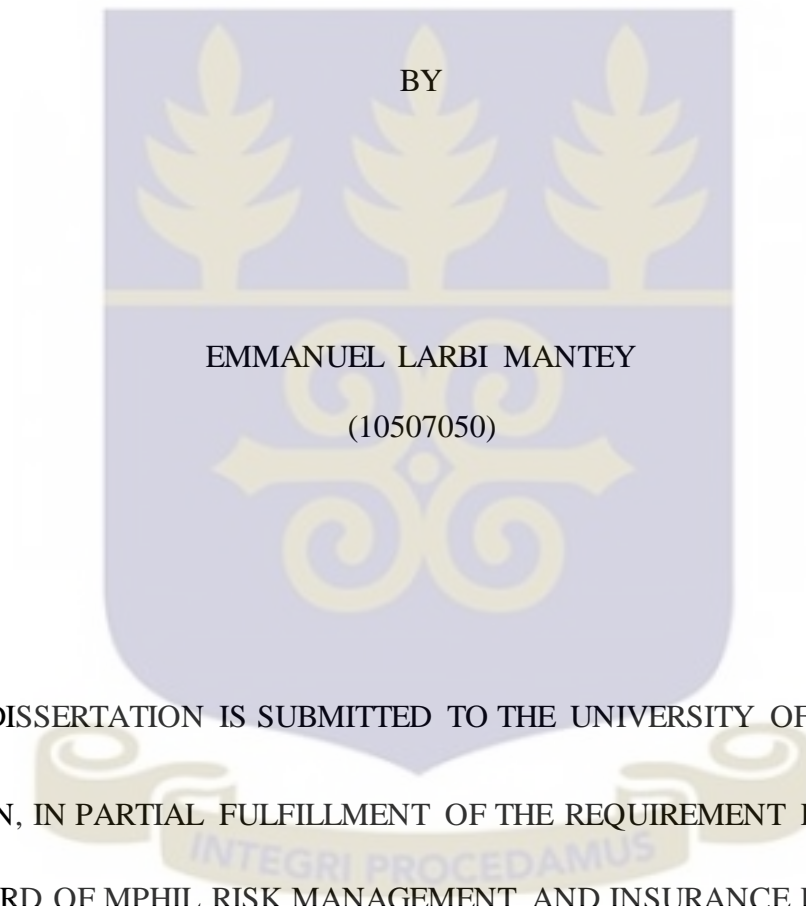


UNIVERSITY OF GHANA

DETERMINANTS OF LOAN DELINQUENCY AMONG CREDIT UNIONS IN GHANA



BY

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THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA,  
LEGON, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE  
AWARD OF MPhil RISK MANAGEMENT AND INSURANCE DEGREE

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## DECLARATION

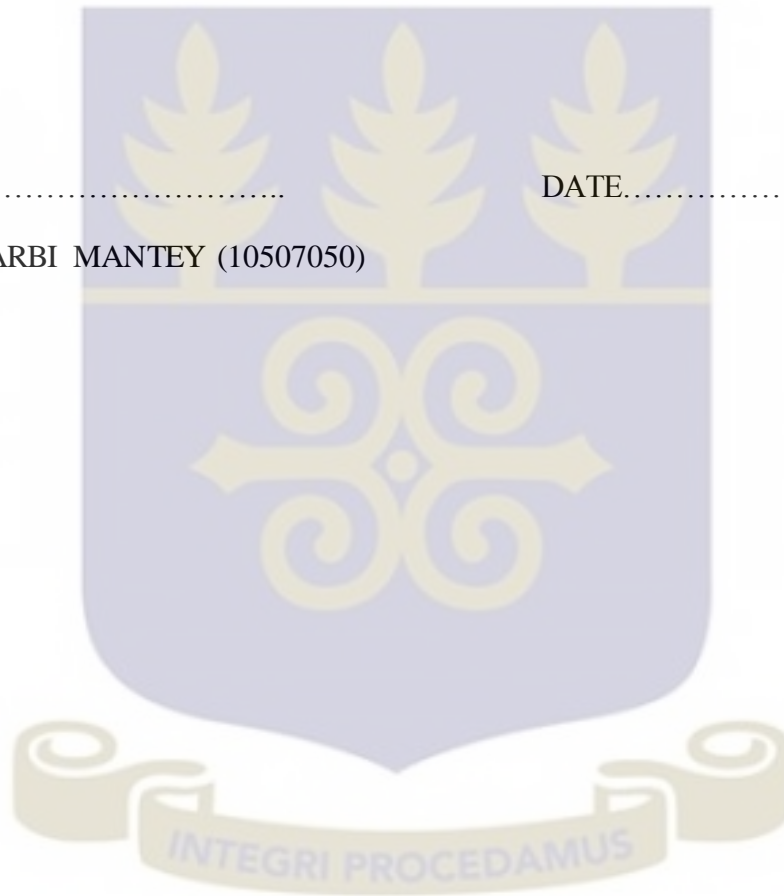
I wish to affirm that except for references, which have fully been acknowledged, this study was originally done by me as a student after a research conducted under the supervision of Dr. Albert Gemegah and Dr. Simon K. Harvey. This work is entirely my original work and it has never been submitted in whole or in part for any degree elsewhere.

SIGNATURE.....

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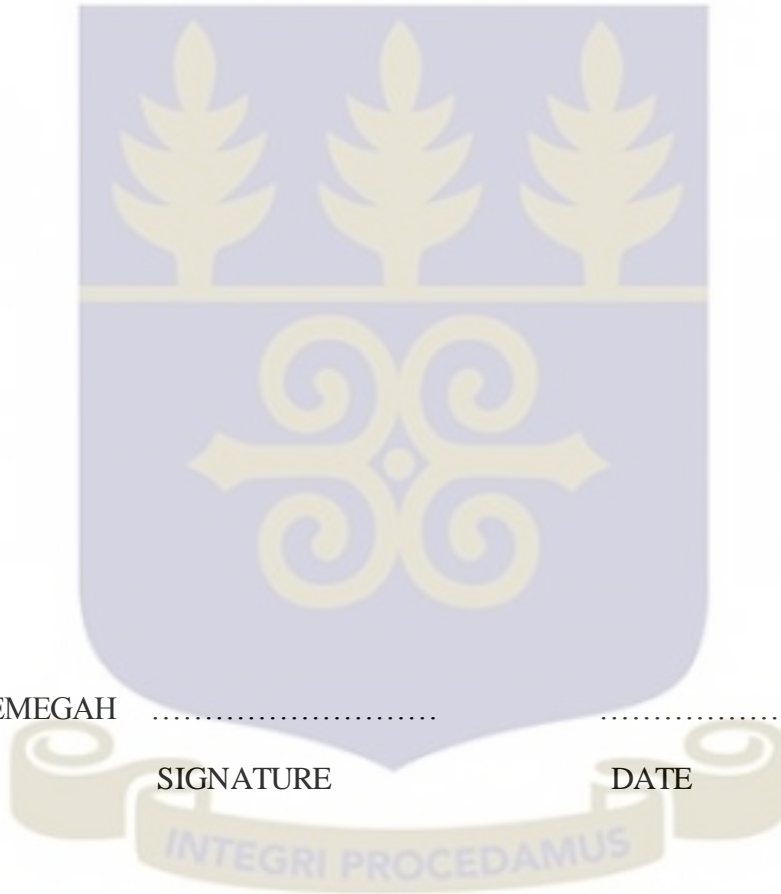
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## CERTIFICATION

I hereby certify that this thesis was supervised in accordance with the procedures laid down by the University of Ghana



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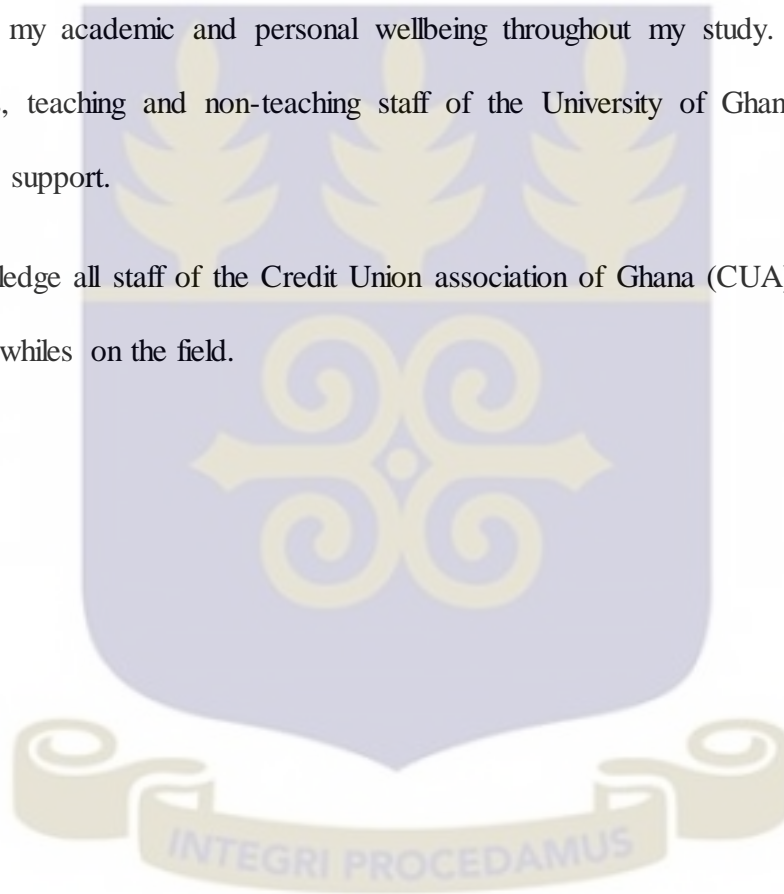
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## ABSTRACT

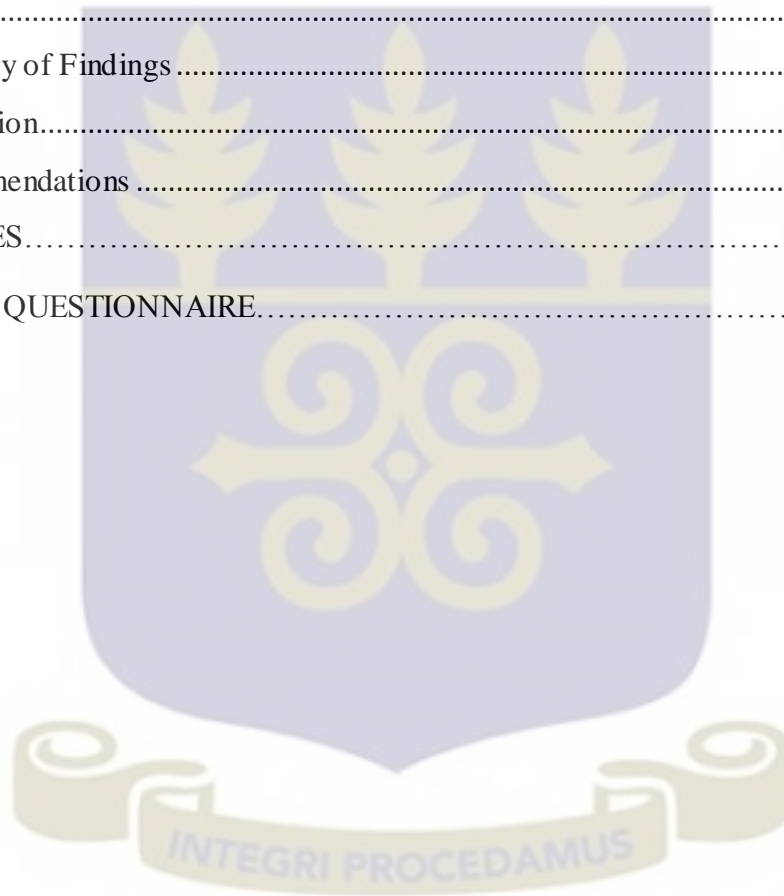
The objective of this paper was to determine the probability and extent of loan delinquency among Credit unions in Ghana. The independent double hurdle model was used to analyze primary data collected from 300 loan beneficiaries of 30 Credit Unions that are under the Accra Chapter of the Credit Union association of Ghana (CUA). Based on the regression results it was found that among the variables that were considered, only four out of eleven variables significantly influenced the probability of loan delinquency and five out of eleven variables significantly influenced the extent of delinquency. The findings of the study suggest that a borrower's number of dependents and illiterate borrowers positively influence loan delinquency whereas the number of previous loans taken and loans taken for productive use have negative influence on loan delinquency. The findings also reveal that borrowers who have other sources of obtaining a credit facility other than the Credit Union, borrowers who have obtained formal education up to the Junior high school level and Senior high school level and borrowers who are required to present guarantors take a shorter time to pay back loans that are in arrears should they become delinquent. On the other hand, borrowers who have accessed many previous loans from the Credit Union take a longer time to pay back loans that are in arrears in the event where they become delinquent. The study recommends that credit unions give financial management counseling to those who have no formal education before loans are disbursed. Credit unions should also make it imperative for loan applicants to get guarantors before loans are given out and credit union loan officers should continuously assess, monitor and supervise borrowers who are seen to have a good credit history with the credit union

