FACTORS AFFECTING MICROFINANCE CONSUMER LOANS DEFAULT PROBABILITY IN MALAWI: THE CASE OF GREENWING CAPITAL LIMITED

Master of Arts (Economics) Thesis

By

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DECLARATION

I, the undersigned, hereby declare that this thesis is my own work which has not been submitted to any other institution for an award of any kind. Where other people's work has been used, acknowledgements have been made.

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CERTIFICATE OF APPROVAL

The undersigned certifies that this thesis reports the student's own work and effort and has been submitted with my approval.

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DEDICATION

To Blessings, Charity and Wonderful

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ABSTRACT

This study examines the factors that affect the probability of consumer loans default using data from Greenwing Capital Limited, a Microfinance Institution in Malawi. This study uses a logit regression to analyse factors that cause default. The study investigates the impact of indebtedness, loan amount, loan term, gender and education on the probability of default of the company.

Data used in the study were on loan applications made between July 2008 and December 2009. The results show that relative to 6 month-loan term, loans offered on a 24 month-term and 36 month-term are less risky at the one percent level. Education also affects the probability of default at the one percent level. Loans offered to clients with higher education are less risky. Gender affects the probability of default at the 5 percent level. Relative to female clients, male clients are less likely to default. On the other hand 12 month-term, loan amount and indebtedness are not significant.

It is therefore recommended that the development of microfinance should not leave out the education sector. Also policy makers should make capital available to microfinance institutions (MFIs) at low interest rates for MFIs to meet the demand for bigger loan amounts.

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LIST OF ABBREVIATIONS AND ACRONYMS

BRAC	Bangladesh Rural Advancement Committee
CIDA	Canadian International Development Agency
DEMAT	Development of Malawian Enterprises Trust
GDP	Gross Domestic Product
GoM	Government of Malawi
MARDEF	Malawi Rural Development Fund
MFI	Malawi Microfinance Network
MPRA	Munich Personal RePEc Aechive
MRFC	Malawi Rural Finance Company
MSCE	Malawi School Certificate of Education
NBFI	Non Bank Financial Institution
NGO	Non Governmental Organisation
NSO	National Statistical Office
PRIDE	Programme Intégré pour le Développement de l'Entreprise
SACCO	Savings and Credit Cooperatives
SEDOM	Small Enterprise Development Organisation of Malawi
USAID	US Agency for International Development
UNCDF	United Nations Capital Development Fund

CHAPTER ONE

INTRODUCTION

1.1 Background

Financial markets facilitate the flow of funds in order to finance the investments by corporations, governments, and individuals. Financial institutions are the key players in financial markets because they serve as intermediaries that determine the flow of funds (Madura, 1998). Charterjee et al (2007) state that households face idiosyncratic[1] shocks to income, preferences, and asset position and therefore have a motive to accumulate assets and sometimes borrow in order to smooth consumption. Idiosyncratic shocks, as opposed to covariate shocks, consist of household specific problems. When faced with such shocks, households sometimes gain assistance from traditional support networks, other households or financial institutions (GoM, 2006).

Microfinance Institutions are the main providers of small loans to households in the financial sector. Usually, the loans given are very small, in short term period, no collateral needed and require weekly repayment (Nawai and Shariff, 2010) and repayment problems become the main obstacle for Microfinance Institutions to continue providing such loans.

[1] Idiosyncratic risks are household –specific risks such as illness and covariate risks are those that affect many household in an area or across areas. It is argued that the state can be more effective in covering covariate risks, while most idiosyncratic risks may be handled better by private financial providers

Microfinance refers to small-scale financial services-primarily credit and savings-provided to people who farm or fish or herd; who operate small enterprises; who provide services; who work for wages or commissions; who gain income from renting or small amounts of land, vehicles or machinery tool (Robinson, 2001). Microfinance can also be referred to as the provision of a broad range of financial services to those excluded from formal financial systems (Burritt, 2006). In Malawi, microfinance definition is not provided instead, the microfinance act (2010) defines microcredit as the provision of small loans to small or micro enterprises, low-income customers, or as determined by registrar, where such loans are granted to a person whose income depends on his own business or economic activity, whose security may include non-traditional instruments such as group guarantees or compulsory savings and the borrower may be required to make frequent repayments in small amounts.

Microfinance activities attempt to serve the credit demand for the people who can hardly be served by the banks in the industry. However, players in the industry have not been able to meet the demand for financial services in Malawi. Conventional banks have failed to complement the services of Microfinance Institutions (MFIs) for various reasons such as adopting (banking) models that are unsuitable for managing a microfinance business characterized by high-volume, low-value transaction, and also employing traditional lending technologies based on collateral requirements to which the unbanked generally do not have access (Burritt, 2006).

The other reason that banks have not served households is the existence of information asymmetry. Dubey et al. (2005) argue that perfect information eliminates the need for lenders to compute how the size of their loan and the price they quote might

affect default rate. However, lenders operate in an environment of asymmetric information (Robinson, 2001), thereby making financial institutions conscious of possible default. In view of this, a number of imperfect information credit models have been constructed based on the assumption that financial institutions cannot differentiate between high risk and low risk loan applicants. Stiglitz (1981) argues that in a world of perfect and costless information, the banks would stipulate precisely all the actions which the borrowers could undertake, however, the banks are not able to directly control all the actions of borrowers, therefore, they formulate the terms of the loan contract in a manner designed to induce the borrower to take actions which are in the interest of the bank as well as to attract low-risk borrowers. It is because of these information asymmetries that no single microfinance format will exist that simultaneously will satisfy the varying needs of all different segments of the poor (Bhatt and Tang, 2001) and Basu et al (2004) argue that banks and MFIs complement each other well by serving substantially different client base.

Insufficient supply of financial services is not the only problem in the financial industry/market. The few institutions in the provision of financial services face risks common in the lending industry and the notable ones are: liquidity risk, interest risk and default risk which all affect the supply of financial services in Malawi. The default risk is a major concern for microfinance institutions since most of the funds are allocated to consumers (Madura, 1998 and Churchill, 2001). Default risk is a concern because customers who borrow from microfinance institutions are those that in most cases did not pass the credit scoring systems in conventional banks and who exhibit moderate risk.

Again, micro-lending is unsecured (i.e., traditional collateral is not often used to secure microloans) Churchill (2001) leading to increased default rate. Churchill further argues that microfinance portfolios often have a high concentration on one sector. Consequently, delinquency can quickly spread to a significant portion of the portfolio if the targeted sector is exposed to some external threat. The volatility in microloan portfolio quality makes credit risk control important.

Additionally, microfinance institutions generally do not hold assets that could be sold in the secondary markets and when in need of funds, they borrow hence their balance sheet structure does not call for much liquidity. Since most MFIs do not take deposits and that all their funds are from borrowing rather than deposits, they are not susceptible to unexpected deposit withdrawals as such minimizing their liquidity risk. Liquidity risk is higher in deposit taking institutions since they need to keep funds for depositors to withdraw while they ensure they have enough to meet loan demand. Also, both assets and liabilities of microfinance institutions are short or medium term (Madura, 1998) therefore, they are not as susceptible to increasing interest rates as are savings institutions.

It is the purpose of this paper to study default in microfinance institutions. The study will focus on the investigation of factors that affect the probability of consumer loan default in microfinance sector in Malawi: The case of Greenwing Capital Limited. The study was designed to target microfinance institutions currently operating in Malawi. However, it was not possible to access information from all MFIs, therefore, Greenwing Capital was chosen since it is the only institution that paved way to accessing information

relevant to the study. The institution has the highest market share of 37 percent of all MFIs in consumer lending in Malawi.

1.2 Problem Statement and Significance of the Study

Credit is a pivot on which the development of many sectors in an economy rests (Addisu, 2006). Microfinance institutions provide credit to lower income groups of the society. They serve credit demand of the poor households, who are often not served by other players for various reasons including lack of appropriate and adequate collateral to cover the problem of information asymmetry (Stigltz, 1981).

According to Godquin (2004) information asymmetries arise when gaining information on characteristics or on behavior of borrowers is costly for the MFI. Information asymmetries generate the problem of adverse selection-allocating loans to undeserving clients. The use of collateral is an option where information asymmetry exists. However, some lenders overcome the problem of information asymmetry by producing (or correcting) information about the borrower and using it in their credit decisions (Scott and Sugato, 1999). Sharma and Zeller (2000) observe that the problems of moral hazard and information asymmetry are severe for consumption loans. In Malawi, information on borrowers' performance (history) is not available to lenders due to unavailability of a credit bureau thereby heightening the problem of information asymmetry hence most MFIs rely on their own judgment in making decisions.

