

MULTIPLE BORROWING, OVER-INDEBTEDNESS AND HOUSEHOLD
CONSUMPTION EXPENDITURE IN GHANA



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Sciences, College of Humanities and Legal Studies, University of Cape Coast,
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Philosophy Degree in Economics

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Candidate's Declaration

I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this University or elsewhere.

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Supervisors' Declaration

We hereby declare that the preparation and presentation of this thesis were supervised in accordance with the guidelines on supervision of thesis as laid down by the University of Cape Coast.

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ABSTRACT

Multiple borrowing and over-indebtedness are significant issues of the credit industry, which have attracted recent scrutiny. As a growing area of study, this thesis extends existing research from an objective perspective. The three themes addressed are: (1) the effect of institutional density on multiple borrowing, (2) the effect of loan amount on over-indebtedness, and (3) the effect of over-indebtedness on household consumption expenditure. It adopts a quantitative approach using secondary data from GLSS6 and RAFiP surveys. Probit, logit and identification by heteroscedasticity estimation techniques were employed for the analyses. The results suggest that increasing the density of MFIs in rural areas may engender multiple borrowing and rural clients of FNGOs may be more likely to engage in cross-borrowing. Larger loan amounts raise the probability of over-indebtedness; however, the magnitude depends on the loan size. Over-indebtedness reduces household consumption expenditure by 20 percent, leading to a fall in living standards. Prevalence of multiple borrowing and over-indebtedness are 35 and 28.7 percent respectively. The thesis confirms existing concerns and recommends the following for stakeholders: borrowers' financial discipline; institutions are advised to cap the critical threshold of debt-burden at 15 percent; particularly, for borrowers on low incomes and share information between them to monitor rising indebtedness. The Microfinance Desk at Bank of Ghana (BOG) is advised to strengthen institutional monitoring. The Ministry of Finance could establish a Credit Advisory Bureau (CAB) in every region and the government is advised to deepen the social objective framework of credit delivery for vulnerable clients.

KEY WORDS

Household consumption expenditure

Identification by heteroscedasticity

Loan amount

Microfinance institutional density

Multiple borrowing

Over-indebtedness



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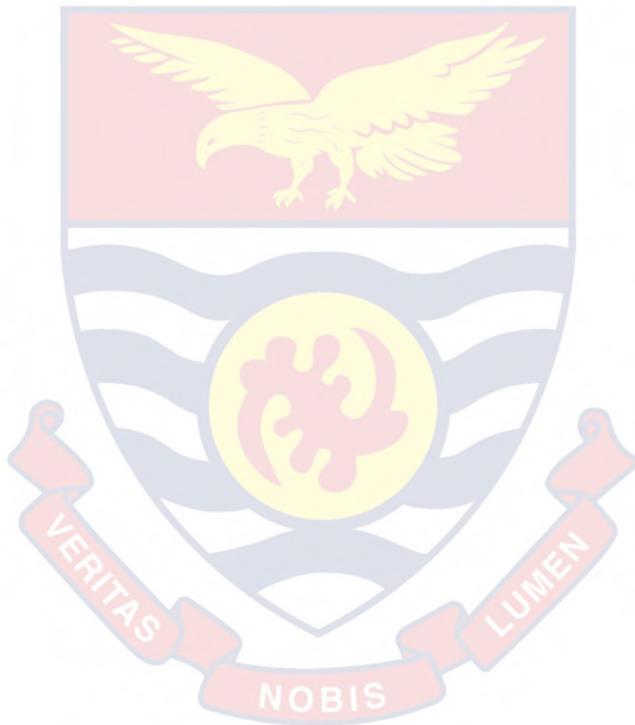
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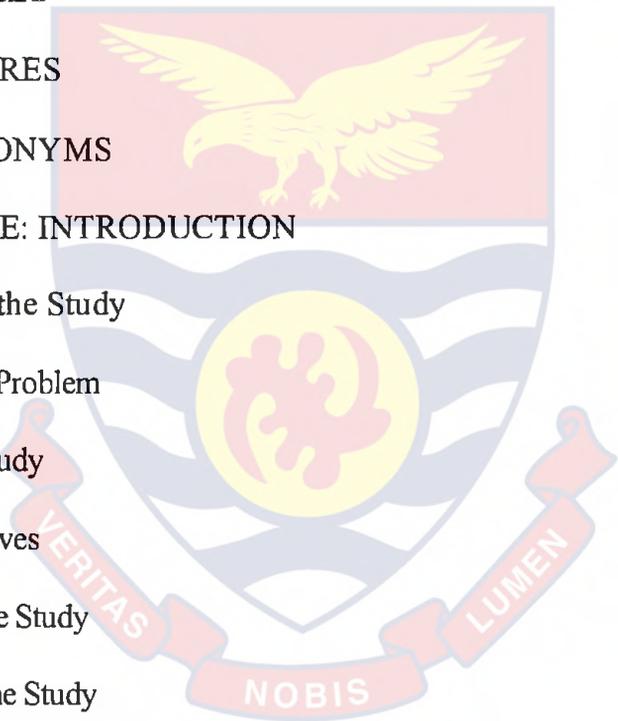
DEDICATION

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To my mother, Mad. Victoria Mensah; husband, Nana Kobina Ewusie, and children; and, to the memory of my late brother, Francis Osei-Bonsu.



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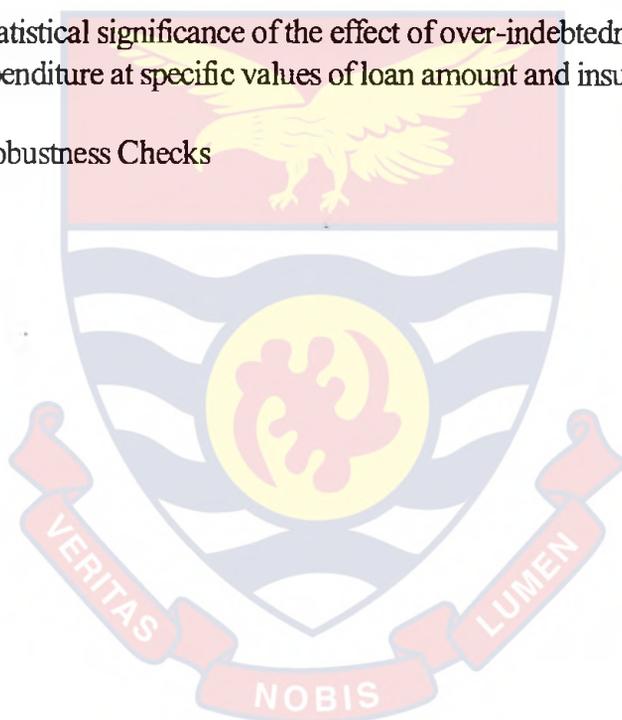
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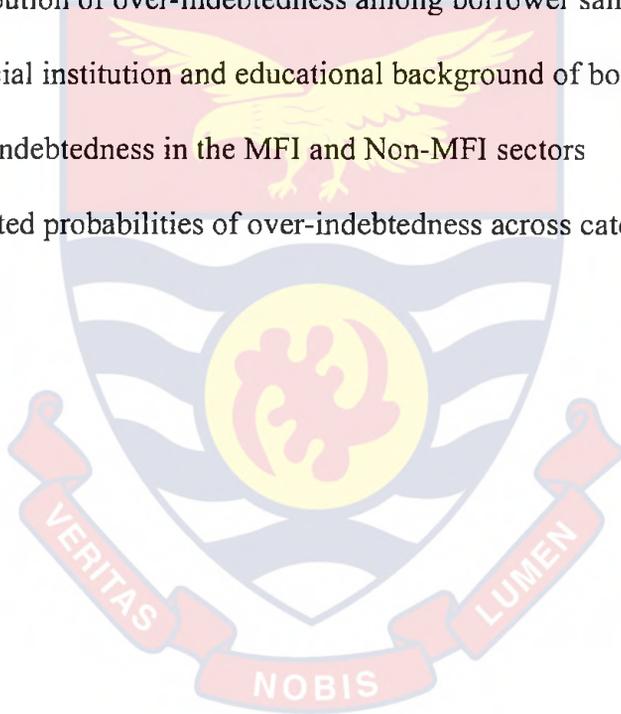
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LIST OF ACRONYMS

BECE	-	Basic Education Certificate Examination
BIS	-	Department for Business Innovation and Skills
BOG	-	Bank of Ghana
CMF	-	Centre for Microfinance
CU	-	Credit Union
DRIC	-	Directorate of Research Innovation and Consultancy
ECOWAS	-	Economic Community of West African States
EU	-	European Union
FINSAP	-	Financial Sector Adjustment Programme
FINSSP	-	Financial Sector Strategic Plan
FNGO	-	Financial Non-Governmental Organisation
GAMC	-	Ghana Association of Microfinance Companies
GDP	-	Gross Domestic Product
GHAMFIN	-	Ghana Microfinance Institutions Network
GLSS	-	Ghana Living Standards Survey
GSGDA	-	Ghana Shared Growth and Development Agenda
GSS	-	Ghana Statistical Service
HHEP	-	Household Economic Portfolio
HIPC	-	Highly Indebted Poor Country
IEA	-	Institute of Economic Affairs
ILO	-	International Labour Organisation
IMF	-	International Monetary Fund
ISSER	-	Institute of Statistical, Social and Economic Research
JHS	-	Junior High School

MASLOC	-	Microfinance and Small Loans Centre
MDAs	-	Ministries, Departments and Agencies
MFARN	-	Microfinance Action Research Network
MFCs	-	Microfinance Companies
MFI	-	Microfinance Institutions
ML	-	Money Lenders
MLAG	-	Money Lenders Association of Ghana
MoFEP	-	Ministry of Finance and Economic Planning
MSLC	-	Middle School Leaving Certificate
MSMEs	-	Micro, Small and Medium Enterprises
NBFI	-	Non-Bank Financial Institutions
NDPC	-	National Development Planning Commission
NGO	-	Non-Governmental Organisation
PPP	-	Public and Private Partnership
RAFIP	-	Rural and Agricultural Finance Programme
RCB	-	Rural and Community Bank
RCTs	-	Randomised Control Trials
RMFIs	-	Rural and Microfinance Institutions
ROSCA	-	Rotating Savings and Credit Association
S&Ls	-	Savings and Loans
SILC	-	Survey of Income and Living Conditions
UBL	-	Universal Banking License
UNDP	-	United Nations Development Programme

CHAPTER ONE

INTRODUCTION

Over-indebtedness is a critical problem of the rapidly expanding credit industry. In 2009, the Consultative Group to Assist the Poor (CGAP) unravelled the “*growing concern that microcredit may be getting borrowers into trouble*” (p.2) [emphasis added]. This emerging threat is preceded by the risk of multiple borrowing and is crucial because it presents an ominous threat to the financial sector with severe consequences for borrowers, institutions and governments (Betti, Dourmashkin, Rossi & Ping Yin, 2007; CGAP, 2009; European Commission, 2013; Khandker, Faruquee & Samad, 2013; Liv, 2013; Pytkowska & Spannuth, 2011; Schicks, 2013). Hence, the seemingly meagre concepts of multiple borrowing and over-indebtedness have enormous capacity to topple the financial services sector.

As the first objective analysis of over-indebtedness in Ghana at the micro level, the research seeks to extend the subjective perspective adopted by Schicks (2013) and expands the coverage to include rural borrowers. It also provides the first objective analysis of multiple borrowing in Ghana. At a practical level, the study provides vital information for policy decisions on multiple borrowing and over-indebtedness. Additionally, it presents insights into associated consequences for household consumption expenditure, while emphasising the urgent need to monitor and curtail further deterioration of living standards.

Multiple borrowing and over-indebtedness are growing problems of the burgeoning credit industry (CGAP, 2009, 2010; Khalily & Faridi, 2011; Vogelgesang, 2003). These emerging threats have a capacity to cause financial distress for borrowers and institutions, and, can lead to a deterioration of household's living standards (Betti et al., 2007; Morvant-Roux, 2009). Multiple borrowing is simply defined as having more than one loan either from the same or a different provider (Khandker et al., 2013; Liv, 2013). The phenomenon is used interchangeably with overlapping, cyclical and cross-borrowing (Khalily & Faridi, 2011; Khandker et al., 2013; O'Loughlin, 2006). Over-indebtedness, on the other hand, refers to problems with the use of credit. It is multifaceted and has no unanimous definition in the literature (Bridges & Disney, 2004; D'Alessio & Iezzi, 2013; Disney, Bridges & Gatherwood, 2008; Kempson, McKay & Willitts, 2004). The two growing phenomena have attracted scrutiny and criticism, which have incited research into this vital area of concern.

While the concept of multiple borrowing is suggestively straightforward, the definition of over-indebtedness is rather intricate. Generally, over-indebtedness describes problems of indebtedness and refers to being in arrears, having multiple commitments, using a high proportion of income to service debts and perceiving debt as a burden (European Commission, 2008). Thus, multiple borrowing and over-indebtedness emanate from the use of credit (indebtedness) and are situated in the wider context of finance and development.

The global financial system is a mechanism with an extensive capacity to foster growth and development. It comprises a network of local and

international financial institutions, which encompasses retail and investment banks, stock markets, building societies and other financial outlets (World Bank, 2009). Financial development encapsulates processes of removing costs and rigidities associated with the use of finance. These include contract enforcement and transaction costs (*Global Financial Development Report*, World Bank, 2014). Currently, mobile payments and mobile banking facilities expedite the use of financial services such as credit, savings, insurance, remittances and payments (World Bank, 2015-16). While acknowledging the difficulties associated with technical challenges, financial services are generally enhanced by efficient financial systems and innovative services.

Users of long-term finance (usually contracted for a minimum of one year) include households, firms and governments (World Bank, 2015-16). However, individual participation has also intensified with the rapid growth of the financial industry and the subsequent availability of short-term loans; particularly, due to the sprawl of microfinance institutions (MFIs) (Armendáriz & Morduch, 2010). The unprecedented growth in this sub-sector resulted in intense competition and lax lending practices (Khandker et al., 2013; Schicks, 2010), which subsequently precipitated issues of multiple borrowing and over-indebtedness, and initiated enquiries into the implications of these problems for the financial sector.

The effect of the use of finance by households and governments is firmly rooted in the nexus between finance and development, which is well documented in the literature on finance and economic growth (World Bank, 2015-16). While benefits to improvements in gross domestic product (GDP) have been highlighted (King & Levine, 1993a, 1993b; Levine, 1997),

subsequent empirical reviews have presented contrasting viewpoints of the possible disbenefits of finance to the overall development agenda (Badun, 2009; Levine, 2005). A growing literature also highlights risks associated with household use of credit (World Bank, 2015-16). Therefore, the use of, and the accumulation of debt poses risks and has implications at the national (macro) or individual/household (micro) levels.

Since vulnerabilities surrounding the use of credit are recognised at the macro and micro levels, this background, presents an overview of debt risks from these two perspectives. It begins with the consequences of indebtedness at the macro level; particularly, in the Ghanaian context, to usher in similar challenges with credit use at the household level. Analysing the background from these two perspectives, provides a wider and balanced context to the source and implications of problems encountered with the use of credit.

Indebtedness at the macro level- the Ghanaian experience

In Africa, national debt levels are rising exponentially. Debts have become unsustainable due to a gradual intensification of accumulated borrowing and Ghana is no exception (Kwakye, 2012). Consequently, the International Monetary Fund Report on sub-Saharan Africa (IMF World Economic Outlook Surveys) has cautioned African governments against accumulating excessive debts (IMF, 2015). The caution, notwithstanding, borrowing has been necessitated primarily by revenue mobilisation challenges and other factors including levels of government expenditure and the trade balance. On revenue mobilisation for example, the report indicates, that only about half of developing countries are able to collect 15 percent or more of GDP

in taxes. Thus, the gaping hole in the primary budget balance cannot propel expected and sustained development.

Historically, Ghana has grappled with low revenue base compared with developmental needs. Projected tax revenue for 2015 fell short of earnings by 4.9 percent (Institute of Statistical, Social and Economic Research [ISSER], 2016). In the event of fiscal shortfalls, the urgency for government to resort to both local and international financing becomes untenable. In the costing framework for the Ghana Shared Growth and Development Agenda (GSGDA) II, 2014-2017, prepared by the National Development Planning Commission (NDPC), there is an 8.4 percent shortfall in the resource envelope, which is expected to be financed from domestic and external sources (NDPC, 2014). Such avenues of capitalisation offer the relief and momentum to pursue developmental goals, which would have been otherwise implausible amidst the reality of financial constraints.

While resorting to finance as a means of closing the resource gap, uncontrolled borrowing is not without consequences. By the year 2000, Ghana's external debts had shot to 77 percent of GDP (IMF, 2001), earning the country a classification of Highly Indebted Poor Country (HIPC). Between 2004 and 2006, Ghana received considerable reprieve from the IMF and multi-lateral agencies - an intervention which assured a sustainable debt level of 26 percent of GDP (Kwakye, 2012). Following the period of total debt relief, Ghana's debt levels rose to 73 percent of GDP in 2015 (ISSER, 2016), culminating in an increasingly disconcerting and unsustainable trend. The country's larger fiscal deficit is also acknowledged in the overall degenerating economic performance of the sub-Saharan African region (IMF, 2017). Although, prominence is

accorded to the impact of revenue shortfalls, poor governance and lack of accountability contribute to inefficient management of financial resources; hence, the escalating borrowing. Therefore, at the macro level, unsustainable debt levels are a real threat and disruptive for developmental efforts and sustainability.

At the macro level, uncontrolled borrowing involves trade-offs which could have debilitating effects for development (Checherita & Rother, 2010). Such unsustainable debt levels are fraught with inherent vulnerabilities in the form of external credit worthiness - a high debt-to-GDP ratio attracts a high cost of borrowing (World Bank *World Development Report*, 1985). Already, the country has resorted to commercial borrowing by floating shares on the Eurobonds market. Hence, the consequences of an increasing trend in commercial borrowing are inevitable. Without improvements in the current situation, Ghana could soon revert to HIPC status (IMF, 2015). Therefore, at such epic levels of borrowing, the country could be classified as 'over-indebted' with consequences for national development.

While indebtedness may not be ominous, over-indebtedness stems from problem debt which derives from the lack of capacity to service debts or when debts become unsustainable. The former assertion implies that once a 'capacity' to hold debt exists, debt acquisition is not necessarily problematic. For example, after the oil discovery, Ghana's GDP was subsequently rebased in 2010 with the belief that projected income from oil reserves would enable the country to carry debt 'sustainably' (Kwakye, 2012). Yet, this 'capacity' to hold debts could be inherently volatile, especially, when subjected to unanticipated shocks. The foregoing, has been demonstrated by falling GDP growth rates post 2011 (GSS,

2014), a clear indication that projected oil earnings have not been sustained with respect to the optimism generated for borrowing. While issues pertaining to governance and accountability are acknowledged, the focus is whether oil revenue has been commensurate with the prognosis. Hence, rather than being sustainable, a debt capacity tends to be more unpredictable as supported by the fact that in a neo-liberal system of free-market principles, such a capacity could itself be subject to various unforeseen shocks.

The above panoramic view of debt issues at the macro level is invoked to aid a parallel analyses of debt problems at the micro level. Thus, for individuals and households, issues of debt and debt sustainability are a microcosm of the characteristics exhibited at the macro-level. However, while effects at the macro level are at a more general and abstract plane, consequences at the micro-level may be personal due to identifiable ownership.

Debt implications at the micro-level

Personal debt is an antiquarian phenomenon (Russell, Maître & Donnelly, 2011), and as intimated earlier, indebtedness is not synonymous with debt problems. Available evidence from Europe indicate, that debt problems have emanated from unprecedented availability and increasing levels of credit use (Bryan, Taylor & Veliziotis, 2010; European Commission, 2008; Haas, 2006; Russell et al., 2011). Similar to the macro-level illustration, debt capacity, in the form of future income streams, is also unpredictable at the micro-level; particularly, in the largely Ghanaian informal sector, where 86.2 percent of livelihoods are concentrated, usually with income insecurity (Ghana Statistical Service [GSS], 2010). The proportion of the informal sector continues to rise and recorded a 2.3 percent increase over the statistic for the previous census

(GSS, 2010). With a falling macro-economic performance and rising unemployment, the figure is expected to be higher and may currently not deviate substantially from the 90 percent proportion in sub-Saharan Africa (IMF, 2015). Therefore, the absence of a predictable capacity to service debts is integral to most debt problems and consequences vary significantly for governments and households.

When debt levels reach tipping point due to lack of capacity, there are asymmetries in the rescue efforts available for governments and individuals. At the national level, heavily indebted countries may earn partial or total debt relief as witnessed in the case of the HIPC facility (IMF, 2015). At the individual or household level, such *liberating* efforts only parallel bankruptcy filing mechanisms available to distressed borrowers in developed countries. In contrast, such corresponding permanent or even temporary reprieve may not be available to borrowers in low or middle-income countries.

Harsh consequences endured by borrowers include asset seizures and anecdotes of emotional trauma faced by delinquent borrowers, who have had to flee their communities to avoid arrest or stigmatisation, or, commit suicides in extreme cases; as reported by Hulme (2000), and fairly recently, by Microfinance Focus (2010) and Biswas (2010). For those who are forced to flee to find 'refuge', affected borrowers continue their lives in perpetual emotional instability. Additionally, anecdotes of the abandonment of families and dependants also create a vicious cycle of challenges and falling living standards. At the micro level, debt problems are personal, psychologically burdensome and debilitating for households (Lea, Webley & Levine, 1993).

Multiple borrowing and over-indebtedness are two significant and insidious consequences of the credit industry and both are becoming formidable issues for the financial sector (CGAP, 2010). While literature on multiple borrowing may not exist in the Ghanaian context, very little is known about over-indebtedness of borrowers in the country.

In view of the previous reference to challenges encountered with borrowing at the macro and micro levels, this section presents the motivation for the research. It focuses on borrowing risks and associated effects in the micro sector; specifically, at the household level. Examples of the risks motivating the study include; the crises experienced in Andhra Pradesh in India, and in Nicaragua, Morocco and Bosnia-Herzegovina (Bateman & Chang, 2012; Bateman, Sinković & Škare, 2012; Pytkowska & Spannuth, 2011). These problems have attracted real concerns within the industry.

The problem statement is presented in two parts. The first sub-section presents emerging evidence on institutional growth and multiple borrowing, and recent developments, which are the source of current concerns in the Ghanaian context. In the second sub-section on over-indebtedness, the paragraphs analyse existing knowledge, which culminate in four issues requiring urgent attention. The two concluding paragraphs summarise the gaps identified in the two sub-sections and suggest how this research intends to contribute knowledge to fill these gaps.

According to Griffith-Jones and Karwowski (2013), vulnerabilities and financial crisis run parallel to exponential financial growth. In the microfinance sector in particular, such negative consequences of the growing industry are attracting intense scrutiny and criticism (CGAP, 2009, 2010). Adding to the mounting anxiety, Copestake and Williams (2011) rightly cautioned the growing industry, that, “microcredit can be *harmful* to a significant minority of recipients” (p.21) [emphasis added]. Hence, CGAP (2009) ratifies the rationale for promoting and intensifying research into over-indebtedness issues.

Multiple borrowing, as a precursor to over-indebtedness, has received critical attention. Rhyne (2001) referred to the phenomenon as contributing to the causes of the Bolivian crisis. Subsequent anecdotal and empirical evidence (of which rigorous studies are rare) suggest that multiple borrowing has become a real challenge for the microfinance industry, as indicated by concerns of cross-borrowing by rural clients (Deepthi & Gachot, 2011). For lenders in Uganda, McIntosh, de Janvry and Sadoulet (2003) highlighted that multiple borrowing was a real challenge and according to O’Loughlin (2006), proliferation of credit promotes easy access to cyclical borrowing.

A study of microfinance clients by Mpogole, Mwaungulu, Mlasu and Lubawa (2012) found that, in Tanzania, 70 percent of borrowers had at least two loans from different MFIs at the same time. According to the Centre for Microfinance (CMF) Focus Note, 84 percent of rural borrowers had two or more loans. In Cambodia, Liv (2013) found that 21 percent of total borrowers had multiple loans, while 18 percent of microfinance borrowers had more than one loan. According to Khandker and Samad (2013), 61 percent of Grameen clients

were members of other programs in their study on Bangladesh. Tilakaratna (2013) also suggests that multiple borrowing has risen to 75 percent in Sri Lanka. The foregoing evidence suggest that multiple borrowing exists and countries with a progressive microfinance sector, particularly, low and middle-income countries, may be required to pay attention to the likelihood of, and the effects of any excesses in the sector, especially for vulnerable rural borrowers.

According to a recent microfinance census by the Ministry of Finance and Economic Planning (MoFEP), under the Rural and Agricultural Finance Programme (RAFiP), there are approximately 7.2 million microfinance clients in Ghana (RAFiP, 2015). In contrast, previous insights from an over-indebtedness study in Ghana suggested that, in 2011, total count of MFI clients in the country was 358,717 (Schicks, 2013). Given the previous baseline, an exponential increase in the number of clients is starkly apparent.

The intensive rise in indebtedness may have two implications: either more people are becoming indebted or multiple borrowing is on the increase. In 2010, Glazer predicted warning signs of multiple borrowing in Ghana, as suggested by his over-indebtedness study based on one MFI activity. Yet, despite evidence of the prevalence of multiple borrowing in countries with active microfinance sectors, and, the exponential increase in the current number of microfinance clients in the country, the likelihood of multiple borrowing in the microfinance industry is unknown.

Developments in the microfinance sector, which have generated a new response from the regulatory body, may also be a source of emerging concern for the industry. The unprecedented transformation of the microfinance sector saw increased participation of more commercially-oriented institutions that are

fully regulated (Armenakis & Morduch, 2010). In Ghana, the move to coordinate microfinance activities resulted in the recognition of seven institutional categories by Bank of Ghana (BOG, 2011) under the Banking Act 2004 (Act 673) and Non-Bank Financial Institutions Act 2008 (Act 774). Currently, there are 2,974 MFIs in the country (RAFiP, 2015). A corresponding concern may arise from the increasing institutional growth and the effect of the different categories of MFIs on borrowers' experiences.

The institutional and legal environment has been identified as an external factor which can drive borrowing risks (Schicks, 2010). Institutional growth reflects the rapidity in the spread of financial institutions or the 'presence and extent of coverage' (density) of institutions in an area (Khandker, et al., 2013, p.22). Consequently, Khandker et al. (2013) examined the effect of microfinance program participation on multiple borrowing, conditional on institutional density. Given the vulnerability of rural borrowers in Bangladesh, the authors tested whether the village-level density of MFIs, measured by the number of NGOs, is a possible measure of multiple borrowing (multiple program membership), and a cause of over-indebtedness.

Findings from the Bangladesh study suggest that, the village-level density of MFIs positively influences indebtedness through household level program participation. Hence, institutional growth in a locality, may engender multiple borrowing, before leading to a full crisis of over-indebtedness. Despite the growth in number of MFIs in Ghana, the question remains as to whether an increase in the number of institutions in a locality may make a borrower more likely to engage in multiple borrowing, and, whether there is a possibility that

the seven MFI categories have different effects on the probability of multiple borrowing. The next sub-section considers issues of over-indebtedness.

Over-indebtedness in Ghana: design, coverage, measurement and effects

Over-indebtedness is a generic multi-dimensional concept which encapsulates problems with the use of credit. The first investigation covering the European Union (EU) was conducted a decade ago from a subjective perspective (Betti et al., 2007). Prior to this study, research initiated in mainland Europe was mainly analytically descriptive and qualitative (Betti et al., 2007). Hence, few econometric studies are available worldwide. Bryan et al. (2010) confirmed that until their study, there was no in-depth analysis to investigate extent and drivers of over-indebtedness in the United Kingdom. In Ghana, the only existing study is subjective (Schicks, 2013). According to the author, the study is the premiere analysis of over-indebtedness from a customer perspective, thereby constituting the beginning of over-indebtedness research in the country.

Being a new research area, there are four fundamental issues yet to be addressed. These are: research design, coverage of borrowers, appropriateness of the measurement of over-indebtedness to the Ghanaian context (use of the debt-service ratio), and effects of over-indebtedness. The following paragraphs elaborate on these issues.

Qualitative research designs are constructive; however, the approach may not independently provide a holistic perspective to a vital problem. While the premiere subjective research on over-indebtedness in Ghana provides initial crucial insights, an objective analysis is currently lacking and is urgently needed to build existing knowledge, which estimated an over-indebtedness prevalence

of 30 percent (Schicks, 2013). Being the only value-based evidence available, the existing study requires a complementary objective perspective.

Coverage is an issue linked to the design of the existing research. Schicks' (2013) focused only on urban microfinance borrowers. Therefore, the study lacks a rural perspective. Its target of microfinance borrowers also suggests that the likelihood of over-indebtedness of household borrowers, who engage with the traditional banking sector, is also unknown. The new module of 'Household Access to Financial Services' in the Ghana Living Standards Survey (GLSS 6) data provides the opportunity to conduct the first nationally representative cross-sectional analysis of over-indebtedness. Although, traditional banks are mainly located in urban areas, some diversified their portfolios to include microfinance activities, in a bid to remain competitive (Harper, 2003). Without capturing clients of these banks, the probability of their over-indebtedness risks being overlooked.

Another problem linked to the measure of over-indebtedness is the use of arbitrary thresholds for the debt-service ratio (DSR) indicator (Betti et al., 2007; European Commission, 2008; Khandker et al., 2013; Liv, 2013; Maurer & Pytkowska, 2010; Schicks, 2013). The DSR determines the proportion of household income used to service debts. In developing countries, clients value the opportunity to have access to credit and endeavour to commit to repayment (Schicks, 2013). This commitment to debt servicing places enormous strain on households' capacity to meet the minimum expenditure required to cater for their basic needs and the situation can culminate in objective-burden over-indebtedness. However, one critical issue is that the DSR indicator is limited by

the use of arbitrary thresholds which is currently a problem (Khandker et al., 2013).

The effects of over-indebtedness have also received very little attention. These are examined by considering the amount borrowed, household consumption expenditure as a measure of living standards, and, the ameliorating effects of a borrower having an insurance policy. So far, few studies have examined the effect of loan amount on over-indebtedness (Gonzalez, 2008; Khandker et al., 2013; Liv, 2013). While Gonzalez (2008) and Liv (2013) considered the effect of a single loan amount, the outcome is mixed. The former acknowledges that borrowers can be over-indebted even with a single loan amount, while the latter finds no relationship between a single loan and over-indebtedness. Given the already conflicting evidence, there is the need for more research to contribute to the body of knowledge.

Another critical effect is the implication for borrowers' living standards. Literature on over-indebtedness confirms issues of possible deterioration of living standards (Hartfree & Collard, 2014; Stamp, 2009). The foregoing is consistent with Betti et al.'s. (2007) finding that over-indebted households have a low level of income/consumption compared to normal households. Additionally, Russell et al. (2011) suggest that 29 percent of over-indebted Irish households were at risk of poverty, compared to non-borrowers while the European Commission (2013) report also reveals that debt servicing diminishes available household income. In the study on Cambodia, 51 percent admitted to struggles with loan repayment. The findings suggest that 48 percent sacrifice on food quality while 44 percent sacrifice on the quantity taken (Liv, 2013).

Hence, available evidence suggest that over-indebtedness may adversely affect borrowers' living standards.

For borrowers in Ghana, evidence from an objective perspective on the effect of over-indebtedness on livelihoods is unknown. According to the recent GLSS6, the country has succeeded in halving its poverty from 51 percent in the 1990s to 24 percent in 2014. Sustaining this improvement is crucial for development. Hence, for users of credit, the motivating question is, whether over-indebtedness has any deleterious effect on their living standards. According to Schicks (2013), clients in Ghana are enduring huge sacrifices to meet debt repayments. The study suggested that 74 percent of urban borrowers sacrifice to repay debts and 40 percent sacrifice persistently to repay their loans. Sacrificing means taking extraordinary actions (Gonzalez, 2008); and in the Ghanaian context, some borrowers starved or reduced food intake to a single meal per day.

The foregoing evidence suggest that over-indebtedness can be harmful to borrowers' livelihoods by lowering their consumption. However, there is no objective evidence which employs welfare scores computed from household consumption expenditure to determine the effect of over-indebtedness on borrowers' living standards.

The availability of insurance services to households resonates with the reason for the microfinance revolution, since the credit market is characterised by high transactions costs and challenging contract enforcement (Armendáriz & Morduch, 2010). Thus, parallel to the growth in microfinance, there is a similar ambition to provide insurance on loans and deposits in the micro-sector. Life, health, property and crop insurance seem to be flourishing (Armendáriz &

Morduch, 2010; Morduch, 1999). Respective evidence from Bangladesh and India suggest that 50 percent and 42 percent of respondents were plagued by at least one major health risk (Collins et al., 2009), and it is expected that these innovations in insurance services will improve borrower's lives; especially, in times of crisis. Currently, there seem to be no study on the effect of insurance on borrower's consumption expenditure.

Evidence presented in the above sub-sections on multiple borrowing and over-indebtedness have highlighted current gaps in empirical literature. On multiple borrowing, the current prevalence is unknown and the effect of institutional density and type of MFI on the probability of multiple borrowing is also undocumented. The over-indebtedness literature also lacks an objective perspective and embed issues of measurement, coverage and effects.

This study, therefore, seeks to fill the gaps identified by contributing to knowledge on the following: the effect of institutional density on multiple borrowing in a rural area, the possible effects of the different categories of MFIs, and, the prevalence of multiple borrowing. On over-indebtedness, the research is approached from an objective perspective and extended to new territory to include rural borrowers and clients of traditional banks to achieve national representativeness. It also seeks to improve on the DSR indicator. Issues to be addressed on potential effects include; a single loan amount, insurance, and the relationship between over-indebtedness and household consumption expenditure. The study seeks to contribute to knowledge from the academic, methodological and policy perspectives.

Purpose of the Study

The purpose of this study is to investigate the issues of household indebtedness in Ghana from an objective perspective. It seeks to contribute vital knowledge to build academic literature on multiple borrowing and over-indebtedness, improve on the debt-service indicator for measuring over-indebtedness and provide policy recommendations for safeguarding household borrowers against the effects of an ever-bourgeoning credit industry.

Multiple borrowing and over-indebtedness have emerged as a result of the prominence given to finance as the ‘magic wand’ for the take-off, growth and sustainability of micro, small and medium enterprises (MSMEs) and consequently leading to a transformation of the lives of poor and vulnerable persons. To achieve its purpose, three relationships are examined in this thesis: (1) multiple borrowing and institutional density, (2) loan amount and over-indebtedness, and (3) over-indebtedness and household consumption expenditure. Examining these relationships will provide the needed framework for the credit industry in order to forestall the likelihood of further impoverishment to beneficiaries. The Andhra Pradesh experience of multiple borrowing and threats to other markets alluded to, are examples of cases to support the purpose of the study.

Research Objectives

The objectives which constitute the three empirical analyses of the thesis are to:

- 1) Determine the rural-urban effect of institutional density and type of MFI on multiple borrowing, and estimate the incidence of multiple borrowing;

- 2) Determine the effect of a single loan amount on the probability of over-indebtedness and its subsequent effect on the intensity of over-indebtedness; and
- 3) Estimate the effect of over-indebtedness on household consumption expenditure, and, examine the individual interaction effects of loan amount and insurance with the policy variable (over-indebtedness), to determine corresponding effects on household consumption expenditure.

Hypotheses of the Study

In view of the above stated objectives, the study focuses on the following seven research hypotheses. The first three constitute the main alternative hypotheses and the remaining four support the main themes.

- i. An increase in the density of MFIs in rural areas is a source of multiple borrowing;
- ii. A single loan amount has a significant effect on the probability of over-indebtedness;
- iii. Over-indebtedness has a significant effect on household consumption expenditure;
- iv. The propensity of rural residents to engage in multiple borrowing varies with the density of a particular MFI category;
- v. Larger loan amounts have a significant effect on the intensity of over-indebtedness;
- vi. The effect of over-indebtedness on household consumption expenditure depends on the amount borrowed; and

- vii. The effect of over-indebtedness on household consumption expenditure depends on whether the borrower has an insurance policy or otherwise.

Significance of the Study

Given the disruption that financial challenges can inflict on borrowers and institutions, a study to investigate issues of multiple borrowing, over-indebtedness and its effect on household consumption expenditure is a timely and critical precautionary measure. The results will inform stakeholders on instituting policies and practices aiming to extenuate all possible adverse effects and enhance the advantages of borrowing.

The significance of this study is four-fold. First, it is surmised that the multiple borrowing analysis provides a first estimate of the prevalence of multiple borrowing in the country. It also contributes to the knowledge gap regarding the effect of rural-level density of MFIs on multiple borrowing. In Ghana, there are seven categories of MFIs with specific operational methodologies. Distinctive institutional practices will undoubtedly impact on the probability of multiple borrowing. Hence, insights from analysing the effect of institutional density and type on the probability of multiple borrowing will enable MFIs to review lending practices, particularly, those targeted at rural borrowers. This information will encourage collaborative information sharing among MFIs to ensure a crises-moderated financial system.

Second, the study could potentially be the premiere analyses of objective-burden over-indebtedness in Ghana. The new knowledge will complement and build on the literature. It will provide stakeholders with a holistic and balanced platform for informed decision making within the various

facets of over-indebtedness. The third crucial significance is linked to the objective-burden approach. It introduces a novelty to the measurement of over-indebtedness using the debt service- to-income ratio (DSR). One critical problem with the objective approach is the setting of cut-off points for measuring over-indebtedness. For existing studies, such cut-off points have been arbitrary. Consequently, the study presents an innovative solution and derives thresholds from borrowers' total household expenditure to examine the effects of repayment on consumption expenditure in a contextual, objective and evidence-based framework. The objective measure is further categorised to show the severity of household indebtedness and is a significant aspect of the study of over-indebtedness.

Finally, the study estimates the effect of over-indebtedness on household consumption expenditure and depicts how the phenomenon can contribute to reducing borrower's living standards. This information is pertinent for stakeholders and households and provides clear evidence which would support action to reduce the burden of over-indebtedness on household consumption expenditure.

Delimitations

The three paragraphs below specify the boundaries adopted for the study and the rationale underlying the choices made. Enumerated issues pertain to the geographical boundary, nature of the literature review, reference to three indicators of financial development and the issue of endogeneity as suggestively implied by the relationship between over-indebtedness and loan amount.

Geographically, the study focuses on household borrowing at the national level. A nationally representative data commissioned by the Ministry

of Finance and Economic Planning (MoFEP) under the Rural and Agricultural Finance Programme (RAFiP) is used for the multiple borrowing analysis and the over-indebtedness investigation is based on the sixth round of the Ghana Living Standards Survey (GLSS6), which is also nationally representative. The two national datasets support the generalisation of the findings beyond Ghana.

Due to the fledgling nature of the problem of over-indebtedness, empirical evidence on the subject is sparse, especially for the objective-burden measure. Therefore, the literature review is limited to available relevant evidence, which suffices for the build-up of arguments and analyses, especially on objective-burden over-indebtedness. The review adopts a thematic approach to provide focus and conciseness amidst the multi-faceted nature of the over-indebtedness phenomenon.

Financial sector development is a hugely nebulous concept and various approaches have been adopted in its practical evaluation. Even though the study makes reference to three out of four themes (depth, access and stability), it does not measure these indicators. The finance and development theme provides an over-arching background and the indicators are adopted loosely as theoretical signposts for analysing the current state of the traditional banking sector and the microfinance industry.

On measuring the effect of loan amount on over-indebtedness, the issue of endogeneity is implied. However, this problem is pervasive in cases of multiple borrowing and over-indebtedness originating from defaults or delinquencies. Thus, while a larger loan size may cause a borrower to sacrifice for repayments, a bi-causal effect may not arise because borrowers have committed to repayment on a single loan and the counter-effect of multiple

borrowing is not consistent with the objective-burden measure. Hence, endogeneity is not addressed in the second empirical analysis because of the use of single loans and the debt-service ratio adopted for the investigation.

Limitations

The study has provided the opportunity to investigate issues of indebtedness in the country. In spite of its significant benefits to academic knowledge and policy, the methodological choices, in terms of design, data and estimation techniques are not entirely devoid of limitations which could not be addressed during the course of the study. Three issues were noted.

First, the research is a cross-sectional analysis of multiple borrowing and over-indebtedness. While not always the case, over-indebtedness is perceived as having a time dimension. Therefore, a cross-sectional study may not allow for the tracking of a temporal evolution of household indebtedness.

Second, the influence of institutional growth on multiple borrowing could have been augmented with a qualitative perspective of institutional practices from the apex bodies of the microfinance categories.

Third, data limitation influenced the choice of estimation technique for the third empirical analysis. Absence of internal instruments prevented the use of traditional instrumental variable (IV) analysis and the bi-causal relationship between over-indebtedness and household consumption expenditure could not be estimated due to the unavailability of computational commands for simultaneous equations.

While attention is drawn to these limitations, the scope and focus of this study were determined by time and resource constraints. Therefore, these

limitations do not detract from the research but provide avenues for further investigations.

Contributions of the Study

This thesis investigated issues of household indebtedness in response to the risks posed by multiple borrowing and over-indebtedness. It makes three main contributions derived from the academic, methodological and policy perspectives.

Academically, this study contributes to the scarce literature on multiple borrowing and objective-burden over-indebtedness and provides evidence from the sub-Saharan African region. It presents the first estimate of the prevalence of multiple borrowing in Ghana and provides the interaction effect of rural-level density of MFIs on multiple borrowing. The study suggests that the density of MFIs in rural areas is a source of multiple borrowing. Additionally, it provides knowledge that the type of MFI determines the probability of multiple borrowing for rural residents.

On over-indebtedness, it complements the subjective analysis and contributes the first empirical evidence from the objective perspective. The finding suggests that borrowers can be over-indebted, even from a single loan contract and are more likely to be severely over-indebted from larger loan amounts. This new evidence covers urban and rural clients alike and encapsulates both microfinance and mainstream banking institutions. On the effect of over-indebtedness on living standards, the study suggests, that being over-indebted reduces household consumption expenditure and drives a quarter of borrowers into worsening forms of poverty.

From the methodological perspective, the study derives a practical, meaningful and relevant threshold for the debt-service indicator by removing the arbitrariness in its measurement. It also introduces a new instrumental variable analysis technique - Identification by Heteroscedasticity-Based Instruments (IDHI) to the measurement of endogenous variables, especially in the case of a mismeasured regressor.

The study also makes policy recommendations for borrowers, financial institutions and government bodies. Borrowers are encouraged to take responsibility for their borrowing by ensuring financial discipline. Institutions are advised to cap the critical debt burden threshold at 15 percent; particularly, for vulnerable clients and collaborate to share information for the prevention of multiple borrowing. For the government, the Microfinance Desk at BOG should intensify the monitoring of institutional growth, particularly into rural areas and government assisted microfinance programs should be channelled through non-commercial FNGOs to deepen social objective and reduce vulnerability of rural borrowers. The Ministry of Finance could also establish an independent credit advisory bureau (CAB) in every region, in view of the debilitating effect of over-indebtedness on borrowers' livelihoods.

Organisation of the Study

This thesis contains eight additional chapters. The next chapter presents a broader background of finance and development from the intermediation perspective. It examines policy expectation vis-à-vis the existential state of the banking sector and the microfinance industry. The chapter draws on the banking sector performance indicators in the BOG Financial Stability Report for the traditional banking sector analysis, and uses information derived from the

RAFiP data to examine developments in the microfinance industry. Information on the use of financial services is derived from the GLSS6 data. It also considers financial stability issues, which lead to the need for client protection.

In the third chapter, theoretical underpinnings of research into indebtedness and over-indebtedness are outlined, focusing on the Life Cycle-Permanent Income theories as the over-arching framework for the analyses. It introduces the theories of competition, multiple borrowing and over-indebtedness.

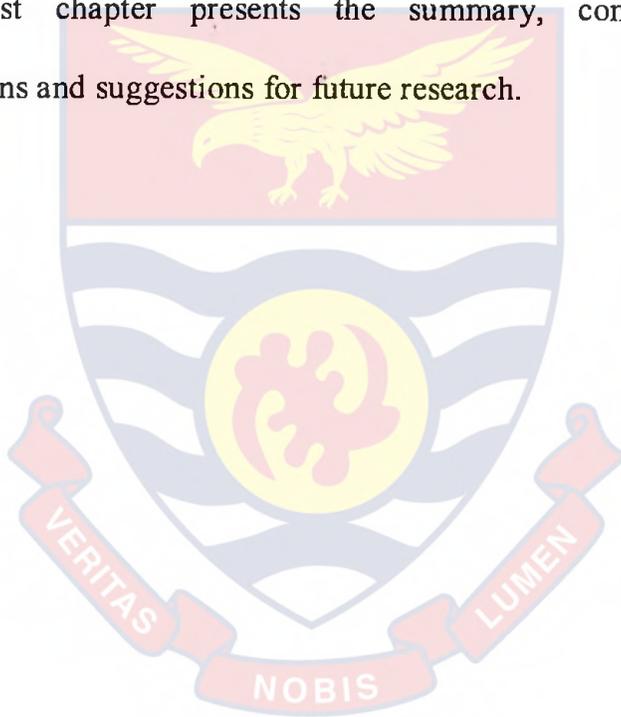
Chapter four reviews empirical literature on multiple borrowing, over-indebtedness, and the link between over-indebtedness and poverty. Providing evidence on the relationship between over-indebtedness and poverty, serves as a proxy for locating the rationale to investigate over-indebtedness and household consumption expenditure. It also presents a conceptual framework followed by an overview of empirical methodology.

The fifth chapter submits the methodological choices for the three empirical analyses. It presents a rationale for the research design, which is based on a quantitative approach using secondary data. The maximum likelihood estimation technique for probit and ordinal probit models are adopted for analysing the effect of institutional density on multiple borrowing. The second empirical analysis uses the same estimation for the logit and ordinal logit models, while the third utilises the identification by heteroscedastic-based instruments for the instrumental variable analyses. It also presents procedures for post-estimation tests and methods of interpretation.

The next three chapters present results and discussion of the empirical analyses. Chapter six submits knowledge on multiple borrowing and

institutional density, followed by the drivers and prevalence of the phenomenon. Chapter seven contains a derivation of the over-indebtedness thresholds; including, results and discussion of the effect of loan amount on the probability of over-indebtedness. It also presents findings on the intensity of over-indebtedness and provides the objective estimate of over-indebtedness in the country. Chapter eight provides results and discussion of the third empirical analysis, which examines the effect of over-indebtedness on household consumption expenditure.

The last chapter presents the summary, conclusions, policy recommendations and suggestions for future research.



CHAPTER TWO

FINANCE AND DEVELOPMENT: A POLICY AND PRAXIS

PERSPECTIVE

Introduction

This chapter presents prior information necessary for appreciating the three empirical themes of the study. Using finance and development as the overarching background, it approaches this context from the intermediation perspective, focusing on mainstream banking and the microfinance industry. The adopted policy and practice perspective is analogous to the syntactical presentation of the *expected* and *reality*, which demonstrate a connective purview of finance and development as analysed in this context.

The policy perspective is derived from the government's effort at providing an enabling environment to promote overall economic and social development. In pursuit of growth and sustainability, there has been a consistent focus on seven major themes of national development. Among these, is the emphasis on enhancing the competitiveness of the private sector. This long-standing objective has been actively promoted through the previous and current phases of the medium-term development framework, the GSGDA I & II, covering 2010-2013 and 2014-2017 respectively. To achieve this goal, financial sector development is one of the principal policy objectives which is expected to improve access and use of financial services to create jobs and improve living standards.

The praxis perspective is drawn from an existential state of the mainstream banking sector and the microfinance industry. Information presented is based predominantly on analysis derived from the two datasets

employed for the study (GLSS6 and RAfiP surveys) and supplemented by the BOG Financial Stability Report on the banking sector. With the microfinance sector driving household lending, the analysis is slightly biased in this direction, presenting new information based on a current census. Three indicators of financial development; depth, access and stability are adopted loosely as signposts to guide the analysis as it traces the growth, development and stability of the sector.

This chapter is structured as follows: The second section presents the role of the financial sector. In view of expected growth, the next section describes the level of financial ‘deepening’ by examining the current state of the financial sector, focusing on traditional banking and the microfinance industry. The fourth section presents developments in the financial sector as demonstrated by households’ ‘access’ to financial services and highlights issues of use, evolution and convergence. Financial ‘stability’ and its interdependence with macroeconomic stability is examined in the fifth section. It introduces contextual issues of financial risks, such as multiple borrowing and over-indebtedness. The sixth section explores the ultimate objective of finance and development as a quest to improve borrowers’ living standards. The last section provides the chapter summary.

Financial Development: The Role of the Financial Sector

Financial development has been used interchangeably with financial intermediation, financial systems and financial mechanisms in spite of their specific subtle connotations. The World Bank *Global Financial Development Report* (2015-2016) defines financial development as a process of reducing the costs of acquiring information, enforcing contracts and making transactions. It

encompasses all constituents which contribute to an efficient functioning of the financial sector and comprises the agents (institutions), the markets (local and international) and the legal and regulatory framework. Amidst the ubiquity of usage, each terminology is inclined towards a particular objective.

On the functioning of the financial system, Ćihak, Demirgüç-Kunt, Feyen and Levine (2013) have attempted to synchronise the cacophony of existing literature. The authors developed four broad characteristics, each of which specifies a set of financial indicators. These groupings are: (1) the size of financial institutions and markets (financial depth), (2) the degree to which individuals can and do use financial institutions and markets (access), (3) the efficiency of financial institutions and markets in providing financial services (efficiency), and (4) the stability of financial institutions and markets (stability). A financial system therefore exists to facilitate the lending and borrowing pact and focuses on finding the optimal mix which minimises omissions and enhances opportunities to guarantee a satisfactory process for both provider and customer.

Over the years, Ghana has embarked on an extensive financial liberalisation policy, aimed at facilitating access to credit to foster a vibrant and sustainable private sector growth. The medium-term national development policy framework – the GSGDA II, in conjunction with the Private Sector Development Strategy (PSDS) II, provide the blueprint for the functioning of the financial sector as the main catalyst for private sector development (NDPC, 2014). The sector strategy provided in the GSGDA II, 2014-2017, concentrates on providing a thriving private sector that creates jobs and enhances livelihoods for all (NDPC, 2014). The policy objective is to have a financial sector which

is efficient and responsive to private sector needs and extends financial services to microenterprises as well as individuals and households on low income.

In Ghana, the financial sector constitutes three broad areas of activity - banking, insurance and capital markets (Ackah & Asiamah, 2014; Kwakye, 2012). The sector is however dominated by the banking service (intermediation) as pertains in most developing economies (Ackah & Asiamah, 2014). Banks allocate scarce resources from savers to borrowers and offer additional risk management services to individuals and firms. Recently, the growth in the financial sector has been augmented by the increasing number of institutions, particularly in the microfinance industry (RAFiP, 2015). The increasing competitive environment is expected to provide robust, profitable and efficient financial institutions with the anticipation that such efficiencies will be passed on to consumers in terms of lower borrowing costs and improved access to credit.

Financial Deepening: State of the Financial Sector

The current hype in financial growth has been enabled by liberalisation policies pursued by the government. Financial Sector Adjustment Programmes (FINSAP I and II), pursued in late 1980s to early 1990s, initiated the vast development in the sector (Antwi-Asare & Addison, 2000). Additionally, the Universal Banking Business Licence (UBBL) introduced in February 2003, removed operational restrictions, which were previously exclusive to certain banking categories (Antwi-Asare & Addison, 2000). Yet, the need for more streamlining necessitated a continued programme of restructuring, embodying the two phases of the Financial Sector Strategic Plans (FINSSP). The second phase, FINSSP II (2011-2015) was launched in 2011 (Ackah & Asiamah, 2014).

Concerted liberalisation efforts have undoubtedly improved the operational environment of the entire financial system, as witnessed in the current state of the banking sector and the microfinance industry.

The banking sector

To date, the banking sector has evolved tremendously from its antecedents. Referring to the work of Adjetei (1978), Antwi-Asare and Addison (2000) provide a century – long chronology charting the evolution of banks from 1896 to 1996, during which 18 banks were listed. For the past two decades, there has been a marked transformation in the banking sector. The Economic Community of West African States (ECOWAS) protocol activated a surge of penetration, mainly by Nigerian investors (Ackah & Asiamah, 2014). As of March 2016, the banking sector comprised 29 banks, of which 15 are foreign owned. Overall, there are 1,173 branches (BOG, 2016). Moving from 18 banks within a century to 11 in two decades, is a noteworthy development. The new Banking Act 2004 (Act 673) reinforces the Bank of Ghana’s regulatory and supervisory functions (Ackah & Asiamah, 2014). The BOG has, therefore, revamped its strategy to streamline operational activities in the sector and avoid over-spills, which could threaten the system’s stability (BOG, 2011). One of such revolutionary measures is the increment in the capital requirement for banks.

According to the BOG Financial Stability Report (2016), banks remained vibrant in the first quarter of the year, although there was a contraction in some indicators such as earnings, portfolio quality and efficiency. Total bank asset is reported to have grown by 17.2 percent to GHS 64.56 billion with net loans and advances of GHS 26.77 billion, recorded as of end of March 2016.

An aggregation of credit portfolio indicated that 78 percent of total loan portfolio was advanced as credit to the private sector in March 2016 and reflected a 2.3 percent increase over the figure for the previous year (75.7 percent). The bleak macroeconomic performance necessitated the implementation of some risk management measures (BOG, 2016). However, the report suggests, that in spite of the move to curtail credit due to the increasingly pervasive economic slowdown, the proportion of household loans to Gross Loan Portfolio (GLP) remained comparatively stable, as indicated by a recording of 0.1 percent reduction from 15.6 percent in 2015 to 15.5 percent in March 2016.

Current evidence on financial soundness indicators from the Stability Report (2016) seem to suggest a mixed performance. In March 2016, the Capital Adequacy Ratio (CAR) rose to 17.6 percent, up from the 16.9 recorded in 2015. From the 2014 figure of 16 percent, the CAR has been on a steady increase. While the latest figure is above the prudential limit of 10, the report suggests that the rise could be attributed to a buoyant credit delivery. On the profitability front, indicators showed a deceleration. Net interest income plummeted to 14.8 percent from 37.3 percent noted in March 2015. Net profit after tax shrunk by 2.6 percent compared to 24 percent recorded in the previous year. Interest rate spread, however, indicated an increase of 0.7 percent over the 2015 figure of 3.2 percent. Compared to the 2015 figures, Return-on-Assets (ROA) declined to 5 percent from 6.3 percent while Return-on-Equity (ROE) fell to 23.5 percent from 29.3 in 2015. Generally, while the CAR and interest rate spread have improved, net profit after tax, ROA and ROE have been on the decline.

One major risk facing the banking sector is poor asset quality, as depicted by the Financial Stability Report (BOG, 2016). Within a year (March 2015-March 2016), the sector had recorded almost 60 percent increase in non-performing loans (NPLs) from GHS 3.1 billion in March 2015 to GHS 4.9 billion in March 2016 (BOG, 2016). The report also highlights that private sector credit constitutes 94 percent of total NPLs. The foregoing is indicative of the challenges facing the private sector amidst a deteriorating macroeconomic environment. Factors contributing to the worsening NPL position include a slackening economic performance, increased utility prices resulting in high production costs and a re-alignment of bank loan portfolios (BOG, 2016). With such a deteriorating situation, profitability levels could be affected, with general economic implications for households.

This cursory review of the current state of the banking sector reveal that the sector has expanded in terms of the number of institutions. Records from the BOG Financial Stability Report (2016) indicate a growth in total bank asset with a larger proportion of loans advanced to the private sector. In spite of the current weak macroeconomic milieu, household loans recorded an infinitesimal drop. Overall, the banking sector's contribution to financial development is vibrant. However, a major risk which could have deleterious consequences for clients and institutions is the high percentage of NPLs. For clients who struggle to repay, some sacrifices will have to be endured, resulting in objective-burden over-indebtedness and a possible lowering of living standards; and for those who default outright, the banks may be compelled to write-off such loans, thereby weakening their financial position and threatening institutional sustainability.

The state of the microfinance industry

Antecedents of the conventional microfinance industry, particularly, Susu and Credit Unions have existed in Ghana for more than half a century. A recent census of MFIs revealed that the Otsuu Oyee Susu Services in the Ga Central community of Greater Accra region was founded 70 years ago. Additionally, the Wa Community Credit Cooperative Union and St. Joseph's Credit Union in Jirapa, Upper West, have been active for 50 and 60 years respectively (RAFiP, 2015). Given the genesis of the Grameen Bank (Yunus, 2003), these revelations remarkably pre-date the world-wide acclaim of Dr. Muhammad Yunus' 1970s village microcredit model.

From the transformation generated by the Grameen model, which offered small loans to poor people, the microcredit market burgeoned with growing international interest emanating from the popular phrase, that microcredit will confine poverty to history (Robinson, 2001; Yunus, 2003). Microcredit then metamorphosed into microfinance, which encompasses credit, savings, insurance, remittances and other financial services, including financial literacy and training (Armendáriz & Morduch, 2010). By the end of 2009, the microfinance industry in Ghana is reported to have reached 358,717 borrowers with a gross loan portfolio of USD 131.2 million (Schicks, 2013). According to a recent census (RAFiP, 2015), there are 2,974 MFIs reaching a total of 7,202,385 clients. This estimate represents more than a quarter of the country's population.