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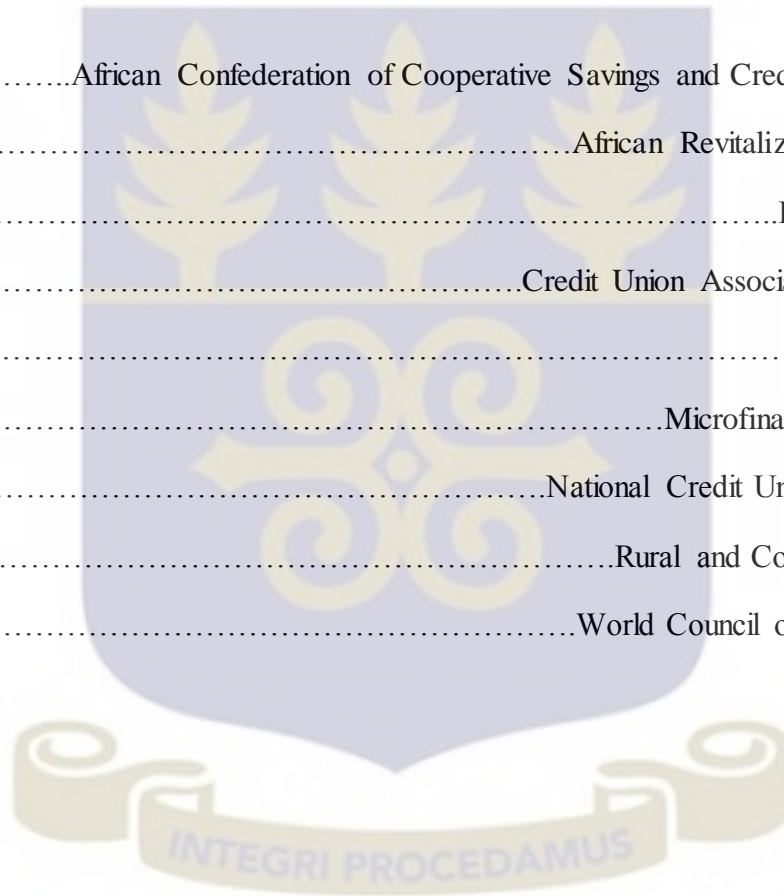
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## LIST OF ABBREVIATIONS

ACCOSCA.....	African Confederation of Cooperative Savings and Credit Association
APR.....	African Revitalization Program
BoG.....	Bank of Ghana
CUA.....	Credit Union Association of Ghana
CU.....	Credit Union
MFI.....	Microfinance Institutions
NCUA.....	National Credit Union Association
RBC.....	Rural and Community Banks
WOCCU.....	World Council of Credit Unions



## CHAPTER ONE

### INTRODUCTION

#### 1 Background

Every country's economic development is dependent on how strong and vigorous the financial system of the country is (Drzik, 1995). The functions of financial institutions are analogous to the role blood vessels play in the human body. Just as the heart pumps blood to the other parts of the body, financial institutions accelerate growth in all sectors of a country's economy (Shanmugam & Bourke, 1992). The banking sector in Ghana has not been able to satisfy the increasing demand for credit. As a result many borrowers have sought refuge with informal lending sources to keep up with their production and consumption (Antwi & Antwi, 2010).

Information asymmetry has been established as one of the major reasons why people find it difficult to obtain loans from financial institutions. This is because borrowers often have more information about their activities than lenders. Since commercial banks aim at maximizing profit, borrowers who are not able to provide credible credit history or sufficient collateral are most of the time cut off, thus making access to credit difficult to low income borrowers and micro entrepreneurs (Wu, 2010).

The Provisional National Defense Council Law (PNDCL) 328 gave legal backing to non-bank financial institutions such as savings and loans companies, finance houses, credit unions among others in Ghana (BoG, 2007). The emergence of these non-bank financial institutions have made credit available to borrowers who thus far were not able to access credit from banks due to their perceived high risk nature. Ghana currently operates three types of non-bank financial institutions. These are formal suppliers of microfinance such as savings and loans companies, rural and

community banks and commercial banks; semi-formal suppliers of microfinance such as Credit Unions (CU) and financial non-governmental organizations; and informal suppliers of microfinance such as susu collectors, clubs and money lenders (BoG, 2007).

Among the types of non- bank financial institutions in Ghana, CUs are unique. McKillop and Wilson (2011) define CUs as self-help cooperative financial organizations aimed at ensuring that the financial and societal goals of members are achieved. They take on dual nature as a financial institution and cooperative. They are formed by people who share a common bond such as people who belong to a particular organization, community or association. Each credit union is governed by members who volunteer as officers and directors. Members of credit unions vote on a one-on-one basis. This means every member is entitled to a single vote irrespective of how much savings a member has (Baker, 2008). Unlike other financial institutions, credit unions are not duty-bound to gratify members with shareholder profit expectations (dividend). Instead, credit unions are established to meet the economic and social goals of its members. The excess monies generated from business activities may be paid to members as dividend or used for developmental projects that benefit all members (Griffiths & Howell, 1991). Aside the unique features of credit unions, they act as financial institutions that take deposits and give out loans to members at very low interest rates.

CUs have now become a global force to associate with. They cut across over 103 countries worldwide serving over 208 million people and also have a penetration of 8.06%. Globally, credit unions have a total USD 1.4 trillion in savings and shares and USD 1.7 trillion in total assets (WOCCU report, 2013). In Ghana, Credit unions have also achieved remarkable growth since it was introduced in September 1955, at Jirapa in the North – West (Upper West Region of Ghana). The idea was made known by an Irish Canadian priest known as Rev. Father John McNulty

(Adusei, 2013). The number of credit unions in Ghana now stands at 476 serving over 571,479 people nationwide. They have a combined savings and shares of about USD185, 417,435, total assets of USD221, 772,512 and penetration of 3.9% (WOCCU, 2014).

Credit unions have been viewed as an essential means in tackling financial exclusion and also as financial intermediaries with the task of giving aid to people who are financially handicapped (McKillop & Wilson, 2008). Credit unions have over the years impacted positively on the lives of members. About 90% of credit union members in Ghana alluded to the fact that their purchasing power increased by virtue of them joining a credit union (Oosterhout & Dzandu, 2009). The positive impact that credit unions have had on their members can also be measured by the social protection the unions offer. Thus, members are able to recover more quickly from adverse events (Oosterhout & Dzandu, 2009). As credit unions continue to fulfill their social objective by giving out low interest loans to members to enhance their welfare, Eales and Bosworth (1998) suggest that they are also faced with a conflict of ensuring that prudent risk management practices are put in place to mitigate default since the solvency of the credit union is affected by high rates of loan delinquency. The social role of credit unions is likely to be at odds with the financial viability of the credit unions if it results in credit union managers adopting less thorough procedures that will not allow them to properly carry out credit risk appraisal of individual borrowers (Ralston & Wright, 2003).

Issues of loan delinquency in financial institutions have been the focus of discussion on many platforms and it comes up as the number one reason why commercial banks have not been at the forefront of granting loans to micro, small and medium enterprises (Addae-Korankye, 2014). A loan is delinquent when payments of interest and principal are not made a day after the first missed payment. The entire outstanding loan balance is therefore considered past due (WOCCU, 2008).

When loans become delinquent, the credit union's liquidity and ability to give out more credit is hampered, the confidence of members dwindle and as a result the rates at which members save may reduce considerably. Credit risk is the largest risk that credit unions face due to the nature of their business. It is of the essence that managers of credit unions become acquainted with the issue of loan delinquency in order for them to adopt suitable policies that will curb this bane. This position is reiterated by Bessis (2003) who states that the default of few members may result in large losses for credit unions.

### **1.1 The Statement of the Research Problem**

The sustainability of lending institutions depends fundamentally on their ability to recover loans that have been given out (Addae-Korankye, 2014). Loan default is regarded by Hunte (1996) as a tragedy since the failure of credit institutions to put in place effective lending strategies and reliable credit policies commonly results in the collapse of these institutions. The participation of credit unions in the offering of credit services brings up the question of how credit unions can ensure good repayment rate. This question is important because although credit unions are also classified as Non-bank financial institutions similar to Rural and Community banks (RBCs), Savings and Loans companies and Microfinance companies (MFIs), Credit Unions (CUs) are very different in terms of their structure, profit motive and operations.

Unlike other financial institutions, credit unions were seen as institutions that experienced minimal cases of loan delinquency because of their tight common bond restriction (Emmons & Schmid, 1999). The common bond restriction allowed membership through a common occupation, geographical area or association (religious organization). The tight common bond restriction of credit unions served as a tool to mitigate the incidence of loan delinquencies and also serve as a substitute of borrower credit history and collateral. Thus, it sought to reduce the high cost of

lending such as the risk of delinquency, gathering credit information of borrowers and bad debts because officers making the lending decisions knew more about the creditworthiness of borrowers and thus made borrowers feel more reluctant to default (Black & Dugger, 1981). It was also easy to monitor the activities of borrowers in order to ensure smooth repayment of loans because of the close knit relationship and proximity between members (Black & Dugger, 1981). However, the upsurge in population and development in Ghana have necessitated the growth and expansion of credit unions. As stated by Mckillop and Wilson (2008), tight common bonds restrict growth in credit unions by limiting members to a finite group. In order to take advantage of the increased population and development, credit unions have expanded their membership by loosening up their common bond to broaden up the scope of members who can join. This has therefore made it increasingly difficult to rely on the protection of the common bond. As credit unions loosen up their common bond restrictions, it becomes very difficult to gather a borrower's credit information that will help screen a borrower before a loan is given out (Mckillop & Wilson, 2008). Huppi and Feder, (1990) and Frame, Karels, and Mcclatchey, (2002) postulate that the size of a cooperative becomes negatively correlated with the availability of information about borrowers. Consequently, a chunk of the loans that are given out by the credit unions become delinquent and hence affects their financial performance.

Delinquent loans are mostly as a result of lenders inability to assess borrower characteristics and the failure of credit unions to be flexible enough to change lending conditions that will accommodate the risk of each individual loan applicant (Weaver, 1994; Ralston & Wright, 2003). In a bid for credit unions to continue with their social objective of maximizing the welfare of members, they first have to ensure that they are economically viable. The incidence of loan delinquency has proved to be detrimental to the economic viability of credit unions not only when

loans become delinquent but when the loans are in arrears for a long period. Thus the longer a loan becomes delinquent, the probability of recovery becomes less (WOCCU, 2008). Since corporative members are the suppliers of lendable funds through their savings deposits, it is imperative that the pool of funds from which credit is given is replenished without delay to allow other members benefit from the credit facility and also allow members have access to their savings without trouble. The loss of principal and interest weakens financial viability if it goes unchecked. This can result in the collapse of credit unions since income from lending constitute averagely 80-90% of total credit union income in Ghana (Habib & Ibrahim, 2014).

It is thus important to examine and make available empirical evidence on the determinants of loan delinquency so that there can be a collective understanding of the factors that influence it. This study therefore aims at examining factors that affect the probability of loan delinquency among credit unions in Ghana and also go further to examine the factors that influence the extent of delinquency.

## **1.2 Research Questions**

The study attempted to address the following research questions.

1. What are the borrower and loan characteristics that influence the probability of loan delinquency of credit unions in Ghana?
2. What are the borrower and loan characteristics that influence the extent of loan delinquency of credit unions in Ghana?

## **1.3 Objectives**

The general objective of this study is to examine the factors that influence the probability of loan delinquency among credit unions in Ghana. Specifically, it seeks

1. To determine how borrower characteristics and loan characteristics influence the probability of loan delinquency in credit unions.
2. To determine how borrower characteristics and loan characteristics influence the extent of loan delinquency in credit unions.

#### **1.4 Significance of Research**

This study is intended to contribute to the knowledge of loan delinquency of Credit unions in Ghana and also act as the beginning for further research. The outcome of this study will thus enable Credit unions to adopt strategies that will help control the increasing problem of non-performing loans.

Furthermore, the study will provide an insight into the various approaches that can be utilized by credit union managers to reduce the credit risk exposures that credit unions face and to reform credit risk management policies for the enhancement of credit union loan portfolios.

This current study will also aid the government and Credit Union Association of Ghana (CUA) to restructure their policies on regulatory requirements that will improve the supervision and monitoring and evaluation of credit unions

#### **1.5 Limitations of Research**

The study was limited to the Greater Accra Region. The major contributory factor for narrowing the study to the Greater Accra Regions is time constraint, considering the period within which the work is to be completed. Due to this limitation, the study may fail to represent the bigger picture depicted by the whole country. Besides, the data collected for analysis is from a primary source. This might somewhat contain biases from the response of the respondents and may in turn affect the results of the study's analysis.

## 1.6 Organization of Work

This study is structured in five chapters. Chapter one comprised the background, problem statement, objectives, research questions, significance of the study and research limitations. Chapter two focused on the review of theoretical and empirical literature relevant to the subject matter. Chapter three explained the methodology employed to achieve the objectives. The presentation of findings and discussion is captured in chapter four. Chapter five presented the summary of the discussions, conclusions and recommendations.



## CHAPTER TWO

### LITERATURE REVIEW

#### **2 Introduction**

This chapter reviews various literature behind the study. It comprises both theoretical and empirical literature. The theoretical literature reviews various theories surrounding the study. The empirical literature on the other hand reviews already existing studies on loan delinquency.

