THE AMERICAN UNIVERSITY IN CAIRO
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Repayment Determinants for Egyptian Microfinance Institutions

A Thesis Submitted to the

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In partial fulfillment of the requirements for the degree of

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By: Reem Nabil Hashad

Under the supervision of

Dr. Mohamed El-Komi

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Dedication

To the one who gave me beyond the call of duty, who instilled in me the importance of and pleasure derived from education. In the memory of my late father.

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First and foremost, thanks are due to Allah, the most Beneficent and Merciful, to whom I relate my success in life.

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Abstract

Finance is one of the core development axes and is the basis for job creation, income, poverty reduction and economic growth. Financial resources in Egypt are both idle and misallocated. Access to finance is a major constraint especially to the poor stratum of the Egyptian society. Microfinance is one of the means through which the poor can gain access to finance. However, Egyptian microfinance institutions (MFIs) are inefficient and are unable to supply 90% of the demand for microcredit.

This research focuses on how the supply-demand gap of microcredit in Egypt can be reduced. Hence this paper examines what are the borrowers' socio-demographic characteristics and loan conditions that affect the microcredit repayment rate in Egypt. These factors are examined so that Egyptian MFIs can be financially and socially efficient and serve as better engines for change.

This paper employs the mixed method (qualitative and quantitative) approach in an attempt to answer the research question proposed. The paper estimates the log likelihood of a probit regression model based on data from two MFIs: Misr El Kheir (MEK) and Resala. In addition, interviews were conducted with twelve borrowers of one of Egypt's MFIs (Tanmeyah). The results show that the repayment determinants are country-specific. Lack of timely repayment is both a supply-sided and demand-sided problem i.e. it is attributed to both the MFI policies and the borrowers' characteristics. Lack of timely repayment is due to the MFI lending policies, long repayment period, the time the first installment is due, the borrower's job, income, address and most importantly his/her willingness to pay. Macroeconomic shocks, such as the 25th of January Revolution, have positively contributed to the probability of the borrowers defaulting.

Although microfinance is only a tool for poverty alleviation, not the solution, its importance can not be understated. MFIs can reduce the supply-demand gap by mitigating the reasons for lack of timely repayment such as long repayment period, lack of experience, lack of willingness to pay and so on. This will enable MFIs to revive financial resources and promote economic growth.

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Chapter One

Introduction

Finance is one of the main development axes; however in Egypt the financial sector is undiversified and many are deprived from gaining access to finance. This is the case since the banking sector dominates the financial sector and the banking sector is dominated by conventional banks. Even the non- banking financial sector in Egypt is underdeveloped (Abu loghod, 2011). The focus of the banking sector is on a very narrow stratum of the Egyptian society; the elite clientele, those who are less risky to the bank, or more accurately, those with political patronage. Access to finance is important as a prerequisite for economic growth, employment, social cohesion and poverty reduction (Kumar, 2011).

In the year 2008, only 17.4% of the firms operating in Egypt had a bank loan or a line of credit and 84.5% of the loans required collaterals, hence imposing a huge constraint on the poor who need to access credit. In addition, 31% of the firms in Egypt stated that access to finance was a major constraint for their business (Enterprise Surveys, 2013). Insufficient savings and lack of collaterals force the poor to look for means of financing other than commercial financial institutions. This segment doesn't have access to formal financial institutions such as banks given that they do not possess collaterals nor do they have a credit history and are hence deemed more risky(Morduch, 2010).

Lack of diversification and innovation of the financial markets in the Middle East and North Africa (MENA) region entails that the demand for credit by the poor is unmet. Fortunately however microfinance is a tool for the poor to gain access to credit. So what is microfinance? Microfinance is the provision of financial services such as microcredit, savings, microinsurance and remittances to the poor and low- income segment of society. Microfinance institutions (MFIs) complement the formal and informal financial systems, aiming to serve the heterogeneity of the demand structure for financial services (Imai, 2010).

Microfinance is served by microfinance institutions (MFIs) which include non-governmental organizations (NGO- MFIs), UN agencies, service companies, credit unions, postal saving banks, public development banks and commercial banks. MFIs may also offer non-financial products such as training, health services, business development programs and literacy programs (Daily News, 2011). In Egypt, MFIs are mainly NGO- MFIs, with more than 400 NGO- MFIs and four banks offering microfinance services. The most active

borrowers are those in the Upper Egypt governorates and almost three-fourth of the total borrowers work in the trading sector (Efsa, 2010).

The National Impact Survey for microfinance clients had estimated that most of the clients borrow from MFIs to finance health insurance and retirement funds, followed by credit insurance then savings accounts and finally consumption loans (Waly, 2008). MFIs mainly offer microcredit; the poor take a microloan in order to establish a new microproject or expand an already existing microproject. Examples of microprojects include, but are not limited to, handicraft production, fruit and vegetable vendors, small retail shops and kiosks (Daily News, 2010).

Banks limit the amount lent to poor households since they are perceived that they can not have an active financial life as a result of their poverty. However, Morduch in his book, "Portfolios of the poor How the World's poor live on $2 a day", states that the poor households have an active financial life as a consequence of their poverty, not despite of it (Morduch, 2010). While banks lending decisions depend mainly on their clients' history, MFIs on the other hand base their lending decision mainly on the clients' future. So the main distinguishing factor is that MFIs look at the economic potential of the borrower as the selection criterion, rather than their poverty and need for the money.

The aim of microfinance is to mobilize the poor people to act instead of waiting for charity (Consultative Group to Assist the Poor, 2005). Microfinance supplies a portion of the unmet demand of households and small firms to both financial and non-financial products. However, the needs of a large market segment of potential borrowers in Egypt remains uncovered. According to Nasr (2010), the problem is both demand-sided and supply sided. The take-up rates of microfinance products are low despite the high levels of poverty (Morduch, 2010).

To further illustrate, in Egypt, at the end of the year 2009, a gross loan portfolio of approximately 2.2 billion Egyptian pounds (EGP) was lent by MFIs to more than 1.4 million borrowers, half of whom are women. The number of active borrowers ten years earlier was almost 0.1 million borrowers. Despite the large increase in the number of borrowers from 1999 till 2009, the potential outreach increased from 1.5 million borrowers to 12.6 million (Brandsma, 2003 and Efsa, 2010). Hence, since 1.4 million borrowers were served as of the year 2009, but there remains 12.6 million who are not; that means that 90% of the demand for

microcredit remains unmet i.e. a 90% supply-demand gap exists despite that Egypt has the highest level of current outreach (Efsa, 2010).

In order to reduce this supply-demand gap, there has to be an improvement in the performance of MFIs. One of the means to measure the performance of MFIs is through measuring the loan repayment rate (Rosenberg, 2009). MFIs lend to borrowers and oblige them to repay the full loan amount, a certain percentage of the loan or the whole loan amount with an interest. The amount of money paid by the borrower to the MFI, part or all of it is then injected into a new loan for a different borrower. This paper examines loan repayment in the context of the borrower being able to meet all of his/her financial obligations on time. For a borrower to default means that the borrower fails to abide by the terms of the agreement and that entails failure of making repayment on the due date (Business Dictionary, 2014). Accordingly, a borrower will default if he/she does not repay the full loan amount or delays paying at least one installment. If the borrower defaults, then the ability of MFIs to lend to more borrowers will decrease, hence decreasing the level of efficiency of Egyptian MFIs and widening the supply-demand gap.

This paper hence focuses on Egypt since improving the level of efficiency of MFIs in Egypt is detrimental, since MFIs in the MENA region are characterized with the lowest levels of efficiency worldwide. Despite slight improvements in efficiency levels in some years, the MENA region has been also experiencing decreasing levels of efficiency in others (Triki, 2013). However, there is no data available for the level of efficiency for Egyptian MFIs in terms of loan repayment.

Therefore, given the 90% supply-demand gap and current low penetration rate, is there a way out for the MENA region or did we reach a deadlock? In fact, a huge potential of growth exists for the microfinance industry. The problem is that there are missed opportunities; resources are not only misallocated, but a large portion remains idle. Microfinance is a tool that recycles financial resources/assets. The question of how to revive financial resources is answered by realizing that the problem is not in the presence of the assets, but how to channel them. Aiming at reviving the financial resources and channeling them appropriately, this paper examines what are the borrowers' socio-demographic characteristics and loan conditions that affect the microcredit repayment rate in Egypt so that MFIs can be financially and socially efficient and serve as better engines for change.

The paper is divided as follows: Chapter one is the introduction, chapter two presents an overview of the existing empirical literature on microfinance, while chapter three discusses the methodology and data this paper employs. Chapter four presents the empirical results of the probit model and a discussion of the results, followed by chapter five which describes the qualitative approach and results. The paper then ends by chapter six which is the conclusion and policy implications on how can Egyptian MFIs be more efficient and narrow the supply-demand gap.

Chapter Two

Literature Review

This chapter aims to give an overview of the empirical literature on microfinance. To tackle the issues that affect the efficiency of MFIs, one has to start by studying the effect of MFIs on alleviating poverty through different approaches. Since it can be inferred from the literature that microfinance alone is not the panacea for the poverty problem, the literature discusses financial inclusion and how does outreach of the MFIs to the poor affect the MFIs' social and technical efficiency. The more efficient MFIs are, it is proposed by the literature that, the more sustainable they become. A prerequisite for this sustainability is regulation, or lack thereof in Egypt. The chapter then focuses on the literature related to microcredit repayment determinants; the borrowers' characteristics and loan characteristics that affect the repayment rates. The chapter will end by comparing and contrasting group lending with individual lending as a factor that might affect repayment.

2.1. Impact of microfinance

Since the main aim of MFIs is to provide the jobless and low- income households with access to credit, it is crucial to examine whether MFIs achieve their aim and offer the poor with the needed credit. Not only is it important to determine whether they can have access, but more importantly whether this credit can help alleviate poverty levels. There is no evidence in the literature that MFIs cause poverty levels to decrease. Some papers found that MFIs have a positive effect on poverty; however this is a correlation relationship, not causation.

2.1.1 Positive impacts of microfinance

2.1.1.1. Impact on poverty

Most of the literature suggested that microfinance is positively correlated to alleviating poverty levels. That has been evident since microenterpreneurs are able to remove the financial constraints they face. As a result of the microfinance products, the poor benefit from access to finance and it has been shown that there are spillover effects of these financial products that reach the rich. Poverty reduction due to access to microfinance had a positive effect on employment since these poor now work on their microprojetcs. As a result of employment, the income increased and since consumption is a function of income, then

consumption levels increased in the short-run and in the long- run. In the long- run, there is also a positive impact of increased savings and investment. Finally, besides alleviating poverty, non-monetary gains such as economic empowerment and gender equality also take place.

To begin with, Imai, Annim and Arun (2010) used a quantitative approach to test whether access to microfinance can reduce household poverty based on an Indexed Based Ranking indicator that displays multidimensional aspects of poverty. A national level microfinance impact study was then developed using cross-sectional data for 5,260 Indian households borrowing from a sample of 20 MFIs in diverse regions in India in 2001. Treatment effects models were used to estimate the effect of MFIs productive loans on poverty reduction, taking into consideration endogenous binary treatment effects and sample selection bias related to access of MFIs. Then a robustness test of the model was done using the Propensity Score Matching.

In addition, tobit regression was applied to investigate the effect of the loan on poverty reduction. The study hypothesized that access to MFIs, productive loans and the loan amount helped reduce poverty. The authors have reached the result that the multidimensional welfare indicator is significantly positively affected by MFIs productive loans after controlling for socio-economic characteristics. Therefore, MFIs play a role in poverty reduction and the use of the loan (whether for productive purposes or not) determines the poverty reduction extend. Although access to MFIs productive loans had poverty reducing effects, simple access to MFIs had a larger effect on poverty reduction in urban areas. On the other side, the effect of MFIs on poverty reduction was higher in rural than in urban areas when access to MFIs entails taking loans for productive purposes rather than other purposes. The model also proved that the higher the loan amount the better the improvement in well-being. Limitations of this study come from potential unobservable determinants of access to MFIs.

Islam's (2009) qualitative paper had the same results by studying the effect of different products of MFIs (microsavings, microcredit and microinsurance programs) individually on poverty and insecurity. Then the study pointed out the complementarities between these products and how these complementarities can be utilized to triumph over the weaknesses of the programs. The paper suggested that the indirect broad impact of microfinance on the socio-economic status of the poor is more influential in having a more

equitable endowment distribution, fighting poverty, and reducing insecurity compared to its narrow, direct financial impact. This paper found that microfinance has a significant positive impact on poverty alleviation and economic security. Poverty and economic insecurity represent a vicious circle with economic insecurity being embedded in poverty. Poverty reduction stems from an egalitarian distribution of endowments and microfinance can facilitate human and physical endowment distribution and allow households to access opportunities offered by the public and private sectors.

Similarly, Waheed (2009) utilized primary data for the year 2005 and applied a stratified random sample technique of variables such as households' income, education, family size, assets and credit. Secondary data on the Punjab Rural Support Programme (PRSP) of 24 districts for the years 1999-2004 and interviews were also examined. Through these data, the study evaluated the impact of the PRSP on income improvement of rural borrowers in Pakistan and examined whether these loans provide a basis for a sustainable life. The study found that not only do the poor benefit from microcredit, but also the non poor. In addition, microcredit, proximity to urban market and education elevated income, while the family size and assets had no effect on income improvement. Also the loan utilization purpose, whether investment or consumption, determined the ability to repay the loan and the sustainability of income. Hence, MFIs in rural areas should target new loan products and decrease the misuse of loans. Key lessons derived are that the villages in Pakistan are economically and socially distinct and hence the microfinance staff has to pay attention to the region specificities.

Weele and Weele (2007) focused on the enterprise formation loans given by the Instituto de Desenvolvimento Humano (IDH) from the period 1977 to 1982 and from 1989 to 1992. Loans for enterprise formation have been viewed as the best way to outreach to a large market segment and accordingly the best way to build a sustainable MFI. [1] A linear regression model was estimated controlling for enterprise and borrowers' personal variables. The results show that enterprise formation loans used by small microenterprises helped alleviate poverty and increase proprietor income. When the social cost-benefit ratio was employed without the control group, the social cost-benefit ratio is amplified. A limitation is that the study was based only on microenterprises in Hondarus and the results might be

[1] A field survey was carried out to enterprises who took loans from the IDH and those who did not take loans from the IDH (control group). This survey assessed the impact and social benefits and costs of the microcredit program.

irrelevant to other countries. In addition, the growth of these microenterprises depends on the economic, political, social, policy and institutional environment which were not taken into consideration.

Hence, the above papers agree that access to finance increase the standard of living of the borrowers and reduce the level of poverty. The studies showed that there has been an increase in economic security and a potential of removing the poor from their poverty trap. This effect however, might differ according to where the borrower lives and where the microproject is carried out.

2.1.1.2. Impact on Rural versus Urban districts

So focusing on geographical differences, Montgomery and Weiss (2005) applied comparative qualitative analysis on the effectiveness of MFIs in reaching to the core poor. The similarities and differences in the experiences of Asia and Latin America were compared to find evidence on the success of MFIs. This success is in terms of targeting the poor, the cost effectiveness of microfinance as a tool of poverty alleviation and whether microfinance initiatives can drag the households out of their poverty. Data from a survey published by Meyer (2002) and another by Morduch(1999) along with data from the Microbanking bulletin were used that prove that the number of MFIs reaching the core poor are limited, although there is evidence that microfinance has a positive impact on poverty. Local variations significantly affected the success or failure of MFIs and hence Asia should have a better commercially oriented MFI sector similar to the one in Latin America. MFIs in Latin America don't serve as a tool for core poverty removal, but are rather a vehicle of development of the micro-enterprise sector.

2.1.1.3. Impact on employment and microenterpreneurs

Measuring the impact of MFIs on income improvement and employment, Becchetti and Castriota (2011) evaluated the impact of an equity injection into a Sri Lankan MFI after the 2004 Asian Tsunami on the borrowers and hence tested its effectiveness as a recovery tool through four different periods. From the bank records a treatment group consisted of 200 borrowers was randomly selected along with a control group of 105 borrowers. The treatment group represented those borrowers who were affected with at least one type of damage as a result of the Tsunami, while the control group was not damaged. In 2007, a questionnaire was constructed and the groups were interviewed face-to-face. The results revealed that the post-

tsunami microfinance loans had a positive significant effect on income and labor hours and that damaged borrowers were able to reinstate their economic activity. The effect of the loans on the borrowers affected by the Tsunami was stronger than those who were not affected by the Tsunami. Donor intervention was useful because several MFIs would not have been able to continue their operations without new capital injections. Recapitalizing MFIs provides effective liquidity injections, which for the poor has similar effects as an expansionary monetary policy.