Microfinance operations are channelled mainly through the private sector and also through funding from some ministries, departments and agencies (MDAs). The Ghana Microfinance Institutions Network (GHAMFIN) has

evolved from the Micro Finance Action Research Network (MFARN), an institution established in 1996 to gather all groups engaged in microfinance projects (GHAMFIN, 2013). GHAMFIN's prime objective is to improve performance monitoring and benchmarking in the private sector, while Microfinance Small Loans Centre (MASLOC) coordinates projects implemented by government schemes.

The classification of MFIs in Ghana has undergone a much-anticipated transformation with the goal of streamlining and regulating the sector. Prior to the re-structure, there were five main groups (GHAMFIN, 2013). These were: Credit Unions (CUs), Rural and Community Banks (RCBs), Savings and Loans (S&Ls), Susu Companies and Individual Operators and Financial Non-Governmental Organisation (FNGOs). Yet, it was apparent that within the operating framework, there remained an enormous pluralism regarding existing outlets which could not be captured due to the highly-infantilised nature of their operations in terms of scale, documentation and visibility.

The rising volume of clandestine activities led to a major revolution of the industry by BOG in 2011 to bring all institutions under one umbrella of regulation, supervision and licensing (BOG, 2011). Subsequently, two more institutions were recognised under the restructure, bringing the total to seven. These were the Microfinance Companies (MFCs) and Money Lenders (MLs). The new regulation stipulates a four-tiered system as required by initial capital outlay, prudential reporting and extent of regulation. From the highest to the lowest tier, there is a tapering of requirements in the three regulatory specifications. The current classification fosters easy identifiability of operators in the sector and promotes effective monitoring and supervision.

Types of microfinance institutions

Figure 1 shows the categories of MFIs and their corresponding distributions in the country. The graph indicates that the dominant group is the MFCs, followed by RCBs and CUs. The following paragraphs presents the individual categories of MFIs.

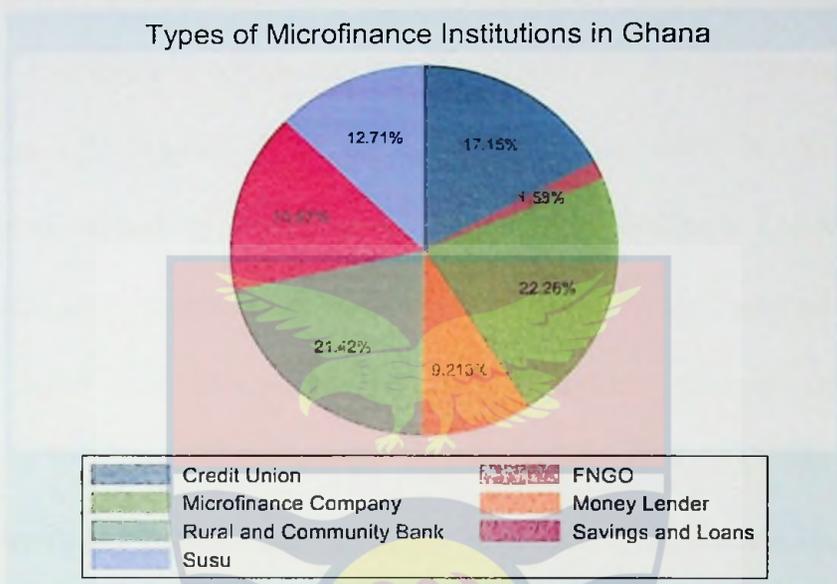


Figure 1: Distribution of microfinance institutions in Ghana
Source: Author

Microfinance companies

Microfinance Companies (MFCs) are the new breed of MFIs incorporated under the new classification and they constitute the largest group of MFIs. The group represents a body of institutions which offered microfinance services without formal regulation. As indicated by the census, there are 662 MFCs in the country. Out of this, only 385 were registered with the BOG (Microfinance Companies in operation as of 31st July, 2016). With their formal recognition, the current number of unregistered institutions is indicative of the extent of services that were not under direct supervision. MFCs currently lead the market in terms of loan advances. In 2011, an umbrella body, Ghana

Association of Microfinance Companies (GAMC) was formed to coordinate the group's activities.

Rural and community banks

Rural and Community Banks (RCBs) were established in 1976 to complement traditional banking activities to provide finance for rural projects. Ownership structure is community based (GHAMFIN, 2013). Capitalisation is mainly through deposits from individuals and also from donor-supported programmes aimed at reducing poverty. Loan facilities linked to the government and implemented through the Public-Private-Partnership (PPP) schemes have been channelled through government agencies and routed through RCBs. Once operating from their own districts, RCBs extend beyond their geographical boundaries. The banks have spread extensively over the ten regions. There are now over 600 mother banks, up from 133 in 2010 (GHAMFIN, 2013). At 21.4 percent, RCBs are almost at par with Microfinance Companies in terms of distribution.

Credit unions

Credit Unions (CUs) play a significant role in the microfinance sector and account for 17 percent of the distribution. They were started as self-help groups within organisations, churches and small community groups. For several decades, the unions have been mobilising savings and offering loans to exclusive members and gradually reaching out to non-members. An apex body for the group was formed in 1968 to support the development of its members who benefit from a range of programs including advocacy, training and performance monitoring (GHAMFIN, 2013). From a steady growth of 432 in

2010, there are currently 510 institutions. Credit Unions are the third major microfinance services outlet in the country and are ahead of S&Ls and Susu in the administration of loans and deposit taking.

Savings and loans

Savings and Loans (S&Ls) companies were among the five pioneering categories of microfinance institutions recognised by the Bank of Ghana (GHAMFIN, 2013). The Non-Bank Financial Institutions (NBFI) Act of 1993 as amended in 2008 also provides opportunities to private individuals or groups to form companies and deliver financial services. They are commercial vehicles whose capitalisation is above that required for RCBs. According to the 2015 MFI census, S&Ls comprise approximately 16 percent of the distribution of MFIs and are mostly located in urban areas.

Susu operators

Susu operators have been the spine of microfinance growth in the country and the West African Sub-region. This sub-sector constitutes individuals who mobilise diurnal savings, accumulates collections monthly and return total savings less a day's contribution as commission. Other offshoots of the group include Rotating Savings and Credit Associations (ROSCAs) and similar schemes operated by banks (Armendáriz & Morduch, 2010). Susu groups form approximately 13 percent of the total distribution. Compared with disbursed loans and the penetrating activities of other major categories, Susu operators are active in the savings sector.

Money lending

Money lending in Ghana is an old age practice. Formal recognition of such credit arrangements existed in the country before independence. Antwi-Asare and Addison (2000) highlight the existence of a Moneylenders Ordinance Act (1951) which regulated lending activities. Even though money lenders operated on a freelance basis, the foregoing provides evidence of a legal framework which protected clients. There is also evidence of money lenders who have been documented by District Assemblies (Aryeetey, 1994). Currently, the category is officially recognised as the Money Lenders Association of Ghana (MLAG), a body which represents the group. This is in contrast to some unregistered members who may remain underground and continue to operate as 'loan sharks'. The moneylending category is the fifth on the league table and forms 9.2 percent of total distribution of MFIs in the country. As of end of July 2016, there were 64 money lending companies registered with the BOG.

Financial non-governmental organisations (FNGOs)

FNGOs are not-for-profit institutions offering financial services. They participate in rural microfinance programmes and are supported by development partners, donors, social investors and the government to engage in projects directed at improving the lives of rural residents (GHAMFIN, 2013). FNGOs are therefore not required to take deposits and provide micro-lending services with a social objective (GHAMFIN, 2013). Compared to the dominance of the commercially-based counterparts, FNGOs constitute a marginal 2 percent of the distribution of MFIs in the country. Due to shrinking donor support, some FNGOs have been remodelling to join the commercial fleet of microfinance services, further driving down the numbers. With the guarantee

of its donors, Ghana's largest FNGOs have been resorting to the market for capitalisation (GHAMFIN, 2013). As of July 31st, 2016, there were ten FNGOs registered with BOG compared to 47 reported in the current census of MFIs.

Figure 2 shows the distribution of loans across the different categories of MFIs. The trend follows the distribution of categories in Figure 1. The highest number of loans are offered by MFCs, RCBs, CUs and S&Ls in the order listed and the least is offered by FNGOs.

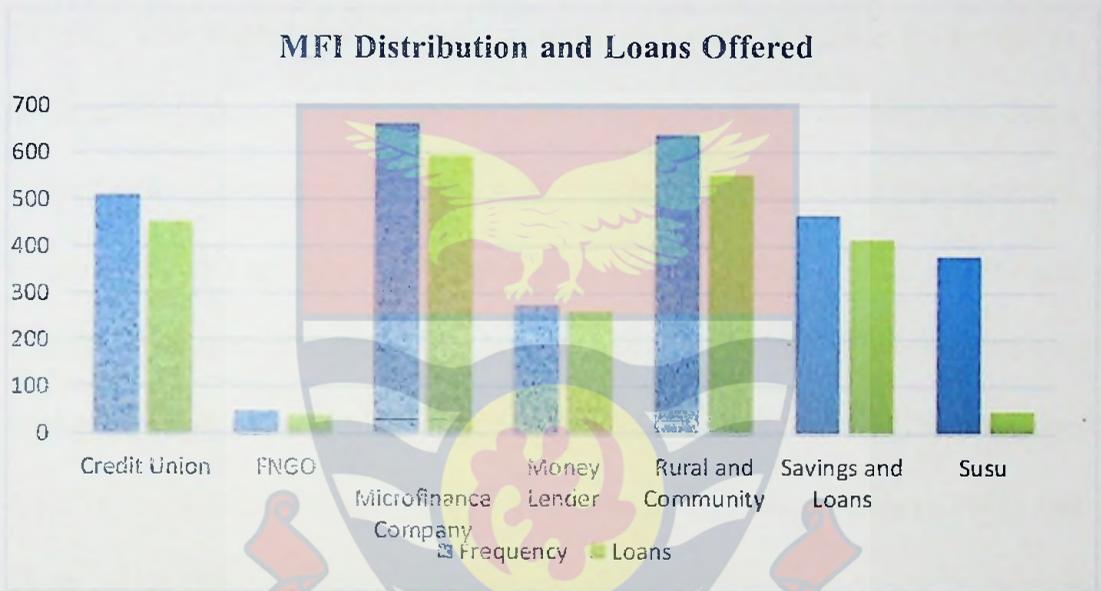


Figure 2: Distribution of loans across MFIs (Source: Author)

Households' Access to Financial Services

The financial sector policy is aimed at ensuring financial inclusiveness. The drive is to provide easy access to financial products for both existing and prospective clients. In terms of 'access', developments in the sector will be presented through the use, evolution and convergence of financial services at the household level, using information from the sixth round of the Ghana Living Standards Survey (GLSS6).

Use of financial services in Ghana

The GLSS6 presents a primeval opportunity to examine and elicit vital fundamental information about households' use of financial services. From this exploratory analysis, types of services and borrowers' characteristics are identified. Financial products accessed by households include credit, savings insurance, and other types of investments.

According to the data, borrowers access credit from formal and informal sources. The formal institutions are state and private banks, cooperatives, government agencies, non-governmental organisations and business firms. Others include employers, money lenders, savings and loans, and susu schemes. Informal sources comprise borrowing from traders, farmers, relatives, friends, neighbours and other sources. The proportions of borrowers across regions are: Western (17%), Brong-Ahafo (14%), Ashanti (13%), Volta (11%), Eastern (11%) Central (8%) Upper East (8%) Greater Accra (6%), Northern (6%) and Upper West (6%). To track development in both sectors, source of borrowing is categorised into MFIs and Non-MFIs. The taxonomy illustrates that 47 percent borrow from MFIs while 53 percent borrow from non-MFIs.

Remarkably, the data indicates that only 1 percent of the sampled population is unaware of the availability and relevance of financial services; implying, that 99 percent of the adult population sampled have knowledge of financial services. Out of the total sample size, 42 percent are bankable (have a bank account or are contributing to a savings and loans scheme). Hence, 58 percent of adults are unbankable.

Out of those who own a bank account, 95 percent have a savings account. The Commercial Bank has a largest percentage of account holders,

comprising 49 percent of total number of borrowers, followed by 28 percent of accounts held by Rural and Community Banks. Savings and Loans schemes also hold 10 percent; while, Susu schemes and Investment and Mortgage banks contain approximately 8 percent each.

On insurance policy, 26 percent of account holders have one form of insurance or the other. The highest cost of premiums has the utmost explicative power for reasons why clients do not take up insurance. Of the reasons cited, 43 percent stated unaffordability of insurance policies as their main reason, followed by 29 percent which is attributed to ignorance of insurance policies. Lack of a necessity to acquire a policy is also cited and 20 percent of people fall into this category. Types of short-term insurance policies include vehicle/motor, medical, funeral, property, commercial or business, and insurance for travel purposes. Long-term policies include life insurance secured from a private holder or from an employer, retirement annuity, education and other endowment/investment or saving plan.

The data also reveal information on the use of financial services across gender. A gender bias is apparent in the proportion of those who are bankable. Total proportion of account holders is dominated by males who constitute 77 percent in contrast to 23 percent of females. One of the acclaimed beneficence of MFIs is the program's capacity to reach more women, increase their empowerment and reduce poverty (Armendáriz & Morduch, 2010; Duvendack, Palmer-Jones, Copestake, Hooper, Loke & Rao, 2011). Given the increased lending by MFIs, a corresponding trend is exhibited by the data. Compared to non-MFIs, MFIs lend to more women by 19 percent and more men borrow from Non-MFIs.

Location and employment status also reveal marked differences. The data indicates that 56 percent of borrowers are rural dwellers while 44 percent are in the urban areas. On employment status, 20 percent of borrowers are in the public sector, 9 percent are private sector workers, 28 percent are self-employed, engaged in non-agricultural activities and 39 percent are own account holders in the agricultural sector. The remaining 5 percent are either unemployed, retired or inactive.

On education, household borrowers with a maximum of primary level education have the highest distribution of 41 percent, 31 percent have a Junior High School/Middle School Leaving Certificate (JHS/MSLC), 8 percent have a Senior High School qualification and 20 percent have a tertiary education. When the preceding is contrasted with the employment status background, the theoretical pattern that borrowers in the self-employed sector tend to have low levels of education also emerges, where 64 percent of borrowers have a JHS/MSLC qualification or below, and 36 percent have a Senior High School Certificate or higher.

The evolution of microfinance services

A development in the household borrowing sector would be incomplete without addressing the recent evolution of the microfinance industry, as a key driver of the intense growth and development in the financial sector. The evolution is discussed from the product and innovation point of view. According to the RAFiP census data, microfinance activities have extended beyond traditional products. Following loans and savings, a developing and significant activity is directed towards 'Investments'. From Figure 3, it is

evident that institutions are diverting into government securities as an option for risk diversification, resulting in the growing trend.

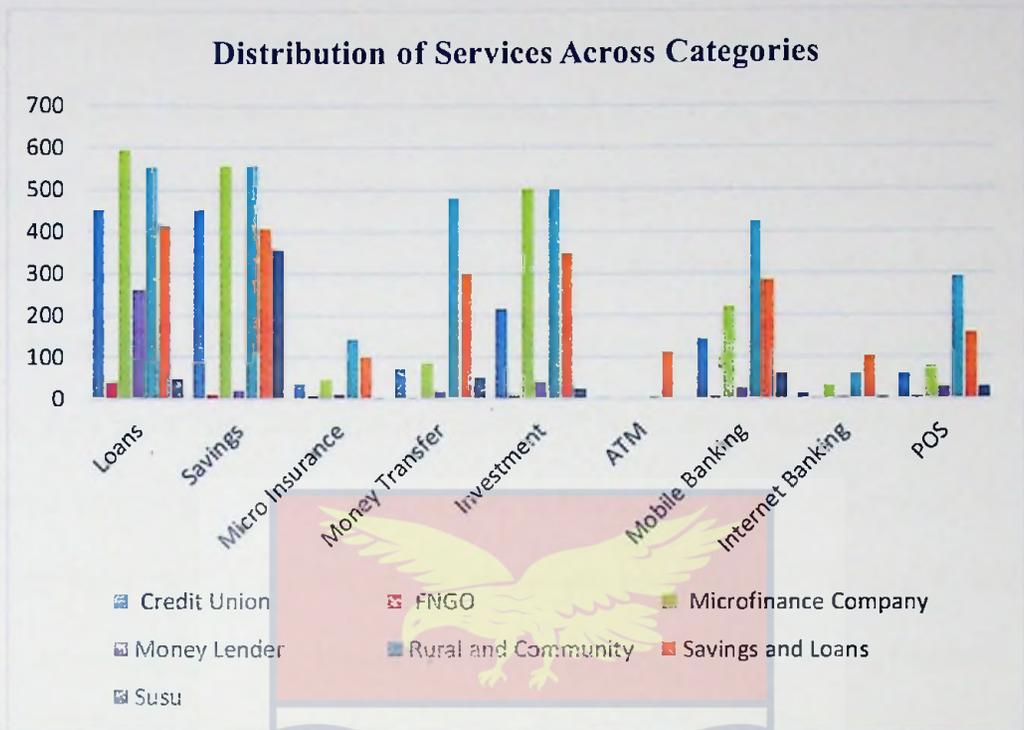


Figure 3: Distribution of MFI services

Source: Author

The two leading categories in the investments sector are RCBs and MFCs. While RCBs have a history of long operational activity, the level of investments undertaken by MFCs indicate the extent of profit orientation. S&Ls and Susu follow the trend with similar increasing activity. One reason for the intense growth in investments could be the trade-off between higher rewards and lesser risks for investments vis-à-vis higher risk and relatively lesser rewards for loans. Recently, government borrowing from the private sector increased appreciably (Kwakyee, 2012). Financial institutions, in an attempt to diversify portfolio and manage risk, are opting for government securities which yield a higher rate of return and are comparatively less risky. This emerging insight is informative for the increasing trend of profit orientation. Remittance services have seen an intense growth led by RCBs and S&Ls. The growth in

insurance services is also led by RCBs and S&Ls. From the foregoing, the transforming nature of microfinance services is evident.

Technology and innovation are also driving a new façade of microfinance business not only in Ghana but also in the sub-Saharan African region. The sector is recording its highest growth in the mobile banking division. In view of the success achieved by M-Pesa in Kenya, the mobile banking innovation led by RCBs and S&Ls are a worthwhile development given that data protection and security issues will be robustly enforced. MFCs and Credit Unions are also performing well in this sector. Currently, mobile-phone penetration in the country is an enormous potential for driving financial inclusion through this avenue. Another innovation is the improvement in payment-of-services (POS). Currently, clients can now pay for utility services using their phones. Following the trend of mobile banking, RCBs and S&Ls are again at the forefront of this service, supported by MFCs and CUs. Internet banking is also taking hold with S&Ls in the lead. This move also translates into the category's significant lead as the sole implementer of the use of automated cash machines (ATMs) by its members. The development in the services recounted above signals a swift transformation of the microfinance sector. Gradually, its activities are morphing with practices of mainstream banking.

Convergence in the micro and macro banking sectors

As highlighted in the above section, recent evidence from the two datasets seem to suggest a convergence in the micro and mainstream banking services. There are some fledgling commonalities. Examples include areas of operation such as investments, technological advances, lending rates and

educational background of the respective clientele base. Moreover, the investments witnessed in the microfinance sector are comparable to investments originally undertaken by mainstream banks. With profits to be made and risks suggestively manageable, it is unsurprising that the microfinance sector is converging with the mainstream banking sector on this score.

The convergence may restrict lending to relatively poorer individuals and constrain growth in the micro sector. Advances in the microfinance sector which is integrating with the mainstream also include growth in the use of mobile banking, ATMs, internet banking and POS services. Additionally, high interest rates are now an accepted feature of micro-lending (Armendáriz & Morduch, 2010). This notwithstanding, interest rates of 120 - 200 percent APR, have been recorded in the sector (RAFiP, 2015). In the case of interest rates, the microfinance sector may even be surpassing its mainstream counterpart; a situation of a juxtaposition instead of the seeming convergence.

Financial Stability

The financial stability component of financial development usually assesses banking sector stability employing indicators such as CAR, asset quality ratios and liquidity ratios (Ackah & Asiamah, 2014; BOG, 2016). While the sector generally reported a robust performance in the March 2015-March 2016 review, degenerations in ROA and ROE were also recorded (BOG, 2016). One critical issue is that the sector faces a major risk with a 60 percent increase in NPLs (BOG, 2016). An escalation in NPLs is, however, a reflection of the general economic conditions in the country. Even though a short-term remedy is to retract credit delivery, the solution could be deleterious for bank profitability since credit forms the integral business of the banks (BOG, 2016).

Therefore, in assessing the financial stability of the banking sector, it is imperative to highlight that stability in the sector is not monotonic and is largely contingent on the general state of the economy. Maintaining an enabling macroeconomic environment is crucial for financial intermediation (Forbes & Warnock, 2012). The conducive environment is created through monetary policies formulated to counteract domestic, external and influential factors which may contribute to instability in the sector.

Macroeconomic stability

Monetary policy and prudential macroeconomic management is pivotal for financial stability. Yet, there is a crucial symbiosis between the two. While economic growth requires a robust, responsive and stable financial sector, the financial sector thrives on a stable and efficient macroeconomic framework (Ames, Brown, Devarajan & Izquierdo, 2001; Kwakye, 2012). A stable macroeconomic framework is therefore crucial for poverty reduction efforts. Consequently, the world's largest economies (United States, China, Japan and Europe) have demonstrably pursued relatively stable macroeconomic policies.

One notable indicator underpinning the success attained in advanced economies is the prevailing relatively low interest rates. Japan has maintained a zero percent rate (Chandran, 2016), while the European Central Bank has also, as of 9th March 2017, kept interest rates of refinancing operations at zero percent (European Central Bank, 2017). The bank emphasised that the current low interest rate will continue for an extended period of time and is expected to stimulate the European economy. Other favourable indicators include a stable exchange rate, a healthy fiscal balance and low inflation. Affordable credit at

low interest rates may reduce production costs, improve business profitability, reduce defaults and improve banks' financial stability.

Ghana's macroeconomic environment has been deteriorating sharply. Growth rates have fallen from a peak of 15 percent in 2011 to 4 percent in 2016. (BOG, 2016). A heightened increase in public debt, over the past six years led to a slow-down of the economy. The prevailing high interest rates have resulted in exponential costs of borrowing (Kwakye, 2012). High interest rates are therefore pervasive in both the mainstream and microfinance sectors (Ackah & Asiamah, 2014; DRIC, 2016). In a bid to survive, banks and microfinance institutions pass on such high cost of credit to borrowers. Therefore, a weakened economy stifles businesses and results in increasing rates of NPLs and defaults. However, the antithesis is equally valid. Risks in the financial sector can also harm the economy, businesses and households.

Financial instability: implications for household borrowing

According to Ackah and Asiamah (2014), excesses in the financial system can trigger instabilities in an economy. For example, the 1929 Great Depression was ushered in by a cataclysmic demise in stock market prices on the New York Stock Exchange (Albers & Uebele, 2015). Hence, financial instability can activate economic repressions which pose severe threats to growth and development. The 2007/8 financial crises evolved from an unprecedented proliferation of credit which almost led to the demise of the international financial markets.

At the institutional level, a proliferation of credit can also have a counter-productive effect. The quest for survivability in the financial sector is driving enormous competition with accompanying consequences (Harper,

2003). Increasing levels of profitability has attracted more players, leading to unrestrained availability of credit (Armendáriz & Morduch, 2010). Therefore, borrowing has become less cumbersome and easily attainable. For the microfinance industry, there can be grave repercussions. Given the rampant borrowing opportunities, some borrowers engage in multiple borrowing, either to repay debts, or to supplement insufficient loans (Krishnaswamy, 2007). This activity causes a cyclical rotation of debts.

Opportunistic institutions can also engage in excesses, as witnessed in the case of DKM Microfinance Limited - an uncomfortable reality of the inherent threat posed to the industry and livelihoods (Quist, 2016). The inevitable response was the BOG's decision to close down 70 microfinance institutions to safeguard the sector ("Bank of Ghana revokes licenses", 2016). Therefore, an inundation of credit can cause saturation similar to the financial crises observed in the wider financial industry (Mathiason, 2008). Saturated microfinance markets also collapsed to the surprise of the microfinance community (Bateman & Chang, 2012; Pytkowska & Spannuth, 2011). Hence, a stable financial environment is a key condiment to attaining a progressive society which promises economic freedom for all.

The Finance and Development Goal

The finance and development goal anticipates that ultimately, households will be able to utilise financial services in a manner that promotes economic activities and increases incomes through a bottom-up strategy (World Bank, 2014). With a 'ceteris paribus' premise, finance will affect development through the well-known transmission mechanism as briefly decocted. A stable financial sector supported by enabling macroeconomic conditions will facilitate

competitive rates ideal for private sector investments. Low interest rates induce low operational costs, culminating in increasing profits. Thus, borrowers may be able to service debts without having to sacrifice on consumption expenditure. Therefore, given the preceding positive expectation, any objective to investigate the relationship between finance and development from the perspective of household living standards, may be informed by an a-priori expectation of a rise in borrowers' consumption expenditure.

In Ghana, investigations into living standards are conducted through the Ghana Living Standards Surveys (GLSS). The survey collects information on household consumption expenditure, which is used to determine household welfare scores. The absolute poverty line indicates the value of a basket of food and non-food items required to meet a minimum standard of living (GSS, 2014). According to the latest survey, poverty in Ghana has been halved from 57.1 percent to 24.2 percent. The goal for a progressive society will be to improve upon these figures. Therefore, the finance and development goal can only be achieved if the necessary steps are taken to assess and ameliorate risks to household welfare, and provide an enabling environment for accessing financial services in a manner which leads to improvement in livelihoods.

Client protection principles

Client protection entails assessing risks faced by borrowers and initiating action to mitigate threats (Brix & Mckee, 2010). Given the risks posed by excesses of penetrating financial growth to consumers' livelihoods, the Consultative Group to Assist the Poor (CGAP), a subsidiary of the World Bank, initiated an action plan to protect borrowers, dubbed the 'Client Protection Principles'. These recommendations are to be applied by institutions to ensure

adequate insulation of clients from any debilitating consequences of a heated financial sector. The principles constitute seven action points as indicated under Appendix A.

Referring to the essence of safeguarding borrowers, Schicks (2013) emphasised the urgency of a framework for preventing over-indebtedness. Two issues of concern, which have emerged from this background analysis are rising NPLs (BOG, 2016) and an exponential increase in the number of microfinance borrowers (RAFiP, 2015). Reports on the banking sector indicated that the greatest risk to the sector is the 60 percent rise in NPLs and for the microfinance industry the increase in number of borrowers is startling. Within six years, the industry has seen a 1,907 percent increase in the number of borrowers. As impressive as the changes in the industry might be, it is postulated, that the extraordinary percentage change in the number of microfinance borrowers for a period of six years (2009 to 2015) might embed some degree of multiplicity instead of an additive progression. Thus, for a growing, competitive and unsaturated market, the fundamental step is to investigate the extent of multiple borrowing and over-indebtedness and determine any risks, which could provide evidence to safeguard borrowers' livelihoods.

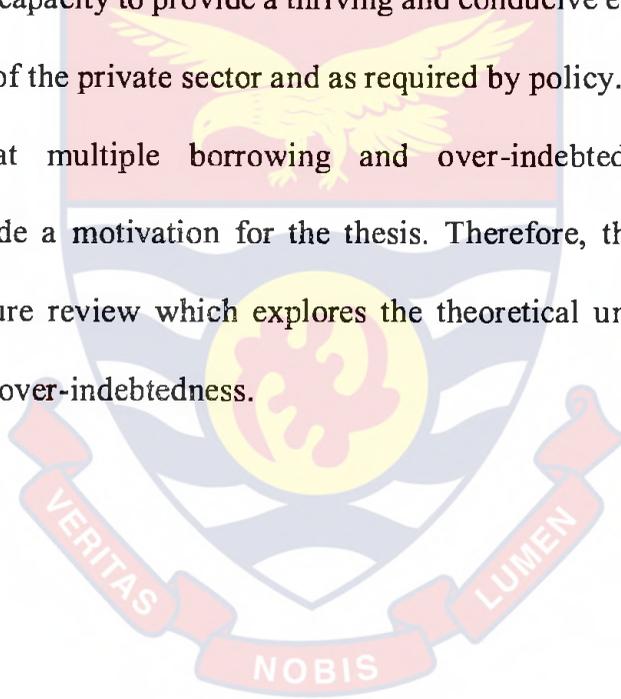
Chapter Summary

The medium-term development framework, GSGDA II and the PSDP II specify the role of the financial sector as a catalyst for promoting a thriving and competitive private sector capable of providing and sustaining jobs and enabling a better livelihood for all. In the financial system, financial intermediation plays a dominant role and is pertinent for promoting expectations of the private sector

and for the growth of MSMEs. Over the years, the intermediation sector has undergone a significant transformation.

This chapter provided a run-down of developments in the banking and microfinance sectors and the analysis indicated a robust growth. Three financial indicators (depth, access and stability) were used as themes to provide a practical overview of the sector. Currently, there are issues of concern. The analysis has unravelled evidence of borrowers unable to repay loans and the possibility of multiple borrowing. These developments can threaten the financial sector's capacity to provide a thriving and conducive environment, for the development of the private sector and as required by policy.

The threat multiple borrowing and over-indebtedness pose to households provide a motivation for the thesis. Therefore, the next chapter presents a literature review which explores the theoretical underpinnings of indebtedness and over-indebtedness.



CHAPTER THREE

THEORETICAL FRAMEWORK

Introduction

A theoretical framework presents the logical constructs underlying the explanation of a given phenomenon (Schumpeter, 1911). This chapter presents theoretical foundations for investigating multiple borrowing and over-indebtedness. The chapter is organised as follows: Prior to presenting the micro theories underlying indebtedness and over-indebtedness, the first section presents the nexus between finance and development, which is supplemented by the theory of financial intermediation. The second section introduces the Life Cycle-Permanent Income hypotheses as the dominant theoretical framework for analysing indebtedness. Constructs of financial institutions and institutional growth are advanced in the third section. The fourth section presents the theory of competition and multiple borrowing and the last section explains the concept of over-indebtedness, and, the constructs of credit, insurance and poverty reduction.

The Finance and Development Nexus

The connection between finance and development has been robustly studied through the finance and development literature. For instance, Bagehot (1873) and Schumpeter (1911) highlighted the essential role of the financial system and projected a positive and substantial relationship between financial development and economic growth. The prevailing paradigm was that financial intermediation could booster a rapid economic growth and have accounted for the financial *supremacy* of the developed economies.

Subsequent empirical contributions of the finance-growth nexus were pivotal in shaping the essence of the concept. One of the first empirical investigations was conducted by Goldsmith in 1969. The author used size of the financial sector as a measure of financial development and found a positive correlation between financial development and long-run growth. According to Gockel and Akoena (2002), the development hypothesis view of finance evolved from Goldsmith's work and earlier contributions, notably, Gerschenkron (1962) and Patrick (1966). Hence, from these empirical works, the 'interventionist' paradigm was advocated to provide the necessary institutional framework required to foster growth and development.

Given the prevailing institutional framework, the 'interventionist' model was regarded as repressive and represented a sub-optimal financial system in need of transformation. The Mckinnon-Shaw hypothesis argued that financial sector regulation leads to a contraction and a subsequent squeeze of economic growth (Mckinnon, 1973; Shaw, 1973). Liberalisation of financial markets were subsequently advanced to facilitate efficient resource allocation (World Bank, 1989). However, the Mckinnon - Shaw treatise attracted acute criticisms from various segments. For instance, Stiglitz and Weiss (1981) were of the view that, contrary to the assumptions of perfect competition, information asymmetries would prohibit an unrestricted interest rate from allocating credit efficiently. These subsequent developments highlighted the market's inability to correct inefficiencies resulting from a controlled financial sector.

Following the two schools of thought, and of Goldsmith's inability to draw causal interpretations, other studies have employed various econometric techniques and investigated facets of the multi-dimensional concept of finance

and growth. Notable among these are: Barro (1991), King and Levine (1993a, 1993b), Miller (1998), Demirgüç-Kunt and Levine (2009), Beck, Demirgüç-Kunt and Levine (2010), Beck (2012), and, Barajas, Chami and Yousefi (2013b). Overall, the above studies, among others, as well as general positive conclusions from reviews such as Gertler (1988), Levine (1997, 2005) and, Demirgüç-Kunt and Levine (2008) have affirmed Bagehot and Schumpeter's position.

In spite of the affirmative position indicated above, some authors have been uninclined to assert the full impact of finance on economic growth. For instance, Bađun (2009) refers to a recent body of empirical literature that casts doubt on focusing on the complete efficacy of financial policies as an engine of growth (Shan, 2005; Zang & Kim, 2007). Furthermore, some studies have unearthed the evidence that a poor functioning financial system can destabilise economies and livelihoods. Collier and Mayer (1989) highlighted issues of competition and efficiency and argued that a free-market reform of the financial sector grants no assurance of perfect competition and efficiency in resource allocation. Therefore, whether liberalised or controlled, finance for development tend to have both enabling and entrapping consequences.

From the above evidence, the financial sector, as an engine of growth, may be indispensable but inherently susceptible to market imperfections which can hinder or harness poverty reduction efforts. For instance, Greenwood and Janovic (1990) find that financial markets are profitable for the rich and may exacerbate income inequality. The evidence is later augmented by studies into financial development and the level of poverty (Clarke, Xu, & Zou, 2003; Honohan, 2004a; Jalilian & Kirkpatrick, 2002, 2005). On the other hand, there

tendencies, a transactional approach requires exhaustive contracts backed by strict legal instruments for enforcements, acute performance monitoring and a near-absence of any exercise of discretion. The traditional banking system aligns with this form of contractual approach.

On the contrary, relational theory indicates a situation where both the purchaser and supplier collude in their expectations and goals. Contractual enforcement is accomplished through reciprocity of trust, mutual collaboration, communication and a lack of selfish interests (Macneil, 1978, 1985). The original microfinance model was constructed around the relational theory; hence, the difference between the two approaches seem to suggest a continuum in the two forms of intermediation.

Clearly, the transactional approach of contract enforcement is costly, non-congenial and exclusive, while the relational approach may not be wholly altruistic. Therefore, even though a purely transactional approach may be downplayed in the microfinance sector, some legal enforcements are necessary since a purely relational approach might not be entirely pragmatic. It would therefore suffice to intimate that instead of a strictly polemic approach being exercised, the traditional banking and microfinance sectors have tended to adopt a mix of methods, especially due to the competition posed by microfinance activities for traditional banking, as well as the opportunistic behaviour witnessed from the supply and demand sides of the microfinance sector. For both approaches, there is an inherent risk of deviation. Thus, the use of one modus operandi or the other; or a mixture of both, will depend on the type or density of institutions, the product, extent of confidence in the legal or institutional systems and a host of contextual factors.

The above section presented the concept of finance and development as the overall background for the study. It introduced evidence of benefits and disbenefits associated with the relationship between finance and development and presented the two approaches adopted by the traditional sector and microfinance industry in their lending processes. The next section presents the theory underlying the need for individuals to borrow and the circumstances which trigger borrowing risks.

Life Cycle-Permanent Income Theories

Individual or household borrowing decisions are situated in the field of microeconomics and the tenets of utility maximisation theory. Understanding borrowing decisions at the micro level dates back to Keynes' (1936) consumption function. In economic theory, indebtedness is predicated on the life cycle-permanent income (LC-PI) theories which underpin the consumer's task of allocating resources to present and future consumption (Betti et al., 2007). The theoretical foundations for explaining indebtedness follows Betti et al's. (2007) framework for understanding the nature of indebtedness and over-indebtedness for the first systematic EU-wide empirical analysis of over-indebtedness. The same framework is adopted by Du Caju, Rycx & Tojerow (2016) in the analysis of unemployment risk and over-indebtedness.

This framework is based on the LC-PI theories of consumption/savings behaviour by Friedman (1957) and Modigliani (1966). Using the simple LC-PI as the basis, Betti et al. (2007) outline further developments of the model to present the circumstances under which a representative consumer becomes indebted and the same constructs are extended to conceptualise over-

indebtedness. Hence, the main elements of the framework are expounded below for the purpose of this study.

The simple LC-PI model underpins the understanding of a representative consumer's consumption and saving behaviour. Hence, a consumer will borrow or save at the market interest rate to smooth consumption over the life cycle. The authors highlight that the basic LC-PI model is premised on two crucial elements- the behaviour of the representative consumer and the institutional setting. For borrowing decisions, the consumer is assumed to be rational, far-sighted and has an unfettered access to credit. Therefore, a rational consumer faced with unrestricted credit will maximise utility subject to intertemporal budget constraints.

Contrary to Keynes' (1936) simple consumption theory that current consumption will be determined by current income, Fisher (1930) argues that consumption depends on the present value of life-time resources and the actual timing of income may not be the utmost decisive factor because consumers can borrow or save between the periods. Therefore, in anticipation of future income increases, for example, consumption can be spread over both time periods by borrowing in the current period.

The authors indicate that at any particular time in the consumer's life span, optimal consumption is a constant fraction of discounted resources (human and financial) in the current and future time periods as given in equation (1):

$$c_t = c + \frac{r}{(1+r)} \left(\sum_{i=0}^{\infty} \frac{y_{t+i}}{(1+r)^{t+i}} + A_t \right) \quad (1)$$

where r is the real interest rate, y_t is the income received at time t and A_t the asset level at time t . Using the standard principles of demand analysis, the effects of changes in assets, income and interest rate can be determined from the above model. For example, present or future increase in employment income may actuate a corresponding increase in consumption. Additionally, the relationship between current and future income will determine the magnitude of effect of the changes in current income on current consumption. One pivotal caveat pertaining to the simple LC-PI model is that it does not preclude any uncertainty regarding future income streams.

Based on Hall's (1978) contribution, uncertainty of future income streams is introduced into the simple LC-PI model. Hence, the first order conditions of the maximisation of lifetime utility given an intertemporal budget constraint give rise to the following Euler equation:

$$E_t[(1 + r_{t+1})\beta u'(c_{t+1})] = u'(c_t) \quad (2)$$

where $u(c_t)$ represent the utility derived from consumption c_t , β is the discounting factor for the utility in future periods and r the real interest rate. Given a quadratic utility function with constant demographic factors and a convergence of the discount and interest rates, then optimal consumption is given by equation (3):

$$E_t(c_{t+1}) = c_t \rightarrow c_{t+1} = c_t + u_{t+1} \quad (3)$$

The above equation indicates a “stripped down” life cycle model demonstrating the circumstances under which optimum consumption level changes from one period to the next. Under this condition, optimal consumption path is expected to be smooth even though the consumer is restrained from deriving optimal consumption in terms of life-time resources. According to Hall's Martingale

hypothesis, any change in consumption can only be triggered by new information regarding the consumer's resources, and this new information cannot be expected (which a rational, far-sighted consumer would have already processed), but rather, by unexpected new information that is purely random.

Theoretical adaptations to the consumer's utility function explicate on the stochastic nature of the optimal consumption path (Caballero, 1990; Weil, 1993). These developments include the constant-relative-risk-aversion (CRRA) and stochastic programming methods. The authors subsequently highlight a general knowledge that in the presence of uncertainty regarding future income, the optimisation problem does not present a 'closed-form' solution. Therefore, rather than focusing on the determinants of consumption, the core issue hinges on the factors which trigger a change in consumption from one period to the next. Following Hayashi (1997), the authors present a change in consumption as follows:

$$\Delta c_t = \sigma \log(\beta) + \sigma r_{t+1} + \sigma \text{Var}_t(\varepsilon_{t+1})/2 + \eta_{t+1} \quad (4)$$

where σ is the risk aversion parameter in the CRRA utility function, β is the discount, r is the interest rate, $\Delta c_t \equiv \log(c_{t+1}) - \log(c_t)$, ε_{t+1} is the error term between actual and expected marginal utility in the next period, and η_{t+1} is a collection of error terms relating to the differences between actual and expected consumption and between actual and expected interest rate in the next period. From equation (4), the optimal consumption growth depends on factors such as risk attitude, discount factor, uncertainty about future income streams, unexpected shocks to consumption and the real interest rate in the next period.

While the above illustrations and generated factors do not culminate in an explicit indebtedness model, the implications derived by Betti et al. (2007) which are crucial for the understanding of indebtedness, is that,

It is optimal for a consumer to be indebted under certain circumstances and at certain stages of the life cycle, particularly the earlier stages. If there is no unexpected change to total resources or expenditure requirements and in the absence of any inter-generational transfer mechanism, the consumer's current asset will be exactly balanced by the present value of his/her debts over all future periods. This intertemporal budget will hold and the consumer will never be over-indebted (p.140).

In the LC-PI framework, the authors refer to two conditions favouring the optimisation process: the representative consumer and the institutional setting. The institutional setting therefore plays a crucial role in borrowing and over-indebtedness issues and these are explored through institutional growth and the theories of competition and multiple borrowing.

Financial Institutions and Institutional Growth

Ex-ante knowledge about financial institutions and attendant institutional growth commences with the era of financial repression and overarching government control of the financial sector. According to Jackelen and Rhyne (1991), the two prominent factors included interest rate repression and directed credit. These factors, among others, characterised the inefficiencies, paralysing bureaucracy, lack of competition and constricted growth in the financial sector (Jackelen & Rhyne, 1991). In many countries, traditional intermediaries, such as commercial banks, were state owned and operated an urban-based model (Adjetei, 1978). Over time, financial

liberalisation paved way for the entry of specialised financial institutions and other multinational banks (Ackah & Asiamah, 2014; Jackelen & Rhyne, 1991). With the focus on urban clientele, an enormous opportunity was created for lending to the unbanked rural and urban poor. Therefore, reaching both urban and rural poor in the informal sector required a new operational banking model, capable of lending small loans on a predominantly unsecured basis.

In the financial market, increased institutional growth was propelled by the growth in the microfinance industry. For the finance and development agenda, liberalisation implied an efficient and competitive financial sector (World Bank, 1989). The efficiency drive subsequently found its way into the original microcredit model and propelled a wave of commercialisation across the industry (Adams & von Pischke, 1992). Consequently, non-governmental organisations (NGOs) and initial MFIs converted into for-profit status or microfinance banks with deposit-taking capability (Otero & Rhyne, 1994). Unsurprisingly, not even the iconic Grameen Bank was immune from the 'best practice approach' which inevitably became the fundamental reasons for the much-needed transformation.

With more commercial players entering the market, various strategies were adopted to ensure institutional viability. Armendáriz and Morduch (2010) summarise the institutional environment as follows:

the microfinance movement is thus populated by diverse institutions, some large and many small, some urban and some rural, some more focused on social change and others more focused on financial development (p.22).

Given the intensified commercialisation and the ever-increasing opportunities for lending and borrowing, competition, institutional growth and multiple borrowing have become inevitable for institutions and borrowers alike, in anticipation of financial rewards.

Theory of Competition and Multiple Borrowing

In a highly competitive environment, McIntosh, de Janvry and Sadoulet (2003) suggest that increasing concentration of institutions offers opportunities for multiple borrowing and its consequences, and this may be inevitable, even within an information-sharing environment. The theory underpinning competition and multiple borrowing hinges on institutional decision to allocate small loans, mainly to new clients (Krishnaswamy, 2007).

In the wake of information asymmetries, MFIs adopt small loan sizes to manage the adverse selection threat (Krishnaswamy, 2007). Initial small loans and subsequent upgrading is a risk management strategy adopted by institutions to facilitate a gradual accumulation of credible customer history to inform future loan decisions (Harper, 2003). Repayment information on initial small loans provides the basis for a graduation strategy. Hence, financial institutions can rely on this vital information to decide on future loans or in a case of a monopolistic environment, refuse further loans as a disincentive to delinquencies and defaults.

In the operational sense of a restricted loan management, the client-provider relationship reflects confidence and trust between supplier and receiver. Hoff and Stiglitz (1998) assert that the relationship can only be efficiently managed in a monopolistic environment. Therefore, managing small loans in this manner is only plausible in a controlled environment and becomes

tenuous in an open market. According to Chen and Chivakul (2008), households will not only borrow but borrow the desired amount to smooth consumption. Yet, in a controlled setting, borrowers may not obtain the desired amount and can be credit constrained. Hence, a competitive environment creates difficulties in information sharing and exacerbates information asymmetries (McIntosh & Wydick, 2005). It dissipates institutional power and offers clients more borrowing options.

Competition therefore reduces repayment incentives and borrowers benefit from the plurality of institutions (Gonzalez, 2008). Given the costs of borrower-monitoring behaviour across institutions, clients can opt to engage in cross-borrowing, giving rise to the push factors of multiple borrowing. On the pull front, multiple borrowing may arise initially from the institutional setting, which creates a condition of over-lapping either from small loan sizes, rising interest rates or increasing number of MFIs in a location, and the general external environment (Schicks, 2010). In their analysis of the relationship between multiple borrowing and over-indebtedness, Khandker et al. (2013) control for the village-level density of MFIs, as a measure of MFI competition, a probable source of multiple borrowing and a cause of over-indebtedness.

Concept of Over-Indebtedness

The conceptualisation of over-indebtedness follows from the constructs of indebtedness. Indebtedness refers to the use of credit or committing to repayment obligations from a loan contract (Betti et al., 2007; Haas, 2006). Betti et al. (2007) present a qualitative perspective to the concept of over-indebtedness and emphasises that the only explanation for over-indebtedness that is consistent with the LC-PI model is the issue of unexpected adverse

shocks to the consumer's expenditure requirements. Such negative shocks are in the form of a reduction of household financial resources engendered by loss of employment, plummeting profits, ill-health, changes in family structure and a deteriorating macroeconomic environment.

A development to the issue of income sensitivity has been addressed by Jappelli and Pistaferri (2010), who examine issues of unanticipated income changes. The authors identified labour income as the most essential source of income uncertainty for working-age individuals. The study also referred to adverse shocks such as illness, disability, unemployment, and, the effect of crop failure and adverse climatic changes in developing countries. Hence, causes underlying adverse shocks to income have been the roadmap for analysing issues of over-indebtedness.

Following the conceptualisation of indebtedness arising from 'uncertainty', as encountered by a representative consumer, Betti et al. (2007) consider the situation where over-indebtedness can erupt intrinsically from the consumer's consumption/savings plan. These could arise from irrational behaviour, or market imperfections imposing liquidity constraints (Betti et al., 2007). Although, the authors highlight the absence of a general model that explains over-indebtedness from irrational behaviour, they proffer a qualitative explanation to these factors.

In view of the prominence of microfinance, issues of over-indebtedness began to take centre-stage and with insights from the consumer finance literature, Schicks (2010) presented a framework for understanding the drivers of over-indebtedness in the microfinance industry. The drivers are aggregated into demand, supply and external factors. Demand factors include socio-

demographic and economic factors, sociological influences and cognitive and psychological biases. Marketing and growth focus, inflexible products and unfair lending procedures account for the supply factors, while the general macroeconomic or legal environment and adverse shocks constitute the external drivers. Thus, for a representative consumer, the probability of over-indebtedness will depend on the consumer's idiosyncratic characteristics, supply factors and the external environment.

While adverse shocks may be impermanent, the state of dis-equilibrium can be restored through mechanisms such as self-insurance, market insurance and forms of social capital (Jappelli & Pistaferri, 2010). Brown (2001) defines insurance as a 'financial service that uses *risk pooling* to provide compensation to individuals or groups that are adversely affected by a specified risk or event' (Harper, 2003, p.73). In the literature, a complete insurance market model refers to insurance from the formal or informal sector, from subsidies or pay-outs through governments programs, or from relatives and friends (Jappelli & Pistaferri, 2010). On the contrary, market imperfections can result in a suboptimal situation for some consumers and social safety nets and intergenerational transfers may not exist for deprived or low-income communities and over-indebtedness may persist (Armendáriz & Morduch, 2010; Betti et al., 2007). Therefore, borrowers may not be totally immune from over-indebtedness and a proportion of the population may be affected at any point in time.

Credit, insurance and poverty reduction

Access to credit is essential for economic growth and contributes to improvements in individual and household living standards. According to Chen and Dunn's (1996), Household Economic Portfolio (HHEP) model, a household's economic portfolio is conceptualised as consisting of three components. These are: (1) human, physical and financial resources, (2) household economic activities, and (3) the interaction between resources and economic activities. Credit augments the household portfolio and may be allocated to any of the activities within the household (production, investment or consumption).

According to the simplest conceptualisation of the relationship between credit and poverty, a borrower is a sole agent undertaking a given economic activity and is impeded by a lack of credit which prevents the growth of the enterprise and the borrower's subsequent well-being (Duvendack et al., 2011). The acquisition of credit will therefore lead to increased outputs, income and profits, and an ultimate improvement in the borrower's living standards.

While acknowledging the positive impact of credit on poverty, potential adverse effects have long been acknowledged (Sebstad et al., 1995). To ensure a state of equilibrium, the borrower's capacity to settle credit commitment depends on the income-yielding potential of the business to meet existing and future debt-servicing costs. The effect of the level of lending rates has been highlighted in response to its influence on borrowing risks for individuals and households (Jenkins & Harvey, 1993). Therefore, uncertainty regarding contractual loan terms implies that rising borrowing costs such as fees, interest rates and charges are unavoidable (Armendáriz & Morduch, 2010), and

production costs are certain to rise with general price levels given high interest rates and high inflation. For unstable informal sector ventures, credit, in spite of its potential benefits, may have negative effects if its marginal returns fail to compensate for the high marginal cost. Consequently, borrowers' livelihoods may be put at risk. The foregoing scenario has led to the consideration of the relationship between credit and poverty.

A borrower may continue to finance debt-servicing obligations by enduring a substantial shock to basic levels of consumption to satisfy repayment obligations (Betti et al., 2007). When the situation persists, the sustainability of the optimal consumption path is severely threatened and the borrower plunges to a lower consumption path, which could seriously disintegrate familiar standards of living, resulting in a possible negative effect of over-indebtedness on living standards (European Commission, 2013). To examine relationship between over-indebtedness and poverty, relevant measures of over-indebtedness are linked to indicators of poverty, conditional upon socio-economic, demographic and external characteristics (Russell et al., 2011). The concept underlying the link between credit and poverty, therefore, forms the basis for determining whether over-indebtedness affects household living standards.

In the extensive poverty measurement literature, various indicators have been used to reflect its intricacies. The use of consumption expenditure, rather than income, as a measure of living standards is well-documented in the literature (Easterlin, 2000; Meyer & Sullivan, 2010, 2011). While defining the various poverty measures is beyond the scope of this study, this research adopts

consumption expenditure as a measure of household living standards, since the focus is on a quantitative measure of living standards.

On the effect of insurance on poverty, earlier consumption models assumed that consumers do not have access to either formal or informal insurance markets. According to Jappelli and Pistaferri (2010), 'insurance opportunities also affect consumption allocation and the response to income shocks' (p. 48). Traditional products include; life and home insurance, health, education, vehicle, building and business packages. The emergence of micro-insurance encapsulates products designed to suit the needs of low income groups or individuals (Brown, 2001). Insurance against crop and livestock failure and the innovative rainfall insurance packages are predominant in the agrarian sector of developing countries (Armendáriz & Morduch, 2010). Therefore, having an insurance policy is expected to smooth consumption in an event of a risk and reduce the vulnerability of households.

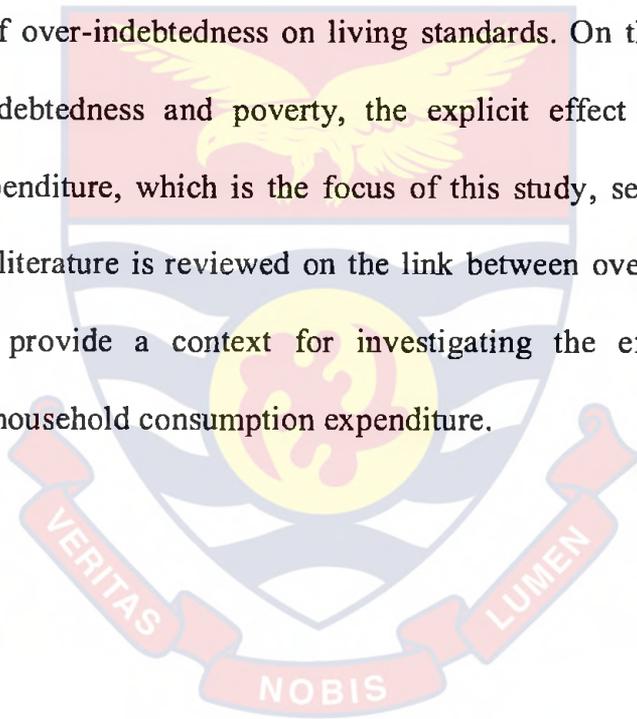
Chapter Summary

This chapter has presented theoretical underpinnings for multiple borrowing and over-indebtedness research. It presented the broad context of finance and development as the focal point of the thesis. Theories of relational and transactional costs also describe the operational models of traditional banking and microfinance intermediation. The Life-Cycle Permanent Income (LC-PI) hypotheses explained the development of the consumption function from a period of income certainty to the situation of unanticipated adverse shocks to income arising from uncertainty.

It also presented institutional growth as a response to competition and commercialisation; particularly, in the microfinance industry and introduced the

concept of multiple borrowing. An explanation of over-indebtedness follows from the LC-PI theories, leading to a discussion on the theory of credit and poverty, which identifies household consumption expenditure as a measure of living standards. The efficacy of an insurance package to ameliorate risks faced by households and its effect on consumption smoothing is also presented.

The next chapter presents an empirical review of the literature. It is organised by a thematic approach to reflect the problems identified and focuses on competition and multiple borrowing, loan amount and over-indebtedness, and, the effect of over-indebtedness on living standards. On the relationship between over-indebtedness and poverty, the explicit effect on household consumption expenditure, which is the focus of this study, seem to be non-existent. Hence, literature is reviewed on the link between over-indebtedness and poverty to provide a context for investigating the effect of over-indebtedness on household consumption expenditure.



CHAPTER FOUR

EMPIRICS OF MULTIPLE BORROWING, OVER-INDEBTEDNESS AND HOUSEHOLD CONSUMPTION EXPENDITURE

Introduction

A review of theoretical and empirical literature sets the analytical framework for an intended study and provides opportunities for research, as determined by the divergencies in the content, scope and context of the subject matter. Over-indebtedness research, particularly, in the microfinance industry, is a growing area of enquiry. The infantile stage of this research area is demonstrated by the fact that, as of the year 2011, Schicks and Rosenberg, writing on behalf of CGAP, identified only six empirical studies of microcredit over-indebtedness. To date, additional studies such as Khandker et al. (2013) on Bangladesh and Liv (2013) on Cambodia, including other contributions, demonstrate the paucity of enquiry into over-indebtedness.

While expounding on the 'Economics of Microfinance', issues of commercialisation and regulation were advanced as arguments for client protection (Armendáriz & Morduch, 2010). Institutional growth and multiple borrowing have also been identified as crucial factors of the saturation experienced in the market (Krishnaswamy, 2007). Given the growing enquiry into multiple borrowing and over-indebtedness in the last decade, the study draws on limited empirical evidence from microfinance over-indebtedness research and comparable evidence from consumer finance studies. This approach provides the essential opportunity to engage in further research in this vital area.

The empirical review adopts a thematic approach, which focuses on the three main themes of the thesis: (1) multiple borrowing and institutional density, (2) loan amount and over-indebtedness, and (3) the effect of over-indebtedness on household consumption expenditure. Due to the unavailability of direct evidence on the effect of over-indebtedness on household consumption expenditure, empirical knowledge on over-indebtedness and poverty is reviewed to set the foundation for the intended analysis into the effect of over-indebtedness on household consumption expenditure as a measure of household living standards.

The thematic review is intended to be targeted and focused. Wide and subtle variations in the definitions and measurements of over-indebtedness adopted in the literature (Betti et. al., 2007; European Commission, 2008; Gonzalez, 2008, Grammling, 2009; Schicks, 2013), and, the differing approaches used to establish the link between over-indebtedness and poverty (Hartfree & Collard, 2014), underlie the choice of empirical evidence employed. While the trimmed-down focus may be seemingly parsimonious, in relation to the expected, it provides a framework for the identification of existing empirical knowledge, which utilise a ‘similar’ measure of the adopted over-indebtedness indicator. Hence, the analysis seeks to identify gaps to contribute to the growing body of knowledge, in contrast to accomplishing a ‘comprehensive’ critique, as anticipated of an established area of study with elaborate and divergent schools of thought.

This chapter proceeds as follows: The next section reviews empirical evidence on multiple borrowing, focusing on the extent, drivers and effects. Its sub-section discusses the issue of multiple borrowing and institutional density.