#### **2.1 Theoretical Concept of Credit Unions**

##### **2.1.1 Interest Rate Restrictions**

Individuals who manage CUs are mostly volunteers who may lack certain expertise that can be used to critically assess borrowers before loans are given out. As a result it is deemed to be beneficial to allow these volunteers to make decisions within restrictive parameters such as a capped interest rate. If there is no interest rate ceiling and CUs are allowed to charge high interest rate, people who will borrow from CUs at high interest rate are those who are likely not to obtain credit elsewhere, resulting in adverse selection (Ferguson & Mckillop, 2008).

##### **2.1.2 Objective Function**

Credit Unions are member owned, not for profit organizations that provide savings and low cost loan facilities to members (Ryder, 2003). The main objective of credit unions is not to generate profit. This means that the economic behavior of credit unions then becomes dissimilar to the neoclassical theory of the firm which assumes firms maximize profit (Mckillop & Wilson, 2011). Researchers over the years have formulated theories that sought to identify and explain the objective and behavior of credit unions. Taylor (1971) paid attention to how credit unions are able to put into equilibrium the interest of both borrowing and saving members. This conflict stems

from the fact that borrowers want to borrow at low cost (low interest rate) while the saving members want higher dividends on their shares. These interests can, however, not be fulfilled concurrently since higher dividend means borrowing at high interest rates and low cost credit means earning lower dividends on savings. Taylor (1971) established that three types of credit union exist; these are (1) neutral credit union, (2) borrower-dominated credit union and (3) saver-dominated credit union. Taylor (1971) explained that for neutral credit unions (where neither borrowers nor saving members' interest dominate), the balance level of production should be at the point where the interest charged on loans, deducted from the dividend paid, should equal the cost of operations. Thus, the maximum benefit of members in the credit union can be realized. In the case of the borrower-dominated credit unions, the credit unions will always act in the interest of borrowers. This type of credit union will welcome new savers because they are a source of low-priced funds. However, new borrowers will not always be welcomed. The saver-dominated credit union's objective is the maximization of average net return. For this type of credit union new borrowers will be welcomed because they increase the capacity to earn higher dividends. On the other hand, an increase in the number of savers will not be welcomed since it means that dividends will be shared by many people hence lower dividends will be paid. The proposition of this theory is that neutral credit unions are more efficient, in that, new members are encouraged to join and also there is no discrimination against either borrowers or savers. This means that the credit union maximizes the interest of both borrowers and savers.

### **2.1.3 Liquidation and Regulations**

Wood (1967) focused on resource allocation at the time of a credit union membership flux. He proposed that members who opted out of credit unions should be given some form of benefits since members did not have direct control over the reserves of the credit union. He went on to propose

a system whereby members would have to pay a fee when buying shares and also have the opportunity to sell the shares for a refund at any time they wish to exit .The fee that is to be paid is based on the reserve or share ratio at the time of transaction.

Wolken and Navratil (1981) came out with a model that established that in order for credit unions to accomplish economic efficiency, the process of regulation needed to be flexible enough to differentiate among credit unions types. Flannery (1974) in his model also proposes that for credit unions to be more efficient it is of great importance for the industry to be deregulated.

#### **2.1.4 Taxation**

Credit unions are presently exempted from paying tax on retained earnings. Researchers over the years have come out with models that sought to explain the impact taxation will have on credit unions. Notable among them is Smith (1988). He developed a model which established that imposing tax on credit unions will have a regressive and non-uniform impact on their development. Smith explained that only credit unions that are sufficiently well capitalized could avoid taxation whereas credit unions that are inclined to accumulating more capital reserves because they are newly organized or fast growing could experience heavy tax burdens. He asserted to the notion that the tax exemption status of credit unions could someday be withheld and so credit unions should prepare for such a time by considering to increase their capital reserves in order for them to compete on the same scale with other credit institutions. Cook and D'Antonio (1981) also established that imposing income tax on credit unions increases deposits and loans because credit unions will in turn increase share rate and lower loan rates. This will result in a reduction in profits for the credit unions whereas members will receive more favorable rates. Overstreet and Rubin

(1991) believes this pricing strategy will result in the worsening of the credit unions' equity position.

### **2.1.5 Common Bond**

One of the most unique features of credit unions is their member eligibility requirement. Credit unions are formed by people who are closely related based on place of work (occupation), community or association (Frame *et al.*, 2002). This feature has been criticized by Fuller (1998). He argues that the use of common bond restricts the number of people who can join and also does not allow credit unions to develop at the rate they are supposed to. On the other hand Ferguson and Mckillop (1997) take an opposite stance. They argue that the existence of common bond strengthens the credit union membership and also this bond serves as a security for loans since the closely knit relationship among members help to morally compel members to pay back. Baker (2008) concurs with Ferguson and Mckillop (1997). Baker states that the common bond morally enjoins borrowers to pay back since defaulting on the loan means refusing to pay back money they have received from the community. The common bond concept served as a substitute for the lack of member's credit history and collateral. Thus, it reduced the high cost of lending such as the risk of delinquency because officers making the lending decision happen to know more about the borrowers and thus makes borrowers feel more reluctant to default (Black & Dugger, 1981).

There are two types of credit union common bond; the single common bond and multiple common bonds credit union. The single common bond credit union is based on occupation, association (e.g. religious group) or community. On the other hand multiple-bond credit unions include "two unrelated employers (occupation) or two unrelated associations or a combination of two or more employers or associations"(Frame *et al.*, 2002). Extant literature posits that credit union common

bond type influences the operations and performance of credit unions. Kohers (1986) and Kohers and Mullis (1986) established that occupational single common bond credit unions operating in unsteady economic environment experienced lower profitability and a high loan loss provision as compared to the other types of single common bond credit unions in a stable economic environment. Fried, Lovell and Eeckaut (1993) also found that associational credit unions have higher productive efficiency as compared to community based credit unions. Frame *et al.* (2002) found that occupational credit unions experience lower delinquency because loans given to members are most of times deducted as source.

## **2.2 The Theory of Information Asymmetry**

Yun (2009) defined information asymmetry as the situation where one party to a contract has more information than the other party. Ekumah and Essel (2003) also describe asymmetric information as the instance where both parties to an undertaking are not privy to certain vital information. The kind of relationship that exists between a lender and borrower makes the concept of asymmetric information very important. For that reason, Mehrteab (2005) explained that the ability of a lender to get back both principal and interest depends on the borrowers' probability of repayment. The lender is placed in a very tight position due to the derisory and untimely information available. Akerlof (1970) could not agree less. He states that lenders are mostly at the disadvantage since borrowers know more about the use of the money they have received. Akerlof (1970) in his theory about 'lemons' posited that in a market of buyers and sellers, sellers know more about the differential qualities of their products and thus offer these products for sale to buyers. Since the buyers do not know about the difference in quality, they offer prices based on their perception on the average quality of the product. This is likely to discourage the sellers from putting on sale good quality products. In the end good products will be driven away by bad products. Likewise in the

credit market, lenders may not be adequately informed about the characteristics of borrowers and therefore will not have the luxury to distinguish between good and bad borrowers. The incidence of information asymmetry leads to the problem of adverse selection and moral hazard for CUs (Binks & Ennew, 1992).

### **2.3 The Theory of Adverse Selection**

The issue of adverse selection is based on the idea that borrowers have better information concerning their behavior or risks associated with the projects or investments they intend to undertake as compared to lenders. Stiglitz and Weiss (1981) sought to explain that increasing interest rate affects the quality of the loan portfolio. The authors theory on adverse selection rests on two postulations; that lenders cannot make a distinction between good and bad borrowers and borrowers only pay back loans if they have the means to so. This model assumes that riskier borrowers engage in riskier activities with lower likelihood of success but a greater return on investments whereas less risky borrowers engage in projects that are of low risk, have a higher success rate but yield low return on investment. For any type of project yielding the same return, the interest rate can be used to differentiate between risky and less risky projects. As the interest rate increases, the low return yielding project begins to experience negative returns. A borrower will only decide to borrow at a high interest rate only if he will gain higher returns (Gosh, Mookherjee & Ray, 2000). Good borrowers will drop out leaving the bad borrowers because they will not be able to pay for the high interest rate. Stiglitz and Weiss (1986) also postulated that a lender may decide to use collateral to segregate good borrowers from bad borrowers. High risk borrowers are less inclined to put up collateral since they may lose their collateral if their project fails.

Ghatak and Guinnane (1999), agree that in order for lending institutions to segregate bad borrowers from good borrowers, collateral should be required. They, however, suggest that requiring

collateral does not also result in the desired outcome. This is because with regards to lending to poor people, the requirement of collateral may not be the way to go since poor people do not usually have assets that make good collaterals. To deal with problem of adverse selection, Ghatak and Guinnane (1999) postulated that group lending with joint liability was the way forward. Thus group lending is able to take advantage of local information in order to attain direct information about borrowers. This means that people who belong to a particular group have better information about the use of funds by members in the group. Under a joint liability credit contract, a borrower must ensure that the loan is repaid whenever the borrower's project or investment yields a return. On the other hand, if the borrower's partner within the group is not able repay the loan, he or she will have to pay extra to make up for her partner's inability to repay the loan. Since the group's liability is jointly held, good borrowers would want to associate with other good borrowers who are always likely to repay their loan. This allows the lender to appraise borrowers by the company they keep.

Existing literature have supported the idea that lending to people who share common characteristics results in less loan repayment problems. According Gosh et al. (1999), the close binding relationship of the traditional societal groups such as mutual cooperatives give lenders the much needed information they need about their borrowers. Huppi and Feder (1990) further asserts that lenders who give out loans to self-selected groups that are formed by individuals who share a common bond such as place of residence tend to be more successful than others when it comes to loan repayment.

#### **2.4 The Theory of Moral Hazard**

Moral hazard in lending refers to the situation where lenders are not able to observe the actions of borrowers after having access to a loan (Armendáriz & Morduch, 2005). Moral hazard may also

arise when the privately taken actions of individuals affect the probability distribution of an outcome (Arrow, 1970). Increase in interest rate adversely affects the actions of borrowers, thus dipping their commitment to ensure that their loans are repaid. Once the borrower assesses the loan, the ability of repayment depends on the successful utilization of the loan by the borrower. However, it becomes difficult for the lender to continually assess or monitor the actions of the borrower (Stiglitz & Wiess, 1981).

Peer monitoring is seen as an antidote for mitigating moral hazard. According to Ghatak and Guinnane (1999), group members take keen interest in the manner in which other members use their funds because the group's liability is jointly held. Thus each member bears his or her own liability as well as other group members'. Incorporating the use of collateral in lending gives rise to moral hazard. Thus in an attempt to eliminate adverse selection, the unwanted effect of moral hazard is awakened. This is because the worth of the collateral guaranteed by the borrower is affected by the maintenance in the use of the asset (Igawa & kanatas, 1990). However, Chan and Thakor (1987) on the contrary suggest that moral hazard exists whether or not collateral is pledged by the borrower.

Padilla and Pagano (2000) analyzed the effect of information sharing on moral hazard. They found that if lending institutions are able to share information concerning bad borrowers, it can be an effective tool that can be used to mitigate moral hazard. This is because if borrowers know that information about them is shared among other lenders, they will consider that defaulting on their current lender will affect their credit rating with all other lenders. Thus the motivation to put up actions that will help them repay their loans will be stirred. Daimond (1991) also showed that the borrower's concern for good reputation helps to mitigate moral hazard. In his paper he posits that borrowers will want to put up good loan repayment behavior because they will not want to find it

difficult accessing future credit. Thus borrowers with bad reputation gain credit at a higher cost as compared to borrowers with good reputation.

According to Boltyenkov (2015), moral hazard in lending is experienced in two phases; ex ante moral hazard and ex post moral hazard. The former occurs once the loan is given out to the borrower. This has more to do with the effort the borrower puts into his project or investment in order to repay the loan. When a borrower gets access to a loan without collateral or with a collateral that is more valued to the lender than the borrower, the borrower is likely to engage in a risky investment or project that has high returns but a lower probability of success.

Ex post moral hazard on the other hand occurs once returns on investment or projects have been realized. The borrower may decide whether or not to inform the lender about the realized return. In the event where the borrower makes less return than the money borrowed and the value of the collateral is not enough to cover the difference between the actual borrowed funds and the return, the borrower may decide to default. However, where the return is positive, the borrower may decide not to repay the loan if the value of the collateral is less than the loan to be repaid.

## **2.5 Development of Credit Unions in Ghana**

The first Credit union was established in September 1955, at Jirapa in the North–West now the Upper West Region of Ghana. The idea was presented by an Irish Canadian priest known as Rev. Father John McNulty (Adusei, 2013). The Credit unions were initially promoted by missionaries. The concept of credit unions was later adopted by teachers and trade unionists who took it upon themselves to spread it to other societies and work places in the southern parts of Ghana. As the CUs expanded from the north towards the south, the membership structure changed from parish members to wage earners. These credit unions were divided into community, parish and workplace

constituting 32%, 6.6% and 60% respectively (Kirsch & Goricke, 1977). Statistics available from WOCCU report (2014), indicates that the number of credit unions as well as membership have been on the rise. Total number of credit unions in Ghana as at 2001 was 232 with a membership of 96,052.