Moreover, Abiola (2011) investigated whether microfinance institutions have helped Nigerian microentrepreneurs gain access to credit. Using a random sampling technique, a cross sectional survey was conducted on the enterprise business activity in December 2009. Then a binary logit regression was estimated to measure the demand for internal funds in two states. Lagos State, a state where a significant number of microfinance banks (MFBs) existed was compared and contrasted with Ekiti State, where a limited number of MFBs existed. Ten independent variables were used in the model to examine the effect of MFB in constrained and unconstrained locations on the possibility that microentrepreneurs would invest in fixed assets, which is used to measure the entrepreneurs' sensitivity to financial constraint. The paper reached the conclusion that enterprises that are located in constrained locations had greater demand for internal sources of funding than enterprises in unconstrained locations. Age and gender had an insignificant effect on business investment. Overall, MFBs played an effective role in solving the microentrepreneurs' financial constraints; availability of microloans alleviated credit constraint in the Nigerian financial markets.

2.1.1.4. Impact on consumption

Since Castriota (2011) is in consensus with Abiola (2011) in that microfinance has a positive impact on income, it is hence expected that those involved in microfinance will enjoy better levels of consumption. Measuring the effect of microfinance on consumption, Kamanou and Morduch (2002) estimated for households in Côte d'Ivoire the expected distribution of future expenditures by using the Monte Carlo and bootstrap statistical techniques. The analysis relied on the Côte d'Ivoire Living Standards Survey (CILSS) and theories of expected utility, risk and uncertainty. A Generalized Linear Model was estimated to measure the change in the per capita consumption. These data provided helpful insights into consumption patterns, household behavior and poverty dynamics. Regarding policy actions, the effectiveness of poverty alleviation programs are best measured by the

comparison of vulnerability before and after the program. The results showed significant differences in vulnerability in the cities of Côte d'Ivoire between 1985 and 1986. Poor households who were part of the CILSS had, on average, an increase in their consumption levels despite the overall decrease in the country's level of consumption. This approach can account for different poverty measures, but falls short of explaining the tradeoffs between winners and losers. A shortcoming of the paper is that the analysis is limited only to the short-run.

2.1.1.5. Impact on women

So MFIs contribute positively to poverty alleviation and increase the borrower's levels of income and consumption. So that is in terms of the monetary effect of MFIs. However, can there be non-monetary positive effects of MFIs on the borrowers?

Studying the socio-economic impacts of microcredit on the welfare of women living in North Eastern South Africa, Hietalahti and Linden (2003), contrasted the performance of the Small Enterprise Foundation (SEF) microcredit programs on household welfare. In 2003, empirical data from this program on the borrowers' loan history, education, changes in the households' activities, income, expenditure and their view of the future was gathered through open and close-ended surveys. A credit rationing model was then used to inspect the means of credit allocation and the SEF borrowers' repayment performance. Improvement in women's income and well-being, less vulnerability and better food security were the metrics used to assess the impact of the loans on the women's welfare.

The study showed that the more educated clients who were at a better starting point were able to diversify their risks, protect themselves against vulnerability and enhance their businesses. SEF provided products that allowed some of the poorest women to get out of their poverty trap. The bigger the loan size the women were offered, the greater their ability to properly use their resources and generate higher incomes; however MFIs preferred giving small loans to account for the high risk and low capacity of the poor. On the other hand, group heterogeneity, different borrowers' income levels, and moral hazard caused several repayment problems. This showed a tradeoff between cost-effectiveness and outreach; maximizing efficiency through cutting costs would have adverse effects on the poor. A limitation of the paper is that the data was focused on a limited area and for a narrow span of time.

Littlefield, Hashemi and Murduch (2003) relied on qualitative and quantitative findings of previous research papers and proved that microfinance contributed significantly to the achievement of the Millenium Development Goals (MDGs). The evidence of these previous research papers were drawn from the MicroBanking Bulletin, Freedom from Hunger studies, A Save the Children study, Women's Empowerment Program in Nepal and others. The results showed that microfinance not only enables the poor to access credit, but through credit the poor are able to get employed, schooled and have access to healthcare services; hence reducing poverty and its effects. Moreover, access to finance meant better nutrition, more confident women and less gender inequality. The MDGs can't be sustained without increased earnings and flow of financial resources. Better planning is also a positive spillover of microfinance; hence, microfinance has a positive impact on poverty alleviation in the short-run and the long-run. So microfinance acted as the basis on which other policy interventions depend as it offers social benefits on an ongoing basis. Being less donor dependent over time, these institutions can offer a sustainable tool of poverty alleviation.

Not only had microfinance positively affected the borrowers, but there were also increasing marginal returns to borrowing. Imai et al. (2012) using cross-country and panel data on MFIs from the World Bank and the Microfinance Information Exchange found that the higher the MFIs gross loan portfolio per capita, the lower the poverty level indices. [2] The paper applied an ordinary least squares model (OLS) were gross loan portfolio per capita was estimated by an instrumental variable in an instrumental Variable model (IV). The authors found a pair-wise positive significant correlation for gross loan portfolio of MFI per capita with deposit accounts, loan accounts and number of branches of microcredit institutions. Poverty rates, measured by three criteria (incidence, depth and severity) have declined as the number of MFIs increased, GDP per capita and share of credit in GDP increased. GLP per capita was significantly negatively related to the poverty headcount ratio. The results showed that microfinance is a financial tool that significantly decreases poverty at the macro level whether by decreasing its incidence, depth or severity; a result contrary to micro evidence.

[2] Taking account of the endogenity associated with the MFIs loans, cross sectional data for the year 2007 covering 48 developing countries was used along with a 2003 and 2007 panel covering 61 countries.

2.1.1.6. Impact on Savings and Investment

Looking at the long- run impact of microfinance on poverty, Brune (2009) conducted an empirical study on the impact of microfinance institutions on development. Brune (2009) explained the impact of MFIs by using descriptive and quantitative econometric analyses of a sample of MFIs in Asia and Africa. Data on 1,406 MFIs was retrieved from the Market Mix Database; the data included descriptive statistics, financial data, and data on outreach. The results found that the simple microcredit lending schemes supported the poor by granting them access to finance and enhanced private savings. It was found that in the long- run there have been an increase in savings for these microcredit borrowers and/or an increase in the rate at which they save. That has also shed light on microcredit being a tool for the economy to increase the level of capital accumulation. In addition, as a result of the increase in savings level it was proposed that the Asian and African countries might evade levels of stagnation. Hence, the paper concluded that countries can develop due to the increased level of savings as a result of microcredit. The contribution of a country's future development is hence independent from the differences in the country's cultural, economic, and political environment.

Hence, the studies found that MFIs have a positive impact on income, employment, and consumption. In addition, MFIs contributed to the achievement of MDGs and allowed the poor to gain access to schools and healthcare services. MFIs also allowed the borrowers to increase their level of savings and hence increased the total level of savings and investment in the economy in the long-run.

2.1.2. Average/Minimal impact of microfinance

On the other hand, several found that the impact of microfinance on poverty is minimal. Khandker (2005) found that MFIs have only an average effect on poverty alleviation since it does not reach the extreme poor. A quasi-experimental method depending on exogenous eligibility conditions was used as a method to identify program effects. A 1991/92 survey and a 1998/99 follow-up survey were used to evaluate the effects of microfinance on poverty in rural Bangladesh. A panel data analysis was then conducted to estimate the effect of current and past borrowing, taking into account that consumption gains vary over time. A dynamic model was also used to estimate for borrowers and non-borrowers the time-varying borrowing effects on the level of consumption. The results showed that microfinance helps the poor borrowers and the economy by contributing to poverty reduction,

mainly to females. Microfinance increased per capita consumption for those who are and are not part of the microfinance projects. The results show that the three percentage points of annual poverty reduction among the program borrowers, more than half of it was accounted to microfinance. Despite that, additional borrowing proved to have diminishing returns, so the increase in loan amount was not enough to reduce poverty levels as expected. So microfinance programs increased the probability of the poor escaping poverty and benefited the non-borrowers by increasing the growth in their total income and contributed to the economic growth of the economy, but were not very successful in reaching the extreme poor.

Others such as Amin, Rai and Topa (2003) evaluated through a panel dataset, whether microcredit programs reach the poor and vulnerable. Monthly income and consumption data of 229 households living in two Bangladeshi villages were collected before the households received the loans. The paper tested whether the households who joined a MFI in 1991 were more poor and vulnerable in 1991-1992 compared to those who didn't join a MFI. This was tested through a comparison of average consumption and vulnerability of members with nonmember and estimation of probit regressions of microcredit membership on vulnerability, consumption and household characteristics.

The results showed that microcredit programs are successful at reaching the poor, but not the vulnerable[3]. There is strong evidence that those joining a MFI were poorer than those who didn't join, however there is weak evidence that those who joined were more vulnerable than those who didn't. Vulnerable households in the poor village were excluded from receiving microcredit and in the richer villages; microcredit doesn't reach the vulnerable due to their potentially higher default risk. In addition, a negative relationship existed between monthly consumption and receiving a loan and vulnerability and receiving a loan. A limitation of this paper is that the vulnerability and average consumption level used were constant throughout the examined period, however this is not controlled for due to limited data.

Likewise, Hietalahti et al. (2010) qualitatively evaluated the effect of microcredit on poverty by the change in several of the borrower's socio-economic characteristics. Their

[3]The vulnerable are those who are most prone to destitution i.e. the level of poverty is so extreme that the person lacks the means to provide for his/herself. Amin(2003) defined the poor as those who enjoy low levels of consumption, while the vulnerable are those who are unable to smooth consumption if they are faced with sudden income fluctuations.
[3]

study was carried out in a village in Bangladesh were three microfinance programs had been operating for more than five years. Statistical comparisons between a random sample of borrowers and non-borrowers (control group) with similar socio-economic conditions were then interviewed on how the loan had an impact on the life of the households. It was concluded that MFIs have an average effect on multidimensional poverty reduction, but do not target the poorest in the village. Despite that the non targeted poor group represented a very small percentage of households; resource allocation was more to households above the poverty line rather than below. Compared to the control group, microfinance borrowers' socio-economic conditions improved, and in case the microfinance socio-economic conditions didn't improve that was a result of mismanagement of the loan by the households rather than a failure of the MFI. For MFIs to alleviate poverty in better ways, technological support, skills training, education and health related schemes should be implemented. A limitation of this paper is that the differences in any of the two groups' socio-economic conditions during the past three to five years were considered to be only a result of being a member in a MFI.

By tracking the progress of borrowers, similar results were reached by Wydick's (2002) study on 239 borrowers of a Guatemalan MFI who were surveyed in 1994. These borrowers were resurveyed in 1999 to monitor changes in the enterprises and the borrowers' welfare and explore the benefits and limitations of microfinance as a tool of economic growth. The findings indicated that after the initial credit access, the increase in the employment level within the sample enterprises is followed by a period of stagnation in employment growth. Employment and enterprise revenue increased substantially as a result of the credit program. At the beginning, access to credit initiated rapid enterprise growth, however there was rapid diminishing returns to credit access thus limiting significantly their long-run growth. Unexpectedly, in the long-run hired female entrepreneurs were more than the hired male entrepreneurs. Women had greater enterprise employment stability, fewer drop-outs and higher rates of employment. Most of the borrowers said they have experienced qualitative impacts from the loan. On the other hand, none of the enterprises grew to be medium-sized enterprises nor did the role of the entrepreneurs change over time. As the number of employees grows, credit access might be a binding constraint to the enterprises' growth. A limitation of this study is that the results are country specific and might not be generalized across developing countries.

Hence, microfinance is only a tool for poverty reduction, but is not the panacea. Those who received loans from MFIs were being self- selected and that is why there are a few papers finding the effect of microfinance on poverty. Hence, we alternatively examine microfinance indirectly by examining financial inclusion/outreach rather than poverty reduction.

2.2. Outreach and Efficiency of MFIs

The above papers examined the effect of MFIs on poverty and the extent of their impact depends on their outreach. To increase outreach entails targeting more the poor and vulnerable to whom the cost of lending is the highest, which conflicts with efficiency. The literature explained the different types of efficiencies of MFIs and examined whether a tradeoff exists between outreach and efficiency in addition to whether subsidies to MFIs increase outreach and efficiency.

To begin with, Barman, Marthur and Kalra (2009) conducted a pilot survey in 12 Indian villages on 59 households; some who borrowed from the Self Help Group (SHG) bank and others who borrowed from MFIs. They investigated the relationship between a borrower's involvement in a MFI and his/her indebtedness to moneylenders. The result of the chi squared test was that MFIs and SHG lending arrangements were capable of meeting the financial needs of the poor. Despite that, clients of a MFI have a higher level of indebtedness to moneylenders. Moneylenders meet more than 90% of the unmet demand for rural credit. This is due to MFIs lending only for income generating purposes, hence the poor who want to take loans for consumption purposes for instance must search for other informal sources such as moneylenders. The poor also resort to moneylenders in order to be able to promptly pay back the loans to the MFIs. This may lead to the poor being stuck in a vicious cycle and instead of escaping their poverty trap, they become deeply rooted in it.

Examining the factors affecting efficiency, Gutiérrez-Nieto, Serrano-Cinca and Mar Moline (2007) used the data envelopment analysis (DEA) approach and applied a multivariate analysis on 30 Latin American microcredit institutions. The results showed that MFIs should not only be ranked according to their use of inputs (credit officers and operating expenses) and outputs (interest and income fee, gross loan portfolio, and number of outstanding loans); there are other factors that affect efficiency. NGOs were found to affect MFIs' efficiency and so are the country effects. Subsidies offered to NGOs allowed them to

behave differently than non-NGO institutions, hence affecting their efficiency. MFIs should be ranked therefore based on the DEA rather than financial ratios that fall short of explaining some exogenous factors affecting efficiency.

2.2.1. Tradeoff between efficiency and outreach

To determine whether a tradeoff exists between outreach to the poor and MFI efficiency, Hermes, Lensink and Meesters (2011) applied a stochastic frontier analysis. Data of 435 MFIs was obtained from the MixMarket, a global web-based microfinance information platform comprising more than 1,300 institutional- year observations from the years 1997-2007. The authors' conclusion was that outreach is negatively correlated with MFI efficiency. MFIs lending more to women and/or have a lower average loan balance, i.e. have higher level of outreach, are less efficient. Furthermore, a cost function was estimated showing that salary and gross loan profits are positive and significant and that indicated a higher cost, while technological change lowered the cost. The average marginal effect of the total financial expenses of MFI's per dollar of deposits was also positive and significant. Group lending also lowered information costs. Finally, efficiency was increased only at the expense of reaching less to the poor.

Similarly, Hartarska, Shen and Mersland (2013) applied a structural approach to capture MFIs efficiency, outreach and sustainability. Using panel data of 989 observations on MFIs in 69 countries, input price elasticity and economies of scale for lending-only and deposit-mobilizing MFIs were estimated. A system of equations of cost functions and cost shares were used to estimate the seemingly unrelated regressions (SUR). The estimated translog cost function showed that a tradeoff exists between sustainability and outreach. Efficiency aroused from the growth or consolidations of all MFIs except the profitability-focused deposit mobilizing MFIs, who do not have increasing returns to scale. Outreach resulted from the highest cost savings and scale efficiency which is met by NGO-MFIs when they are transformed into regulated deposit-mobilizing MFIs. As a result of regulation and governance, technical progress is present in lending-only MFIs but not in saving-mobilizing MFIs. To increase sustainability and secure funding, MFIs should start to be more commercialized and hence their mission will drift.