The third section outlines definitional and measurement subtleties and also presents empirical work on the extent, drivers and effects of over-indebtedness. In the fourth section, the threat of over-indebtedness to poverty reduction is reviewed as a proxy for the intended analysis into household consumption expenditure. It begins by presenting the current state of poverty reduction in Ghana. The fifth and sixth sections introduce the conceptual framework and an overview of empirical methodology for investigating multiple borrowing and over-indebtedness.

Empirics of Multiple Borrowing: Extent, Drivers and Effects

The term *multiple-borrowing* evolved from borrowing or indebtedness and is synonymous with *overlapping* and *cross-borrowing* (Khandker et al., 2013; Maurer & Pytkowska, 2010). The terminology is applicable to individuals and households alike and are used interchangeably in this thesis to refer to the same phenomenon. At the literal level, the term is self-explanatory and a common interpretation is widely accepted in the literature. *Multiple borrowing means having more than one loan*. According to Khandker et al. (2013), the term refers to “*borrowing from more than one MFI source for the same or similar purpose, and the term applies to both individuals and households*” (p.3). Liv (2013), however, emphasises the source of borrowing and defines it as “*having more than one loan regardless of the loan provider*” (p.11). The following paragraphs present the extent, drivers and effects of multiple borrowing.

Anecdotal reports of multiple borrowing emerged in parts of the world which had competitive microfinance activities (Krishnaswamy, 2007; Rhyne & Otero, 2006). Subsequently, empirical studies were launched to determine the

extent of multiple borrowing in India, Bangladesh, Cambodia and rather recently, in Tanzania. Krishnaswamy (2007) reports evidence from an exploratory study by Burki and Shah (2007), which suggest that incidence in high concentration areas was between 50-75 percent, while loan officers estimated a 20-40 prevalence in Lahore. Further insights on multiple borrowing in India were provided by the Centre for Microfinance (CMF) Focus Note which indicated that 36 percent of clients took more than one loan within two successive months, 52 percent had two loans, 5 percent possessed as many as six loans while 84 percent of rural borrowers had two or more loans.

For Bangladesh, the Institute of Microfinance (InM) Policy Brief provided an estimate of 40-60 percent based on the work of Khalily and Faridi (2011). Liv (2013) found that in Cambodia, 56 percent of borrowers had multiple loans in saturated markets. In Tanzania, Mpogole et al. (2012) also found that 70 percent of borrowers had at least two loans from different MFIs at the same time. The above incidences of multiple borrowing suggest that it is a fledgling issue of concern. Grammling (2009) provided earlier suggestions of the phenomenon in the Ghanaian market, based on a qualitative study which focused on one MFI activity. To date, there is no rigorous quantitative study on multiple borrowing in Ghana and the actual extent of the phenomenon is unknown.

In the empirical literature, evidence on the drivers of multiple-borrowing have been investigated from the demand, supply and external factors. On the demand side, Vogelgesang (2003) found that multiple borrowing among new clients increased significantly from 13 percent in 1996 to 24 percent in 2000. The evidence confirms the conceptual underpinning that new clients are more

likely to perceive their loans as insufficient and therefore resort to overlapping opportunities. Although not based on a rigorous econometric study, the evidence from Mpogole et al. (2012) found level of education and number of dependants to have a significant effect on cross-borrowing.

In the only identified econometric study of the determinants of multiple borrowing, Khandker et al. (2013), focused on returns to investments while controlling for other socio-demographic characteristics and found low returns to have a significant effect on multiple borrowing. From the consumer credit literature, evidence from the Department of Business Innovation and Skills (BIS, 2010) suggests that being female, having a highly skilled occupation, having dependants, being separated, divorced or widowed are positively associated with multiple borrowing whereas a negative relationship is found with long-term unemployment, age or borrowers who have never worked. Hence, idiosyncratic factors and socio-economic status of clients contribute to their propensity to engage in multiple borrowing.

From the supply perspective, multiple borrowing has been attributed to the rapid growth of MFIs. This has been derived from the concept of competition and institutional growth, as highlighted earlier (Johnson, 2004; Krishnaswamy, 2007), and most importantly, to the concentration of microfinance institutions in an area (Wisniwski, 2010). While evidence suggests that competition leads to greater awareness of financial efficiency (Hermes, Lensink & Meesters, 2011), others indicate that increased competition leads to lowered standards (Schicks & Rosenberg, 2011).

Investigating the Bolivian crisis, Vogelgesang (2003) found a positive correlation between competition and high levels of indebtedness while

Krishnaswamy (2007) provides evidence of competition and multiple borrowing in India. Khandker et al. (2013) also found that competition and multiple borrowing raise indebtedness. Therefore, given improved accessibility amidst minimal client monitoring and evaluation systems, underserved clients take advantage of credit availability and borrow to augment small loans granted by a parent MFI. Insufficient loan amounts and repayment rigidities, such as, inflexible repayment deadlines and restrictive loan durations, are all attributed to the supply-side drive. With the influx of capital, multiple borrowing was considered a consequence of intense competition.

Macroeconomic conditions also have an external influence on multiple borrowing. In the 1999 Bolivian crisis, part of the repayment challenges was attributed to a stall in the macroeconomic environment, which led to a reduction in economic activities (Rhyne, 2001). In various contexts, a combination of demand and supply factors, coupled by general macroeconomic conditions may determine the drivers of multiple borrowing. These are driven by demographic and socio-economic factors, institutionally-motivated influences and effects of the external economic environment. Given that MFIs adapt their operational models to different environments, the particular drivers of multiple borrowing in the Ghanaian context, which is based predominantly on an individual lending model, is unknown and such knowledge will be vital in contributing to the evidence on the subject.

The effects of multiple borrowing in the literature are inconclusive. As already reiterated, multiple borrowing may be unproblematic, if accompanied by income growth (BIS, 2010; Khandker et al., 2013). Among the few studies available, effects are either negative, positive or mixed. Earlier studies reported

evidence of degenerating repayment performance and defaults or delinquencies (Chaudhury & Martin, 2002; Vogelgesang, 2003). In Bangladesh, available evidence found a deteriorating repayment performance due to rising number of households with multiple loans (Chaudhury & Martin, 2002). The rippling effect of high rates of defaults is demonstrated by Vogelgesang (2003), who argued that poorest borrowers are acutely affected by high rates of defaults, which causes lenders to raise interest rates accordingly. Hence, evidence of negative effects engendered further investigation into the problem.

Increased borrowing accompanied by a generic application of high interest rates may result in rising sacrifices of consumption expenditure. Consequently, Krishnaswamy (2007) focused on clients' capacity to contain additional credit and commit to repayment without sacrificing consumption. The author found positive benefits for both clients and institutions - multiple borrowing induced loan repayment and also guaranteed the sustainability of MFIs. The study further suggests that repayment performance of borrowers with multiple commitments are at par or even surpass clients on single loans from the same location.

While the preceding positive finding is suggestively intriguing for repayment performance, two possibilities are inherent. Firstly, without explicit reference to loan utilisation, the multiple loans could have been taken to service other facilities thereby improving repayment performance. Secondly, if additional loans have been successfully invested in productive ventures, which are yielding expected profits (as would be expected to happen in this case), then, borrowing from different sources may not be obstructive, but rather result in enhanced loan repayment.

On the effect of multiple borrowing on over-indebtedness, Khandker et al. (2013) find mixed outcomes. The authors suggest that cross borrowing can negatively affect short-term liabilities but improves assets in the long run and conclude that despite increases in loans held, households with overlapping membership accumulate higher net assets over time. On the other hand, Liv (2013) finds a positive relationship. Currently, the scanty evidence on the effect of multiple borrowing on repayment performance and over-indebtedness is disparate; nevertheless, it provides knowledge on the phenomenon.

Multiple borrowing and institutional density

The theory of competition and multiple borrowing posits that institutional concentration may engender multiple borrowing. The closest study, which examines the influence of institutional density on multiple borrowing is Khandker et al. (2013). The study addressed “whether the *village-level density of MFIs* measured by the number of NGOs in a village, *a possible source for raising multiple program membership* and a measure for MFI competition, is causing the extent of over-indebtedness in Bangladesh” (p.17) [emphasis added].

As implied by the above quotation, the speculative nature of the link between institutional density and multiple borrowing indicates the incipience of such analyses. However, the study measures the density of MFIs by the number of NGOs. Since FNGOs are a category of the seven MFIs in Ghana, the number of MFIs in this research context will be based on all MFIs in the country. Therefore, this study measures MFI density by the number of all seven categories, in contrast to the number of village NGOs, unless number of NGOs

refers to all MFIs at the village level, or the assumption is based on the propensity that NGOs are more likely to concentrate in rural areas.

Exploratory studies by the Centre for Microfinance in India also suggest that multiple borrowing is common among the rural poor. The Focus Note reports that 84 percent of poor rural households have two or more loans from any source (Johnson & Meka, 2010). The foregoing evidence is apparent in the association of “village-level density” of MFIs to multiple borrowing and there is also no rigorous study that links the location of borrowers and institutional density to the probability of multiple borrowing. Evidence on this relationship is best determined through an interaction effect between location and the density of MFIs. Such interactive analysis will provide a deeper understanding of the relationship between institutional density and location.

It is clear from the literature that while the explicit relationship between location and institutional density is untested, institutions are usually lumped together for the purpose of analysis and no distinction is made between the effect of individual types or categories, where such differentiation exists. Given that there are seven categories of MFIs in Ghana, it would be beneficial to ascertain the specific types of institutions, which may be driving multiple borrowing, to aid policy decisions with appropriate evidence. This section has demonstrated that there is the need for researching the extent of multiple borrowing, and, the effect of institutional density, location and the type of MFI on multiple borrowing in Ghana.

Over-indebtedness: Definition, Measurement, Prevalence and Drivers

As previously highlighted, indebtedness per se, is unproblematic so long as future income growth can meet current and future repayment costs. Over-indebtedness is associated with repayment challenges and arise from unexpected adverse shocks to income due to business collapse, low returns to investment, unemployment, increases in interest rates, illness, death of a partner, new birth, institutional factors and external environmental factors, such as natural calamities or unfavourable economic environment (Betti et al., 2007; BIS, 2010; Keese, 2009). Over-indebtedness is identified as the consequence of profuse lending available as consumer credit in the developed economies and subsequently as microcredit in developing countries.

Definitional heterogeneity

Over-indebtedness is a dynamic, multi-dimensional concept and it is unsurprising that a unanimous definition is not available in the literature (Bridges & Disney, 2004; D'Alessio & Iezzi, 2013; Disney, Bridges & Gatherwood, 2008; Kempson et al., 2004; Khandker et al., 2013; Liv, 2013). Its defining features remain nebulous and any attempt at a homogenous classification is hampered by an intense level of heterogeneity and multiplicity. Consequently, various definitions seem to focus on some core elements of the problem which have been expressed in diverse ways.

Common definitional elements summarised by the European Commission (2008) include: number of financial commitments, payment capacity, time dimension, reduction in minimum standard of living expenses and illiquidity. A similar adaptation is provided for the microfinance industry by Schicks' (2013) study, where the elements are categorised under choice of

definition based on purpose, method and severity. These three components are further disaggregated into dimensions and categories, illustrating the scale of nuances involved in an attempt to define the concept.

In Europe, various definitions were adopted for country-specific analysis involving Austria, Belgium, Ireland, Germany, Italy, Portugal and other countries, as demonstrated by the European Commission (2008) report. In Ireland, the Money Advice and Budgeting Service (MABS) adopts the following definition:

“Households are over-indebted if they are persistently unable to meet from their income reasonable living expenses and deferred payments as they fall due” (p.35).

The actors of a Finland stakeholder interview admitted to a ‘customised’ definition as illustrated below:

“We use our own definition in our research.....the idea of debt problems includes paying debts with new loans, for example” (European Commission 2013, p.27).

The above two definitions have been incurvated from the outlined components. One crucial constituent of the definition is the reference to essential living expenses which is noted clearly by Russell et al. (2011). The importance of satisfying essential living costs ahead of repayments is reinforced by a German definition of the phenomenon which is given as:

“A private household is over-indebted if its income over an extended period is not sufficient for servicing debt on time (after deducting costs of living expenses) despite a reduction of the standard of living” (p.35).

Broadly, the definitions applied in research encapsulate four dimensions of over-indebtedness. These are; *excessive use of credit, sustaining arrears on payments, perceiving debt as a burden and making high repayments relative to income* (BIS, 2010). The fourth category is further divided into specific indicators depending on the thresholds adopted. In the microfinance over-indebtedness literature, Gonzalez (2008) presents three additional significant dimensions by considering borrowers' conscious elective conduct, in the form of *refusal or sacrifice* and an outright *unavoidable incapacity to repay*.

Measuring over-indebtedness

Following from the definition of over-indebtedness, there is also no consensus on how it should be measured, or which indicator best captures true over-indebtedness (BIS, 2010; D'Alessio & Iezzi, 2013; Keese, 2009). Subsequently, existing definitions have culminated in different proxies used as indicators. These indicators include: (1) level of income or absolute debt, (2) debt-to-income or debt-to-asset ratios, (3) arrears, (4) number of credit commitments, (5) debt service-to-income ratios, and (6) subjective burden. As widely recognised, income is the single most important indicator necessary for measuring over-indebtedness.

An individual's level of income determines the capacity to meet borrowing commitments. Therefore, analysis of those at risk of over-indebtedness usually focuses on the ratio of debt to annual income, implying that the absolute level of debt is not necessarily a good indicator of potential problems, as households may have high income to offset larger debts. Indebtedness ratios are calculated by dividing the total value of outstanding

household debt by total household income or total assets (Khandker et al., 2013).

The next two indicators are arrears and number of credit commitments. With income challenges, borrowers may fall behind payments and accumulate arrears. For such scenarios, creditors make allowances to cater for a timeline reprieve in order to avoid counting cases of incidental oblivion. Thus, three or more successive non-payments may be counted as a situation of over-indebtedness. The availability of credit also implies that borrowers may have more opportunities to borrow, either from the same or different avenues. Hence, number of credit commitments is also used as an indicator, usually three or more. Again, there is no consensus on the exact number to be used.

Debt service indicators provide an objective measure of debt burden. The arguments in favour of these indicators are supported by the fact that in view of the unpredictability of income, borrowers may encounter difficulties before they actually become manifest as depicted by defaults and delinquencies. The foregoing resulted in the use of debt-burden indicators which are measured by debt service-to-income ratios (DSR). These consider the proportion of income committed to debt servicing costs. Usually, such borrowing costs tend to rise with unsuspecting intermittent hikes in interest rates and associated fees as contractually embedded in the small print. The DSR therefore highlights emerging problems before they become intransigent.

In spite of its human-facing approach to measuring over-indebtedness, the DSR is noted to have a limitation regarding the threshold that determines the point in the repayment-to-income ratio that qualifies a borrower as over-indebted (Betti et al., 2007; Khandker et al., 2013). Hence, various arbitrary

thresholds have been employed. D'Alessio and Iezzi (2013) provide a range of arbitrary cut-off points and assesses their efficacy for measuring over-indebtedness. Another variant of the DSR is the net indebtedness index (Maurer & Pytkowska, 2010). So far, the identified indicators are all quantifiable and can be measured objectively.

Since the DSR considers borrowers' expenditure for a minimum standard of living, the measure is alternatively referred to as the objective-burden indicator. On the opposite side of the objective paradigm, is a counter argument that individuals themselves are best judges of repayment difficulties and, therefore, the most potent measure is how borrowers perceive their difficulties (Schicks, 2013). This has culminated in the subjective measure of over-indebtedness which solicits borrowers' value-based judgements on the difficulties encountered with borrowing.

In the consumer credit industry, researchers and practitioners measure over-indebtedness as the debt service ratio (Collins, 2008), default or arrears (Disney et al., 2008; Kappel, Krauss & Lontzek, 2010). Others measure it as a perception of debt burden (Betti et al., 2007; Guerin et al., 2009; Lea et al., 1993). Microfinance specific research also uses debt-to-income and debt-to-asset ratios (Khandker et al., 2013), net indebtedness index and subjective approach (Betti et al., 2007; Liv, 2013; Pytkowska & Spannuth, 2011; Schicks, 2013). In order to focus on the centrality of over-indebtedness, as measured from a standard of living perspective, the study uses a refined DSR as a measure of over-indebtedness.

Prevalence of over-indebtedness

In line with the differences in definition and measurement, evidence on the extent of 'over-indebtedness' also vary significantly. Most of the available evidence could be located among studies focused on Europe. One of such EU-wide studies concentrated on two subjective indicators derived from the Eurobarometer Survey and the European Union Standard of Living and Income Survey (EU SILC). The subjective indicator, which measured number of borrowers who 'totally agreed' that they were in financial difficulties estimated a prevalence of 4 – 25 percent based on the Eurobarometer survey for 25 European Union (EU) countries (listed in order from Sweden to Greece).

From the above survey, those who 'tend to agree' with having financial difficulties ranged between 8 and 44 percent. For the EU SILC 'arrears' indicator, the level of over-indebtedness was from 3 – 33 percent among 26 European countries (European Commission, 2008). In 2010, the BIS reported an increase in the depth of over-indebtedness in Britain. It indicated that between July 2006 and June 2008, research undertaken with the Wealth and Assets Survey (WAS) suggested that 9-25 percent of borrowers were not over-indebted. Yet, the borrowers had become over-indebted in the Household Annual Debtors Survey (HAS), which was conducted a year later, covering October 2007 to June 2009.

Studies on the extent of over-indebtedness in the microfinance industry is advancing due to its sensitive nature. To date, few countries have undergone a fully blown over-indebtedness crisis. Consequently, evidence remain scarce. Maurer and Pytkowska (2010) found 17 percent of micro-borrowers to be over-indebted and 28 percent were 'severely' over-indebted in Bosnia, based on the

net-indebtedness indicator. In Cambodia, while 6 percent of borrowers were over-indebted according to the subjective measure, 22 percent of borrowers were identified as insolvent based on the objective burden indicator (Liv, 2013). The preceding evidence, although intriguing, seems contradictory to the view that subjective perceptions are likely to over-state the extent of over-indebtedness.

According to Liv (2013), the wide difference in the subjective and objective measure is an indication of clients' high level of tolerance for sacrifices and the immense value accorded to the opportunity to have access to loans. Therefore, 48 percent reduced quality of food intake while 44 percent cut down on food entirely. Similarly, Gonzalez (2008) found 75 percent of Bolivian borrowers to have resorted to at least, one costly unanticipated measure to repay their loans and identified 85 percent of households as over-indebted, based on the adopted definition. In Bangladesh, Khandker et al. (2013) conclude on the basis of the aggregate measures of 'stock-flow' and 'income-based' indicators, that on average, the asset-liability measure estimated 24.3 percent of households as over-indebted, while 25.1 percent were over-indebted as per the income-liability measure. The foregoing suggests that income-based measures robustly predict the extent of over-indebtedness.

In Ghana, Grammling (2009) assessed the resilience of the microfinance market. Using a qualitative approach and one MFI activity, the author defined over-indebtedness as a situation when a borrower's capital depreciates and business assets do not exceed liabilities. It highlighted the possibility of multiple borrowing and concluded that 12 percent of borrowers were over-indebted and 16 percent were at risk. Four years later, Schicks (2013) finds that 30 percent of

micro-borrowers were over-indebted from a sample of 530 micro-borrowers from five of Ghana's leading MFIs. From both studies, evidence suggests that over-indebtedness in Ghana almost tripled within two years and is consistent with borrowers' perception of their worsening situation.

Evidence on the drivers of over-indebtedness

The first step to understanding over-indebtedness is to appreciate the underlying factors which are multitudinous, depending on the indicator employed. Some descriptive analysis provide evidence on the triggers attributed mainly to unexpected events (Knobloch, Reifner & Laatz, 2008). Quantitative studies, on the other hand, identify drops in income as the major cause of financial difficulty and problem debt (BIS, 2013; Collard, Finney & Kempson, 2013; European Commission, 2008; Keese, 2009; Kempson et al., 2004). Due to the wide variation in indicators employed, various drivers are identified in the consumer credit and microfinance literature.

In consumer credit empirical literature, Kempson (2002) found that single parents, low incomes, being unemployed and experiencing a drop in income are positively related to self-assessed over-indebtedness. Using the arrears indicator, Bridges and Disney (2004) also identified less educated households in addition to being young and having a low income as associated with over-indebtedness. Similarly, Del-Rio and Young (2005) suggest that household wealth, ethnicity, marital status and health are the main determinants of self-reported financial stress. Fricke, Austria, Schulze and Wager (2007) use ordinary least squares (OLS) and find that being younger, low education, living in a partnership and unemployment are positively and significantly related to perceived debt burden. Furthermore, Betti et al's. (2007) study suggest that

being young, single parenthood and high earners are positively associated with over-indebtedness. The foregoing evidence suggests that individuals with low income, as well as high earners are equally susceptible to the threat of over-indebtedness.

Anderloni and Vandone (2008) suggest that the determinants of over-indebtedness constitute variables that capture individuals' socio-demographic and economic characteristics such as low income, being unemployed, a young adult (25-35) or a tenant, single parenthood, and those that try to measure the impact of shocks, such as health and income shocks. Exploring the relative (over-indebtedness) measure with a panel study, Keese (2009) found that childbirth, household size and unemployment significantly triggered severe over-indebtedness. Bryan et al. (2010) used arrears and objective-burden indicators and found determinants common to individual level indicators as being a tenant, unemployed, separated or divorced, child dependants and illness. Household level indicators include young or female household-head, a divorced or separated household-head, being unemployed, illness or having a disability.

On the other hand, some factors have been identified as mitigating the effects of over-indebtedness. Brown and Taylor (2008) locate a negative significant effect of age, education and income. Similarly, Bryan et al. (2010) found a negative association between high education level, being married, working age, retired or employed. Some factors also fluctuated between positive and negative effects depending on the specific indicator used (BIS, 2010). These include number of working adults and a household-head who is either retired or highly skilled.

In microfinance focused studies, subjective perceptions and objective-burden measures have been used (Khandker et al., 2013; Liv, 2013; Maurer & Pytkowska, 2010; Pytkowska & Spannuth, 2011; Schicks, 2013). On the drivers of over-indebtedness, Khandker et al. (2013) found that age does not matter for indebtedness and that the effect of a younger household head is only noticeable in the short run but not in the long run. In the Liv (2013) study, age was not significant. The two studies reported similar outcomes for education and over-indebtedness and found no significant relationship.

On gender and household size, the effects are mixed. Khandker et al. (2013) find that male-headed households are more indebted than female-headed households in the short-run, but not in the long-run. However, the Cambodian study was inconclusive on the gender outcome since it had insufficient data to determine the relationship between gender and over-indebtedness because sample size of male borrowers was too small to derive any meaningful comparison (87 percent of borrowers are female, and 13 percent are male). On the effect of household size, Liv (2013) reports no relationship while Khandker et al. (2013) reports on the dependency ratio, which is significant in all model specifications.

Evidence on borrowers' economic activity seem to be unanimous for borrowers engaged in agriculture. Liv (2013) found that 30 percent of agricultural borrowers were over-indebted while Khandker et al. (2013) equally observe increases in indebtedness with agricultural landholding in the short run but not in the long term. Liv (2013) also reports on the crucial variable of loan use and its effect on over-indebtedness. The study found no link between over-indebtedness and loan-use. The absence of an effect could be attributed to the

measurement of the variable. Most studies using secondary data investigate loan-use based on borrower's plans stated at the point of application, which may differ from actual loan utilisation. It is, therefore, vital for researchers to enquire information on actual and not intended loan use, to accurately estimate the true effect.

Whereas studies on over-indebtedness have concentrated on factors underlying the phenomenon, the issue of loan size has not received much prominence in the consumer credit literature, because of the means through which credit is accessed. In the developed world, household credit is largely obtained through the use of cards or accounts held with different stores or financial institutions. While the needed credit could be secured easily in this manner, the issue of credit sufficiency obtained from a particular source did not become relevant. In the microfinance industry, however, borrowers are not in control of how much credit they can acquire, since credit is mostly delivered in liquid form and at the lender's initial discretion. Hence, the borrower does not have that 'over-riding' influence to acquire the desired amount in the first instance. This arouses interest in the effect of loan size on the probability of over-indebtedness for total household borrowers in the country, and is the focus of the second empirical analysis.

Loan amount and over-indebtedness

One question of particular policy interest for this study is whether over-indebtedness is related to loan amount. Unlike the consumer credit model where loans (excluding mortgages) may be secured for purely consumption purposes, household loans in the Ghanaian context are contracted predominantly for investments; to start a new business or expand an existing one. This brings into

focus, the question of whether inadequate loan sizes are a trigger for over-indebtedness. This vital question has been explored by the following two selected studies in the microfinance over-indebtedness literature.

One reason for multiple program membership is inadequate loan size also referred to as credit constraint. A household is considered credit constrained “if its loan amount, given the interest rates and other terms, is less than the desired amount. In other words, the household is likely to seek additional credit from other sources, to satisfy its unmet demand” (Khandker et al., 2013 p.14). For example, according to the stock measure of indebtedness, the above authors suggest that, among credit constrained households, 31 percent were indebted in 1991/92, rising to 49 percent in 1998/99 and 57 percent in 2010/11. This implies that, generally, indebtedness is higher for borrowers with small loan size than for credit unconstrained households, and that this difference also grew over time.

For the Cambodian study, the findings on loan size was mixed. Liv (2013) suggests a relationship between the size of the borrower’s total debts from all loans and over-indebtedness, but finds no correlation when only one loan is considered. The data shows that only 4 percent of borrowers with outstanding debts below USD 500 are insolvent. The insolvency rate increases to 22 percent for borrowers with debts of USD 500-1000, 37 percent for those borrowing USD 1001-5000, and 51 percent for those borrowing USD 5001-10,000. There seem to be a turning point as the percentage falls to 25 percent for loans of over USD 10,000.

Although the above descriptive statistics are similar to the effect of a single loan size, the findings from econometric analysis differ. The proportions

for over-indebted borrowers in the various categories for a single loan are: 4 percent for loans below USD 500, 2 percent for those borrowing between USD 500-1000, 4 percent for USD 1001-5000, 9 percent of those with USD 5001-10,000 and zero percent for those with loan size over USD 10,000. Yet, the study concludes that when the “multiple loan effect” is removed by looking at only borrowers with one loan, the data showed no relationship between over-indebtedness and loan size. Therefore, early signs of positive relationship between loan size and over-indebtedness is because borrowers with smaller loan amounts tend to have parallel loans, which lead to over-indebtedness.

Being the two studies so far identified, which directly address the issue of credit constraint or small loan size and over-indebtedness, the findings reveal an intriguing outcome. Whereas Khandker et al. (2013) suggest that the proportion of borrowers who are credit constrained rises over time, Liv (2013) demonstrates that the proportion of insolvent borrowers rises with larger loan sizes and begins to fall after a certain threshold. The former implies that larger loan sizes may have a potential to curtail the rate of over-indebtedness, while the latter suggests that larger loans aggregated from multiple borrowing are positively associated with over-indebtedness.

Another interesting outcome is the fact that the number of over-indebted borrowers with loans exceeding USD 10,000 begin to fall for both borrowers with multiple or single loans (25 percent and zero percent respectively), resulting in a turning point. One similarity between these two studies is the focus on multiple borrowing and, in the case of Liv (2013), there is no relationship between a single loan size and over-indebtedness. Hence, in addition to the two

polemic results, evidence on the effect of a single loan size on over-indebtedness is needed to inform policy in this direction.

From the literature, a convergence in lending amounts is suggestively apparent in the banking and microfinance sectors. Loan sizes used by the Cambodian study suggest that figures disbursed as microloans may not be significantly different from loans granted by traditional banks (Liv, 2013). The Desk Review Database was the primary dataset which contained the most recent data on client debts collected from September to October 2012. Translating the example of a USD 10,000 loan into the Ghanaian context, the figure, discounted by 31st December 2012 exchange rate (1 USD to GHS 1.04) may be about GHS 10,400 (a significant amount for a household microfinance loan, even in real terms). Schicks (2013) decided to cap micro loans at GHS 5000 to provide a common threshold for micro and SME borrowers, but highlighted that in the sample used, over 87 percent of disbursed loans were less than GHS 2000. Although the two studies were conducted around the same period, the concept of what constituted a microloan was significantly different.

Currently, there seem to be a shift towards the Cambodian scenario in terms of micro-lending in Ghana. The recent RAFiP survey suggests an exponential increase in the amounts disbursed as microloans. Loan sizes of over GHS 50,000 were disbursed; although, these may have been requested for SMEs, as rightly anticipated by the Schicks (2013) study. From the data, 99 percent of borrowers have loans up to GHS 20,000. Given the peak of GHS 56,000, the loans will range between USD 4,000 – USD 14,000 (estimates may be more in real terms). In the GLSS 6 survey, which contains borrowing from the traditional banking sector, an amount of GHS 14,000 equates only a few of

the one-tenth of loans in the 90th percentile which were granted to households by mainstream banks.

To buttress the above point, evidence from BIS (2010) DebtTrack survey on secured and unsecured loans is provided to illustrate lending statistics in the consumer credit market. According to the study, 24 percent owed less than £1,000; a quarter borrowed between £1,000 and £4,000, and, 23 percent owed between £4,000 and £10,000. In total, 72 percent owed £10,000 or less. With the impression from the 2010 study in Britain and the figures used by the Cambodian analysis (acknowledging slight variation in real values over the two-year difference), there is evidence to suggest a confluence in the amounts disbursed for consumer credit and microfinance. Hence, rather than focusing solely on the microfinance sector, the convergence presents an opportunity to examine the effect of a single loan size on over-indebtedness in the household credit market, using borrowing information from the traditional banking and microfinance industry in the GLSS6 household survey.

The Threat of Over-Indebtedness to Poverty Reduction

Poverty alleviation remains elusive and eradicating the syndrome is an intricate aspiration. The concept's multidimensionality, as exhibited in the economic, social, psychological, environmental and technological variants is affirmed by the World Bank's core mission, which seeks to eradicate extreme poverty everywhere, in all its forms. These dimensions are, however, not mutually exclusive and present a labyrinth of interconnectedness and interrelationships, reflecting the subtle processes involved in the attempt to eradicate the phenomenon.

According to the GLSS6 report, Ghana has made impressive strides in halving poverty (GSS, 2014). However, maintaining and advancing poverty eradication achievements depends on the effects of on-going or new efforts initiated by governments or driven by the private sector. While acknowledging the benefits of financial inclusion, over-indebtedness is a growing by-product of financial growth and could be insidious for borrowers' livelihoods. Hence, challenges posed by the phenomenon have brought its effects on livelihoods to the centre-stage. One of such high-profile interventions is CGAP's action on client protection.

The Schick's (2013) study in Ghana was an effort to create awareness on client protection. It focused on client's own perception of over-indebtedness and found 30 percent of micro-borrowers to be over-indebted. Particularly, the study found that within the microfinance industry, 74 percent of urban borrowers sacrifice to meet repayment obligations. The estimate, which presents evidence of a specific locational analysis, can assist in pre-empting the extent of sacrifices made towards repayment by borrowers at the national level – including rural clients.

Poverty in Ghana is a rural phenomenon and when estimating the extent of sacrifices, it is imperative to consider the effect of over-indebtedness on this vulnerable group. Therefore, it might be plausible to postulate that a national estimate of over-indebtedness, which includes sacrifices of rural inhabitants, may even be higher. Moreover, the study reveals that 43 percent of urban borrowers persistently struggle with every single instalment; implying, that almost half of urban borrowers struggle persistently with their payments. This is inevitably, an issue of concern. From the preceding evidence, the extent of

sacrifices leads to the proposed problem of the third empirical inquiry. If over 74 percent of urban borrowers in the microfinance industry struggle to make payments and 43 percent struggle persistently with *almost every single instalment*, then, what is the effect of such sacrifices on household welfare, taking both rural and urban locations into account and considering the effect of household borrowing from both the traditional banking and microfinance sectors?

This section of the review on over-indebtedness and poverty is addressed in two parts. The first sub-section presents the trend and predictors of poverty situation in Ghana, as a precedence for the analysis of the effect of over-indebtedness on poverty. The second sub-section presents a review of empirical studies, which highlight the limited evidence available on over-indebtedness and poverty; especially, in relation to household consumption expenditure.

The trajectory and triggers of poverty in Ghana

The Ghana Living Standards Survey (GLSS6), has offered opportunity to examine the trend of poverty levels of the country since its inception in 1987/88. Six rounds of the survey have so far been implemented and the results indicate positive progress. Poverty measures employed include consumption poverty, lack of access to services and limited human development (GSS, 2014). A Ghana Statistical Service (GSS, 1995) report issued on the third round (1991/92) indicated that over two decades ago, more than half of the population were poor (64 percent). The incidence reduced to 51.7 percent in the fourth round. Between these two rounds, most regions of the country performed well and reflected the significant reduction in overall poverty levels, with the exception of the savannah region which recorded no improvement.

One notable observation since the implementation of the survey is the persistent decline in consumption poverty, from 51.7 percent in 1998/99 to 24.2 percent in the 2012/13 survey. In the most recent survey, the upper poverty line was estimated at GHS 1,314.00, based on the re-calibration of the Consumer Price Index (CPI) to reflect the changing composition of a household's minimum consumption basket. However, the trend of poverty exhibited by the regions in the previous survey remained unchanged in the 2012/13 round. Recent results indicated an equidistant regional classification of poverty, with five regions below and five above the national average. Vibrant commerce and continued growth of the Greater Accra region seemed to have consistently improved the livelihoods of its inhabitants, positioning it as the least poor region, while the Upper West scores as the nation's overall poorest region.

Currently, about a quarter of Ghanaians are poor, representing 6.4 million people in the country (GSS, 2014). On extreme poverty, the statistic is comparatively lower at 8.4 percent, representing about a tenth of the population. Since the inception of the surveys, poverty in Ghana has been, and, continues to remain a rural phenomenon. The disconcerting revelation from the current survey is that inequality has worsened with a slight increase in the Gini coefficient of 42.3 percent, compared to 41.9 recorded in 2005/06. While the increase might be suggestively minimal, it has grave implications for the distribution of wealth and equality in the country.

In 2007, a study by Coulombe and Wodon estimated the determinants of poverty in the Ghanaian context using the three waves of the GLSS. From the 2005/2006 survey, the authors found that consumption per equivalent adult, (henceforth, CPA) decreased by 17 percent due to an additional person in the

household. On gender, the study found no statistical difference between female and male-headed households. However, household heads who are separated, divorced or widowed tend to lose out on CPA by 13 percent, compared to those who are married.

Education, on the other hand, increases consumption levels of household heads in urban locations, with the category having secondary or tertiary qualification recording a 49 percent increase. Rural counterparts recorded a 40 percent rise in consumption levels. The categorical age variable indicated that consumption per equivalent adult reduces by 13 percent for the 15-60 indicator for urban borrowers and reduces by 15 percent for the same category in rural areas. The employment status variable also reveals that self-employed people engaged in agricultural production for exports attracted a loss in CPA of 29.6 percent, compared to being self-employed in the crop-producing agricultural sector. The effect was also not significant for public and formal or informal private sector workers. Therefore, findings based on the three waves of the previous GLSS surveys suggest that being married and having a higher education increase household consumption while age, household size and being employed in the agricultural sector reduce household welfare.

Current evidence on the determinants of poverty is provided on some covariates in the GLSS6 report. These include: sex, education, economic activity of household head and administrative region. Analysis of the covariates indicates that incidence of poverty for a male-headed household is 25.9 percent compared to 19.1 percent for females. The uneducated seem to contribute the greatest proportion to poverty while it remains under 1 percent for the educated. On economic activity, higher levels of poverty were recorded among

households whose heads were self-employed in the agricultural sector. The economy of the regions also contributed to the varying proportions of poverty, with five regions improving over the previous survey, while the other half had poverty incidence below the national average.

Empirical evidence of over-indebtedness and poverty

Earlier studies have linked over-indebtedness with poverty (Bryan et al., 2010; Stamp, 2009). While attempting to review empirical work on over-indebtedness and poverty, it is pertinent to highlight that parallel to the concept of poverty, over-indebtedness is multi-faceted. Consequently, locating similarities and contrasts presents a subtle task as points of reference for equivalencies or otherwise, are not immediately apparent. Even within the available limited studies, there are significant variations in measurement and application to various contexts. Therefore, empirical evidence is selected either by proximity to study definition for the variable of interest (over-indebtedness), or based on a broader definition of poverty to present the foundation for investigating the effect of over-indebtedness on household consumption expenditure.

The few explorative studies, establishing statistical associations of a possible deteriorating effect of over-indebtedness on borrowers, have focused on the relationship between indebtedness and poverty. With finance graduating from the preserve of high-income earners to those in the lower brackets, studies in advanced nations began to monitor issues of household indebtedness (Berthoud & Kempson, 1992). In the United Kingdom, the Department for Business Innovation and Skills (BIS) initialised investigation into 'Over-indebtedness in Britain' in 2005. This study utilised data from the longitudinal

DebtTrack Surveys. While informative on the extent of over-indebtedness and types of credit use by households, the research did not explicitly focus on the connection between over-indebtedness and poverty.

Initial concerns about the increasing worrying trend of debt engendered a drive of nationwide studies on over-indebtedness across Europe, which attempted to link the phenomenon to poverty. Germany, then Europe's largest credit market recorded the earlier studies addressing the phenomenon. Haas (2006) focused on income-related causes of over-indebtedness and suggested that household income committed to debt repayment was not necessarily an indicator for poverty. Currently, the proportion of income committed to repayment, measured by the debt service-to-income ratio, is one of the critical indicators of objective burden over-indebtedness, which is linked to sacrifices.

Investigating over-indebtedness from the 'arrears' perspective, Haas (2006) acknowledged the linkage between financial stress and its inevitable effect on poverty and social exclusion, which was attributed to low economic growth and changes in the labour market. The first EU-wide empirical study estimated the effect of consumption-income ratio on over-indebtedness and finds that normal households have a higher level of consumption/income ratio than over-indebted households (Betti et al., 2007). This study also concludes from evidence that 'it appears over-indebted households have to reduce their consumption to repay their debts' (p.151).

The foregoing is also buttressed by the European Commission (2008) report, which suggests that over-indebted households have high repayments that drive borrowers below the poverty line. Similarly, Liv (2013) finds that 51 percent of borrowers struggle to repay their loans on time and some common

sacrifices served as coping strategies. The study suggests that 48 percent reduced the quality of food while 44 percent sacrificed on quantity of food intake. The European Commission (2013) report also provides a qualitative overview of over-indebtedness across Europe and conclude that one of the consequences of the condition is a reduction in living standards, which leads to a deterioration in household well-being.

Available empirical literature on over-indebtedness seems to suggest, that only a handful of studies have attempted to investigate its explicit relationship with poverty. Examining over-indebtedness in Irish households, Russell et al. (2011) investigated the impact of financial exclusion and poverty on over-indebtedness, controlling for other idiosyncratic and socio-demographic covariates. Data for the study was derived from the Survey of Income and Living Conditions (SILC) special module on over-indebtedness and financial exclusion.

The definition of over-indebtedness adopted in the above study is based on the common operational definition of over-indebtedness in the European Union (European Commission, 2008). Indicators adopted include structural arrears, burden of monthly payments and illiquidity. Being a primeval application of the EU-recommended indicators, the measurement applied in this study was an 'experimental' task. The study adopts a composite measure of poverty termed 'consistent poverty' comprising both income and non-income measures. However, the income-based measure is a derived indicator based on those who are 'at risk of poverty'. They find that 29 percent of over-indebted households were 'at risk of poverty'. Compared to non-borrower households, the descriptive statistics highlighted that over-indebted households encounter

higher levels of basic deprivation and endure a detrimental impact on their consumption of consumer goods, their general health and environment conditions.

Recent work on the nexus between credit, debt and poverty has been reviewed by Hartfree and Collard (2014). The review concentrated on published studies undertaken in the last fifteen years and comprised evidence from the United Kingdom, United States, Canada and Australia as the main countries with empirical studies on indebtedness. The study also included evidence from the Northern European and Scandinavian Member States that were deemed to be relevant to its goals. As the only identified existing review, it emphasised the limited availability of literature on debt and poverty. The study assessed the extent to which problem debt *causes* poverty. As previously highlighted, comparability issues became the inevitable challenge encountered by the review, due to heterogeneity in poverty definitions.

Interestingly, the review uncovered enormous intrinsic heterogeneity and exposed intricacies in the definitions of ‘problem-debt’ and ‘poverty’ adopted. The studies analysed were not conducted from any acclaimed ‘poverty perspective’ and either contained disparate definitions of poverty or failed to include any specific definition of the concept. Problem debt (over-indebtedness) is defined as borrower’s inability to honour obligated payments on their credit and bills. Therefore, for over-indebtedness, the review focused on proportion of households in arrears. To resolve the complexities in the poverty definition, the reviewers employed a basic definition of poverty, as adopted by the Rowntree Foundation, which emphasises lack of sufficient resources to meet minimum

needs and proceed to adopt low income and unemployment as proxies for poverty.

On whether problem debt causes poverty, the review did not identify any evidence. This could be attributed to the fact that the measure adopted did not consider income used to service debts, which is crucial for the analysis of over-indebtedness. However, it finds evidence to confirm that indebtedness effects can have a degenerating consequence on living standards of borrowers as servicing debts diminishes available household income (Hartfree & Collard, 2014). The foregoing seems to suggest that 'problem debt' can deepen people's poverty. Most importantly, the review did not identify any evidence to establish the direction and extent of the effect of a relationship between problem debt and poverty. One reason which might explain the review outcome is that the studies included did not take account of income being spent on servicing debts. On this backdrop, the review concluded that problem debt is a consequence of poverty and not vice versa. Thus, the review evidence is not sufficiently robust to indicate an effect of over-indebtedness on poverty, specifically, from the debt-burden perspective.

One study, which addresses the issue of financial stress and poverty, uses debt-serving indicators as a measure of over-indebtedness. D'Alessio and Iezzi (2013) focus on the methodology for measuring over-indebtedness and adopt the Italian data on Household Income and Wealth to augment knowledge on the different dimensions of measuring economic distress. The indicators were grouped into four categories: (1) debt-burden indicators discounted by asset values, (2) debt-poverty indicator which utilizes the poverty line, (3) non-collateralised loans indicator, and (4) the structural arrears indicator. The study

utilizes an extensive array of different sub-indicators with three differentiating cut-off points to highlight the intrinsic multi-dimensionality of over-indebtedness. Although the emphasis was on using 'arrears' as a measure of financial difficulty, it is highlighted that the debt-servicing measure of over-indebtedness employed by the authors, is comparable to this study's adopted approach, in terms of its link with poverty, even though it uses the asset denominator.

Results from the study suggest that the debt-poverty, non-collaterized loans, and the arrears measures, suggested a positive association between over-indebtedness and economic poverty. One interesting insight is that even with the consideration of assets instead of income, there remains a negative relationship between the objective debt-burden indicators and poverty. The A₃₀ indicator which is the overall debt-burden at a cut-off of 30 percent, results in low income (consumption) of 17.8 percent, lower than those of non-borrower households. There is therefore evidence to suggest that debt-servicing indicators are linked to a reduction in household consumption.

From the above analyses, several indicators have been used to measure over-indebtedness and poverty. Since improvement in living standards is the ultimate goal of most, if not all developmental efforts, it is timely to analyse the phenomenon and its direct effect on household consumption expenditure per equivalent adult, as a direct measure of household welfare. This study contributes to knowledge on over-indebtedness and household living standards, particularly, to evidence which focuses on objective-burden analysis of the problem, and uses income measures of poverty to determine the burden of repayment and sacrifices endured.

It is also evident from the Hartfree and Collard (2014) review that evidence from a developing or middle-income country was missing from this vital review on the effect of over-indebtedness on poverty, and there is no targeted investigation of over-indebtedness and household consumption expenditure. Therefore, focusing directly on the sacrifices borrowers endure to honour repayments and how these sacrifices affect household living standards, measured directly by household consumption expenditure is vital to the growing body of knowledge in this significant field of study.

Insurance and household over-indebtedness

The growth of financial services has been accompanied by a growth in empirical literature on access to financial services. These studies have focused on the triad of credit, savings and insurance, with credit receiving the most attention (Zeller & Sharma, 2002). The recent move from microcredit to microfinance has generated a more holistic approach, which now recognises the importance of other financial services, including insurance. Insurance is considered a preventive strategy for smoothing consumption (World Bank, 2014). Generally, the poor are highly vulnerable to risks and sudden exposure can cause irreparable damage to their livelihoods, particularly, those in the agricultural sector.

As recognized by Betti et al. (2007), market imperfections create opportunities for self-based coping strategies, or market-based insurance schemes, to smoothen the effect of over-indebtedness in the event of shocks to income. Traditionally, mainstream banks have offered a range of insurance products involving education, health, accident and life insurance plans. The recent growth of the microfinance industry and the acknowledged vulnerability

of households have also highlighted micro-insurance as a risk-managing strategy for borrowers on low incomes (Churchill, 2006; Cohen & Sebstad, 2003; Morduch 1995, 1999). Hence, micro-insurance packages are being offered to combat natural disasters such as drought, floods or pest invasion to mitigate the destructive effect of such occurrences on the livelihoods of poor people.

Purchasing insurance products comes at a cost and its attractiveness depends on affordability and a trust in the institution. In Ghana, 26 percent of borrowers have an insurance policy and holders are in the higher income bracket (GSS, 2014). In the previous chapter, it was highlighted that 43 percent of borrowers cited unaffordability as the reason for not acquiring insurance. While these payments are relatively manageable for public and private sector workers in secure employment, the majority of borrowers earn a livelihood in the informal sector. Lack of income was, therefore, cited as the next major limiting factor. According to the Global Financial Development Report (World Bank, 2014), there is currently a minimal uptake of micro-insurance products although affordable insurance packages can insulate vulnerable livelihoods against irremediable losses from droughts, fire, flooding, illness, temporary unemployment or crop failure.

For the first time, the GLSS6 contains information on households' access to and use of insurance services. Given its potential to smoothen household vulnerability, this study introduces the insurance variable as a control to determine the effect of over-indebtedness on household consumption expenditure. The new information presents a unique opportunity to determine the effect of insurance on household living standards.

Conceptual Framework

In this thesis, multiple borrowing and over-indebtedness are identified as significant issues of the credit industry with an enormous potential to cause financial distress to borrowers and ultimately, lead to a reduction in household living standard. The framework for analysis is that an increase in institutional density may lead to high levels of indebtedness, which increases objective-burden over-indebtedness; which, in turn, leads to a reduction in household consumption expenditure.

This section presents a conceptual framework that seeks to establish the link between institutional density and multiple borrowing; and how having even a single loan may lead to over-indebtedness, and, the link between objective-burden over-indebtedness and household consumption expenditure. In this study, conceptual definitions are suggestively simple and the chain of reasoning necessary to provide the linkages are rather straightforward. Therefore, a linear extrapolation of the transmission mechanism from one concept to another is implied; rather, than one that establishes divergent or cross-linkages.

Income is the main predictor of over-indebtedness (Betti et al., 2007; BIS, 2010; Jappelli & Pistaferri, 2010) and this framework is predicated on the LC-PI theories as underpinning the conceptualisation of borrowing and borrowing risks. Uncertainty of income introduced by Hall's (1978) Martingale hypothesis led to the consideration of factors which cause consumption to change from one period to another (Hayashi, 1997). These factors include unpredictable income streams, future interest rate, attitude to risk and shocks to consumption (Betti et al., 2007).

Anderloni and Vandone (2008) suggest that a household or an individual's propensity to encounter borrowing risks is based on socio-demographic and economic characteristics and income and health shocks. Hence, in the context of this study, the foregoing focuses the analysis on the factors which contribute to a borrower's propensity to engage in multiple borrowing within the microfinance industry or to become over-indebted by committing to debt repayments for a year.

The first transmission from institutional density, as a probable predictor of multiple borrowing, is traced through the concept of competition. Thus, institutional density, measured by the number of institutions in a locality, is used both as a measure of MFI competition and a possible cause of multiple borrowing (Khandker et al., 2013). Once borrowers are availed to the multiplicity of credit, their advantageous situation weakens the monopolistic leverage of institutions, which was hitherto, the main deciding factor for the determination of loan sizes.

Given the proliferation of institutions, financially constrained or opportunistic borrowers take advantage of the plurality in the market to acquire more than one loan from either the same or a different provider (Gonzalez, 2008; Krishnaswamy, 2007). Therefore, a higher number of institutions in an area, can lead to the risk of multiple borrowing (Khandker et al., 2013). For each borrower or household, the risk will depend on socio-demographic and economic idiosyncratic factors, including the institutional setting and the external environment captured through regional characteristics.

The second transmission from multiple borrowing to objective-burden over-indebtedness is channelled through having more than one loan. Generally,

over-indebtedness is defined as difficulties arising from the use of credit. While having two or more loans may not be challenging, the accumulation presents multiplicity which could put enormous pressure on income, thereby increasing the DSR. These vulnerabilities could be exacerbated, particularly, by the vagaries of an agrarian sector. Therefore, the number of commitments held by the borrower is conceptualised as a predictor of over-indebtedness and used as one of the objective measures of the phenomenon (D'Alessio & Iezzi, 2013, Khandker et al., 2013; Liv, 2013). Empirically, multiple loans have been used as a measure of objective-burden over-indebtedness (Khandker et al., 2013; Liv, 2013). According to the authors, having multiple loans is positively related to over-indebtedness, as measured by the debt-service ratio. Although the extent of borrower vulnerability is exacerbated with multiple loans, the study examines the probability that over-indebtedness can also occur from a single loan contract.

In defining over-indebtedness, a critical element is the satisfaction of a minimum standard of living ahead of repayments (European Commission, 2008). Absolute debt may not be considered an effective measure of the phenomenon, since total debt servicing actually includes interest rates and exogenous penalty charges (Armendáriz & Morduch, 2010). Consequently, only a low cost of credit can have a minimal impact on the debt burden. Yet, with the overall prevailing usurious interest rates in Ghana ranging from 120 to 200 APR (DRIC, 2016), debt burden may be inevitably high. Therefore, the debt service ratio (objective-burden indicator) is considered an appropriate measure which highlights the burden faced by borrowers in the repayment of their loans.

The transmission from objective-burden over-indebtedness to the effect on household living standards is determined through the proportion of household income spent on debt-servicing as a ratio of total household income. For the definition of over-indebtedness, it is essential that basic minimum household consumption is not sacrificed. A borrower becomes over-indebted once a considerable proportion of income is committed to debt repayment (25 to 50 percent in the case of secured and unsecured loans), and, enormous sacrifices are made in terms of ‘extraordinarily costly actions’ (European Commission, 2008; Gonzalez, 2008).

Standard of living is computed from the cost of a consumption basket constituting a minimum basic expenditure requirement as given by the welfare scores in the GLSS6 data. The welfare scores, derived as consumption expenditure per equivalent adult, forms the basis for estimating the effect of over-indebtedness on living standards (GSS, 2014). Using the DSR as a measure of over-indebtedness, a low DSR will reflect minimal or no burden on repayment, and a high DSR reflects a high burden of repayment which leaves very little income for survival. These differing consumption levels will be determined by the effects on the corresponding welfare scores for households.

Overview of Empirical Methodology

Empirical methods applied in the study of multiple borrowing and over-indebtedness, although varied, follow a general trend of research design. This brief overview provides some examples of empirical methodology adopted in over-indebtedness research. Studies on over-indebtedness and multiple borrowing are designed as a qualitative, quantitative or mixed methods research. Qualitative studies cover stakeholder perspectives from microfinance

institutions, financial bodies, public authorities, civil society groups and experts (European Commission, 2013).

Quantitative studies, on the other hand, focus on gathering and analysing measurable data. These are either cross-sectional or longitudinal (Gumy, 2007; Khandker et al., 2013). Even though experimental surveys are deemed optimal and mostly preferred, such *perfection* is usually unattainable in the social sciences and quasi-experimental surveys are commonly used (Duvendack et al., 2011). Other studies have adopted complementary evidence from both qualitative and quantitative data (Liv, 2013). Together, the various approaches have contributed useful insights into the knowledge on the phenomena.

Data adopted for investigations are either from a primary or secondary source (Johnson & Meka, 2010). A primary approach is undertaken by institutions, government departments and other relevant bodies to gather sufficient data for a given purpose. Based on institutional interests, the research design may either focus on a narrower target population for practical and logistic reasons, or conducted as a comprehensive survey where feasible. In the UK, the Department of Trade and Industry (DTI) commissioned MORI Financial Services to undertake a large survey on consumer over-indebtedness (European Commission, 2008). For policy purposes, a nationally representative survey is conducted by responsible government departments or regional entities. For example, the European Survey of Income and Living Standards (EU-SILC), European Quality of Life Survey (EQLS), the Eurobarometer Survey and the DebtTrack Survey (DTS) have been used in EU-countries for over-indebtedness research (European Commission, 2008; Russell et al., 2011).

Likewise, microfinance studies have employed nationally representative data. Surveys are designed to solicit extensive and detailed information in a carefully planned and sensitive manner and contain comprehensive micro-level data, which covers individual and household level socio-economic and demographic information (Khandker et al., 2013). Data collected and compiled for a given purpose also becomes available for further analysis, when deemed appropriate. These are released as institutional reports, publications, datasets and other formats. For example, Khandker et al. (2013) employed panel survey data collected by the World Bank and Bangladesh Institute of Development. Generally, the availability of secondary data has motivated most empirical research into multiple borrowing and over-indebtedness.

Data analysis techniques are determined by the nature of the problem under study, and to some extent, by data considerations. These are suggested by the linearity or non-linearity of the outcome variable. While OLS have been used in linear multivariate analysis, others have applied binary response models such as logit and probit models and their ordinal variants to determine the probability of engaging in multiple borrowing, being over-indebted or for establishing the intensity of the phenomenon (European Commission, 2008; Gummy, 2007; Khandker et al., 2013; Liv, 2013). Other researchers have employed appropriate and robust econometric techniques to surmount the non-experimental nature of the data, by employing methods such as, fixed effects and difference-in-difference methods for panel data (Khandker et al., 2013; Roth, Phann, Sry & Pon, 2016). The varied data analysis techniques are informative for analysing a problem of interest.

The above brief overview of the empirical methodology, together with the literature review, provide insights into the empirical choices made in this field of study and offer guidance on the appropriate methodology for investigating the problems identified for this research.

Chapter Summary

This chapter has provided the empirical basis for investigating the three problem areas identified for this study. The first thematic review focused on empirical evidence on multiple borrowing, including the relationship between institutional density and multiple borrowing. The second section presented definitional and measurement complexities, and evidence on the drivers of over-indebtedness. It also analysed issues of loan size as the focus of the second empirical analysis. The nexus between over-indebtedness and poverty was examined in the third section. Its sub-sections addressed poverty levels in Ghana and any potential threat, which could be posed by over-indebtedness to borrowers' consumption levels. The fourth section presented a text-based conceptual framework indicating the linkages between the three main concepts. Lastly, an overview of empirical methodology was presented to signpost the methodological choices adopted for the study.

The review led to the discovery of four knowledge gaps which motivate the study. First, it indicated that the link between location and institutional density is a tentative one at present; and in Ghana, the influence of the density of a particular MFI category on multiple borrowing is unknown. The gap presents an opportunity to make this differentiation. Second, available evidence seems to suggest a convergence of lending amounts in the consumer credit sectors and the microfinance industry and emerging knowledge on the effect of

a single loan amount is mixed. There is also evidence to suggest that the existing DSR for measuring objective-burden over-indebtedness is arbitrary. Finally, the review has highlighted the crucial link between over-indebtedness and poverty; and in Ghana, the effect of over-indebtedness on living standards, specifically, as measured by household consumption expenditure is unknown. Together, evidence on these issues will help contribute to the knowledge gaps identified and to promote sustainable livelihoods for borrowers. The next chapter presents the methodology for investigating the gaps identified.



CHAPTER FIVE

RESEARCH METHODS

Introduction

This thesis investigates emerging problems of household indebtedness. It concentrates on multiple borrowing, over-indebtedness and the effect of over-indebtedness on household consumption expenditure. Specifically, the study focuses on three thematic issues: multiple borrowing and institutional density, loan amount and over-indebtedness, and, over-indebtedness and household consumption expenditure. The main themes are supplemented by exploratory analyses into the prevalence and drivers of the two phenomena to build a complete understanding of issues of indebtedness in the country. The study tests seven hypotheses relating to the three thematic areas of study.

The chapter is organised as follows: The next section presents an overview of the research paradigm followed by a justification for the adopted quantitative approach. The fourth section submits a description of the data sources. The next three sections present the hypotheses, model specification and estimation techniques for the three thematic areas of study. This is followed by procedures for post-estimation diagnostics and methods of interpretation. Limitations of the research methods are highlighted in the ninth section and the final section presents the chapter summary.

Research Paradigm

To understand the functioning of the world, human enquiry adopts a particular paradigm. A paradigm is a reference point for the conduct of research, which is constitutive of a particular tradition based on assumptions, values, practices and techniques and provides a systematic method of investigation

(Guba & Lincoln, 1994; Jankowicz, 2003). It specifies the ontological, epistemological and methodological basis underlying a field of study (Anaman, 2014). The three preceding concepts provide a frame for held beliefs and assumptions, any information pertinent to claims being made, and, a method for coagulating the basic assumptions and knowledge in order to arrive at a particular outcome.