**Table 1** Credit Union growth and membership

<b>Year</b>	<b>Credit Unions</b>	<b>Membership</b>	<b>Average Membership of per Credit Union</b>
2001	232	96,052	414
2002	240	114,187	475
2003	246	133,923	544
2004	261	164,863	631
2005	260	174,026	669
2006	275	202,390	735
2007	318	229,952	723
2008	326	253,863	778
2009	409	281,447	688
2010	422	314,963	746
2011	422	314,963	746
2012	446	437,520	980
2013	450	479,890	1066
2014	476	571,479	1200

Source: WOCCU statistical report (2001-2014)

Credit unions in Ghana were faced with lots of challenges and thus struggled to meet the challenges in the Ghanaian economy. In 1995, the African Revitalization Program (APR) was initiated by WOCCU in partnership with the African Confederation of Cooperative Savings and Credit Association (ACCOSCA). As part of the eight countries that participated in the program, Ghanaian credit unions were strengthened to become competitive, financially independent and economically viable. This involved a conversion from the traditional model of credit unions to a more economically independent credit union (Morton, 1997).

The traditional credit union model encouraged borrowing rather than savings. As a result members who saved subsidized those who borrowed. A member was allowed to redeem his or her shares only if the membership was terminated and the amount of loan a member was entitled was dependent on the number of shares the member had. This resulted in the shortage of loanable funds (Richardson, Lenon & Branch, 1993).

On the other hand, the new model reduced the dependence on member shares and deposits. Some of the changes that resulted from the new model were as follows (Richardson *et al.*, 1993);

- I. Cost-effective pricing for savings and loans
- II. Rigorous mobilization of savings
- III. Maintenance of tolerable liquidity to satisfy unforeseen withdrawals of savings
- IV. Use of new lending principles centered around capacity-to-pay analyses, credit history and collateral
- V. Establishment of loan loss reserves in relation to delinquency.
- VI. Lessening of nonproductive assets.

In order for the new credit model to achieve its intended objective, credit unions had to adopt financial management policies such as capital accumulation, loan delinquency control, loan loss provision and liquidity management (WOCCU & ACCOSCA, 1995).

## **2.6 Credit Risk Management in Credit Unions**

Fiedler (1971) defined credit risk as the possibility that a loan will not be paid back in accordance to the terms agreed by the lender and borrower. Fatemi and Fooladi (2006) on the other hand describe credit risk as the uncertainty surrounding a borrower's ability to pay back loans. The performance of every credit union depends on the quality of their loan portfolio (Fiorillo, 2006).

The main source of funds for credit unions is from the savings deposits made by the members and it is from this same source that loans are given out to borrowers (Cheruiyot *et al.*, 2012). The ability of credit unions to effectively ensure that loans are repaid without delay is paramount to its survival. A credit union's sustainability and development depends largely on loan recovery. It is therefore essential that credit unions put into place policies and procedures that will be implemented constantly and with consistency in order to enhance loan repayment (Lagat *et al.*, 2013).

Ralston and Wright (2003) posited that one of the important ways that credit unions can effectively address the credit risk they are exposed to is to implement effective lending practices. Credit unions must first ensure that credit appraisal techniques are spot on in such a way that adequate information about the risk associated with the loan applicant will be obtained. Credit unions should also be flexible enough to vary loan terms in order to accommodate the risk that each loan applicant bears. They also have to implement timely loan recovery procedures in order to ensure that loans in arrears are paid in the shortest possible time so as to safeguard the replenishment of the pool of funds from which other members may benefit.

### **2.6.1 Loan Underwriting Procedures of Credit Unions in Ghana**

The loan committee is the main body responsible for the approval or disapproval of loans in a credit union. Habib and Ibrahim (2014) suggested that the loan committee is to ensure that the credit granting process achieves three major objectives:

- I. Loans given out should be distributed equitably and fairly considering the capacity and capabilities of prospective members.
- II. Liquidity and reserve ratios are to be maintained at all times

- III. The incidence of loan delinquency should be reduced to the barest minimum.

The process of underwriting a loan in credit unions requires that;

- I. Loan applications should first be in writing before being transferred unto a prescribe form.
- II. The loans committee is to ensure that the prospective borrower signs the filled form before the loan is disbursed.
- III. The loans disbursed are to be insured as part of the Ghana Credit Union (CUA) risk management mitigation strategy. The loans are insured against injury or death of the borrower.
- IV. It is highly advised that the loan committee counsels prospective borrowers before loans are disbursed
- V. A member only qualifies for a loan after six months of uninterrupted membership
- VI. Loans that are given out should be backed by a security or collateral. This includes savings or shares of the borrower or guarantor who must be a member of the cooperative. Landed property or standing orders may also be used in the case of salaried workers.
- VII. Credit appraisal for prospective loan beneficiaries should comprise capacity to repay, character, collateral and credit worthiness.

### **2.6.2 Credit Appraisal in Credit Unions**

Credit appraisal is an important aspect of lending in credit unions. It is the procedure by which a lender assesses the creditworthiness of a prospective borrower. This involves evaluating the borrower's credit history and sustainability and quality of income (Chepkorir *et al.*, 2014). Akila and Padmavathy (2014) also define credit appraisal as a holistic exercise that starts from when a prospective borrower applies for a loan, delivery of the loan to the borrower and monitoring with

the objective of ensuring that the borrower pays back within the stipulated time. Since credit unions are involved in the business of giving out credit, it is vital that credit unions place more emphasis on appraising a prospective borrower in order to have an idea of the repayment capability of the borrower.

Credit unions in Ghana are governed by by-laws. Section 55 of the by-laws gives the loans committee the power to approve or disapprove a loan application. This means credit appraisal is handled by the loans committee with the help of the loans officer. Extant literature posits that credit unions rely on subjective judgments in assessing prospective borrowers. The principles regarding whether or not to extend a loan facility to a borrower in credit unions comprise character, purpose of loan, capacity to repay and collateral (Shanmugam, Turton & Hempel 1992).

**Capacity** refers to the ability of the borrower to pay back both principal and interest within the stipulated time. The borrower's income generating ability is mostly considered because it is from that same source the loan will be serviced (Frank, Mbabazizie & Shukla, 2015).

**Character** is considered in light of moral hazard and adverse selection. It seeks to determine the character of the borrower that makes him a good or bad risk (Turvey, He, Kong, Ma & Meagher, 2011). Credit unions are to verify the loan applicant's integrity and honesty as well as past loan experiences with other lenders (Frank *et al.*, 2015).

**Collateral** refers to the value of sellable assets that a borrower pledges against a loan (Turvey *et al.*, 2011). With respect to credit unions where majority of borrowers may not have valuable assets to pledge against loans, prospective borrowers are required to pledge a proportion of their savings as collateral or a third party who is a member of the credit union could also guarantee the loan with his or her savings (Frank *et al.*, 2015).

The **purpose** or destination of the loan is very important. Loans that are invested in wealth creation have a higher probability of payment as compared to loans that are taking for personal use (Baklouti, 2013).

## **2.7 Loan Delinquency**

CGAP (1999) defines loan delinquency as the delayed payment of a loan according to scheduled time. WOCCU defines a delinquent loan as loan in which payments of interest and principal are not made a day after the first missed payment. The entire outstanding loan balance is therefore considered past due. The issue of loan delinquency is one that cannot be taken lightly. Measuring it helps predict the level of loss of a loan portfolio since loans are not getting repaid (Addae-Korankye, 2014). Loan delinquency has three broad indicators; collection rates, arrears rates and portfolio-at-risk rates. Collection rates constitute the amounts that have been paid as against amounts that are past due, arrears rates measures amounts that are overdue as against the total amount and portfolio-at-risk measures outstanding balance of loans that are not being paid on time as against total outstanding balance of loans (CGAP, 1999).

### **2.7.1 Impact of Delinquent Loans on Credit Unions**

Delinquent loans are seen as one key reason for the collapse of institutions involved in the provision of credit. To ensure the sustainability of credit institutions, effort should be made to achieve minimum delinquency to ensure healthy loan portfolio (Mensah, 2013). High rate of delinquency affects the operations of the credit unions. These include the capital of the credit union, image and liquidity (WOCCU, 2008).

Loan delinquency in credit unions can lower the liquidity of the cooperative. As a result members may not be able to enjoy the services they are supposed to enjoy. When the liquidity of the credit

union is affected, the corporative may be forced to ration credit among members. This is because the loans being given out are not being replenished fast enough to serve other members. Members may therefore receive amounts lesser than what they require or loans requested by members may delay since there may not be enough loanable funds in the coffers of the credit union. The failure of credit unions to recover both principal and interest at scheduled times often results in the slow capital buildup of the credit union. This is mainly as a result of lower profitability which results in the credit union's waning ability to finance operational cost such as salaries, rent among others. When credit unions find it difficult to minimize loan delinquency it affects the image of the cooperative thus inviting negative reactions from the members. Members may find it unwise to continue saving since they fear their savings will be lost. Minimizing delinquent loans will help sustain the confidence of the members.

## **2.8 Empirical Literature**

The copious number of studies on the factors influencing loan delinquency is suggestive of its popularity in the intellectual community. The study by Antwi, Mills, Mills and Zhao (2012) sought to determine the factors that influence loan default in the Akuapem Rural Bank in Ghana. Using data collected over a period between 2006 and 2010, they found that security and type of loan significantly influenced loan default whereas sex, marital status, age, educational level and town were not significant. The findings of the study was in contrast to that of Salazar (2008) who found marital status, education and gender as factors that significantly influences loan delinquency. Addae-Korankye (2014) also found that the major causes of loan delinquency in microfinance institutions in Ghana are high interest rate, lack of monitoring, inadequate loan sizes and poor client appraisal. The study was in support of earlier studies done by Ahmad (1997) and Balogun

and Alimi (1988) who found that delay in loan disbursement, high interest rate and poor client appraisal significantly influenced loan delinquency in microfinance companies.

Asantey and Tengey (2014) analyzed the determinants of bad loans in financing small medium scale enterprises in commercial banks in Ghana. The study revealed that years of experience in business, educational level, business size and the type of products or service are the most significant drivers of bad loans.

Agbemava, Nyarko, Addae and Badiako (2016) examined the factors that influence the risk of default in microfinance companies in Ghana. They found that marital status, number of dependents, loan type, collateral and loan repayment duration significantly affects the probability of loan default.

Baklouti (2013) did a study on determinants of loan repayment in the Tunisian Microfinance bank. Using a logistic regression, he found that being female and married is likely to increase a borrower's loan repayment probability. The study also suggested that repayment rate increases with borrower's who are younger and older as compared to middle aged borrowers. Borrowers with low educational levels such as vocational training are less likely to exhibit loan repayment problems as compared to borrowers with high formal education. The study explained that borrowers with low educational levels may not have alternate sources of credit and therefore value loans more highly as compared to borrowers with higher formal education who may have alternate sources of credit.

Besides, Reinke (1998) using a probit model found that in South Africa, microfinance institutions' repayment performance is highly influenced by gender. Thus women are less likely to default in their loan repayment as compared to men. This suggests that average repayment will improve if

more women are involved in credit programs, reiterating the position by Baklouti (2013). Also as suggested by Baklouti (2013), Reinke (1998) found that borrowers with high formal education are likely loan defaulters as compared to borrowers with lower levels of education. The study also found that borrowers who stay longer in the credit program are less likely to default in their loan repayment.

Salazar (2008) also examined the determinants of loan repayment among microfinance institutions in the Dominican Republic. Using a linear probability model (LPM), Salazar (2008) found that the proximity of the loan office had the greatest influence on loan repayment. Other variables that also significantly affected loan default were education, gender and marital status.

Roslan and Karim (2009) conducted a study in Malaysia to investigate the determinants of micro credit repayment by commercial banks on a non-group lending basis. The study suggested that loan default is less likely among female borrowers as compared to their male counterparts. The study also proposed that the nature of business also influences the loan payment probability of borrowers. Borrowers who are engaged in the provision of services were less likely to default as compared to those involved in production.

Furthermore, Oke, Adeyemo and Abgonlahor (2007) conducted a study on the determinants of microcredit repayment of microfinance institutions in South Western Nigeria. The study established that remoteness between place of residence and bank, penalty for lateness to group meetings, number of days between loan application and payout, poverty indicator, income, socio-cultural expenses, amount of credit and access to business information significantly influenced loan repayment. The first four variables had negative coefficients whereas the remaining variables exhibited positive signs.

Chaudhary and Ishafq (2003) using 224 rural borrowers in their study in Pakistan showed that borrowers with higher educational levels were less likely to default in their loan repayment. This study however contradicts studies by Baklouti (2013) and Reinke (1998) who found that borrowers with higher levels of education were more likely to be delinquent in loan repayment as compared to borrowers with lower levels of education. Other variables that were significant in the loan repayment probability of rural borrowers in Pakistan were female, non-farm business activities and loans put into investment. However, subsidized interest rate was found to have an insignificant effect on loan repayment probability of rural borrowers in Pakistan.

The study by Idama and Asongo (2014) was conducted to examine the determinants of loan delinquency in Nigerian microfinance banks. Using a sample of one hundred and sixty-nine loan beneficiaries and twenty bank staff, it was found out that the cause of loan delinquency included staff turnover and client drop out, non-supervision of borrowers on the use of funds, multiple borrowing by members, failure to remind borrowers about their repayment, lack of job experience by staff and lack of penalty for defaulters.

Again, Duy (2013) conducted a study in Vietnam to determine the repayment performance of farmers and non-farmers who borrow money from formal banks. The study established that repayment performance is positively affected by loan amount, borrowers as farmers, and gender of borrowers.

Kohansal and Mansoori (2009) investigated factors influencing loan default of borrowers who received credit from the Agricultural Bank of the Khorasan-Razavi province in Iran. Using a logit model and a sample of 175 borrowers, the empirical results showed that interest on loans, farming experience and total loan application fees significantly influenced repayment performance.