Alternatively, Osman, Zakareya and Mahrous (2006) employed the principal component factor analysis (PCFA) to develop an antipoverty targeting program in Egypt. Several asset ownership and socio-demographic indicator variables were then used as a proxy

index for household wealth. Those with values on the wealth index that belong to the bottom 20% of the population were classified as poor. A composite poverty indicator (CPI) and Receiver Operating Characteristic (ROC) curves were used to measure the efficiency of the estimated CPIs once for Egypt as a whole and once for rural and urban areas. The results showed that programs that specifically target the poor appeared to be relatively more efficient. When the poor and vulnerable represent the reference group, the efficiency for targeting the poor is not reduced. However, a limitation of this paper is that the multidimensional aspects of poverty were not taken into consideration.

Cull, Demirgü.-Kunt and Morduch (2005) examined the profitability determinants, loan repayment determinants and cost reduction determinants of MFIs using a newly available data set of 124 MFIs in 49 countries from 1999 to 2002. They attempted to answer why has the profitability of MFIs been low despite the high loan repayment rates. The data was gathered from the MicroBankaning Bulletin and an ordinary least squares model was estimated linking labor and capital inputs to profit and social change.[4] In addition, the study examined whether a tradeoff exists between outreach and profitability, has there been a mission drift and have high interest rates negatively affected the loan repayment rates.

The results revealed that increasing interest rates can be beneficial for MFIs but only up to a certain limit. Beyond that limit, portfolio quality declines along with the profitability level of the MFIs who do not deal with group-based lending. For individual-based lending MFIs investing in labor is key to achieving high levels of profitability. Although the higher the staff and input costs, the lower the expected the profitability, however, these high costs lead to economies of scale which reduce the overall cost. Rather than the presence of a mission drift, the study found evidence of a reverse mission drift i.e. focusing on poorer consumers is intertwined with achieving high profits. Also, microbanks that operate with more inputs have lower levels of outreach with a tradeoff existing between the breadth and the depth of outreach showing that contract design is crucial for the success of the MFIs.

2.2.2. Effect of subsidizes on outreach

Since there is a tradeoff between outreach and efficiency, then what are the factors that affect outreach and efficiency? To start off with the factors that affect outreach, Paxton

[4] The data has the advantage of describing the nature and tradeoffs of lending relationships by offering differences in the MFIs contractual types, prices, target markets, institutional location and size.

(2003) used a poverty outreach measure that was created using a modified Foster, Greer, and Thorbecke poverty index to measure the scale and outreach of MFIs. This poverty outreach index was used to measure the depth of outreach of MFIs across different regions and test whether unsubsidized MFIs have a deeper outreach than subsidized MFIs.[5] The poverty outreach index showed that the large, heterogeneous institutions such as banks target more those who are below the poverty line. This makes us doubtful that the best way to reach the poor is through the small, subsidized NGOs. Furthermore, the poverty outreach index found that the correlation between depth of outreach and level of subsidies is negative or non-existent, unlike the traditional measures which found a positive relationship between both.

On the other hand, Hudon and Traca (2011) found that MFIs that didn't receive subsidies were less efficient than MFIs that received subsidies and hence subsidies positively affect efficiency. That is true only up to a certain subsidy amount; if the subsidy is above a certain threshold the marginal effect on efficiency and productivity becomes negative and it would be better to lower the subsidy level. The results were reached using a cross-section regression that estimated the proportional decrease in a MFI's efficiency with a certain level of subsidy intensity, compared to the benchmark of no subsidies, also known as the efficiency-tax as a function of subsidy intensity. Better macroeconomic environment i.e. higher levels of GDP and PPP will increase the efficiency and productivity of MFIs. A limitation is that there was an upward bias of the OLS estimate of efficiency tax, meaning that a weak MFI might attract more subsidies from the donors. The paper was not able to correct this bias through the use of proper instruments given the limited data in the database of rating agencies. Another limitation is that very large standard errors and multicollinearity might exist when GDP per capita, PPP and the loan size were added as explanatory variables to determine the subsidy intensity. Also, the correlation coefficient was very low and that indicated that the model didn't capture well the determinants of productivity.

Hence, given that some view that subsidies positively affect efficiency, while others don't, Wydick and Mcintosh's (2005) conclusion that self-sufficient MFIs should act in conjunction with subsidized MFIs given that the subsidies are targeted only to the poor should be taken into consideration. This paper took a quantitative approach and developed a model in which a client-maximizing MFI is in competition with a moneylender. Their study

[5] Unlike the traditional methods of outreach measurement such as average loan size, the poverty outreach index showed that the small, subsidized NGOs whose main aim is to target the poor had fewer poverty outreaches compared to credit unions and banks.

modeled the behavior of non-profit MFIs and found evidence that their client-maximizing objectives lead them to cross-subsidize within the present group of borrowers. The analysis offered in this paper indicated that competition eliminated rents on profitable borrowers and worsened the problem of asymmetric information leading borrowers to acquire several loans.

2.3 Sustainability of MFIs

The more efficient MFIs are, it is proposed by the literature that, the more sustainable they become. MFIs have to increase their outreach in order to be more efficient and hence more sustainable and target the marginalized. It is also proposed that there is demand for MFIs due to limited finance offered to the poor by the formal sector.

Tsai (2004) qualitatively analyzed why people are targeting informal finance as a means of receiving credit despite China and India's policies of limiting informal finance and usury. The statistics showed that the demand for credit is unmet by microfinance and formal financial institutions. If loans given by donor funds and subsidized programs are viewed as developmental side-payments; their repayment rate will be lower in comparison to MFIs that charge sustainable interest rates. Despite the high probability of bankruptcy in informal institutions given the budget constraints of informal financiers, subsidies stimulate microcredit and that's why microfinance and informal finance are imperfect substitutes. In addition, developmental outcomes of banks, MFIs and subsidized loans are shaped by the society's social, political and economic incentives and greater potential for microfinance programs were present when these incentives are broken and the programs were designed according to local needs. So MFIs are unsustainable because they rely on subsidies and the informal sector is a perfect substitute to MFIs.

A similar result was found by Pollinger, Outhwaite Cordero-Guzman (2007) who quantitatively and qualitatively analyzed relationship-based financing and the lending process of MFIs in the U.S. They analyzed data from a survey of real-world practices of several MFIs, put forward the elements of a micro lending model and estimated the break-even price of loans. In addition, they examined the role of nonprofit organizations in providing credit to small businesses, how pricing affected sustainability and self-sufficiency of MFIs and what can be done to better structure the credit market. The results showed that MFIs need to receive grants/subsidies to offer their products at a subsidized rate to microenterpreneurs. Subsidizing credit might explain why mainstream financial institutions do not directly fund

microenterprises and negatively affect the long term sustainability of the MFIs. MFIs are sometimes constrained by their donors to charge a certain level of interest, are not incentivized to know their true cost and maximize efficiency.

On the other hand, Crab (2008) wrote an article in the MicroBanking bulletin which questioned whether the microfinance industry can deliver its objectives given the instability of the global economy. MFIs take loans in local currencies and borrow from international agencies worldwide which expose them to exchange rate risk. The author argued that foreign exchange rate risk management became prevalent the more MFIs started to lend to clients. This paper used measures of economic exposure, annual data from the Microfinance Information Exchange on 276 MFIs from 2001 to 2004 and data on exchange rates from the International Financial Statistics of the International Monetary Fund to measure the extent of economic exposure of some MFIs. Sharpio's measure of economic exposure of a MFI was then applied to test the effect of a currency fluctuation on a firm's value. The findings confirmed that there is no evidence of MFIs exposure to exchange rate risk. A possible justification for that is the small size of MFIs which isolated them from macroeconomic factors. Another possible reason is that the MFIs capital base is dominated in local rather than foreign currency. A limitation of the article is that the data used is annual which might obscure significant risk.

To further support, sustainability is possible given the existence of non-profit organizations (NPOs), advocate shareholders firms (SHFs) and cooperatives (COOPs). Mersland (2009) offers a theoretical framework to understand the ownership costs in MFIs. While policy makers advocate SHFs, most MFIs are either NPOs or COOPs. Hence, this paper compared and contrasted the ownership-cost of the three types of MFIs and applied the Hansmann economic theory of ownership which compared the cost-variables related to market contracts to the cost variables related to ownership. Further support is provided by using descriptive global statistics from the MIX 2006 Benchmarks. The results showed that there must be SHFs, NPOs and cooperatives; their coexistence is necessary to maximize customer welfare. The high costs of market contracts are a result of three market inefficiencies; cost of limited competition, cost of "lock-in" market power and asymmetric information. A blend of the different ownership types is a necessity for microfinance to have a greater impact on customers.

2.4. Regulation

In order for MFIs to be more efficient and sustainable, the literature shows that MFIs have to be further regulated, especially given the current low levels of regulation of MFIs. Arun (2005) qualitatively explored the need for regulation of MFIs to deliver their mission and offer sustainable, diversified services such as savings and insurance to the marginalized. The paper reviewed the major regulatory approaches, their rationale, nature and their impact on the microfinance sector. This was done by reviewing the sector specificities and the current regulatory practices. Regulation is not a one-size fits all police; regulations should be country specific to account for the different macroeconomic environment and stage of development of the country. The diversity of the institutions and the sector-specific requirements should be accounted for by a new regulatory framework. MFIs should be part of the financial regulation legislations so that the demand of the poorest of the poor are met. These country specific regulations if coupled with prudential reforms may allow MFIs to mobilize savings and tackle the enforcement problems of the normal banking regulations and allow further mobilization of savings.

Further examination of the regulation system of MFIs in four African countries (Benin, Ghana, Guinea, and Tanzania); Basu, Blavy and Yulek (2004) relied on studies done by the IMF and the World Bank to qualitatively identify facts and trends of MFIs. The analysis offered by this paper indicated that MFIs complement the banking system and the growing linkages between them. In addition, the role of NGOs coupled with regulation and supervision give rise to a sound sector that is capable of extending its financial services to the poor. Peer pressure and joint liability ensure loan repayment for MFIs, despite MFIs not demanding collaterals from the borrowers. NGOs and donors played an effective role in the development of the microfinance sector by bringing regional and international best practices into MFIs in Sub Saharan Africa. Challenges faced by MFIs included lack of information on borrowers, regulations, and shortage of skilled staff. The governments' role in enforcing regulations and having a regulatory environment that is sector specific and is in accordance with the country's stage of development was proved to be mandatory.

Furthermore, Ahlin, Lin and Maio (2010) looked into how can a country's macroeconomic and micro-institutional environments affect the performance of MFIs. Are MFIs independent of the host economy or is there a dualistic relationship between both? Country-level economic and institutional data are collected alongside data from

MixMarket on 373 MFIs that operated on or before 2004. The main performance indicator was the operational self-sufficiency, which is the ratio of annual financial revenue to annual total expenses. The dependent variable in the OLS regression was the outcome of a MFI in a certain country during a certain year. Complementary between the macroeconomic and micro-institutional environment and the performance of MFIs was evident.

Financially deeper economies, greater macroeconomic stability, higher levels of growth and competition and lower levels of inflation increased the MFIs efficiency, sustainability and return, and allowed MFIs to charge higher interest rates. Growth also reduced the cost on MFIs and the borrowers default rates. Micro-institutional factors like low levels of corruption, stability, and accountability improved the performance of MFIs, while active government policies and good regulations might have increased the cost of operation on MFIs. Difficulty in starting a business, contract enforcements and property were found to have an impact on MFI performance. So MFIs are interdependent with the country's economy; the micro-institutional and macroeconomic performance shape the direction of the MFI and regulation is a necessity for good MFIs performance. A limitation of the study is that despite that the 337 MFIs operate in geographically distinct areas, a sample bias estimate might have existed and the results might not be generalized to all MFIs worldwide.

On another vein, Cull, Demirguc-Kunt and Morduch (2009) through the use of global surveys on MFIs and cross-sectional data from the Microfinance Information Exchange and the MicroBanking Bulletin illustrated the tradeoffs that MFIs, regulators and donors face. The data involved three different types of customers' poverty and included data on 346 institutions in 67 countries from 1999 to 2002. To test for the mission drift of MFIs, variables measuring outreach were regressed while controlling for institutional characteristics. Trade-offs arose as a result of competition, regulations, commercialization, different contracting mechanisms, lack of collaterals, lack of banks monitoring and data collection and more importantly lack of the banks interest in low income groups. The authors quantitatively found solutions on how can the different microfinance actors expand financial access, improve efficiency and increase fairness of capital markets. Financial sustainability and outreach are not two opposing forces; however a tradeoff exists between social goals and maximizing profits. Regulatory supervision, although costly, is critical for deposit taking but may shift

the MFIs target segment to those who are well-off. Further competition from the formal-sector drives MFIs to target more the poor.

Lack of regulation was also found by Wagner and Winkler (2013) who explored the effect of the financial crisis on the credit growth of MFIs, since the credit growth is a key financial vulnerability indicator. After controlling for a group of MFI-level, structural and macroeconomic factors that affect credit growth in non-crisis times, a panel regression was estimated to test whether the crisis negatively affected MFI credit growth. The regression was based on data of credit growth of 722 MFIs in 74 developing and emerging market countries. The data is annual, from 2000-2009, and was obtained from MixMarket. A cross-regression analysis of 437 MFIs in 49 countries was conducted to test whether the depth of the credit bust during the time of the crisis can be predicted by the size of the credit boom preceding the crisis.

The paper's findings were that there is lack of regulation of MFIs and over time MFIs became more vulnerable to financial turmoil and during the financial crisis credit growth of MFIs declined sharply. The more integrated a MFI is in the global economy, the greater its use of domestic and international markets for funds and hence the greater the severity of the crisis on the MFI. The higher the credit growth in the pre-crisis period, the stronger was the fall in credit growth as a result of the crisis. MFIs operating in countries with better macroeconomic conditions were less affected by the crisis. There was little difference in credit growth patterns of the different types of MFIs, however financial inclusion and vulnerability were evident and one of the reasons of the lack of stability is inadequate regulation.

2.5. Determinants of loan repayment

Hence, the above section showed the importance of regulation for MFIs to be sustainable. Not only are the regulations important for MFIs to be sustainable, but there are other factors that affect repayment rates and efficiency. These factors are mainly divided into two main sections; those that are related to the borrowers' characteristics on the one hand and on the other hand those that are related to the MFI.

2.5.1. Borrower's characteristics that affect repayment

Examining what factors affect the repayment rate, Arsyad (2006) assessed Village Credit Institutions, also known as Lembaga Perkeditan Desa (LPD) in Bali. A logistic model was based on data from the 1999-2001financial reports of LPDs, population data, the number of client data, and Gross Regional Domestic Product. This time period was chosen as it was a period of economic stability in Bali. The results of this paper showed that high repayment rates of the LPDs were affected by the institutional arrangements that are based on the Balinese social customs (sanctions, social norms and values), formal and informal institutions. In addition, the number of staff, borrowers, savers and wealth did not impact the repayment rate, but rather the capacity and willingness of the borrower to repay were the ones that affected the repayment rate. The model showed high repayment rates and low delinquent borrowers ratio (those who didn't repay their loans on time relative to total borrowers), indicating the clients willingness to pay the interest rate even if the inflation rate was significantly smaller than the interest rate. A limitation is that the model was based on only two years, which might not be indicative of what happened in Bali throughout the years since these two years were a period of high economic stability.

As for the Cape Verdean microenterpreneurs and microenterprises, Baptista, Ramalho and Silva (2006) looked at the characteristics of the microenterpreneurs that influence the probability of their need for external start-up capital. The article also related how variables such as the borrowers' socioeconomic backgrounds and MFI characteristics can affect the borrower's need of capital. One of the authors distributed a survey questionnaire in 2003 to 120 microentrepreneurs and analyzed the characteristics of the demand side of microcredit in Cape Verde. Then a random sample of microenterprises was selected from the database “Ficheiro de Unidades Estatísticas”. The survey showed that in Cape Verde the main entrepreneurs were women with very low levels of education who voluntarily started their trading firm before the age of 40 and decided to work alone or with only one employee. Significant differences existed between rural and urban microenterprises; microenterprises in rural areas are smaller than those in urban areas, target more women and the less educated who voluntarily become self employed in the trading sector. The dependent variables in the regression model (age, education, gender, and reason for being self-employed) were found to be positively significant in determining the need for external capital. It was also found that microenterprises serve as a tool for

reducing unemployment, alleviating poverty and enhancing economic growth in Cape Verde.