Generally, researchers are guided by two overarching paradigms. These are positivism and constructivism (Guba & Lincoln, 1994). Given the existing differentials in the discipline-specific use of the positivist paradigm, the concept is explained from the economics perspective. Positivism generally relies on 'facts' gained through observations (collected data) and interpreted through the objective approach (Hovenkamp, 1990). This philosophy assumes that the researcher has no direct influence on the data observed and preclude any introduction of normative judgements (Friedman, 1966). It uses deductive reasoning which derives hypothesis from theories (Crowther & Lancaster, 2008).

In the positivist approach, a methodology is specified by formulating a hypothesis and testing its reliability through empirical observation. The idea is summarised by Friedman's (1966) positivist methodology, which asserts that the essence of the approach lies in its predictive capability. According to Friedman, the design of positivism is:

to provide a system of generalizations that can be used to make correct predictions about the consequences of any change in circumstances. Its performance is to be judged by the precision, scope, and conformity with experience of the predictions it yields (p.4).

Hence, positivism adopts the scientific approach and relies on objectivity by employing facts of a given phenomenon to undertake a systematic process of analysis. In spite of its preferred objectivity, positivism is not completely immune from normative influences because of human participation, particularly in the social sciences.

Constructivism, on the other hand, build perceptions of human phenomena based on personal and social experience and hinges largely on qualitative methods as opposed to quantitative research (Guba & Lincoln, 1994) According to this paradigm, people resort to their own experiences to construct meaning for a given phenomenon. Yet, contrary to the positivist paradigm, qualitative methods of research have been noted as being subjective and experiential and prone to individual value judgements, which could mask objectivity (Friedman, 1966). In spite of the criticism, useful knowledge and contributions to academic literature about the nature of human phenomena has been gained; particularly, in the humanities tradition through what Kenny (2010) describes as the diverse variants of constructivism. Rather than predicting, qualitative research provides more explanation and understanding to a given research enquiry.

An addition to the prevailing paradigm, is a third approach which seeks to combine positivist and constructivist beliefs to gather a more holistic investigation which encompasses both objective 'facts' and experiential knowledge. The mixed method of research, therefore, employs both quantitative and qualitative approaches. Together, the two channels present a 'balanced' design to investigating a particular problem, where neither a purely quantitative

or wholly qualitative approach is preferred. Both are pivotal to the advancement of knowledge.

Justification of Research Design – A Positivist Approach

Historically, economists have analysed economic phenomena primarily from the positivist perspective (Schumpeter, 1933). However, the choice of research design is based on the study's problem and purpose. In the paucous literature on over-indebtedness in Ghana, there is currently a lack of an objective perspective. Hence, the research seeks to contribute to knowledge from an objective perspective to build academic knowledge on multiple borrowing and over-indebtedness in the country and the sub-Saharan African region. It also seeks to improve on the DSR indicator of over-indebtedness, which is an objective measure. As implied by the study title, the research seeks to achieve national representativeness and can attain this objective by the use of a nationally representative data. Therefore, the choice of a cross-sectional quantitative approach is underpinned by the problems identified and the focus of the study.

To achieve full representativeness of borrowers in the entire country, a primary survey would command a large-scale project, requiring logistical and resource capability beyond the capacity of this study. Hence, the anticipated release of the nationally representative GLSS6 survey data at the onset of the project, and the national data on the Assessment of Poverty Impacts of Rural Microfinance Institutions (RMFIs) and Government Assisted Programmes in Ghana (RAFiP, 2015), both informed the choice of a quantitative approach. Specifically, the focus on objectivity is illustrated through the hypotheses to be

tested and the following paragraphs provide a justification for each of the three empirical chapters.

On multiple borrowing, the main hypothesis, which tests the effect of institutional density and type of MFI on the probability of multiple borrowing, is 'best' estimated from 'facts' on the number of institutions and the categories of MFIs. Information on institutional density, a count of the number of institutions in a locality and the type of institution is derived from observational survey data by MoFEP (RAFiP, 2015). The data provide facts of total number of institutions and corresponding number of specific types of institutions in a locality. Hence, the intent is to employ objective data of institutional density to estimate its effect on the probability of multiple borrowing.

The second empirical analysis focuses on an objective indicator for measuring over-indebtedness. This estimates the burden on clients by using the debt-service to income ratio (DSR) to elicit the residual income available to satisfy a minimum standard of living. An objective analysis will, therefore, require data on repayments and total household income, which are collected through observational surveys. The analysis also requires a derivation of contextual thresholds for the DSR and the researcher seeks to achieve this objective by using data on average annual household per capita expenditure by expenditure group as compiled. This information is provided by the sixth round of the GLSS. (GSS, 2012/13). While Schicks (2013) estimated an incidence of 30 percent, an objective incidence will provide a contrasting perspective and also improve the level of confidence due to the availability of evidence-based information from both research designs.

Another justification linked to the second empirical analysis is the issue of sample size. To achieve national representativeness, which will aid policy decisions, the sample size is pertinent. In the two existing studies on over-indebtedness in Ghana, one focused on a single MFI activity (Grammling, 2009), while the other used 530 borrowers from an urban locality (Schicks, 2013). A crucial issue is that the preceding study does not consider rural borrowers, even though, when analysing borrowers' vulnerability, it is vital to seek insights from rural clients, as they constitute the majority of poor people in the country (GSS, 2014). To meet the purpose of this study from a policy perspective, it is necessary to encapsulate borrowing experiences of rural clients. The intent, therefore, is to use a national survey, which includes data on both rural and urban borrowers.

The third empirical analysis also seeks to estimate the effect of the burden of over-indebtedness on household living standards from an objective perspective. Schicks' (2013) highlights that about 24 percent of borrowers sacrifice on food intake to repay their loans and this sacrifice is considered unacceptable. Implicitly, the sacrifices pose a threat to their livelihoods. To estimate the threat to living standards, it resorts to the use of household consumption expenditure, which is a quantitative measure for the analysis of living standards (Deaton, 2000). Hence, the welfare scores computed by the GLSS6 data, are used to estimate the effect of over-indebtedness on household living standards.

While acknowledging any inherent limitations, the choice of a quantitative approach is mainly based on the urgency of the investigation into over-indebtedness and the opportunity of timely secondary data, which contain

rich information that allows for such vital analyses. Together, the datasets contribute to an immediate knowledge of multiple borrowing and over-indebtedness from a national perspective. The RAFiP data provides the first opportunity to analyse multiple borrowing in the country. Being the first survey to introduce a new module on 'Household Access to Financial Services', the GLSS6 also provides an opportunity to conduct a cross-sectional study in the first instance, to ascertain issues of over-indebtedness.

Despite the subject area alignment, it is admitted that some extremely useful insights from the subjective experiences of borrowers may not be gained through a purely quantitative spectrum. Yet, without the secondary data, a nation-wide scope would have been unattainable for a study of this nature and a primary survey would also have restricted the scope of analysis due to financial and logistical constraints. Therefore, the value of the adopted quantitative design using secondary data, is based on the problem statement, the purpose of the study, the opportunity of the use of national data for micro-level planning and research in Ghana, and, the rigorousness of estimation and analytical procedures employed.

Description of Data Sources

Data sources for the study were determined by the main objectives of the research. The timely release of two nationally representative surveys were deemed ideal for the study since they contain variables which permit the investigation of the problems identified. These are the RAFiP Microfinance and Poverty Survey and the sixth round of the Ghana Living Standards Survey (GLSS6). The former is used to analyse the first objective, while the second and third objectives are based on the latter. Having adopted the use of secondary

data, the research design is reported based on the description of sampling procedures and data collection processes of the secondary data.

The rural and agricultural finance (RAFiP) programme

The RAFiP data is a nationally representative survey commissioned by MoFEP, under the RAFiP programme to investigate the state of microfinance operations and the impact of microfinance on poverty in Ghana. The survey was conducted in 2015 and covered all ten regions in the country. Target population include clients of all RMFIs operating in Ghana (MFCs, RCBs, CUs, FNGOs, S&Ls, MLs, Susu), microfinance non-client households (control group) and government and donor-supported programmes. Data collection was at the individual, household and institutional levels and is suitable for analysing the effect of institutional density and type of MFI on the probability of multiple borrowing. The data is augmented with the RAFiP Microfinance Census Data for the institutional analysis.

Sampling procedure

The RAFiP survey employed stratified sampling technique to select client and non-client households. To achieve this, the country was split into two; creating the northern and southern zones. Clients and non-client households were sampled from all ten regions. In consultation with the Ghana Statistical Service (GSS) and the microfinance apex institution (GHAMFIN), a sampling frame was developed for the RMFI client and non-client households. The 2010 census enumeration data was obtained from the GSS to construct a representative sample of enumeration areas. For clients, the primary sampling unit is the microfinance institution, and for non-clients, the target is the

household. From the seven categories of RMFIs, 46 institutions were engaged, based on revisions and consultations regarding the initial sample estimation of 35 RMFIs. Respondents were based on selected microfinance units from which corresponding households were identified. Total sample size of the RAFiP survey is 3,156 and the borrower sample comprise 2,009 clients from all institutions. The data provided a final sample of 1,099 for the institutional density analyses.

Data collection processes

The survey used a structured questionnaire adapted from the Microfinance Poverty Assessment Tool (MPAT) for pre-testing and subsequent data collection at both client and institutional levels. The comprehensive questionnaire addressed 17 thematic issues, including the introduction to the survey. The RAFiP Report (DRIC, 2016) identifies these themes as: informed consent, household identification, household structure, purpose for loan/repayment of loan, returns on loan, and, related expenditures on footwear and clothing, food, transport, dwelling, health and education. Others include: asset-based indicators, living standards indicators, subjective poverty and subjective assessment of financial stress.

The data contains household level information on socio-economic and demographic characteristics such as age, gender, level of education, marital status, household composition, economic activity, expenditure on food, clothing, health and transportation; returns on investment and repayment rate. Other client-level information include region, district, locality, length of stay with RMFI, number of credit contracts, type of service received which specified credit, savings, money transfer, insurance, financial literacy training, and

subjective perspectives of repayment burden. At the institutional level, information collected include programme type, average loan size, average size of savings, repayment rate specifying portfolio at risk (PAR), effective and annualized interest rate, number of branches, registration status at the time of exercise (licensed or otherwise) and administrative cost.

Data validity and reliability

For a researcher using secondary data, the validation process ensures the integrity and veracity of a particular dataset. The process ensures that a dataset is appropriate and variable measurements are valid for intended use. Although, a codebook can suggest the appropriacy of a dataset, a close examination may unearth inherent imperfections, which may not facilitate the intended use or require cleaning to ensure the suitability of data for intended analysis. Reliability also requires that the data be precise, and assuming no change in the situation being researched, measured variables should produce the same result on re-measurement.

For the RAFiP survey, the researcher first examined the data by describing the variables to ensure that existing coding, which were originally based on the assumptions and purpose for which the data was collected, were valid for the intended research. All relevant variables in the data were individually inspected and cross-checked with the description in the codebook. Subsequently, some variables were re-coded to align with the purpose of the study and to ensure conciseness and accuracy. The data was checked for outliers and coding of missing data was also verified and confirmed as appropriate.

Data reliability was conducted using the sixth round of the GLSS, which is nationally representative. The investigation of descriptive statistics such as

the mean, median, standard deviation, skewness and kurtosis and preliminary cross-tabulation also provided a snapshot of the nature of the variables. Demographic variables such as age of the reference person and household size were found to be consistent with the descriptive statistics of the national data (GLSS 6). For example, the average age of household head (46.9 years) and household size (4.9) were found to be consistent with the national data, albeit with slight variation (45.1 and 4.0 respectively). Additionally, gender distribution of 64 percent for males and 36 percent for females closely align with the trend in the GLSS 6 survey (69 and 31 percent respectively). The variations could be attributed to the specific population of the RAFiP data.

Examining the statistics also revealed the need for transforming relevant variables. As commonly found in such surveys, there was an observed skewness in the loan amount, expenditure and returns variables. The corresponding variables in the GLSS6 also exhibited the same trend. These were subsequently normalised to ensure the correct and standard use of such variables in econometric analysis. Generally, the RAFiP data exhibits features of national representativeness.

The Ghana living standards survey – sixth round (GLSS6)

The Ghana Living Standards Survey (GLSS) is a nationally representative data collected by the GSS and recognised as one of the important tools for monitoring welfare in Ghana. The study was initialised in 1987 and has since provided a wealth of information and valuable insights for understanding living conditions of Ghanaian households. The latest round, conducted within twelve months from between 18th October 2012 and 17th October 2013 is distinctive to earlier surveys. It features three new modules

comprising the Labour Force, Governance, Peace and Security and Household Access to Financial Services.

The module on 'Household Access to Financial Services' is the focus of this study. It contains crucial variables on credit information such as: amount borrowed, amount repaid, purpose of loan and source of loan. The data holds vital information for the creation of the over-indebtedness index, used in measuring the over-indebtedness status of households. Information on debt repayments is used to compute the debt repayment burden as the ratio of annual repayments to annual total household income. The survey population covered households in the country. Estimated number of households is 6.6 million and the mean household size is 4.0. In addition to the complementary thematic areas, the 'Household Access to Financial Services' module of the GLSS6 renders it an ideal dataset for the research.

Sampling procedure

As a national survey, the GLSS6 employs the same sampling methodology and questionnaires used in previous studies. The survey adopted a two-stage stratified sampling design. At stage one, 1200 enumeration areas (EAs) were selected to form the primary sampling units (PSUs), which were further categorised into urban and rural localities of residence. Using probability proportional to population size (PPPs), the 8,700 PSUs were allocated to the 10 regions. Next, a complete listing of households in the selected PSUs was undertaken to form the secondary sampling units (SSUs). At stage two, 15 households were selected systematically from each PSU, giving the total sample size of 18,000 nationwide. The increase in the number of households for the sixth round from 1,200 in Round 5 to 18,000 households, represented an

exponential increase of 107 percent to augment representativeness. Final enumeration covered 16,722 households. Out of a total borrower sample size of 1990, a final sub-sample of 1295 and 1292 observations were used for the second and third analyses respectively. The data therefore allows for the examination of the correlates and incidence of over-indebtedness across households. Furthermore, it will provide a good representative view of the scale of over-indebtedness in the country and its effect on the living standards of borrowers.

Data collection instrument

The GLSS questionnaire has been used throughout the last three rounds with the incorporation of new dimensions for the recent survey. It collects detailed information on economic variables (income, consumption, employment, expenditure, assets, and savings), social variables such as education, health, water, communication and transportation, and several demographic characteristics (age, sex, ethnicity, location, marital status, and religion). Household income is a total of income from employment and own account, remittances, rental income, financial investment income, pensions, unemployment and other social benefits. The data is relevant for the analysis because information on socio-economic and demographic variables will facilitate the analysis of the incidence of indebtedness, which differs among households of different ages, education, residence, sex or employment type.

Data validity and reliability

The GLSS6 provides national data on living standards which has been collected since 1987. Throughout the individual rounds, the GSS has made

enormous attempts to improve on the dimensions necessary for the analysis of household welfare. The Living Standards Surveys are designed in accordance with international specifications and are found in most developed and developing countries. For example, the household expenditure analysis is categorised in line with the UN statistical Classification System known as ‘Classification of Individual Consumption According to Purpose’ (COICOP). The nature of the survey makes it valid for its use in this study. Its reliability was also checked by replicating the tabulated results on ‘Average Annual Household Per Capita and Estimated Total Annual Cash Expenditure by Expenditure Group’ presented as Table 10.6 in the main report (GSS, 2014). The replication produced the same results with minimal decimal variations. The GLSS6 data validity and reliability derive from its use as the main data for micro-level planning and policy-oriented research in Ghana.

Data analysis procedures

As highlighted in the literature review, the investigation into household indebtedness is conducted on a thematic basis in accordance with the three-themed focus of the study. While the first uses the RAFiP data, the remaining two empirical analyses utilise the GLSS6 data. In all three investigations employing survey data, the unit of analysis is the household. According to Deaton (2000), income and specifically, consumption data largely relates to household, rather than individuals. The GLSS6 survey interview manual defines a household as consisting of “a person or group of **related or unrelated persons**, who live together in the **same housing unit**, who acknowledge one adult male or female as the **head** of the household, who share the **same**

housekeeping and cooking arrangements, and are considered as one unit” (p.22).

The following sections present data analysis procedures for each objective. Each empirical analysis is conducted via the following processes: the hypotheses, model specification and estimation technique. Details of variable definitions, measurements and a-priori expectations are provided in Appendix B. All analyses are conducted with the stata econometric software package.

Multiple Borrowing and Institutional Density

The first empirical analysis is designed to test two main hypotheses relating to multiple borrowing and institutional density and to derive insights into the extent and drivers of multiple borrowing. The two hypotheses to be tested are:

- i. An increase in the density of MFIs in rural areas is not a source of multiple borrowing;
- ii. The propensity of rural residents to engage in multiple borrowing does not vary with the density of a particular MFI category.

Model specification

With insights from related theory and empirical findings, an econometric model is specified describing the function that relates factors influencing multiple borrowing to the outcome variable. For the first two empirical chapters, the dependent variables are binary, resulting in a linear probability model which precludes the use of ordinary least squares (OLS). In applied research, probit and logit models are the most widely used binary response models which are differentiated by assumptions on the distribution of

the error terms. For both models, the underlying probability is the cumulative density function (CDF). The probit model assumes a standard normal distribution of errors while the logit adopts a logistic distribution. The probit and logit models and their ordinal equivalents are adopted in the first and second empirical analyses respectively.

Probit regression model

A probit regression is used to model the probability of a microfinance client engaging in multiple borrowing. The dependent variable, multiple borrowing, is a binary variable measured as 0 if the borrower has a single loan and 1 if borrower has two or more loans. Given that the OLS is not applicable to the analysis, the probit model is estimated by the maximum likelihood estimation technique (MLE). An explanation of the MLE is provided in Appendix B6. The probit model with multiple regression is given by equation (5):

$$Pr(Y = 1|X_1, X_2, \dots, X_k) = \Phi(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k) \quad (5)$$

where the dependent variable Y is binary, Φ is the cumulative standard normal distribution function and X_1, X_2, \dots, X_k are the regressors. In the context of the problem, equation (5) is revised as:

$$Pr(Multi_borr = 1 | X_i) = \beta_0 + \beta_i X_i + \varepsilon_i \quad (6)$$

where, $Multi_borr$ (number of loans per client) is the binary dependent variable, X_i is a vector of exogenous determinants and ε_i is the error term. The error term represents any unpredictability regarding borrowing behaviour or confounding factors which cannot be observed. Due to the pervasive heterogeneity inherent in household survey data, robust standard errors (Huber-Eicker-White) are invoked for the estimations to cater for the presence of heteroscedasticity and

to counteract a possible misspecification of the underlying link function (Long & Freese, 2014).

From equation (6), model specifications for the first and second hypotheses are presented as follows (a table of variable descriptions and a priori expectations are provided in Appendix B1):

$$Pr (Multi_borr = 1|x) = \beta_0 + \beta_1 location + \beta_2 \ln tothhexp + \beta_3 hhsiz e + \beta_4 agey + \beta_5 MFI_dens + \beta_6 MFI_dens\#Loc + \beta_7 emp_status + \beta_8 female + \beta_9 edu + \beta_{10} marstat + \beta_{11} health_shock + \beta_{12} region + \varepsilon_i \quad (7)$$

where

<i>Multi_borr</i>	=	<i>two or more loan contracts</i>
<i>location</i>	=	<i>borrower's rural or urban residence</i>
<i>ln tothhexp</i>	=	<i>natural logarithm of total household expenditure</i>
<i>hhsiz e</i>	=	<i>number of working adults in the household</i>
<i>agey</i>	=	<i>age of household head</i>
<i>MFI_dens</i>	=	<i>MFI density (total number of MFIs in a location)</i>
<i>MFI_dens#loc</i>	=	<i>Interaction of MFI density and location</i>
<i>emp_status</i>	=	<i>economic activity of household head</i>
<i>female</i>	=	<i>sex of household head (proxy for gender)</i>
<i>edu</i>	=	<i>level of education of household head</i>
<i>marstat</i>	=	<i>marital status of household head</i>
<i>health_shock</i>	=	<i>health status of household head</i>
<i>region</i>	=	<i>borrower's region of residence</i>

and β_6 tests the interaction effect of location and total number of MFIs (density).

The second model is specified as:

$$Pr (Multi_borr = 1|x) = \beta_0 + \beta_1 location + \beta_2 ln\ tothhexp + \beta_3 hhsize + \beta_4 agey + \beta_5 MFI_Type + \beta_6 MFI\#Loc + \beta_7 emp_status + \beta_8 female + \beta_9 edu + \beta_{10} marstat + \beta_{11} health_shock + \beta_{12} region + \epsilon_i \quad (8)$$

where

$$MFI_Type = \text{Density of MFI category}$$

$$MFI\#Loc = \text{Interaction of density of MFI category and location}$$

β_6 tests the interaction effects of location and the density of a type of MFI on the probability of multiple borrowing. Equation (8) is estimated for all seven categories of MFIs.

Equation (9) specifies the determinants of multiple borrowing as:

$$Pr (Multi_borr = 1|x) = \beta_0 + \beta_1 location + \beta_2 ln\ returns + \beta_3 log_loan + \beta_4 ln\ tothhexp + \beta_5 hhsize + \beta_6 agey + \beta_7 emp_status + \beta_8 female + \beta_9 edu + \beta_{10} marstat + \beta_{11} health_shock + \epsilon_i \quad (9)$$

where

$$ln\ returns = \text{natural logarithm of business profits}$$

$$log_loan = \text{natural logarithm of loan amount borrowed}$$

Equation (9) is repeated for the categorical loan amount which distinguishes between the effects of different sizes of loan amounts:

$$Pr (Multi_borr = 1|x) = \beta_0 + \beta_1 location + \beta_2 ln\ returns + \beta_3 loan_cat + \beta_4 ln\ tothhexp + \beta_5 hhsize + \beta_6 agey + \beta_7 emp_status + \beta_8 female + \beta_9 edu + \beta_{10} mastat + \beta_{11} health_shock + \epsilon_i \quad (10)$$

where

$$loan_cat = \text{categorical loan amount}$$

Loan Amount and Over-Indebtedness

The second empirical analysis tests whether a single loan amount has a statistically significant effect on over-indebtedness, controlling for other covariates. As a first opportunity to present the drivers of over-indebtedness from an objective perspective, the effects of the covariates in the main estimation are also of interest. The estimations are conducted with the logit and ordinal logit models, which utilise the maximum likelihood technique. An ordinal regression determines the effect of borrowing on the individual categories of over-indebtedness, particularly, for severely indebted borrowers.

Hypotheses

- i. A single loan amount has no significant effect on the probability of over-indebtedness
- ii. Larger loan amounts have no significant effect on the intensity of over-indebtedness

Logit regression model

Similar to the probit model expressed above, the logistic regression is used to model a binary response model. In this model, the cumulative distribution function is a standard logistic function which is denoted by F in equation (11).

Following Long and Freese's (2014) exposition on Theil (1970), the logit model, which estimates the predicted probability that the outcome variable is a success, is bound between the range of 0 and 1 unlike the linear probability model (LPM) where predicted probabilities can be greater than 1 and 0. In this context, the probability of success is given as $P_i = E(Y_i = 1 | X_i)$ which translates as

the probability that a borrower is over-indebted conditional on the values of the explanatory variables and $P_i = E\{Y_i = (1 - P_i) | X_i\}$, measures the probability that a borrower is not over-indebted. Hence, the binary over-indebtedness variable is measured as 1 if a borrower is over-indebted and 0 if the household head is not over-indebted. According to Stock and Watson (2014), the general compressed logit model is given as:

$$\begin{aligned} \Pr(Y = 1 | X_1, X_2, \dots, X_k) &= F(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k) \\ &= \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)}} \end{aligned} \quad (11)$$

Econometric model

Following the logit function above, hypothesis one is tested in two forms. The first investigates the principal variable in the continuous form and the second uses a categorical variant to investigate any differences in the effect of the categories. The dependent variable (over-indebtedness), which is binary, is an indebtedness index with a threshold determined practically from the household consumption expenditure contained in the GLSS6 data. Consistent with Khandker et al. (2013), the indebtedness index is generated by dividing total loan repayments in the last twelve months by total household income for the same period. Choice of independent variables are also consistent with the theory of over-indebtedness from the LC-PI model. Such variables are important household specific variables such as age of household head, sex, education, household income, household size and marital status, assets, economic activity, loan use, employment status and location. Variable definitions and a priori expectations are presented in Appendix B2.

The equation for the continuous loan amount is given as:

$$Pr(OVI_i=1|X_i) = \beta_0 + \beta_1 \log_loan + \beta_2 \lnhhexp + \beta_3 hhsiz e + \beta_4 female + \beta_5 agey + \beta_6 prod_invest + \beta_7 emp_status + \beta_8 region + \beta_9 \lnasset + \beta_{10} edu + \beta_{11} urban + \varepsilon_i \quad (12)$$

where

<i>OVI</i>	=	<i>over-indebtedness status of household head</i>
<i>log_loan</i>	=	<i>loan amount borrowed</i>
<i>lnhhexp</i>	=	<i>log of total household expenditure</i>
<i>hhsiz e</i>	=	<i>number of working adults in a household</i>
<i>female</i>	=	<i>sex of household head</i>
<i>agey</i>	=	<i>age of household head</i>
<i>prod_invest</i>	=	<i>intended loan use</i>
<i>emp_status</i>	=	<i>economic activity of household head</i>
<i>region</i>	=	<i>borrower's region of residence</i>
<i>lnasset</i>	=	<i>logarithm of total household assets</i>
<i>edu</i>	=	<i>level of education of household head</i>
<i>urban</i>	=	<i>borrower's location in a region</i>

Equation (12) is repeated for the categorical loan variable (*loan_amt*).

Ordinal regression models (probit and logit)

Ordinal regression (OR) is modelled on the binary response but has a progressive higher number of categories. The structure of the model is such that the outcomes increase sequentially as the latent variable y^* , crosses increasing thresholds (\mathcal{T}_1) (Cameron & Trivedi, 2010). The propensity to have multiple loans or become over-indebted is predicated on the underlying continuous latent variable. Hence, in the context of the study, y^* is an unobserved measure of

multiple borrowing and over-indebtedness. For a particular borrower, denoted as i , the model is specified as follows:

$$y_i^* = x_i\beta + \varepsilon_i \tag{13}$$

where i is the observation and ε is a random error. For the ordered logit model the ε is logistically distributed with $F(z) = e^z / (1 + e^z)$ while for the ordered probit model, e is standard normally distributed with $F(\cdot) = \Phi(\cdot)$, the standard normal c.d.f. (Cameron & Trivedi, 2010). Using multiple borrowing as an illustration, for very low y^* , a borrower has a single loan; for $y^* > \mathcal{T}_1$, number of loans held increases to two; for $y^* > \mathcal{T}_2$, number of loans increases to three and progresses to the fourth loan. The same applies to the issue of over-indebtedness. The observed response categories are tied to the latent variable by the measurement method. Assuming $\mathcal{T}_0 = -\infty$ and $\mathcal{T}_j = \infty$, then:

For multiple borrowing:

$$y_i \begin{cases} 1 \rightarrow \text{Single} & \text{if } \mathcal{T}_0 = -\infty \leq y_i^* < \mathcal{T}_1 \\ 2 \rightarrow \text{Two} & \text{if } \mathcal{T}_1 \leq y_i^* < \mathcal{T}_2 \\ 3 \rightarrow \text{Three} & \text{if } \mathcal{T}_2 \leq y_i^* < \mathcal{T}_3 \\ 4 \rightarrow \text{Four} & \text{if } \mathcal{T}_3 \leq y_i^* < \mathcal{T}_4 = \infty \end{cases} \tag{14}$$

For over-indebtedness:

$$y_i \begin{cases} 1 \rightarrow \text{Not over - indebted} & \text{if } \mathcal{T}_0 = -\infty \leq y_i^* < \mathcal{T}_1 \\ 2 \rightarrow \text{Moderately over - indebted} & \text{if } \mathcal{T}_1 \leq y_i^* < \mathcal{T}_2 \\ 3 \rightarrow \text{Over - indebted} & \text{if } \mathcal{T}_2 \leq y_i^* < \mathcal{T}_3 \\ 4 \rightarrow \text{Severely Over - indebted} & \text{if } \mathcal{T}_3 \leq y_i^* < \mathcal{T}_4 = \infty \end{cases} \tag{15}$$

Thus, when the latent y^* crosses a cut point, the observed category changes. Ordinal probit is estimated to derive the predicted probability of moving into a higher threshold of over-indebtedness.

The ordinal logit model uses the categorical loan amount and is given as:

$$Pr(OVI_i^* = 1|X_i) = \beta_0 + \beta_1 loan_amt + \beta_2 lnhhexp + \beta_3 hhsiz e + \beta_4 female + \beta_5 agey + \beta_6 prod_invest + \beta_7 emp_status + \beta_8 region + \beta_9 lnasset + \beta_{10} edu + \beta_{11} urban + \varepsilon_i \quad (16)$$

where

OVI_i^*	=	<i>the grouped continuous index of over-indebtedness (categorical dependent variable) which measures the scale of over-indebtedness</i>
$loan_amt$	=	<i>size of loan amount borrowed (categorical)</i>
$lnhhexp$	=	<i>log of total household expenditure</i>
$hhsiz e$	=	<i>number of working adults in a household</i>
$female$	=	<i>sex of household head</i>
$agey$	=	<i>age of household head</i>
$prod_invest$	=	<i>loan use</i>
emp_status	=	<i>economic activity of household head</i>
$region$	=	<i>borrower's region of residence</i>
$lnasset$	=	<i>logarithm of total household assets</i>
edu	=	<i>level of education of household head</i>
$urban$	=	<i>borrower's location in a region</i>

Over-indebtedness and Borrowers' Living Standards

The third empirical analysis investigates whether over-indebtedness has an effect on households' living standards. In addition to determining the effect of over-indebtedness on household welfare, the analysis also tests for the interaction effects of over-indebtedness with the amount borrowed and insurance held, to determine their effect on household consumption

expenditure. In this study, a careful consideration of theory confirmed conditions of endogeneity exhibited by a possible simultaneity bias and measurement error problems. Appendix B7 presents the traditional instrumental variable (IV) technique to addressing the endogeneity problem and its complications in applied work. To address the issue of instrument availability, the study adopts a variant of the IV technique (Identification by heteroscedasticity-based instruments). The technique rectifies the identifiability problem by utilizing higher moments of the data.

For the third empirical analysis, the dependent variable is consumption expenditure per equivalent adult, representing the standard of living for each individual in the household. The welfare scores are computed by the Ghana Statistical Service (GSS) using comprehensive income or expenditure data to determine the consumption expenditure that constitutes a minimum food basket, providing 2900 calories per adult equivalent per day. It is estimated by dividing total household consumption by the number of adult equivalents in the household. This dependent variable is utilised by Coulombe and Wodon (2007) for the estimation of household welfare in Ghana.

Over-indebtedness is the principal variable of interest. Choice of control variables is consistent with the conceptualisation of poverty, particularly in the Ghanaian context. Therefore, to determine the effect on household consumption expenditure, the control variables are based on empirical work on the determinants of poverty as indicated by Coulombe and Wodon (2007). These include: age of household head, gender, education, household income, household size and marital status, assets, economic activity, employment status, location etc. The main thrust is to introduce the over-indebtedness variable into

this model and estimate its effect on consumption expenditure for indebted households. This section presents the hypotheses, empirical models, post-estimation tests for instrumental variable technique and the pros and cons of the new estimation technique.

Hypotheses

- i. Over-indebtedness has no significant effect on household consumption expenditure;
- ii. The effect of over-indebtedness on consumption expenditure does not depend on the amount borrowed;
- iii. The effect of over-indebtedness on household consumption expenditure does not depend on whether the borrower has an insurance policy or otherwise.

Model specification

The hypothesis of a link between over-indebtedness and household living standards is estimated by modelling a regression equation with welfare scores, measured as the consumption expenditure per equivalent adult as the dependent variable; over-indebtedness, as the main variable of interest, and a vector of controls derived from demographic and socio-economic indicators. Following Coulombe and Wodon (2007), determinants of household consumption expenditure is expressed as follows:

$$\ln CExp_i = \beta_0 + \beta X_i + \varepsilon_i \quad (17)$$

where $\ln CExp_i$ is the log of consumption expenditure per equivalent adult (dependent variable), X_i is a vector of exogenous determinants and ε_i is the independently and identically distributed (i.i.d) error term with unobservable

characteristics such as business acumen, personality traits, family background and influence of networks. With this model, relationships between these variables and household welfare status can be analysed through a multivariate framework. Introducing the principal variable of interest into equation (17), we have:

$$\ln CExp_i = \beta_0 + \beta X_i^* + \beta X_i + \varepsilon_i \quad (18)$$

where X_i^* is the variable of interest (over-indebtedness), which is suspected to be endogenous due to measurement error. Using the variables itemised in the previous section, equation (18) is represented with the mismeasured regressor and control variables as:

$$\begin{aligned} \ln CExp_i = & \beta_0 + \beta_1 OVI^* + \beta_2 \log_loan + \beta_3 hhsize + \beta_4 agey + \beta_5 agesquare + \\ & \beta_6 emp_status + \beta_7 male + \beta_8 urban + \beta_9 edu + \beta_{10} marstat + \beta_{11} region + \\ & \beta_{12} health_shock + \beta_{13} depend + \varepsilon_i \end{aligned} \quad (19)$$

where

$\ln CExp$	=	log of consumption expenditure per equivalent adult
OVI^*	=	over-indebtedness status of household
\log_loan	=	loan amount borrowed
$hhsize$	=	number of working adults in a household
$agey$	=	age of household head
$agesquare$	=	square of age
emp_status	=	economic activity of household head
$male$	=	sex of household head
$urban$	=	borrower's location in a region
edu	=	level of education of household head
$marstat$	=	marital status of household head

<i>region</i>	=	<i>borrower's region of residence</i>
<i>health_shock</i>	=	<i>health status of household head</i>
<i>depend</i>	=	<i>number of dependants in the household</i>

From the above main equation, equations (20) to (22) are specified to test the second and third hypotheses.

$$\begin{aligned} \ln CExp_i = & \beta_0 + \beta_1 OVI^* + \beta_2 \log_loan + \beta_3 OVI^* \# \log_loan + \beta_4 hhsz + \\ & \beta_5 agey + \beta_6 agesquare + \beta_7 emp_status + \beta_8 male + \beta_9 urban + \beta_{10} edu \\ & + \beta_{11} mastat + \beta_{12} region + \beta_{13} health_shock + \\ & \beta_{14} depend + \varepsilon_i \end{aligned} \quad (20)$$

where β_3 tests the interaction effect of over-indebtedness and amount borrowed.

$$\begin{aligned} \ln CExp_i = & \beta_0 + \beta_1 OVI^* + \beta_2 Insure + \beta_3 \log_loan + \beta_4 hhsz + \beta_5 agey + \\ & \beta_6 agesquare + \beta_7 emp_status + \beta_8 male + \beta_9 urban + \beta_{10} edu + \\ & \beta_{11} mastat + \beta_{12} region + \beta_{13} health_shock + \\ & \beta_{14} depend + \varepsilon_i \end{aligned} \quad (21)$$

where β_2 estimates the effect of insurance (*Insure*), which is added as a control variable for over-indebtedness.

$$\begin{aligned} \ln CExp_i = & \beta_0 + \beta_1 OVI^* + \beta_2 Insure + \beta_3 OVI^* \# Insure + \beta_4 \log_loan + \beta_5 hhsz + \\ & \beta_6 agey + \beta_7 agesquare + \beta_8 emp_status + \beta_9 male + \beta_{10} urban + \beta_{11} edu + \\ & \beta_{12} mastat + \beta_{13} region + \beta_{14} health_shock \\ & + \beta_{15} depend + \varepsilon_i \end{aligned} \quad (22)$$

where β_3 tests the interaction effect of over-indebtedness and insurance.

Post-Estimation Tests and Methods of Interpretation

Model specification tests are conducted using a variety of methods. Examples are the Wald, Likelihood Ratio (LR), Lagrange Multiplier (LM), Hosmer-Lemeshow and the Link test (Cameron & Trivedi, 2010; Long &

Freese, 2014; Stock & Watson, 2007; Wooldridge, 2010). Measures in the probit and logit regression output provide results on the fit of the model. These include, the log likelihood and the likelihood ratio test. An accompanying p-value provides a test for the joint significance of all regressors. According to Long and Freese (2014), the output provides results of the Wald test when robust standard errors are applied.

Another measure of fit applicable to non-linear models is the McFadden's R^2 measure, commonly known as the Pseudo- R^2 . Although, ideal for binary outcome models, the Pseudo- R^2 does not directly replicate the R^2 of the linear model. Hence, it is not a measure of the proportion of variation of the outcome variable explained by the model (Long & Freese, 2014). Similar to the R^2 for cross-sectional studies, the McFadden R^2 statistics tend to be low.

The Hosmer-Lemeshow test also provides a test for specification where the null suggests that the model is correctly specified (Cameron & Trivedi, 2010). Therefore, the accompanying p-value should be large enough to result in a failure to reject the null hypothesis. Although the test statistic is widely used for assessing model fit, a caveat is drawn regarding a complete reliance on this measure, since it uses predicted probabilities based on an arbitrary decision on the number of sub-groups used in the test. Without any such specification, the test defaults to a value of 10 subgroups (Cameron & Trivedi, 2010; Long & Freese, 2014). For the specification tests, the study uses the Wald test of the regression output, the linktest and the Hosmer- Lemeshow tests.

Model comparison

Model comparison tests are used to compare the sufficiency of a particular model. The Akaike and Bayesian Information Criteria (AIC and BIC)

or the Likelihood Ratio tests are used for such comparisons. For the AIC and BIC, a smaller value is preferred when the models are non-nested (Cameron & Trivedi, 2010; Long & Freese, 2014). Alternatively, the choice between a full and nested model will be indicated by the larger model.

Hypothesis tests

Hypothesis tests are conducted using the z statistics in the regression output. The z test is the Wald test and may also be computed as a chi-square test. The methodology for hypothesis testing follows these steps - the standard errors which estimate the standard deviation of the distribution are computed, the z -statistic is derived, and the p -value is determined. Stata regression output displays estimates for the coefficient, the standard error, the z statistic and its accompanying p -value, and the confidence intervals. The essence of the results is derived from the researcher's examination of the regression output (Cameron & Trivedi, 2010; Long & Freese, 2014). The z statistic is the ratio of the estimated coefficient and the estimated standard error. The p -value is the smallest significance level at which the null hypothesis could be rejected. The confidence interval approach is another way of testing hypothesis.

In testing a hypothesis about a variable, there is the null (H_0) and the alternative (H_1). The null hypothesis usually specifies that the coefficient of the parameter in question has no statistically significant effect on the dependent variable. In other words, the effect is zero ($H_0: \beta_i = 0$). The alternative is specified as ($H_1: \beta_i \neq 0$). Usually, the hypothesis is stated either as a one-tailed test where a particular direction of effect is specified by theory or a two-tailed test when no direction is indicated. The rule of thumb for the analysis, therefore,

differs for the two scenarios. The study adopts a two-tailed testing approach for all the analyses and by default, stata produces the two-tailed tests.

In any hypothesis tests, there is the possibility of committing either a Type I or Type II error. In the former, the researcher can reject the null when it is true and in the latter, fail to reject the null even though it is false. To avoid such a significant error, a dividing line is chosen in the probability distribution to minimise these errors. If the sample mean lies to the left of the line, H_0 is rejected; if it lies to the right, then it is not rejected. Usually, a Type I probability is calculated for any value using the z score. Since the probability for the Type II is inestimable, due to the uncertainty regarding the precise distribution under H_1 , the convention is to use a Type I probability of 5 percent commonly referred to as the significance level (Barrow, 2009). However, stata computes significance levels of 1 percent, 5 percent and 10 percent respectively. Hence, the smaller the probability, the stronger the robustness of the prediction.

Interpretation of model coefficients

For the binary response models, estimated coefficients are not readily meaningful since they indicate the coefficient of the latent variable. Hence, the coefficients may not determine the effect of the probability that the borrower engages in multiple borrowing. For the logit model, the coefficients represent the log of the dependent variable (Gujarati, 2004). Consequently, marginal effects are more informative for interpreting the model coefficients (Long & Freese, 2014). Interpretation of the probit and logit estimations will be based on the marginal effects.

The marginal effect is the effect of a unit change in the independent variable on the probability of the success of a dependent variable. Following

Long and Freese (2014), the derivations are presented below. In the BRM, the marginal change has the simple formula:

$$\frac{\partial \Pr(y_i=1|x)}{\partial x_k} = f(x\beta)\beta_k \quad (23)$$

Where f is the normal probability distribution function (PDF) for probit and the logistic PDF for logit. In logit models the marginal change is expressed as follows:

$$\frac{\partial \Pr(y_i=1|x)}{\partial x_k} = \Pr(y_i = 1|x) [1 - \Pr(y_i = 1|x)]\beta_k \quad (24)$$

The effect depends on the values of the independent variables, consequently, it differs for each individual borrower. For a continuous variable, the marginal effect measures the partial derivative of a change in an independent variable with respect to the dependent variable. This is given by the formula below:

$$\text{mean } \frac{\partial \Pr(y_i=1|x_i)}{\partial x_k} = \frac{1}{N} \sum_{i=1}^N \frac{\partial \Pr(y_i=1|x=x_i)}{\partial x_k} \quad (25)$$

For a dummy variable, the marginal effect uses the finite-difference method to compute the discrete change in the independent variable, as the dependent variable moves from 0 to 1.

$$\text{mean } \frac{\Delta \Pr(y_i=1|x_i)}{\Delta x_k} = \frac{1}{N} \sum_{i=1}^N \frac{\Delta \Pr(y_i=1|x=x_i)}{\Delta x_k} \quad (26)$$

Marginal effects for binary or ordinal dependent variables can be computed as observed, also known as average marginal effects (AMEs), at the means (MEMs) or at representative values (MERs). The AMEs are used in the interpretations given the higher number of categorical variables. The effect is computed for each observation and averaged over the entire sample. Although, no particular measure supersedes the other, a particular choice will be based on

the variables in the model and the interests of the researcher (Long & Freese, 2014).

Interaction effects

In a regression model, an interaction term is a product of two covariates. This analysis tests whether the partial effect of one variable depends on the value of another predictor. For example, the interaction between MFI density and location tests whether the effect of MFI density on the outcome variable depends on the location of the institution. For the full interaction effect (net effects), Norton, Wang and Ai (2004) compute the cross – partial derivative of the expected value of the outcome variable with respect to the interacted variables (x_1 and x_2). According to Buis (2010), this differs from the first derivative of the expected value of the outcome variable with respect to the multiplicative term, ($x_1 \times x_2$), which Norton et al. (2004) refer to as “the marginal effect of *just* the interaction term” (p.155) [emphasis added]. Similar interaction analyses are made in the third empirical chapter where the net effects are computed for the continuous and discrete variables.

Instrumental variables post-estimation tests

The under-identification test is a Lagrange Multiplier test of whether the equation is identified - that the excluded instruments are "relevant", meaning correlated with the endogenous regressors. To test whether instruments created by the identification by heteroskedasticity estimation technique are identified, it uses post estimation analysis techniques for the traditional instrumental variable analysis. The null hypothesis states that the equation is under-

identified. A significant p-value means that the null hypothesis is rejected in favour of the alternative hypothesis that the equation is exactly identified.

The Sargan-Hansen test is a test of overidentifying restrictions. The joint null hypothesis tests that the generated instruments are valid (uncorrelated with the error term), and that the excluded instruments are correctly excluded from the estimated equation. Under the null, the test statistic is distributed as chi-squared in the number of (L-K) overidentifying restrictions. A rejection casts doubt on the validity of the instruments.

Weak identification arises when the excluded instruments are correlated with the endogenous regressors, but only weakly (Stock & Yogo, 2005). Estimators can perform poorly when instruments are weak. For an equation to be robustly identified, excluded instruments should not only be correlated with endogenous regressors but the correlation should be strong. In the presence of weak instruments, IV estimators are likely to be biased and can produce large distortions.

Sensitivity analysis of the debt-service ratio (DSR)

In a sensitivity analysis, certain changes are made on the assumptions of key quantitative variables, to assess its effect on the outcome variable. One major criticism of the DSR (measure of over-indebtedness) is the use of arbitrary cut-off points. As noted in the literature review, variations of the cut-off points are based on purpose, interest and focus. One significant contribution of this study is the use of objective thresholds derived from the GLSS6 data. These are in contrast to the arbitrary thresholds usually employed. To test the performance of the computations derived from the indebtedness index, the estimated over-indebtedness prevalence will be re-computed with the arbitrary

thresholds used in the Khandker et al. (2013) study to assess its effect on the overall estimate of the extent of over-indebtedness.

Limitations of Research Methods

In spite of the study's significant benefits to policy, the methodological choices in terms of design, data and estimation techniques are not wholly devoid of limitations. The research is a cross-sectional analysis of over-indebtedness in Ghana, which presents an analysis at a point in time. Additionally, the GLSS6 is a more general household survey; and, although adequate for the analysis, it does not collect exhaustive information on all financial variables necessary to examine the other measurements of over-indebtedness. Furthermore, a caveat is drawn to the fact that the number of multiple-borrowing used are self-reported and might have the tendency to under-report the extent of over-lapping. However, such self-reported loans have been used in the growing literature on multiple borrowing. Finally, data limitation influenced the choice of estimation technique for the third empirical analysis. Absence of internal instruments precluded the use of the traditional approach of instrumental variable analysis.

Chapter Summary

This chapter outlined the methodological choices for the study. It provided a justification for the choice of a quantitative approach, as hinging primarily on the problem statement, the purpose of the study and the timely availability of suitable and comprehensive nationally representative data. Probit and logit estimation techniques and their ordinal variants were adopted based on the binary nature of the outcome variables and the suitability of an ordinal analysis. The third empirical analysis adopted a new identification technique to

resolve a problem of endogeneity based on the unavailability of an external instrument. Post-estimation procedures for all three analyses were also presented in addition to the limitations of the methodology.

The next chapter presents the results and discussion of the first empirical analysis, which focused on the effect of institutional density on multiple borrowing and the influence of a particular type of MFI on the probability of multiple borrowing. It also presents insights into the extent and drivers of multiple borrowing from the preliminary investigation.



CHAPTER SIX

EFFECT OF INSTITUTIONAL DENSITY AND TYPE OF MICROFINANCE INSTITUTION ON MULTIPLE BORROWING

Introduction

This chapter presents the results and discussion of the first empirical analysis which investigates issues of multiple borrowing in the microfinance industry. It tests two main hypotheses: (1) an increase in the density of MFIs in rural areas is not a source of multiple borrowing, (2) the propensity of rural residents to engage in multiple borrowing does not vary with the density of a particular MFI category. These hypotheses seek to contribute to knowledge on the effect of rural-level density of MFIs on multiple borrowing. Additionally, the analysis provides insights into the extent and predictors of multiple borrowing. The study employs probit and ordinal probit estimation techniques to investigate the probability of multiple borrowing and to determine the predicted probabilities for different categories of indebtedness.

The chapter is organised as follows: The next section continues with the descriptive statistics followed by findings on the effect of institutional density on multiple borrowing for rural dwellers. The rural-level effect of the density of MFI category on multiple borrowing is presented in the third section. The fourth section provides insights into the drivers of multiple borrowing and the fifth section presents knowledge on the prevalence of the phenomenon in Ghana. The final section summarises the chapter.

Descriptive Statistics

This section presents the summary statistics of the quantitative variables in Table 1, followed by a description of the cross tabulation of the categorical variables with the dependent variable (multiple borrowing). From Table 1, data on loan size varies from GHS 10 to GHS 56,000. Hence, the mean amount is approximately GHS 2,400. The large standard deviation is indicative of the vast heterogeneity in loan size. According to the percentile distribution, 99 percent of borrowers have loans up to GHS 20,000, while the final percentile possess loans from GHS 20,000 – GHS 56,000. To provide consistency with existing research (Liv, 2013), the study uses a maximum of GHS 20,000 for the loan amount variable. The mean for this distribution is GHS 2,085.

Average age of the household reference person is 46.9 years and resonates with the average age for the GLSS6 household survey (45). The difference could be attributed to the specific group of interest which constituted the focus of the RAFiP survey. Returns on investment is also positively skewed and a similar trend is exhibited by the expenditure variable. Due to the nature of these variables, their natural logs are used in the analysis. The mean adult household size is 4.9 and the maximum is 26 (the mean is slightly higher than the national average household size of 4 as indicated by the GLSS6 data).

Table 1: *Summary Statistics*

Variables	Mean	Std Dev	Minimum	Maximum
Amount of current loan	2398	4324	10	56000
Loan Amount	2085	2697	10	20000
Age	46.9	13	18	80
Returns	3164	11633	0	384000
Household Size	4.9	2.6	1	26
Expenditure	948	1492	0	49965
N = 1,099				

Source (Author)

Data on level of education suggests that 22 percent have a post-secondary qualification, 15 percent have completed a Vocational, Technical or Commercial training, 13 percent have a Middle School or Junior High School qualification, while approximately 10 percent have completed primary education. Clients with Middle School Leaving Certificate (MSLC) or Junior High School (JHS) qualifications are more likely to engage in multiple borrowing with 45.5 percent, followed by borrowers with Senior High School/Vocational or higher education (39.5%) This relationship is however not significant (Pr =0.860).

Gender distribution is 64 percent for males and 36 percent for females. This distribution closely aligns with the trend in the borrower sub-sample of the GLSS6 survey (69 and 31 percent respectively). The data also reveal that men are more likely to engage in multiple borrowing than women. Approximately 60 percent of men compared to 40 percent of women, have multiple loans and the relationship is significant at 0.01 percent.

On the rural-urban distribution, there are more urban clients compared to rural borrowers; indicating 68 percent to 32 percent respectively. MFIs advance more loans of up to GHS 5000 to borrowers in both locations, even though the distribution in urban areas is comparatively higher. Additionally, more borrowers obtain loans between GHS 4,000 – GHS 10,000 in the urban areas. A cross tabulation between multiple borrowing and location shows that multiple borrowing is prevalent in rural areas. According to the data, 52 percent of rural borrowers engage in multiple borrowing, compared to 48 percent of urban borrowers and the relationship is highly statistically significant ($p < 0.01$). The insight may be suggestively counter-intuitive to the expectation that multiple borrowing will be facilitated by intense competition and concentration of MFIs, which is more pronounced in the urban areas.

The employment status variable measures economic activity of the household head. The cross tabulation of the employment status with multiple borrowing indicates that clients in the informal sector are more likely to engage in multiple borrowing with 71 percent of clients in this sector having multiple loans compared to 25 percent from the formal sector and 4 percent by borrowers who are currently unemployed. This relationship is not significant ($Pr = 0.213$).

Effect of Institutional Density on Multiple Borrowing

The purpose of analysing the effect of density of MFIs as a principal variable of interest, is to provide knowledge on the interaction effect of a borrower's location (rural/urban) and the number of MFIs in the locality. This study uses number of all MFIs as a measure of institutional density. As with ordinary regression analysis, the effect of one variable is estimated holding all other variables constant. In this case, the effect of other predictors on the

variable of interest is isolated. However, an interaction presents a deeper form of analysis, where it can be determined whether the effect of MFI density on multiple borrowing depends on the location of the borrower, particularly, the rural context.

The interaction effect is analysed under two models – full and constrained. The full model includes regional level dummies and the analysis suggest that there is a trade-off between the location and regional variables. In the first estimation containing the regional dummies, the location variable is not significant whereas the MFI density variable is significant, but suggestively counter-intuitive. Since interest is in the interdependent effect of location and MFI density, a joint significance test is conducted for the MFI density and the interaction variables.

The test yields a significant result at 0.05 percent, implying that the joint effect of the two variables is not equal to zero. [$\chi^2(1) = 4.70$; Prob > $\chi^2 = 0.0302$]. Hence, the net effect of the interaction term is the cross partial derivative rather than the first derivative of the marginal effects (Buis, 2010; Norton et al., 2004). According to results indicated in Appendix C1 (Model 1) the net effect of the interaction term is positive. This confirms the descriptive analysis which indicated that multiple borrowing is common among rural clients. Thus, for rural borrowers, an increase in the density of MFIs, increases the probability of multiple borrowing by 0.06 percentage points.

Due to the earlier trade-off observed, the full model is constrained by excluding the regional variable to assess any change of effect on the interaction term. The results are presented in Model 2 of Appendix C1. Constraining the model does not have any impact on the estimate of the interaction term.

Nonetheless, it improves the performance of the location variable in the model, which is highly significant at the 0.01 percent level. According to the model comparison tests, a significant chi-squared statistic of the log likelihood test, means that the null hypothesis that the coefficient of the region variable is zero, is rejected and the full model is preferred (LR $\chi^2(8) = 95.54$; $p < 0.001$). From the two estimates of the net effects, there is only a marginal 0.005 difference in the two models. While the magnitude of the interaction may not be alarming, or provide a cause for concern, the direction has a significant policy implication. Thus, compared to urban areas, an increase in MFI density in rural areas, increases the probability of multiple borrowing.

To situate the results in the literature, the theory of competition and multiple borrowing conceptualises the concentration of MFIs as a measure of MFI competition, a source of multiple borrowing and a probable cause of over-indebtedness (Armendáriz & Morduch, 2010; Khandker et al., 2013; Krishnaswamy, 2007). In this study, the results suggest that, as an independent variable, institutional density is less likely to *cause* multiple borrowing. It is evident from the above assertion that perceptions about multiple borrowing, competition and its effect on over-indebtedness, were convictions generated from the 'growth surge' at the institutional level, as suggested by Rhyne and Otero (2006) and were mostly not data-driven. This study suggests that institutional density may not exacerbate multiple borrowing and there may be some plausible explanations to the finding.

One reason could be, that contrary to the expectation, that an increase in the density of institutions would lead to multiple borrowing, the effect may depend on the actual level of concentration. For an increasing number of

institutions to engender multiple borrowing, some markets may either be at the brink of saturation, or already saturated. Before the crises of the microfinance sector, affected markets were saturated by high levels of defaults and delinquencies as experienced in Bolivia, India and Bangladesh (Bateman & Chang, 2012). Therefore, for an unsaturated market, with minimal incidence of defaults and delinquencies, an additional institution in an area may not necessarily trigger the level of competition, which creates an eldorado of credit.

Another justification may be attributed to the mode of capitalisation. Currently, MFIs borrow from commercial investment vehicles and may be cautious of their market penetration, or be more circumspect with credit delivery. Hence, number of institutions per se might be less threatening, but will depend on the actual supply of credit. Where the lending practices of an additional institution does not effectively lead to a profusion of credit, an increase in institutional density may not engender multiple borrowing.

Finally, and most crucially, the institutional density variable may depend on another predictor. Therefore, the implausibility of institutional density to independently promote multiple borrowing, as indicated by the study, seems to suggest, that the microfinance market is currently in an 'expansive' state and unsaturated with possibly low levels of defaults and delinquencies. Hence, an increase in the number of institutions alone may not necessarily create a condition of overlapping membership.

The preceding factor leads to the analysis of the interaction between location and institutional density. The benchmark study, Khandker et al. (2013) concentrated on 'village-level' density as a plausible cause of over-indebtedness. On the *possible* relationship between density and indebtedness,

Khandker et al. (2013) found that the availability of microcredit programs in a community can result in an overflow of credit which may exacerbate a borrower's indebtedness. The finding from the research hypothesis corroborates with the above study's conclusion on the level of indebtedness; and, the rather marginal effect is also consistent with the benchmark study, where the positive coefficient of the village-level density of MFIs loses its significance when program participation is accounted for.

For rural borrowers, the positive relationship with multiple borrowing is critical and demonstrates the vulnerability of rural clients to a proliferation of MFIs. The foregoing is consistent with the exploratory analysis of Centre for Micro Finance's (CMF) study on borrowing in Andhra Pradesh, that multiple borrowing is 'extremely' common among the rural poor and 84 percent of households had two or more loans from any source (Johnson & Meka, 2010). Therefore, institutional density is more likely to engender multiple borrowing for clients in rural areas, compared to urban residents.

Given that institutional density may not independently trigger multiple borrowing, there may be some probable underlying factors, which increase the probability of multiple borrowing for rural borrowers. These contributing factors could be analysed from the demand and supply perspectives. On the demand side, underlying economic factors such as low and unstable incomes could be a major trigger. Hence, any concentration of institutions, no matter how small, may induce multiple borrowing. However, this may not be caused independently of the supply factors. The phenomenon could be more pronounced where MFIs are capable and willing to supply the much sought-after credit, which could most likely be absorbed, primarily for consumption

smoothing; particularly, in an environment where poverty is rife, as is the case in the Ghanaian context. Hence, when such favourable conditions are created from the supply side, more rural borrowers will be inclined to indulge in multiple borrowing given the location's economic vulnerability, which can pose a serious risk to borrowers and institutions alike.