Consumption at household level constitutes a great proportion of GDP in Malawi. Household consumption expenditure in 2005 accounted for 85.3 percent of GDP, 81.2 percent in 2006 and 79.2 percent in 2007 (GoM, 2010). Thus household consumption

forms an integral part in the growth of GDP. MFIs are one source of income for household consumption expenditure. According to a finscope survey, from table 1A in the appendix, 42 percent of the funds borrowed at household level were used for consumption purposes compared to the 50.9 percent for Investment[2] as such constituting a significant proportion of household borrowing. However, a significant body of research on credit in Malawi (Chirwa 1997; Diagne 2000) has focused on investment loans, thereby, leaving out an equally large consumer loan market untested.

Recognizing the role of financial services providers in poverty reduction, Malawi has been accommodative in her policy and strategic framework to ensure the growth of MFIs[3]. However, an enabling environment for the operations of the MFIs is not sufficient to keep MFIs in business. The health and growth of MFIs also depend on the ability to recover loans among other factors. One indicator of the effectiveness of a loan release is repayment performance of borrowers (Addissu, 2006). Non repayment of loans affects the profitability of microfinance institutions as such they charge high interest rates to cover the risk of loan loss.

The possibility of default and the lack of effective contract enforcement mechanisms, restrict credit supply even if lenders have more than required capital to meet a given demand (Stiglitz and Weiss, 1981). Discontinuation of services by financial institutions is another result of poor loan recovery (Von Pischke, 1980). Some lenders charge high interest rates to cushion themselves against loan loss, thereby making credit

[2] Finscope Survey (2008) questionaire

[3] See Burrit (2006) and the Malawi Growth and development Strategy.

expensive for the poor, thus preventing them (the poor) from lifting themselves out of poverty through the use of credit(GoM, 2006).

In view of the problems associated with consumer loan default, some writers (Oni et al 2005; Weiss 2008; Oladeebo and Oladeebo 2008) have written on the subject. However, there is no literature on consumer loans default in Malawi. Earlier studies (Chirwa 1997; Diagne 2000) were done on investment loans-either investment in small scale businesses or in agriculture. Such loans are expected to bring returns to borrowers which are used to service the loan. Consumer loans, on the other hand, are serviced from current sources of income, as such, monthly salary as is the case of Greenwing Capital Limited. Such loans instead reduce the disposable income which may make debt servicing even more difficult as Rinaldi and Sachis-Arellano (2006) argue that larger credit availability can lead to an increase in external financing resources and hence in current consumption while at the same time an excessive indebtedness can lead to higher debt-service burden with a possibly negative impact on future consumption. Early studies on consumer loan default include those by Steenackers and Goovaerts (1989) in Belgium and Wiginton (1980). This study seeks to find out factors that affect consumer loan default in Malawi with the case of Greenwing Capital. This provides additional literature on consumer loan default in Malawi.

1.3 Objective of the Study

The underlying interest of this study is to investigate factors that affect individual loan repayment behavior.

1.3.1 Specific Objectives

Specific objectives are to;

i. Determine the effect of indebtedness on loan default for clients borrowing for consumption.

ii. Ascertain how demographic factors like gender and age affect loan default for clients borrowing for consumption.

iii. Analyse the effect of loan period on repayment of loans.

1.4 Hypotheses

The following are the hypotheses to be tested;

i. Indebtedness has no impact on consumer loan default

ii. Demographic factors have no impact on consumer loan default

iii. Repayment term has no impact on consumer loan default

1.5 Organisation of the Report

The rest of the study is organized as follows; Chapter two presents a background to microfinance. Chapter three reviews both theoretical and empirical literature. Chapter four describes the methodology used in the study. Chapter five discusses the findings and chapter six provides concluding remarks.

CHAPTER TWO

MICROFINANCE BACKGROUND

2.1 Introduction

This chapter provides a brief background of microfinance. Section 2.2 previews the origin of microfinance. The role of microfinance institutions in poverty reduction is discussed in section 2.3. Section 2.4 previews the microfinance industry in Malawi. Section 2.4.1 preview the background of Greenwing Capital and the risk position of the company is discussed in section 2.4.2.

2.2 The Origin of Microfinance

The origin of the idea of microfinance is not very clear, but it can be linked to different countries (Germany's village bank movement, Chicago's Shore bank). The development and practicing of the idea could be attributed to Dr. Muhammad Yunus who created the Grameen Foundation of Bangladesh to advance poverty alleviation fight in the 1970s. Over the years, there have been transformations in the MFIs with a record of 7000 MFIs serving over 25 million people throughout the world (Crabb and Keller, 2006). The Microfinance sector is considered to be heavily dominated by Non-Governmental Organizations which are recently transforming into commercial institutions.

The commercialization drive was pioneered by the Latin America[4]. Proponents of commercialization argue that it leads to higher profits which attract more players in the market and later on potentially lower prices for borrowers (Ledgerwood et al, 2006). It is a belief among financial systems advocates that a primary goal of microfinance should be to operate at a very large scale. Commercially profitable MFIs attract investments from private sector and eventually reach out to more clients and help more people than could be serviced through donor-supported programs.

The main criticism of the commercialization process is that it subordinates the needs of borrowers to those of institutions where MFIs are perceived to be more of debt collectors than service providers (Dacheva, 2009). It is because of this that the poverty lending approach is advocated. According to Amartya Sen (1999), poverty must be seen as the deprivation of basic capabilities rather than merely as low incomes. Proponents of poverty lending approach argue that provision of credit to the poor can be an important tool in alleviating the problems that arise from inadequate income and employment opportunities, though it is incapable of fully eradicating the basic deprivations that perpetuate the cycle of poverty.

The poverty lending approach incorporates and emphasizes the importance of maximizing the necessary benefits to people instead of maximizing the number of people who can receive the minimum benefits. Models of poverty lending approach are based on provision of additional services alongside microcredit programming. Critics of poverty lending argue that MFIs adopting the approach will never be able to secure necessary

[4] Commercialization is referred to as the movement out of heavily donor-dependent sector of subsidized operations into one in which microfinance institutions are financially sustainable.

capital to reach the millions who could benefit from micro-lending services because they cannot grow without donor support. To date, there are both approaches to microfinance.

2.3 The Role of Microfinance Institutions in Poverty Reduction

Millions of the poor and vulnerable non-poor want financial services (Burritt, 2006). They seek a diverse range of services including loans, savings, insurance, and remittances for funds transfer and payment services. Morduch (2000) argues that microfinance promises both to combat poverty and to develop the institutional capacity of financial systems through finding ways that cost-effectively lend to poor households. The importance of increasing access to credit, savings opportunities and other financial services as a means of reducing poverty has long been recognized in Malawi (GoM, 2008) hence the recommendation for a comprehensive strategy to deepen financial service in the country.

Many studies have revealed the importance of microfinance in poverty alleviation, Adjei et al (2009) argue that access to emergency or consumption loans can enable households or individuals to meet unexpected demands for cash, without having to sell or pawn key income generating assets or withdraw children from school. In Malawi, Education of children increased for primary and secondary school with membership of PRIDE-an MFI (UNCDF, 2004).

Mac Isaac (1997) argues that the impact of microcredit, particularly those that affect the market for goods and services, will extend beyond the borrowers themselves. For example, flooding the market with goods for which there is finite demand will cause prices to fall. Bakhtiari (2006) also argues that when poor households have access to

financial services, they can earn more; build their assets and cushion themselves against external shocks. Microfinance helps them move from everyday survival to planning for the future such as investing in better nutrition, housing, health, and education.

Zaman (1999) finds that microcredit contributes to mitigating a number of factors that contribute to vulnerability. In a survey of 1072 households of members and non-members from BRAC in Bangladesh, he observes that members who borrowed beyond some threshold were better off in terms of their income and poverty levels than non-borrowers. In another study, Sharma and Zeller (2000) argue that access to services as consumption loans can help to avoid severe shortfalls in food consumption. Households attempt to stabilize their disposable income or liquidity and when faced with shocks that affect their income and access to financial services has the potential of substituting for some higher-cost informal sources of consumption credit. Having discussed the role of microfinance in alleviating poverty, the next section previews the microfinance sector in Malawi.