Bhatt and Tang (2002) examined loan repayment performance in four microcredit programs in United States of America Microenterprise program. The study revealed that education and proximity to lending program, lower transaction cost and penal sanction for default positively increased the likelihood of loan repayment.

Joseph, Edson, Manuere, Clifford, Michael and Kamoyo (2012) analyzed the causes of loan default in commercial banks in Zimbabwe. The study found that nonperforming loans of commercial banks in Zimbabwe were caused by internal and external factors. Internal factors such as poor credit appraisal, poor credit monitoring and insider loans had limited influence on loan default. However, external factors such as natural disaster, government policy and borrower integrity significantly influenced the loan repayment performance of borrowers.

Moreover, Magali (2013) assessed factors that affect loan default in Savings and Credit Cooperative Societies (SACCOS) in Tanzania. Using quantitative, descriptive and multivariate regression analysis and a sample of 431 borrowers, the study revealed that years of schooling and loan amount influenced positively on loan default. However, factors such as marital status, loan activity, interest rate, repayment period and collateral had no significant effect on loan default.

Bichanga and Aseyo (2013) conducted a research to examine the causes of loan default in the Trans Nzoia county of Kenya. Using a sample of 150 from 200 microfinance institutions, they found that the major cause of loan default was a result of no supervision of borrowers and inadequate training on the utilization of funds by borrowers. Their findings corroborate the studies done by Idama and Asongo (2014) and Addae-Korankye (2014) who also found no supervision of borrowers and inadequate training on the utilization of funds by borrowers as a major cause of loan default.

The empirical literature on loan delinquency, especially Ghana, have mostly focused on lending institutions such as commercial banks, microfinance companies, rural banks among others. It is important to note that literature on credit unions in Ghana is sparse. However the few studies done have focused on other dimensions of the credit union industry other than issues concerning loan default. Adusei and Appiah (2011a) examined the determinants of group lending among credit unions in Ghana. The results of the study showed that the gender structure of credit unions in Ghana does not affect their group lending decision. The decision to embark on group lending is dependent on the existence of a large management, absence of delinquent loans over 30 days, low repayment performance, better liquidity position and how long the credit union has been in business. Aboagye (2009) also undertook a study to examine the historical performance of MFIs in Ghana. The results of the study showed that rural banks and Credit Unions have a good potential for survival. However, CUs were in a better position to survive for a longer time. Mbroh and Anowie (2015) analyzed the role of CUs in financing micro business in Ghana. The findings reveal that being a member of a credit union impedes capital formation and financial growth. This is because as at 2015, CUs were contributing only 25% of their operational funds in the financing of micro businesses. On the other hand, micro businesses enjoyed over 50% start up financial support from CUs. As a result, members were able to establish their own business three years after joining their respective credit unions. Members, however, lacked other financial services such as pre loan counseling and financial management skills. Adusei (2013) examined the determinants of credit union savings in Ghana. The study established that savings in credit unions were determined by credit risk, size of the credit union and female membership.

In spite of the negative effect of loan delinquency to the survival and operations of CUs, to the best knowledge of the author, little work has been done on the determinants of loan delinquency

of CUs in Ghana. A study by Adusei and Appiah (2011b) examined loan default of CUs in Ghana, The study, however, concentrated only on the gender side of lending without regard to other factors that influence loan default. This current study therefore builds on the earlier research by Adusei and Appiah (2011b) by examining how borrower characteristics and loan characteristics affect loan delinquency and the extent of loan delinquency



## CHAPTER THREE

### METHODOLOGY

#### **3 Introduction**

This chapter presents the methodology for the study. It outlines the source of data, the variables used and presents the econometric model and estimation strategy used for the study.

#### **3.1 Research Design**

The study employed an exploratory and quantitative approach. An exploratory study helped to explain the reason for an already existing observable fact (Cooper, 2001) and also helped to find the underlying relationship between variables (Grover, 2003).

#### **3.2 Target Population and Sampling Technique**

The population for the study comprised 85 CUs under the Accra Chapter of the Credit Union Association of Ghana. Credit unions were placed into either community based or association based credit unions. Occupational credit unions were exempted from the study. This is because such credit unions seldom experience delinquency (Frame *et al.*, 2002). Unlike occupational credit unions, members of association and community based credit unions have to voluntarily make efforts to repay their loans. Credit unions in Ghana adopt the single common bond structure. Therefore the loan beneficiaries used in this study are all from single common bond credit unions.

Simple random sampling was then applied to these subgroups to obtain a total of fifteen (15) credit unions from each strata. Ten (10) loan beneficiaries from each of the CUs were also randomly selected, implying that (300) loan beneficiaries were used for the study. The sampling frame included all borrowers who had completed at least one loan term

### 3.3 Data Collection

The study made use of primary data. Structured questionnaires and interviews were used to find out borrowers' socio demographic characteristics, loan characteristics and repayment performance of borrowers. The questionnaires were pre tested to check for consistency and clarity.

### 3.4 Model

The study makes use of the independent double hurdle model. The choice of this model is due to the fact that the choice to be delinquent and the extent of delinquency are two independent decisions. Two different latent variables are used to model each decision stage. In addition, different set of explanatory variables may influence each of the two independent decisions. However, in situations where the explanatory variables are found in both equations, they may differently influence the two dependent variables (Moffatt, 2005). The double hurdle model propounded by Cragg (1971) contains two equations. The first equation (first hurdle) determines the probability of a loan beneficiary being delinquent and the second equation (second hurdle) determines the extent of delinquency given that the borrower is delinquent. This will be measured in terms of the number of days the loan is in arrears. The first hurdle is analyzed using the probit model because it contains borrowers who are delinquent and borrowers who are not delinquent. The second hurdle is analyzed using a truncated normal model. It is truncated because it makes use of observations that are able to cross the first hurdle i.e. those who are delinquent. The error terms of the two equations are assumed to be independent of each other. This means that the unobserved factors that cause a borrower to be potentially delinquent are uncorrelated to the unobserved factors that affect the extent of delinquency given that a borrower is delinquent.  $\varepsilon_i \sim N(0, 1)$  and  $\mu_i \sim N(0, \sigma_I)$

### 3.4.1 First Hurdle or Probit Model Specification

The Probit model is used to analyze an econometric model that has a dummy dependent variable. If the observed dummy variable,  $Y$ , represents whether or not a borrower will be delinquent, then  $Y^*$  will define a borrower's propensity to be delinquent. A borrower's propensity to be delinquent can be therefore be defined as  $y^* > 0$ . However, the issue that arises is that the propensity to be delinquent cannot be observed, rather whether or not a borrower is delinquent is what is actually observed (Akotey, Gemegah & Osei, 2011).

The dummy variable  $Y$  can be defined as follows:

$$Y_i = \begin{cases} 1 & \text{if a borrower } i \text{ is delinquent} \\ 0 & \text{otherwise} \end{cases} \dots\dots\dots 3.1$$

Thus  $Y_i$  is equal to one (1) if a borrower is delinquent and 0 otherwise. This means the probability that a borrower is delinquent is simply the probability that a borrower's propensity to be delinquent is greater than zero ( $y^* > 0$ ):

$$\text{Prob}(Y_i = 1) = \text{Prob}(y_i^* > 0) \dots\dots\dots 3.2$$

$Y_i$  can therefore be generated as follows:

$$Y_i = \begin{cases} 1 & \text{if } y_i^* > 0 \\ 0 & \text{otherwise} \end{cases} \dots\dots\dots 3.3$$

$y^*$  (*delinquency\**) is known as the latent variable choice that denotes binary censoring. It is so called because it is unobserved unlike  $Y_i$  (delinquency) which is actually observed (Akotey *et al.*, 2011).

The latent variable  $y_i^*$  is defined by

$$y_i^* = z_i\alpha + \varepsilon_i \dots\dots\dots 3.4$$

Where  $y_i^*$  is the latent variable representing a loan beneficiary's propensity to be delinquent in the payment of a loan,  $z_i$  are explanatory variables that influence a loan beneficiary's propensity to be delinquent,  $\alpha$  represents the coefficients of the independent variables and  $\varepsilon_i$  is the error term distributed with a standard normal distribution.

The probit model takes the form:

$$\Pr(Y=1|Z) = \Phi (Z^T\beta) \dots\dots\dots 3.5$$

Where Pr is the probability, and  $\Phi$  is the cumulative Distribution Function (CDF) of the standard normal distribution, Z is the explanatory variable and  $\beta$  are the parameters which are estimated by maximum likelihood.

The empirical model used to estimate a borrower's propensity to be delinquent is given by:

$$\Pr(Y=1|Z) = \Phi ( \beta_0 + \beta_1 Age_i + \beta_2 Age_i^2 + \beta_3 Gender_i + \beta_4 Martstus_i + \beta_5 Edu_i + \beta_6 PURCRDT_i + \beta_7 LOGCR_i + \beta_8 REPPER_i + \beta_9 NOPL_i + \beta_{10} NOSC_i + \beta_{11} Numdpn_i + \beta_{12} Guarantor_i ) \dots\dots\dots 3.6$$

Y = delinquency status of the borrower (delinquent = 1, otherwise = 0)

*Age* = age of borrower

*Age Squared* = age squared of borrower

*Gender* = gender of borrower (male =1, female = 0)

*Martstus* = marital status (married = 1, single = 0)

*Edu* = educational level of borrower (Illiterate, JHS, SHS, tertiary)

(JHS = 1, otherwise = 0)

(Illiterate = 1, otherwise = 0)

(SHS = 1, otherwise = 0)

*Guarantor* = security required by the credit union (Guarantor = 1, otherwise = 0)

*LOGCR* = credit amount in Ghana cedis

*PURCRDT* = purpose of credit (business = 1, personal use = 0)

*NOPL* = number of previous loans

*REPPER* = Repayment period (months)

*NOSC* = other sources of credit

*Numdpr* = number of dependents of borrower

### 3.4.2 The Second Hurdle

The second hurdle involves the outcome equation which makes use of the truncated normal model to determine the factors that affect the extent of delinquency (the number of days a loan is in arrears). At this stage the model uses observations that reported a positive or greater than zero number of days of loans in arrears. According to Moffatt (2005), the truncated normal regression may be used in situations where the extent of default variable is observed exactly but not in situations where the dependent variable is observed in interval form. For example in this current

study, the dependent variable ‘Number of days in arrears’ is observed in a 30 day interval (1–30 days; 31- 60 days; 61- 90 days; 91- 120 days; 121-150 days; 151- 180 days). Stewart (1983) as cited by Moffatt (2005) posits that interval normal regression model should be used to deal with data of this kind.

$$y_i = x_i\beta + \mu_i \dots\dots\dots 3.7$$

Where  $y_i$  the number of days a loan is in arrears for loan beneficiary  $i$ ,  $x_i$  is the set of explanatory variables for loan beneficiary  $i$ ,  $\beta$  is the coefficient of the explanatory variables and  $\mu_i$  is the error term.

The empirical model used to estimate the second hurdle equation is given by;

$$y = \beta_0 + \beta_1 Age_i + \beta_2 Age_i^2 + \beta_3 Gender_i + \beta_4 Martstus_i + \beta_5 Edu_i + \beta_6 PURCRDT_i + \beta_7 LOGCR_i + \beta_8 REPPER_i + \beta_9 NOPL_i + \beta_{10} OSC_i + \beta_{11} Numdpn_i + \beta_{13} Guarantor_i + \mu_i \dots\dots 3.8$$

$y$  = Extent of delinquency (Number of days a loan is in arrears)

$Age$  = age of borrower

$Gender$  = gender of borrower (male =1, female = 0)

$Martstus$  = marital status (married = 1, single = 0)

$Edu$  = educational level of borrower (Illiterate, JHS, SHS, tertiary)

(Illiterate=1, otherwise = 0)

(JHS = 1, otherwise = 0)

(SHS = 1, otherwise = 0)

*Guarantor* = security required by the credit union (Guarantor= 1, otherwise = 0)

*LOGCR*= credit amount in Ghana cedis

*PURCRDT* = purpose of credit (business = 1, personal use = 0)

*NOPL*= number of previous loans

*REPPER* = repayment period (months)

*NOSC*= Number of other sources of credit

*Numd<sub>pn</sub>* = number of dependents of borrower

The log likelihood function of the independent double hurdle model for interval data is given by

$$LL = \sum_0 \ln \left[ 1 - \phi \left( z_i \alpha \right) \Phi \left[ \frac{x_i \beta}{\sigma_i} \right] \right] + \sum_+ \ln \left[ \phi \left( z_i \alpha \right) \sum_{j=1}^J I \left( y_i \in I_j \right) \Phi \left[ \left[ \frac{b_{j-x_i \beta}}{\sigma_i} \right] - \Phi \left[ \frac{a_{j-x_i \beta}}{\sigma_i} \right] \right] \right] \quad \dots\dots 3.9$$

The ‘0’ indicates summation over zero observations and ‘+’ indicates summation over positive observations. The  $\phi$  denotes the standard normal distribution function and  $\Phi$  denotes the standard normal density function.  $I(\cdot)$  is the indicator function which takes the value of one if the statement in parenthesis is true or zero otherwise. Let  $I_j = [a_j, b_j]$  be the  $j$ th interval,  $j = 1, \dots, J$ . The first term represents the probit model whereas the second term of the log likelihood function represents the interval regression model (Moffatt, 2005).