In addition, Gomez and Santor (2001) explored the determinants of self-employment success for borrowers of microcredit, the economic returns to social capital accumulation and the effect of microfinance programs on clients. This was done using a cross-sectional data set from a survey by the authors, in addition to administrative files for small-scale self-employed clients who accessed credit from Canada's largest non-profit micro lending institution from the period 1994 to 1998.[6] The model demonstrated that a positive determinant of self-employment earnings is social capital. Social capital aided the borrower in case of lack or limited financial collateral and therefore positively affected individual labor market performance. In addition, middle-aged, male, married and Canadians earned the most from self-employment activities. Borrowers with the same educational level however did not have equal profits from their microcredit loan. Furthermore, the location was proved to be a determinant of small-scale self-employment success.

Furthermore, Abd Karim and Roslan (2009) employed probit and logit models to examine what are the factors that affect loan repayment for non-group microcredit borrowers. In 2007, a random sample survey was conducted on 2630 borrowers from 86 branches of Agrobank, a commercial bank in Malaysia that lend mainly to those working in the agriculture sector. The dependent variable of the model took a value of 1 in case of a loan default and 0 otherwise. The determinants of repayment were divided into three categories: characteristics of the borrower, characteristics of the loan and characteristics of the project. The results showed that the type of business, loan duration and amount, training, and gender of the borrower are all significant factors that affect the probability of loan repayment. The probability of default for men was higher than that for women since women are hard workers, financially disciplined and become economically empowered after taking a microloan. In addition, less risk was found in the services sector compared to the production sector leading to lower default rates for those involved in the services sector. The higher the loan amount, the shorter the repayment rate and the provision of training all contributed positively to lower

[6] A reduced-form human capital earnings equation augmented with social capital and neighborhood effects was then estimated using a survey on 612 group borrowers and on the other hand 52 individual borrowers (borrowers who receive credit but don't have social capital).

probability of default rates. Age, education, prior employment, race and the number of dependency were among the factors that did not influence the probability of default.

Applying the same method, Mokhtar, Nartea and Gan (2012) employed a logistic to determine the factors affecting repayment in India. The model employed the loan repayment problem as the dependent variable that is a function of the borrower characteristics, business characteristics and microcredit loan characteristics. The loan repayment problems were either a result of the loan characteristics or the borrowers' socio-economic characteristics. The dependent variable took a value of 0 if the borrower always paid on time and a value of 1 if he/she did not repay more than four times during a period of two years. This information was collected from a survey questionnaire were 472 borrowers from different districts had to answer how many times did they default.

The main findings were that some of the borrower's characteristics such as gender, age and type of business involved contribute to the loan repayment problems of MFIs, in addition to some loan characteristics such as the mode of repayment and the repayment amount. The results showed that females had higher repayment rates compared to men. Borrowers who were involved in small business activities had lower default rates compared to borrowers who worked in the agricultural sector. The biggest age group and the lowest age group had loan repayment problems and older borrowers defaulted more compared to the young. More frequent loan repayment periods meant more loan repayment failures. Hence, different loan repayment methods/ more flexible contracts should be present to suite the revenue cycle of each project and the level of experience and skills of each borrower.

2.5.2 MFI characteristics affecting repayment

2.5.2.1. Impact of interest rates on loan repayment

Examining whether interest rates can negatively affect repayment rates, Asli Demirgü.-Kunt, Cull and Morduch (2006) gathered data on 124 institutions operating in 49 countries to see the profitability, loan repayment and cost reduction patterns over the years 1999 to 2002. Data was gathered from the Microfinance Information Exchange and the MicroBanking Bulletin. Several regression models were then estimated with the dependent variables being the financial self-sufficiency (FSS) ratio, operation self-sufficiency (OSS) and return on assets (ROA). Some of the independent variables included the MFI's history, yield, region, cost, orientation and lending type. The results

showed that institutional design and orientation are key players for any MFI. Positive significant correlations existed between FSS, ROA and OSS. Despite the negative return on assets for all the MFIs combined, more than half of the MFIs had positive profits. The correlations provided little evidence on the existence of a tradeoff between outreach and profit, agency problems and mission drift. Also the correlations showed that raising interest rates didn't lower repayment rates and profitability, nor negatively affected the MFIs social mission.

By conducting a lab experiment, Abbink, Irlenbusch and Renner (2006) studied the behavioral impact of the repayment burden, determined by the interest rate, on the repayment rate of the borrowers. The paper investigated how free-riders behavior changes with different group loan repayment amounts. Four treatments were carried out and the first three treatments were carried out were the repayment depended only on the group solidarity, but each of the four players of the group invested in a separate risky project. Varying the repayment burden imposed on the group, they tested whether higher burdens lead to an improved repayment discipline. The contribution rates in the three basic treatments were similar despite the different interest rates. A loan can be fully repaid even if not all the four players repay; if three or less repay the full amount then further loans can be taken from the MFI.

The fourth treatment was conducted and two opposing effects were evident; the higher the repayment rate the higher the incentive for borrowers to free-ride and on the other side, loans with high interest rates loans meant that borrowers were less tolerant towards intentional defaulters. So the high interest rates can enhance repayment disciplines instead of encouraging free riding or negatively affect the willingness to pay. In this experiment, group members who had to pay high interest rates were not able to take several loans; hence loans have to be offered at prices that are suitable for the borrowers to achieve sustainability.

Moreover, Karlan, Mullainathan and Morduch (2010) analyzed why the take-up rates of financial goods and services are low; is it a demand-sided problem or supply-sided. The paper defined that the take-up rate of a product or service is where the demand meets the supply. Microfinance penetration rate was measured using data from MFIs and census data. Other take-up measurements relied on data from household surveys that were obtained from the World Bank's Living Standards Measurements Surveys. In addition, two

surveys and thirteen projects were used to provide a clear picture of the take-up rates of financial services. The data implicated that take-up rates for microfinance products (credit, savings, and insurance) were low. The main reasons for so is that people do not like to be in debt and are generally unsatisfied with the terms of credit offered in the credit market. These MFIs and their products did not serve the poor and the creditworthy. Consequently, more than half of the eligible households to participate in microfinance did not and preferred to resort to informal sources of financing such as moneylenders, families and friends. MFIs should therefore monitor the take-up rates of different financial products so that a larger market segment can be reached. Interest rates should not be high, as that resulted in lower rates of repayment. A limitation of the paper is that a small sample size was used and a larger sample should have been employed.

2.5.2.2. Impact of innovation of financial services

Repayment is directly affected by the borrower characteristics and loan characteristics including regulations and interest rate. Repayment is mostly influenced by information asymmetries, poor performance of the MFIs, low levels of education and adverse shocks to the borrower. Although the variables that affected repayment were slightly different from one paper to another that could be a result of the evidence being country specific. Hence, we examine whether factors other than the borrower and loan characteristics had an impact on loan repayment.

Godquin (2004) answered the question of whether microfinance innovations such as nonfinancial services, group lending and dynamic incentives affected the rate of repayment. Using household data, regression models were estimated taking loan size to be an endogenous variable once and repayment performance to be another. Instrumental variables were then added to correct for the loan size. Also Smith and Bludell's exogenity test was applied to estimate the borrower's capacity to have cash that will enable him/her to repay the loan before the repayment rate. It can be deduced from the model that nonfinancial services positively affect the repayment rate while group homogeneity and social ties do not necessarily mean a better performance. The financial innovations of the MFIs lending methodologies have helped in poverty alleviation in a sustainable manner. However since these innovations are costly, a cost-benefit analysis has to be constructed on whether these financial services should be provided or not. In addition, MFIs dedicated

larger loans to groups whose borrowing periods are longer; however this lead to a negative impact on the repayment rate.

2.5.2.3. Other determinants

Other determinants were found by El-Gamal, El-Komi, Karlan and Osman(2012) who conducted a laboratory experiment in the field to test the performance of a microfinance model, Bank-Insured rotating savings and credit association (RoSCA)[7], against a Grameen microcredit model. The aim of the experiment was to examine whether credit unions in the muslim countries can narrow the gap between the poor and the main financial sector. This experiment was carried out in 2 Egyptian governorates (Behayra and Fayoum), were the poor muslim borrowers may reject conventional forms of microfinance, but will not reject the guaranteed RoSCA. The sequential structure of the experiment made the subjects more aware of the game. After applying bank penalties and examining the percentage of those who opt out, the percentage of those who defaulted and the percentage of good equilibrium, the series of randomized controlled trials showed that there were higher take up and repayment rates for the bank-insured RoSCA compared to the Grameen microcredit model. Although this paper took into account the probability of the subjects defaulting as a result of moral hazard, the paper fell short of accounting the probability of the subjects defaulting as a result of random returns.

Looking also at muslims who do not engage in traditional microfinance contracts as a result of the payment of interest rates which is religiously prohibited, El-Komi (2012) experimentally tested the demand for Islamic-compliant microfinance products. There are three different contractual agreements (interest, profit-sharing and joint venture) under which a borrower takes money and invests in a risky project where the outcome is unknown. Controlling for adverse selection and looking at moral hazard, the experiment aimed at identifying the borrowers who willingly comply with the contact terms. The results showed that profit-sharing and joint venture contracts performed better than interest contracts. In addition, the take up rates for Islamic -compliant microfinance products were higher than that for the traditional microfinance products that are interest- based. It was also found that the

[7] A RoSCA, abbreviated for Rotated Savings and Credit Associations, is a group of people who pay an amount of money, usually monthly, and in each round (month) one of the group member receives the total amount of money paid by the whole group. RoSCAs are informal savings and credit institutions that facilitate day- to- day financial transactions (Varadharajan, 2004).

compliance rate was higher for women than for men. A limitation of this paper was that it was not carried out in the field on microenterpreneurs.

To sum up, it can be deduced from the literature that the borrower's characteristics and loan characteristics are very important determinants for microloan repayment. There were however other variables that contributed to repayment such as financial innovations and regulation. The results also showed that there is no consensus on what factors affect repayment. Some papers found that gender affects repayment, with men's probability of defaulting being higher than that of women's, while others found no difference. Although all the above papers found that the repayment mode contributes to loan repayment, there was no consensus on the loan amount contributing. Same applies for gender; hence we can infer that the repayment determinants are country specific.

2.6. Group versus Individual Lending

After touching upon the borrowers' and MFI characteristics that affect repayment rates, of equal importance in determining repayment rate is the method of lending of MFIs (group versus individual lending). Further testing of whether group lending had a better effect on repayment rates, Cason, Gangadharan and Maitra (2009) conducted a laboratory microfinance experiment to compare peer monitoring treatments with lender monitoring in the presence of costly peer monitoring and moral hazard. 29 sessions were carried out in Australia and India with 12 subjects in every session and each session consisting of forty periods. The experiment showed that when the monitoring costs are the same, performance of both types of monitoring is almost the same. The benefits of group lending outweighed the benefits of individual lending; resulting in greater loan frequencies and repayment rates and more monitoring if the cost of peer monitoring is less than lender monitoring. Group lending is more successful because peer monitoring tackles the informational and enforcement problems that restrain formal sector credit in developing countries. Long-term relationships among borrowers and social capital are vital for the success of group based lending and peer monitoring, but don't exist in urban slums. Social ties, self-selection and group lending are necessary but insufficient conditions for microcredit programs. A limitation of this experiment is that its subjects are graduate and undergraduate inexperienced university students who make decisions for relatively low stakes.

Abbink, Irlenbusch and Renner (2006) studied the behavioral impact of the repayment burden, determined by the interest rate, on the repayment rate of the borrowers. By

conducting a lab experiment, the paper examined how free-riders behavior changes with different group loan repayment amounts. Four treatments were carried out and by varying the repayment burden imposed on the group they tested whether higher burdens lead to an improved repayment discipline. The contribution rates in the three basic treatments were similar despite the different interest rates. The opposing effects were evident; the higher the repayment rate the higher the incentive for borrowers to free-ride and on the other side loans with high interest rates loans meant that borrowers were less tolerant towards intentional defaulters. So the high interest rates can enhance repayment disciplines instead of encouraging free riding or negatively affecting the willingness to pay. In this experiment, group members who had to pay high interest rates were not able to take several loans; hence loans have to be offered at prices that are suitable for the borrowers to achieve sustainability.

In addition, Besley and Coate (1995) invented a repayment game which studied the repayment rates of groups when the members are jointly liable for repayment. The paper examined if banks have limited sanctions in the face of defaulting borrowers, can group lending be a successful mean to improving repayment rates. Unlike other papers that looked at the borrowers' ability to pay, this study qualitatively looked at the borrowers' willingness to pay. The game revealed that successful group members may be incentivized to repay the loans of those who were not able to earn sufficient return to repay the loan. On the other hand, a negative effect arose if the whole group defaulted because there could have been individuals who were able to repay under individual lending. Fortunately, this negative effect can be mitigated if group lending taps on social collaterals. Social penalties pressure the borrowers, leading to higher repayment rates under group lending. Therefore, higher repayment rates occur under group lending as a result of pressure from both the MFI and the group.

Examining the importance of group lending as a method of mitigating risk and how useful of a tool it is to provide access of credit to the poor Wydick (2001) conducted primary field research data to develop a simple game- theoretic model of group lending. Data was obtained from a 1994 survey and a 1999 follow up survey of 137 borrowing groups in Guatemala and nearby rural areas, each group consisting of three to five members. The paper hypothesized that when informational flows are high between group members, risk is mitigated and hence the probability of misallocating borrowed capital decreases, since borrowers with a high rate of time preference are removed. Also with tightly knit social structures, asymmetric information is mitigated.

The results showed that group lending is preferred over individual borrowing contracts; as individuals in the group behave in a less riskier degree due to the threat of being excluded from the group, inability to access credit from other institutions in case of default or being sanctioned in case of capital misallocation. These sanctions are evidence that screening of borrowers is an ex-post process to group formation. Peer monitoring, social cohesion and the safety net of intragroup credit insurance decreased some of the risky investment behavior. This is shown despite that there is no significant relationship between social ties on intragroup credit insurance. In addition, a tradeoff between peer monitoring and the threat of social sanctions existed in a perfect Bayesian equilibrium. Hence, despite the higher cost to group borrowers, group lending is pareto efficient for both borrowers and lenders.

Since the benefits of group lending outweigh the costs, Bruce (1999) presented an empirical test on what makes group lending in developing countries successful. Is it peer monitoring, group pressure to repay loans, or social ties between members? A bivariate logit model was applied along with likelihood ratio tests on primary data collected from a survey by Wydick and one of the group lending institutions on 137 rural and urban Guatemalan borrowing groups in 1994. This model analyzed the effect of social cohesion on the mitigation of moral hazard, supplying intra-group insurance and overall group repayment performance. The results showed that group pressure has a small effect in mitigating moral hazard and social ties were statistically insignificant. Despite that, peer monitoring had a significant effect on group loan repayment through stimulating intra-group insurance. Hence, the success of group lending is not a result of the institution's ability to put to use already existing social ties, but rather peer monitoring and the group's willingness and ability to internally pressure irresponsible members. Repayment is enforced in different ways in different geographical locations; in urban groups, repayment rates increased mainly through stimulating intra-group insurance via peer monitoring and in rural areas moral hazard decreased by applying social pressure.

2.7. Conclusion

This chapter presents an overview of the empirical literature on microfinance. It was found that MFIs contribute to poverty alleviation, higher levels of income, employment, consumption, savings and investment. On the other hand, the literature showed that MFIs can have a negative impact on poverty by decreasing the borrowers' level of consumption and immersing them more into their poverty. Hence, it can not be concluded that microfinance is

the solution to the poverty problem; it can only be a tool. The chapter also discusses the existence of a tradeoff between outreach and efficiency and that efficiency is positively correlated with the level of regulation of MFIs. In addition, to increase efficiency, one can examine loan repayment and its determinants (borrower characteristics, loan characteristics, financial innovation, regulation and others). It is also evident that the microloan repayment determinants are country- specific and therefore the rest of this paper will examine what are the repayment determinants for Egyptian microfinance institutions.