2.4 Microfinance in Malawi

In Malawi, financial services are basic and unsophisticated. Credit outside the formal and informal financial system in Malawi pre-dates the colonial era (chirwa, 2002). In 1958 the Nyasaland African Loans Board was established to offer cash or services in kind (seeds and fertilizer) to Malawian farmers and was later on replaced with the Central Loans Board in 1964. The government of Malawi used to intervene in the financial sector until in the late 1980s when the financial system in Malawi was liberalized (Microfinance Transparency, 2011). Until then, financial institutions, except commercial banks and

credit unions, only existed in urban areas. Chirwa (2002) observes that dating back to 2002 there were few MFIs which did not operate national programmes.

In 2002, the government of Malawi drafted and approved a microfinance policy statement that described its vision for development of microfinance. In its statement, the government put into place actions aimed at reducing poverty and one of such actions was the promotion of income generation and employment creation which could be achieved through increased access to credit, savings opportunity and other financial services. However, by 2004, Malawi had a large unmet demand for microfinance services, especially in rural areas (GoM, 2008). At that time, microfinance consisted of a mixture of trade finance and agricultural credit, most of which were extended by government owned firms. Client dropout levels among most microfinance institutions (MFIs) were more than 50 percent and loan default rates for the sector were substantially high.

In 2010, financial services were provided by 10 banks and 14 non-bank financial institutions (Kadale Consults, 2010). These banks are Ecobank, NBS Bank, INDEBANK, NEDBANK, Standard Bank, National Bank of Malawi, Opportunity International Bank of Malawi and First Merchant Bank. The list of non-bank financial institutions include CUMO Microfinance Ltd, FINCA Malawi, Microloan Foundation, Pelton Finance, Greenwing, Izwe, Blue Financial Services, Touching Lives, DEMAT, MARDEF, MRFC, PRIDE, SEDOM and SACCOs.

Financial services in Malawi are provided by a number of financial institutions[5] taking different forms, these comprise:

[5] Kadale Consults (2010)

i. banks that are regulated under the Banking Act (1989) and are supervised by the RBM, including one leasing company and two discount houses;

ii. non-bank microfinance institutions (MFIs) under several legal forms and ownership structures, which cover the range of for-profit and non-profit institutions that include (a) companies with (private) shareholders (e.g. moneylenders), (b) trusts (typically NGOs),(c) companies limited by guarantee, and (d) public entities;

iii. member-owned or member-based organizations such as financial cooperatives or

iv. savings and credit cooperatives (SACCOs); and informal financial service providers, including individual moneylenders (e.g. Katapila operators).

Microfinance services providers in particular, exist either as commercial banks falling under the Banking Act (1989) and supervised by the Reserve Bank of Malawi, or as semi-formal MFIs under several legal forms and ownership structures operating as non-governmental organizations (NGOs), private and public companies, and parastatals (Luboyeski et al, 2004). The institutional forms of suppliers of microfinance services include NGOs, companies, non banking financial institutions (NBFI), specialized microfinance banks, subsidiaries of mainstream commercial banks, credit unions, leasing companies, and insurance companies (Burritt 2006). One of the microfinance institutions offering consumer loans in Malawi is Greenwing Capital Limited, a privately owned company. The following section discusses the company.

2.4.1 Greenwing Capital Limited profile

Greenwing Capital Ltd is a subsidiary of Real People Investment Holdings (Pty). Real People Investment Holdings was established in 2001 with the group headquarters in Eastern Cape Province of South Africa. Its core business is management of credit exposures. The group originates its business through a number of channels/products including: (i) retail financial services, (ii) in-store credit, and (iii) distressed debt acquisitions. Services are provided through a number of subsidiary companies including Real People (Pty) Ltd which is registered with the National Credit Regulator of South Africa. The group has operations in Lesotho, Swaziland, Botswana, Kenya, Tanzania, and Malawi. In Malawi, it operates as Greenwing Capital Limited.

Greenwing Capital is one of payroll money lenders-lending for consumption. Others are Blue Financial Services and Izwe Loans (Kadale Consultants, 2010). From Table 2A in the appendix, MFIs lending for consumption are Peltons Finance, Greenwing Capital Limited, Blue Financial Services and SACCOs, which all together take up a 48.9 percent share of business volume of all MFIs. Among these consumer loans MFIs, Greenwing Capital Limited has a 37 percent market share with the largest number of branches (30) across the country seconded by SACCOs with 35 percent and Blue Financial services taking 19 percent.

2.4.2 Risk Positioning of the Company

Real People Investment Holdings (Pty) credit risk is managed by a credit committee and an integrated and centralized collection platform is in use, with the system managing the complete contract life-cycle. The group's risk position is adversely affected

by its aggressive balance sheet growth and the nature of its operations, which effectively comprise unsecured lending to low income earners that are potentially sensitive to the macro-economic environment. Studying the company's clients' repayment behavior is important since the group relies on short term loan repayments and new funding agreements for its liquidity requirements. Failure to make timely and full payments of debt obligations would result into liquidity problems hence failure to finance future demand for loans. Furthermore, in 2007, the asset quality of the group reflected typically high bad debt levels that accompany micro-lending businesses (with non-performing loans (NPLs) as a percentage of gross loans of approximately 14 percent for its micro-lending business). The next chapter discusses the theoretical and empirical literature in the area of loan default.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

This chapter reviews earlier work in the area of default in microfinance. The chapter has two sections. Section 3.2 reviews some theoretical literature followed by section 3.2 that reviews some empirical evidence on the relationship between individual characteristics and probability of default in consumer loans.

3.2 Theoretical Literature

3.2.1 Default Defined

Default is defined as a loan written off, or a delay in payment exceeding 90 days, or a client classified by bank as substandard, doubtful or loss–making during the observed period (Fidrmuc et al. 2007). The term default can also be used with other meanings as something minor as late payment of a debt obligation so that the bank can apply a penalty default interest rate between the due date and actual payment date. It can also mean something as serious as bankruptcy or insolvency where the lender initiates a recovery process to limit loss from a collateralized loan (Wilson, 2007).

The latter definition is more meaningful. Any advance or late payment of a debt has its implications. Most financial institutions' interest calculations are based on the reducing balance method[6]. As such, late repayment entails higher interest calculation and results in a penalty. Defining default as repayment exceeding 90 days would undermine the consequential interest arising from such late repayment. In strict legal terms, default is defined as any failure to meet terms of credit obligation (Wilson, 2007). Chirwa (1997), in his study, includes partial repayment as component of default.

The identification of banks' default factors is a crucial condition for an efficient prevention of instability within the lending industry. However, before discussing the sources of default, it is important to appreciate the impact of default on access to consumption loans and then appreciate the study of factors affecting default. The following section discusses the relationship between consumption and default.

3.2.2 The Relationship between Default and Consumption from Borrowing

Household borrowing, from theoretical perspective, with perfect financial markets and without uncertainty, can be explained by focusing on demand-side determinants (Rinaldi and Sachis-Arellano (2006). However, from life-cycle model, aggregate

[6] To calculate loan balance at the end of n^{th} period on reducing balance, the following steps are followed;

$$B_n = B_{n-1} + (B_{n-1} - p)i - p$$

Where $B_n =$ balance after n payments have been made

$i =$ the interest rate per period

$p =$ the amount of payment

household debt depends on demographic factors, the expected path of future income and real interest rates. Life-cycle and permanent income hypothesis[7] consider consumer spending as consisting of wages, earnings and income from assets. To maximize utility, consumers aim to smooth consumption over time, despite varying incomes in different periods.

Building from Lawrence (1995) model of life-cycle consumption, assuming a two-period model and that private markets for insurance against income loss do not operate, borrowing will exceed lending rates.

Consumers maximize expected lifetime utility with preferences for consumption described by

$$V(C_1, C_2) = U(C_1) + \frac{1}{1+\beta} E[U(C_2)], \tag{1}$$

where C_t is a consumption in period t and $E(\cdot)$ is expectation operator conditional on information available in first period, and U is one-period, constant relative risk aversion utility function with properties; $U' > 0$, $U' < 0$ and $U'(0)$ is infinite. Period two consumption is uncertain because second-period labour income is uncertain.

Assuming a probability q for period-two income Y_L, a low level income, and $1-q$ probability of high level income Y_H. With perfect capital markets, individuals borrow

[7] The Permanent income hypothesis states that, in its simplest form, the choices made by consumers regarding their consumption patterns are determined not by current income but their longer-term income expectations.

and lend freely at a risk free rate, R. A saver gives up x_1 units of period-one consumption in favour of x_2 additional units of period-two consumption, where $x_2 = x_1(1+R)$. A borrower increases period-one consumption by x_1 units by giving up x_2 period-two units.