The above section has contributed to knowledge on the direct effect of institutional density on multiple borrowing. The results suggest that while the total number of institutions alone may not be a trigger for multiple borrowing, the effect depends on the borrower's location; precisely, a rural area. By the very nature of the rural location, it is unsurprising why an increase in the concentration of institutions will be more likely to engender multiple borrowing. Rural dwellers are economically vulnerable, on average, and sensitive to the penetration and lending activities of MFIs.

Effect of Density of MFI Category on Multiple Borrowing

Table 2 presents a summary of the results of the second hypothesis. Seven estimations were conducted to test whether the extent of the interaction effect of location and MFI density, can be determined from the particular type of institution. In each model, the total density of MFIs is decomposed into the seven categories of MFIs. Each MFI density variable indicating a particular type of institution is interacted with the location variable. The results suggest that, with the exception of the outcome of Rural and Community Banks (RCBs), which is positive but nonsignificant, it is more likely for a rural borrower to engage in multiple borrowing in response to an increase in the density of the other six categories of MFIs. Detailed results are presented in Appendix C2. For all estimated models, associated diagnostics are presented under Appendix C5.

Table 2: *Effect of Type of MFI on Multiple Borrowing*

Institutions	Interaction Effect (Net)	Standard Error	P-value
RCB	0.0015961	0.0012637	0.207
CU	0.002786**	0.0012205	0.022
S&L	0.0025438**	0.0012424	0.041
ML	0.0045988**	0.0017981	0.011
MFC	0.0037946**	0.0015156	0.012
SUSU	0.0101225**	0.0032268	0.002
FNGO	0.0654591***	0.0106777	0.000

Source: Compiled by author

In view of the diversity in MFIs' operational methodology and ethos, there is a possibility that the type of institution will have an effect on the likelihood of overlapping. Consequently, the second hypothesis extends the institutional density analysis and tests whether the effect of rural-level density of MFIs on multiple borrowing, is linked to the type of MFI. Hence, it appears that an increase in the concentration of individual categories of MFIs may enable conditions of multiple borrowing for rural borrowers, albeit on a small scale. The following paragraphs present the interaction effects, based on significance and increasing levels of probability. As the first analysis of its kind, the implications for individual types of MFIs are drawn from the Ghanaian context.

From the findings, the least propensity is by RCBs and the effect is not significant. The banks were created by the Bank of Ghana to extend credit to rural farmers (GHAMFIN, 2013). Having been in operation for over four decades, RCBs have mushroomed in most districts and now offer microfinance activities. From the distribution of loans presented in Figure 2, RCBs have the second largest number of loans extended to borrowers (21.4%), and, because

they were purposefully established to support rural clients, the proportion of loans disbursed could suggest that clients' capital requirements are being met. Where RCB clients do not experience a product-need mismatch, are not credit constrained and are able to secure the loan sizes required, there may not be the need for clients to cross-borrow. Hence, the insignificant effect suggests that RCB operational activities may not create opportunities for multiple borrowing.

The next group comprises the Credit Unions and, Savings and Loans Companies. On average, with an increase in institutional density, rural borrowers of each of these institutions are likely to engage in multiple borrowing by 0.27 and 0.25 percentage points respectively and effects are significant at the 0.05 percent level. Again, in terms of magnitude, the individual propensities for clients of Credit Unions or S&Ls to overlap is suggestively marginal. The effect could also be attributed to the distribution of loans by MFIs. Figure 2 illustrates that, CUs and S&Ls comprise the third and fourth categories (19.16% and 17.55% respectively), and the loan distribution for S&Ls is approximately 2 percent less than CUs. Given the equally sizeable loan distribution for these two categories, the evidence may suggest that their density in rural areas, coupled with the nature of operations, may cause an extremely small propensity for their clients to engage in multiple borrowing.

In the next category comprising Money Lenders and Microfinance Companies, the effect is the same across the two groups. Yet, in terms of loan distribution, MFCs have 58 percent more outlets than Money Lenders. For Money Lenders, the distribution of loans is small compared to MFCs, and this could cause clients to approach other institutions for more loans. One reason could be that the effect of money lending is being neutralised by the intense

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growth of MFCs. The justification for the microcredit panacea was predicated on the argument of usurious interest rates charged by money lending operators. This has resulted in the growth of MFCs but the currently formalised operations of money lending activities in the country also provide avenues for clients who currently use their services. Thus, the dwindling share of loan distribution by Money Lenders may result in cross-borrowing.

Another explanation could be that, in terms of operations, particularly regarding interest rate charges, activities of MFCs are no longer differentiable from that of Money Lenders. On the other hand, the intense growth of MFCs may drive competition among themselves, which could also create opportunities for multiple borrowing, as demonstrated by the Bolivian scenario due to the onset of 'opportunistic' lenders (Armendáriz & Murdoch, 2010). Therefore, owing to either insufficient loan size, product mis-match or inflexible contractual terms, specific interests and operations of both institutions might cause borrowers to overlap.

For the Susu category, the effect of rural-level density on the probability of multiple borrowing has a one percent magnitude. The outcome may be induced by the distribution of loan services, which is lower for the Susu category. Traditionally, Susu groups have adopted the savings-led model to microfinancing, which is their predominant area of business. Credit disbursement may therefore be on a smaller scale, compared to the quantum of savings collected. From the data, the Susu category collects 15 percent of savings compared to advancing just 2 percent of credit. Therefore, for clients who borrow from the Susu groups, it is evident that, given the limited availability of credit, borrowers might resort to additional borrowing from other

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institutions, thereby giving rise to the comparatively higher propensity for this category.

Overall, FNGOs were found to have the largest and most strongly significant effect on multiple borrowing. These financial not-for-profit organisations were started like Compartamos in Bolivia before its Initial Public Offering (Rhyne, 2001). However, given the over three-and-a-half decades of commercialisation, most FNGOs had no choice but to commercialise or fold up, due to the removal of subsidies and donor support. The evaporation of funds starkly reflects the limited distribution of loans by this category, including a miniscule contribution to all service areas as depicted by the distribution of loans in the second chapter.

Compared to all categories, FNGOs have the least percentage of loans granted (1.65%), although, the percentage is similar to the loan distribution of the Susu category. Nonetheless, as explained earlier, credit delivery is not the mainstay of this classification, whereas it constituted a major part of activity for FNGOs, even though loans were subsidised. The seemingly high magnitude of 7 percentage points of FNGOs is due to their lowest percentage in terms of loan distribution. Additionally, from the background information, FNGOs mainly operate in rural areas. Hence, there is reason to suggest that, given the current limited financial resources available to the non-commercialised institutions, it is inevitable that clients of FNGOs may not receive sufficient loans and resort to other institutions to complement their capital outlay. Currently, a number of FNGOs are metamorphosing into fully-fledged commercial institutions.

Given the evidence provided by FNGOs, there is an inherent implication that with a type of institution, its density in the location, coupled with

operational activities could account for the conditions enabling multiple borrowing. The evidence seems to suggest that in an unsaturated market, various operational factors, in addition to the density of a particular type of MFI, would provide the necessary conditions for multiple borrowing.

Drivers of Multiple Borrowing

Econometric analysis to determine the drivers of multiple borrowing was conducted in two parts. Appendix C3 presents results of models (3) and (4) which provide the first set of analyses, focusing on the continuous and categorical loan amount variables, while Appendix C4 submits results for the second set, presented by models (5) and (6) which focus on the remaining determinants. Literature on the determinants of indebtedness identifies loan size and returns on investment as two significant drivers (Khandker et al., 2013; Liv, 2013). However, on the inclusion of the loan variable, the sample size drops to 416 and encounters a further drop to 400 when 'returns to investment' is added. In spite of the drop, remaining observations present an opportunity to analyse the effect of these two key variables.

Even though attention is drawn to this occurrence, the outstanding sample sizes remain potent for the analyses since Long and Freese (2014) confirm that a minimum of 100 observations may be required for a maximum likelihood estimation. Additionally, the inclusion of the loan amount variable presents a trade-off with the region variable, which is a proxy for regional characteristics. All regional dummies lose significance when factored into the model with loan amount. The response seems to suggest that the predictive power of loan amount on multiple borrowing may not depend on the regional

location of the borrower. Models (3) and (4), therefore, exclude the regional dummies.

In the reduced sample analysis, some regressors were not responsive. This outcome was plausibly attributed to observed data characteristics (sample size attrition). In models (5) and (6) of Appendix C4, the loan amount and returns on investment variables are excluded, to determine the full effect of other predictors in a relatively sufficient sample. Model (5) represents the full estimation of the analysis which includes the regional dummies. As anticipated, it improves some variables which were not responsive under the first set; yet, the education and employment status variables remained insignificant.

Given the relevance of education and employment status variables to the analysis, the marital status and illness variables, which were not significant under the full estimation, were dropped to determine the effect on the remaining predictors, if any. This action resulted in the nested model (6) but makes no difference to the estimates. Hence, results are based on model (5), as preferred by the robustness checks. Irrespective of the imposed constraint, results of the two models suggest that the point estimates are identical for most variables, but for infinitesimal differences. The following paragraphs present results and discussion of the control variables, focusing on the drivers of multiple borrowing. For each determinant, the result is presented first, followed by the discussion. The drivers are presented based on their magnitude and significance and expounded by a discussion of the economic and practical significance.

To the best knowledge of the researcher, three relevant empirical studies identified with direct reference to multiple borrowing are Krishnaswamy (2007), Khandker et al. (2013) and Liv (2013). However, these studies have

different purposes. The first focused on multiple borrowing as a consequence of competition and its effect on borrower's repayment experiences; the second addressed indebtedness as a consequence of MFI density and a cause of over-indebtedness and the third concentrates on the drivers of over-indebtedness using number of loan contracts as a measure. From the available literature, the identified comparator study is that of Khandker et al. (2013). Therefore, the aforementioned, and evidence from the consumer credit industry on number of commitments, will be advanced to support the discussion to situate the study's findings in the available body of knowledge.

The finding suggests that loan amount had the strongest effect. Model (3) shows the strongly significant effect of the continuous loan amount in increasing the probability of multiple borrowing by 10 percentage points ($p < 0.001$). Meanwhile, results of the categorised loan amount in model (4) clearly depicts the probability of multiple borrowing for the differentiated categories, with loans below GHS 100 as the base reference. The estimates suggest an increasing magnitude of effect from the lowest to the highest category. Borrowing between GHS 100 – GHS 1000 increases the probability of multiple borrowing by 14 percentage points ($p < 0.05$). For GHS 1001- GHS 5000, the magnitude increases to 30 percentage points and is strongly significant ($p < 0.001$). Correspondingly, loan amounts within the range of GHS 5001 to GHS 10000 increases the probability of multiple borrowing by 39 percentage points and is strongly significant at the 0.001 percent level. The last group of GHS 10001- GHS 20000 increases the probability of multiple borrowing by 59 percentage points which is significant at the 0.05 percent level. Hence, the

results suggest that larger loan amounts have a higher probability of increasing multiple borrowing.

The economic significance of loan size and its effect on overlapping is grounded in the theory of competition and multiple borrowing, which postulates that a small loan size drives cross-borrowing (Khandker et al., 2013; Krishnaswamy, 2007; Liv, 2013). Likewise, the effect of the continuous loan amount suggests that a marginal increase in the amount borrowed increases the probability of multiple borrowing. This finding corroborates with the theory that a small increase in loan size, particularly, if it is not commensurate with the amount required, may engender the client to garner loans from different sources to augment the loan size.

From the categorical loan variable, which actually indicates the effects of the different sizes of loans, the magnitude increases steadily with larger borrowing sizes. Although, the effect may seem counter-intuitive economically, it may be of a practical significance. The only comparator study, which addresses the issue of loan size and indebtedness, considered the effect of credit constraint (Khandker et al., 2013). In that context, 'credit constraint' is synonymous with 'insufficient capital'. The study found that credit constrained borrowers are more likely to overlap than unconstrained borrowers. Given the preceding evidence, this study's finding regarding larger amounts of borrowing could have both economic and practical significance and may be due to the following two possible explanations.

First, the positive and increasing relationship identified is supported by the cross tabulation of multiple borrowing and size of loan, which indicate that the number of borrowers with multiple loans rises from 2 percent for borrowers

with a loan size of less than GHS 100 and rises steeply to 35 percent for clients who have loans between GHS 100-1000 and 51 percent for borrowers of GHS 1000-5000. Therefore, a positive increasing effect might suggest that, economically, loan sizes of GHS 5000 or less may be considered *insufficient* for the intended purpose. In that case, the affected borrowers can be considered 'credit constrained'.

Additionally, given the mean amount of approximately GHS 2,400, it is unsurprising that above-average borrowers needing additional loans will engage in overlapping to acquire the desired loan amount. Furthermore, loans between GHS1000-5000 could be considered 'inadequate' and spur on additional borrowing from the same or a different provider, to augment existing capital for the desired levels of investment. Equally plausible, is the situation, where a borrower might have a 'small' loan and yet be unconstrained with respect to intended loan use. Therefore, the issue of 'small loan size' is inherently subjective and may be dependent on intended loan use.

Second, any sense of competition among MFIs may trigger an acquisitive signal, where potential clients approached by agents of new MFI institutions, may already belong to incumbent institutions. In certain cases, acquired loan amounts may be sufficient for a specific business, but the availability of credit can be irresistible for some, thereby creating an 'appeal effect' for clients who may borrow, either to set up additional businesses or for unproductive purposes. At this level, information asymmetries are heavily maximised by borrowers and lenders alike.

Therefore, contrary to the conventional view that small loan sizes create opportunities for multiple borrowing, the study suggests that any loan size may

engender the need for over-lapping, depending on whether the said amount is considered sufficient or whether there are incentivising avenues to be acquisitive. Therefore, the definition of 'small' is highly subjective and may be determined by both demand and supply factors. Institutions may therefore consider a detailed product and needs assessment, in order to establish the appropriate amount desired for a particular purpose in order to curb the growing cross-borrowing phenomenon. Hence, while institutions can monitor how their practices affect multiple borrowing, each loan size should be determined on its own merit.

Like the categorical loan amount, the marital status variable suggests a sizeable predictive power, but embeds a trade-off with the amount borrowed and returns on investment variables, since it is significant only under the first two estimations ($p < 0.05$). Compared to a client who has never married, being married increases the probability of multiple borrowing by 18 percentage points and 'not married' compared to 'never married' also increases the likelihood of multiple borrowing by 19 percentage points. Notwithstanding the sizeable effects in the first set of estimations, the variable drops in magnitude under model (4) and loses significance. Therefore, the foregoing seemingly suggests that the viability of the marital status variable in predicting multiple borrowing may depend on the amount borrowed and gains from investment.

Consistent with evidence from BIS (2010) and European Commission (2008), which suggest that being separated, divorced or widowed is positively associated with number of commitments, the study finds that 'not married', which is the equivalent of being separated, divorced or widowed also increases the propensity of overlapping. Insights from the different estimations suggest

that if a borrower is not married, compared to 'never married', then the probability of multiple borrowing will again depend on the amount of money borrowed.

The marital status variable only becomes statistically significant in the model with the loan amount variable; implying, that its response is sensitive to loan amounts. Therefore, a borrower's marital status per se, may not engender multiple borrowing without considering the amount borrowed. In a household where income pooling may not be the norm, indebtedness has a propensity of worsening. Similarly, a borrower who is 'not married' may, by virtue of the implied status, be over-burdened by financial responsibilities and engage in multiple borrowing. Hence, the economic significance of the marital status variable would depend on the pooling of resources between partners, which will also depend on their independent level of economic activity and the level of borrowing.

Overall, age increases the probability of multiple borrowing but the magnitude reduces with increasing levels of age. From Appendix C4 model (5), the estimate for the group aged between 18-24 (lower working age) is positive but not significant. However, the effect for borrowers aged between 25-49 (upper working age) increases to 17 percentage points and gains statistical significance ($p < 0.05$). For the pre-retirement age (50-59), the probability of multiple borrowing increases by 16 percentage points and is significant at the 0.05 percent level. The results of the two upper categories suggest that the probability of multiple borrowing reduces with increasing age.

The evidence suggests that borrowers between the ages of 18-24 do not have a statistically significant influence on multiple borrowing. Yet, for the

relatively economically active category of 25–49 years, classified as the ‘working group’, the probability of overlapping increases. According to the descriptive statistics, the mean age for borrowers is 46 years, which falls within this classification. A probable reason is the tendency for this group to be vibrant and enthusiastic and may be risk lovers, who take positive advantage of the availability of credit to engage in start-up projects or business expansion. Nevertheless, the risk may not yield the desired results, in an unfavourable economic environment. Therefore, both low profits and increased access may increase the probability of multiple borrowing for this group.

There is also a positive probability for the pre-retirement category (50–59 years), which has a significant effect. Borrowers in this category are within one standard deviation of the mean age, suggesting that they are active borrowers, but that the magnitude of effect reduces for this category. At this age, clients may be focussing on ensuring more economic stability and may engage in multiple borrowing, although not at the rate of the lower working age group. Overall, the study suggests that the magnitude of multiple borrowing reduces with increasing age. This finding is consistent with Khandker et al. (2013) who found that younger household heads are more likely to be indebted than older household-heads in the short run. In the long run, the preceding study suggests that age is not significant. This mixed effect will call for proper screening of any relevant factors apart from the age variable, in determining individual borrowers’ risk of engaging in multiple borrowing.

Location also increases the probability of multiple borrowing. The finding is consistent with the descriptive statistics that 52 percent of rural borrowers have multiple loans compared to 48 percent of urban clients. Thus,

compared to an urban borrower, living in the rural area increases the probability of multiple borrowing by 7 percentage points and the effect is highly significant at the 0.001 level. Nonetheless, the magnitude recorded in the first set of estimations is larger, compared to the effect from models (5) and (6) of Appendix C4. Upon the inclusion of the region variable, location loses viability in terms of both magnitude (22 percentage points) and significance (0.05). Since the rural or urban location of a borrower is influenced by specific regional attributes, it is unsurprising that regional characteristics account for part of the effect of the location variable.

The fact that residing in a rural area raises the probability of multiple borrowing may not be a surprising one. This outcome is consistent with Johnson and Meka's (2010) descriptive evidence that a higher proportion of rural borrowers engage in multiple borrowing. The finding is also consistent with evidence that deprivation of borrowers may lead to multiple card ownership in advanced economies (BIS, 2010). According to the study, 'deprivation' refers to people on low incomes who live in socially rented houses in deprived areas. A fact associated with the above evidence is the average low incomes of the rural poor in Ghana. Predominant agricultural activities characterise the low-income levels of rural communities. While there are pockets of deprived areas in urban localities, poverty in the rural areas may underlie the trend of multiple borrowing, which could exacerbate their vulnerability and trigger a debt trap.

Interpretation of the positive influence of a rural location will depend on the characteristics of borrowers in the locality and impinge on whether borrowing is engendered by demand, supply or external factors. On average, rural households may have low income and larger household sizes and these

may serve as pull factors. Given such conditions, some proportion of borrowing may be absorbed into household expenditure. Hence, the positive effect of household expenditure, as suggested by this study, may be relevant to this analysis. When uncontrolled, indebted households' expenditure to cater for family commitments may cause greater indebtedness. In Tanzania, Mpagole et al. (2012) found family commitments to increase overlapping whereas BIS (2010) suggests that number of dependants contribute to multiple borrowing, which in the context of this study, may be relatively high for rural borrowers compared to urban households. Therefore, such intrinsic characteristics of rural communities, and of rural borrowers themselves, may trigger the need to overlap.

For rural borrowers, loan size is a significant supply factor since their small ventures and nature of economic activities may not enable them to acquire the desired loan amount. Product mis-match may cause diminishing returns to small investments, which may struggle to survive in an economically deprived area. Consequently, repayment pressures will encourage borrowing from other sources. Furthermore, in an intense environment of financial growth, access to credit becomes uncomplicated to the productive as well as the non-productive poor. Based on reasons of either small loans or the effortless access to credit, rural borrowers on low incomes may succumb to the pressure of borrowing and increase indebtedness.

Imbalances in the external environment may cause shocks to income. Harsh climatic conditions and a decline in the general economic environment might cause unexpected crop and business failure. These conditions can trigger the sometimes only available alternative to escaping the humiliation of

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defaulting - borrowing from one MFI to pay another (O'Loughlin, 2006). In terms of location, rural areas may be more vulnerable due to their characteristics. Therefore, more coordination will be required on the part of the lenders to offset any major risks to their portfolios and to the livelihoods of their borrowers.

On the effect of gender, the propensity of multiple borrowing for a female-headed household increases by 7 percentage points compared to a male-headed counterpart. This effect is significant at 0.05 percent level. The result suggests that there is a statistically significant difference in the probability of multiple borrowing between males and females. In the literature, Khandker et al. (2013) found the reverse of the study's finding, where male-headed households are more indebted. However, the emphasis is on time difference. The indebtedness of male-headed households is only possible in the short run and not in the long run. This may imply that in the long run, male-headed households may not be indebted, which could be consistent with the study's result that female-headed households are more indebted.

In the consumer finance industry, BIS (2010) suggests that number of commitments are higher for women, which is consistent with the study's finding. In the advanced economies, highly indebted women are, on average, more likely to be single parents who have access to state benefits. In contrast, female-heads in this context may not be necessarily single and may not have access to welfare assistance; they are enterprising women who provide enormous support to the sustenance of the household.

Traditionally, men are more likely to be regarded as household heads, irrespective of their comparatively low economic contribution to household

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finances. Yet, whether single or otherwise, females with dependants have a tendency to assume responsibility to provide for the household. Therefore, on average, women who borrow are resourceful but given their intense operations in the informal sector, the unpredictability of incomes and the levels of household responsibilities, they can be over-burdened by financial responsibilities and therefore resort to multiple borrowing.

From the estimations, household expenditure has a positive effect on multiple borrowing. However, the effect is almost negligible at 0.042 percentage points and is significant at 0.1 percent level under model (3). One notable difference is that the significance of the expenditure variable improves under model (4) which incorporates the categorical loan size and gains an infinitesimal difference in the magnitude of effect (0.050; $p < 0.05$). This presupposes that the very low but predictive ability of household expenditure depends on the actual amount borrowed.

The effect of household expenditure could imply that the variable will impact on multiple borrowing based on the loan size. Especially, where the loan is utilised for intended purpose and yields a significant return on investment, the propensity of household expenditure to drive over-indebtedness may be extremely small, as suggested, since expenditures could be catered for from business profits. Another interesting insight from the data is that, on average, microfinance clients are not poor, indicating their ability to survive, albeit without persistent struggles. Hence, expenditure levels may not impact on borrowing amounts unless this element becomes excessive and begins to corrode available capital. Therefore, where amount received is commensurate with intended purpose, and provides the necessary gains, levels of household

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expenditure may not drastically dissipate borrowing, to cause the need for overlapping.

The regional variable, which controls for supply-side factors and wider external characteristics produces mixed effects of multiple borrowing. Of the ten dummies, Greater Accra region is used as the base category in tune with the Ghana Statistical Service standard. Overall, seven regions exhibited no significant effect on multiple borrowing. These include the positive effects of Western, Ashanti and Northern regions and the negative effects registered by Central, Eastern, Upper East and Upper West regions. On the other hand, two regions have a statistically significant effect. One increases the probability of overlapping and the other reduces the likelihood. In the Volta Region, a client's probability of multiple borrowing increases by 28 percentage points and this prediction is strongly significant ($p < 0.001$). Clients in the Brong-Ahafo region are less likely to engage in multiple borrowing at a magnitude of 30 percentage points ($p < 0.01$).

In the literature, multiple borrowing is predicated on the concentration of institutions in an area. The situation usually develops because MFIs initially choose to locate in economically viable regions before venturing to other more promising and less competitive areas. With Greater Accra as the base reference, the Ashanti region, which has the second largest concentration, has a positive likelihood of multiple borrowing but is not statistically significant.

On the other hand, the Central Region, with the next highest concentration of MFIs, has a negative effect on the probability of multiple borrowing and is also not significant. The foregoing may indicate, that these regions, although having a larger number of institutions, have not reached

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saturation points compared to existing population or the risk-taking capacity of businesses in the specific regions. One reason why the Central Region has a higher number of institutions but is negatively correlated with multiple borrowing may be due to the very low level of economic activity compared to the Ashanti region. Likewise, the Eastern region records the next largest number of institutions and is negatively related to multiple borrowing, but is not significant.

The Volta Region ranked seventh in terms of institutional density but has a strongly significant effect of 28 percentage points. According to the GLSS 6, Volta Region is placed fourth on the poverty incidence league table. Hence, clients' low incomes may be creating a cycle of borrowing; probably, for loan repayment if economic activities of the region do not support business viability. Conversely, the positive effect of Brong-Ahafo region is strongly significant and the increasing move from agriculture to the non-agricultural sector may account for rising incomes, which reduce the probability of multiple borrowing.

From the above mixed results, factors apart from the number of institutions, may account for the increased tendency of multiple borrowing in the identified region. It is plausible that, if borrowers receive insufficient loans from a small number of institutions, they might resort to multiple borrowing. The same assertion cannot be attributed to the few numbers of institutions in the Upper West and Upper East regions, which have a less likely effect to engender multiple borrowing, although the effect is not significant. Therefore, individual regional characteristics may account for the differences in the results obtained.

Among the control variables, returns on investment reduces the probability of multiple borrowing. This effect, is extremely small at 0.04

percentage points and almost negligible. Yet, the effect is statistically significant at the 0.05 percent level. While the findings suggest that returns on investment is important in reducing the probability of multiple borrowing, the extremely small effect may be due to the sample size.

The outcome is consistent with the study by Khandker et al. (2013) who found that a low return to micro-investment has a significant effect on multiple borrowing and creates a cycle of debt dependency. Profits from micro-investments is a key driver in determining the positive effects of borrowing. For the majority of borrowers, the prevailing economic condition is a significant factor in driving business success. Hence, in an environment of economic slow-down, businesses may suffer and consequently affect profitability; particularly, in a highly informal economy, where some sectors may be more productive than others. Therefore, it is incumbent on lenders to critically assess the types of investments which are more likely to succeed and to grant credit accordingly. In the midst of sustained penetration, such assessments may only be feasible in principle, but impracticable amidst the overarching profit-maximising supremacy. However, to ensure the sustainability of the industry, tighter and stricter business evaluations might be necessary, to safeguard both lenders and borrowers against risks.

This section presented the results and discussion on the drivers of multiple borrowing. The results suggest that amount borrowed, marital status, upper working age (25-49), female-headed households, rural location and household expenditure are more likely to engender multiple borrowing. Expectedly, returns on investment reduces the likelihood of over-lapping. On the other hand, employment status, education, household size, lower working

age (18-24) and illness are not significant in determining the probability of multiple borrowing. The results provide new insights on drivers of multiple borrowing in the sub-Saharan African region.

Prevalence of Multiple Borrowing

Overall, the prevalence of multiple borrowing in the microfinance market is approximately 35 percent, as depicted in the left section of Figure 4. Hence, more than a third of borrowers have two or more loans from the same or different provider. The right-hand pie chart provides a break-down of the actual percentages according to the number of loans taken. Single borrowing is the dominant activity which is estimated at 65 percent. Approximately 15 percent have two loans, 5 percent possess three loans and 15 percent have four or more loans.

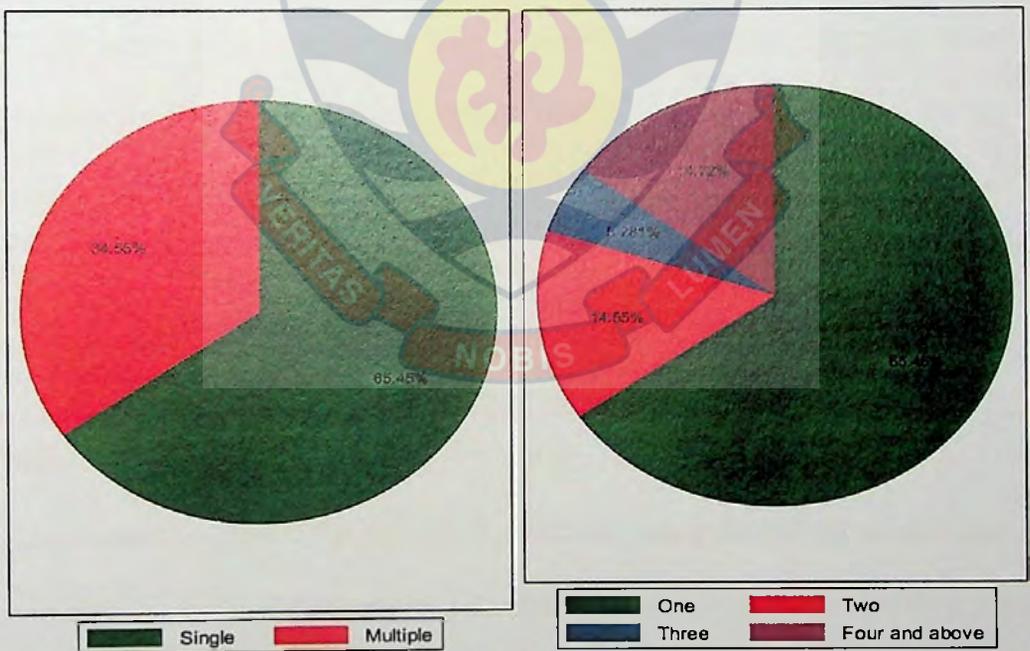


Figure 4: Incidence of multiple borrowing in the MFI Market (Source: Author)

The study suggests that 35 percent of borrowers in the microfinance industry have multiple loans. This estimate is consistent with incidence of 40-

60 percent in Bangladesh (Khalily & Faridi, 2011), and 20-40 percent in moderate parts of India (Krishnaswamy, 2007). Although, the Ghanaian microfinance market is unsaturated and not currently leaning towards the nature of crises witnessed elsewhere, the estimate is tangential to figures recorded for India which had experienced levels of saturation. Therefore, it may be justifiable to assert that in a crisis-free market, if a third of borrowers already engage in multiple borrowing, then, the situation may potentially translate into a portentous risk.

The above evidence confirms the introductory assertion that multiple borrowing is a significant problem and can lead to the disruption of the microfinance industry; hence, the need to ascertain its prevalence. In spite of the prevailing relative calm, the country has experienced its own turmoil within the industry. Disruptions caused by the DKM Microfinance incident (Quist, 2016), together with the proactive intervention by Bank of Ghana to close down seventy microfinance institutions (“Bank of Ghana revokes licenses”, 2016), portray how an uncontrolled lending and lax supervision may effortlessly lead to a chaotic and potentially risky environment for institutions and a life-changing experience for affected clients.

Predicted probabilities of multiple borrowing

Figure 5 depicts the distribution of predicted probabilities of multiple borrowing from the ordinal probit estimation which gives the probability for each observation. Since the focus is on the distribution, results of the ordinal analysis are not presented. Hence, the figure shows the distributions for the four levels of borrowing, labelled as ‘Single’ for borrowers with one loan, up to ‘Fourplus’ indicating the intensity of multiple borrowing. The predicted

probability of clients with multiple loans falls between 5 and 25 percent for clients borrowing two to four loans. For clients with four loans and above, it peaks at 35 percent. According to the distribution, clients with single loans have between 60 to 75 percent predicted probability.

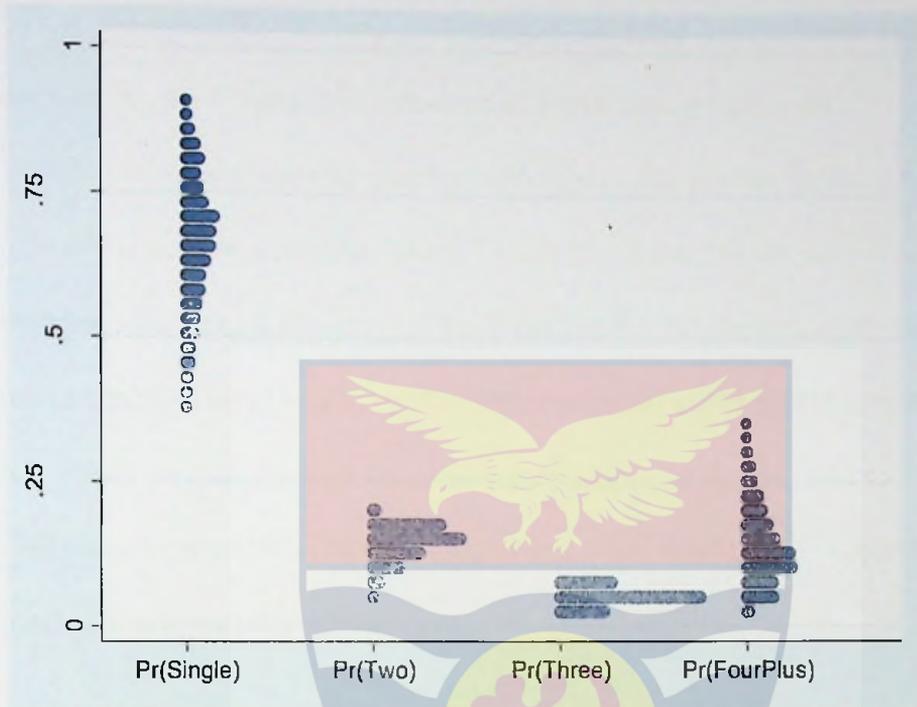


Figure 5: Distribution of predicted probabilities (Source: Author)

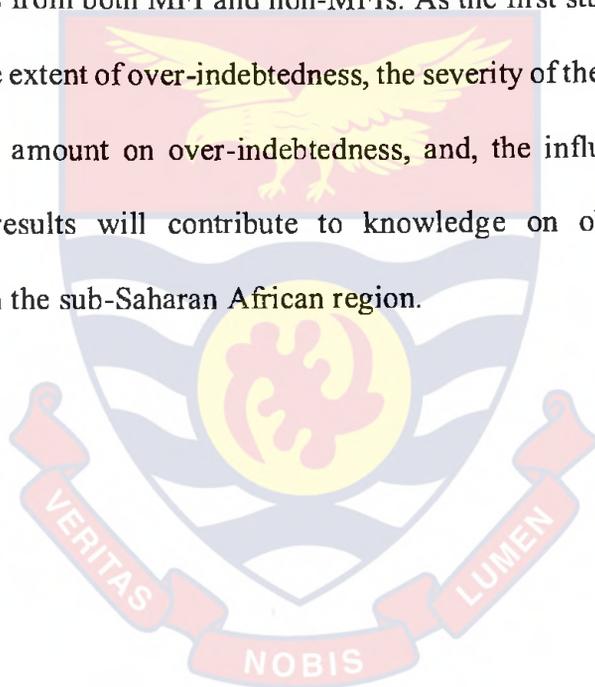
Chapter Summary

This chapter presented results and discussion of the effect of institutional density and the type of institution on the probability of multiple borrowing. The interaction effect of location and institutional density has a positive effect on multiple borrowing and the relationship highlights the vulnerability of rural borrowers. On the effect of the density of MFIs distinguished by type of institution, current operational practices of FNGOs may exacerbate the probability of multiple borrowing.

The investigation was complemented by results of the drivers of multiple borrowing and its prevalence. The study suggests that a borrower's

loan size, upper working age (25-49), female-headed households and a rural location, are the major drivers of the phenomenon, whereas returns to investment was found to reduce the probability of multiple borrowing. From the analysis, 35 percent of microfinance clients are engaged in multiple borrowing. Given the statistics, it may increasingly become an ominous problem, if unchecked; since more than one-third of borrowers are affected.

The next empirical chapter investigates the crucial issue of household over-indebtedness, using the Ghana Living Standards Survey data. The analysis encapsulates loans from both MFI and non-MFIs. As the first study of its kind, it will establish the extent of over-indebtedness, the severity of the phenomenon, the effect of loan amount on over-indebtedness, and, the influence of other predictors. The results will contribute to knowledge on objective over-indebtedness from the sub-Saharan African region.



CHAPTER SEVEN

LOAN AMOUNT AND OVER-INDEBTEDNESS OF HOUSEHOLD BORROWERS

Introduction

This chapter investigates over-indebtedness of household borrowers. As a first study on objective-burden over-indebtedness, it focuses on total borrowing in the microfinance and traditional banking sectors. To date, the effect of indebtedness on Ghanaian household borrowers is unknown. The chapter tests two main hypotheses: (1) a single loan amount has no significant effect on over-indebtedness, and (2) larger loan amounts have no significant effect on the intensity of over-indebtedness. It also identifies the drivers of over-indebtedness and the prevalence of the phenomenon from an objective perspective. Yet, to accurately investigate these issues of over-indebtedness, an effective indicator should be applied. Hence, a successful undertaking of the second objective of this thesis will depend on the quality of the indicator employed.

In measuring over-indebtedness, the use of debt-service ratios (DSR) is fraught with a major challenge. Evidently, arbitrary cut-off points have been a source of limitation and criticism as highlighted in the problem statement. This defect, notwithstanding, debt service indicators continue to be used and are vital in measuring the repayment burden encountered by borrowers (European Commission, 2008; Khandker et al., 2013; Liv, 2013). It is therefore essential that the indicator is improved to ensure its legitimacy, robustness and precision in estimating repayment challenges. One essential significance of this study, is its contribution to the measurement of the objective-burden indicator. It

improves on the arbitrariness of cut-off points used to establish the thresholds at which borrowers are considered over-indebted.

The study uses the GLSS6, a national survey data, which allows for the analysis of household over-indebtedness. Total sample size is 1,295 and encapsulates total household borrowing in Ghana. While the primordial interest is on loan size, the GLSS6 does not solicit for information on the adequacy of loans granted to borrowers. Nevertheless, to facilitate the urgent analysis of over-indebtedness, the loan amount is categorised to examine the effects of different sizes of borrowing. Logit and ordinal logit estimation techniques are employed for the analysis.

The chapter is structured as follows: The second section addresses perceived shortcomings in the measurement of over-indebtedness and provides a derivation of the novel cut-off points. Using the objective thresholds for the indebtedness index, the third section presents the prevalence and intensity of over-indebtedness followed by the descriptive statistics. The fifth and sixth sections present results and discussion for the two hypotheses. The drivers of over-indebtedness are submitted in the seventh section and the last section contains the chapter summary.

Over-Indebtedness Threshold Derivation: A Novel Approach

As highlighted in the literature review, over-indebtedness is a dynamic and multi-dimensional concept and attempts at an overarching definition is hampered by intense heterogeneity. With such complexities, there is no acclaimed definition in the literature. The authors, Betti et al. (2007) clearly project this disharmony, by emphasising that there is neither a unanimous definition, nor an agreed measurement. It is reiterated for the purpose of this

derivation, that researchers adopt a particular definition based on their interest, purpose and perspective (Liv, 2013). Furthermore, a European-wide definition was based on expert opinion on what is 'relevant and operational' (European Commission, 2008, p.6). Therefore, an attempt to estimate the prevalence of the phenomenon should ideally be based on a definition which accurately fits its context.

Earlier in the empirical literature review, examples of definitions in applied work were highlighted. Among available options, the closest definition compatible with the research objective is the Austrian definition provided by the European Commission 2008 report. The Austrian Counselling Agency IFS-debt (IFS Schuldnerberatung) defines over-indebtedness as follows: "Individuals or households can be regarded as over-indebted if after deduction of current cost of living expenses like food, clothes, rent, social and cultural needs/requirements, they are not able to discharge all payment obligations" (p.34).

The above definition, though relevant, focuses on borrowers meeting expenses ahead of payment obligations. However, this definition, appropriate for the welfare of borrowers, may encourage 'opportunistic unwillingness to repay' (Gonzalez, 2008); particularly, in environments where borrowers uncommitted to repayments, may be not be emotionally or psychologically affected by persistent defaults or bankruptcies. The usefulness of the definition in the Austrian context could be attributed to the explanation that, in developed countries, procedures for dealing with bankruptcies are formalised and private. In contrast, cases of defaults and asset seizures for ordinary household borrowers may be public knowledge in developing countries and attract

stigmatisation or public ridicule, which may result in an enormous social cost.

The following sub-section presents a justification for the novel approach, based on pragmatic and relevant contextual factors.

A working definition of over-indebtedness

In contrast to the issue of meeting essential living expenses before repayments, as adopted by the Austrian definition, data used for the study upholds a more favoured position - borrowers are already honouring repayment commitments. However, these payments may not always be made, subsequent to satisfying essential household needs. Any commitment to meeting debt obligations is positive for financial sustainability of lending institutions and also for borrowers' own credibility and future borrowing opportunities. Therefore, the Austrian definition is transposed to reflect repayments ahead of expenses. Hence, the working definition derived for the study is:

“Individuals or households can be regarded as over-indebted, if, after discharging payment obligations, they are unable to meet current basic cost of living expenses like food, clothes, rent, utilities, education, health, and transportation requirements”.

The above definition is consistent with other studies on over-indebtedness and support reasons to adapt to contextual differences in environments, where a generic medium of assessment might not reflect and elicit the true vulnerabilities of households, especially in developing countries.

The debt-service ratio: a contextual measurement

This study uses data from GLSS6 to present a framework where cut-off points for determining over-indebtedness thresholds are no longer arbitrary, but

factual, and depend on the components of household expenditure necessary for meeting a borrower's minimum household needs. Appendix D1 is a replica of the GLSS6 average annual household per capita expenditure, classified in accordance with the UN Statistical System, which categorises individual consumption according to purpose. The table presents the classification of household expenditure into food (food and non-alcoholic beverages) and non-food components. According to the GLSS6 main report, the non-food component comprises expenditure on alcoholic beverages, tobacco and narcotics; clothing and footwear; housing, water, electricity, gas and other utilities; health, education, recreation, personal care and durable goods.

Using data from Appendix D1, I derive a scientific basis for the over-indebtedness thresholds. A crucial feature of the over-indebtedness definition is the element of borrowers' 'standard of living'. In determining the 'standard of living' appropriate for the study, the researcher employs the basic needs concept. The ILO report for the 1976 World Employment Conference defined basic needs in terms of food, clothing, housing, education, healthcare and public transportation. Elements of the basic needs expenditure are therefore restricted to the ILO definition.

From the data, the total of average annual household per capita expenditure is GHS 9,466, of which 45.8 percent is spent on food, representing GHS 3,673. The food component includes expenditure on non-alcoholic beverages and it is acknowledged that this element may not be considered a basic need in a developing country, even though it may be a norm for average households in advanced economies. However, the data does not allow for a disaggregation of the explicit cost and the imputed component symbolises an

occasional accompaniment, whose percentage may fail to significantly augment the overall food contribution, for the majority of borrowers. Moreover, the price of such beverages could either equate or contribute towards the cost of the next meal and may, therefore, not represent an optimal economic decision for ordinary households to spend any significant proportion of the food component on non-alcoholic beverages.

Expenditure on non-food items is GHS 5,793, representing 54.2 percent of total household expenditure. Based on the ILO specification, Appendix D2 shows a hierarchy of household expenditure, created with corresponding percentage distributions, to determine the total cost of basic needs and the associated cut-off point, where households may not be considered over-indebted. Above this threshold, the table shows additional components of household expenditure, which are sacrificed for repayments, and how this translates into the different thresholds of over-indebtedness.

Using the percentage distributions presented under column (3) of Appendix D2, comprising food; health; education; housing, water, electricity, gas; clothing and footwear; and transportation, the percentage of total household expenditure reflecting households' basic needs is estimated. From the computations, the total for the components enumerated above is 82.5 percent, as indicated in the row for 'Total Basic Consumption Expenditure'. It is also vitally important that, in attempting to compute the basic standard of living for borrowers, the distribution of poverty is captured. In Ghana, poverty is a rural phenomenon (GSS, 2014). Therefore, given the uncertainties faced by rural households, any measurement of over-indebtedness should account for

conditions in the rural areas to reflect an index, which is not only realistic, but also sensitive to the vulnerable.

According to the report, rural households spend 55 percent of their expenditure on food (GSS, 2014), about 4.2 percentage points more than the national average (45.8%). Additionally, the report stresses that there is no significant variation in this percentage across the regions, thereby giving justification to the consideration of the rural percentage as a significant factor in this context. Furthermore, borrowers in the lowest quintile, who are more likely to be affected by the burden of over-indebtedness, spend over 56 percent of their budget on food (GSS, 2014). Hence, the rural proportion for food consumption is factored into the analysis.

Using the 55 percent statistic, the total household expenditure, which assures a minimum standard of living for a borrower in the rural area is 91.7 percent, as shown in Column (4). The difference between the national average of minimum basic expenditure (82.5%) and that accounting for the peculiar circumstance of the rural area is evident. Thus, if borrowers are to meet essential cost of living expenses ahead of repayments, then, for rural residents, the residual income that will be available for debt-servicing is less than 10 percent (9.3%), reflecting low income levels in the rural areas.

Factoring in the rural basic expenditure proportion of 91.7 percent, an average estimate is computed for the general and rural percentages. This gives an overall basic consumption expenditure of 87.1 percent (Row 8 of Columns 3 and 4). Therefore, the difference between total income (100%) and the percentage spent on basic needs (87.1%) is 12.9 percent. Hence, in the Ghanaian context, the critical threshold (income remaining after the deduction of

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minimum household expenses) above which borrowers make sacrifices to repay debts, and below which debts servicing is containable, is approximately 13 percent.

But how does this compare with thresholds in the literature? When considering cut-off limits for Italy, D'Alessio and Iezzi (2013) argue that the rate could be as low as 25 percent in the case of unsecured loans. On the contrary, the IMF (2013) report on Brazil asserts that debt service ratios of 23 percent are associated with some fragilities. Hence, since household wealth and social safety nets may be more limited, in emerging (Brazil) than in advanced economies, the threshold for financial stress could also be lower, especially at lower income levels. Therefore, to show some sensitivity, although arbitrary, Khandker et al. (2013) use 20 percent for the lowest threshold.

With an argument for the threshold to be lower in emerging countries, it is justifiable to expect that it could even be lower in developing or middle-income countries as rightly depicted by the above derivation. Consequently, a 13 percent threshold computed from a national survey on living standards is credible, pragmatic and consistent with literature. Interestingly, in an attempt to further differentiate between the objective-burden indicators, D'Alessio and Iezzi (2013) also employ an arbitrary cut-off point of 15 percent for borrowers of non-collateralised loans (p.17), showing sensitivity to associated higher borrowing costs for such types of loans.

Earlier in the analysis, it was highlighted that the non-alcoholic component of the food expenditure could not be disaggregated. To counteract a possible deflationary tendency of this component, a 2 percent allowance is made to restrict the food component to food expenses only. This results in an over-

indebtedness cut-off point of 15 percent, up from the initial 13 percent. While the objective is to have a realistic and relevant threshold, the 15 percent level also facilitates ease of comparability with existing literature.

Column 6 of Appendix D2 is used to create a taxonomy of over-indebtedness as presented in Figure 6, which shows a gradation of over-indebtedness, reflecting the proportion of income (POI) committed to loan repayments as explained below.

- *A borrower spending less than 15 percent of income on repayment is not sacrificing basic needs expenditures to repay debts and classified as “not over-indebted”*
- *A borrower spending between 15 and 30 percent of income on repayment is sacrificing on clothing, footwear and transportation expenditures and is considered to be “moderately over-indebted”*
- *A borrower spending between 30 to 55 percent of income on repayments sacrifices expenditure on health, education, housing, water, electricity and gas. Borrowers in this category experience an intensification of sacrifices over categories C and D and are described as “over-indebted/fully over-indebted”*
- *A borrower spending between 55-100 percent on repayments sacrifices on food. Due to the extremities involved in the nature of the sacrifice, borrowers in category A are constituted as “severely over-indebted.”*

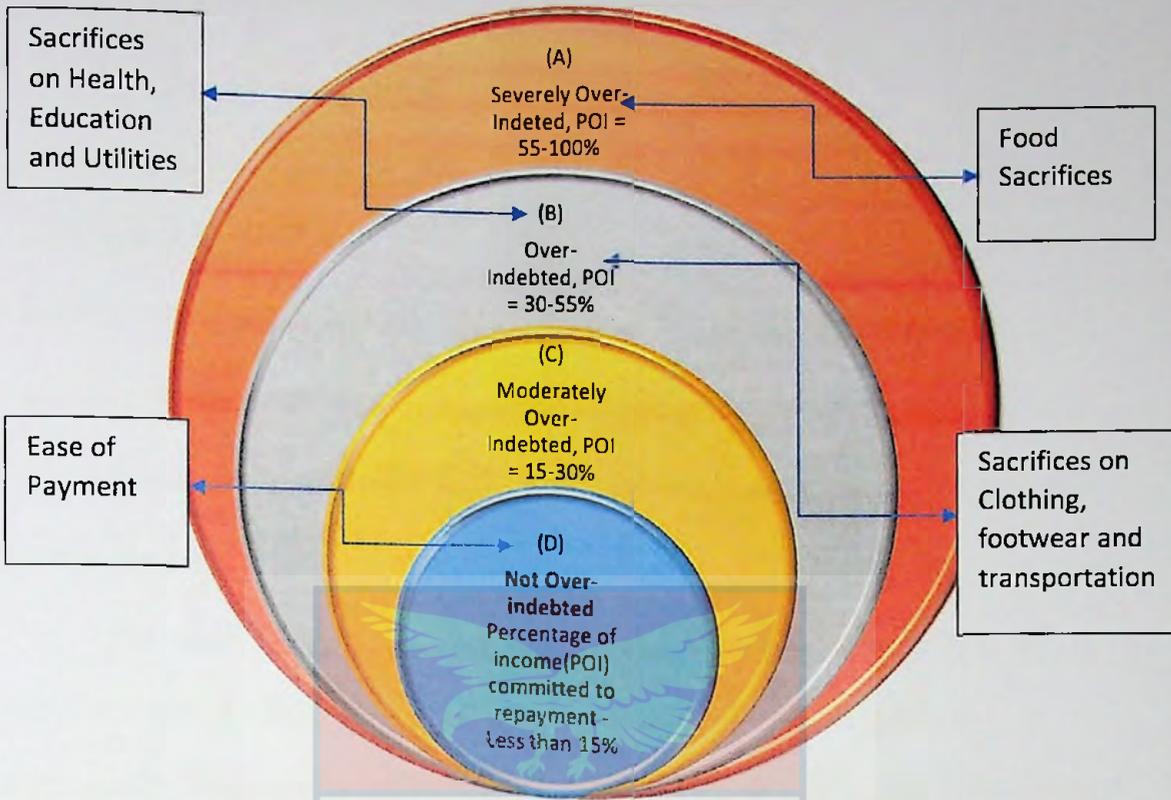


Figure 6: Objective cut-off points for the debt-service indicator
Source: Author

Table 3 compares thresholds from a study on over-indebtedness in column A with the derived thresholds in column B. These cut-offs do not show marked variations even though the computed thresholds are realistic, objective and contextual. From the literature, 'indebtedness' simply refers to the use of credit (Betti et al., 2007). It is emphasised, that once a threshold at which a borrower is considered over-indebted is specified, either arbitrarily or based on a practical measure, as derived in this study, any borrower above that threshold could be considered over-indebted, and higher percentages of the DSR will signify intensifying levels of over-indebtedness.

Table 3: *Threshold Comparison*

A	B
(Bangladesh)	(Ghana)
Arbitrary (Khandker et al., 2013)	Objective and Contextual
Less than 20% = Not indebted	Less than 15% = Not (over)indebted
20-40% = Moderately indebted	15-30% = Moderately (over)indebted
40-60% = Over-indebted	30-55% = Fully over-indebted
60+ = Severely indebted	55+ = Severely (over)indebted

Source: Author

The adopted measure of indebtedness by Khandker et al. (2013) is consistent with the derived DSR index and the two sets of thresholds may be conceptually comparable based on the following reason. Once a loan is contracted, a client becomes indebted, and the indebtedness index, which measures the proportion of income committed to debt servicing is used as an objective measure of over-indebtedness. However, a cut-off point is required to make this distinction. For the two studies, the initial cut-off point on the indebtedness index are set at 20 percent and 15 percent respectively. However, the extent of percentages of income committed to repayment will determine the intensity of over-indebtedness (Maurer & Pytkowska, 2010).

For the above reason, it may be of a particular interest to set this threshold at a higher DSR. In the case of Khandker et al. (2013) for example, the threshold for (over)indebtedness is set from 40-60 percent which corroborates with this study's derived threshold of full over-indebtedness (30-55 percent). Hence, using 'Not indebted' to refer to a borrower, who has contracted a loan and commits less than 20 percent of income to service the debt

is rather conflicting for the purposes of analysing indebtedness and over-indebtedness issues. Therefore, using either a subtle ‘indebtedness’ or an explicit ‘over-indebtedness’ to refer to challenges with the use of credit is a matter of purpose or interest.

While the aim is not to create a “gold standard” for the measure of the DSR, the efficacy of the derived indicator is inherent in its cardinal properties of sensitivity to borrowers’ livelihoods and specificity to their environment. Hence, the objective method of deriving the thresholds provides more meaning and precision over the arbitrary approach.

Prevalence and Intensity of Over-Indebtedness

According to the objective-burden indicator, 28.7 percent of households are over-indebted, meaning that they commit over 15 percent of their monthly income towards repayment. Within the sample, the DSR indicate that about one in eight (13.8 percent) spend more than 15 percent of their income to service their loans. These borrowers are classified as moderately over-indebted. Approximately one in fourteen (6.7 percent) spend more than 30 percent and are considered over-indebted and one in fourteen (8.2 percent) spend over 55 percent of their income on repayments. Borrowers who fall into this category are classified as severely over-indebted. Figure 7 shows the overall distribution of over-indebtedness.

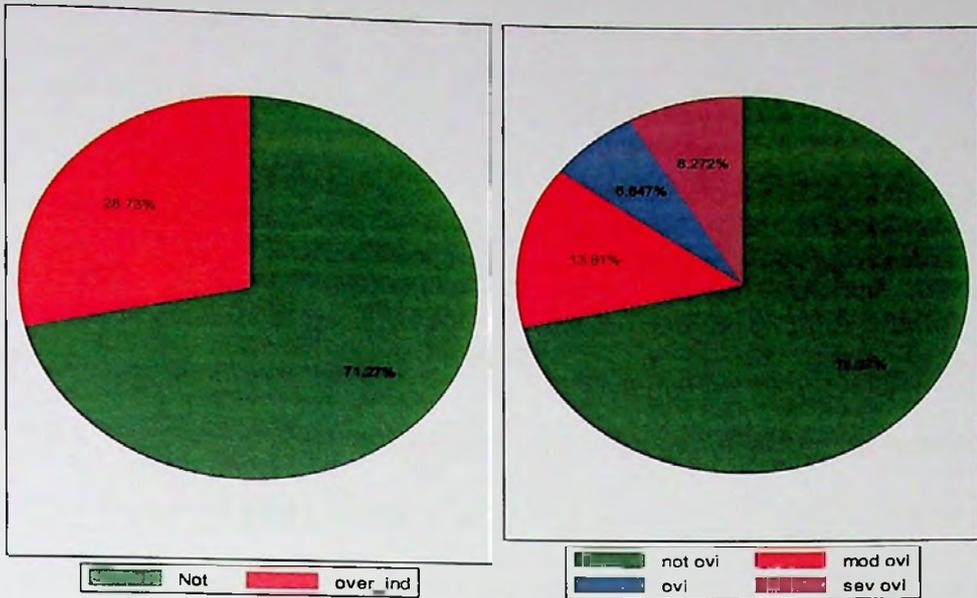


Figure 7: Distribution of Over-indebtedness (Source: Author)

The preceding section presented a rationale for developing an objective threshold for the measurement of over-indebtedness. It has explained the source of the data and presented the necessary components used in deriving the threshold. Based on the statistics, the critical cut-off point is estimated at 15 percent. Subsequently, the prevalence of over-indebtedness from the descriptive statistics is also estimated at 28.7 percent. The objectively sensitive threshold grants precision and robustness to the debt-service ratio used in the analyses.

Sensitivity analysis

In the methodology, it was highlighted that due to the new over-indebtedness index applied, it is necessary to use an existing index to detect any influence on the outcome variable. Using the initial cut off point of 20 percent by Khandker et al. (2013), the results suggest that the over-indebtedness prevalence is 24 percent and not-over-indebted borrowers constitute 76 percent. The indebtedness statistic is therefore not markedly different from the evidence-

based cut-off point of 15 percent, which reflects the real basic consumption expenditure to be met ahead of repayment obligations.

Descriptive Statistics

This section presents results for the summary statistics of the quantitative variables presented in Table 4, followed by a cross tabulation between over-indebtedness and the control variables. Although, the empirical analysis focuses on total household borrowing, ancillary descriptive statistics of Table 5 are presented for borrowing between MFIs and Non-MFIs to aid the discussion, where relevant.

Table 4: *Summary Statistics of Quantitative Variables*

Variable	Mean	Std. Dev.	Min	Max
Loan Amount	1388.58	1909.57	10	10000
Age	45	15	15	99
Household Size	4	2.7	1	29
Household Expenditure	8108.86	7587.05	31.2	146345.4
Assets	14472.13	872156.10	200	110000
<i>N</i> = 1,295				

Source: Author

A Pearson chi-square analysis is conducted for the relationship between loan amount and over-indebtedness. This investigation indicates a strongly significant relationship between over-indebtedness and loan amount ($p < 0.001$). The data shows that only 3 percent of borrowers with outstanding debts below GHS 100 are over-indebted. The frequency increases to 7 percent for borrowers with debts of GHS 101-300; 10 percent for those borrowing GHS 301-500, and

22 percent for those borrowing GHS 501-1000, and increases sharply to 58 percent for those borrowing above GHS 1000.