Chapter Three
Methodology and Data

To test for the efficiency of MFIs, this empirical paper will qualitatively and quantitatively determine the factors affecting loan repayment for Egyptian MFIs. This chapter aims to explain the type of research methodology applied, its advantages, disadvantages and how is it applied. Then the chapter offers an explanation of how the data used in the empirical model was gathered, along with the MFI lending policies of the data sources. Then the chapter describes the data available from the two MFIs followed by an illustration of the econometric model that this paper will be guided by, and how the variables will be incorporated in the model.

3.1. Research Methodology

The mixed method approach is the research methodology that this paper applies. The mixed method approach employs both a qualitative and quantitative approach in an attempt to answer the research question proposed. This paper utilizes both approaches as the research questions calls for real-life contextual understandings that a quantitative model alone cannot capture (Meissner, 2010). Social norms, cultural influence, the borrower's lives and experiences are measures that give insight into the repayment problems but can only be captured through a quantitative approach.

Beyond the rigor of quantitative modeling, this paper includes a chapter on real-life cases of successful and unsuccessful borrowers within a critical comparative context on how things happen on the ground. The qualitative analysis gives an in-depth aspect to the core repayment problems. Although the repayment determinants can be outlined using an econometric model or an interview with an MFI branch manager, interviewing the borrowers leads to insights to the different stories behind the borrowers' repayment.

Along with explaining the borrowers' reasons for defaulting, the qualitative chapter serves not only to complement the findings of the model specified, but it also serves to include variables that are not included in the literature or that are country-specific. For instance, the interviews have unveiled that one of the root causes for lack of timely repayment is the 25th of January Revolution.

The revolution has adversely affected the microprojects and consequently loan payment. That has led the researcher to quantitatively measure the significance of a

macroeconomic shock such as the revolution on loan repayment. Therefore, the findings of the quantitative section are to some extent built on the findings of the qualitative section.

So despite that a quantitative approach does not aid in understanding the setting in which people behave, qualitative research does. On the other hand, the qualitative approach might lead to biased analysis or hasty generalizations that are not applicable to the whole sample, quantitative research offsets this disadvantage. Hence, the weakness of each approach is offset by the strength in the other approach (Meissner, 2010).

The advantage of this qualitative research is that focuses on human lives and experiences through the use of interviews for the purpose of inductive research. The qualitative data also presents intricate information about the borrowers by explaining their living conditions and conveying their messages through quotes. On the other hand, the qualitative aspect serves to establish a measurable cause and effect relationship between the dependent and independent variables using a sample data that could be generalized to represent the whole population (Meissner, 2010).

Moreover, the quantitative analysis focuses on answering "what" factors affect repayment, while the qualitative focus on "why" and "how" do these factor affect repayment. Accordingly, using a qualitative or quantitative method alone is deemed inadequate in developing multiple perspectives and in offering a cohesive understanding of the core repayment determinants for Egyptian MFIs.

The disadvantages of the qualitative approach however lie in the difficulty of accessing the homes/ working place of the borrowers. In addition, communication problems or language barriers have been present since the borrowers used some expressions that I did not totally understand. Furthermore, some interviewees refused to answer questions that were related to income, revenues, expenses and household appliances.

In addition, data collection has its limitations in that the sample size chosen might not be representative of the whole population, so access to administrative records pose a limitation on data collection. Another disadvantage is that the mixed method approach is more time consuming and increases the complexity of the evaluation. Discrepancies might also arise between the qualitative findings and the quantitative findings and these discrepancies might be hard to resolve (World Bank, 2001).

Despite these disadvantages, the qualitative and quantitative methods are used simultaneously to mitigate the weaknesses of any single approach. The mixed method

approach is also used to establish a more coherent picture of the repayment problems by illustrating the contexts of the borrowers' lives and reasons for (un)successful loan repayment and validating the results by providing experiences along with outcomes (Clark, 2010). The quantitative analysis assesses the significance and magnitude of a loan repayment problem, while the qualitative aspect gives a better understanding of such a problem and possibly draws policy implications on how to solve these problems (Meissner, 2010).

Therefore, this paper applies the mixed method approach to strengthen the validity of the findings as the main advantage of the mixed methods approach is the possibility of triangulation i.e. examining the same phenomenon through different angles (Guion, 2013). The qualitative approach consists of in-depth interviews with 12 borrowers living in Al-Qalyoubia and Al- Monofia governorate. The interview process, method of selection of the borrowers and results of the interview will be explained in detail in chapter five.

3.2. MFI lending policies

As for the quantitative approach, the estimation model used depends on the data gathered from 2 Egyptian MFIs; Resala and Misr El- Kheir (MEK). Several other MFIs were approached; however these were the only two MFIs that agreed to give me access to their data. There is no data available on loan repayment for Egyptian MFIs. Hence, primary data must be collected. Before explaining the data I was given, an overview will be given on each of the MFIs lending policies.

First, both of these MFIs are NGO- MFIs. Resala and Misr El Kheir rely on money from philanthropists or grants as a source of funding to their loans. It is widely assumed that for an NGO to be a MFI then it must dedicate all of its resources in offering financial services. Although these NGOs might engage in non-financial development activities, so long as they are supplying financial services to the poor they are called MFIs (Microfinance Gateway, 2014). The difference however is that their objective is not to obtain profit and that is why they do not charge their lenders any interest rate. They have a greater socio- economic element compared to for-profit MFIs.

During November 2013, I interviewed the head of microprojects at one of Resala's branches to know on what basis they choose their borrowers, the aim of the microprojects and the reasons behind unsuccessful loan payments. Along with interviewing the head of microprojects, I asked several loan officers about the process of choosing the clients, the

method of lending and of collecting installments. In addition, I interviewed a couple of borrowers who were applying to a loan at the time of the interviews to be familiar with how Resala perceives its potential borrowers and on what criteria are they chosen.

According to the interviews, lending in Resala is on an individual basis, with hardly any group lending. The eligibility criterion for receiving a loan for a microproject is that the applicant should be in need of the loan in order to have a sustainable flow of income. The applicant must also have the physical and mental ability to carry out the project. If the applicant is in need of money but is not able to carry out a project, then Resala offers him/her a job so that the borrower can have a sustained source of income.

The microfinance team (head of microproject and loan officer) researches whether the applicants for a microproject are in need of the loan. A member of the team visits the applicants' homes and examines their wealth conditions. If the potential borrower is deemed eligible for the loan, a member from Resala starts to offer the equipments (machinery, cloth, products,,,) needed. No cash is given and no collateral is required. Resala's policy in providing the equipment to the borrower rather than give him/her cash is to ensure that the loan is directed towards the project rather than being directed towards other purposes such as consumption. The amount that Resala pays to buy the equipment will be repaid by the applicant over the borrowing time period. The repayment period varies according to the loan size and type of project.

After the loan is approved, Resala arranges with NGOs to offer training sessions to some of the borrowers for free. Then the borrower undergoes a test after the training session is over to verify his/her capability of carrying out the project and if the borrower passes the test then Resala starts lending him/her. In addition, current successful borrowers give advice to new borrowers on how to manage their projects. Borrowers approach Resala in order to apply for a project, but Resala's team of microprojects discovered that poor eligible applicants living in rural areas such as Deiweka are unaware of Resala's microprojects, so they started approaching them.

The loans are usually paid back monthly over a period of a year and a half, however they can range from one month up to three years. The loan amount is divided into equal increments over the loan period excluding the first month, since not enough revenue is generated during the first month and the amount generated will be better reinvested in the project. Once per month, a volunteer from Resala will check the status of the microproject

and would give advice on how to improve it. In case the project is failing, the volunteer examines the reason for failure and intervenes to help the borrower.

As for the other MFI under study, Misr El Kheir (MEK) is an NGO-MFI that serves as a financial intermediary between philanthropists and poor borrowers. This organization is different than Islamic and Grameen institutions in that it used to give the microloan to the poor borrower without asking them to pay anything. That means that the money that the borrowers take is offered by a philanthropist and hence there is no obligation on the borrower to repay anything, not even the amount of the loan itself.

This however has been proven to be inefficient according to the head of microprojects in MEK in that the borrowers would start selling their project or start using the loan as a consumption loan or paying their debts instead of carrying out the project, as there is no commitment to the MFI to pay anything. As a result, MEK lately has decided that the borrowers have to repay 40% of the loan amount. This money will then be given to another borrower and the cycle continues. This way, MEK is still a non-profit organization and is able to achieve better levels of efficiency, sustainability and lend a larger number of borrowers.

MEK does not limit its clients to any age group. Both males and females borrow from MEK, whether they are residing in a rural or urban area. No previous experience is required from the borrower. Also as a philanthropist organization, even if the borrower's health condition is not good, MEK would finance the borrower with a project that suits his/her health condition and monitors them frequently.

As for the projects, there are several project types with different repayment schemes. The installments for the loan amount has to be paid monthly for all of the projects, except for the cattle project were the first installment is paid after seven months from taking the loan so that the cattle would have breaded and the borrower would have enough revenue to pay the installment.

3.3. Data

During October and November 2014, primary data was gathered from these 2 MFIs. Cross - sectional data for all the clients of one of Resala's branches was gathered. This Resala branch had data for 163 borrowers starting the year 2009, the year Resala started giving loans for microprojects. Their data is classified into 3 categories; the first includes

borrowers who paid their installments on time and are done repaying back the whole microloan and those who are still paying but did not default in any of their installments. The second category consists of those borrowers who were not able to repay their loan installments on time. The third category consists of deceitful borrowers who sold their microprojects or didn't repay their loan.

The following data were retrieved from Resala's applications: age of the borrower, his/her gender, marital status, address, whether the applicant is able to read or write, number of people in the household, living conditions in terms of furniture and electronics and the borrower's health status and that of his family. It also included data on the total family income and its breakdown (wage, social insurance, and external sources of funding), monthly expenses including rent, and level of indebtedness.

In addition, data on the loan characteristics include the date when Resala's committee agreed to finance the microproject, the date the loan was received by the borrower, the total amount required by the borrower to carry out the project and the amount Resala agreed to finance. Moreover there was data on the monthly loan installment and the payment date of the first installment, the repayment period, type of microproject, whether competitors exist, expected revenue and the level of experience acquired by the borrower.

In the case of MEK, a random sample of 838 borrowers was selected by the head of microprojects from the years 2011 till 2013. These borrowers live in 12 of Egypt's governorates. The data includes successful cases of lenders who were able to pay on time. On the other hand, the data also included unsuccessful cases of borrowers; those who were unable to pay on time but were then able to complete the project, those who were unable to repay on time and the project has stopped as a result, and those who sold their microprojects.

Misr El Kheir's applications contain information on the age of the borrower, his/her gender, marital status, address, number of people in the household, number of children receiving an education, living conditions and whether MEK provides them with other sources of help if the living conditions of the borrower are poor. The data also includes the job status (whether he works or not and whether his job is permanent or temporary) and the borrower's health status and that of his family. It also includes data on the total family income and its breakdown (wage, social insurance, charity, and external sources of funding), each member's share from the income, monthly expenses including rent, and level of indebtedness.

Furthermore, data on the loan characteristics include the date when MEK's committee agreed to finance the microproject, the date the loan was received by the borrower, the total amount required by the borrower to carry out the project and the amount MEK agreed to finance. Moreover, the data includes the monthly loan installment and the payment date of the first installment, the repayment period, type of microproject, whether competitors exist, is the applicant himself carrying out the project or is he helped by his family, relatives or acquaintances, and whether it is a new project or an expansion of an existing project.

Grouping the two data sets into one model, the variables included in the empirical model below have been chosen based on the variables common to both MFIs and only those that affect repayment. The first group of variables is the socio-demographic characteristics of the borrower; which include age of the borrower, gender, marital status, number of people in the household, address, living conditions, job status, and the borrower's health status. In addition, the model also includes data on the total family income, monthly expenses, and level of indebtedness. As for the loan characteristics, that includes the loan amount, loan installment, the repayment period, type of microproject, and interest rate.

Having data on the above variables, this paper follows the empirical model of Roslan and Abdel Karim who employed a probit and logit model that regressed loan repayment on several repayment determinants (Roslan, 2009). This model is chosen as it is the most relevant to the available data set in terms of the variables in the model. Abd Karim and Roslan (2009) employed probit and logit models to examine what are the factors that affect loan repayment for non-group Malaysian microcredit borrowers. The dependent variable in their model was loan repayment, which took the value 1 if the whole loan amount is paid without any delays in paying the installments and took the value O otherwise.

They characterized the repayment determinants (independent variables) into the borrowers' socioeconomic characteristics, loan characteristics and project characteristics. The borrowers' socioeconomic characteristics were comprised of age, gender, level of education, other jobs and experience in the current job. The project characteristics included the ownership structure of the project, type of project, and distance from the project to the MFI. Lastly, the loan characteristics encompassed the loan size and repayment period. Other independent variables were added to the model including the marital status, race, training, membership in business society, number of dependents and revenue from the project.

This paper also applies a probit model rather than the ordinary least squares (OLS) method which is the most common linear model applied in social sciences research. The dependent variable (y) in this model is the probability of loan repayment, which takes the value of 1 in the case of the borrower promptly paying all the installments and 0 otherwise. Since the dependent variable is categorical and discrete, using the OLS method leads to biased and inefficient estimators. Hence, since the dependent variable is a binary response (takes the value of either 0 or 1), then a logit or probit model should be employed (Indiana University, 2014).

The estimates of the parameter therefore will be obtained by maximizing the log likelihood function. This paper applies only a probit model rather than a logit model and the difference between both models lies in the distribution of the errors. The disturbances are assumed to follow the standard normal distribution in a probit regression, while they follow the standard logistic distribution in the logit regression. This model assumes that the dependent variable is moderately balanced between zero and one and follows a standard normal distribution and accordingly a probit model will be used (Indiana University, 2014).

Another distinguishing factor between this paper and that of Roslan's is that this paper focuses on Egyptian MFIs rather than Malaysian MFIs. With only seven institutions in Egypt serving 65% of the current borrowers, that raises the question of whether the problem of unmet demand is demand sided (inability of the borrowers to repay measured by their socio-demographic characteristics) or is it supply-sided (inability of MFIs to operate efficiently). Hence, these variables are different from that of Roslan's in that some variables such as race, level of education, experience, membership in a business society, distance of the project to the nearest bank, revenue generated from the project and training provided to the borrowers were omitted from the model due to data unavailability.

3.4. Empirical Model

Following Roslan and Abdel Karim's probit model in determining the factors affecting repayment rate for microcredit in Malaysia, the below model measures the factors affecting repayment for Egyptian MFIs (Roslan, 2009). Other variables beyond Roslan's model were included such as indebtedness, which was part of Van Gool's binary logistic model on mid-sized Bosnian microlending (Van Gool, 2009). Also, a distinction in the repayment rate of rural and urban households was examined by Huerta's paper on

microfinance in rural and urban Thailand (Huerta, 2010). Finally, household size was included based on Godquin's research on "Microfinance Repayment Performance in Bangladesh and household income was included based on Bhatt's repayment determinants in the United States (Bhatt, 2002 and Godquin, 2004). A description of the aforementioned variables is discussed below, with an explanation of how the variable will be incorporated in the model.

The general empirical model is given by:

$$Pr(Y_i) = \alpha + \beta X_i + L_i + R + \varepsilon_i$$

Where,

Y: Full loan repayment on time

X_i: Summation of borrowers' socio-demographic characteristics that affect loan repayment

L_i**:** Loan characteristics

R: Dummy Variable for the borrowers affected by the 25th January Revolution

ε_i**:** Error term

$_i$**:** Individual / Borrower

Variables

Y_i**:** Endogenous variable that takes the value 1 if the whole loan amount is repaid without any delays in paying the installments and takes the value O otherwise. To further illustrate, the value of the dependent variable for the first category of Resala's borrowers (borrowers who repaid all their installments on time whether they repaid the whole loan or are still paying) will take the value 1. As for the second and third category of Resala's borrowers (borrowers who were not able to repay any of their loan installments on time and deceitful borrowers who sold their microprojects or didn't repay their loan) will take the value of 0. The same applies for MEK's borrowers.

X_i**:** Vector of variables that include the borrowers' socio-demographic characteristics that affect loan repayment

X_1: Age

X_2: Gender Gender =0 in case the borrower is a female and 1 in case of a male.

X_3: Marital Status A value of 0 is given if the borrower is single (including divorced, widow, and engaged) and 1 if married.