### 3.4.3 List of Independent Variables Used in the Study

#### **Borrower Characteristics**

**Age:** This is a discrete variable which represents the borrowers age in years. Baklouti (2013) suggests that older borrowers are considered to be more matured and thus are able to handle their finances properly as compared to younger borrowers. On the other hand, older aged borrowers may have more responsibilities on their hands and this may cause them to experience loan repayment problems. Hence the contribution of age to loan delinquency cannot be predetermined (Reinke, 1998).

**Education:** This is a dummy variable taking the value of 1 if the borrower is an illiterate, Junior High School (JHS), Senior High School (SHS) or Vocational Training (VOC) and 0 if the borrower has attained tertiary education. Borrowers with higher levels of education are expected to be able to understand complex information, keep good records and also make right business decisions. Hence such borrowers are expected to experience good loan repayment (Bhatt & Tang, 2002). Other studies, however, suggest that borrowers with no formal education or lower levels of education are less likely to be delinquents since they have fewer financial options and for that reason they value their loans highly (Salazer, 2008).

**Gender:** This is also a dummy variable which takes a value of 1 for a male borrower and 0 for female borrowers. Females are expected to be less likely delinquents as compared to their male counterparts. This might be because women naturally enjoy hard work and they are less inclined to take on risky businesses (Bhatt & Tang, 2002).

**Number of Other Sources of Credit (NOSC):** This is a discrete variable that indicates the number of other credit sources available to the borrower. It is expected that if a borrower has

more credit sources to his disposal, he or she is less likely to be delinquent in the payment of loans since he or she can fall on other lenders. Therefore a positive sign is expected. On the other hand, borrowers with multiple sources of credit may feel careless to repay their loans if they decide to borrow from another source.

**Number of Dependents (NUMDPN):** It is a discrete variable and it is assumed that having a high number of dependents causes borrowers to be delinquents. This may be attributed to the fact monies meant for the payment of the loan may be diverted to other purposes because of many responsibilities that must be met.

**Marital Status (MRTSTUS):** This is a dummy variable which takes the value of 1 for married and 0 for single. It is expected that borrowers who are married are more likely to be delinquent as compared to borrowers who are single. The reason is that married borrowers are likely to have more responsibilities on their hands and in turn they may experience financial pressure which may hinder their ability to pay back the loan (Dinh & Kleimeier, 2007).

**Number of Previous Loans (NOPL):** This is a discrete variable which measures the number of loans a borrower has taken from the credit union. This variable is expected to impact negatively on loan delinquency. Kcenda and Vojtek (2009) believe that the longer the history between the borrower and the lender, the less likely will there be default.

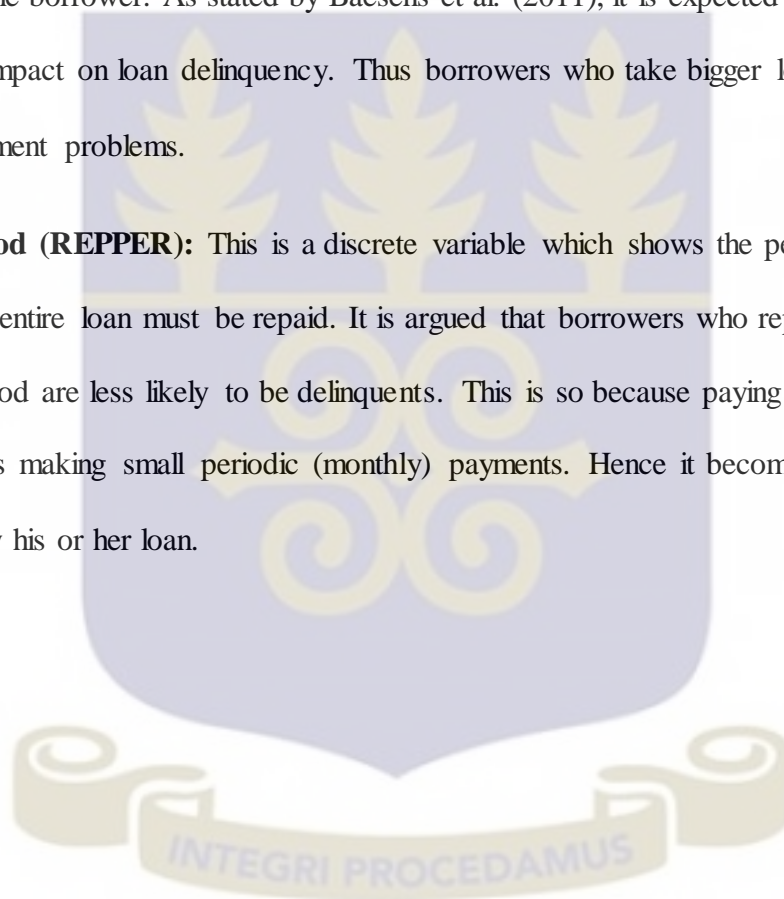
### **Loan Characteristics**

**Purpose of credit (PURCRDT):** This is a dummy variable which takes the value of 1 if credit is taken for business purposes and 0 if credit is taken for personal use. It is expected that borrowers who take loans for business purposes will experience better loan repayments than borrowers who take loans for personal use (Bhatt and Tang, 2002).

**Guarantor:** This is a dummy variable with the value of 1 representing borrowers who present guarantors and 0 for borrowers who do not present guarantors. It is expected that having a guarantor will impact negatively on loan delinquency whereas not having a guarantor impacts positively on loan delinquency.

**Credit Amount (LOGCR):** The credit amount is a discrete variable that show the amount of money given to the borrower. As stated by Baesens et al. (2011), it is expected that loan size will have a negative impact on loan delinquency. Thus borrowers who take bigger loans are likely to experience repayment problems.

**Repayment Period (REPPER):** This is a discrete variable which shows the period of time during which the entire loan must be repaid. It is argued that borrowers who repay their loans over a longer period are less likely to be delinquents. This is so because paying a loan over a long period means making small periodic (monthly) payments. Hence it becomes easier for the borrower to repay his or her loan.



### 3.4.4 Predictor Variables for the First Hurdle

Table 3.1 Summary of Predictor Variables in First Hurdle

VARIABLE NAME	VARIABLE TYPE	EXPECTED SIGN
<b>BORROWER CHARACTERISTICS</b>		
Age	Discrete	+/-
Gender	Dummy	-
Education	Dummy	+/-
Marital status	Dummy	+
Number of dependents	Discrete	+
Number of previous loans	Discrete	-
Number of other sources of credit	Discrete	+/-
<b>LOAN CHARACTERISTICS</b>		
Purpose of credit	Dummy	-
Credit amount	Discrete	+
Guarantor	Dummy	-
Repayment period	Discrete	-

### 3.4.5 Predictor Variables for the Second Hurdle

Table 3.2 Summary of Predictor Variables in Second Hurdle

VARIABLE NAME	VARIABLE TYPE	EXPECTED SIGN
<b>BORROWER CHARACTERISTICS</b>		
Age	Discrete	+/-
Gender	Dummy	+/-
Education	Dummy	+/-
Marital status	Dummy	+/-
Number of dependents	Discrete	+/-
Number of previous loans	Discrete	+/-
Number of other sources of credit	Discrete	+/-
<b>LOAN CHARACTERISTICS</b>		
Purpose of credit	Dummy	+/-
Credit amount	Discrete	+/-
Guarantor	Dummy	+/-
Repayment period	Discrete	+/-

## CHAPTER FOUR

## PRESENTATION OF DATA AND ANALYSIS

**4 Introduction**

This chapter presents the findings of the study, analysis of data and interpretations of data in relation to the study. These findings are presented in the form of tables, frequencies and percentages where applicable.

**4.1 Descriptive Statistics****4.1.1 Borrower Characteristics****Table 4.1** Marital Status of respondents

	FREQUENCY	PERCENT	Y=1(%)
MARRIED = 1	183	60.66	43.16
SINGLE = 0	117	39	38.46
TOTAL	300	100	

Source: field survey 2016

Table 4.1 show that 60.66% of the respondents are married whereas 39% are single. The results indicate that majority of the borrowers are married and thus they are likely to have larger family sizes which will cause them to spend more. From the results, married borrowers recorded a delinquency rate of 43.16% as compared to single borrowers who recorded a delinquency rate of 38.46%. This may be due to the fact that married borrowers have more responsibilities, hence their high delinquency rate

**Table 4.2** Age of Respondents

	FREQUENCY	PERCENT	Y=1 (%)
21 – 40	131	43.66	41.22
41 – 60	155	51.66	38.70
61 – 65	14	4.66	28.57
TOTAL	300	100	

Source: field survey 2016

For analytical purposes, the age variable was categorized into age groups. The results show that the youngest respondent was aged 21 whereas the oldest respondent was 65 years. Majority (51.66%) of the sampled respondents are aged from 41 to 60 years. 43.66% range from 21 to 40 years and only 4.66% are above 60 years. Borrowers between the age group of 21 to 40 recorded the highest delinquency rate of 41.22% as compared to borrowers in other categories. This is because borrowers who fall within this age group tend to be young and thus are less experienced in managing their finances. The results also indicate that people from all age groups are able to access loans from credit unions.

**Table 4.3** Gender of Respondents

	FREQUENCY	PERCENT	Y=1 (%)
FEMALE = 1	128	42.66	35.15
MALE = 0	172	57.33	45.93
TOTAL	300	100	

Source: field survey 2016

Table 4.3 shows the percentage distribution of male and female respondents. The results show that 57% of the sampled credit union borrowers were males whereas 42.66% were females. This highlights the fact that women are less inclined in taking credit facilities as compared to men. It is

however evident from the table above that 45% of males were delinquent in their loan repayment while only 31.71% of females were delinquent

**Table 4.4** Educational Level of Respondents

	FREQUENCY	PERCENT	Y=1 (%)
ILLITERATE	25	8.33	72
JHS	123	41	44.71
SHS / VOC	93	31	38.70
TERTIARY	59	19.66	25.42
TOTAL	300	100	

Source: field survey 2016

The results show that the highest educational level of majority (41%) of the sampled borrowers is the Junior High school level (JHS). There are some borrowers who never had access to formal education. This group of borrowers constituted 8.33%. Such borrowers are likely to have inadequate knowledge about loan procurement and management as compared to borrowers who had some form of formal education. Borrowers whose educational attainment is SHS/ VOC and tertiary constituted 31% and 20% respectively. The highest delinquency rate was recorded by borrowers who had no formal education. This could be because they lacked basic skills to effectively manage their finances. The results also show that people with various levels of educational attainment borrow money from Credit Unions

**Table 4.5** Respondents' Number of Dependents

	FREQUENCY	PERCENT	Y=1 (%)
0 – 2 dependents	45	15	15
3 – 5 dependents	86	28.6	40.69
6 – 10 dependents	169	56.3	45.56
TOTAL	300	100	

Source: Source: field survey 2016

For analytical purposes, the numbers of dependents indicated by the respondents were categorized into groups. The results show that 15% of the sample borrowers have dependents ranging from zero to two whereas 56.3% and 28.6% have dependents ranging from three to five and six to ten respectively. The results show that a greater percentage of the borrowers have between six to ten dependents and thus raises their total expenditure which consequently affects their loan repayment negatively. This is evident from the fact that 45.56% of respondents whose dependents ranged from six to ten were delinquent as compared to borrowers who had dependents ranging between zero to two and three to five.

**Table 4.6** Purpose of Credit Indicated by Respondents

	FREQUENCY	PERCENT IN SAMPLE	Y=1 (%)
BUSINESS =1	186	62	29.03
PERSONAL USE = 0	114	38	61.40
TOTAL	300	100	

Source: field survey 2016

Results in table 4.6 show that majority (62%) of the sampled respondents took loans for the sole aim of doing business as compared to 38% who took loans for personal use. This means that 62% of the loans taken were put into income generating activities. It thus puts such borrowers in a better

position to pay back as compared to moneys that were borrowed for personal use such as paying school fees, funerals among others. It can be seen that only 29.03% of the loans that were taken for business purposes experienced delinquency whereas about 61.40% of the number of people who took loans for personal use became delinquent.

**Table 4.7** Number of Other Sources of Credit Available to Respondents

	FREQUENCY	PERCENT IN SAMPLE	Y=1 (%)
ZERO	253	84.33	39.52
ONE SOURCE	33	11	54.54
TWO SOURCES	14	4.66	42.85
TOTAL	300	100	

Source: field survey 2016

From the results above, 84.33% of the borrowers that were sampled relied solely on their respective credit unions for credit facilities. On the other hand 33 out of the 300 borrowers, apart from the credit union they belonged to, had another source of acquiring a credit facility while only 14, constituting 4.66% of the sampled borrowers had two other sources of acquiring credit other than their respective credit unions. The results show that borrowers who relied solely on the credit unions for loans experienced the lowest delinquent rate as compared to borrowers who had one and two other sources of acquiring a credit facility. This might result from the fact borrowers who rely solely on credit unions have no other source of credit and this makes them value their loans highly as compared to those who have alternative sources.

**Table 4.8** Number of Previous Loans Taken by Respondents

	FREQUENCY	PERCENT IN SAMPLE	Y=1 (%)
ZERO	57	19	52.63
ONE	146	48.66	36.36
TWO	77	25.66	48.05
THREE	12	4	35.06
FOUR	8	2.66	0
TOTAL	300	100	

Source: field survey 2016

From table 4.8, the results indicate that majority (48.66%) of the respondents had taken one loan prior to the last loan they serviced. Borrowers who had taken two previous loans constituted 25.66% whereas borrowers who had taken zero, three and four previous loans constituted 19%, 4% and 2.66% respectively. Borrowers who have a long history with their credit unions in terms of loan acquisition experienced lower rates of delinquency. The results show that borrowers who had taken four previous loans prior to the last one they took did not experience any delinquent loan.