In perfect capital markets, individuals choose x_1 to maximize expected utility in equation 2 subject to budget constraint in equation 3.

$$V(C_1, C_2) = U(Y_1 + x_1) + \frac{1}{1+\beta}[qU(Y_L + x_2) + (1-q)U(Y_H + x_2)] \tag{2}$$

$$x_2 = -(1+R)x_1 \tag{3}$$

At the optimum, the consumer's marginal rate of substitution equals, $1+R$:

$$MRS = \frac{U'(Y_1 + x_1)}{qU'(Y_L + x_2) + (1-q)U'(Y_H + x_2)}(1+\beta) = 1+R \tag{4}$$

With perfect capital markets, lenders lend freely at the risk less rates. Financial institutions are only willing to do so if they face no risk of default. To ensure that no one defaults, severe penalties are imposed. Making an assumption that zero consumption causes infinite disutility, and that financial institutions have legal claim to all the resources held by default debtors, no one would expose himself to possibility of default and no one would borrow more than can be paid back with certainty.

In practice, financial institutions face growing restrictions on the ability to collect from default debtors. Assuming that in the event of default, financial institutions only claim income in excess of Y_L, with the probability that a borrower has a q percent chance of receiving Y_L in period-two, financial institutions face a q percent chance that they will not receive payment. Therefore, financial institutions no longer lend at risk-free rate. Instead they charge a competitive risk neutral rate at which expected profit equals zero as in equation 5:

$$1 + r = \frac{(1 + R)}{(1 - q)} \tag{5}$$

Equation (5) presents a higher marginal rate of substitution than the one in situations of no default in Equation 4. Thus borrowers pay more in period-two for today's consumption than they would if there were no cases of default.

The maximum loan size is also affected with the presence of default and is

$$b_{\max} = \frac{1}{1+r}(Y_{H-}Y_L) \tag{6}$$

The maximum amount is dependent on the value of r (the cost of borrowing in the presence of default, see equation 5). Thus, borrowers with high chances to default get lower loan amounts than less risky borrowers and repay more than their counter parts.

Notwithstanding the impact of default on consumption, there are factors that affect default. The next section discusses the factors that affect loan repayment.

3.2.3 Factors that Affect Loan Repayments

Borrowers at a household level default due to reasons at individual and economic environment. A loan which may have started off as a being easily serviceable may become a struggle due to unanticipated developments. Wilson (2007) explains that one of the reasons borrowers are unable to make a loan repayment by due date is liquidity problem. Negative cash flow is considered one of the main causes of illiquidity. In a household with home loan, illiquidity occurs when total disposable income after allowing cost of living and other expenses is insufficient to meet debt payments.

Wilson further discusses how liquidity failure affects loan repayment through his discussion on loan serviceability rate. Loan serviceability rate, r_s as given in equation (7), is the maximum loan interest a borrower can service an amount L from net disposable income after living expenses

$$r_s = \frac{t(W) - D - X}{L}, \quad (7)$$

where W represents gross income from wages, salaries and other sources, $t(.)$ is nonlinear function to calculate after tax income from pretax income, D is other debt repayment and X is the cost of living which may be represented by some minimum or acceptable standard of living from the given number of persons. Thus, the numerator is the net disposable income available to service a loan.

Fiscal policy has a bearing on the tax, $t(W)$. An increase in tax, for example, reduces disposable income and may affect the ability to service a loan. Thus in the course of repaying the loan, consumers may find themselves failing to repay their loans due to increases in taxes which reduce their disposable income. The capacity to service a loan may also be affected by changes in employment conditions and divorce rates. Inflation may also affect the cost of living, X, and in turn affect r_s. Finlay (2006) describes a similar aspect as indebtedness. In his study, the numerator is expenditure on all existing credit commitments and noncredit expenditures, and denominator net income. The logic drawn out of this is that over-indebtedness leads to nonpayment and default.

According to Barro (1976), primary collateral in personal loan markets is the future income stream of the borrower which may be garnished or assigned by the lender in case of default. This future income is assumed to be a normally distributed random variable whose mean and variance are known to the lender. The ability of the lender to garnish or assign income in case of default is limited by regulations. Default occurs when the amount of the loan exceeds the amount of future income which the lender can collect in case of default. Thus, for consumers, default on a loan is much more related to cash flow and income being insufficient to service the loan (Thomas et al, 2005).

However, personal shocks are far more important for individuals than continuous process of revaluation of their liabilities and assets. Consumer credit being unsecured and a consumer in default losing only some rights over his assets, using liquidity as the only determinant in consumer default may lead to some aspects of consumer default being excluded.

Households may fully discharge their debt by filing for bankruptcy (Chatterjee et al., 2007). Importantly, filing for bankruptcy protects a household's current and future earnings from any collection actions by those to whom the debts were owed. Lenders sometimes use dynamic incentives mechanisms to reduce cases of willful default (Morduch, 1999). Lending in small amounts which then are increased upon satisfactory repayment sometimes help improve repayment rates. When consumers see no benefit in accessing future credit facility, they are likely to default (Chatterjee et al., 2007). Households will attempt to yield the maximum utility they can achieve. If a household has debt and the budget set conditional on not defaulting is empty, the household usually defaults. However, a household with net liabilities and a budget set conditional on not defaulting being not empty, the household chooses the default option which yields higher lifetime utility. Thus, households in deferent situations will either voluntarily or involuntarily default. In some situations default will be the only option where as in others it becomes the best option. In Malawi, a borrower can default by voluntarily committing an Act of bankruptcy and filling at court a declaration to that effect (see S 3 (1) (f) of the Bankruptcy Act Cap 11.01 of the laws of Malawi) as read with section 8. S 9 provides that the effect of being declared bankrupt is that the court will appoint a receiver and consequently no creditor can proceed against the debtor or his property unless with leave of the court.

Gender is another factor that may affect individual bevaiour towards honouring contracts. There are two perspectives in the theory of gender and cooperation in literature; gender and gender composition (Anthony and Horne, 2003). Gender rests on the internal traits of individuals while the other perspective considers the effect of group

gender composition on cooperation. There is a widespread sense that women and men are different where some scholars suggest that gender differences are biologically innate while others suggest that women and men occupy different structural positions in the society and thus learn different kinds of behavior (Eagly, 1987; Lueprow et al., 2001). However, some scholars argue that individual behavior is beyond gender. People tend to conform (behave) in ways consistent with those around them (Asch, 1956) such that their behaviuor is group-oriented. This study is carried in an institution which lends to individuals hence the study of group effects is beyond this paper.

Education is another factor that aid financial decision. Households, especially low income and less educated, usually make mistakes with personal finance decisions (Martin, 2007). Levels of knowledge affect the way people behave in areas of cash management, savings, credit management, and investment. Courchane and Zorn (2005) argue that knowledge is a significant variable for explaining credit outcomes and increasing individual knowledge yields better financial outcomes. This study includes education in determining its effect on the probability of default.

The other factors that affect default in loan contracts are deficiencies in product design which often result in excessively high transaction costs for borrowers, raising effective interest rates to high levels which in turn leading to dissatisfied clients who often end up exiting lending programmes, either willfully or by defaulting on loans (Burritt, 2006). Morduch (1999) explains some of the mechanisms adopted to improve loan repayments like group lending and regular loan repayments.

Bad risk management and control is another source of default in microfinance institutions (Godlewski, 2005). The excess risk is the output of a credit decision which increases default risk. The main reason why banks undertake such credit risk taking behavior is poor agents' decision. The moral hazard, where the agent/loan officer behaves in an undesirable way, causes default.

Other factors that influence repayment are information asymmetries, adverse shocks affecting the borrower, or the low performance of institutions such as justice or education (Godquin, 2004). Information asymmetries arise when gaining information on the characteristics or on behavior of borrower is costly for MFI. The result of information asymmetry is adverse selection and moral hazard. In a lending environment, information asymmetry results in allocation of loans to borrowers with undesirable characteristics and moral hazard results in borrowers behaving in an undesirable way. Moral hazard and information asymmetry increase the proportion of borrowers who cannot repay their loans on time. Some lenders in Malawi for a decade have adopted group lending with joint liability to solve the problem of information asymmetry. Nevertheless borrowers have remained unwilling to repay loans (Simtowe et al., 2006).