X_4: Household Size

X_5: Family's income level

X_6: Address If the borrower lives in a rural area in any of the 12 governorates then the variable address will take take the value 1 and 0 if the borrower lives in an urban area.

X_7: Indebtedness

X_8: Health Status Health=1 in case the borrower does not suffer from any health problems and health=0 otherwise.

X_9: Job Job=0 if the borrower doesn't have a job, job=1 if the borrower has a permanent or temporary job.

L_i: Vector of the loan characteristics that affect loan repayment

L_1: Loan Size It is expected, according to the literature, that a positive relationship exists between the loan amount and the ability to repay. Large loan amounts lead MFIs to monitor the microprojects more carefully and hence the probability of repayment will be higher. In addition, a micro project based on a small loan will not be able to generate as much cash flow and hence the ability of the borrower to repay will be lower.

L_2: Repayment period Borrowers in both MFIs have to pay monthly installments. The number of months throughout which the loan will be fully repaid is the repayment period.

L_3: Type of Project A dummy variable is assigned to each type of microproject depending on the project's sector. The projects are related to the services, manufacturing, agricultural and animal sectors. This vector includes only the manufacturing, services, and animal sectors as the agricultural sector serves as the base and will be omitted to avoid multicollinearity. The variable manufacturing will take a value of a 1 if the project is related to the manufacturing sector and 0 otherwise. The variable agriculture will take a value of a 1 if the project is related to the agricultural sector and 0 otherwise. Similarly, the variable services will take a value of a 1 if the project is related to the services sector and 0 otherwise and the variable animal will take a value of a 1 if the project is related to animals and 0 otherwise.

L_4: Type of MFI MFI=0 if the borrower borrowed from Resala and MFI =1 if the borrower borrowed from MEK. This dummy variable is incorporated into the model to capture any differences in the operations of the 2 MFIs.

R_i: Dummy Variable for the revolution

R: A value of 1 is given to the borrower if he/she was affected by the revolution (took the microloan before the 25th January revolution and had to pay at least one of the installments during the time of the revolution) and takes the value of 0 otherwise.

Chapter Four

Empirical results and Policy Implications

This chapter will decompose the socioeconomic characteristics of the 163 borrowers of Resala and the 838 borrowers of MEK along with the loan characteristics in an attempt to answer how can MFIs in Egypt be more socially and financially efficient. A linear probit regression will then be estimated to test what are the variables that affect repayment and draw policy implications on how to increase the repayment rate and overall efficiency of MFIs in Egypt.

A common method used to measure efficiency of MFIs is calculating the repayment rate of loans taken by microfinance borrowers. Borrowers from Resala and MEK represent the population from which the sample of 1,001 borrowers is drawn. The table below shows the number of borrowers who paid on time and those who defaulted.

Table 1: Statistics on loan repayment

Loan Repayment	Frequency	Percent	Cumulative frequency
0	285	28.47	28.47
1	716	71.53	100.00
Total	1,001	100.00	

From the available data, 716 borrowers were able to pay all their loan installments on time, while 285 failed to do so. That means that 71.53 % have fully repaid the loan installments on time and 28.47% delayed repaying the loan installments on time and hence the default rate of the loan beneficiaries is 28.47%. In other words, these two MFIs were only successful by 71.5% in terms of efficiency since only 71.5 % of the borrowers are able to comply with the MFIs loan conditions.

Table 2: Summary Statistics on the borrowers' socio- demographic characteristics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Loan Repayment	1001	.7152847	.4515043	0	1
Age	984	42.05589	10.11711	10	79
Age Squared	984	1870.95	916.2022	100	6241
Gender	1001	.6203796	.485535	0	1
Marital Status	992	.7379032	.4399968	0	1
Household Size	990	5.186869	1.77114	0	12
Family Income	981	554.2088	318.6783	0	2400
Address	994	.1629779	.3695314	0	1
Indebtedness	991	219.553	1916.927	0	51840
Health Status	990	.6828283	.4656101	0	1
Job	986	.6237323	.4846943	0	1

This section presents the statistics in the order in which they appear in the model. All of the tables presented are based on the data of the 1,001 borrowers. The first socioeconomic characteristic is the age of the borrowers. When MFIs choose to whom they should lend, there is no age limit for the borrowers. The age of the borrowers in this sample range from 10 years up to 79 years. As long as the borrower is deemed capable of carrying out the project, the microloan is given to the borrower regardless of his/ her age. The average age for the borrowers is 42 years old. The variable age was squared to depict whether a non-linear relationship exists between the borrowers' age and loan repayment.

The gender variable took the value of 0 when the borrower is a female and 1 when the borrower is a male. Almost 38% of the borrowers are women and 62% of the borrowers are men. Despite that only 38% of the borrowers are women, this figure is overestimated. From the interviews with the head of the microprojects at Resala, he stated that some male borrowers are not able to take a loan from the MFI either because they were imprisoned before or took a loan from a MFI and didn't repay,,, and hence the wife is the one who applies for the loan, but her husband is the one who takes the loan to carry out the project.

Therefore, in reality less than 38% of the borrowers are women, which show that these MFIs focus on lending to men.

As for the marital status, 260 applicants are single and 734 are married. Only 994 observations are available and that is due to another inefficiency in MFIs which is that when the applications are filed, some of the data is missing. For instance, in the applications that the MFI files for its borrowers, one of the questions is related to the presence of competitors. In some applications, this question is answered while in others it is not, depending on whom from the MFI fills in the borrowers' data. The same applies for whether the beneficiary takes social insurance or not and the condition of the furniture and electronics in the house. Some applications include the breakdown of the income, while others don't although they are all borrowers of the same MFI. Furthermore, experience in the project in some applications are recorded in terms of years of experience while in others it is recorded as the level of experience (average, medium, excellent) which makes it hard to quantify in terms of years and therefore this variable cannot be accurately used to determine whether or not it affects repayment. Hence, not all of the data is available on the socio-demographic and loan characteristics of the MFI borrowers.

Moving on to the household size, on average the borrowers have five members in the family. Some families have up to 12 members. This variable is important since the higher the number of people in the household, the higher the burden might on the family to repay the loan on time. However, if the other family members work then in this case the higher the household size the better. Accordingly, a better estimate for measuring the effect on repayment would have been the number of dependents, however there was no data available. MFIs lend to either those who are jobless or those whose income from their job is low. According to this sample, the family income ranges from 0 to 2,400. Those who have zero income don't have a job or a source of revenue and start borrowing from others. On average, the borrowers earn 554 pounds per month. Some MFIs put a limit on the income; if the borrower has an income higher than that limit, then they are not eligible for the microloan since the loan must target the very poor segment of society.

Table 2 also shows the composition of the sample according to whether they live and carry the project in a rural or in an urban area. The borrowers in this sample live in 12 governorates : Cairo, Giza, Alexandria, Monofia, Alyoubia, Al sharkiya, Al Ismalia, Abo El nomros, Aswan, Assuit, Bany Sweif, South Sinai and Qena. 832 of the borrowers live in the

rural area, while 162 live and carry their microproject in an urban area. This shows that almost 84% of the clients live in rural areas and hence MEK and Resala perform well in terms of outreach. This is in accordance with the literature that there is a tradeoff between outreach and efficiency; these MFIs do well in terms of outreach, but not in terms of efficiency.

From the sample, 37.55% of the borrowers are without a job and 62.45% have a job. The 62.45% who have a job, 42.55% have a permanent job and 16.9% have a temporary job.

Table 3: Statistics on the Loan Characteristics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Loan Amount	998	3357.952	1613.608	205	9000
Repayment Period	981	14.67348	8.607503	7	100
Manufacturing	996	.125502	.3314537	0	1
Agriculture	996	.0281124	.1653771	0	1
Services	996	.4297189	.4952846	0	1
Animal	996	.4166667	.4932543	0	1

Once an applicant is eligible to take a loan for a project, the MFI decides the amount that should be lent to the borrower based on the type of project, his/her socio-demographic characteristics and more importantly their ability to repay. A project evaluation is carried out by the MFI to determine the loan amount and since the loan amount is very specific to each borrower's characteristics and project, the difference in the loan amount ranges from 205 to 9000 pounds.

As for the repayment period, the minimum repayment period is 7 months. On average most of the loans are repaid after 14 months, however the repayment period varies largely depending on the type of project, loan amount and the ability of the borrower to repay.

Table 4: Statistics on the type of project

Type of project	Freq.	Percent	Cum.
Manufacturing	125	12.55	12.55
Services	28	2.81	15.36
Agriculture	428	42.97	58.33
Cattle	415	41.67	100.00
Total	996	100.00	

Moreover, table 4 shows data for the type of project carried out by 996 borrowers. The least number of projects carried out was for the agricultural sector (28 projects) followed by the manufacturing sector (415) then cattle (415) and the sector for which most of the microprojects were done was the services sector (428 projects).

4.1 Probit Regression

After examining the summary statistics of each variable, the paper estimates a linear probit model were loan repayment is regressed on the borrowers' socio-demographic characteristics and loan characteristics. The dependent variable in this model is loan repayment, which will take the value 1 if the whole loan amount is repaid without any delays in paying the installments and takes the value O otherwise.

Before regressing, the paper estimates a correlation matrix (Appendix Table A) to test for the presence of multicollinearity between the variables. Since the correlation between the percentage of the loan to be repaid and the dummy variable is 1, the model omits the variable related to the percentage of the loan that has to be repaid to avoid collinearity. The effect of this variable nevertheless is captured in the dummy variable. Also in the type of project vector, the projects that functioned in the agricultural sector were omitted to avoid collinearity.

Table 5 illustrates the maximum likelihood estimate of the heteroskedastic probit regression. The results reveal that the probability of the borrowers paying on time is affected by the borrower's characteristics (gender, his/her total family income, where they live), loan characteristics (repayment period, type of project, the type of MFI) and economic shocks (25th January Revolution).

Table 5: Maximum Likelihood estimate of the probit regression

Loan Repayment	
Loan Amount	-0.0000206
	(0.00003)
Repayment Period	-0.0335**
	(0.100631)
Manufacturing	-0.150
	(0.3043069)
Services	-0.134
	(0.2856309)
Cattle	0.795*
	(0.2936603)
MFI	-2.045***
	(0.4578509)
Age	-0.0100
	(0.03112)
Age Squared	0.000144
	(0.0003416)
Gender	-0.0348
	(0.1427883)
Marital Status	0.0182
	(0.1458233)
Household Size	-0.00197
	(0.031552)
Income	0.000366*
	(0.0001706)
Address	-0.706*
	(0.3213783)
Indebtedness	0.0000123

	(.0000177)
Job	0.240**
	(.1114735)
Health Status	-0.134
	(0.1096705)
Revolution	-0.965*
	(0.2971632)
Constant	2.837***
	(0.8769668)
Number of Observations	955
Pseudo R^2	0.134
* p<0.01, ** p<0.05, *** p<0.001	
Standard Errors are in parentheses	

4.2 Discussion

The probability of paying on time is a function of the borrowers' and the loan characteristics. The log-likelihood function of y_i has been maximized to obtain the estimates of the parameters. To start with, the variable gender is negative and insignificant implying that there is no difference in the repayment rate between men and women. Similar results were found in the literature; Bhatt (2002) found no difference between the repayment of men and women who borrow from MFIs in the U.S. Others however such as Abd Karim (2009) found that the probability of default for men is higher than that for women since women are hard workers, financially disciplined and become economically empowered after taking a microloan. Okurut (2003) also found that women have higher repayment rates because they view that the loan doesn't only increase the income used for personal consumption but also the income required to support the children and their education. This shows that the results are country- specific.

Age, age squared, marital status, household size, indebtedness, health condition and job have no effect on the borrowers defaulting. All the previous studies have shown that the marital status of the borrower does not affect the probability of repayment. Whether a borrower is indebted or not, that has no effect on repayment. Borrowing before the loan is

taken and having to pay at the time of the loan will increase the financial burden on the borrower, however borrowing at the time of the loan is a solution for the borrower as not to default.

In the above model, being indebted didn't have any effect on the repayment rate. This differs from the findings of Van Gool whose binary logistic model on mid-sized Bosnian microlending found that the higher the presence of a debt increases the probability of default (Van Gool, 2009). That is due to the fact that in the above model, the total amount of debt is known; however it is unknown whether this debt was present before the loan or is the borrower indebted as a result of the loan. Also it is unknown whether the borrower is paying part of this debt along with paying the loan installments and hence the borrower's financial obligations increase hence increasing the probability of default.

Abd Karim and Roslan (2009) found similar results; age and number of dependency were found not to affect the repayment rate (Roslan, 2009). The higher the number of people in the household that can be an enhancer or a hinderer to timely repayment since the borrower has to spend more on his family. Consequently, a better measure would have been measuring the number of dependents especially that in Egypt a lot of men have to spend on their mothers; however data was not available for the number of dependents. On the other hand, it may be the case that other members of the family contribute to the income and hence help in the loan repayment and in this case lower the probability of default.

In fact, the total family income has been found to be a significant factor that contributes positively to loan repayment. The higher the family income, the higher the probability the beneficiary will pay on time. This income includes the wage of the borrower, money they receive as social insurance, income of other family members and donations from mosques or the MFI itself. This is similar to Bhatt's findings that cash flows, regardless of their source aid in loan repayment (Bhatt, 2002).

Furthermore, the variable address was significant at 95% confidence interval and the coefficient was negative meaning that those who live and carry their microprojects in rural areas are better at repaying the loan on time compared to those who live in the urban areas. This contrasts with the findings of the literature where there is a tradeoff between efficiency and outreach. This shows that the higher the level of outreach, the more the clients are able to repay on time and hence the higher the level of efficiency. On the other hand, Hermes who examined the financial development and efficiency of MFIs found that found that contrary to this paper's finding those who live in rural areas perform worse in terms of loan repayment.

This can also be compared with the results of Baptista, Ramalho and Silva (2006) who distributed a survey questionnaire in 2003 to 120 micro entrepreneurs to analyze the characteristics of the demand side of microcredit. The survey showed significant differences exist between rural and urban microenterprises; microenterprises in rural areas are smaller than those in urban areas, target more women and the less educated who voluntarily become self employed in the trading sector. It was found that microentrepreneurs living in urban areas performed better than those living in the rural.

As for the health condition, the results show that it doesn't affect the repayment rate. Table 6 shows that there are 678 borrowers who have a good health condition and 314 borrowers do not. Of the 678 who have a good health condition, 476 were able to pay the loan on time (70%). As for the 314 borrowers who suffered from a disease, 237 were able to pay the loan on time (75%). This shows that those who suffer from a disease do not have a disadvantage in running the project as their repayment rate is almost the same as those who don't suffer from a disease. Hence, there is no correlation between the health status of the borrower and the repayment rate.

Table 6: Statistics on beneficiaries' health condition

Health Condition	Frequency	Percent	Cumulative frequency
0	314	31.65	31.65
1	678	68.35	100.00
Total	992	100.00	

As for the loan amount, the coefficient is negative and insignificant which means that the loan amount doesn't affect the probability of the borrower's default. That is in accordance with the results of Abafita (2003), who examined the effect of microfinance and loan performance in Kuyu. This however contrasts the results of Sharma and Zellar (1997) who tackled the repayment performance of group-based credit programmes in Bangladesh. They found that the higher the loan amount received by the beneficiary, the higher is the probability of his/her default. The higher the loan amount, the higher the loan installment that has to be paid by the borrower and this financial burden leads to a higher probability for default. Others however, such as Jimenez (2004), Onyeagocha(2012) and Abd Karim (2007)

found a significant but positive relationship, since a small sized loan does not generate enough revenue that enables timely repayment of the loan by the borrower.

The first loan characteristic that negatively affects repayment performance is the repayment period. The longer the repayment period, the higher the probability of default because some of the borrowers prefer to spend the higher income/revenue from the project once the revenue is obtained. Similar results were found by Mokhtar (2009) and Abd Karim (2007); the longer the repayment period the lower the willingness to pay of the borrowers and the higher the probability of the borrower spending the revenue early on hence disabling him/her from paying later loans.