Gender is also significantly related to over-indebtedness ($p < 0.05$). Male-headed households are almost twice as over-indebted as female-headed households. The proportions are 64 percent and 36 percent respectively. The difference is significant at 0.05 percent.

The relationship between over-indebtedness and number of working adults in the household is also statistically significant. The distribution of over-indebtedness for single adult households is 43.6 percent and reduces gradually to no incidence of over-indebtedness from a 13-member household and above ($p < 0.001$).

A cross-tabulation for education indicates that the highest distribution of over-indebted borrowers falls into the JSS/MSLC category, with 37.5 percent ($p < 0.001$), followed by clients with no education at 23.9 percent. Borrowers with tertiary education have the second highest distribution of over-indebtedness at 28.2 percent, and the lowest distribution is recorded in the SSS category (10.2%).

Statistics on employment status reveal that the highest distribution for over-indebted borrowers are self-employed clients in the non-agricultural sector with a distribution of 33.9 percent. Public sector employees account for the next highest distribution of 26.7 percent, followed by clients who are self-employed in the agricultural sector (19.8%). Private sector employees have a distribution of 12.3 percent and borrowers, who are currently unemployed or retired constitute 2.1 percent and 1.5 percent respectively.

indebtedness is an urban condition (60.9%) compared to 39.1 percent for rural households. The relationship between location and over-indebtedness is strongly significant ($p < 0.001$).

Over-indebtedness has a significant relationship with the region variable and is statistically significant at 0.05 level. Western Region has the highest distribution of over-indebted borrowers (16%). Ashanti Region follows with 13 percent and is closely matched by the Eastern and Brong-Ahafo Regions. The three northern regions have the lowest distribution of over-indebted borrowers.

Borrowing in the MFI and non-MFI sectors

Table 5 depicts borrowing frequencies in the microfinance and traditional banking sectors. Generally, the distribution does not show much variation except for the lowest and highest category of borrowing, which reveal interesting insights for both the traditional sector and the microfinance industry. The descriptive statistics suggest that the depth of outreach is higher for Non-MFIs compared to MFIs. On the other hand, MFIs lend more loans in the highest category than their traditional counterparts.

Table 5: *Distribution of Borrowing in the Non-MFI and MFI Sectors*

Loan Amount	Non-MFI	MFI	Total
GHS 10 - GHS 100	162	59	221
GHS 101 -GHS 300	144	104	248
GHS 301- GHS 500	87	89	176
GHS 501 - GHS 1000	119	137	256
GHS 1001 and Above	195	248	443
Total	707	637	1344

Source (Author)

borrowers in the MFI and non-MFI sectors. As evident from the graph, the two groups of institutions are lending larger amounts to borrowers with higher education.

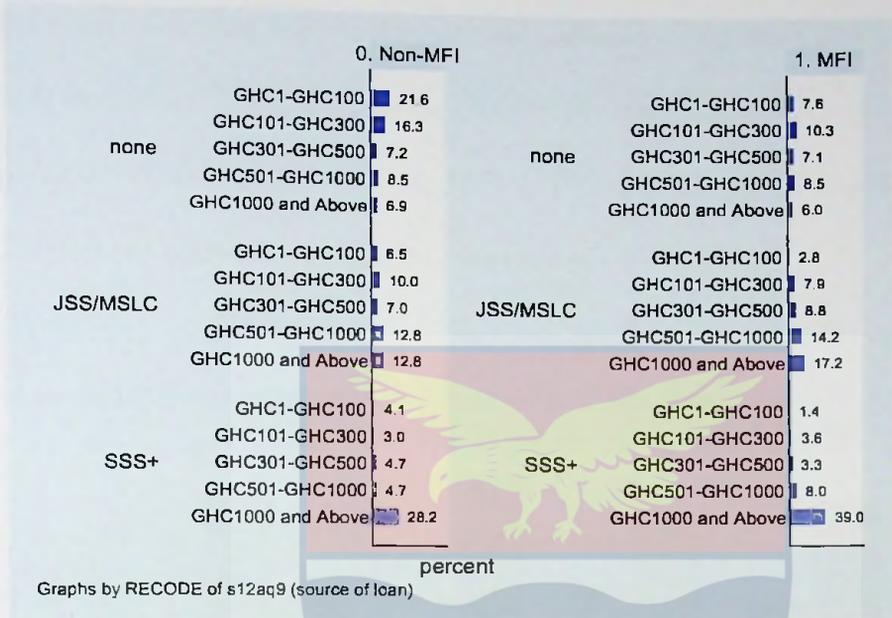


Figure 8: Financial institution and educational background of borrowers (Source: Author)

Currently, the outcome for MFIs may be unsurprising. In the MFI sector, 39 percent of lending is offered to borrowers with SSS education or higher, compared to 28 percent for non-MFIs. The sector leads its mainstream counterpart by 11 percent for borrowers in this category. On the contrary, non-MFIs are lending to more clients in the low or no education bracket. At the lowest category, MFIs lend to only 7.6 percent compared to 21.6 percent for non-MFIs. Overall, the percentages offered as loans in the highest categories of individual levels of education provide evidence to support the suspected convergence in the sectors, since MFIs have suggestively outpaced Non-MFIs in terms of borrowing amounts.

One striking observation from the data is over-indebtedness in the MFI and Non-MFI sectors. The contingency analysis suggests that borrowers in the MFI sector are more over-indebted than those in the non-MFI sector (58% compared to 42%). For the moderately over-indebted group, 61 percent of borrowers from the MFI sector are over-indebted compared to 39 percent for MFI borrowers. In the severely over-indebted category, there is a noticeable 14 percent difference between the MFI (57%) and Non-MFI (43%) sectors. Differences within the categories are presented in Figure 9.

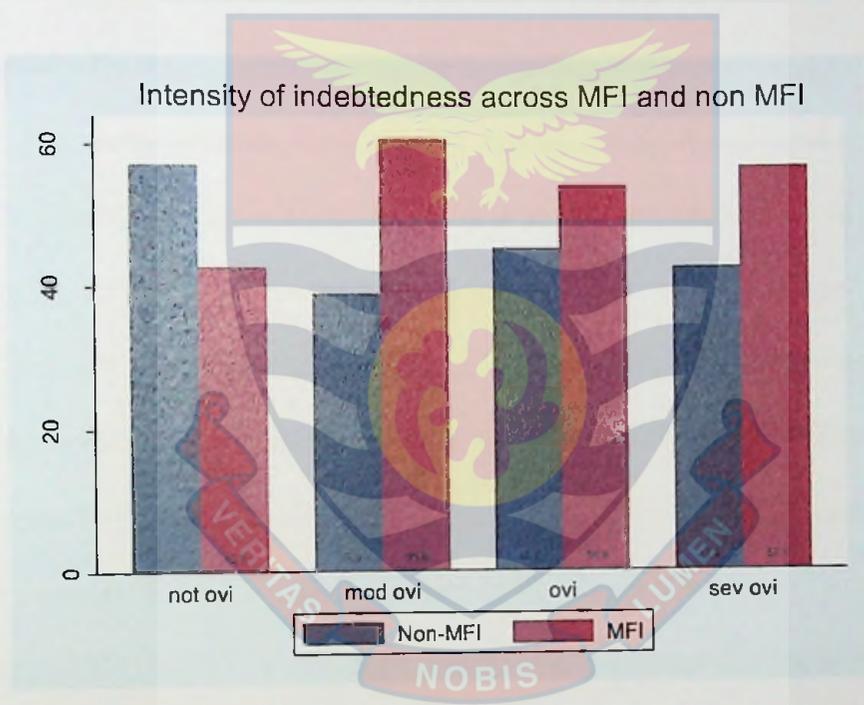


Figure 9: Over-indebtedness in the MFI and Non-MFI Sectors (Author)

Effect of Loan Amount on Over-Indebtedness

Investigating the effect of loan amount on over-indebtedness, the principal variable was tested in two forms – continuous and categorical. A strong evidence of a positive relationship was found between over-indebtedness and both forms of the loan amount variable. Appendices D3 and D4 present results of the continuous and categorical models respectively. For the set of

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regional dummies, Appendix D5 model (5) utilises the Greater Accra base, whereas model (6) uses the default base (Western Region). Interestingly, the default Western Region is not merely coincidental but symbolic. The region has the highest number of over-indebted borrowers and the dummies are more responsive to this base than to the Greater Accra reference. (For the Greater Accra base, only Western Region was significant). Consequently, results for the main variable and the drivers are based on Model (4) of Appendix D4. Appendix D5 presents a snapshot of the categorical loan variable with alternate base categories. With the exception of the regional dummies, the estimates for the other covariates remain unchanged.

The findings from Appendix D4 Model (3) on the continuous loan variable indicate that on average, an increase in the loan amount increases the probability of over-indebtedness by approximately 14 percentage points ($p < 0.001$). Although the result is informative, the continuous loan amount does not enable the effect of particular loan sizes to be determined. In contrast, differences in loan sizes indicate that larger loan amounts are associated with a steady increase in the magnitude of over-indebtedness. Compared to the base category (GHS10-100), borrowing GHS101-300 increases the probability of over-indebtedness by 5 percentage points ($p < 0.05$). There is an exceedingly strong positive relationship between the probability of being over-indebted and the next three categories of amount borrowed. Borrowing GHS 301-500 increases the probability of over-indebtedness by 15 percentage points ($p < 0.001$). The magnitude of effect for GHS 501-1000 is 28 percentage points ($p < 0.001$) and loans over GHS1000 increase the probability of over-indebtedness by 44 percentage points ($p < 0.001$).

The effect of loan amount, precisely, the size of borrowing on the probability of over-indebtedness, has crucial implications for borrowers and financial institutions. The results show that the magnitude of effect for amount borrowed rises incrementally from 5 to 44 percentage points for the largest category. The analysis seems to suggest that, on average, larger amounts of borrowing precipitate higher levels of over-indebtedness and vice versa.

As observed, the changes in effects across the categories are strongly significant. The results corroborate with findings from Liv (2013). This study investigated the relationship between loan size and over-indebtedness, using the net-indebtedness index. The study found that 4 percent of borrowers with outstanding debts below USD 500, were over-indebted. The rate increases to 22 percent for borrowers with debts of USD 500-1,000; 37 percent for those borrowing USD 1,001-5,000 and 51 percent for clients borrowing USD 5001-10,000. Comparing the two studies, an upward trend emerges in the magnitude of over-indebtedness at higher levels of borrowing, irrespective of loan size.

In terms of the increasing magnitude, Liv (2013) concludes that there is a relationship between all loans held by borrowers and over-indebtedness, but finds no relationship when only one loan is considered. Conversely, results from this study suggests that there is a strong positive relationship between a single loan amount and over-indebtedness. Hence, the finding adds to the existing knowledge that, while over-indebtedness is associated with multiple borrowing, larger loan sizes from a single contract can also increase the probability of over-indebtedness.

A possible explanation for the low probability of over-indebtedness for smaller loan sizes is submitted from the perspective of intended loan use. The

data suggests that for borrowers who have a 4 percent probability of being over-indebted, 78 percent borrowed to meet day to day expenses, to cater for funeral and medical emergencies, to invest in their own or family member's education, to purchase agricultural inputs or to expand a business. For loans below GHS 300, the repayment burden may not be severe.

Such loans are also vital for households which find small amounts useful since these are utilised mainly for medical emergencies, education, expanding a business or purchasing agricultural inputs on a small scale. Where amounts below GHS 300 are invested in businesses with relatively rapid turnovers, like food vending and retailing, borrowers may not encounter a high extent of sacrifices to repay loans. Hence, these small amounts are practical and have economic significance for the sustenance of livelihoods.

On the contrary, 65 percent of borrowers of GHS 500 and above contracted loans to expand their businesses; 74 percent purchased fishing equipment, approximately 58 percent of larger loans were contracted to pay off debts and about 56 percent invested in education. For the highest category, over 75 percent was invested in property. Admittedly, these are long-term investments, which will take time to yield anticipated profits. For both microfinance and traditional institutions, the largest percentage of loans were contracted for business expansions. In the context of this study, it is understandable that, borrowers of larger amounts which have been invested in businesses, may, in the short-term, endure higher sacrifices to repay their loans. The foregoing implies that there is a significant and probably unavoidable risk of over-indebtedness associated with large amounts of borrowing.

The economic implications of small loan amounts on households cannot be underestimated. If borrowers manage to repay commitments on small amounts, without a significant burden, then borrowing at this level may be economically viable for vulnerable households. Institutions may also face less risk of defaults or delinquencies. However, for real poverty reduction effects, larger amounts of borrowing may make both practical and economic sense, as already explained in the previous empirical chapter, where 'large' loan amounts are positively related with multiple borrowing.

The results seem to suggest that real economic effects on household businesses can be realised with sufficient capitalisation. Yet, this will be accompanied by the repayment burden, particularly, in the short term. Larger loan amounts may also require more proactive risk management from lending institutions, since, beyond an intolerable point of sacrifices, the inevitable consequence will be to default. Therefore, borrowing small or large amounts may both have attendant benefits and costs and requires a clearly tailored approach of lending to such borrowers, requiring specific amounts for a particular purpose.

Loan Amount and Intensity of Over-indebtedness

The second hypothesis tests whether larger loan amounts have a significant effect on the intensity of over-indebtedness. Ordinal logit model is estimated to investigate the continuum of over-indebtedness effects, from not over-indebted, to moderately over-indebted, through to full over-indebtedness and severe over-indebtedness. Using the ordinal logit enables the detection of differences in the magnitude of effect over different thresholds.

The study focuses on severe over-indebtedness and examines the effect of borrowing on this category, to determine the extent of food sacrifices. Appendix D6 shows the magnitude of effect for the four categories of over-indebtedness. On average, borrowing, GHS101-300 increases a borrower's probability of severe over-indebtedness by 1.1 percentage points, compared with a client who borrows between GHS10-100. The effect is significant at 0.05 percent. Similarly, the magnitude of effect rises to approximately 4 percentage points for the GHS 301-500 category ($p < 0.001$). Likewise, the effect for the GHS 501-1000 category is strongly significant at 8.2 percentage points ($p < 0.001$). The highest category increases in likelihood by approximately 16 percentage points for clients with severe over-indebtedness ($p < 0.001$). The findings indicate that larger loan amounts increase the probability of severe over-indebtedness.

Analysis on the intensity of the phenomenon suggests that approximately 8 percent of borrowers are severely over-indebted and sacrifice on food intake. These are mainly borrowers of larger loan amounts. One explanation for the effect of severe over-indebtedness being high for the largest borrowing, is that the majority of borrowers in this category, have a high education, and may be more likely to be in the middle or high-income bracket. According to GSS (2014), households in the highest income quintile spend 41.5 percent of income on food, indicating that the proportion of food expenses is high, even for high earners. The education background of borrowers of larger amounts presupposes that such households, may, on average, have a high component of food expenditure based on the quantity and quality of food intake. According to the data, 85 percent of borrowers with tertiary education borrowed

for productive purposes. These include starting or expanding a business, undertaking agricultural improvements and for investing in a property or asset. It is therefore, unsurprising, that in a short-term analysis, as undertaken by this cross-sectional study, borrowers in this category may have to cut down on elaborate food expenses to pay off their loans.

Given that a higher percentage of borrowers fall within the moderate category, it could be inferred that over-indebtedness in Ghana is moderate and borrowers in this category are making sacrifices on clothing, footwear and transportation to repay their loans. Moderate over-indebtedness, although unacceptable, provides less risk in terms of the costly actions taken to repay loans. From this knowledge, the level of borrowing which poses the lowest risk to borrowers can be determined. The findings suggest that borrowing GHS 300 and below is associated with the lowest probability of moderate over-indebtedness (3 percentage points). The foregoing implies that clients who borrow more tend to shoulder the highest burden of sacrifices. Therefore, on average, borrowing the lowest amount is associated with a low probability of over-indebtedness.

Predicted probabilities of over-indebtedness

Similar to the analysis of multiple borrowing, predicted probability of over-indebtedness for each borrower in the sample can be determined from the ordinal logit regression. From the distribution depicted in Figure 10, clients who do not have to sacrifice to make repayments have a 50-90 percent predicted probability. The estimate is between 5-20 percent for those in the moderate category, 5-15 percent for full over-indebtedness and 5-20 percent for severe over-indebtedness. For their practical significance, the estimates suggest that

there is a 0.20 predicted probability for clients who are moderately over-indebted and such borrowers are 'at risk' of full over-indebtedness.

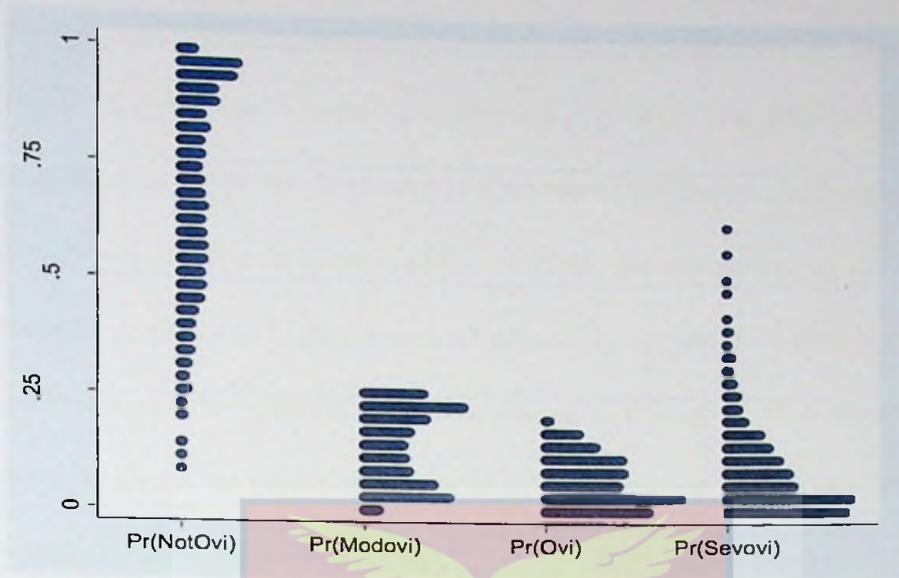


Figure 10: Predicted probabilities of over-indebtedness across categories (Source: Author)

Drivers of Over-Indebtedness

Analysing the effect of borrowing on over-indebtedness also provides the opportunity to determine the control variables which drive the phenomenon. Results are provided in Appendix D4 model (4). Education, location, loan-use, gender and household expenditure are the major drivers. The following paragraphs present results and discussion of each of the drivers, followed by the mitigating factors. Due to the heterogeneity of the over-indebtedness concept, the measure adopted in this study, and its focus, associated evidence will be drawn from both consumer credit and available studies on microfinance to support the discussion.

The education variable exhibits a strong positive effect on over-indebtedness; however, the finding suggests that its magnitude reduces with increasing levels of education. On average, having a JHS/MLSC qualification compared with having 'no education' increases the probability of over-

indebtedness by 10 percentage points. This effect is sharply significant at the 0.001 level. With an SHS qualification, the probability of over-indebtedness increases by 9 percentage points and having a tertiary education increases the probability of over-indebtedness by 6 percentage points. The latter categories are both significant at the 0.05 and 0.1 levels respectively. Although, still positive throughout the three tiers of the variable, the robustness of statistical significance weakens at higher levels of education, as depicted by the steady decline in magnitude of effect of over-indebtedness from 10 to 6 percentage points respectively. As expected, higher levels of education reduce the effect of the probability of being over-indebted.

Theoretically, low levels of education are linked to over-indebtedness and this is consistent with previous comparable research (European Commission, 2008, 2013). Using repayment-to-income ratios, the European Union Living Standards (EULS) study concludes that households in which the reference person has no qualifications are most likely to be over-indebted (11.3%). A subjective study also confirms from stakeholder interviews that 44 percent of people with elementary education or lower were at high risk of facing on-going difficulty with their financial commitments, compared to 11 percent for those with a college level education or higher (European Commission, 2008).

From the Liv (2013) finding, borrowers with high levels of education had a moderately negative relationship with payment struggles, although the result was not significant. The author provided a caveat that the small sample of borrowers with high education may underlie the outcome. Similarly, Khandker et al. (2013) found that education was not significant in their sample.

Hence, while evidence from consumer credit indicate that level of education matters, microcredit studies suggest the contrary. The outcome from the microfinance studies is attributable to the majority of clients on low incomes, who either lack formal schooling or have low levels of education. Therefore, the finding from this study contributes to the mixed evidence.

The study suggests that repayment burden exists for all borrowers irrespective of their level of education, and that it reduces for clients with a higher educational background. Hence, even where the risk remains for all borrowers, clients with higher education suffer less. The reducing magnitude is observed because, at the tertiary level, majority of borrowers with loans exceeding GHS1000, are more likely to be in formal employment, which guarantees job security and income stability to counteract excessive sacrifices. Hence, as the level of education increases, borrowers with high education are less likely to suffer significantly from repayment struggles.

Lending to borrowers with high education may also be a risk management strategy for institutions, since high levels of income security may also be an attraction for lenders. The descriptive analysis clearly indicated that larger loan amounts are being offered to those in the highest education bracket, especially in the microfinance finance industry. The outcome implies, that for the uneducated, larger loan sizes may be more burdensome, and, since the finding on loan amount suggests that borrowers with small loans have a lower effect of over-indebtedness, borrowers may be given appropriate loan amounts tailored to their businesses, loan use and educational background.

Location has a strong positive relationship with over-indebtedness. Compared to living in the rural community, the probability of over-indebtedness

for a borrower living in the urban area is 6 percentage points ($p < 0.01$). The finding suggests that urban-based households are more likely to be over-indebted compared to rural households. One reason accounting for this situation is the current high concentration of financial institutions in the urban areas, resulting in easy accessibility.

On average, borrowers in urban areas are not poor, based on the poverty distribution for the country (GSS, 2014). Therefore, one probable occasion, where urban borrowers will have to sacrifice to repay loans, is when larger loans become unsustainable. Such a possibility is associated with evidence from the analysis of the severity of over-indebtedness, which suggests that borrowers of larger loan amounts tend to make more food sacrifices. On average, such households are more likely to be found in urban areas and may underscore the reason for the over-indebtedness observed for this category. Another critical reason, may be the general trend of rising cost of food (ISSER, 2013). According to the GLSS report, food expenditure accounts for 41.5 percent of total budget of households in the highest quintile. Even for the highest income category, the food budget is considerable. Therefore, in an environment of rising food prices, borrowers in an urban location may be compelled to sacrifice on food expenditures to repay their loans.

Loan-use is also positively related to the probability of over-indebtedness. Compared to not utilising the loan for an investment purpose, investing the loan may make a borrower more likely to be over-indebted by a magnitude of 6 percentage points. This effect is significant at the 0.05 percent level. Loan use has been widely acknowledged as a potential driver of over-indebtedness (Khandker et al., 2013; Maurer & Pytkowska, 2010; Schicks,

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2013). Usually, the intended purpose stated at the time of application, tend to differ from the actual loan use (McIntosh & Wydick, 2005). Hence, the probability of over-indebtedness may increase or decrease depending on actual loan utilisation.

The study found that productive loan use makes a borrower more likely to be over-indebted, on this measure. In the microfinance over-indebtedness literature, Liv (2013) found no link between over-indebtedness and non-productive loan use. The outcome was attributed to the data, which reports intended loan use from loan files, rather than the actual usage. While the study results may seem counter-intuitive, it is suggestive of some intrinsic practical relevance.

One reason which could explain why loans invested productively may make a borrower more likely to be over-indebted, is that the effects of over-indebtedness might be registered over time. It is therefore unsurprising that for a cross-sectional study, borrowers with larger loan amounts contracted for business start-ups or expansions, would have to make sacrifices to repay their loans. It could be inferred that the effects of the investments could, on average, be realised over-time where the business would be yielding profits to counteract any repayment burden.

The gender related difference in the probability of being over-indebted is weakly significant ($p < 0.1$). Compared to a male-headed household, a female-headed household faces the risk of over-indebtedness by 5 percentage points. The outcome of the gender variable corroborates with existing literature; particularly, studies from Bolivia and Cambodia. Maurer and Pytkowska (2010) indicate that the gender variable was noted to be significant, but rather weak in

explaining its effect on over-indebtedness. In the latter study, the effect was not significant (Liv, 2013). As suggested by this study's results, risk of over-indebtedness is heavily driven by the amount borrowed; therefore, irrespective of gender differences, any unregulated levels of borrowing may lead to over-indebtedness, even though results from this study indicate that female-headed households are more likely to be over-indebted. This is in contrast to the summary statistics which suggest that male-headed households are more over-indebted.

The explanation for this contrast may be due to the consideration of other characteristics. According to the data, a large number of female borrowers have no education and are largely engaged in the informal sector. Given the precariousness of livelihoods and the need to meet inexorable and daily rising costs of living, it is inevitable that more female-headed households will be making sacrifices towards loan repayment, resulting in the outcome realised. This observation implies that female-headed households are at risk of over-indebtedness compared to their male counterparts, due to their low education background and low income. The foregoing has wider implication for the delivery of financial literacy training and business support services.

Household expenditure has a significantly positive effect on over-indebtedness. On average, a marginal increase in household expenditure increases the probability of over-indebtedness by approximately 4 percentage points ($p < 0.05$). Like the analysis on the effect of household expenditure on multiple borrowing, the explicit consideration of this variable is an addition to the literature on the drivers of over-indebtedness.

be due to increases in the volume of purchases or in the costs of the individual components of the consumption basket. In the former scenario, it is expected that, for a borrower committed to loan repayments, elective increases in household expenditures will be cautiously monitored, even though a possibility of increased spending, regardless of indebtedness situation, may not be entirely discounted. In this case, the borrower may need to intensify level of sacrifices endured in order to meet repayment obligations. For instance, if the expenditure has been incurred through the evitable purchase of durable goods, conscious sacrifices will need to be made from other expenditure components to cater for the repayment.

In the second option, borrowers can be made worse off through inevitable increases in household expenditure by sudden illness or increases in medical, education, food or utility costs. With households already committing to loan repayments, additional increase in expenditure, without a corresponding increase in income, will unduly overextend resources for repayment and drive households into making more sacrifices. For example, using the median household expenditure of GHS 6,227, a 10 percent increase in the cost of living can cause households to sacrifice 40 percent of income (GHS 2,491) for loan repayment. This is a significant sacrifice indeed. Therefore, where the increase in expenditure is not met by commensurate income, household finances will fall relative to debts, subsequently increasing the debt service-to-income ratio.

Even though the contingency analysis showed regional differences in over-indebtedness, the regression estimates indicate that only Western region is significant when Greater Accra is employed as the base category. The

probability of over-indebtedness for the region increases by 9 percentage points and is significant at the 0.1 percent level. However, it may be of a practical significance to suspect that the regional dummies may have a different response when compared to Western Region, which has the most over-indebted borrowers. The region has the highest percentage of borrowing (16%), with the majority of borrowers engaged in the agricultural sector. Hence, the base category is altered to examine whether the non-responsive dummies will react, when Western Region is used as the base category.

As suspected, Appendix D4 indicate that six regional dummies become significant in response to the change in base category. However, this action does not have any effect on the magnitudes of the other variables estimated with the Greater Accra reference. The interesting insight, however, is that using the Western Region as the base, suggests that all regions mitigate the effect of over-indebtedness. These are: Central (12%), Greater Accra (9%), Volta (10%), Eastern (8%), Ashanti (11%) and Brong-Ahafo (9%). Although the three Northern regions equally indicate a less likely probability, the effects are relatively marginal and not significant: Northern (0.4%), Upper East (2.2%) and Upper West (1.2%).

In the Western region, majority of borrowers are engaged in the agricultural sector. Thus, economic factors such as high input prices, fluctuations in market prices and production inconsistencies could aggravate households' unstable financial position. Where borrowers have taken more loans without realizing any substantial returns, this irregular cycle of agrarian cash flow can incite serious financial difficulties in the absence of alternative income generating activities and create high levels of over-indebtedness.

The foregoing is consistent with Taylor's (2011) position that given the uncertainties in income generation from the agricultural sector, high amounts of borrowing would easily drive borrowers into debt. As revealed by the Poverty Profile of the GLSS6 (2005-2013), 'household heads who are farmers are not just the poorest in Ghana, but they contribute the most to Ghana's poverty' (GSS 2014, p.25). Therefore, in terms of the repayment-to-income ratios, it implies that a greater percentage of income will be committed to the repayment of debts, thereby leaving insubstantial amounts for expenditure on basic household needs.

One distinctive observation with using Western Region as the base reference is in relation to the response of all other regions. Given the intensity of the probability of over-indebtedness in the Western Region, all regions, compared to this base, indicate a less likely probability of resident borrowers becoming over-indebted. Six out of the nine regions are significant. The remaining non-significant regions, comprise the three northern regions and this outcome may be self-evident. Given the poverty levels of the three regions, the outcome is probably due to chance, simply because irrespective of their poverty status, the regions are being compared to one that has a more challenging environment for borrowers. In that case, the circumstances of the three regions may seem relatively less threatening and engender the negative effect, although given the number of borrowers, the effect may not be significant.

Mitigating factors:

There is a robustly strong relationship between economic activity and over-indebtedness. Being engaged in an economic activity has a strongly negative relationship with over-indebtedness. Compared to 'not being in work',

the probability of over-indebtedness falls by 16 percentage points, on average, for borrowers engaged in either formal, or own account employment, and the relationship is significant at the 0.01 level. <https://ir.ucc.edu.gh/xmlui>

In a developing country context, it is crucial that borrowers have a secure source of income. The results suggest that, compared to not being currently employed, either due to illness, retirement or social circumstances, being engaged in work reduces the probability of over-indebtedness. Among the predictors which mitigate the effect of over-indebtedness, the work variable has the greatest magnitude (16 percentage points). Work, in this context, may be formal or informal. This relationship confirms the fact that income is the most single predictor of over-indebtedness (Betti et al., 2007; BIS, 2010; European Commission, 2008, 2013; D'Alessio & Iezzi, 2013). Therefore, a borrower with a source of income will stand a greater chance of dealing with risks associated with borrowing, than a client who is currently unemployed.

In a developed country context, unemployed borrowers may still have access to a source of secured income in the form of state support. When properly managed, such may be utilised for loan repayment, irrespective of their work status. On the other hand, consequences of income unavailability in the study context may be severe. Hence, some evidence of a viable economic engagement must be a critical requirement for borrowing, save unexpected events which cause borrowers to be unemployed, such as illness or accidents.

Household size also shows a very strong inverse relationship with over-indebtedness but by a marginal magnitude. An additional working adult in the household, reduces the probability of over-indebtedness by 2 percentage points ($p < 0.01$). The variable captures working adults in the household and may justify

the ameliorating effect of this variable on household over-indebtedness. <https://ir.ucc.edu.gh/xmlui>

Evidence of a link between levels of over-indebtedness and number of working adults in households is established by some studies (BIS 2010; European Commission, 2013; Kempson, 2002). Although the magnitude of working adults may not be substantial, it engenders an interesting observation, which could account for the low magnitude. Results from the data indicate that the majority of working adults are self-employed, engaged in non-farm enterprise and agricultural sectors. Possible inherent volatilities in these sectors, could account for low household incomes underlying the rather low effect on over-indebtedness. Hence, the type of economic activity of working adults will determine the magnitude of effect, *ceteris paribus*.

The study also examines the relationship between assets and over-indebtedness. The analysis indicated that the inclusion of the variable spurs on the gender, work and loan use predictors, even though, at a *prima facie* level, it might suggest a collinearity with household expenditure. A pairwise correlation coefficient of 0.0114 suggest that the two variables are weakly correlated. The results indicate that the value of assets reduces the probability of over-indebtedness. Hence, a marginal increase in the total value of assets decreases the probability of over-indebtedness by 2 percentage points on average ($p < 0.1$).

The level of household assets has become imperative in analysing its capacity to deal with threats of vulnerability. It is postulated that all forms of assets, including financial, physical, human and social are vital in enabling a household to effectively cope with borrowing risks, particularly in the microfinance sector (Assessing the Impacts of Microfinance [AIMS], 2000). Consequently, the asset variable (in spite of its limitations) is used as a measure

of over-indebtedness, premised on the fact that assets accumulated over-time can accurately measure the effect on over-indebtedness rather than the flow measure. (Betti et al., 2007; Khandker et al., 2013). Therefore, total value of assets will determine the probability of a borrower's over-indebtedness.

In spite of the immanent intricacies with the asset measure, the variable has some viability in the model and is illustrated by its negative effect. The AIMS (2000) study on 'Risk Management and Poverty' suggest an overall positive but not a strongly direct relationship, between a household asset level and its risk-coping capacity. Hence, the study's finding is consistent with the foregoing evidence, as it reduces the effect of over-indebtedness. The cumulative effect of the asset measure, contributed to the reason why borrowers found to be over-indebted in the Khandker et al. (2013) study, were lower than the percentage from the income-based measure. Hence, for the objective-burden over-indebtedness, household assets are vital in reducing over-indebtedness.

In a research undertaken for the European Commission (2013), results from stakeholder interviews revealed that, borrowers aged between 25 and 39 years were most likely to experience financial stress. Similarly, the EU SILC indicator found that the likelihood of over-indebtedness was high, for households headed by those aged between 20 and 40 years and climaxed for a household head aged 30 years. These findings are consistent with the exploration of the age variable. The data shows that number of over-indebted borrowers increases steadily on an upward trend until it peaks at age 37 and subsequently fluctuates, till it maintains a single-digit stream of over-indebtedness from age 55 upwards. From the analysis, age is not significant,

although it showed a negative relationship with over-indebtedness. At the model specification stage, no functional form of the variable was significant.

The outcome is consistent with Khandker et al's. (2013) finding that the age variable is not significant in the long run. It may seem somewhat surprising that the variable is not significant in these studies, since it is generally found to be a predictor of over-indebtedness (European Commission, 2008). The difference in outcome could be attributed to the specific groups employed, as illustrated by the focus on either microfinance or consumer credit research. Additionally, model characteristics and the underlying data could also account for the counter-effect and lack of significance. Hence, evidence on the variable's effect is currently disparate depending on measure, focus and the underlying data.

Chapter Summary

This chapter has presented findings and discussion on the study into the effect of loan amount on over-indebtedness, and the effect of larger loan amounts on the intensity of over-indebtedness. To obtain an accurate estimation of effects, the chapter presented the rationale for the derivation of objective cut-off points, which were computed with data from the GLSS6. According to the analysis, households commit approximately 85 percent of household income to minimum household expenditure. Hence, the initial threshold at which borrowers may not be considered over-indebted, is 15 percent of household income, in contrast to the arbitrary thresholds, which are frequently employed.

Results from the first hypothesis found that a single loan amount is positively related to over-indebtedness, and that borrowers of larger amounts have a higher magnitude of over-indebtedness and vice versa. The second

hypothesis, estimated by <https://ir.ucc.edu.gh/xmlui> Cardinal Regression, also suggests that borrowers of larger amounts are more prone to severe over-indebtedness. Overall, 28.7 percent of borrowers are over-indebted in Ghana. According to the results, the drivers of over-indebtedness are loan amount, low level of education, female-headed households, loan-use, location and household expenditure. The variables which reduce the effect of over-indebtedness include being engaged in work, household size and assets.

Having determined the prevalence of over-indebtedness in the country, the results suggest that over a quarter of household borrowers are over-indebted. On the consequences of over-indebtedness, the phenomenon has been associated with household welfare. Rising household expenditures, irrespective of the origin, may require borrowers to make sacrifices for loan repayment. However, do the sacrifices make borrowers worse off, in terms of their living standards? Hence, studying over-indebtedness on its own may be incomplete, without knowing its effect on living standards. Consequently, the next chapter presents the effect of over-indebtedness on household consumption expenditure, as a measure of borrowers' standard of living.

CHAPTER EIGHT

OVER-INDEBTEDNESS AND HOUSEHOLD CONSUMPTION EXPENDITURE

Introduction

Evidence suggests that clients who experience worsening repayment struggles may be having challenges with sustaining their livelihoods; hence, the threat to their welfare and poverty status (Betti et al., 2007; European Commission, 2008; Russell et al., 2011). This empirical chapter presents the results and discussion of the effect of over-indebtedness on household consumption expenditure, as a measure of living standards. It tests three hypotheses: (1) over-indebtedness has no significant effect on household consumption expenditure, (2) the effect of over-indebtedness on consumption expenditure does not depend on the amount borrowed, and (3) the effect of over-indebtedness on household consumption expenditure does not depend on whether the borrower has an insurance policy.

As a first objective analysis of over-indebtedness employing a nationally representative data, it also determines the drivers of household welfare for borrowers. The study uses the latest round of the Ghana Living Standards Survey (GLSS6) and estimation is by identification by heteroscedastic-based instruments. The chapter proceeds as follows: The next section presents descriptive statistics of over-indebtedness and the key control variables. It also presents the results of the effect of over-indebtedness on household consumption expenditure. The third section discusses the outcome of the link between over-indebtedness and household living standards. The fourth section presents evidence on the second hypothesis, which tests the interaction of loan

amount and over-indebtedness, and their combined effect on household consumption expenditure. The fifth section also submits the outcome of the interaction effect of insurance and over-indebtedness on household consumption expenditure. Determinants of living standards for indebted households are presented in the sixth section and the final section presents the chapter summary.

Descriptive Statistics

To estimate the relationship between over-indebtedness and household living standards, as measured by consumption expenditure per equivalent adult, descriptive statistics are presented for over-indebtedness and the two control variables of interest, loan amount and insurance. This is followed by results of the econometric analysis. Detailed results of all inferential computations are presented under Appendix E.

Table 6 provides summary statistics of the quantitative variables. As suggested by the data, the mean of household welfare scores is GHS 3,275.86. The accompanying standard deviation of GHS 3,433.68 is greater than the mean, indicating that the distribution exhibits enormous variation as confirmed by a skewness of 6.0. Consequently, a natural logarithm is taken to smoothen the distribution.

Table 6: *Descriptive Statistics of Key Explanatory Variables*

Variable	Mean	Std. Dev.	Min	Max
Consumption Expenditure	3275.861	3433.677	39.01579	96421.3
Log of Consumption Expenditure	7.750499	0.828671	3.663966	11.47648
Loan amount	1388.583	1909.575	1	10000
Log of loan amount	6.454921	1.362791	3.218876	9.21034
Age	45.8	15.9	15	99
Household size	4.3	2.8	1	29
N = 1,292				

Source: Author

Given that the distribution of consumption expenditure is highly skewed, it is pertinent to examine welfare scores across the quantiles. The quantile distribution provides a graphic presentation of the spread of consumption expenditure. Table 7, shows household welfare scores across the percentiles, which indicate that for households constituting the 10th centile, the average welfare score is GHS 799.99. The 50th percentile of welfare scores is recorded as GHS 2,331.23, illustrating that the mean of household consumption, which is usually affected by extreme values, is GHS 944.63 more than the median score. Moreover, all households in the bottom quintile are poor while all households in the fourth decile, and above are non-poor. The only exception pertains to households in the third decile where 56 percent are non-poor and 44 percent are poor. The data highlights that the average welfare score for households in the 25th centile is GHS 1,354.13, which is only slightly above the

national poverty line of GHS 1,314.00. For the purposes of this study, households constituting the 25 percent, are the most vulnerable, and, any effect of over-indebtedness on their consumption, will have a detrimental impact.

Table 7: *Percentiles of Consumption Expenditure and Amount Borrowed*

Percentiles	Welfare Scores	Borrowing
1%	326.2574	10
5%	579.9426	50
10%	799.9902	80
25%	1354.134	200
50%	2331.234	600
75%	4061.207	2000
90%	6689.534	4000
95%	8872.818	5700
99%	15568.25	10,000

Source: Author

A contingency analysis between over-indebtedness and poverty status indicates a highly significant relationship between the two variables, which is not simply due to chance ($\chi^2(1) = 29.36$, $Pr = 0.000$). While 32 percent of the non-poor are over-indebted, 13 percent of the poor are over-indebted. The econometric analysis further investigates the magnitude of effect of over-indebtedness on household consumption expenditure.

From Table 6, the average amount borrowed is GHS 1,388.58. However, the distribution also indicates considerable heterogeneity, as depicted by the standard deviation. According to the 50th centile, half of the households took loans averaging GHS 600.00 and the remaining half borrowed amounts ranging

from GHS 600-10,000 of Cape Coast <https://ir.ucc.edu.gh/xmlui>
Precisely, the upper quartile borrowed between GHS 2,000 -10,000. A Pearson chi-square test also indicates that there is a highly significant relationship between borrowing and poverty status, which is not simply due to chance ($\chi^2(4) = 160.56, Pr = 0.000$). The highly significant relationship between over-indebtedness and borrowing ($\chi^2(4) = 194.16, Pr = 0.000$) also excites an analysis of an integration of the foregoing relationship on household consumption expenditure.

The descriptive statistics of the insurance variable reveals an interesting but unsurprising insight. The quantile distribution seems to suggest that only the upper quartile of households hold an insurance policy. However, being a dummy variable, a categorical cross tabulation of amount borrowed with insurance indicate that the majority of households borrowing under GHS 1,000.00 do not have any insurance. A Pearson chi-square test of the relationship between insurance and over-indebtedness suggests a highly significant relationship ($\chi^2(1) = 27.04, Pr = 0.000$). Similar to the loan amount scenario, an attempt is made to investigate whether there is any significant relationship between an interaction of insurance and over-indebtedness on household consumption expenditure.

The analysis of the effect of over-indebtedness on consumption expenditure per equivalent adult is reported under Appendix E1. In addition to the principal variable, the first model estimation also focuses on loan amount as a key financial variable in the model. Details of the analyses are presented in the following three paragraphs.

As suggested by the second empirical analysis, loan amount is positively related to repayment burden and the nexus observed in the first model, affirms

the relationship. Consequently, there is the need to control for loan amount when determining the effect of repayment burden on household consumption expenditure. Whereas the foregoing might hold, the presence of the two variables could potentially suggest issues of collinearity. Hence, the foregoing necessitated a pairwise correlation analysis ($\text{pwcrr} = 0.3224$). The results suggest a weak correlation and the variables are subsequently maintained in the model.

The results suggest a negative and strongly significant relationship between over-indebtedness and household consumption expenditure. Even though an expected a priori effect is not yet established for the objective-burden measure of over-indebtedness, regression results have unsurprisingly confirmed intuitive expectation of the directional effect of the relationship. From Appendix E1 column (1), the negative OLS coefficient, which does not account for mismeasurement, suggests that being over-indebted leads to a 13 percent reduction in consumption expenditure per equivalent adult ($p < 0.01$); implying that, being over-indebted adversely affects consumption expenditure and translates into worsening living standards. By contrast, the IV results report 18 percent loss in consumption. The effect is strongly significant at the 0.01 level.

Given that the effects are estimated from a log-linear model, the coefficients measure “log points”, which suggest an approximate percentage change (Angrist & Pischke, 2015). Therefore, the exact percentage change is given by exponentiated effects, computed as 14 and 20 percent respectively for the OLS and IV analyses. The results further indicate that the OLS coefficient is lower compared to the Instrumental Variable estimate. This reflects the attenuation bias, which is consistent with the assumptions of the classical error-

in-variables model (Deaton, 2000; Hausman, 2001; Wooldridge, 2010). The difference in the magnitudes of the two estimates suggests that OLS may under-report the effect of over-indebtedness on consumption expenditure if measurement error problem is unaccounted for.

Over-Indebtedness and Household Consumption Expenditure

The link between over-indebtedness and poverty has been suspected (Bryan et al., 2010) but has not received sufficient attention. Russell et al. (2011) assert that indebtedness can affect poverty by reducing basic consumption expenditure. Likewise, the European Commission (2008) report found that over-indebted households have high repayments, which pushes them below the poverty line. This study's finding that over-indebtedness reduces household consumption expenditure is consistent with the above evidence. Due to scarce comparable evidence on the flow-based measure of over-indebtedness and household consumption expenditure, evidence from a wider poverty context will be drawn to aid this particular discussion.

As anticipated, the negative effect observed may not be caused by borrowing per se, (borrowing itself is found to be positively related to household consumption expenditure, although the effect is small) but by conditions surrounding repayment and also from socio-economic influences. Debt-servicing generally entails repayment conditions, encompassing loan duration, interest rates, fees, charges and repayment schedule. According to Ackah and Asiamah (2014), financial institutions in Ghana are the most profitable in the sub-region. Whilst interest rates have been averagely high for most borrowing, inflexible repayment schedules have been reportedly entrapping, thereby putting enormous strain on households to sacrifice available income for debt-

servicing (Schicks, 2013). As measured from the objective-burden perspective, being over-indebted entails sacrificing on basic consumption. Indeed, income sacrificed means consumption foregone. Therefore, it is apparent, how such sacrifices would activate a reduction in the consumption levels of households.

At the macro level, Loko et al. (2003) investigated the relationship between *indebtedness* and poverty, using non-income measures. In their work on the effect of external indebtedness on poverty in low income countries, the authors find that high external indebtedness is negatively related to poverty. Although the above evidence may be incomparable due to scale, measurement and focus, it is both commensurate and interesting that over-indebtedness at the household level, will equally trigger a negative effect on household consumption expenditure.

The magnitude of a loss in consumption expenditure for this analysis, is consistent with the micro-level study of D'Alessio and Lezzi (2013), which suggests that the overall debt-burden indicator with a 30 percent cut-off point, results in a reduced consumption of 17.8 percent. Although this indicator uses the stock-based measure of over-indebtedness, the magnitude of effect resonates with the flow-based measure adopted in this study. Similarly, Russell et al. (2011) also found in their study of over-indebtedness in Irish households that 29 percent of over-indebted households were at risk of poverty, where 'at risk of poverty' reflects high levels of basic deprivation, which is analogous to the loss of consumption expenditure observed.

Even though the 29 percent estimate indicated above is not a measure of objective-burden over-indebtedness; it however, suffices to complement the paucous evidence on the subject in general, and the specific indicator in

particular. The subjective nature of the Irish household study also explains the comparatively high estimate suggested. Likewise, the result resonates with a study by European Commission (2013), which provided a qualitative overview of over-indebtedness across Europe. Although not directly focusing on poverty, the study concluded that a critical consequence of over-indebtedness is a reduction in the standard of living of borrowers.

Given the above evidence, the study's finding of falling living standards corroborates with prevailing evidence of the possible deleterious effect of over-indebtedness on borrowers' livelihoods, and embeds economic significance with inherent implications. As indicated by the drop in household consumption, income sacrificed for repayments, as a consequence of over-indebtedness, translates into relinquished consumption. From the results, a cursory glance at the point estimate of 20 percent loss of consumption may be seemingly innocuous since it suggests a modest threat to living standards, or, from the comfortable point of view, may be indicative of an absence of a real threat to quality of life. Yet, borrowers' welfare scores elucidate the possible threat to household welfare.

Percentile distribution of welfare scores highlighted that the average score for households in the 25th centile is GHS1,354.13, which indicates that a quarter of borrowers are marginally subsisting above the national poverty line of GHS1,314. For these households, a 20 percent decrease reduces household consumption expenditure by GHS 271.00 to 1,083.00 pushing them below the poverty line. At the median welfare score of GHS 2,331.00, household welfare will be reduced by GHS 466.00 to 1,865 and for 10 percent of borrowers, their welfare score of GHS 799.99 is approximately GHS 8.00 above the extreme

poverty line of GH¢ 792.05. Hence, a 20 percent drop will push these borrowers deeper into extreme poverty.

Income is the main predictor of over-indebtedness (Betti et al., 2007), and for households, adverse shocks to income are caused by a drop in income from loss of employment, falling business profits or an increase in interest rates, fees and charges on loans (BIS, 2010; Jappelli & Pistaferri, 2010). Triggers of a fall in household consumption expenditure can be located in the elements of the over-indebtedness index. The objective-burden index entails variables such as household income and debt-servicing costs (fees, charges, interest rates). To a large extent, the level of household income and related debt-servicing costs are influenced by a sequel of external, regional and internal circumstances. Hence, all three prevailing factors affect the debt-servicing components, and, may underlie the falling living standards for over-indebted borrowers. These three crucial factors are elaborated sequentially as follows:

First, implications for household incomes depend on the broader macroeconomic environment. The external economic milieu hugely affects the nation's general macroeconomic framework with direct consequences for living standards. Currently, the global economic outlook embeds greater uncertainty (IMF, 2017). Almost nine years following the financial crises, developed economies continue to grapple with internal structural problems, which pose severe threats to the stability of these economic strongholds. For example, a looming and imminent schism of the European Economic Community, may have unforeseen repercussions for the world economy. However, Brexit may not be the only fault-line. Other crevasses may emerge and optimists will be encouraged to follow the exeunt, depending on the outcome. For this major

economic block, potential economic tremors are guaranteed to reverberate through other regions. Any trade partnerships may be affected, thereby impacting on the overall economic performance of the country with its inevitable consequences for businesses and households.

Second, the plummeting growth of the sub-Saharan African region also has implications for the economic lives of its inhabitants. According to the IMF Regional Outlook Report (2016), the region's growth rate fell drastically to 3½ percent, the lowest record of the past fifteen years; and is even predicted to deteriorate further. To date, economies in the sub-region, with Ghana being no exception, have relied heavily on natural resources which are vulnerable to commodity price fluctuations (IMF, 2016). These indeterminate prices could hinder long-term planning and disrupt attempts at macroeconomic improvement. Consequently, any developmental efforts which hinge on unpredictable performance of commodity prices on the international markets, may not sustain progressive growth for the nations involved.

Third, the deteriorating macroeconomic performance is not only a regional, but also a national problem, which has implications for households' economic activities. Over the last five years, Ghana's growth rate declined from its peak of 15 percent in 2011 to 4 percent in 2015 (BOG, 2016). Thus, economic implications for households and individuals are inescapable, particularly for vulnerable clients. Therefore, the general economic environment in the country is highly relevant for this research and the use of the objective-burden measure of over-indebtedness provides an explanation to how the over-arching economic context can affect household incomes and *cause* borrowers to reduce their consumption expenditure.

The different categories of the over-indebtedness index derived in this study, which supported the ordinal logit analysis, are linked to components of household consumption expenditure. Each category of the DSR depicts the particular components of household expenditure sacrificed for repayments. In the case of borrowers who are severely over-indebted, they sacrifice on quality or quantity of food. Thus, evidence from this study relating to food sacrifices corroborates with Schick's (2013) finding that borrowers preferred to go hungry or eat a single meal per day and considered this to be unacceptable. Therefore, the tendency to easily sacrifice on food can be attributed to the general economic climate.

Sacrificing on food intake may be engendered by constantly rising food prices as observed, not only in Ghana, but also in the sub-region (IMF, 2016; ISSER, 2013). Food prices are severely susceptible to inflation, which is currently at 19 percent (BOG, 2016). Additionally, with a dwindling manufacturing and agricultural sector (GSS, 2014), Ghana relies heavily on imports, even for the basic household essentials including foodstuff, which contribute to the upward pressures on inflation. For instance, the ISSER (2013) report admitted to increases in prices of most staple foods and, as indicated by the GLSS6 report, food prices have increased by 9 percent on average, from 2005 to 2013 (GSS, 2014). Therefore, conditions of the prevailing economic environment contribute to the sacrifices made for repayments.

For households, adverse shocks to income may be triggered by the wider macroeconomic environment as explained by the external, regional and internal circumstances. Thus, economic and financial security of households in Ghana may not be entirely insulated from the ripples of the enormous external, regional

and local uncertainties of Cape Coast <https://ir.ucc.edu.gh/xmlui>, which might engender an increase in the magnitude of consumption losses.

Effect of Loan Amount and Over-Indebtedness on Household Consumption Expenditure

Results from the study suggest that borrowing impacts positively on consumption expenditure, as indicated in Appendix E2 Column (2). Having a constant elasticity interpretation, a percentage increase in the amount borrowed will lead to 0.18 percent increase in consumption. Hence, a 10 percent increase generates a 1.8 percent increase in consumption expenditure. The effect is strongly significant at the 0.01 percent level. Although a positive response, the effect may be suggestively low compared to the percentage increase in borrowing. Appendix E5 presents model estimates for the separate interaction effects of over-indebtedness with loan amount. A summary of interaction effects at differing levels of loan amount and insurance are presented under Appendix E7.

With a continuous loan amount variable, a significant interaction between over-indebtedness and borrowing indicates, that the effect of over-indebtedness on household consumption expenditure varies with different levels of borrowing. Even though the interaction term is insignificant, a significant joint hypothesis test of the interaction term and the over-indebtedness variable, could provide validity for subsequent analyses, if found to be significant (Wooldridge, 2002). According to the stata *testparm* command, a joint hypothesis test between the two variables is strongly significant ($p = 0.0011$). The interaction effects are subsequently evaluated at the mean and maximum amount, including the 25th and 75th percentiles. Accordingly, the net effect

results indicated under Appendix E7 suggests that, interacting over-indebtedness with loan amount, reduces the intensity of the effect on household consumption expenditure from 20 percent to 15 percent, as indicated by the analysis at the 25th percentile.

The results of the interaction effect indicate that from the lowest to the maximum amount of borrowing, the observed reduction in intensity of consumption loses continues to decline to 11.5 percent at the maximum amount, as depicted by the marginal decreases in the coefficients. The noticeable but small reductions are validated by the accompanying z-scores, indicating that the interaction effects of over-indebtedness with borrowing at the computed levels, are all statistically significant from zero. At the mean loan amount, the exact effect of over-indebtedness on consumption expenditure is 14 percent. Without this interaction, it could be comfortably underscored that the exact effect of over-indebtedness on household consumption is 20 percent, without taking borrowing into account.

Discussion on the interaction effect of over-indebtedness and loan amount is preceded by the analysis of the effect of loan amount on household consumption expenditure in order to put the interaction effect into perspective. According to the descriptive statistics, average loan amount is GHS 1,388.00. Hence, increasing average borrowing by 10 percent (GHS 138.00), will increase the median welfare score by GHS 42.00. The results suggest that borrowing is constructive for facilitating improvement in the economic progress of households by providing the much-needed financial resources to start or expand a business, and, invest in education, housing or agriculture. Therefore, the evidence corroborates with the theory that borrowing could be essential for

lifting people out of poverty (Martin, Hulme & Rutherford, 1999; Rutherford, 2000). Unless struck by shocks such as loss of income due to business failure, job loss or illness, the study suggests that credit favourably affects consumption expenditure.

The above discussion focused on the effect of borrowing on household consumption expenditure, when loan amount is held fixed. From the previous analysis on over-indebtedness and household living standards, the result suggested that being over-indebted leads to a 20 percent fall in household consumption expenditure. Knowing that borrowing, per se, is positive for borrowers' economic lives, an interaction effect between loan amount and over-indebtedness can help determine whether, for an over-indebted client, the size of borrowing has any influence on the level of household consumption expenditure. Results of the interaction effects summarised in Appendix E7 suggest that contrary to intuitive expectation that larger levels of borrowing and over-indebtedness will make a borrower rather worse off, by increasing the intensity of the magnitude of over-indebtedness, the antithesis is revealed.

Interestingly, the results suggest that together, over-indebtedness and larger amounts of borrowing have an extenuating effect on the severity of consumption losses for households. For example, an over-indebted household with a borrowing of GHS 200 will experience a 15 percent reduction in consumption. However, for a client who borrows GHS 5000, the magnitude reduces to 12 percent. At the maximum level of borrowing, the log point on household consumption expenditure reduces further to 10.9 percent. The implication is that, given the potential harmful effects of over-indebtedness on households, the positive effects of borrowing may not be strong enough to

counteract the negative effect between over-indebtedness and household consumption expenditure. This notwithstanding, with larger amounts of borrowing, the strong positive effect can ameliorate negative consequences of sacrifices being made, to lessen the overall loss in household consumption.

The foregoing implies that, generally, the overall effect of the interaction of over-indebtedness and loan amount is negative; however, it is the magnitude of the loss that dissipates with increasing amounts of borrowing. The following could have two explanations. First, clients who borrow large amounts to invest in a business or to start a new business which turns around profit in the shortest possible time (where the amount borrowed significantly exceeds any immediate pressure from intruding household expenditures), might sacrifice to repay the loans with lower magnitude of consumption losses. Alternatively, where a comparatively smaller amount of credit is received, but not commensurate with the anticipated figure, the insufficient credit will either cause the loan to be syphoned into immediate household expenses, encourage multiple borrowing or impede the intended use. Thus, such borrowers may later endure severe sacrifices to repay the loan which will intensify losses in household consumption expenditure.

Effect of Over-indebtedness and Insurance on Household Consumption

Expenditure

Results on the effect of insurance on over-indebtedness are reported under the full and nested models of Appendices E3 and E4 respectively. The model for Appendix E4 is nested due to the response of the 'dependants variable' in the generated instruments produced by the Identification by Heteroscedasticity Instrumental Variables Technique. Constraining the variable

improves the robustness of the model, which passes the over-identification test; hence, results are based on Appendix E4.