In general, there are other factors that affect the repayment in loans. Burritt (2006) discusses a list of sources of weak performance in microfinance institutions. Some are:

i. Sub-culture of willful default. The subculture has been encouraged by political figures that forgive debt in an effort to win political favour. This sends mixed messages to clients about repayment obligations;
ii. Weak portfolio management practices on the part of MFIs which do not adequately enforce loan contracts.

iii. There are some programmes that use credit as a mechanism for transferring money to food insecure or poor households. In some cases, donors simply do not enforce loan contracts and send confusing messages about the need to repay. Sometimes donor credit programmes are targeted at households that cannot pay for loans and have no expectation of repayment;

iv. The inability of lenders to use the legal system to enforce contracts. This happens when legal authorities are unable to process and adequately rule on actions against defaulters.

v. Failure of credit risk management strategies. For example, stop orders are used by MFIs to collect loan repayments directly from borrowers. Some borrowers have been able to circumvent such stop order systems in Malawi.

Having discussed the theories of default, it is important to discuss methods which are used to reduce default. Using the factors thought to affect default, credit scoring models help lender make decisions on who to grant a loan to. The section below discusses credit scoring mechanism.

3.2.4 Credit Scoring Methods

In risk credit scoring, two mutually exclusive outcome states for each individual's behavior are considered; Good and bad (Zhu et al., 2001). An individual is considered good if he or she does not default. The fundamental decision problem in credit scoring is to decide which individual to accept. Credit scoring is the set of decision models and their underlying techniques that aid lenders in the granting of consumer credit. These techniques assess, and therefore help to decide, who will get credit, how much credit they

should get, and what operational strategies will enhance the profitability of the borrowers to the lenders (Thomas et al., 2002).

Making a decision about accepting or rejecting a client credit can be supported by judgmental techniques and/or credit scoring models. The judgmental techniques rely on the knowledge and both past and present experience of credit analysts, who evaluate the required requisites, such as the personal reputation of a client, the ability to repay credit, guarantees and client's character.

Judgmental decision in granting loans rests on the view that what matters are the five Cs (Thomas, 2000). These Cs are:

i. The **character** of a person; the decision maker considers their familiarity of the applicant's family.
ii. The **capital**; how much capital is the applicant asking for.
iii. The **collateral**; what is the applicant willing to put up from their own resources.
iv. The **capacity**; what is the applicant's repayment ability
v. The **condition**; what are the conditions in the market.

Thus after considering the factors above, one makes a decision of granting a loan or not. However, Steenackers and Goovaerts (1989) argue that decisions based on human judgment are time consuming hence expensive as such financial institutions make use of credit scoring systems. A switch from human judgment of the risk of default to the models of credit scoring was led by the economic pressures resulting from increased demand for credit allied into greater completion. Also the development of computer technology has led to development of sophisticated statistical models to aid the credit granting decisions. Papers of Hand and Henley (1997), Rosernberg and Gleit (1994), and

Thomas (2000) outline the different modeling techniques that are used in credit decisions. Credit scoring is the name used to describe this more formal process of determining how likely applicants are to default within their repayments. Making use of historical data and statistical techniques, the lender/decision maker tries to isolate the effects of various applicants' characteristics on delinquencies and defaults. Rosernberg and Gleit (1994) suggest that a good scoring system outperforms human experts.

3.2.4.1 The use of Computerized Scoring System

Computerized procedure of credit scoring attributes to the client a score according to a number of characteristics as income, profession and age among others. In developing a credit scoring model, the developer needs to answer two major questions: which characteristics to use and the score for each characteristic.

In mathematical terms, Steenackers and Goovaerts (1989) express credit scoring system as a decision rule based on a linear function

$$f(x_1,...,x_k) = b_1x_1 + b_2x_2 + ... + b_kx_k \quad (8),$$

Traditionally, estimating the default risk of an applicant or current borrower has used linear or logistic regression, mathematical programming or classification trees, with logistic regression being the most common model (Thomas et al, 2005). Wiginton (1980) was one of the first to describe the results of using logistic regression in credit scoring.

In credit scoring, some of the variables/characteristics (factors) used are categorical in nature. The use of such variables violets the normality assumption of some models like linear regression and discriminant analysis. In situations of variables being categorical, logistic regression is the appropriate method since it does not imply that the variables are multivariate or normally distributed.

The logistic regression is expressed as

$$\log\left(\frac{p}{1-p}\right) = b_0 + b_1 x_1 + b_2 x_2 + \ldots\ldots\ldots + b_k x_k . \quad (9)$$

In credit scoring, the main interest is in developing a scoring system which can correctly rank customers in terms of their relative default risk so that those above some cut-off are more or less riskier than those who are below. Credit scoring is beneficial both to the lender and the borrower. Henley and Hand (1997) argue that accurate classification of applicants is beneficial both to the creditor (in terms of increased profit or reduced loss) and to the applicant (avoiding over commitment).

Credit scoring models are broadly classified as applicants scoring and behavioral scoring. The objective of both is whether the customer will default or not in a given period. However, application scoring models are used when granting a loan to a new applicant. On the other hand, behavioral scoring models are used when the decision maker wants to evaluate the credit worthiness of existing client to determine if they can be granted additional loan.

All in all, the theoretical literature section presented the problem consumers face when lenders consider losses arising from default such as issuing smaller loans to those with higher probability of default. The section also discussed the factors related to default and the models that are used to see which factors are more likely to cause default.

3.3 Empirical Literature

It is generally thought that an increase in MFIs will expand financial service opportunities for the poor, thereby contributing to the improvement of their welfare. Yet, if there are too many MFIs competing with each other in the same region, borrowers who did not complete repayments to a certain MFI might be able to obtain loans from other MFIs (Kono and Takahashi 2009). Kadale Consultants (2010) observe that there is an increase in the number of players in the financial sector in Malawi over the years between 2005 and 2010, particularly among banks and other non-bank credit-only institutions, which allowed for greater competition within the sector. Schreiner (2004) makes another observation on the effects of competition on default. He observes that about one-third of the increase in problematic loans was due to changes in characteristics that appear in the scorecard, while two-thirds of the increase was due to other factors such as changes in competition and in the macro-economy. Thus in some cases lenders are overtaken by the objective of commanding huge market share at the expense of loans quality.

Income is an important variable in credit granting decisions. Lenders consider the income levels of borrowers in order to accept or reject a client. Again, income is put into consideration when deciding how much loan to issue to a borrower. Researchers such as Rinaldi and Sachis-Arellano (2006) and Peter and Peter (2006) observe a positive

relationship between borrowers' income and default. In their observation, the younger households (whose income is less than the average income) tend to be adversely affected by increasing burden of mortgage payments caused by volatility in prices and interest rates than middle-aged households.

At the individual level, the life-cycle hypothesis predicts that wealth increases up to retirement, and declines smoothly thereafter. Such increases in wealth imply that the individual ability to repay improves with the wealth accumulated and of course worsens with the decline in wealth accumulation. Wealth generation in the life-cycle hypothesis is linked to an individual's age. Jappelli (1999) observes the typical humped shape predicted by the life-cycle hypothesis. He finds out that wealth peaks at age 55 and declines steadily thereafter. Thus at some age when income starts declining, borrowers are likely to default and lending out to such individuals would be risky. In Malawi, a survey by NSO in 2005 shows the same humped shape. Grouping individuals into age categories of 15-24, 25-34, 35-49, 50-64, 65+, the survey found out that 69.4 percent, 84.7 percent, 87.1 percent, 85.7 percent, 73.3 percent were involved in income generating activities respectively. This shows that the age group of 35-49 years was the one mostly involved in income generation.

Previous studies have also shown that loan amount has an impact on the probability of default (Fafchamps and Gubert, 2002; Moffatt, 2005; Chirwa, 1997). Larger loan amounts are likely to affect repayments records in difficult economic and political environments than smaller loans. Fafchamps and Gubert (2002) observe that the propensity to repay a loan decreases with loan amount and interest rate. Moffatt (2005) found that loan amount has a positive impact on arrears. However, some studies have had

different observations. Kapsalis (2001) observes that up to certain limit, higher loan amounts do not appear to have noticeable impact on default rates. In Malawi, a study by Chirwa (1997) finds that amount of loan granted was not statistically significant.

Gender is also another variable that captures behavioral differences towards repayment of loans. Previous studies have had different observations on the impact of gender on default. Moffat (2005) observes that the proportion of females defaulting is higher than that of males, but that male defaulters are on average in arrears to a greater extent than females. In another study, Pearson and Greeff (2006) observe that females have better repayment history than males. Addisu (2006) finds that despite its positive effect on repayment, gender (as female borrowers) is not significant. Such differences in findings make gender an important variable in this study.

Repayment period (term of the loan) also affects the performance of the loan book. There is an assumption that default rates are high during the first 12-24 months of starting of the loan. Malik and Thomas (2007) observe that propensity to default is high during early stage of loan and gradually comes down there after.