Another important factor in determining repayment is the type of project which depends on the repayment scheme. The projects that operated in the cattle sector had a positive significant effect on prompt loan payments and had better repayment rates than those who operated in the services or manufacturing sector. The microprojects dealing with cattle had 87% of its borrowers pay on time (the highest repayment percentage compared to the other sectors). MEK allows the borrowers whose microproject is cattle to pay their first loan after seven months so that the cattle would have breaded and that the project would have generated sufficient revenue for paying the first installment. This is in agreement with Mokhtar (2012) who employed a logistic regression model to explain the determinants of loan repayment defaults of two MFIs in Malaysia. The main findings were that some of the loan characteristics such as the mode of repayment and the repayment amount contribute to the loan repayment problems of MFIs. The results showed that more frequent loan repayment periods meant more loan repayment failures and that different loan repayment method/ more flexible contracts should be present to suite the revenue cycle of each project and the level of experience and skills of each borrower to improve repayment rates.

The third significant loan characteristic shows that the MFI itself affects the repayment rate. The two MFIs differ in terms of their lending policies (interest rates charged, training and advice given to the borrower and the time when the first installment is due). Since the coefficient of the variable MFI is negative that means that Resala's borrowers had a lower probability of default compared to MEK's borrowers. While Resala requires its borrowers to pay the whole loan amount, MEK requires it's borrowers to pay only 40% of the original loan amount. Despite that difference, MEK's borrowers do not have a higher

probability of timely repayment. This is in agreement with the result that the loan size is an insignificant factor in loan repayment.

The differences that contribute to Resala's borrowers performing better include that Resala offers training to its borrowers while MEK doesn't. Moreover, a member of Resala's microproject team advices the borrowers in case the microproject isn't performing well and that contributes positively to repayment. Additionally, Resala allows its borrowers a one month grace period before paying their first loan, while MEK doesn't. This is also in accordance with the aforementioned result that when the MFI allows its borrower time to generate revenue without having to pay an installment at that time, the higher the probability of timely repayment. These differences in how the MFI operates affect the borrowers' repayment. This is similar to Derban et al. (2005), who found that one of the three main causes of the causes of non-repayment is the characteristics of the lending institution (Derban et al., 2005).

Finally, this study examined how the 25th of January Revolution in Egypt affected the microfinance borrowers. A value of 1 is given to the borrower if he/she was affected by the revolution (started the loan before the revolution and had to pay some of the installments during the time of the revolution) and took the value 0 otherwise. This variable was added to capture the effect of macroeconomic shocks on repayment. The variable is significant at 99% confidence interval with a negative coefficient implying those who were affected by the revolution had a higher probability of default.

This model examined the effect of the revolution as a determinant of loan delinquencies because in the interview with the managers of the three MFIs, they all stated that the repayment rates have declined heavily as a result of the revolution. It was mentioned that some of the clients were starting to default after the revolution, some of them because their projects shut down. Others interestingly enough didn't repay because they were no longer willing to pay the loan and used the poor economic conditions as a reason not to repay while their project was performing the same after the revolution as before it.

It is evident that those who were affected by the revolution performed much worse than those who were not affected. 57.5% of the borrowers who were affected by the revolution defaulted, while only 26% of those who were not affected by the revolution defaulted. This shows that the percentage of borrowers who defaulted at the time of the revolution was more than double of those who defaulted at times other than the revolution.

Tedeschi (2006) also found that one of the two main reasons for default is economic shocks. Shocks such as family emergencies, social crisis and crop losses were found by

Onyeagocha to negatively affect the repayment rate. The above model also suggests that the revolution has negatively affected the repayment rate since the sign of the variable revolution was negative and significant.

After estimating the log likelihood function, the paper presents the marginal effects as the coefficients in the above model are not meaningful. The marginal effects are used in the probit model to measure how a unit change in the independent variable affects the dependent variable. Table 7 shows the marginal effects. The highest marginal effect is that of the MFI, meaning that the MFI lending policies has the highest effect on repayment. Since the value of the marginal effect of the variable MFI is -.577022, that means that a borrower from Resala has a 57% lower probability of default compared to a borrower from MEK. The revolution for instance has increased the probability of the borrowers defaulting by 27%.

Table 7: Marginal Effects

Loan Repayment	Dy/dx
Loan Amount	-.00000581
Repayment Period	-.0094433
Manufacturing	-.0424334
Services	-0.377883
Cattle	.2244883
MFI	-.577022
Age	-.0028351
Age Squared	.0000405
Gender	-.0098168
Marital Status	.0051386
Household Size	-0.0005571
Income	.0001034
Address	-.199115
Indebtedness	3.48e-06
Health Status	-.0379058
Job	.0678682
Revolution	-.272247

4.3. Diagnostic Tests

In addition, the McFadden's Pseudo r- squared, was performed in order to test the association between the dependent variable and each of the independent variables. This r-squared is a goodness of fit test and its value in the model is 0.134 meaning that 13.4% of the variations in the probability of repayment are attributed to the dependent variables used. Although probit models have lower R-squared compared to OLS models since there is uncertainty when calculating the probability, one of the reasons why this model in particular had a low R-squared is because the model was unable to capture some variables such as level of education as a result of data unavailability (Ben Akiva, 1985). Other factors that were not captured by the model because it was hard to quantify was the borrowers' ability to repay. In the literature, Arsyad (2006) found that the number of staff, borrowers, savers and wealth did not impact the repayment rate, but rather the capacity and willingness of the borrower to repay are the ones that affect the repayment rate; however that was not incorporated in the above model.

To test for the robustness of the above model, two other probit models were regressed. For the first probit regression, (Appendix Table B) loan repayment was regressed on the loan characteristics only. The results of the model show that the variables repayment period, cattle and MFI were significant at the same confidence interval as the above model with the same sign of the coefficient. In addition, the variables loan amount, manufacturing and agriculture were also insignificant.

For the second probit regression (Appendix Table C) loan repayment was regressed on the borrowers' socio-demographic characteristics and loan characteristics along with a couple of interaction variables. The interaction variables include age and gender, age and marital status, and marital status and gender. The interaction variables are important given that the research topic is empirical. The results show that the interaction variables are insignificant. Once again, the borrowers' socio-demographic characteristic and loan characteristics that were significant in the above model were still significant after adding the interaction variables. That indicates that that the above model is robust.

Furthermore, Ramsey's test was conducted using the fitted values of loan repayment to test whether or not the model suffers from an omitted variable bias. The null hypothesis is that the model has no omitted variables. The results show that Prob>F = 0.1558, meaning that we do not reject the null hypothesis i.e. there is no omitted variable bias in the model.

Moreover, a robustness test was performed to check for the residuals and whether the model suffers from heteroskedasticity. The findings indicate that the robust standard errors are better than the standard errors that are computed without robustness, and hence the standard errors in Table 5 above are those for the robust regression.[8]

4.4. Limitations

There are several limitations to the model; firstly, lack of data was a major constraint since only data for two MFI were used in the model whereas Egypt has more then 400 MFIs. Secondly, a sample selection bias might arise since MEK's data was randomly selected and the data for Resala was obtained for only one of Resala's branches, and hence the sample size used might not be representative of the whole sample. Thirdly, although probit models have lower R-squared compared to OLS models since there is uncertainty when calculating the probability, one of the reasons why this model in particular had a low R-squared is because the model was unable to capture some variables such as level of education as a result of data unavailability (Ben Akiva, 1985). Fourthly, one of the main variables that affect loan repayment is willingness to pay, however such a variable is not quantifiable.

4.5. Conclusion and Policy Implications

The results of the model indicate that both the borrower and the MFI characteristics affect the repayment rate. The results reveal that the probability of the borrowers paying on time is affected by the borrower's characteristics (total family income, where they live, and whether they have a job). The loan characteristics that affect repayment are (repayment period, type of project, and the type of MFI). Also, a macroeconomic shock such as the 25th January Revolution affects repayment negatively.

Furthermore, the MFIs have been focusing on lending to those who live in the rural areas, in which case they appeared to be more efficient in terms of repaying and hence MFIs should continue targeting them. Lending to those in rural areas will lead to an increase in the levels of both outreach and efficiency. MFIs should decrease the repayment period to increase efficiency. Furthermore, offering a grace period for the borrowers before repaying their first loan installment should be applied to all the projects, not only the cattle projects. In addition, MFIs can increase their efficiency by focusing on group lending rather than

[8] In addition, the residuals have been plotted and the results indicate that the model doesn't suffer from severe heteroskedasticity since the difference in standard errors between the model without and with robustness is minimal.

individual lending, since according to the literature social pressure increases the probability of timely repayment.

Moreover, MFIs should also find ways to decrease the intensity of macroeconomic shocks on the borrower. Choosing the appropriate way to lend to a customer is not a one-size fits all policy. The MFIs should lend to those who are truly in need and those who have the characteristics suitable to pay the loan on time along with offering them the appropriate training and the appropriate repayment scheme that suits their microproject.

Chapter Five

Qualitative Analysis of Microloan Repayment Determinants

In an attempt to test for the efficiency of MFIs, this empirical paper will quantitatively and qualitatively determine the factors affecting loan repayment to Egyptian MFIs. An econometric probit regression will be employed along with interviews with microfinance borrowers. The purpose of this chapter is to explain the qualitative approach taken to test for the factors affecting repayment. The qualitative approach serves to complement the findings of the quantitative model and more importantly look at the subtle issues that affect repayment in real life that cannot be determined quantitatively. This chapter explains the method by which the interviews were conducted, the MFI lending policies and the real-life reasons for successful and unsuccessful repayment based on interviews with the microfinance managers, loan officers, and more importantly microfinance borrowers.

This study applies qualitative analysis through in-depth interviews with 12 microfinance borrowers and several loan collectors in order to gain insight on what the core repayment problems are based on how things happen on the ground. The Qualitative Interviews Method was applied were direct questions were asked to 12 borrowers from Tanmeyah, one of the largest MFIs in Egypt. I interviewed 12 borrowers living in Al-Qalyoubia and Al-Monofia governorates (2 rural governorates) during April 2014. Of the 12 borrowers; one borrower had just received the loan at the time of the interview, five borrowers repaid the loan on time and six borrowers defaulted. Those who defaulted were unable to promptly pay at least one monthly loan installment.

Along with interviewing these 12 borrowers, several questions have been asked to the managers of Tanmeyah and the loan collectors to gain insight into the repayment problems from both the supply side and the demand side. The 12 interviewees were chosen by the MFI's branch manager in such a way so as to explore diverse cases and living conditions that affect repayment. Although the 12 cases that were interviewed are not representative of the whole population since they are statistically insignificant, they provide insight into valid reasons for lack of timely repayment that cannot be captured by the model.

Open ended and close ended questions were used in the interviews to explore the concrete issues affecting repayment. The questions were divided into four sections: general questions about the borrower (socio-demographic characteristics), loan characteristics, reasons for timely/untimely repayment and policy implication questions. Along with these

questions, others were added depending on the case of the interviewee. The questions were written in the English language, but the language that the interviews were conducted in was in Arabic to facilitate the interview process, since most of the interviewees were unfamiliar with the English language.

Besides the Qualitative Interview Method as a tool for qualitative analysis, the Direct Observation Method was also used. The Direct Observation method focuses on what can be observed by the interviewer, rather than what the interviewee explicitly states. The interaction between the interviewer and the interviewees took place at the interviewees' home or at the place of his/her microproject. The direct interaction with the interviewee allowed the interviewer to verify the answers given.

This is mainly concerned with questions related to earnings/profits and expenses, were the interviewee is either reluctant to give an answer or gives an incorrect one. Through several questions and building a trust relationship with them, some of them changed their answers at the end of the interview to give the exact amount they earned. In addition, examining the living conditions of the borrowers and how his/her microproject operated at the time of the interview has led to conclusions on whether the interviewee was not repaying because his/her project wasn't functioning well, i.e. unable to pay, or whether he/she was able but unwilling to. Hence, this led to answer verifications which could not have been captured quantitatively. Before explaining how this happened during the interviews, an insight is given on the MFI lending policies.

5.1. MFI lending policies

Tanmeyah is one of the largest MFIs in Egypt, whose mission is to serve the lower-income tier individuals and small businesses that have been underserved by local banking institutions and to provide them with a full range of financial products and services. Tanmeyah's microenterprise lending program is provided to all sectors excluding agricultural production, cattle and poultry growing, fish breeding and transportation (Tanmeyah, 2010). Each branch consists mainly of a branch manager and several loan officers who evaluate the potential borrower's needs and collect the loan installments.

Lending in most of the MFIs in Egypt, and this MFI is no exception, is based on individual lending rather than group lending (Brandsma, 2003). For an applicant to be eligible to take a loan, he/she must demonstrate the physical and mental ability to carry out the project. Tanmeyah also conditions that the borrower has a project that has existed for at

least one year so that the borrower has experience in the project. This is checked by the loan officer before giving the loan.

Once the borrower applies for a microproject from Tanmeyah, a loan officer heads to the existing project to inspect whether the project has existed for more than one year, gather information about the status of the project and the living conditions of the borrower to assess whether he/she deserves to take a microloan. Hence, this MFI doesn't lend to startups and therefore the aim of the microloan is for microproject expansion (Tanmeyah, 2010). The percentages of expansion of the projects as a result of the loan, according to the interviews, range from 30 to 80%.

Moreover, different lending programs are offered; all based on short-term lending with loan sizes ranging from 1,000 to 30,000 EGP and the repayment period ranging from 4 to 12 months. From those interviewed, the minimum loan amount was 3,000 and the maximum was 11,000 EGP. Regardless of the repayment mode, no collateral is required from the borrower and installments have to be paid monthly. If it is the first time for the borrower to take a loan from Tanmeyah, the maximum loan amount that he/she may receive is 7,500 EGP. These borrowers can choose between different payment modes, however choosing to repay for a longer period of time comes at a tradeoff of a higher interest rate charged. The loan amount and interest rate is divided into equal increments over the loan period. The 12 interviewed chose to pay monthly installments for a period of 12 months at a repayment rate of 125% (paying the original loan amount and 25% interest). Alternatively, they could have chosen to pay for a period of 6 months and at a lower repayment rate. However, they chose not to since the monthly loan amount would have been higher, as it is divided over a shorter period of time and hence they stated that that will increase their probability of defaulting.

Repaying on time is crucial not only for the MFI, but also for the borrower since taking a loan from the MFI is contingent on successful repayment of the previous loan (i.e. paying all the monthly installments on time).Upon successful repayment of the first loan, the borrower has the option of moving into a higher loan-tier category (Tanmeyah, 2010). The following section explains the interview process and results.

5.2. Case studies: Reasons for (un)successful loan repayment

Tables 8 and 9 below provide general information of the borrowers' socio-demographic characteristics based on the interviews. Person A- E represents those who paid all the loan installments on time, while person F-K represents those who defaulted. There is

no age limit for a borrower to take a loan from Tanmeyah so long as the borrower is capable of managing the project; Person B aged 70 and Person F aged 76. Each borrower had a different story behind the reason of paying on time or defaulting. The general information listed below is to provide an understanding of their living conditions, for instance it can be seen that none of those who paid on time were indebted, while 66% of those who didn't repay on time were indebted. Rarely did any of the borrowers have an account in the bank or in the post office.