The result suggests a significant positive effect of insurance on household consumption expenditure of less than 10 percent {0.0887 - giving an exact percentage change of 9.2 percent ($p < 0.05$)}. Including the insurance variable generates a noticeable influence on the over-indebtedness variable, whose magnitude reduces from 18 percent to 16.5 percent. The 1.5 percent decrease in the magnitude of effect on consumption expenditure, provides insights into the possible benefits of having an insurance policy. Therefore, the results suggest that, having an insurance policy, tapers the effect of a loss in household consumption.

From Appendix E7, it is observed that, upon the introduction of the interaction term into the model, the insurance variable loses its significance, while the interaction term remains significant. To confirm the potency of both variables, the interaction and over-indebtedness variables are also significant, according to the joint significance results ($P\text{-val} = 0.0025$). Results from Appendix E7 suggest that, for an over-indebted household with an insurance policy, the loss in consumption expenditure is 6 percent. Not having an insurance policy creates a consumption loss of 18 percent. The accompanying statistical significance tests indicates that the 6 percent decline in consumption loss, is insignificant ($z = -0.94$). The lack of significance may be due to the fact that very few households do subscribe to an insurance policy and such a drop may not be representative.

Insurance services have been a critical component of financial services, although the uptake of such policies is not extensive in the country; much so, at

lower levels of borrowing. Available products include life insurance, sickness, bereavement, accident and education packages. According to the descriptive statistics, only 26 percent of borrowers have an insurance policy; hence, 74 percent of borrowers in the country do not possess any form of insurance. The result suggests that having an insurance policy may alleviate the burden of over-indebtedness. However, such gains can only be accrued by those in the higher income bracket.

On the interaction between over-indebtedness and insurance, the outcome may simply be due to chance. There could be some plausible explanations to why such an impressive drop in the intensity of the effect on household consumption expenditure turns out to be insignificant. One reason, is that insurance premiums are expensive. According to the GLSS6 report, the justification for the low uptake of insurance is affordability. In both urban and rural localities, the percentage citing unaffordability as a hindrance was appreciable – 60 and 40 percent respectively. Hence, high insurance payments reduce available disposable income which may affect household consumption expenditure, and is more likely to increase the intensity of consumption losses for households on unstable incomes.

Another reason may relate to compensations. The institutional culture of insurance settlements is fraught with extensive bureaucracy and lack of transparency which could make claims to the schemes even more costly for households. Hence, not having an insurance policy, while sacrificing to repay loans may seem like an attractive option. Consequently, the decision to purchase insurance policies will depend on available income and the attractiveness of such policies, to reduce the burden of over-indebtedness. For this analysis, the

lack of significance could relate to the very small number of borrowers holding an insurance policy. <https://ir.ucc.edu.gh/xmlui>

Without considering the surrounding complications enumerated above, it seems that insurance contributions for an over-indebted household may palliate the effect on household consumption expenditure. This mitigating tendency is evident in the response of the independent insurance variable. The foregoing is consistent with the assertion by the World Bank *Global Financial Development Report* (2014), that micro-insurance may insulate against risks although the uptake is minimal. Thus, where payments are affordable and contracts deemed favourable, uptake of insurance may be encouraged, especially to counteract the unpredictability and impact of adverse shocks in the informal sector.

Determinants of Household Living Standards for Indebted Clients

This section contributes to the literature on the determinants of living standards for indebted households. Although, Coulombe and Wodon (2007) provide evidence on the determinants of poverty for households in general (measured by consumption expenditure), very little is known about the factors contributing to the welfare of indebted households. The findings indicate, that being employed, higher levels of education and living in an urban area, lead to an increase in the standard of living for borrowers. This section presents results and discussion of the control variables for the analysis of over-indebtedness and household consumption expenditure. Result of each determinant is presented, followed by the discussion in the accompanying paragraphs. The three drivers are addressed according to the magnitude and significance of effect. This section is complemented by the aggravating factors.

The study results indicate under column (2) of Appendix E2, suggest that private sector employment has the highest magnitude of effect, and increases household consumption by 20 percent, which is strongly significant at the 0.05 level. This is followed by public sector employment which also increases consumption expenditure by 15 percent ($p < 0.1$). Therefore, as suggested by the results, being employed is positively related to household consumption expenditure; implying that compared to a borrower who is currently unemployed, employment in all its forms, increases household consumption expenditure.

According to the GLSS6 report, the main sectors of employment in the country are the private, public and not-for-profit sectors (GSS, 2014). On average, maximum wages in formal private sector employment have been higher than the public sector (BOG, 2007). Hence, the narrow difference in magnitude between the two formal employment sectors could be attributed to the recent upward revision of public sector salaries. According to Kempson and Atkinson (2006), not engaging in any work, exposes individuals to severe vulnerabilities and hardships. Hence, a steady stream of employment income is an indispensable pre-requisite for determining living standards of indebted households.

Level of education also has a positive effect on the consumption expenditure of indebted households. Compared to the reference category of having no education, a household head with a JHS/MSLC experiences a 12 percent gain in consumption while this magnitude almost doubles to a 23 percent increase for those who have completed a senior secondary school

education. At the tertiary level, the gains rise incrementally to 38 percent. All coefficients are significant at the 0.01 percent level.

The positive outcome of education on consumption expenditure is suggestive of two issues. First, it is probable that educated borrowers are in secure employment, with a steady flow of income. Consequently, any shocks from the use of credit could be absorbed by the constant source of income. In the absence of income shocks, the additional credit facility will augment household income, if invested in a profitable business, thereby increasing the household's consumption expenditure and living standard.

Second, education may also empower their use of credit. Educated borrowers have the capacity and knowledge to understand and appreciate the pros and cons of borrowing. Borrowing contracts may be adequately scrutinised, with the added confidence of soliciting for favourable contractual terms. Therefore, given the above evidence, which suggests positive implications of education for borrowing, it is pertinent that financial literacy for the uneducated is intensified countrywide, to increase the capacity of borrowers with low education, who are predominantly female, to understand the implications of their loan contracts, and, to facilitate their appreciation of the costs involved.

Similarly, the location variable has proven to be crucial for household analysis of consumption poverty. Studies affirming the differences in household living standards between rural and urban areas include Deaton (2001) and UNDP (1997). The location of a borrower is immensely crucial for debt sustainability and repayments. The results suggest that compared to residing in a rural area, living in an urban environment produces a 20 percent gain in

consumption. The reasons why rural locations do not fare well, particularly for income generation, which is pertinent for debt repayments, are explored below.

Living in a rural area, compared to an urban location has disadvantages for income generation, specifically for informal sector livelihoods. In Ghana, poverty has been, and remains a rural phenomenon (GSS, 2014). On average, rural locations are deprived and not endowed with adequate infrastructure such as roads, schools, electricity, water or health facilities, which can attract investments. Economic activities in the rural locations have been mainly agricultural, even though analysis of the fifth and sixth rounds of the GLSS survey revealed that the proportion of the economically active population engaged in agriculture is reducing (GSS, 2014).

One major limiting factor is the lack of adequate transportation infrastructure to increase accessibility to rural communities. The roads are impassable, particularly at the peak of the rainy season. Farmers have struggled to transport agricultural produce to market centres promptly and time lapses have frequently resulted in financial losses with implications for credit repayment. These reasons, in addition to developing problems could aggravate the conditions of the location for rural borrowers.

While the foregoing may already be evident, what is new, is the emergence of two issues and their implications for over-indebtedness: a currently diminishing agricultural sector and a cornucopia of credit. The effects may be both productive and unproductive. A shrinking agricultural sector may imply a migration from the dependence on the volatile sector as the main contributor to economic growth. Therefore, this divergence may be beneficial for economic diversification. Yet, the propagation towards the services sector

(GSS, 2014), may cause its own volatilities, particularly for livelihoods in rural areas. <https://ir.ucc.edu.gh/xmlui>

The preceding assertion is plausible due to the second issue - a deluge of credit access. Availability of credit, evidently constructive for business start-ups and expansion, could have repercussions for rural households setting up own businesses. Currently, the prevailing and convenient economic activity in the informal sector is the proliferation of retailing in consumer goods. While these businesses spring up in the communities, they are easily marooned by more people having access to credit and replicating same ventures. This uncontrollable duplication of ideas creates a 'siphoning' syndrome, where the supply of the same products increases with a shrinking demand. Regrettably, most small ventures in these economically deprived communities have collapsed as a consequence.

The crux of the issue is that with financial institutions resorting to creative lending, credit is being transmitted faster than the progress in infrastructure, or the capacity for existing businesses to thrive and grow. Therefore, having more credit with less opportunity to create commensurate profits from businesses, in an enabling environment, provides the conditions for over-indebtedness, which ultimately leads to a decrease in consumption expenditure for rural borrowers.

Aggravating factors

At the regional level, heterogeneity in resource endowments and variations in climatic conditions, or human interventions such as technological and infrastructural developments, have conveniently positioned certain regions to support internal economic activities and livelihoods. In Ghana, the ten

regions have different levels of economic growth being supported by the existing resource base and infrastructural development. These regional characteristics may determine the poverty levels of inhabitants, as highlighted by resource distribution differentials, which have been inequitable.

Over the years, Greater Accra, the national capital, has witnessed a rapid and accelerated growth in population size, due to its attractiveness to inhabitants of other less endowed and economically inactive regions. According to Coulombe and Wodon (2007) and the GLSS6 (GSS, 2014), poverty levels have been lowest for the Greater Accra region for over fifteen years. Notably, most of the financial institutions are based in the region. With its comparably attractive resource base, new investments are likely to locate in the city and neighbouring towns to maximise profitability. For example, existing communication services are far advanced in the Greater Accra region. Businesses currently enjoy the 4G internet technology, which has improved connectivity speed and subsequent efficiency of business transactions, resulting in improved economic positions of households, on average. It is the hub of most commercial activities, businesses, education, transport and health facilities.

In statistical analysis, the default base region is Greater Accra. Given the economic supremacy of the region, it is expected that, on average, a borrower living in the Greater Accra region will have gains in consumption expenditure, compared to the other regions. Hence, using Greater Accra as the base category remarkably shows that, compared to the capital, borrowers in all the nine regions experience a decline in consumption expenditure. It is emphasised that the magnitude of the losses differs across regions.

according to intensity of reduction and categorised as having high, moderate or low consumption. Therefore, from the highest to lowest, Upper West, Northern and Brong-Ahafo constitute the 'high block'; Eastern, Upper East, Central and Volta make up the 'moderate' block and Western and Ashanti comprise the 'low block'. Consistent with the GLSS6 report on regional poverty, Upper West, which is the overall poorest region, also has 54 percent fall in consumption expenditure; the highest among the regions. Northern region follows with an estimate of 43 percent loss and Brong-Ahafo records a 33 percent slump. All estimates are significant at the 0.01 level.

While results of the Upper West and Northern regions may not be surprising, the inclusion of Brong-Ahafo with the 'high block' may be justifiable. The study results resonate with the current poverty profile that extreme poverty is prevalent in Rural Savannah and over a quarter of the extremely poor in the country are located in the urban and rural savannah ecological zone, which mainly comprises the northern regions (GSS, 2014). The inhospitable climatic conditions and minimal infrastructure development has contributed to the sprawl of poverty witnessed.

One implication of this observation is that initial poverty conditions of borrowers could be a strong determinant of over-indebtedness. The high record for Brong-Ahafo is probably unsurprising because, together with the three northern regions and the Volta region, these five regions recorded a high incidence of poverty. Given, Brong-Ahafo's proximity to the urban and rural savannah ecological zones, certain common regional characteristics could account for the high reduction in consumption recorded for the region, although

the GLSS6 highlights that influence of shared boundary features have been marginal. The high incidence could also be attributed to the deviation from the agricultural sector, which was the predominant economic activity in the region.

The results in Column (2) Appendix E2 suggests that an additional person in the household reduces consumption expenditure by 13 percent, which is significant at the 0.01 level. Generally, larger household sizes have been noted to reduce consumption per equivalent adult, as noted by Coulombe and Wodon (2007). While investigating the correlates of poverty over the three rounds of the GLSS survey, the study estimated separate regressions for rural and urban locations and found that household size tends to lower consumption expenditure per equivalent adult, by 13 to 17 percent respectively. Although, consistent with the Coulombe and Wodon (2007) OLS estimate, this study's result represents both urban and rural households for the borrower sample. Thus, for an indebted household managing the burden of debt-repayment, the size of the household will have a crucial impact on its consumption level.

Based on the measure employed, household size indicates number of working adults (GSS, 2014). Consequently, the intuitive inclination will be towards a rise in household consumption. Yet, the result suggests the opposite; implying that if the household is indebted, an addition to household size will constrain consumption, unless the net worth of the additional adult, in terms of income contributed, outweighs accompanying costs. Therefore, increases in household size, even though adults are economically active, could be detrimental to the welfare of indebted households.

While technology is currently driving most production processes, human capital, sustained to a large extent by good health, is enormously vital to

the growth process and is even more pertinent to a borrower; particularly, to micro business operators. Consequently, the results re-affirm this conclusion, by suggesting that a health shock leads to a 12 percent reduction in consumption ($p < 0.05$). For borrowers in the informal sector, with unpredictable income streams and precarious finances, good health is indispensable for maintaining continuity and stability of household financial resources, in the absence of secure income or insurance. Therefore, any threats to stable health would aggravate the conditions for effective functioning and the subsequent repayment of loans.

This section presented results and discussion on the determinants of household consumption expenditure for indebted households. The results suggest that employment, education and urban residence contribute to gains in consumption. It also suggests that regional characteristics, household size and illness may be critical for indebted households.

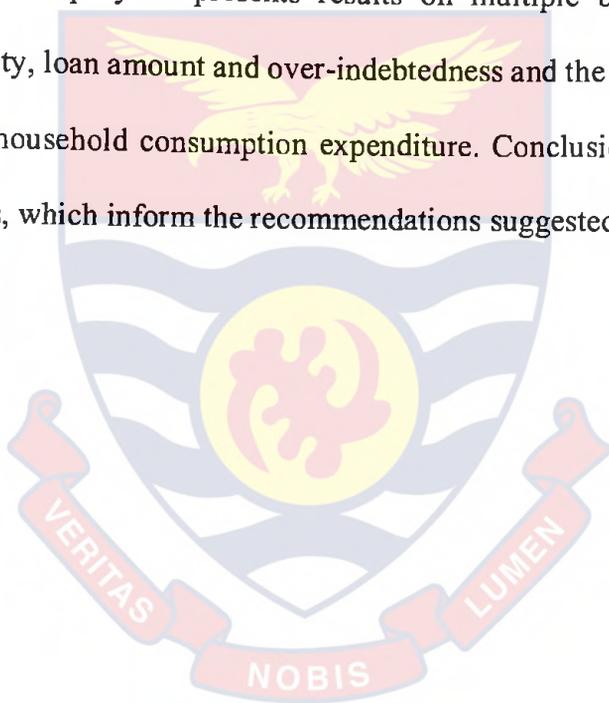
Chapter Summary

This empirical chapter has presented the results and discussion of the effect of over-indebtedness on household consumption expenditure. The results suggest that, being over-indebted, reduces household consumption by 20 percent; which implies that, a quarter of borrowers subsisting marginally above the poverty line, are made worse-off as the 20 percent drop drives them below the poverty line. A further 10 percent of borrowers are pushed below the extreme poverty line.

The overall negative effect of the interaction of loan amount and over-indebtedness suggests that, irrespective of amount, borrowing will always be accompanied by attendant inextricable sacrifices, but on average, those with

larger amounts of borrowing, may suffer less burden. It also focused on insurance and its interaction effect with over-indebtedness. Although, the interaction leads to a substantial drop in over-indebtedness, the result is not significant. The study also suggests that being employed, having higher levels of education, and living in an urban area, increase the standard of living for such borrowers. On the other hand, household size, illness, residing in a rural area or in a poverty-prone region, reduce household welfare.

The next chapter presents a summary of the findings from the three thematic areas of enquiry. It presents results on multiple borrowing and institutional density, loan amount and over-indebtedness and the effect of over-indebtedness on household consumption expenditure. Conclusions are drawn from key findings, which inform the recommendations suggested by the study.



SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The benefits of finance for economic growth have been widely documented in the finance and growth literature. However, rapid infusion of consumer credit and the proliferation of microcredit have presented new challenges to the finance industry. These challenges include multiple borrowing and over-indebtedness. Multiple borrowing is a precursor to over-indebtedness and over-indebtedness is identified as a real threat to individuals, financial institutions and governments. With that ominous backdrop, the issues have become a legitimate source of concern. This study was, therefore, designed to investigate these issues of indebtedness and any possible effects on household welfare.

This chapter presents the study's summary, conclusions and recommendations which include suggestions for further research. It proceeds as follows: The next section presents a summary of the purpose, research hypotheses, methodology and findings from the study. The second section advances the conclusions from key findings and the last section presents recommendations and suggestions for further research.

Summary

This study set out to investigate issues of multiple borrowing and over-indebtedness, to contribute to existing literature and suggest recommendations for addressing key findings from the research. It is designed to provide knowledge to promote a well-functioning and stable credit industry, which

supports the sustainability of MSMEs, and ensures households' economic and social wellbeing. It tests seven hypotheses, which concentrate on three thematic areas: (1) multiple borrowing and institutional density, (2) loan amount on over-indebtedness, and (3) over-indebtedness and household consumption expenditure. The study adopted a quantitative approach using cross-sectional secondary data.

The first empirical analysis focused on multiple borrowing in the microfinance industry and tested the following two hypotheses: (1) an increase in the density of MFIs in rural areas is not a source of multiple borrowing, and (2) the probability of multiple borrowing for rural residents does not vary with the density of a particular MFI category. It used household level data from a nationally representative microfinance survey and a census of MFIs in Ghana, both funded under the Rural and Agriculture Finance Programme (RAFiP). With a sample of 1099, probit and ordinal probit models were used to estimate the probability that a borrower engages in multiple borrowing, and to determine the predicted probabilities for higher categories of multiple borrowing. Standard statistical inference methods were used to test the two-tailed hypotheses.

Three key findings emerged from the first empirical chapter. First, the study suggests that while an increase in institutional density may not independently engender multiple borrowing, an increase in the density of MFIs in rural areas, increases the likelihood of borrowers to engage in multiple borrowing. Second, an increase in the density of a particular type of MFI in a rural area increases the propensity of its borrowers to overlap and the effect is highly significant for FNGOs. Third, incidence of multiple borrowing in Ghana is 35 percent, suggesting that over a third of borrowers have more than one loan

from either the same or a different provider. Drivers of the phenomenon include living in a rural area, loan size and pre-retirement age. Returns on investment and working age reduce the likelihood of multiple borrowing.

The second empirical analysis determined the effect of a single loan amount on the probability of over-indebtedness. Two hypotheses were tested: (1) amount borrowed has no significant effect on the probability of over-indebtedness, and (2) larger loan amounts have no significant effect on the intensity of over-indebtedness. Using household level data from Ghana Living Standards Survey (GLSS 6), the study derived an objective threshold for establishing the critical level of over-indebtedness. With a sample size of 1295, the logit model was adopted to estimate the probability of over-indebtedness. Ordinal logit model was also used to estimate the probability of being in the highest category of over-indebtedness.

The three key findings suggested by the empirical analysis are as follows: (1) increasing the amount borrowed raises a borrower's probability of over-indebtedness and the magnitude increases sharply with larger loan amounts, (2) a larger loan size increases the probability of being severely over-indebted, and (3) more than a quarter of borrowers (28.7 percent) are over-indebted from the objective-burden perspective. Of this, 13.8 percent are moderately over-indebted and sacrifice on clothing, footwear and transportation to repay their loans; 6.7 percent are fully over-indebted and sacrifice on education and health costs while 8.2 percent are severely over-indebted and sacrifice on food intake. Drivers of over-indebtedness include low levels of education, female-headed households, loan-use, rural location and household expenditure.

The third investigation tested three hypotheses relating to household living standards. These were: (1) over-indebtedness has no significant effect on household consumption expenditure, (2) the effect of over-indebtedness on consumption expenditure does not depend on the amount borrowed, and (3) the effect of over-indebtedness on household consumption expenditure does not depend on whether the borrower has an insurance policy. The chapter uses the GLSS 6 and, with a sample size of 1292, a variant of instrumental variable estimation technique (identification by heteroscedasticity) was employed to address the problem of endogeneity (aroused by a mismeasured regressor) through internally generated instruments. Given intractable data challenges, the new technique allowed the estimation of the essential relationship between over-indebtedness and household consumption expenditure.

The major finding of the third analyses suggest that being over-indebted reduces household consumption expenditure by 20 percent. Results on the interaction effect between loan amount and over-indebtedness suggest, that whereas over-indebtedness reduces consumption expenditure, the magnitude of effect reduces with larger loan amounts. On the other hand, the interaction effect of over-indebtedness and insurance, which seems to ameliorate the negative effect on consumption expenditure, is not significant. For indebted households, being employed, having a higher level of education and living in an urban area, improve borrowers' welfare. Conversely, living in a rural area or in a susceptible region (Upper West, Northern and Brong-Ahafo), larger household sizes and illness may contribute to a reduction in household living standards.

It has been argued in this thesis that multiple borrowing and over-indebtedness are growing challenges of the intense availability of credit. Overall, issues raised in six out of the seven research hypotheses have been affirmed. The evidence, therefore, embeds implications for the credit industry and requires critical attention.

On the first empirical chapter, the finding that increasing MFI density in rural areas may engender multiple borrowing is relevant for the operations of institutions in rural areas. Additionally, the new evidence on the positive effect of a particular MFI category is also essential for institutional supervision and monitoring. These findings deepen the understanding of the influence of MFI density on multiple borrowing; particularly, in rural areas. Suggested evidence corroborates with the theory of competition and multiple borrowing, that the concentration of institutions in an area engenders cross-borrowing. The effect of institutional density on multiple borrowing suggest that, currently, the market is 'expansive' because increasing the density of institutions makes a borrower less likely to engage in multiple borrowing. However, the caveat is directed at institutional growth in rural areas, where borrowers are more vulnerable. Therefore, more caution should be exercised regarding borrowing and lending activities in rural areas.

In spite of the controversy engulfing microcredit and poverty reduction, MFIs are found to have a positive impact on poverty in Ghana (DRIC, 2016). As institutions seek to expand their scope of coverage, deeper penetration into rural areas may have escalating consequences for multiple borrowing, as supported by new evidence on the effect of the density of MFIs, distinguished

by the type of institution. It suggests that, with the current operational set-up, the growth of all institutions, with the exception of Rural and Community Banks, may increase the propensity of multiple borrowing; and the foregoing is particularly relevant for FNGOs. This situation calls for a review of the funding requirements of FNGOs to safeguard the livelihoods of vulnerable borrowers, as they strive to combat the wave of growing commercialisation.

Investigation into multiple borrowing has shown, that the phenomenon is prevalent in Ghana and affects a significant number of borrowers. At 35 percent, the prevalence estimate is close to the 20-40 percent experienced in India, at the onset of the over-indebtedness crisis (Krishnaswamy, 2007). The results confirm the suspicion in the background information provided in chapter two, that the unprecedented increase in the number of microfinance borrowers, who currently constitute more than a quarter of the population, may be due to the issue of multiple borrowing. The implication, is that, an escalation of the current incidence, if unchecked, may potentially lead to a crisis. Given that the market is currently unsaturated from the institutional density analysis, this knowledge is crucial and provides evidence for the microfinance industry to begin to streamline borrowing and lending activities.

The second empirical chapter tested hypotheses on the effect of a single loan amount on over-indebtedness and whether larger loan sizes have an effect on the intensity of over-indebtedness. The findings suggest that contrary to the predominant attribution of over-indebtedness to multiple borrowing, a borrower could be over-indebted even with a single loan amount and larger sizes of borrowing could result in severe over-indebtedness. In her subjective assessment, Schicks (2013) suggested that clients who commit to repayment go

to great lengths to repay their loans. There is, therefore, a trade-off between repayment commitment, which is positive for the credit industry, and associated sacrifices that can be deleterious for borrowers. The preceding is confirmed by the study's finding that clients who borrow larger amounts face higher risks of food sacrifices. Hence, the knowledge that borrowers on a single loan amount can be over-indebted, provides evidence for institutions to be more circumspect with offering multiple loans; especially, credit accessed from the same provider, where clients' attempt to over-extend their borrowing capacity can be easily monitored.

On the hypotheses tests relating to over-indebtedness and household consumption expenditure, the negative effect on living standards support the concern that over-indebtedness may pose risks to the livelihoods of some borrowers. For a quarter of borrowers, who are marginally subsisting above the poverty line, the 20 percent fall in consumption expenditure drives them below the poverty line, subsequently making them worse-off. For ten percent of borrowers, the reduction in household consumption expenditure pushes them deeper into extreme poverty. The foregoing is an issue of concern, with the implication that, for some borrowers, deteriorating living standards may impact negatively on their capacity to utilise credit as a means of escaping poverty.

The interaction effect between loan amount and over-indebtedness suggest that, even though, over-indebtedness leads to a reduction in household consumption expenditure, the effect varies for different levels of borrowing. Higher levels of loan amounts are more likely to reduce the intensity of the loss in living standards. The preceding, follows from the analysis that, as an independent variable, borrowing is positively related to household welfare but

for over-indebted borrowers, the positive effect is superseded by the strong negative effect of over-indebtedness. It can, therefore, be deduced from the results that, borrowing, will at all cost, be accompanied by attendant sacrifices.

However, where these sacrifices are unavoidable and minimal, as supported by this study, the evidence could facilitate the argument for more access to credit, a position espoused by the financial inclusion concept. The globalised call for financial inclusion is to ensure that a greater proportion of those who are financially excluded gain access to financial services (World Bank, 2015-2016). Yet, as suggested by this study, borrowing comes with a risk - an inescapable fact which cannot be ignored. The study has suggested that with over-indebtedness, there is always a tendency for a reduction in households' standard of living, but it is only the magnitude that will differ across levels of borrowing. The results seem to indicate that over-indebtedness is a real issue, which may not disappear entirely, even with larger amounts of borrowing. The situation, therefore, requires institutions to take a critical look at available and more sensitive options for borrowers.

Overall, the three empirical chapters have suggested issues of concern for multiple borrowing and over-indebtedness. There is, no doubt, that the availability of credit has removed the barriers that once existed and has proven to be useful for the financially excluded. However, with the current prevalence, multiple borrowing is a real and subtle threat to the sustainability of MFIs and requires crucial attention. The debilitating effects of borrowing on over-indebtedness is also apparent; as well as the alarming consequences of over-indebtedness on living standards. While the overall assessment might seem innocuous, an inherent complacency should be avoided due to the potentially

insidious nature of the phenomena. It is hoped that the disadvantages associated with credit use will be addressed, so that the full value of credit to overall economic development and household welfare can be realised.

Recommendations

As noted in the thesis' introduction, the issue of over-indebtedness has implications for borrowers, institutions and governments. Therefore, recommendations are made for the three main stakeholders, who have a responsibility to ensure that the negative effects of multiple borrowing and over-indebtedness are addressed. Hence, households are advised to:

- **Exercise financial discipline:** The results indicate that increases in loan amounts make borrowers more likely to be over-indebted and larger amounts of borrowing results in severe over-indebtedness. From the objective cut-off points, using the over-indebtedness threshold of 15-30 percent of income to service debts results in moderate over-indebtedness. The 15 percent over-indebtedness threshold derived for the Ghanaian context could serve as a guide for borrowers to determine the amount of loan that can be conveniently serviced. This could prevent the risk of moving into higher levels of over-indebtedness, which could impact negatively on living standards.

Two recommendations are made for financial institutions:

- **Responsible Lending:** Lenders are advised to take responsibility for the credit that consumers can confidently hold and should enforce responsible lending to minimise repayment difficulties. On the issue of loan amount and over-indebtedness, lenders can employ the 15 percent over-indebtedness threshold as a critical benchmark for deciding on

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borrowers' credit capacity, without compromising their minimum living standards. Although, some indicators may already be in existence, these are usually applied universally and might not be sensitive to particular vulnerabilities. Using this threshold will be particularly relevant to safeguard the lives of rural borrowers.

- **Information Sharing:** Financial institutions should promote ease of information sharing between them. GHAMFIN in collaboration with BOG, should ensure that MFIs co-operate to share information on clients and develop a central database, where credit activity could be actively monitored to reduce multiplicity. Effective collaboration can flag up riskier borrowers, as suggested by the number of credit commitments held. This measure can also facilitate risk management efforts of lending institutions.

Due to information asymmetries in market operations, there is a need for government intervention to minimise potential consequences of over-indebtedness. Subsequently, three policy recommendations are made for government bodies.

- **Intensify Institutional Monitoring:** The Microfinance Desk at BOG is advised to intensify its monitoring of the growth of MFIs into rural areas. The outfit should, in collaboration with supervisory heads of the various categories of MFIs, actively monitor institutional growth in rural areas, to limit excessive expansionary effects of institutional growth, due to its propensity to engender multiple borrowing.
- **Safeguard Vulnerable Borrowers:** To safeguard the use of credit by rural borrowers, in particular, the government can intervene to ensure that

social objectives are not completely eroded amidst intense commercialisation. In the study, repayments include interests, charges and fees and in a predominantly private sector, these costs are uninsulated. Therefore, non-commercial FNGOs operating in the rural areas could be supported through government-assisted programmes to promote the delivery of adequate loan sizes required. Such grith intervention could minimise risks and safeguard borrowers' living standards.

- Credit Advisory Bureau: The Ministry of Finance and Economic Planning (MoFEP) could establish a Credit Advisory Bureau (CAB) in every region - an independent body which will advise citizens on debt and debt management issues. Borrowers will have access to independent information on interest rates, fees and charges and be able to compare borrowing costs across institutions. Through assistance from the outfit, borrowers can acquire knowledge and skills on the effective management of credit to minimise the effect on their living standards. They will be empowered to make informed choices regarding their borrowing and appreciate the inherent and inevitable risks of resorting to opportunistic borrowing.

Suggestions for Future Research

From the conceptualisation of the problem to the project's final execution, the study has benefitted from suggestions of improvement from comments noted during departmental seminars. However, due to resource, location and time constraints, the study may not have successfully incorporated

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all comments or been availed to other perspectives. This sub-section presents suggestions for future research.

First empirical analysis

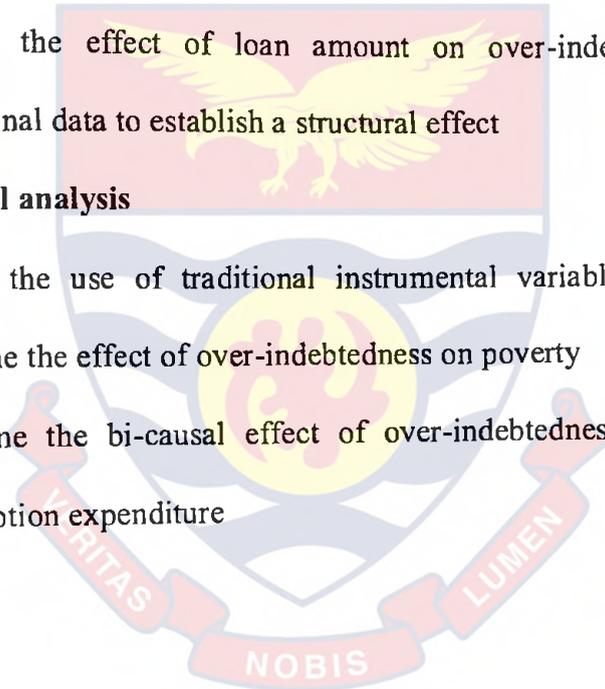
- Explore the use of credit information from loan files of institutions to augment the analysis of multiple borrowing
- Determine the impact of loan size on multiple borrowing by incorporating a control group.

Second empirical analysis

- Estimate the effect of loan amount on over-indebtedness using longitudinal data to establish a structural effect

Third empirical analysis

- Explore the use of traditional instrumental variable estimation to determine the effect of over-indebtedness on poverty
- Determine the bi-causal effect of over-indebtedness on household consumption expenditure



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APPENDICES

Appendix A -The Client Protection Principles

- **Appropriate product design and delivery**

Providers will take adequate care to design products and delivery channels in such a way that they do not cause clients harm. Products and delivery channels will be designed with client characteristics taken into account.

- **Prevention of over-indebtedness**

Providers will take adequate care in all phases of their credit process to determine that clients have the capacity to repay without becoming over-indebted. In addition, providers will implement and monitor internal systems that support prevention of over-indebtedness and will foster efforts to improve market level credit risk management (such as credit information sharing).

- **Transparency**

Providers will communicate clear, sufficient and timely information in a manner and language clients can understand so that clients can make informed decisions. The need for transparent information on pricing, terms and conditions of products is highlighted.

- **Responsible pricing**

Pricing, terms and conditions will be set in a way that is affordable to clients while allowing for financial institutions to be sustainable. Providers will strive to provide positive real returns on deposits.

- **Fair and respectful treatment of clients**

Financial service providers and their agents will treat their clients fairly and respectfully. They will not discriminate. Providers will ensure adequate safeguards to detect and correct corruption as well as aggressive or abusive treatment by their staff and agents, particularly during the loan sales and debt collection processes.

- **Privacy of client data**

The privacy of individual client data will be respected in accordance with the laws and regulations of individual jurisdictions. Such data will only be used for the purposes specified at the time the information is collected or as permitted by law, unless otherwise agreed with the client.

- **Mechanisms for complaint resolution**

Providers will have in place timely and responsive mechanisms for complaints and problem resolution for their clients and will use these mechanisms both to resolve individual problems and to improve their products and services.

(www.smartcampaign.org)



Variables	Definition and Measurement	A - priori
Multiple borrowing	Dependent Variable: Number of loan contracts held by client Binary (0 Single; 1 Multiple)	
Expenditure	Log of total household expenditure (continuous)	+
Returns	Log of returns – level of profit from businesses (continuous)	-
Loan amount	1)Log of amount borrowed in cedis (continuous) 2)Indicator variable representing loan sizes (ordinal with five categories: below GHS 100 as base reference; GHS 100-1000; GHS 1001-5000; GHS 5001-10,000; GHS 10,001-20,000)	+/-
Household Size	Number of working adults over 15 years (continuous)	-
MFI Density	Total number of MFIs in a locality (continuous)	+/-
CU, MFC, FNGO, ML, RCB, S&L, Susu	Seven variables representing density of a particular type of MFI (continuous)	+/-
Age	Age in years of household head (four categories - Lower Working Age (18-34), Upper Working Age (35-49), Pre-Retirement (50-64) Retired (above 65 – base category)	+/-
Sex	Sex of household head; proxy for gender: binary (1 female; 0 male)	+
Employment status	Types of economic activity (Nominal with three categories – Unemployed clients as base reference; Informal sector; Formal sector)	+
Location	Location of borrower; binary (0 urban; 1 rural)	+/-
Education	Levels of educational attainment (ordinal-measured on a scale of 1 to 3 categories – None/Primary; Middle/JHS; SHS/Vocational/Post-Secondary)	+
Region	Region of borrower's residence (Nominal with ten categories)	+/-
Health-shock	Indicator for distress borrowing, binary (0 No; 1 Yes)	-

Appendix B2: Empirical Analysis (2)

Variables	Definition and Measurement	A-priori
Over-indebtedness	Dependent variable: Over-indebtedness status of household head; binary (0 Not over-indebted; 1 Over-indebted)	
Loan amount	1) Log of amount borrowed in cedis (continuous) 2) Indicator variable representing loan sizes (ordinal with five categories: GHS10-100 as base reference; GHS101-300; GHS 301-500; GHS 5001-1000; GHS1000 and above)	+/-
Assets	Log of total value of assets measured in cedis (continuous)	-
Household size	Number of working adults over 15 years (continuous)	+
Loan use	Intended loan use: binary (0 non-productive; 1 productive)	-
Age	Age of household head (continuous)	-
Sex	Sex of household head; proxy for gender (binary: 0 male; 1 female)	+/-
Household expenditure	Log of total household expenditure measured in cedis (continuous)	+
Location	Location of borrowers; binary (0 rural; 1 urban)	+/-
Education	Levels of educational attainment (ordinal with four categories: Base reference: None; Middle/JHS; SHS, Tertiary)	+/-
Employment Status	Economic activity of borrowers; binary (0 Unemployed; 1 Employed)	-
Region	Region of borrower's residence (Nominal with ten categories)	+/-

Variables	Definition and Measurement	A-priori
Consumption expenditure per equivalent adult	Dependent variable- commonly used as a measure of welfare (continuous variable representing household welfare score)	
Over-indebtedness	Over-indebtedness status of household head; binary (0 Not over-indebted; 1 Over-indebted)	-
Loan amount	Log of amount borrowed in cedis (continuous)	+
Household Size	Number of working adults over 15 years (continuous)	+/-
Insurance	Insurance held by household head; binary (0 no; 1 yes)	+/-
Age	Age in years of household head (continuous)	+/-
Age Square	Square of age of household head to determine increasing effect of age (continuous)	+/-
Sex	Sex of household head; proxy for gender: binary (0 male; 1 female)	+
Employment status	Types of economic activity (Nominal with five categories: Base-unemployed; Public sector employee; Private sector employee; Self-employed non-agriculture; Self-employed agricultural sector)	+
Location	Location of borrower; binary (0 rural; 1 urban)	+/-
Education	Levels of educational attainment (ordinal with four categories: Base-None/Primary; JHS/Middle School; SHS; Tertiary)	+
Marital Status	Marital Status of household head (nominal with six categories: Base: Never Married; Consensual Union; Separated; Divorced; Widowed; Married)	+/-
Region	Region of borrower's residence (Nominal with ten categories)	+/-
Dependants	Number of dependants (ordinal with four categorical; Base-No dependants; 1-5 dependants; 6-10 dependants; 10 and above)	-
Health-shock	Health status of household head measured by illness suffered in the last two weeks, binary (0 No; 1 Yes)	-

To explain the behaviour of a dichotomous dependent variable, a suitably chosen CDF must be used. The logit model uses the cumulative logistic function. In some applications, the normal CDF has been found useful. The estimating model that emerges from the normal CDF is popularly known as the **probit model**. The probit model is based on utility theory, or rational choice perspective on behaviour, as developed by McFadden.

To motivate the probit model, it is assumed that the decision of the i th client to engage in multiple borrowing or not depends on an *unobservable utility index* I_i (also known as a **latent variable**), that is determined by one or more explanatory variables, say income X_i , in such a way that the larger the value of the index I_i , the greater the probability of a borrower having more than one loan. We express the index I_i as

$$I_i = \beta_1 + \beta_2 X_i \quad (1)$$

where X_i is the loan amount of the i th borrower.

How is the (unobservable) index related to the actual decision to borrow more? As before, let $Y = 1$ if the borrower has more than one loan and $Y = 0$ if client has a single loan. Now it is reasonable to assume that there is a **critical or threshold level** of the index, call it I^*_i , such that if I_i exceeds I^*_i , the borrower will have more than one loan otherwise the client will possess a single loan. The threshold I^*_i , like I_i , is not observable, but if we assume that it is normally distributed with the same mean and variance, it is possible not only to estimate the parameters of the index given in (1) but also to get some information about the unobservable index itself.

Given the assumption of normality, the probability that I^*_i is less than or equal to I_i can be computed from the standardized normal CDF as:

$$P_i = P(Y = 1 | X) = P(I^*_i \leq I_i) = P(Z_i \leq \beta_1 + \beta_2 X_i) = F(\beta_1 + \beta_2 X_i) \quad (2)$$

where $P(Y = 1 | X)$ means the probability that an event occurs given the value(s) of the X , or explanatory, variable(s) and where Z_i is the standard normal variable, i.e., $Z \sim N(0, \sigma^2)$. F is the standard normal CDF, which written explicitly in the present context is:

$$F(I_i) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{I_i} e^{-z^2/2} dz \quad (3)$$

$$= \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\beta_1 + \beta_2 X_i} e^{-z^2/2} dz$$

Since P represents the probability that an event will occur, here the probability of engaging in multiple borrowing, it is measured by the area of the standard normal curve from $-\infty$ to I_i .

The basic idea underlying the logit model is illustrated by the following linear probability model (LPM)

$$P_i = E(Y = 1 | X_i) = \beta_1 + \beta_2 X_i \quad (1)$$

where X represents an independent variable, loan amount and $Y = 1$ means the borrower is over-indebted. The representation of over-indebtedness is presented by the equation below:

$$P_i = E(Y = 1 | X_i) = \frac{1}{1 + e^{-(\beta_1 + \beta_2 X_i)}} \quad (2)$$

For ease of exposition, equation (2) is re-written as:

$$P_i = \frac{1}{1 + e^{-z_i}} = \frac{e^{z_i}}{1 + e^{z_i}} \quad (3)$$

where $Z_i = \beta_1 + \beta_2 X_i$. Equation (3) represents what is known as the (cumulative) **logistic distribution function**. It is easy to verify that as Z_i ranges from $-\infty$ to $+\infty$, P_i ranges between 0 and 1 and that P_i is nonlinearly related to Z_i (i.e., X_i), thus satisfying the two requirements considered earlier. But it seems that in satisfying these requirements, an estimation problem has been created because P_i is nonlinear not only in X but also in the β 's as can be seen clearly from (2). This means that the familiar OLS procedure cannot be used to estimate the parameters. But this problem is more apparent than real because (2) can be linearized, which can be shown as follows: If P_i , the probability of being over-

indebted, is given by (3), then $(1 - P_i)$, the probability of not being over-indebted, is

$$1 - P_i = \frac{1}{1+e^{z_i}} \quad (4)$$

Therefore, we can write

$$\frac{P_i}{1-P_i} = \frac{1+e^{z_i}}{1+e^{-z_i}} = e^{z_i} \quad (5)$$

Now $P_i/(1 - P_i)$ is simply the **odds ratio** in favour of being over-indebted — the ratio of the probability that a borrower is over-indebted to the probability that the borrower is not over-indebted. Thus, if $P_i = 0.8$, it means that odds are 4 to 1 in favour of the borrower being over-indebted. Now if we take the natural log of (5), we obtain a very interesting result, namely,

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = Z_i = \beta_1 + \beta_2 X_i \quad (6)$$

that is, L , the log of the odds ratio, is not only linear in X , but also (from the estimation viewpoint) linear in the parameters. L is called the **logit**, and hence the name **logit model** for models like (6).

Estimation of the Logit Model

For estimation purposes, equation (6) is written as follows:

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = \beta_1 + \beta_2 X_i + u_i \quad (7)$$

From equation (7) the **maximum likelihood (ML)** method used to estimate the parameters. Interpretations are by odds ratios or by obtaining probabilities.

In estimating the probability that a borrower engages in multiple borrowing or is over-indebted, given the borrower's loan amount (X), the logistic function is used to express the probability as illustrated in equation (8). This is reproduced below for convenience.

$$P_r = \frac{1}{1 + e^{-(\beta_1 + \beta_2 + x_i)}} \quad (8)$$

We do not actually observe P_i , but only observe the outcome $Y = 1$, if an individual

is over-indebted and $Y = 0$, if the individual is not over-indebted. Since each Y_i is a Bernoulli random variable, the probabilities can be written as:

$$P_r(Y_i = 1) = P_i \quad (9)$$

$$P_r(Y_i = 0) = (1 - P_i) \quad (10)$$

Suppose we have a *random sample* of n observations. Letting $f_i(Y_i)$ denote the probability that $Y_i = 1$ or 0, the joint probability of observing the n Y values, i.e., $f(Y_1, Y_2, \dots, Y_n)$ is given as:

$$f(Y_1, Y_2, \dots, Y_n) = \prod_1^n f_i(Y_i) = \prod_1^n P_i^{Y_i} (1 - P_i)^{1 - Y_i} \quad (11)$$

where Π is the product operator. Note that the joint probability density function can be written as a product of individual density functions because each Y_i is drawn independently and each Y_i has the same (logistic) density function. The joint probability given in Eq. (11) is known as the **likelihood function (LF)**. Equation (11) is a little awkward to manipulate. Therefore, its natural logarithm is taken to obtain what is called the **log likelihood function (LLF)**:

$$\begin{aligned}
 \ln f(Y_1, Y_2, \dots, Y_n) &= \sum_1^n [Y_i \ln P_i + (1 - Y_i) \ln(1 - P_i)] \\
 &= \sum_1^n [Y_i \ln P_i - Y_i \ln(1 - P_i) + \ln(1 - P_i)] \\
 &= \sum_1^n \left[Y_i \ln \left(\frac{P_i}{1 - P_i} \right) \right] + \sum_1^n \ln(1 - P_i)
 \end{aligned} \tag{12}$$

From (12) it is easy to verify that

$$(1 - P_i) = \frac{1}{1 + e^{\beta_1 + \beta_2 X_i}} \tag{13}$$

as well as

$$\ln \left(\frac{P_i}{1 - P_i} \right) = \beta_1 + \beta_2 X_i \tag{14}$$

Using (13) and (14), we can write the LLF as:

$$\ln f(Y_1, Y_2, \dots, Y_n) = \sum_1^n Y_i (\beta_1 + \beta_2 X_i) - \sum_1^n \ln [1 + e^{(\beta_1 + \beta_2 X_i)}] \tag{15}$$

As evident from (15), the log likelihood function is a function of the parameters β_1 and β_2 , since the X_i are known. In ML our objective is to maximize the LF (or LLF), that is, to obtain the values of the unknown parameters in such a manner that the probability of observing the given Y 's is as high (maximum) as possible. For this purpose, we differentiate (15) partially with respect to each unknown, set the resulting expressions to zero and solve the resulting expressions. One can then apply the second-order condition of maximization to verify that the values of the parameters obtained do in fact maximize the LF. The ML procedure for the probit model is similar to that for the logit model, except that in (1) the normal CDF is used rather than the logistic CDF.

Problem

According to Cameron and Trivedi (2005), economic theory is at the pinnacle of economic analysis but may not constitute the absolute and overarching consideration of the processes of model specification, estimation and inference. While the underlying theory is the desirable inception stage, potential econometric techniques to analyse some crucial economic relationships, tend to be fraught with challenges imposed by statistical and econometric assumptions which are ‘often arbitrary and frequently implausible’ (Deaton, 2000, p.3).

In this study, a careful consideration of theory confirmed conditions of endogeneity exhibited by simultaneity bias and measurement error problems. The simultaneity-bias implied is the reverse-causality between poverty and over-indebtedness. These two structural scenarios create a revolving feedback, engendering correlation with the error term. Measurement error problems can also plague both sides of the equation. For the regressor, the problem is determined by two main conditions. First, the suspect variable could be measured inaccurately. Second, the variable in question should be the principal variable of interest (Wooldridge, 2002). Imprecise measurements of economic variables are uncommon in household surveys providing information on income. Therefore, the two conditions affect the principal variable of interest since income is the main predictor of over-indebtedness.

Measurement error of the independent variable requires critical attention as estimates in a classical error-in-variable (CEV) case is bound to be biased and inconsistent where the effect derived from a least squares analysis will be

attenuated. Furthermore, under this condition, the parameter estimates of additional regressors will also be biased (Wooldridge, 2002). Although these challenges can be corrected by better data, the solution of 'better' data may remain remote unless households' economic transactions are accurately traced, monitored and recorded, which will be financially prohibitive and intricate, if at all attainable. Therefore, insurmountable challenges posed by data issues are addressed by the appropriate econometric technique. In such instances, instrumental variable analysis technique is employed to address endogeneity problems.

Resolving Endogeneity – The Instrumental Variables (IV) Approach

In estimating the effect of determinants of poverty, some studies adopt the ordinary least squares estimation despite the presence of heterogeneity issues embedded in cross-sectional surveys (Deaton, 2002). Such analyses are prevalent in cases where the covariates are assumed to be justifiably exogenous. However, in the presence of simultaneity and measurement error biases already expounded, parameter estimates of the OLS technique will be biased and inconsistent (Stock et al., 2012; Wooldridge, 2010). Therefore, OLS method may be inadequate to identify the effect of over-indebtedness on consumption expenditure per equivalent adult. Therefore, the traditional instrumental variables (IV) technique is adopted in the case of an endogenous regressor.

In empirical work, a myriad of conceptual and practical difficulties pose challenges for the issue of identification for instrumental variable analysis (Cameron & Trivedi, 2005; Wooldridge, 2010). As indicated, securing an instrument which satisfies ‘exclusion restrictions’ could be problematic; and, in certain cases, implausible, thereby restricting the use of IV techniques (Cameron & Trivedi, 2005; Ettner et al., 1997). Particularly, the ‘instrument relevance’ requirement has a salient role in determining the reliability of estimates. Therefore, any robust parameter estimates will depend on the acceptability of instruments employed. It is noted, for example, that where the applicability of the external instrument is suspected, a few studies explicitly discuss the strength of the correlation in the first stage regression (Chalak, 2016; Ebbes et al., 2009). This resonates with Cameron and Trivedi’s (2005) assertion that the instrumental variable technique “widely used in econometrics and rarely used elsewhere, is conceptually difficult and easily misused.” (p.95). Apparently, detecting appropriate instruments as a solution to endogeneity may be desirable but contextually impracticable in the presence of time, resource and data constraints.

In a study examining the effect of over-indebtedness on consumption expenditure from a borrower perspective, instruments can be generated from supply-side variables such as number of financial institutions, interest rates and types of products offered. However, in terms of the analysis, institutional coverage may suffice for the purpose. Yet, the opportunity to study at first hand, the effect of a possible relationship between over-indebtedness and household consumption expenditure, using the latest available nationally representative

data, also present attendant challenges. Therefore, the condition that instruments highly correlated with the endogenous variable be completely predetermined and independent of the disturbances might not be entirely defensible in this case. The study therefore adopts an instrumental variables approach which generates internally-based instruments using heteroscedastic variances to identify the model.

Instrumental Variables Estimation - Using Higher Order Moments

To address the issue of instrument availability as recognised, the study adopts a novel IV technique. In 2012, Arthur Lewbel, published a paper on the 'Identification by heteroscedasticity-based Instruments Technique' for instrumental variable analysis. The technique rectifies the identifiability problem by utilizing higher moments of the data. In his 1997 work on mismeasured regressors, the author refers to the existence of a long list of literature on the use of higher order moments and catalogues a list of such studies exploiting higher order moments to identify mismeasured regressors.

Sources of heteroscedasticity are observed in micro-economic data, particularly in cross-sectional expenditure surveys which produces typical instances of variables with differing variances (Deaton, 2000). The heteroscedasticity assumption is relevant and appropriate for the study of over-indebtedness on consumption expenditure due to greater variation between incomes and expenditures of borrowers. The approach's strategy for constructing internal instruments is derived from the model data. Nonetheless, the author asserts that, rather than imposing homoscedasticity, the model allows for, in contrast to, requiring heteroscedasticity and therefore applying this methodology addresses issues of endogeneity without recourse to an external

instrument. Appendix B.1 presents a summary of the binary endogenous regressor case.



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**Appendix B7.1 Identification and Estimation Using Heteroscedasticity Without
Instruments: The Binary Endogenous Regressor Case.**
(Lewbel, 2016)

Suppose we observe a sample of observations of endogenous variables Y_1 and Y_2 , and a vector of exogenous covariates X . We wish to estimate the parameter γ and the parameter vector β in the model

$$Y_1 = X'\beta + \gamma Y_2 + \varepsilon_1$$

$$Y_2 = X'a + \varepsilon_2$$

where the errors ε_1 and ε_2 may be correlated. As in Lewbel (2012), we will also consider the more general case where $Y_2 = g(X) + \varepsilon_2$ for some nonlinear, possibly unknown function g .

The standard instrumental variables solution to estimating β and γ is to find an element of X that appears in the Y_2 equation but not in the Y_1 equation, and use that excluded regressor as an instrument for Y_2 . The problem for identification and estimation considered here is that perhaps no element of X is excluded from the Y_1 equation, or equivalently, we're not sure that any element of β is zero. Lewbel (2012) provides identification and a corresponding very simple linear two stage least squares estimator for β and γ , in the case where no element of X is excluded from the Y_1 equation, so no element of X can be used as an instrument for Y_2 . The method consists of constructing valid instruments for Y_2 by exploiting information contained in heteroscedasticity of ε_2 .

The Lewbel (2012) estimator can be summarized as the following two steps. <https://ir.ucc.edu.gh/xmlui>

1. Estimate \hat{a} by an ordinary least squares regression of Y_2 on X , and obtain estimated residuals $\hat{\varepsilon}_2 = Y_2 - X'\hat{a}$
2. Let Z be some or all of the elements of X . Estimate β and γ by an ordinary linear two stage least squares regression of Y_1 on X and Y_2 , using X and $(Z - \bar{Z})\hat{\varepsilon}_2$ as instruments, where \bar{Z} is the sample mean of Z .

In addition to the standard exogenous X assumptions that $E(X \varepsilon_1) = 0$, $E(X \varepsilon_2) = 0$, and $E(XX')$ is nonsingular, the key additional assumptions required for applying this estimator are that $Cov(Z, \varepsilon_1 \varepsilon_2) = 0$ and $Cov(Z, \varepsilon_2^2) \neq 0$, where either $Z=X$ or Z is a subset of the elements of X . Lewbel (2012) shows that a variety of standard econometric models satisfy these assumptions. For example, the assumptions hold when the errors ε_1 and ε_2 satisfy the factor structure $\varepsilon_1 = cU + V_1$, and $\varepsilon_2 = U + V_2$ for some constant c , where U and V_1 are unobserved homoscedastic errors, V_2 is an unobserved heteroscedastic error, and U , V_1 , and V_2 are mutually independent conditional on Z . Examples where these conditions hold are when Y_2 is endogenous due to classical measurement error, or because of the presence of some underlying unobservable factor U that affects both Y_1 and Y_2 (e.g., U could be unobserved ability in a model where Y_1 is education and Y_2 is a labor market outcome).

Lewbel (2012) doesn't explicitly assume that Y_2 is continuous. However, that paper doesn't show that its identifying assumptions can be satisfied when Y_2 is not continuous. For example, if Y_2 was binary then U could not be

independent of K_2 in the above factor structure example. What the next section shows is that the identifying assumptions can be satisfied when Y_2 is binary.

A Binary Endogenous Regressor

Suppose that Y_2 is binary. Then $Y_2 = X'a + \varepsilon_2$ is a linear probability model. But we also wish to allow for more general models, so let $Y_2 = g(X) + \varepsilon_2$ where $g(X) = E(Y_2|X)$. Here $g(X)$ is some possibly nonlinear and possibly unknown function. For example, if Y_2 satisfies a probit or logit model, then $g(X) = F(X'a)$ where F is the cumulative normal or logistic distribution function. Also included are nonparametric models, where $g(X)$ is estimated by a nonparametric regression of Y_2 on X . Note in particular that Y_2 could be an indicator of treatment that might not be randomly assigned. In that case estimation of y corresponds to estimation of a (homogeneous) treatment effect.

Regardless of whether we estimate a linear probability model regression where the estimate is $\hat{g}(X) = X'\hat{a}$, or let $\hat{g}(X) = F(X'\hat{a})$ where \hat{a} is obtained by a logit, probit, or other threshold crossing model estimator, or estimate $\hat{g}(X)$ nonparametrically by, e.g., a kernel or sieve estimator, once we obtain estimates of the residuals $\hat{\varepsilon}_2 = Y_2 - \hat{g}(X)$, step 2 of the estimator described above remains the same.

We maintain the usual linear model assumptions for the exogenous regressors X , i.e., that X is uncorrelated with ε_1 and ε_2 that $E(XX')$ is nonsingular. If g is nonlinear (as in a logit, probit, or nonparametric regression model) then assume whatever is needed for consistent estimation of g .

We now show how the key additional assumptions required for the Lewbel (2012) estimator can be satisfied with Y_2 binary. For simplicity, the result is

derived taking $Z = X$, which then implies that the restrictions can also hold when Z is any subset of X .

ASSUMPTION A1: Let $g(X) = E(Y_2|X)$ and define $\varepsilon_2 = Y_2 - g(X)$. Assume $g(X)$ is finite and that $Cov[X, g(X)(1 - g(X))] \neq 0$.

ASSUMPTION A2: Assume $Y_1 = X'\beta + Y_2 + \varepsilon_1$ with $\varepsilon_1 = Y_2U + V$ for some unobserved random errors U and V , where Y_2 , U , and V are conditionally mutually independent, conditioning on X .

Assume $E(U|X) = c(X)/(g(X)(1 - g(X)))$ and $E(V|X) = -c(X)/(1 - g(X))$, where $c(X)$ is any function such that $Cov(X, c(X)) = 0$

Assumption A1 imposes minimal restrictions on Y_2 and X , and hence on the error ε_2 . The covariance condition in Assumption A1 is testable, since it can be estimated as the sample covariance between X and $\hat{g}(X)(1 - \hat{g}(X))$.

In contrast, Assumption A2 places strong distributional restrictions on U and V , specifically, on the conditional means of the component latent errors U and V . Again it should be stressed that these are not necessary conditions. Rather, they're just one possible set of assumptions that can be shown to work.

Note that the covariance condition in Assumption A2 will automatically hold if $c(X)$ is constant. However, it's also easy to find functions $c(X)$ that can work. For example if Z is any symmetrically distributed element of X that is independent of the other elements of X , then $c(X)$ could equal $(Z - E(Z))^k$ for any even integer k .