The chapter reviewed the theoretical and empirical literature in the subject of consumer default. Theory suggests several factors that cause default which have been tested in some studies elsewhere. This study employs a logit model to study some of the factors using the Malawian data. The next chapter outlines the study methodology.

CHAPTER FOUR

METHODOLOGY

4.1 Introduction

The chapter outlines the study methodology. Section 4.2 presents the analytical framework of the model. Section 4.3 outlines the econometric model with the empirical model and variable description presented in section 4.4. Section 4.5 discusses the data used in the study.

4.2 Analytical Framework

Forecasting financial risk has become one of the major growth areas of statistics and probability modeling. When financial risk is mentioned, one tends to think of portfolio management, pricing of options and other financial instruments. Less well known but equally important are credit and behavioral scoring, which are applications of financial risk forecasting to consumer lending (Thomas, 2000).

According to the economic theory of choice, individual are assumed not to be paralyzed by indecision. They completely understand and can make up their minds about desirability of any two alternatives (Nicholson, 2002). Rational individuals make choices based on expected utility obtained from an action taken.

In a financial setting, individuals too have choices, they can choose to default or not, even when they have enough income to effect repayment. Diagne (2000) argues that the main reason for default in MRFC credit groups is unwillingness to repay and not inability to repay. Such willful default is also a result of some culture that may exist as Chirwa (2002) argues that there is some lingering poor credit culture in Malawi. He argues that during the1990s, several parastatals in microfinance registered loan repayment rates below best practices standards. Such repayment records created the culture that microfinance loans are grants that need not be repaid.

Suppose y is an indicator for default or no default such that $y = 1$ if a loan is defaulted and $y = 0$ otherwise, and U_y^* describe the utilities for two outcomes, thus

$$\begin{aligned} U_{y=1}^* &= x'\beta_1 + u_1, \\ U_{y=0}^* &= x'\beta_0 + u_0, \end{aligned} \tag{10}$$

where x is a set of control variables, β_0 and β_1 are vectors of unknown parameters and, u_1 and u_0 are error terms.

An individual chooses to default if utility gained from default exceeds utility to be gained if full payment is made as Chatterjee et al. (2007) argue that an indebted household will weigh the benefit of maintaining access to the unsecured credit market against the benefit of declaring default and having its debt discharged

Default will therefore be observed when the following condition is satisfied;

$$U^*_{y=1} > U^*_{y=0}$$
$$y = 1(U^*_{y=1} > U^*_{y=0}) \quad (11)$$
$$y = 1(x'\beta_1 + u_i > x'\beta_0 + u_0)$$

Equation 11 presents an unobservable condition to be met for default to take place.

4.3 The Econometric Model

To estimate the probability that a client defaults, a logit specification is adopted following Wiginton (1980), Srinivasan and Yong (1987) and Joanes (1993) studies. The technique uses maximum likelihood estimation which chooses coefficient measurements that maximize the likelihood of a sample dataset being observed.

We consider the situation in which we have a sample of n independent observations (x_i, y_i) $(i = 1,...,n)$ on the random vector (x, y), where y_i denotes the observed value of dichotomous outcome variable y, in this case default or no default, and the random vector $x = (x_1,...,x_b)$ consists of potential explanatory variables. We will assume that the outcome variable is coded 0 (no default) and 1 (default).

Logistic regression involves directly modeling probabilities of default and takes the form

$$p(y = 1|x) = \frac{e^z}{1+e^z}, \quad (12)$$

where $z = \beta_0 + \beta_1 x_1 + ... + \beta_b x_b$. The probability increases with z.

The probability of the contrary event is

$$p(y = 0|x) = 1 - p(y = 1|x) = e^{-z}/(1+e^{-z}). \quad (13)$$

This brings us to the log of odds

$$\ln \frac{p(y=1|x)}{p(y=0|x)} = \beta_0 + \beta_2 + ... + \beta_b x_b \quad (14)$$

Once the model has been fitted to a set of data, the estimated probabilities of each outcome may be calculated. The estimated probability may be used for classification purposes.

The marginal effects of the k^{th} variable is calculated as follows on the log of odds of default occurring is then presented as

$$\frac{\partial \Pr ob(y=1)}{\partial X_k} = \frac{e^z}{1+e^z} * \frac{e^z}{1+e^z} * \beta_k. \quad (15)$$

4.4 The Empirical Model

The explanatory variables used in the study were used in similar studies by Wiginton (1980), Thomas (2000) and Wang (2010). Their studies were done on the following customer characteristics: loan amount, customer's age, customer's gender, term of loan, marital status, number of dependants, and education of customer. In this study, marital status and number of dependents are not included due to unavailability of information on the variables. However, the study includes indebtedness. Finlay (2006) argues that over-indebtedness is a sub-set within the universe of possible default scenarios and a suitably constructed credit scoring model, designed to predict future default, should automatically identify the cases of default arising from indebtedness. The reason behind the inclusion of the variable is the purpose of the loan. Customers apply for

loans to smooth consumption, yet they service the loan from their salaries from which they could not meet current consumption needs. This implies that the take home salary when servicing of the loan begins is reduced which may likely affect future expenditure patterns.

The empirical model is presented as

$$\ln\left(p(y=1|x)\right)_i/\left[1-\left(p(y=1)\right)_i\right]=\beta_0+\beta_1 gender_i+\beta_2 months(12)_i+\beta_3 months(24)_i+\beta_4 months(36)_i+\beta_5 education_i+\beta_6 commitment_i+\beta_7 age_i+\beta_8 indebtedness_i, \quad (16)$$

where i refers to the customer.

4.4.1 Variables description

The dependent variable y depicts default when equal to 1 or no default when equal to 0. Loan repayment for the company is on monthly basis. Wilson (2007) argues that default is any failure to meet terms of credit obligation, hence, the study classifies any installment or part thereof, in arrears of 30 days as default.

The independent variables used in the study are indebtedness, loans repayment period, applicant's gender, age, and education. Huang et al. (2007) argue that credit scoring models are developed to categorize applicants as either accepted or rejected with respect to the applicants characteristics such as age, income and marital status.

Indebtedness: this is measured as total deductions from monthly income over gross income multiplied by 100. Total deductions incorporate all expected deduction at

the time of first monthly installment including the calculated monthly installment. The expectation is, the higher this fraction is the higher the risk of default i.e. there is a positive relationship between indebtedness and default.

Term of loan: the length of loan will be measured as number of months between origination date and maturity date of the loan. Loan collections are done once a month. The relationship between the loan period and default is expected to be positive. This is the case because the longer the repayment period is, the smaller the amount of principal paid when payment is due, hence the likelihood of higher risk of default. Greenwing Capital offers loans in four repayment categories- six months, 12 months, 24 months and 36 months and are coded as Months(6), months(12), months(24) and months(36) is a thirty six respectively. Months(12) = 1 if loan period is twelve months: 0 otherwise, months(24) = 1 if loan period is twenty four months: 0 otherwise, and months(36) = 1 if loan period is thirty six months: 0 otherwise. A six month loan term is the bench category.

Customer's education: this is measured by the highest level of education achieved by the customer. The intuition is that the higher one goes with education the more rational the decision he makes. Thus, an educated person is able to make informed decisions regarding default. He/she ably understands the consequences of default in a contract. In this study, education is coded as 1 if attained higher education (above MSCE), 0 if one has an MSCE or below. No education has been excluded because the clients of the company are employees of various institutions who are on payroll and no employer hires people with no education at all. Economic theories regard education and

training as investments in human capital that increase the scope of gainful employment and improve net productivity of an individual (Peter and Peter, 2006).

Commitment: this captures the amount of principal that has been approved and booked. The expectation is that he higher the value of the loan, the more risky it is. This is because, as the loan amount increases, the installment amount increases, reducing the client's future disposable income more than one who has had a smaller loan, holding other factors constant. An excessive indebtedness can lead to higher debt-service burden with a possibly negative impact on future consumption (Rinaldi and Sachis-Arellano (2006) and in turn leads to default.

Age: is measured as number of years of a client. It is expected that older people will default less than the youth. This is because, according to the life cycle hypothesis, the young generation is just getting established and their current consumption is highly dependent on debt finances while the older generation enjoys consumption from their savings.

Gender: captures the state of a client as male or female. Gender = 1 if male and 0 otherwise. The objective of including this variable is to capture behavioural differences in repayment of consumer loans arising from gender differences. The expected sign of gender is ambiguous. Some studies have found men defaulting more than females while in other studies females defaulting more than males. Moffat (2005) and Pearson and Greef (2006) observe that females are more likely to default than males, however, Addissu (2006) and Wang (2010) contend that male clients are likely to default more than their female counter part.