#### 4.1.2 Loan Characteristics

**Table 4.9** Loan Repayment Period Indicated by Respondents

	FREQUENCY	PERCENT IN SAMPLE	Y=1(%)
1 – 10 MONTHS	139	46.33	53.95
11 – 24 MONTHS	161	53.66	30.43
TOTAL	300	100	

Source: field survey 2016

For analytical purposes, the variable ‘REPPER’ was categorized in to groups. Table 4.9 shows that majority of the borrowers sampled opted to pay back their loans within 11 to 24 months as compared to 46.33% who opted to pay back within 1 to 10 months. This might be because paying back a loan over a longer time frame makes the monthly payment smaller unlike paying back within a shorter time frame. It is thus evident from the table that 53.95% of respondents who paid their loans within 1 to 10 months were delinquent whereas 30.43% of those who opted to pay back within 11 to 24 months experienced delinquency. The study revealed that the repayment period was entirely left at the discretion of the borrower. Thus loan officers have no hand in a borrower’s loan repayment period and also periodic payments were made on monthly basis

**Table 4.10** Amount of Credit Taken by Respondents

	FREQUENCY	PERCENT IN SAMPLE	Y=1 (%)
GHC 150.00 – GHC 1,000.00	23	7.66	39.13
GHC 1,200.00 – GHC 10,000.00	201	67	53.73
GHC 11,000.00 – GHC 40,000.00	76	25.33	72.36
TOTAL	300	100	

Source: field survey 2016

For analytical purposes, the credit amount taken by the borrowers were categorized. From table 4.10 above, the lowest amount taken was GHC150.00.00 whereas the highest amount taken was GHC 40,000.00. 67% of the loans given out ranged from GHC 1,200 – GHC10, 000.00, 25.33% ranged from GHC 150.00 – GHC 1,000.00 and 7.66% of the sampled respondents said they took loans ranging between GHC 11,000.00 – GHC 40,000.00. It is evident from the results that 39.13% of borrowers who took loans between GHC150.00 and GHC 1,000.00 were delinquent whereas a whopping 72.36% of borrowers who took loans ranging from GHC 11,000.00 to GHC 40,000.00 were delinquent

**Table 4.11** Guarantor Provided by Respondents

	FREQUENCY	PERCENT IN SAMPLE	Y=1 (%)
GUARANTOR = 1	187	62.33	27.27
NO GUARANTOR = 0	113	37.66	64.60
TOTAL	300	100	

Source: field survey 2016

Table 4.11 indicates that 62.33% of the sampled respondents were required to provide a security in the form of a guarantor before their loans were disbursed as compared to 37.66% who needed no guarantor. The guarantors are members of the cooperative who are required to use either their entire savings or a proportion of it to serve as a security for the borrower. 27.27% of borrowers whose loans were guaranteed for were delinquent whereas 64.60% of borrowers whose loans were not guaranteed for became delinquent in the payment of their loans. In order to prevent a situation whereby the guarantors will lose their savings, the borrowers will take all necessary steps to repay their loan, hence their low delinquency rate.

## 4.2 Model Diagnostics

### 4.2.1 MultiCollinearity of Independent Variables Used In the Model

Table 4.12 shows the correlation matrix between the various independent variables used for the study. The Pearson correlation test was conducted to check for multicollinearity between the variables employed in the study. The correlation coefficient indicates the degree at which the variables move together and the signs indicate whether the association between the variables is direct or indirect. The threshold for multicollinearity set for this study is 0.7. This is in line with the threshold proposed by Kennedy (2008). From the results there is no sign of multicollinearity among the variables used for the study. The statistical software used in this study is STATA 13

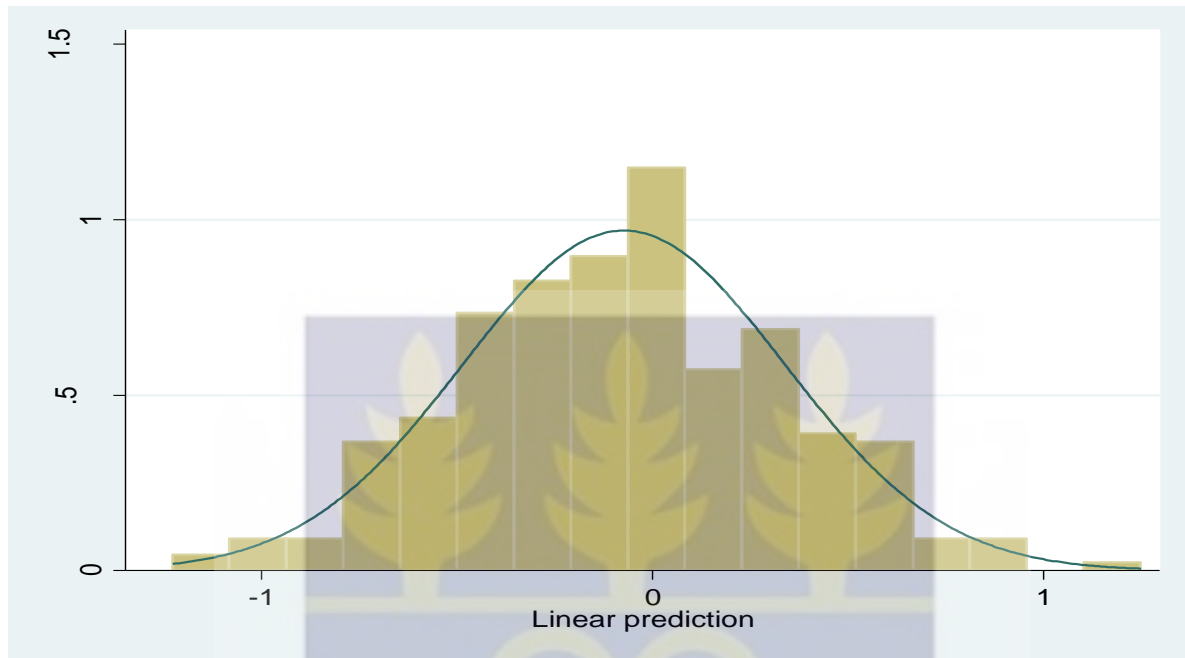
**Table 4.12 Correlation matrix of independent variables used in the study**

	NUMDPN	MRTSTUS	NOSC	ILLITE~E	JHS	SHS	NOPL	AGE	LOGCR	PURCRDT	REPPER	GUARAN~R	GENDER
NUMDPN	1.0000												
MRTSTUS	-0.0075	1.0000											
NOSC	0.0399	0.0994	1.0000										
ILLITERATE	-0.0039	-0.0417	-0.0255	1.0000									
JHS	-0.1512	0.0661	0.0494	-0.0735	1.0000								
SHS	0.0292	-0.0493	0.0323	0.0261	0.2015	1.0000							
NOPL	0.0022	-0.0392	0.0407	0.0472	-0.0360	0.1294	1.0000						
AGE	-0.0416	0.0032	-0.0182	-0.0022	-0.1155	-0.0491	-0.0240	1.0000					
LOGCR	0.0709	0.0815	-0.0724	0.0153	-0.0190	0.0666	-0.0071	0.1203	1.0000				
PURCRDT	0.0342	-0.0163	0.0358	-0.1622	-0.0714	-0.0643	0.0922	0.0951	0.0937	1.0000			
REPPER	-0.0675	0.0685	0.0602	-0.0376	0.0602	0.0750	0.1092	-0.0051	0.0235	-0.0247	1.0000		
GUARANTOR	0.1250	0.0500	0.0031	0.0725	-0.1159	-0.1660	-0.0541	0.0193	0.0336	-0.0292	-0.0278	1.0000	
GENDER	0.0122	0.0324	0.0249	-0.1493	-0.0535	-0.0839	0.0344	0.0026	-0.0876	0.0744	0.0859	0.0586	1.0000

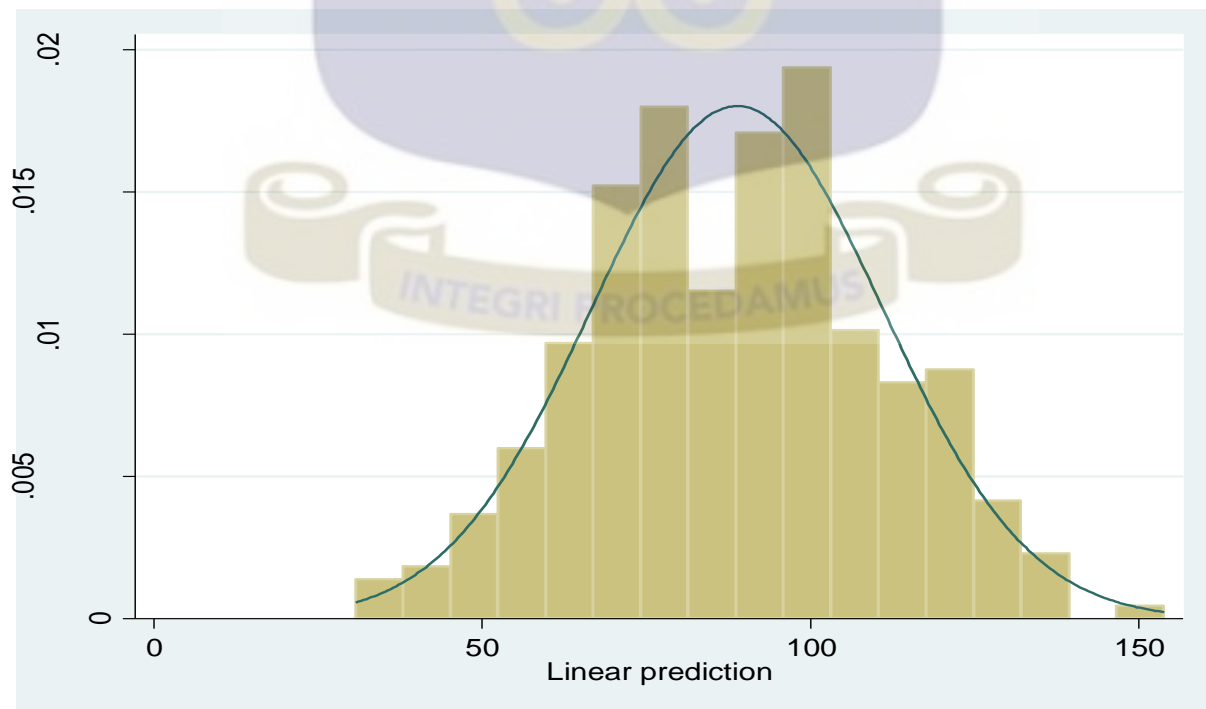
#### 4.2.2 Normality of Residuals

One assumption underlying the use of the independent double hurdle model is the normality of the residuals. Without normality the maximum likelihood estimate will fail to be consistent (Harris, Dillard & Erickson, 2009). From figure 1 and figure 2 it is clear that the residuals of both hurdles are normally distributed.

**Figure 4.1** Residuals of first hurdle



**Figure 4.2** Residuals of second hurdle



### 4.2.3 Relationship between Residuals of the First and Second Hurdle

The independent double hurdle model assumes that the error terms between the 1<sup>st</sup> hurdle and the 2<sup>nd</sup> hurdle are not correlated. As such the decision to be delinquent and extent of delinquency is independent of each other. As proposed by Akpan et al. (2013), this relationship can be investigated by testing the correlation between the residuals of the first and second hurdles.

$H_0$  = There is a correlation between the residuals of the first and second hurdle

$H_1$  = There is no correlation between the residual of the first and second hurdle

$$\rho = \frac{\text{Cov}(\mu_i, \varepsilon_i)}{\sqrt{\text{var}(\mu_i, \varepsilon_i) \text{var} \varepsilon_i}}$$

**Table 4.13** Correlation matrix of hurdle 1 residuals and hurdle 2 residuals

	HURDLE1	HURDLE 2
HURDLE 1(Probit)	1.0000	
HURDLE 2 (Interval regression)	-0.0394	1.0000
	0.4975	

Source: Author's computation (2016)

From the variance co-variance analysis of  $(\mu_i, \varepsilon_i)$ , the  $\rho$  value is -0.0394. Under the assumption of null hypothesis of no correlation between the residuals of the two hurdles, the p- value is 0.4975 and is not significant at any standard level of probabilities. We therefore reject the null hypothesis and state that the residuals of the two hurdles are not correlated and thus the decision to be delinquent and the extent of delinquency are uncorrelated.

#### 4.2.4 Heteroskedasticity

Heteroskedasticity exist when the variance of a regression error term, is not constant (Stock & Watson, 2007). Heteroskedasticity in the residuals of the estimated equation was done using the Breusch-Pagan / Cook-Weisberg test for heteroskedasticity. From the results below it is evident that the p value of both tests is less than 0.05. We can therefore say that both equations suffer from heteroskedasticity.