THEOREM 1: Let Assumptions A1 and A2 hold. Then $E(\varepsilon_1|X) = 0$, $E(\varepsilon_2|X) = 0$, $Cov(X, \varepsilon_1\varepsilon_2) = 0$ and $Cov(X, \varepsilon_2^2) \neq 0$.

PROOF: Verifying each of the conditions in turn, we have

$$E(\varepsilon_1|X) = E(Y_2U + V|X) = g(X)E(U|X) + E(V|X)$$

$$= g(X) \frac{c(X)}{g(X)(1-g(X))} + \frac{-c(X)}{(1-g(X))} = 0$$

$$E(\varepsilon_2|X) = E(Y_2 - g(X)|X) = g(X) - g(X) = 0$$

$$E(\varepsilon_1\varepsilon_2|X) = E(Y_2U\varepsilon_2 + V\varepsilon_2|X) = E(Y_2U\varepsilon_2|X) + E(V|X)E(\varepsilon_2|X)$$

$$= E(Y_2U(Y_2 - g(X))|X) = E(U(Y_2 - Y_{2g}(X))|X)$$

$$= E(U|X)g(X)(1-g(X)) = \frac{c(X)}{g(X)(1-g(X))}g(X)(1-g(X)) = c(X)$$

So

$$Cov(X, \varepsilon_1\varepsilon_2) = Cov(X, E(\varepsilon_1\varepsilon_2|X)) = Cov(X, c(X)) = 0$$

And

$$E(\varepsilon_2^2|X) = E((Y_2 - g(X))^2|X) = E((Y_2 - 2Y_{2g}(X) + g(X)^2)|X)$$

$$= g(X) - 2g(X)^2 + g(X)^2 = g(X)(1-g(X))$$

So

$$Cov(X, \varepsilon_2^2) = Cov(X, E(\varepsilon_2^2|X)) = Cov[X, g(X)(1-g(X))] \neq 0$$

Using the same types of derivations as in the above proof, one can also readily verify that $E(\varepsilon_1Y_2) = E(c(X))$ so Y_2 is indeed an endogenous regressor as long as $E(c(X)) \neq 0$. Theorem 1, along with the results in Lewbel (2012), establishes that the constructed instruments $(X - \bar{X})\hat{\varepsilon}_2$ are valid, and so the estimator of regressing of Y_1 on X and Y_2 , using X and $(X - \bar{X})\hat{\varepsilon}_2$ as instruments (or any subset of the elements of $(X - \bar{X})\hat{\varepsilon}_2$ as instruments) can be applied.

Appendix C1: Effect of Location and Institutional Density on Multiple Borrowing

Dependent Variable – Multiple Borrowing (Binary: 0 Single, 1 Multiple)	Model (1) Full	Model (2) Nested
Location (Urban)	.0017156	.0894183**
Rural	(.0383658)	(.0335983)
MFI Density	-.0007104**	-.0001999
Household Expenditure	(.0002135)	(.0001252)
Client sex (Male)	.0250337*	.030794**
Female	(.0130396)	(.0133278)
Location & MFI Density	.0673226**	-.0707984**
Marital status (Never Married)	(.0302611)	(.0303627)
Married	.000604**	.0006458**
Not married	(.0002592)	(.0002546)
Household Size	.0757856	.1038565
Employment status (Unemployed)	(.0764085)	(.0736905)
Informal sector	.0946109	.1197936
Formal sector	(.0823144)	(.0801669)
Education Level (None/Primary)	-.0045801	-.0049126
Middle/ JHS	(.0070005)	(.0072528)
SHS/Voc/PS	-.0374496	-.0244926
Age of Household Head (Retired)	(.0690249)	(.0708813)
Lower Working Age	-.0449022	-.0057108
Upper Working Age	(.0736216)	(.0756677)
Pre-retirement	.0324441	.0174377
Region	(.0407566)	(.0420863)
Western Region	.0005647	.0200165
Central Region	(.0436153)	(.0442085)
Volta Region	.0156749	.0338438
Eastern Region	(.0623822)	(.06274)
Ashanti Region	.1752137**	.1749704**
Brong Aha fo	(.0526976)	(.051914)
Northern Region	.1447662**	.1424278**
Upper East Region	(.0515318)	(.0510675)
Upper West Region	-.0930129	
	(.0729476)	
	-.1782452**	
	(.0713159)	
	.171489**	
	(.0870669)	
	-.150506*	
	(.0824229)	
	.1140724	
	(.089252)	
	-.4071253***	
	(.0632837)	
	-.0499217	
	(.0762677)	
	-.1225764	
	(.1164386)	
	-.1435716	
	(.0899639)	
Note: dy/dx for factor levels is the discrete change from the base level Robust standard errors in parentheses ***p<0.01, **p<0.05, *p<0.1		
Observations	1,099	1,099
Log likelihood	-637.99762	-685.76633
Wald chi2(24)	123.73	Wald chi2(15) = 54.65
Prob > chi2	0.0000	0.0000
Linktest (_hatsq)	0.340	0.917
Hosmer-Lemeshow Prob>chi2(379)	0.1678	0.2876
AIC	1325.995	1403.533
BIC	1451.049	1483.567
LR chi2 (8) = 95.54	0.0000	

Appendix C2: Effect of Location and Density of MFI Category on Multiple Borrowing

Variables	RCB	CU	S & L	ML	MFC	SUSU	FNGO
Type of Institution	-.000361 (.000756)	-.0007719 (.0006991)	-.0009788* (.0005424)	-.0012789 (.0009749)	-.0009249** (.0004504)	-.0012268 (.0011791)	-.0105338 (.0065732)
Location							
Rural	.1143228** (.0328573)	.0977378** (.0335256)	.0997123** (.0325686)	.0973186** (.0327899)	.089266** (.0329202)	.0729631** (.0355508)	.0200947 (.0335385)
MFI Type & Location	.0015961 (.0012637)	.002786** (.0012205)	.0025438** (.0012424)	.0045988** (.0017981)	.0037946** (.0015156)	.0101225** (.0032268)	.0654591*** (.0106777)
Household Expenditure	.0309752** (.0132861)	.0309361** (.0133041)	.0310767** (.0133521)	.0314331** (.0133239)	.0323587** (.0133292)	.029779** (.0132468)	.0251808* (.0130874)
Client sex							
Male	-.0708889** (.0304326)	-.0717641** (.0303721)	-.0713185** (.0303988)	-.071454** (.0303536)	-.0725676** (.0303785)	-.073883** (.0302987)	-.081631** (.0298896)
Marital status							
Married	.0997473 (.0742083)	.1026825 (.0738905)	.1027994 (.0738185)	.1030497 (.0737545)	.1048521 (.0731379)	.1065779 (.0727683)	.0962031 (.0745944)
Not married	.118492 (.0807923)	.1183387 (.0804191)	.1213472 (.080364)	.1180329 (.0802918)	.1208915 (.0797472)	.1184272 (.0792544)	.1055686 (.080547)
Household size	-.0038219 (.0072297)	-.0047498 (.0072575)	-.0047651 (.0072312)	-.004945 (.0072665)	-.0054063 (.007245)	-.0055323 (.0072987)	-.0038734 (.0069937)
Employment status							
Informal sector	-.0209938 (.0708759)	-.0236684 (.0707147)	-.027605 (.0712652)	-.0234851 (.0706523)	-.0275238 (.0713607)	-.0192191 (.0704276)	-.0125816 (.0692691)
Formal sector	-.0016568 (.0757782)	-.0064119 (.0755686)	-.0116417 (.0760662)	-.00704 (.0754633)	-.0111849 (.07611)	-.01187 (.0750062)	-.0595068 (.0739893)
Educational level							
Middle/JHS	.0177447 (.0421031)	.0169172 (.0420707)	.0198854 (.0420518)	.0160907 (.042082)	.0181827 (.0419789)	.0154154 (.0418307)	.0216827 (.0408685)
SHS/Voc/PS	.0220979 (.0442606)	.0201815 (.0441766)	.0187043 (.044179)	.0198063 (.0441878)	.0194493 (.0441309)	.0231568 (.0439962)	.0219418 (.0430288)
Age							
Lower working age	.0349973 (.0629295)	.0332103 (.062779)	.0371246 (.0625546)	.0325186 (.0629055)	.036005 (.0625941)	.0248001 (.0630072)	.0107689 (.0610379)
Upper working age	.1759482** (.0521148)	.1745156** (.0520192)	.1786476** (.051688)	.1732333** (.0520667)	.1757602** (.051748)	.1695552** (.0523104)	.1756848** (.0513017)
Pre- retirement	.1401495** (.0511943)	.1394886** (.0511121)	.143695** (.0508472)	.1383245** (.0511883)	.1428687** (.0508996)	.1354292** (.0514574)	.143949** (.0504974)
Health status	-.0082331 (.0407086)	-.0052819 (.0404764)	-.002316 (.0404019)	-.0054597 (.0403989)	-.0028256 (.0402653)	-.0031458 (.040399)	.0067962 (.0391136)

Robust standard errors in parentheses

***p<0.01, **p<0.5, *p<0.1

Observations	1,099	1,099	1,099	1,099	1,099	1,099	1,099
Log likelihood	-686.99337	-685.17005	-685.22063	-684.49334	-683.7118	-682.90435	-667.1059
Wald chi2(16)	50.96	53.77	54.08	54.71	57.39	58.32	84.96
Prob>chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Linktest (hatsq)	0.981	0.961	0.938	0.967	0.739	0.706	0.971
Goodness of fit [Pearson chi2]	Chi2(1073)	Chi2(1075)	Chi(1075)	Chi(1075)	Chi(1075)	Chi(1075)	Chi(1075)
Prob> chi 2	1100.92	1101.84	1101.06	1102.33	1099.36	1099.86	1100.31
	0.2703	0.2781	0.2837	0.2746	0.2961	0.2924	0.2891

Dependent Variable – Multiple Borrowing (Binary: 0 Single, 1 Multiple)	Model (3) Loan (Continuous)	Model (4) Loan (Categorical)
Location (Urban)	.213376*** (.0469739)	.2173277*** (.046102)
Rural		
Returns	-.0427823** (.0201074)	-.0393844** (.0190327)
Loan Amount (Continuous)	.1027175*** (.0217106)	
Loan Amount - Categorical (Below GHS 100)		
GHS100-1000		.1354758** (.0689958)
GHS1001-5000		.2984904*** (.07127)
GHS5001-10000		.3864668*** (.108515)
GHS10001-20000		.5924618** (.2057195)
Household Expenditure	.0422611* (.0223838)	.0502627** (.0213359)
Client sex (Male)	.059453 (.0484623)	.0548689 (.0468911)
Female		
Marital status (Never Married)		
Married	.1738846** (.0834964)	.175513** (.0785635)
Not married	.1884221** (.0891668)	.1857442** (.0840053)
Household Size	-.0379918** (.0131622)	-.0392065** (.012638)
Employment status (Unemployed)		
Informal sector	.1041262 (.1714016)	.1308192 (.1577394)
Formal sector	.1022087 (.176905)	.1049241 (.1633046)
Education Level (None/Primary)		
Middle/ JHS	.0610461 (.0577697)	.0505019 (.0558338)
SHS/Voc/PS	-.012342 (.0647249)	-.0079779 (.0920381)
Age of Household Head (Retired)		
Lower Working Age	-.0286992 (.0968481)	-.0141753 (.0920381)
Upper Working Age	.0864514 (.0867887)	.0985302 (.0817396)
Pre-retirement	.1250988 (.0895101)	.1081946 (.0839504)
Health_status	.0484026 (.0569513)	.0219213 (.0559668)

Note: dy/dx for factor levels is the discrete change from the base level
 Robust standard errors in parentheses ***p<0.01, **p<0.05, *p<0.1

Observations	400	416
Log likelihood	-221.92039	-223.39699
Wald chi2(16)	54.55	Wald chi2(19) = 67.55
Prob > chi2	0.0000	0.0000
Linktest (_hatsq)	0.974	0.730
Pseudo R ²	0.1323	0.1455
Hosmer-Lemeshow Prob>chi2(379)	0.1521	0.1748
AIC	477.8408	486.7940
BIC	545.6957	567.4077

Appendix C4: Determinants of Multiple Borrowing

Dependent Variable – Multiple Borrowing (Binary: 0 Single, 1 Multiple)	Model (5) Full	Model (6) Nested (2 Vars)
Location (Urban)	.0651256*	.0678538*
Rural	(.035709)	(.0357592)
Household Expenditure	.0280338**	.0268306**
Client's Sex (Male)	(.0134388)	(.0135587)
Female	.0691835**	.0670395**
Household Size	(.031126)	(.0311479)
Employment status (Not Employed)	-.0054472	-.0053166
Informal sector	(.0071706)	(.006924)
Formal sector	-.0009579	.0052715
	(.0687126)	(.0670919)
Marital status (Never Married)	.0052116	.0087957
Married	(.0739787)	(.0679019)
Not married	.089601	
	(.089601)	
Education (Lower)	.1198998	
Higher	(.0850223)	
Age of household head	-.0144292	-.0158264
Lower Working Age	(.0322137)	(.0322301)
Upper Working Age	.0241507	.0060904
	(.0645219)	(.0622301)
Pre-retirement	.1712725**	.1687688**
	(.0541626)	(.0541577)
Illness	.152428**	.1563252**
	(.0529083)	(.0532947)
	-.016848	
	(.0405033)	
Region (Greater Accra)		
Western Region	.0151512	.0122784
	(.0655055)	(.0655499)
Central Regional	-.0594158	-.0637595
	(.0590455)	(.0587004)
Volta Region	.2891061***	.2840302***
	(.0754065)	(.0753925)
Eastern Region	-.0225215	-.0334108
	(.0712551)	(.0707791)
Ashanti Region	.0407459	.0334104
	(.067985)	(.0676903)
Brong –Ahafo Region	-.2887052***	-.2955696***
	(.0543003)	(.0538993)
Northern Region	.1019299	.0978805
	(.0630485)	(.063028)
Upper East Region	-.1051844	-.1095136
	(.0903185)	(.0905276)
Upper West Region	-.0217345	-.0252552
	(.0811998)	(.0813117)

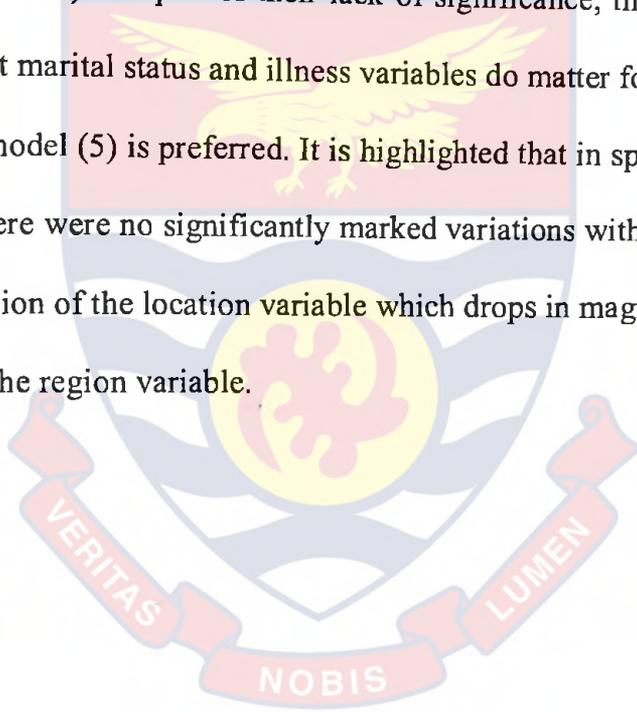
Note: dy/dx for factor levels is the discrete change from the base level
Robust standard errors in parentheses ***p<0.01, **p<0.05, *p<0.1

Observations	1,099	1,099
Log likelihood	-605.52062	-607.87159
Wald chi2(22)	106.42	Wald chi2(19) 105.35
Prob > chi2	0.0000	0.0000
Linktest (_hatsq)	0.377	0.448
Hosmer-Lemeshow Prob>chi2	0.1137	0.1404
AIC	1257.041	1255.743
BIC	1370.8	1354.683
LR chi2 (3) = 4.70; Prob>chi2	0.1950	

Models (1) and (2) of Appendix C1 present results for the effects of institutional density and multiple borrowing while Appendix C2 contain results for the individual effects of institutional types on multiple borrowing. All models pass post-estimation tests as indicated below the results.

For the drivers of multiple borrowing, the estimations were conducted in two sets. Models (3) and (4) forms the first set and models (5) and (6) constitute the second. In both sets, the appropriate diagnostic tests conducted indicated the strength of the estimations in accurately predicting the probability of multiple borrowing. As already reiterated, models (3) and (4) were based on a reduced sample for the loan amount and returns on investment respectively. Iterations for the log-likelihood for both models converged at -221.92039 and -223.39699. Additionally, the Wald chi2 was strongly significant for both equations – Wald chi2(16) = 54.55; Prob>chi2=0.000 and Wald chi2(19) = 67.55; Prob>chi2=0.000 for the categorical loan amount variable. Post-estimation tests for model specification (linktest) is also strongly significant, indicating that both models are correctly specified ($\hat{\rho} = 0.000$; $\hat{\sigma}^2 = 0.974$ and $\hat{\rho} = 0.000$; $\hat{\sigma}^2 = 0.730$). In addition to the link test, the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) diagnostics were also performed. For models (1) and (2), the AIC estimates were recorded as 477.8408 and 486.7940. Similarly, the BIC produced estimates of 545.16957 and 567.4077 respectively. By the rule of thumb, the model specified with the continuous loan amount variable is a better fit. However, for the actual loan size effects, the categorised loan amount provides an illuminating analysis of the different categories of amount borrowed.

Models (5) and (6) are based on the sample sizes of 1,039 and 1,040 respectively. The log likelihood convergence for the two models are -605.52062 and -607.87159. Similar to the robustness of the linktests enumerated above, models (5) and (6) also exhibit the same level of efficacy. Results indicate that both models are correctly specified [(Model 4: $\hat{\mu} = 0.000$; $\hat{\sigma}^2 = 0.377$) and (Model 5: $\hat{\mu} = 0.000$; $\hat{\sigma}^2 = 0.448$]. Both models also pass the Hosmer-Lemeshow goodness of fit test ($P = 0.1137$; $P = 0.1404$ respectively). For a nested model, the log likelihood ratio test is conducted ($LR \chi^2(3) = 4.70$; $Prob > \chi^2 = 0.1950$). In spite of their lack of significance, the log likelihood test suggest that marital status and illness variables do matter for the estimation and therefore model (5) is preferred. It is highlighted that in spite of the model preferences, there were no significantly marked variations within the estimates with the exception of the location variable which drops in magnitude due to its trade-off with the region variable.



CHAPTER SEVEN- APPENDIX D

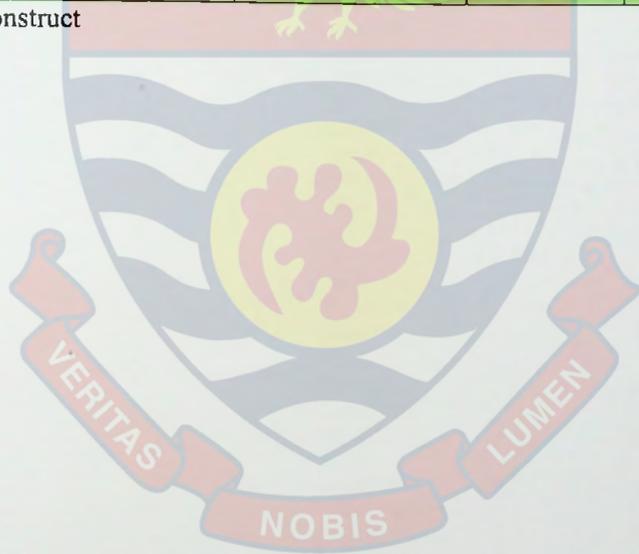
Appendix D1: Average Annual Household Per Capita and Estimated Total Annual Cash Expenditure by Expenditure Group

Expenditure Group	Average annual household cash expenditure (GHS)	Average annual per capital cash expenditure (GHS)	Total annual cash expenditure (Million GHS)	Percentage distribution
Food	3,673	1303	24241	45.8
Food and non-alcoholic beverages	3673	1303	24241	45.8
Non-food	5793	1964	28656	54.2
Alcoholic beverages and tobacco	315	127	551	1.0
Clothing and footwear	556	186	3586	6.8
Housing, water, electricity and gas	1015	354	5997	11.3
Furnishings, household equipment and maintenance	322	111	2076	3.9
Health	148	50	559	1.1
Transport	692	244	3649	6.9
Communication	434	166	2186	4.1
Recreation and Culture	281	90	1309	2.5
Education	1271	306	5591	10.6
Restaurants and hotels	260	145	13	0.0
Miscellaneous goods and services	499	185	3137	5.9
Total	9466	3267	52896	100.0

Source: GLSS 6

Components	Categories	Average Hhd Exp (%)	Rural (%)	Cumulative (%)	Threshold (%)	Incidence
Food	A	45.8	*55	45.8	55 -100	Severely OVI
Health	B	1.1	1.1	23 approx.	55	Over- indebted
Education		10.6	10.6			
Housing Water, Electricity, Gas		11.3	11.3	25		
Clothing and Footwear	C	6.8	6.8	14 approx.	30	Moderately Over- indebted
Transport		6.9	6.9			
Total Basic Consumption Expenditure		82.5	91.7			
Average Basic Consumption Expenditure including rural factor		87.1				
Cut-off point: Total Income - Average Basic Consumption Expenditure (100 - 87 = 13*)	D	15		15	15	Not over- indebted

Source – Author’s Construct



Appendix D4: Logit Estimation II (Region - Base Category: Western)

Dependent Variable – Over-Indebtedness (Binary: 0 Not-Over-Indebted, 1 Over-Indebted)	Model (3) Loan (Continuous)	Model (4) Loan(Categorical)
Loan Amount	.1351792*** (.014028)	
Loan Amount - (Below GHS10-100) GHS101-300		.0473622* (.026692)
GHS301-500		.1495823*** (.0356432)
GHS501-1000		.2773504*** (.0360133)
GHS1000-Above		.4395019*** (.037734)
Household Expenditure	.05431439** (1.820856)	.03994748** (1.818248)
Household Size	-.0138142** (.0050397)	-.0151337** (.0050125)
Gender (Male)	.0589672** (.0270057)	.0514042* (.0277096)
Female	(.0270057)	(.0277096)
Age of Household Head	-.0005719 (.0009393)	-.0008157 (.0009623)
Loan Use (Non-Productive Investment)	.0578985** (.027191)	.0598926** (.0275968)
Productive Investment	(.027191)	(.0275968)
Employment status (Unemployed)	-.1847327** (.0585366)	-.1765874** (.0600217)
Employed	(.0585366)	(.0600217)
Region (Western)		
Central	-.1263533** (.0453745)	-.1211875** (.0451515)
Greater Accra	-.09107* (.0510378)	-.0884211* (.0499877)
Volta	-.1139832** (.0409756)	-.104746** (.0419341)
Eastern	-.0958539** (.0413092)	-.0766393 (.042485)
Ashanti	-.1280534** (.0390167)	-.1132131* (.0395218)
Brong Ahafo	-.0916817** (.0392684)	-.0876029** (.0399742)
Northern	-.0270633 (.0581181)	-.0037283 (.0595477)
Upper East	-.0169013 (.0560666)	-.0222947 (.0598382)
Upper West	-.0377504 (.0617895)	-.0123343 (.0604429)
Asset	-.0189032** (.0073311)	-.0166431** (.0071541)
Education Level (None)		
Middle/ JHS	.1100893*** (.0288314)	.1017171** (.0296858)
SHS	.0909183** (.0459474)	.0898466** (.0464181)
Tertiary	.0435357 (.037268)	.0612877* (.0370937)
Location (Rural)		
Urban	.0626288** (.0256264)	.0622032** (.0256551)

Robust standard errors in parentheses
***p<0.01, **p<0.05, *p<0.1

Observations	1,295	1,295
Log likelihood	-617.86198	-617.86198
Wald chi2(21)	176.38	chi2(24)212.01
Prob > chi2	0.0000	0.0000
Linktest (_hatsq)	0.000	0.440
Goodness of fit [Pearson chi2(1273)]	3021.91	chi2(1270) 1327.72
Prob>chi2	0.0000	0.1268
AIC	1279.724	1292.18
BIC	1393.382	1421.337
R2_p	0.1997	0.1955

Appendix D6: Ordinal Logit Estimation: Intensity of Over-Indebtedness

Dependent Variable – Over-indebtedness Categorical	Not OVI	MOD OVI	OVI	SEV OVI
Loan Amount - GHS101-300	-0.0503865** (.0248301)	0.0295352 ** (.0145782)	0.0105856** (.0053127)	0.0102657** (.0052235)
GHS301-500	-0.1650636*** (.0362306)	0.089649*** (.0187972)	0.0367099*** (.0093655)	0.0387047*** (.0101873)
GHS501-1000	-2.2928747*** (.0350699)	.1437716*** (.0179524)	.0684604*** (.0102639)	.0806426*** (.0134889)
GHS1000-Above	-4.5446621*** (.03838)	.1883579*** (.0181481)	.1103724*** (.0130467)	.1559318*** (.0215652)
Household Expenditure	-4.435162** (1.727802)	1.497692** (.5882527)	1.111426** (.4481133)	1.826044** (.789903)
Household Size	0.0117248** (.0046872)	-.0039593** (.0016304)	-.0029382** (.0011878)	-.0048273** (.0019659)
Gender (Male)	.0617682** (.0258182)	-.0201852** (.0082166)	-.0155665** (.0067867)	-.0260165** (.0113127)
Female	.0006769 (.0009378)	-.0002286 (.0003172)	-.0001696 (.0002367)	-.0002787 (.0003855)
Age of Household Head	-.042265 (.029085)	.0150138 (.0110057)	.0105727 (.0073887)	.0166784 (.010903)
Loan Use	Productive Investment .1762121** (.056971)	-.0430617*** (.0096339)	-.0425843** (.0135369)	-.0905661** (.0361194)
Employment status (Unemployed)				
Employed				
Region (Western)				
Central	.1187388** (.0421772)	-.0393815** (.01522013)	-.0297255** (.0108845)	-.0496319** (.017536)
Greater Accra	.0700487 (.049892)	-.0212497 (.0162036)	-.0175274 (.0126876)	-.0312716 (.0214744)
Volta	.098126** (.0391975)	-.0313757** (.0132643)	-.0245784** (.0099358)	-.0421719** (.0170471)
Eastern	.0854679** (.0382519)	-.0266986** (.0121857)	-.0214033** (.0099655)	-.037366** (.0168882)
Ashanti	.1112807** (.0372609)	-.0364294** (.0126608)	-.0278672** (.0096786)	-.046984** (.0162573)
Brong Ahafo	.0643948 (.0404988)	-.0193206 (.0126795)	-.0161051 (.0102641)	-.0289691 (.0180331)
Northern	.0143993 (.053071)	-.003893 (.0145833)	-.0035716 (.0131903)	-.0069347 (.0253177)
Upper East	.0000513 (.063161)	-.0000134 (.016534)	-.0000127 (.0156069)	-.0000252 (.0310201)
Upper West	.0019541 (.0576274)	-.0005137 (.0151904)	-.0004831 (.0142524)	-.0009573 (.0281849)
Asset	.018484** (.0071223)	-.0062418** (.0024224)	-.004632** (.0017892)	-.0076102** (.0030678)
Education Level (None)				
Middle/ JHS	-.086078** (.0303594)	.0301162** (.0116013)	.0215369** (.0080145)	.0344249** (.011654)
SHS	-.0856365* (.0467945)	.0299827* (.0158953)	.0214267* (.019542)	.0342271* (.0196861)
Tertiary	-.0374677 (.0363064)	.0141095 (.0138966)	.0093614 (.0091579)	.0139969 (.0133925)
Location (Rural)				
Urban	-.0501642** (.0254882)	.0174683* (.0092854)	.0125603* (.0064647)	.0201357** (.0100622)

Robust standard errors in parentheses
 ***p<0.01, **p<0.05, *p<0.1

Observations	1,295
Log likelihood	-1004.0019
Wald chi2(24)	227.32
Prob > chi2	0.0000
Linktest (_hatsq)	0.542
R2_p	0.1309

This section presents results on the individual hypothesis tests of the main variable of interest and the post-estimation tests for the models. Even though the logit output presents the Wald tests for all regressors, the hypothesis for the continuous and categorical loan amounts are tested separately. For the continuous loan variable, the *test* result confirms the effect of the continuous loan amount on the probability of over-indebtedness. The resulting chi squared test with 1 degree of freedom (61.11) and a probability chi square of 0.000 indicates that we fail to accept the null hypothesis that the effect of the continuous loan amount variable on the probability of over-indebtedness is equal to zero. Likewise, the coefficients of the loan amount factor variable are also tested simultaneously using *testparm*. The probability chi-square is strongly significant ($\text{Prob} > \chi^2 = 0.0000$) at 4 degrees of freedom (97.58). For all estimations conducted, the overall test of joint significance is valid. The Wald test suggests that the combined effects of all the parameters of the model with the exception of the intercept are not equal to zero. The Akaike Information Criteria (AIC) and the Schwarz Bayesian Information Criteria (BIC) are used for model comparison.

Although the focus is on loan size, the continuous loan amount is presented as an initial analysis. While the AIC and BIC prefer the continuous loan amount estimation, the model fails two specification tests as indicated in the post-estimation summary under Appendix D3 Model (1). Changing the model base category from Greater Accra to Western also makes no difference in the estimates. On the contrary, the categorical loan amount passes all model specification tests. Given that the linktest and the Pearson model specification

favours the categorical loan amount, the study estimates are based on the categorical variable in accordance with the interest of the study which focuses on the effect of a range of loan sizes. Appendix D4 contain models (3) and (4) which are presented in tandem to illustrate the similarities in the estimates but for changes in the regional dummies which respond to the Western Region base reference. Therefore, the study estimates are based on Model (4) as preferred by the post-estimation tests.



CHAPTER EIGHT- APPENDIX E

Appendix E1: Effect of Over-Indebtedness on Household Consumption Expenditure – Full Model

VARIABLES	(1) Ordinary Least Squares	(2) Instrumental Var 2SLS	(3) Instrumental Var GMM
Over-indebtedness	-0.126*** (0.0351)		
Loan Amount	0.171*** (0.0165)	-0.173*** (0.0640)	-0.145** (0.0614)
Age of Household Head	-0.0113 (0.00916)	0.178*** (0.0177)	0.173*** (0.0171)
Age square	0.000137 (9.45e-05)	-0.0115 (0.00904)	-0.00721 (0.00852)
Household Size	-0.124*** (0.00997)	0.000139 (9.32e-05)	8.78e-05 (8.73e-05)
Public Sector Employee	0.228*** (0.0866)	-0.125*** (0.00991)	-0.123*** (0.00944)
Private Sector Employee	0.271*** (0.0909)	0.217** (0.0870)	0.241*** (0.08p45)
Self-Employed Non-Agric	0.164** (0.0819)	0.266*** (0.0902)	0.278*** (0.0875)
Self-Employed Agric	0.210*** (0.0811)	0.156* (0.0817)	0.143* (0.0798)
Male	0.00856 (0.0465)	0.200** (0.0813)	0.207*** (0.0790)
Urban	0.204*** (0.0355)	0.00518 (0.0461)	0.0146 (0.0449)
JHS/MSLC	0.160*** (0.0394)	0.204*** (0.0351)	0.214*** (0.0339)
SHS	0.246*** (0.0645)	0.164*** (0.0389)	0.171*** (0.0381)
Tertiary	0.362*** (0.0549)	0.249*** (0.0637)	0.244*** (0.0620)
Western	-0.177*** (0.0668)	0.363*** (0.0542)	0.352*** (0.0526)
Central	-0.253*** (0.0756)	-0.171** (0.0665)	-0.191*** (0.0641)
Volta	-0.224*** (0.0728)	-0.251*** (0.0751)	-0.250*** (0.0716)
Eastern	-0.326*** (0.0687)	-0.222*** (0.0721)	-0.235*** (0.0694)
Ashanti	-0.165** (0.0713)	-0.324*** (0.0682)	-0.313*** (0.0647)
Brong Ahafo	-0.345*** (0.0701)	-0.164** (0.0706)	-0.182*** (0.0673)
Northern	-0.451*** (0.0910)	-0.342*** (0.0692)	-0.357*** (0.0667)
Upper East	-0.290*** (0.0892)	-0.443*** (0.0903)	-0.427*** (0.0877)
Upper West	-0.550*** (0.0921)	-0.282*** (0.0884)	-0.279*** (0.0858)
Health Shock	-0.117** (0.0564)	-0.541*** (0.0906)	-0.589*** (0.0860)
1-5 Dependants	-0.300*** (0.0533)	-0.116** (0.0555)	-0.125** (0.0531)
6-10 Dependants	-0.0346 (0.105)	-0.300*** (0.0526)	-0.283*** (0.0507)
10 and above	0.544** (0.258)	-0.0328 (0.103)	-0.0455 (0.0994)
Consensual Union	-0.0401 (0.0510)	0.544** (0.254)	0.643*** (0.229)
Separated	-0.0690 (0.0730)	-0.0385 (0.0503)	-0.0342 (0.0490)
Divorced	0.0323 (0.0680)	-0.0695 (0.0724)	-0.0491 (0.0711)
Widowed	-0.0123 (0.0645)	0.0398 (0.0677)	0.0365 (0.0664)
Married	-0.158* (0.0810)	-0.0101 (0.0636)	-0.0112 (0.0612)
Constant	7.971*** (0.264)	-0.154* (0.0796)	-0.171** (0.0765)
Observations	1,292	7.956*** (0.261)	7.886*** (0.250)
R-squared	0.551	1,292	1,292

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Linktest: $\hat{\alpha} = 0.292$ ovtest: $F(3, 1256) = 1.04$; Prob > F = 0.3747
Underidentification test (Kleibergen-Paap rk LM statistic): 201.531; Chi-sq(31) P-val = 0.0000
Weak identification test (Cragg-Donald Wald F statistic): 17.563; (Kleibergen-Paap rk Wald F statistic): 14.735
Hansen J statistic (overidentification test of all instruments): 38.294; Chi-sq(30) P-val = 0.1424

Appendix E2: Effect of Over-Indebtedness on Household Consumption Expenditure – Nested Model

VARIABLES	(1) Ordinary Least Squares	(2) Instrumental Var 2SLS	(3) Instrumental Var GMM
Dependent Variable: Consumption Expenditure per equivalent adult			
Over-indebtedness	-0.127*** (0.0350)	-0.180*** (0.0666)	-0.148** (0.0643)
Loan Amount	0.173*** (0.0160)	0.180*** (0.0176)	0.177*** (0.0170)
Household Size	-0.125*** (0.00934)	-0.126*** (0.00942)	-0.123*** (0.00908)
Public Sector Employee	0.157* (0.0824)	0.145* (0.0839)	0.178** (0.0816)
Private Sector Employee	0.200** (0.0871)	0.196** (0.0875)	0.213** (0.0852)
Self-Employed Non-Agric	0.0939 (0.0776)	0.0852 (0.0782)	0.0924 (0.0765)
Self-Employed Agric	0.151* (0.0776)	0.140* (0.0787)	0.159** (0.0766)
Male	0.0136 (0.0390)	0.00832 (0.0392)	0.0122 (0.0383)
Urban	0.204*** (0.0350)	0.205*** (0.0351)	0.211*** (0.0342)
JHS/MSLC	0.151*** (0.0384)	0.155*** (0.0386)	0.165*** (0.0381)
SHS	0.231*** (0.0628)	0.235*** (0.0629)	0.231*** (0.0613)
Tertiary	0.352*** (0.0549)	0.353*** (0.0549)	0.342*** (0.0534)
Western	-0.169** (0.0665)	-0.161** (0.0671)	-0.185*** (0.0643)
Central	-0.242*** (0.0752)	-0.240*** (0.0758)	-0.244*** (0.0720)
Volta	-0.214*** (0.0722)	-0.212*** (0.0725)	-0.232*** (0.0694)
Eastern	-0.307*** (0.0678)	-0.304*** (0.0683)	-0.310*** (0.0651)
Ashanti	-0.159** (0.0712)	-0.157** (0.0715)	-0.188*** (0.0683)
Brong-Ahafo	-0.332*** (0.0701)	-0.328*** (0.0702)	-0.358*** (0.0673)
Northern	-0.439*** (0.0897)	-0.430*** (0.0900)	-0.432*** (0.0874)
Upper East	-0.279*** (0.0881)	-0.271*** (0.0885)	-0.274*** (0.0856)
Upper West	-0.545*** (0.0927)	-0.535*** (0.0922)	-0.573*** (0.0875)
Health Shock	-0.115** (0.0573)	-0.114** (0.0572)	-0.107* (0.0551)
1-5 Dependants	-0.250*** (0.0507)	-0.251*** (0.0508)	-0.235*** (0.0496)
6-10 Dependants	0.0231 (0.107)	0.0247 (0.107)	0.0152 (0.103)
10 and above	0.612** (0.255)	0.613** (0.255)	0.670*** (0.235)
Constant	7.745*** (0.170)	7.727*** (0.172)	7.694*** (0.168)
Observations	1,292	1,292	1,292
R-squared	0.547	0.546	0.546

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Linktest: $\hat{\alpha} = 0.249$ ovtest: $F(3, 1263) = 1.08$; Prob > F = 0.3580

Hansen J statistic (overidentification test of all instruments): 31.022 Chi-sq(23) P-val = 0.1223

Underidentification test (Kleibergen-Paap rk LM statistic): 208.938 Chi-sq(24) P-val = 0.0000

Weak identification test (Cragg-Donald Wald F statistic): 22.527 (Kleibergen-Paap rk Wald F statistic): 17.500

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity - Ho: Constant variance
chi2(26) = 64.54; Prob > chi2 = 0.000

Endogeneity test of endogenous regressors: 0.720

Regressors tested: OVI

Chi-sq(1) P-val = 0.396

Appendix E3: Effect of Insurance on Household Consumption Expenditure – Full Model

VARIABLES	(1) Ordinary Least Squares	(2) Instrumental Var 2SLS	(3) Instrumental Var GMM
OVI	-0.125*** (0.0348)	-0.176*** (0.0655)	-0.151** (0.0632)
Insurance	0.0842** (0.0339)	0.0829** (0.0335)	0.0753** (0.0328)
Loan Amount	0.168*** (0.0161)	0.175*** (0.0174)	0.176*** (0.0168)
Household Size	-0.124*** (0.00943)	-0.125*** (0.00941)	-0.123*** (0.00903)
Public Sector Emp	0.144* (0.0828)	0.132 (0.0833)	0.169** (0.0810)
Private Sector Emp	0.188** (0.0869)	0.184** (0.0864)	0.209** (0.0837)
Self-Emp Non Agric	0.103 (0.0777)	0.0941 (0.0775)	0.108 (0.0752)
Self-Emp Agric	0.162** (0.0779)	0.152* (0.0781)	0.171** (0.0756)
Male	0.0164 (0.0389)	0.0112 (0.0387)	0.0140 (0.0378)
Urban	0.195*** (0.0351)	0.196*** (0.0348)	0.202*** (0.0338)
JHS/MSLC	0.144*** (0.0385)	0.148*** (0.0382)	0.161*** (0.0377)
SHS	0.226*** (0.0626)	0.230*** (0.0620)	0.227*** (0.0603)
Tertiary	0.335*** (0.0547)	0.336*** (0.0542)	0.323*** (0.0526)
Western	-0.163** (0.0665)	-0.156** (0.0663)	-0.177*** (0.0635)
Central	-0.248*** (0.0755)	-0.246*** (0.0753)	-0.250*** (0.0715)
Volta	-0.219*** (0.0720)	-0.217*** (0.0715)	-0.239*** (0.0684)
Eastern	-0.332*** (0.0684)	-0.329*** (0.0681)	-0.330*** (0.0647)
Ashanti	-0.159** (0.0710)	-0.158** (0.0706)	-0.183*** (0.0674)
Brong Ahafo	-0.341*** (0.0702)	-0.337*** (0.0695)	-0.362*** (0.0666)
Northern	-0.445*** (0.0893)	-0.436*** (0.0886)	-0.435*** (0.0862)
Upper East	-0.279*** (0.0877)	-0.271*** (0.0871)	-0.267*** (0.0842)
Upper West	-0.541*** (0.0926)	-0.531*** (0.0911)	-0.570*** (0.0863)
health_shock	-0.114** (0.0576)	-0.113** (0.0568)	-0.111** (0.0543)
1-5 Dependants	-0.254*** (0.0509)	-0.255*** (0.0505)	-0.238*** (0.0492)
6-10 Dependants	0.0122 (0.108)	0.0139 (0.107)	0.0107 (0.102)
10 and above	0.581** (0.260)	0.582** (0.257)	0.646*** (0.241)
Constant	7.751*** (0.170)	7.732*** (0.169)	7.687*** (0.165)
Observations	1,292	1,292	1,292
R-squared	0.549	0.548	0.548

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Linktest: $\hat{\alpha} = 0.285$ ovtest: $F(3, 1262) = 1.20$; Prob > F = 0.3080

Underidentification test (Kleibergen-Paap rk LM statistic): 211.77 Chi-sq(25) P-val = 0.0000

Weak identification test (Cragg-Donald Wald F statistic): 21.528 (Kleibergen-Paap rk Wald F statistic): 17.346

Hansen J statistic (overidentification test of all instruments): 33.364 Chi-sq(24) P-val = 0.0966

ldepend_c3 .01392 (.107) ; ldepend_c4 .5822 (.257)

Appendix E4: Effect of Insurance on Household Consumption Expenditure – Nested Model

VARIABLES	(1) Ordinary Least Squares	(2) Instrumental Var 2SLS	(3) Instrumental Var GMM
OVI	-0.114*** (0.0378)	-0.165** (0.0659)	-0.151** (0.0642)
Insurance	0.0898** (0.0366)	0.0887*** (0.0342)	0.0835** (0.0337)
Loan amount	0.167*** (0.0153)	0.174*** (0.0177)	0.177*** (0.0172)
Household size	-0.122*** (0.00596)	-0.124*** (0.00718)	-0.120*** (0.00684)
Public Sector Employee	0.176** (0.0842)	0.164* (0.0844)	0.192** (0.0823)
Private Sector Employee	0.205** (0.0897)	0.200** (0.0873)	0.220*** (0.0851)
Self-Emp Non-Agric	0.0970 (0.0778)	0.0884 (0.0779)	0.0962 (0.0760)
Self Emp Agric	0.142* (0.0776)	0.131* (0.0791)	0.149* (0.0770)
Male	0.0363 (0.0378)	0.0313 (0.0394)	0.0298 (0.0387)
Urban	0.183*** (0.0370)	0.184*** (0.0358)	0.189*** (0.0347)
JHS/MSLS	0.125*** (0.0396)	0.129*** (0.0384)	0.141*** (0.0378)
SHS	0.220*** (0.0652)	0.224*** (0.0620)	0.232*** (0.0610)
Tertiary	0.324*** (0.0581)	0.325*** (0.0554)	0.311*** (0.0536)
Western	-0.161** (0.0764)	-0.154** (0.0654)	-0.162** (0.0629)
Central	-0.262*** (0.0850)	-0.260*** (0.0754)	-0.256*** (0.0723)
Volta	-0.222*** (0.0804)	-0.220*** (0.0715)	-0.233*** (0.0691)
Eastern	-0.346*** (0.0800)	-0.343*** (0.0676)	-0.337*** (0.0643)
Ashanti	-0.144* (0.0782)	-0.143** (0.0703)	-0.158** (0.0673)
Brong Ahafo	-0.337*** (0.0780)	-0.333*** (0.0697)	-0.344*** (0.0669)
Northern	-0.442*** (0.0914)	-0.433*** (0.0881)	-0.433*** (0.0861)
Upper East	-0.306*** (0.0908)	-0.298*** (0.0878)	-0.286*** (0.0852)
Upper West	-0.558*** (0.0931)	-0.549*** (0.0915)	-0.558*** (0.0894)
Health shock	-0.114** (0.0523)	-0.113* (0.0581)	-0.120** (0.0560)
Constant	7.570*** (0.162)	7.551*** (0.169)	7.515*** (0.165)
Observations	1,292	1,292	1,292
R-squared	0.524	0.523	0.523

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Underidentification test (Kleibergen-Paap rk LM statistic): 196.653 Chi-sq(22) P-val = 0.0000

Weak identification test (Cragg-Donald Wald F statistic): 24.357 (Kleibergen-Paap rk Wald F statistic): 19.632

Hansen J statistic (overidentification test of all instruments): 27.400 Chi-sq(21) P-val = 0.1580

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance

chi2(26) = 64.54 Prob > chi2 = 0.0000

Appendix E5: Effect of Over-indebtedness and Loan Amount on Household Consumption

VARIABLES	Expenditure	
	(1) LOAN AMOUNT	(2) OVI & LOAN AMOUNT
Over-indebtedness	-0.180*** (0.0659)	-0.188 (0.217)
OVI & Loan Amount (Oviloan)		0.00850 (0.0305)
Loan Amount	0.180*** (0.0174)	0.172*** (0.0173)
Household Size	-0.126*** (0.00933)	-0.125*** (0.00924)
Public Sector Employee	0.145* (0.0830)	0.156* (0.0816)
Private Sector Employee	0.196** (0.0866)	0.200** (0.0862)
Self-Employed Non-Agric	0.0852 (0.0774)	0.0932 (0.0769)
Self-Employed Agric	0.140* (0.0779)	0.150* (0.0770)
Male	0.00832 (0.0388)	0.0122 (0.0389)
Urban	0.205*** (0.0348)	0.203*** (0.0349)
JHS/MSLC	0.155*** (0.0382)	0.152*** (0.0381)
SHS	0.235*** (0.0622)	0.231*** (0.0621)
Tertiary	0.353*** (0.0544)	0.352*** (0.0542)
Western	-0.161** (0.0665)	-0.168** (0.0659)
Central	-0.240*** (0.0750)	-0.242*** (0.0744)
Volta	-0.212*** (0.0717)	-0.214*** (0.0715)
Eastern	-0.304*** (0.0676)	-0.307*** (0.0672)
Ashanti	-0.157** (0.0708)	-0.159** (0.0705)
Brong Ahafo	-0.328*** (0.0695)	-0.332*** (0.0694)
Northern	-0.430*** (0.0891)	-0.438*** (0.0889)
Upper East	-0.271*** (0.0876)	-0.281*** (0.0872)
Upper West	-0.535*** (0.0913)	-0.544*** (0.0918)
Health Shock	-0.114** (0.0566)	-0.115** (0.0568)
1-5 Dependants	-0.251*** (0.0503)	-0.250*** (0.0502)
6-10 Dependants	0.0247 (0.106)	0.0229 (0.106)
10 and above	0.613** (0.252)	0.610** (0.253)
Constant	7.727*** (0.170)	7.758*** (0.177)
Observations	1,292	1,292
R-squared	0.546	0.547

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

_hatsq = 0.293 ovtest = F(3, 1262) = 1.07 Prob > F = 0.3623

Underidentification test (Kleibergen-Paap rk LM statistic): 238.995 Chi-sq(25) P-val = 0.0000

Weak identification test (Cragg-Donald Wald F statistic): 791.699 (Kleibergen-Paap rk Wald F statistic): 459.983

Hansen J statistic (overidentification test of all instruments): 19.731 Chi-sq(24) P-val = 0.7119

Joint Hypothesis Test of OVI and Loan Amount: OVI = 0, log_loan = 0, chi2(2) = 13.63, Prob>chi2 = 0.0011

Appendix E6: Effect of Insurance and Over-Indebtedness on Household Consumption

Variables	Expenditure	
	(1) Insurance	(2) OVI & Insurance
Over-indebtedness	-0.165** (0.0659)	-0.185*** (0.0542)
OVI & Insurance (Ovinsure)		0.141** (0.0679)
Insurance	0.0887*** (0.0342)	0.0437 (0.0415)
Loan Amount	0.174*** (0.0177)	0.168*** (0.0163)
Household Size	-0.124*** (0.00718)	-0.122*** (0.00706)
Public Sector Employee	0.164* (0.0844)	0.173** (0.0829)
Private Sector Employee	0.200** (0.0873)	0.197** (0.0869)
Self-Employed Non-Agric	0.0884 (0.0779)	0.0956 (0.0772)
Self-Employed Agric	0.131* (0.0791)	0.138* (0.0780)
Male	0.0313 (0.0394)	0.0309 (0.0395)
Urban	0.184*** (0.0358)	0.187*** (0.0357)
JHS/MSLC	0.129*** (0.0384)	0.124*** (0.0383)
SHS	0.224*** (0.0620)	0.231*** (0.0616)
Tertiary	0.325*** (0.0554)	0.329*** (0.0554)
Western	-0.154** (0.0654)	-0.154** (0.0651)
Central	-0.260*** (0.0754)	-0.255*** (0.0753)
Volta	-0.220*** (0.0715)	-0.217*** (0.0715)
Eastern	-0.343*** (0.0676)	-0.339*** (0.0675)
Ashanti	-0.143** (0.0703)	-0.138** (0.0703)
Brong Ahafo	-0.333*** (0.0697)	-0.336*** (0.0699)
Northern	-0.433*** (0.0881)	-0.440*** (0.0879)
Upper East	-0.298*** (0.0878)	-0.308*** (0.0879)
Upper West	-0.549*** (0.0915)	-0.556*** (0.0925)
Health_Shock	-0.113* (0.0581)	-0.112* (0.0582)
Constant	7.551*** (0.169)	7.575*** (0.167)
Observations	1,292	1,292
R-squared	0.523	0.525

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Underidentification test (Kleibergen-Paap rk LM statistic): 196.653 Chi-sq(22) P-val = 0.0000

Weak identification test (Cragg-Donald Wald F statistic): 24.357 (Kleibergen-Paap rk Wald F statistic): 19.632

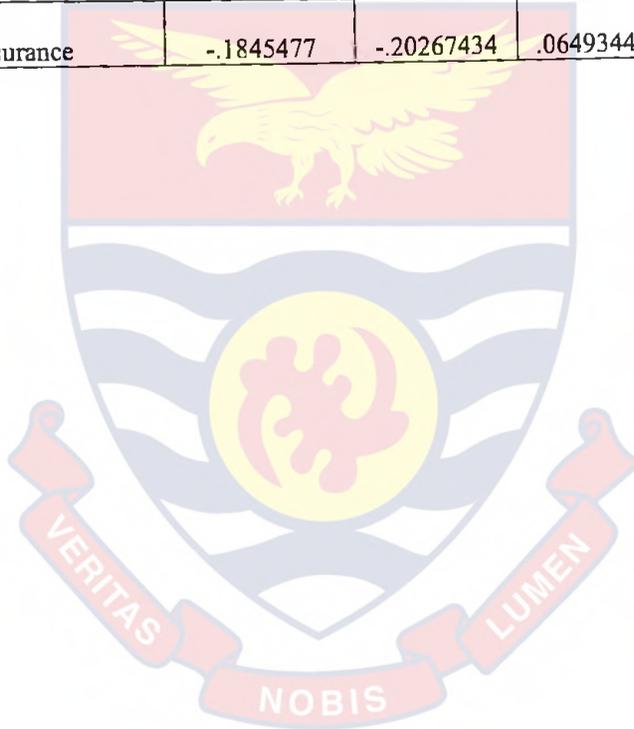
Hansen J statistic (overidentification test of all instruments): 27.400 Chi-sq(21) P-val = 0.1580

Instrumented: OVI

Joint Hypothesis Test of OVI and Insurance: OVI = 0, Insurance = 0, chi2(2) = 11.96, Prob>chi2 = 0.0025

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Appendix E7: Statistical significance of the effect of over-indebtedness on household consumption expenditure at specific values of loan amount and insurance

Values Examined	Net Effect (log points)	Exact Effect	Standard Error	Statistical Significance (z)
25 th Percentile (200.00)	-.14174633	-.15228431	.0356995	-4.20
Mean (1,388.00)	-.13272586	-.14193690	.0310814	-4.56
75 th Percentile (2,000.00)	-.12298558	-.13086811	.0306499	-4.26
At 5,000.00	-.11519757	-.12209510	.0334856	-3.64
Maximum (10,000.00)	-.10930616	-.11550382	.0327848	-3.52
Insurance				
Insurance	-.05904109	-.0608188	.0649344	-0.94
No insurance	-.1845477	-.20267434	.0649344	-3.12



Appendix E8: Robustness Checks

As an alternative to the standard IV approach, the Lewbel IV withstands robustness tests as determined by the traditional post-estimation tests. The main model presented in Appendix E2 passes the model specification tests as presented. It also satisfies the crucial Sargan - Hansen over-identification tests and fails to reject the null hypothesis that the instruments are valid (P-val = 0.1223). For Lewbel's use of internally generated instruments, it is essential that the over-identification requirement is highly uncompromised. Additionally, the Kleibergen-Paap (2006) test of under-identification is rejected in favour of the alternative hypothesis that the model is not under-identified (P-val = 0.0000); and, as illustrated by the Kleibergen - Paap rk Wald F statistic of 17.50, the equation is also strongly identified. If the equation is found to be weakly identified, the IV estimations could be susceptible to bias and large distortions (Stock and Yogo, 2005). Moreover, in line with the requirement of the estimation technique, all models pass the Breusch-Pagan test of heteroscedasticity ($\chi^2(32) = 75.11$; Prob > $\chi^2 = 0.0000$). The *rhs* option is invoked for this purpose since the logarithm of the dependent variable is vital for consistent estimation of consumption expenditures in accordance with empirical work (Cameron & Trivedi, 2010).

For IV estimates, the issue of precision has become a trade-off for the quest to improve the economic analysis of 'causality' by removing inhibiting factors such as omitted variable bias and measurement errors. Consequently, it is usual for the IV estimates to lose efficiency due to large standard errors (Wooldridge, 2010). Cameron and Trivedi (2010) highlight that some traditional IV estimates have reported almost eight-fold increase in efficiency

losses. The foregoing could be attributed to weak identification. However, the precision deficits incurred from using heteroscedasticity-based instruments for this study is moderate. An increase in the standard error for the over-indebtedness variable, from OLS (0.0350) to 0.0666 and 0.0643 for the 2SLS and GMM respectively, represent a less than double increase in precision values. This is an improvement on the efficiency trade-off incurred in the internally generated instrument estimates of the Lewbel Engel Curve example and contributes to the validity of the paper's argument for identification and estimation without external instruments. Furthermore, a success of attenuation bias observed in the 2SLS estimate could also suggest evidence of estimation validity.

Column (3) of Appendix E2 presents the generalised method of moment (GMM) estimates. The GMM result suggests an attenuated estimate compared to the 2SLS outcome. This is consistent with the 2SLS results of Lewbel's application to the Engel Curve estimates as illustrated in the paper. For example, theoretically, the 2SLS approach is expected to augment the least squares estimate. However, Lewbel's IV estimate showed a reversal of the attenuation bias [-0.055 compared to OLS (-0.127)], which was attributed to possible negative correlation of other regressors and with measurement errors in the instrument or the dependent variable. Changing the dependent variable to quantities of food, however, reverts the attenuation with 2SLS recorded as 0.174. Yet, for the purpose of comparability, the food budget share dependent variable had to be maintained and corresponding results presented in the paper. The difference in attenuation observed between the 2SLS and GMM (0.23) for the 'model study' is higher than that of 0.03 observed for this study (-0.018 and

-0.015), although the direction is from GMM to 2SLS. For the food budget share dependant, using both internal and external instruments seem to be more relevant to the GMM method which produces an effect of -0.087, similar to the internally generated 2SLS estimate of -0.086.

The Lewbel method, also indicated that compared to the traditional 2SLS results (-0.086), IV GMM results was also attenuated (-0.078) providing consistency for the study results. However, with insights from Hayashi (2000), Baum and Schaffer (2014) cautions that the use of the GMM approach can incur a trade-off. The authors indicate that the optimal weighting matrix which is fundamental to the computation depends crucially on fourth moments. Therefore, to have reasonable estimates of the kurtosis, the data must be very large. These subtleties can be attributed to differences in underlying data and relationships between the generated instruments and regressors.

Furthermore, endogeneity test can be invoked to confirm the justification of the use of instrumental variables. A Hausman test fails to accept the null hypothesis (P-val = 0.396) as presented under Appendix E2, indicating that the endogenous regressor can be treated as exogenous and OLS estimates could be presented as valid. However, since it is practically unjustifiable that reported income and consumption from household surveys, particularly in the context of a middle-income economy with a substantial informal sector, will be devoid of measurement errors, such issues cannot be overlooked. Discussions are based on IV estimates reported by column (2) of Appendix E2.

Insurance Model: From the estimation in Appendix E3, the full model's over-identification test is compromised due to insignificant generated instruments in the variable as indicated below Appendix E3 as `Idepend_c3` and

Idepend_c4. The Wald test, applicable after invoking the robust option, as pertains in this case, indicates that removing the independent variable - depend_cat, fails to reject the null hypothesis - implying, that excluding the variable will not significantly distort model fit [$F(1, 1265) = 0.01$ Prob > F = 0.9028)]. Results are presented in Appendix E4. The model also passes all post-estimation tests for the instrumental variable analysis.