4.5 Data

The study uses secondary data. Data used in this research were collected from Greenwing Capital Limited. Personal loan applications made between July 2008 and December 2009 were chosen.

A sample of 300 clients was drawn from the file of customers of Greenwing Capital from all 30 branches across the country. To ensure confidentiality, contract numbers were used. All the clients in the sample are consumer loan applicants. The personal characteristics and payment records were constructed from computer printouts and loan application forms. Sampling was done randomly using excel. Information on customers is at the origination of the loan.

Information was available on personal characteristics, financial situation, and loan related characteristics. Data analysis is conducted using STATA 10.1.

CHAPTER FIVE

EMPIRICAL ANALYSIS

5.1 Introduction

This chapter presents and analyses results of the study. Section 5.2 presents some descriptive statistics of variables used then the findings of the impact on probability of default in section 5.3.

5.2 Descriptive statistics

The section presents descriptive statistics of all variables used in the study. The summary of the descriptive statistics is presented in tables 5.1, 5.2 and 5.3. The output in Table 5.1 presents mean, standard deviation, minimum and maximum values of variables for all clients.

Table 5.1 Summary of Descriptive Statistics for all Clients

Variable	Observations	Mean	Std. Dev.	Min	Max
Amount	300	90.50	48.61	10.00	400.00
Age	300	41.24	7.96	25.00	69.00
Gender	300	0.83	0.38	0.00	1.00
Indebtedness	300	0.52	0.09	0.16	0.86
Months12	300	0.01	0.10	0.00	1.00
Months24	300	0.10	0.30	0.00	1.00
Months36	300	0.88	0.32	0.00	1.00
Education	300	0.56	0.50	0.00	1.00

Note: loan amount is in Thousand Malawi Kwacha

Source: own computation

Table 5.1 presents summary statistics for all clients. There were 300 loans sampled. Of the total sample, 71 defaulted representing a default rate of 23.67 per cent. The average age for all applicants is 41.24, the minimum being 25 and maximum 69. It is important to note that the retirement age for Malawi is 65 years. However, the government sometimes extends the contracts of some employees beyond 65 but on temporary basis. The provision of loans to 69 year olds puts the portfolio at risk since such clients may likely quit serving the government or their employer (government) may terminate their service as such they (clients) may default in their loans. The average age for defaulters was 41.92 years, slightly higher than the non-defaulters' 41.04.

The average indebtedness for all clients is 51.57 percent while the one for defaulters was 52.39 percent, which is slightly higher than non defaulters' 51.31 percent. This shows that defaulters are more indebted than non-defaulters. The 51.57 percent average indebtedness indicates that the company committed its client beyond the maximum of 50 percent as stated in the Employment Act of Malawi (2000) that no employer shall deduct an amount more than one-half of the employee's wage for the period in respect of which wages are paid. Such commitments may likely lead to default.

The average amount of loan applied both defaulters and non-defaulters is MK90500 with the minimum as low as MK10000 and maximum of MK400000. The average loan amount for those who defaulted is MK91300 and that of non-defaulters being MK88803. Standard deviation of MK48617 shows that there was a high variation in the amount of loan applied considering an average loan of MK90500. Standard deviation is highest in clients who defaulted.

The output in Table 5.2 presents mean, standard deviation, minimum and maximum values of variables for all clients who did not default.

Table 5.2 Summary of Descriptive Statistics for Clients Who Did Not Default

Variable	Observation	Mean	Std. Dev.	Min	Max
Amount	229	91.03	46.55	15.00	290.00
Age	229	41.48	7.94	25.00	69.00
Gender	229	0.85	0.36	0.00	1.00
Indebtedness	229	0.51	0.09	0.16	0.77
Months12	229	0.00	0.07	0.00	1.00
Months24	229	0.10	0.31	0.00	1.00
Months36	229	0.89	0.32	0.00	1.00
Education	229	0.62	0.49	0.00	1.00

Source: own computation

Note: Amount is in Thousand Malawi Kwacha

The output in Table 5.3 presents mean, standard deviation, minimum and maximum values of variables for clients who defaulted.

Table 5.3 Summary of Descriptive Statistics for Clients who Defaulted

Variable	Observations	Mean	Std. Dev.	Min	Max
Amount	71	88.80	55.07	10.00	400.00
Age	71	42.04	8.03	27.00	61.00
Gender	71	0.76	0.43	0.00	1.00
Indebtedness	71	0.52	0.09	0.32	0.86
Months12	71	0.03	0.17	0.00	1.00
Months24	71	0.07	0.26	0.00	1.00
Months36	71	0.87	0.34	0.00	1.00
Education	71	0.39	0.49	0.00	1.00

Note: amount is in Thousand Malawi Kwacha

Source: Own computation

The statistics show that 82.7 per cent of the sample were males and 17.3 percent females. However, as we move from the whole sample to the group of non-defaulters, the fraction of males in the group of clients with clean repayment records grows to 84.7 percent while the same in the defaulters' group is 76.1 percent. This demonstrates that the propensity to default increases as we switch gender.

Table 5.1 shows that 56.3 percent of the sample had studied beyond MSCE. But this proportion is greater in the group of non-defaulters. 61.5 percent of non-defaulters had gone beyond MSCE in their studies. Only 39.4 percent of the defaulter studied beyond MSCE. This suggests that the higher one goes with education the less risky they become.

Finally, the statistics show that one percent of the sample applied for a six months, one percent 12 months, 9.7 percent 24 months and 88.3 percent 36 months. Relating information in table 5.2 to table 5.3, non defaulters had longer repayment terms than defaulters. For example, 10.5 percent of non-defaulters were in the 24 months loan term category as opposed to defaulters' 7 percent. Again, 88.6 percent of non defaulters got a 36 months loans terms while only 87.3 percent had loan term of 36 months. Thus a bigger proportion in the defaulters group had short term loans as opposed to non-defaulters who had a greater proportion in the longer term loans.

5.3 The Econometrics Results

5.3.1 Diagnostic Tests

To test for any specification error, a linktest is done. The results in table 3A in the appendix show that there is no specification error. The linktest is not significant at 5 percent level indicating that no relevant value is left out. Table 4A in the appendix shows that there is no major correlation among variables. The correlation coefficients for all variables are below 0.5 except between 36 months-loan term and 24 months-loan term. Joint significance of the independent variables is checked by the Wald Chi which is significant at 1 percent as in table 5A in the appendix.

5.3.2 Logit Regression Results

This section presents and analyses estimated results. The logit model results are used to analyze the factors that influence default. A logit model was estimated, and marginal effects are presented instead of the coefficients. The marginal effects measure

the magnitude of change in the conditional probability as a result of a change an independent variable when other variables are constant. The marginal effects are presented in table 5.4.

Table 5.4 The marginal effect of various variables on the probability of default

Variable	Marginal effect
Amount	0.0004
	(0.0006)
Age	0.004
	(0.143)
Gender	0.194**
	(0.079)
Indebtedness	0.406
	(0.311)
Months12	0.10
	(0.183)
Months24	-0.254*
	(0.052)
Months36	-0.603*
	(0.234)
Education	-0.235*
	(0.059)

Note The standard errors are in parenthesis

[*] Significant at 1 percent; [**] Significant at 5 percent

Source: Own computation

There were four variables which were significant. It can be seen that differences in repayment patterns were due to differences in gender, repayment period (24 months and 36 months repayment periods) and the education level of applicants.

The results show that gender significantly affect the probability of default in consumer loans at the 5 percent level. Relative to female applicants, the probability of default for a male client is on average lower by 0.195. This result is consistent with Moffat (2005) findings in the United Kingdom. This challenges the priority given to women in microfinance programs based on better repayment performance of women as is sometime done.

The results indicate that, while twelve months term did not prove to have a significant impact on repayment behavior, 24-month and 36-month loan terms exhibit significant effect on the probability of default at the 1 percent level. Relative to a 6 month-loan term, a 24 month-loan reduces the probability of default on average by 0.25. Additionally, relative to a 6 month loan term, a 36-month loan term reduces the probability of default on average by 0.6.

The study shows that there is highly significant negative relationship between education attainment and probability of default. Holding other factors constant, relative to an applicant with an MSCE or below, an applicant with qualifications above MSCE has a lower probability of default on average by 0.235 at the 1 percent level. This is consistent with Peter and Peter (2006) findings in Australia. This may suggest that investing in

education will lead to the development of the financial sector through improved repayment record.