**Table 4.14 Breusch-Pagan / Cook-Weisberg test for heteroskedasticity**

Test	Hypothesis test	F/Chi2	P value
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity for Hurdle 1	$H_0$ : Constant variance	chi2(12) = 21.29	Prob > chi2 = 0.0305
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity for Hurdle 2	$H_0$ : Constant variance	chi2(12) = 21.52	Prob > chi2 = 0.0432

#### 4.3 Regression Results

The regression results measures the impact that the explanatory variables have on the dependent variables. The use of the double hurdle model helps to achieve the objective of the study by estimating the probability and extent of loan delinquency. The STATA software, version 13, was used to analyze the data. In order to control for heteroskedasticity, the robust option was adopted for the analysis. Therefore the result from the double hurdle model is presented below.

**Table 4.15 Regression Output**

<b>VARIABLES</b>	<b>HURDLE 1</b>	<b>HURDLE 2</b>
<b>NOSC</b>	0.168 (0.157)	-8.885* (4.944)
<b>MRTSTUS</b>		
Single	0.0544 (0.164)	2.271 (5.407)
Married	N/A	N/A
<b>NUMDPN</b>	0.230*** (0.0518)	2.662 (1.644)
<b>EDUCATION</b>		
Illiterate	0.974*** (0.196)	-7.020 (6.182)
JHS	0.0176 (0.165)	-9.848* (5.279)
SHS/ VOC	-0.113 (0.183)	-26.48*** (4.833)
Tertiary	N/A	N/A
<b>NOPL</b>	-0.127* (0.0734)	5.493** (2.496)
<b>AGE</b>	0.0443 (0.0539)	0.624 (1.849)
<b>AGE SQUARED</b>	-0.000650 (0.000634)	-0.0119 (0.0216)
<b>LOGCR</b>	0.0615 (0.0410)	-2.099 (1.397)
<b>PURCRDT</b>		
Business	-0.496*** (0.173)	-5.714 (5.578)
Personal use	N/A	N/A

<b>REPPER</b>	-0.0151 (0.0173)	-0.290 (0.588)
<b>SECURITY</b>		
Guarantor	0.119 (0.163)	-9.157* (5.434)
No Guarantor	N/A	N/A
<b>GENDER</b>		
Female	-0.238 (0.163)	-3.759 (5.357)
Male	N/A	N/A
Constant	0.557 (0.450)	40.22*** (14.69)
<b>Wald Chi ( 14 )</b>	52.38	45.06
<b>Prob &gt; Chi 2</b>	0.0000	0.0000
<b>Pseudo R2</b>	0.1602	
<b>Insigma</b>		3.799*** (0.0473)
<b>Interval Obs</b>		<b>124</b>
<b>Observations</b>	<b>300</b>	<b>300</b>

Source: Author's computation (2016)

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

#### 4.4 Discussion of Regression Results

From the regression results in table 4.15, the Wald chi2 statistic from the first hurdle and second hurdle is 52.38 and 45.06 at 14 degrees of freedom respectively and it is significant at 1%. This means that at least one of the independent variables has a significant effect on a borrower's probability to be delinquent and the extent of delinquency. The results of the first hurdle (probit model) indicates that purpose of credit (PURCRDT), number of previous loans (NOPL), Education (Illiterate) and number of dependents (NUMDPN) are statistically significant variables that affect

the probability of a borrower to be delinquent. The variables were significant at 1%, 1%, 10% and 1% respectively. On the other hand variables such as age, age squared, repayment period, education (JHS, SHS/ VOC), gender, credit amount (LOGCR), number of other sources of credit (NOSC) and Guarantor are statistically insignificant. The results of the interval regression (HURDLE 2) shows that ‘number of other sources of credit (NOSC), education (JHS, SHS), ‘number of previous loans’ (NOPL) and Guarantor are all statistically significant variables affecting the extent of delinquency which was measured in the number of days a loan was in arrears.

From the results it can be seen that conditional on default, it takes a shorter time for a borrower to pay back a loan if the borrower has many other sources of accessing credit. This could be because during times where the borrower is finding it difficult to service the monthly repayments, he or she can fall on other lenders in order to get money that can be used to service the loan taken from the credit union. However, the number of other sources of credit (NOSC) a borrower has is statistically insignificant in influencing the probability of default.

A higher number of dependents of a borrower increase the probability of being delinquent. The reason could result from the fact that having more dependents increases the expenditure of the borrower. This result in the possibility of diverting money intended for paying back the loan to meet the needs of the dependents. This result confirms studies done by Ojiako & Ogbukwa (2012); Wongnaa & Awunyo-Vitor (2013); Agbemava et al (2016); Haque, Akter & Laoubi, (2011) and Ofori, Fianu, Omoregie, Odai, & Oduro-Gyimah, (2014). On the contrary the number of dependents a borrower has plays no role in the number of days the loan will be in arrears given that the borrower is delinquent.

The regression result from the first hurdle indicates that borrowers with no educational background have a higher tendency to be delinquent in the payment of their loans as compared to borrowers with a tertiary educational level. This could be as a result of the fact that borrowers with no education have insufficient understanding about how they can effectively manage loans they acquire. This therefore makes it difficult for illiterate borrowers to pay back their loans regularly and on time. The findings of this current study support earlier studies done by Oladeebo & Oladeebo (2008) and Chaudhary and Ishafq (2003). With regards to the second hurdle, conditional on being delinquent, it takes a shorter time for a loan in arrears to be paid back if the borrower's highest educational attainment is Junior High School (JHS) or a Senior High School (SHS) or Vocational Training as compared with borrowers who have gained tertiary education. This is because borrowers with such low level of education may find it difficult to obtain credit from other lenders. Since they know the credit union is their surest bet of obtaining a loan, they will try as much as possible to pay back their loans in order to qualify for another credit facility if the need arises.

From the results above, 'number of previous loans' (NOPL) significantly and negatively influences the probability of loan delinquency. This means that the higher the number of previous loans taken by a borrower the less likely the borrower will be delinquent. This is because the number of previously taken loans gives an idea on how long the borrower has been dealing with the credit union. Thus the length of history establishes a kind of goodwill bond between the borrower and the credit union which in turn lessens the tendency of delinquency. This result is consistent with the study done by Kocenda and Vojtek (2009). However, the study by Baklouti (2009) shares a contrary view. In his study he found that the number of previous loans concluded between a borrower and a lender is positively related to the probability of loan delinquency. Concerning the

second hurdle, given that a borrower is delinquent, the number of days it takes for a loan in arrears to be paid is increased if there is an increase in the number of loans previously concluded between the borrower and the credit union. The reason could result from the fact that since the borrower has a long history in terms loan acquisition with the credit union, the borrower may not find any urgency to pay back the loan and the loan officer may find it difficult to exert the necessary force that will push the borrower the pay.

The regression results also show that borrowers who use loans for business purposes have a lower tendency to encounter repayment problems as compared to borrowers who use loans for personal use. Borrowers who engage in productive activities are able to generate income to meet their monthly repayment requirements. This result confirms the work of Papias and Ganesan, (2009). The number of days a loan is in arrears is however not influenced by the purpose for which the credit is taken.

Guarantor is not a statistically significant variable that influences whether or not a borrower will be delinquent. However, guarantor influences the extent of delinquency. From the results above, on condition that the borrower is delinquent, it takes a shorter time for a borrower to pay back a loan in arrears if the borrower's loan is secured by a guarantor as compared to a borrower whose loan is not secured by a guarantor, this can be explained in light of the fact that in order to qualify as a guarantor for a borrower, the guarantor should be a member of the cooperative. The guarantor is required to use either his or her entire savings or a proportion of it to serve as a security for the borrower. In the event where borrower becomes delinquent, the savings of the guarantor will be used to defray the arrears owing. In order to forestall such a situation, the borrower will try as much as possible to pay back the loan in the earliest possible time, hence reducing the number of days the loan will be in arrears.

The study revealed that apart from “Guarantor” which is regarded as a loan attribute, the rest of the factors that were significant in determining the probability of delinquency and extent of delinquency were borrower characteristics. This shows that assessing borrower attributes is key in ensuring that loan delinquency is mitigated. This corroborates the study done by Weaver (1994) and Ralston & Wright (2003).



## CHAPTER FIVE

### SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

#### **5 Introduction**

This chapter gives a summary of the findings, conclusions and some policy recommendations based on the results obtained.

#### **5.1 Summary of Findings**

The objective of the study was to examine loan delinquency among credit unions in Ghana. Specifically the study sought to unravel the factors that affect the probability of loan delinquency and the extent of delinquency. The study concentrated on loan beneficiaries of association and community based credit unions that are under the Accra chapter of CUA. Employee based credit unions were left out because such credit unions seldom experience delinquency since loans taken are deducted at source. Information was solicited through survey questionnaires and interviews. A total of three hundred (300) loan beneficiaries were used for the study.

The demographics of the borrowers show that about 60.66% of loan beneficiaries are married and majority (51.66%) of the beneficiaries fall between the ages of 41 to 60 years. Males were the majority (57.33) whereas about 41% of the loan beneficiaries had at least Junior High School (JHS) education. Also 56.3% of the loan beneficiaries had dependents ranging from six to ten while majority (62%) took loans for business purposes. About 84% of the loan beneficiaries indicated that they relied solely on the credit union for credit facilities, 53% opted to pay their loans within 11 to 24 months and 62% were required to provide guarantors before their loans were disbursed.

The study revealed that the probability of a borrower to be delinquent is influenced by a borrower's number of dependents, education, number of previously taken loans and the purpose for which the

credit is taken. A borrower's number of dependents has a positive influence on the probability of delinquency. The study also revealed that education is an important factor that cannot be overlooked. The results established that illiterates have a higher tendency to be delinquent as compared to borrowers who have attained tertiary education. The probability of a borrower to be delinquent is also influenced by the number of previously taken loans prior to the last one that was taken by the borrower. This variable has a negative influence on the probability of delinquency. The study discovered that the purpose for which the credit is taken is significant in determining the probability of delinquency. Borrowers who take loans for business purposes are less likely to be delinquent as compared to borrowers who take loans for personal use.

The study measured the extent of delinquency in terms of the number of days the loan is in arrears. Results show that the extent of delinquency is influenced by the number of other credit sources available to the borrower, education, the number of previous loans taken by the borrower and security. The results revealed that the number of days a loan is in arrears is reduced if the delinquent borrower has other sources of credit. Also, given that a borrower is delinquent, the number of days a delinquent borrower's loan is in arrears is reduced if the borrower has attained formal education up to the junior high school or the senior high school level or vocational level. The findings of the study also suggest that the number of previous loans taken by the borrower impacts positively on the extent of delinquency. Thus the more loans are taken from the credit union, the more days the borrower's loan will be in arrears given that the borrower is delinquent. It was also noticed from the study that the number of days a loan is in arrears is less for borrowers who are required to use guarantors as compared to those who were not required to do so.

## **5.2 Conclusion**

The study identified factors that affect the probability and extent of loan delinquency in credit unions. These factors relate to both the characteristics of the borrower as well as the loan. The probability of loan delinquency is influenced by the borrower's number of dependents, education, number of previous loans taken by the borrower and the purpose for which the loan is taken. Factors that affect the extent of loan delinquency are the number of other sources of credit available to the borrower, education, number of previous loans taken by the borrower and guarantor.

In a bid for credit unions to keep up with their social objective of ensuring that members' welfare is enhanced, they should not lose sight of the fact that their economic viability is paramount. Their economic viability can be safeguarded by mitigating the incidence of delinquent loans. The factors identified in this study will thus go a long way to aid credit union loan officers to effectively assess borrowers in order to ensure that loans are given out to people who demonstrate a greater propensity not only to pay back but also to pay back in the shortest possible time even if they should be delinquent.

## **5.3 Recommendations**

Based on the outcome of the research, the study recommends that credit unions give financial management counseling to those who have no formal education before loans are disbursed. This will enable the borrowers to gain certain basic skills that they can use to effectively manage their finances.

The study also recommends that credit unions should make it imperative for loan applicants to get guarantors before loans are given out. This will help reduce the incidence of loan delinquency. Another recommendation from the study is that credit union loan officers should continuously

assess, monitor and supervise borrowers who are seen to have a good credit history with the credit union. This is because there is a tendency for the loan officers to assume that borrowers who are in their good books are credit worthy and thus they need not to be assessed, monitored or supervised.



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7. Do you rely solely on your credit union for assessing a loan? Yes [ ] No [ ]
8. If your answer in question (7) is No, how many other sources of credit is available to you?  
.....
9. Are you eligible to assess a loan from your credit union? Yes [ ] No [ ]

**Kindly skip the remainder of the questions if your answer for question (9) is No**

10. What is the amount of the last loan you took from your credit union?  
GHC.....
11. How many loans have you been granted prior to the last loan you took? .....
12. Did your credit union demand any security (guarantor) before granting you the loan?  
Yes [ ] No [ ]
13. What was the purpose for the last loan you took from your credit union?  
Business [ ] Personal use [ ]
14. How many months or years did you decide to use to pay back the loan? .....
15. Did the credit union loan officer agree to your repayment period? Yes [ ] No [ ]

**Kindly skip question (16) and (17) if the answer to question (15) is No**

16. Did the loan officer change the repayment period? Yes [ ] No [ ]
17. Was the changed loan repayment period suitable? Yes [ ] No [ ]
18. How frequent were you required to make your periodic loan repayments?  
Daily [ ] weekly [ ] Monthly [ ]
19. Did you encounter any problem which prevented you from regularly making your periodic repayment? Yes [ ] No [ ]

20. How many months did this problem prevent you from making your periodic payments?

.....