Loan amount, age of client and indebtedness are insignificant supporting the null hypothesis that the three variables have no impact on probability of loan default. The work of Chirwa (1997) in Malawi also had the same findings that commitment amount does not significantly affect the probability of default. On the other hand, the Life-Cycle Hypothesis assumes that consumers maximize utility subject to the lifetime resources available to them. The consumption plan that results is a function of resources available, the rate of return on capital and the age of agent. Thus, people during their early stages of life consume from borrowed funds. As they approach their middle age they start saving for future consumption. In their late ages they consume from funds they have been saving. From table 5.1, the average age of all clients is 41.243. This is the age when most people save than borrow, therefore, those within this age group and borrow may not be as committed. Thus most people who borrowed from Greenwing were those within the age bracket that saves. This, therefore, explains the reason age is not significant.

CHAPTER SIX

SUMMARY, CONCLUSIONS, POLICY IMPLICATIONS AND LIMITATIONS OF THE STUDY

6.1 Introduction

This chapter concludes the study. Section 6.2 presents the summary of results. Section 6.3 discusses the policy implications of the study while section 6.4 provides the study limitations and area for further research.

6.2 Summary and Conclusions

The study uses a Logit model with the objective of finding the factors that affecting probability of default at Greenwing Capital Limited, a microfinance company in Malawi. The specific objectives in this study are to determine the effect of indebtedness on the probability of default, investigate how demographic factors like gender and age affect the probability of default, and investigate the effect of loan period on the probability of default.

The null hypothesis that indebtedness has no impact on default was not rejected. Indebtedness is not significant though, it has the expected sign. Age is also not significant. Gender affects the probability of default. Females are more likely to default than males. This behavior is unusual but consistent with some studies cited earlier. The

loan repayment period affects the probability of default with 24 months-term loan and 36 months-term significantly affecting the probability of default. Attending higher education also significantly affects the probability of default where clients with higher education are less risky.

6.3 Policy Implications

The results from this study suggest that there is much more room for improvement if credit supply is to be increase for low income earners. The following recommendations are given based on findings from this study.

Firstly, the result on the impact of education on the probability of loan default has an implication on the role of government on reducing default risk in financial institutions. The results show that clients who attained higher education are less likely to default in their loans. This suggests that an investment in education infrastructure will improve the repayment capacity on applicants in microfinance institutions. The government can also take an initiative to declare attendance of primary school mandatory to ensure everyone has the Primary School Leaving Certificate. This will improve the numbers of those who attend secondary school and beyond.

Secondly, the findings on repayment period imply that lenders will be more willing to offer loans on longer terms than shorter terms. However, despite that such loans attract much more interest than shorter loan terms, they do command higher amounts than shorter loan terms. Thus financial institutions will need to have more funds to meet the growing demand for loans. The government can intervene by reducing the borrowing rate for financial institutions so that they (Financial Institutions) ably meet the

demand for such loans. Barth et al (1983) argue that the cost of capital is related positively to the interest rate and negatively to the amount financed. Thus with high cost of capital, lenders will not only pass the cost to borrowers by charging high interests but also have very little funds available to lend out.

6.4 Limitations of the study

The study did not go without limitations. The major limitation of the study is non coverage of other microfinance providers. The study was intended to cover all players in the microfinance sector but some institutions did provide relevant information to the study. However, the company under study is a leader in consumer lending with 37 percent market share in 2010.

The other issue is inability to control for competition. Competition would be an important variable to include in the study. A fight for market leadership may make lenders compromise standards. However, the data cannot allow controlling for this.

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APPENDICES

APPENDIX A: DEMAND FOR LOANS IN MICROFINANCE INSTITUTIONS

Table 1A presents information on the use of funds as sited by Malawian households in a Finscope Survey Questionnaire

Table 1A Use of funds borrowed from various sources

Reason for borrowing	**Frequency**	**Use**
An emergency other than medical	134	Consumption
A wedding or dowry	5	Consumption
Funeral expenses when needed	11	Consumption
Living expenses when you do not have money at that time	197	Consumption
buying a bicycle, motorcycle, car, truck or other transport	7	Consumption
retirement or old age	1	Consumption
holiday or travel	2	Consumption
for another person to use	8	Consumption
Buying or building a dwelling place	54	Consumption
Buying household goods or appliances	31	Consumption
Education or school fees	49	Consumption
Buying a dwelling place or land to rent out	4	Business
Buying livestock	28	Business
Buying farming equipment or implements	102	Business

Farming expenses such as seeds or fertilizer or fishing expenses such as nets or boats	234	Business
Starting or expanding business	210	Business
Putting money or goods into someone else's business	5	Business
Buying land	9	Business
Invest in shares, treasury bills or government bonds	0	Business
security or cash collateral so that you can borrow more money from someone else	2	
paying off another debt	8	
Other	62	

Source: Finscope Survey Questionnaire (2008)

Table 2A shows information on suppliers of microfinance services in Malawi by 2012

Table 2A Microfinance Institutions in Malawi

Institution	Financial Services Offered	Total assets	Number of clients	Business volume	Branches and outlets	Financial Services Offered
CUMO	Microenterprise loans, small enterprise loans, agricultural loans and loans specifically for tea sector	MK490,988,272	33873	MK178,966,041 in loans	12 branches	Business
Finca Malawi	provide business loans		14133	MK313,916,250 in loans to customers	several outlets in all regions with 16 branches	Business
Microloan	credit only	MK150,833,000	10677	Total loan portifolio of	20 branches	Business

Foundation				MK331,080,000		
Pelton Finance	Salary based/employer guaranteed loans	MK25,000,000	156	A loan portfolio of MK5.35 million	1 branch in Lilongwe	Consumption
Greenwing	Credit only, salary-based loans	MK2.5 billion	31000	MK2 billion	30 branches	Consumption
Izwe	fixed term payroll based loans		9282	total loan of MK481 million	3 branches	Consumption
Blue Financial Services	Salary based/employer guaranteed loans			MK999,459,175 in loans	6 branches	Consumption
Touching Lives	provide group based loans	MK13,738,691	800	MK10,441,677	2 branches in Blantyre and	Business

					Mulanje	
DEMAT	Loans for small scale businesses and compulsory savings	MK9,387,855	1450	MK13,321,285	operates in 6 districs with 6 branches	Business
MARDEF	Credit only: provides business loans	MK86,732,000	154,000	MK669,041,000	Nationwide coverage	Business
MRFC	Savings and credit products. Focuses on agricultural loans and medium-sized loans to non-agribusiness	MK5,967,993,745	262,475 savings accounts	Savings MK536,111,665, total loan portfolio MK3,825,540,469	operates in 16 districs with 6 full branches and 20 sub-branches	Business
PRIDE	credit only; offers micro-leasing products			MK233,024,714 in loans	in all districtsct except Likoma,	Business

					Nsanje, Chitipa and Phalombe	
SEDOM	Credit only: targets SMEs	MK141, 343, 843	10, 970	MK53,099, 220 in loans	operates in 9 districts	Business
SACCOS (MUSSCO members)	savings and credit	MK2,359 ,552,232 in assets and MK1,629 ,671,802 in member shares	82982	MK138,863 ,300 in deposits and MK1,905,7 39,565 in loans	almost nation wide coverage	Business

Source: Kadale Consults (2010)

APPENDIX B: DIAGNOSTIC TEST

The tables below present information on various tests; specification, correlation of variables, and joint significance of variables.

Table 3A: The Linktest for Specification Error

y	Coefficient	Sd. Err	z	p>z
_hat	0.74	0.33	2.22	0.03
_hatsq	-0.14	0.16	-0.92	0.36
_cons	-0.04	0.25	-0.17	0.87

Source: Own computation

Table 4A: Correlation Coefficients for Various Variables

	Amount	**Age**	**Gender**	**Indebtedness**	**Months 12**	**Months 24**	**Months 36**	**Education**
Amount	1							
Age	0.11	1.00						
Gender	0.00	0.08	1.00					
Indebtedness	0.42	0.11	0.05	1.00				
Months 12	0.07	0.03	0.05	0.11	1.00			
Months	-0.12	0.04	-0.06	-0.14	-0.03	1.00		

24								
Months								
36	0.12	-0.01	0.03	0.10	-0.28	-0.90	1.00	
Educati								
on	0.40	0.09	-0.12	0.26	0.02	0.02	-0.03	1.00

Source: Own computation

Table 5A Joint Significance Test

Number of Observations	300
LR chi2(8)	28.58
Prob > chi2	0.0004
Pseudo R2	0.087

Source: Own computation