Table 8: General information on successful borrowers

General Data	Person A	Person B	Person C	Person D	Person E
Age	35	70	31	31	30
Gender	Male	Male	Male	Male	Male
Microproject	Blacksmith	Kiosk	Cloth shop	Cafeteria	Bookstore
Marital Status	Married	Married	Married	Married	Single
Number of children	3	8	3	3	0
Number of people in the household	5	9	5	5	5
Level of education	Literate - 7th Grade	Illiterate	Bachelor of Commerce	Computer Trade	Literate
Apartment owned or rented?	Own	Own	Rent - 1000 pounds	Own	Own
Health Status	Arm amputation	Good	Good	Good	Good
Indebted	No	No	No	No	No
How much is spent per month (in EGP)	1000	400	2500	600	---
Are you part of a RoSCA? If yes what is the monthly RoSCA amount (in EGP)	Yes - 300	Kids yes - 1000	Yes - 1000	No	Yes – 500
Do you own an account in a bank	No	No	Yes	No	No

Do you own an account in a post office?	No	No	No	No	No

Table 9: General information on unsuccessful borrowers

General Data	Person F	Person G	Person H	Person I	Person J	Person K
Age	76	51	42	39	28	30
Gender	Female	Female	Male	Female	Male	Male
Microproject	Grocery	Phone Shop	Car Workshop	Cloth Factory	Carpentry Workshop	Barber
Marital Status	Married	Married	Married with 2 wives	Married	Married	Married
Number of children	7	5	6	3	2	3
Number of people in the household	8	8	9	5	4	4
Level of education	Illiterate	Illiterate	Illiterate	Diploma	Diploma	Illiterate
Apartment owned or rented?	Own	Owns 1- Rents 1	Owns 1- Rents 1	Rent	Own	Own
Health Status	Good	Good	Good	Good	Good	Good
Indebted	No	Yes	Yes- 12,000	Yes- 150,000	No	Yes
How much is spent per month	---	Medical expenses 800	900	1,200	2000	1,200
Are you part of a RoSCA? If yes what is the monthly RoSCA amount (in EGP)	Yes - 10	Yes - 500	Yes - 10	No	No	No
Do you own an	No	No	Yes	No	No	No

account in a bank						
Do you own an account in a post office?	No	Yes	No	No	No	No

From the interviews with the borrowers, loan officer and branch managers, it can be inferred that several factors lead to successful repayment of the loan and several others lead to delays in payment. To begin with, the main factor affecting successful repayment was willingness to pay. This is supported by a study led by the Centre for European Research in Microfinance, which found that the repayment performance of any borrower is a function of their ability and willingness to pay. Willingness to pay was an important determinant of the borrower's payment performance and can be enhanced by the MFI or other borrowers imposing discipline mechanisms on the borrower (Laureti, 2012).

Briefly, financial services for poor people should have flexible features and discipline devices. Discipline devices (e.g., screening, monitoring, and sanctioning mechanisms) help to solve the payment incentive problem. The payment incentive problem is related to clients' willingness to make payments (e.g., loan repayment and savings deposits). The willingness to pay influences the clients' payment performance, but is not the only determinant. Clients' payment performance depends also on the ability to pay. Flexibility in repaying the loan helps money management and thus the poor people's ability to make payments. However, flexibility affects negatively the clients' willingness to pay (Laureti, 2012). Tables 10 and 11 further prove that willingness to pay was the reason for timely loan repayment, irrespective of the borrower's intention of taking the loan.

Table 10: Loan characteristics of the successful borrowers

Loan characteristics	Person A	Person B	Person C	Person D	Person E
Number of loans	3	4	3	2	3
Current loan amount	4,000	11,000	9,000	4,000	9,000
Percentage of the project expansion as a result of the loan	--------	30 – 40	50	80	50

Does anyone help you in the project	Yes- Brother	Yes - Sons' Wages	Yes - Brother and sister	No	No
How was the project financed?	The blacksmith was Inherited	Past savings	Used inheritance money to start the project	Rented the cafeteria	Past savings
Monthly sales	---	---	15,000	2,400-3,000	---

Table 11: Repayment Determinants for the successful borrowers

Repayment Questions	Person A	Person B	Person C	Person D	Person E
Are all the installments paid on time	Yes	Yes	Yes	Yes	Yes
Main factor affecting successful payment	Project's revenue	Project's revenue	Project's revenue	Project's revenue	Project's revenue
Did you face any difficulties in repaying the loan	No	Yes - resorted to kids wages and social insurance	Yes- Resorted to relatives	No	Yes - Decreased his personal consumption
Was the loan used for other purposes like consumption	No	No	No	No	No
Is the project making profits/losses or is it breaking - even?	Profit - 4000	Profit - 3000	Profit - 5000	Profit - 3000	Break - even
Monthly earnings	---	---	500 - 600	---	---

The above two tables show that the five interviewees who successfully paid their loan when asked "what was the main factor affecting your ability in repaying the loan?" the answer was that as a result of the loan the project expansion has induced demand on the goods/services sold and from the resulting increase in revenue, all the loan installments were paid on time.

When further asked whether there had been times when the project didn't generate enough revenue to pay the loan, how were they able to pay; Person B, who is 70 years old, replied that he used money from his social insurance (1000 EGP) to pay the loan installment. He also added that in other cases he seldom relied on part of the wage of his eight kids to pay on time.

Person E, the only borrower who was single from all those interviewed, replied that his bookstore wasn't functioning well at the time of the revolution and since he didn't inform his family that he was borrowing money from the MFI, he wasn't able to resort to them to financially help him. Determined to pay on time, he cut his personal expenses stating "I didn't eat properly for the first 4 months of the 25th of January revolution, so that I can pay the loan on time".

A third borrower has decided to resort to his relatives in order to repay. Hence, these punctual borrowers looked for alternative sources of finance to pay their loans at times of financial constraints as a result of low levels of demand. Hence, commitment and willingness to pay has been evident when interviewing these borrowers. Had they taken the loan for another purpose such as consumption or preparing for a daughter's wedding as stated by the loan officer, which could not have been known by the interviewer, these borrowers may not have been able to pay on time. At the end these borrowers paid because of their willingness to pay.

On the other hand, for those who delayed repaying some of their installments can be divided into two categories. The first are those who are willing to pay but are unable and the second are those who are unwilling to repay the loan even though they are financially capable of paying.

Table 12: Loan characteristics of the unsuccessful borrowers

Loan characteristics	Person F	Person G	Person H	Person I	Person J	Person K
Number of loans	3	4	2	2	1	1

Current loan amount (in EGP)	4,000	10,000	9,000	9,000	4,000	4,000
Percentage of the project expansion as a result of the loan	---	---	70	35	30	0
Does anyone help you in the project	Yes - Kids	No	No	Yes - Husband	No	No
How was the project financed?	Inherited	Inherited	Inherited	Husband's money	Past savings	Past Savings
Monthly sales	---	---	---	---	---	---
Level of education	Illiterate	Illiterate	Illiterate	Diploma	Diploma	Illiterate
Apartment owned or rented?	Own	Owns 1- Rents 1	Owns 1- Rents 1	Rent	Own	Own
Health Status	Good	Good	Good	Good	Good	Good
Indebted	No	Yes	Yes- 12,000	Yes- 150,000	No	Yes
How much is spent per month	---	Medical expenses 800	900	1,200	2000	1,200
Are you part of a RoSCA? If yes what is the monthly RoSCA amount	Yes - 10	Yes – 500	Yes - 10	No	No	No
Do you own an account in a bank	No	No	Yes	No	No	No
Do you own an account in a post office	No	Yes	No	No	No	No

Table 13: Repayment determinants for the unsuccessful borrowers

Repayment Questions	Person F	Person G	Person H	Person I	Person J	Person K
Are all the installments paid on time	No	No	No	No	No	No
Number of delayed installments	2	2	3	3	5	7
Main factor affecting unsuccessful payment	Daughter being hospitalized	Husband's illness	Hospitalized for 2 months - Theft of equipment from his workshop	Claimed lower revenue as a result of lower demand	Claimed burnt equipm-ent	Claimed poor market conditions
Was the loan used for other purposes like consumption	No	No	No	No	No	Yes-consumption
Is the project making profits/losses or is it breaking - even?	Profit	Profit	Profit -	Profits then losses	Break - even	Profit - 800
Monthly earnings	---	1000	1500	---	2,000	1,500

The results from tables 12 and 13 show that not paying the loan on time can be attributed to several causes including the borrowers' willingness to pay/attitude towards their loan, project characteristics, borrower's attitude towards their loans, amount of loan received, shocks in the economy, lack of training and poor monitoring and enforcement of regulations by the MFI.

These points are further illustrated below by listing all the reasons for delaying payment and support of the reason from the literature and from the interviews:

1-Individual shocks (Ex: Unexpected illness)

Goduin's study on *Repayment Performance on Bangladesh: How to improve allocation of loans by MFIs* found that the main factors influencing repayment are adverse shocks, low performance of institutions and information asymmetries. Idiosyncratic shocks such as illness and injuries were found to negatively affect loan repayment (Goduin, 2004). From the interviews with the six borrowers who didn't repay, three of them failed to repay as a result of their sudden illness or that of one of their family members.

The first unsuccessful case (Person F) was a 76 year old illiterate woman selling groceries on the street for 15 years. This woman started by taking a loan of 7,500 EGP (Egyptian pounds) and has repaid all the installments on time. She then took another loan for an amount of 4,000 EGP. Unlike most of the borrowers who move to a higher loan category after the first loan, this time she has decided to take a lower loan amount instead since she was doubtful whether she can successfully take a loan of 7,500 EGP and pay all the installments on time due to poor economic conditions. Again, she has been able to successfully repay on time. As for her third loan of 4,000 EGP, she delayed paying two installments each worth 417 EGP despite the fact that she was able to retain profits from her grocery, since one of her seven children got diagnosed with renal failure. Accordingly, she had to spend on her hospitalized daughter and that has negatively affected her timely payments.

This is also the case of borrower G who successfully paid 3 loans. She unfortunately had to work for fewer hours in her phone shop since her husband had a stroke. Hence, the revenue earned from the job decreased. All of the interviews were conducted in the workplace of the interviewee, but as for this woman her shop was closed as she was sitting next to her husband and the interview was conducted in her two room house, which was almost devoid of any electrical appliances.

At the same time her poor living conditions were further worsened by having to pay 800 EGP for her husband's medical expenses. It has been confirmed by Tanmeyah's loan officer that she has repaid her first three loans on time, she even used to pay before the loan installment due date, but as a result of her husband's sudden illness she is indebted to the MFI with 1,600 EGP. She has been able to repay part of her late installments (700 EGP) from her social insurance (1,200 EGP) and by resorting to her children's wages. This is similar to what the 70 year old man did when there was low demand for his products. Hence, other sources of income, including social insurance and wages of other members of the household contribute to a higher probability of loan repayment.

2- Macroeconomic Shocks (25th January Revolution)

Person F has also stated that her phone shop was negatively affected by the revolution, since fewer customers approached her shop. She also had to work fewer hours as a result of lack of security, since one person just died near her shop a week before the interview was conducted. This is a case that is willing to pay but is unable to. Planning on how to repay the loan has been evident; she used to keep aside 20 pounds from her daily revenue so that at the end of the month she has the amount necessary to repay. The impact of the revolution has been apparent in changing the shop's revenue; she said, with tears dropping on her cheek "I used to keep 20 pounds aside daily from my revenue to pay the loan, but now with fewer customers and fewer working hours due to security reasons and my husband's illness, I can barely keep 5 pounds aside for loan repayment".

Hence, shocks that affect repayment are not only related to individual shocks. Macroeconomic shocks such as the 25th January Revolution, the 2008/2009 financial crisis, government policies such as taxation and others do affect repayment. These macroeconomic shocks and other shocks such as political crisis or foreign currency fluctuations lead borrowers to unforeseen financial difficulties that negatively affect the borrowers' timely repayment (Schicks, 2010).

3- Using the loan for purposes other than the project

Another reason for not paying the installments on time is not utilizing the loan to expand the project. Reta (2011), by examining the determinants of loan repayment performance in Addis Ababa, found that loan usage affects the repayment rate. The

repayment rate is suppressed if the loan is used for an unintended purpose such as consumption. This stems from the fact that if the whole loan was used for the microproject, revenue generation and better business operations would facilitate loan repayment.

Person K, a 30 year old father of three, pays a monthly rent of 400 EGP for his barber shop. This borrower has stated that the market conditions are poor and that is the reason why he wasn't able to pay seven of his installments. He added that he is unable to pay the loan installments as his expenses are 40 pounds per day and that he spends on his mother and is indebted to his siblings. He started by saying that he earns a profit of 20 pounds per day except on Thursdays, when he earns 80. When re-asked about how much he earns near the end of the interview, this time he said he earns a profit of 50 pounds per day. This shows that he has enough money to repay the loan but is unwilling to as he prefers to spend it on other venues.

To further support that he wasn't telling the truth, he kept saying throughout the interview that he didn't repay due to poor market conditions, but ironically enough people do not stop cutting their hair and his barber shop was loaded with customers at the time of the interview. Furthermore, despite stating that the market conditions have deteriorated after the revolution, he added that the number of competitors around him have increased which opposed what he said throughout the interview. Checking the place before leaving, it was clear that there were no barbers around him. That's related to the direct observation method which focuses on what the interviewer observes rather than what is explicitly stated by the interviewee, since he wasn't truthful.

He has explicitly stated that he gave the loan amount to his mother to use it for consumption instead of expanding the shop and that was the true reason that has led to the failure in loan payment. It has been confirmed by one of the MFI managers that almost 90% of the loans are used for purposes other than expanding the project. These purposes include paying for their kids' education or preparing them for their marriage, building a new house, repaying a previous debt, and many more. The borrower added that he planned to join a RoSCA so that he would be able to pay off his installments. However there was no true intention to do so, as this was his plan since the first delayed installment and currently he has seven delayed.

4- Borrower's attitude towards their debt

The above case is an example of how a borrower's attitude affects repayment, or lack thereof. Use of the loan for a purpose other than expanding the project, earning revenue high enough to repay the loan and taking the revolution as a cause for the project's inefficiency in payment all prove his lack of willingness to pay. In addition, most of the interviewees said that they would retake a loan from the MFI; however this borrower said he does not know whether he will take another loan.

The borrower who has just taken the loan at the time of the interview has said she will never delay repayment of the loan even if she was to be indebted to her relatives. She aims to establish a good relationship with the MFI since she wants to take another loan in the future. It can hence be inferred that the borrowers who do not plan to take another microloan have a higher probability of defaulting.

Borrowers' attitude towards their debt was found by Nawai (2013) to be the main factor affecting repayment. Higher chances of timely loan repayment were evident for the borrowers who are determined and set their mind on repaying every installment on time. This is exemplified from my interview with a borrower who used revenue from his carpentry workshop and past savings to pay his first five installments and defaulted for the next six. Person J claimed that his job didn't generate revenue and that he was barely covering his expenses. He took the loan to repair an already existing piece of equipment and buy a new one, and it was also evident that he didn't use the whole loan amount for expansion of his workshop.

Without stating a valid reason for delaying payment, he was unwilling to find a concrete solution on how to make his workshop better, as he stated that there was low demand for his products. Instead, he was thinking of being indebted to his relatives in order to repay the loan, which is just a band-aid for his repayment problem. This borrower has no other source of income and also spent on his mother, but the main source of spending was on drugs. At first, he refused to confess that he took drugs, but then he stated that he took drugs and that's why he is not able to punctually pay the installments; since he is using the loan for other purposes.

Furthermore, Person I, a female owner of a sewing factory has been unable to pay three installments of her second loan as she said that the demand for her products had decreased. The workshop has two lines of production; the first is producing clothes from start to finish and the second is receiving semi-finished clothes from factories and finishing them.

She said that the factories no longer give her semi-finished clothes to work with and hence her revenue now no longer covers her expenses. She was able to repay her first loan despite the poor economic conditions after the 25th January revolution, however now after several years of the revolution she stated that demand has been lower than before due to the economic conditions, which clearly wasn't true. She claimed to have thought of selling one of her machines, but no one wanted to buy it at its cost.

Moreover, despite saying that she has moved to another rented house that now cost 700 EGP monthly instead of 1,200 EGP, she did not use this 500 EGP difference to pay the loan installments. She asked for a grace period to increase production; however she wasn't truly in need. Her workshop was working well contrary to what she said, throughout the interview her machines did not stop and one of her workers has finished producing a pile of clothes and went to sell them. She also did not lay off any of her workers, which would have been the case if the demand for her products had fallen tremendously as she stated. Finally, although she said that she is unable to borrow from her relatives because of their severe financial conditions, it turned out that she owns a car and has a personal driver, which all shows that she has the money but is unwilling to pay.

5- Managing several projects simultaneously

Managing several projects simultaneously is another reason for borrowers defaulting. Person H was able to pay his first loan of 7,000 EGP but stammered in paying three installments of his second loan which were worth 9,000 EGP. The first loan was used to expand his car workshop and his second loan was to buy a new car that he will use to transport equipment. The reason he stated for defaulting was that he went to the hospital for two months and in the meantime the equipment in his car workshop were stolen. He also had to borrow 12,000 EGP to pay for the hospital expenses and doesn't have any other source to resort to in order to borrow more money to pay his installments. This borrower is an example of those who are willing to pay but unable to. This conclusion is supported by the fact that he had paid off some of the installments of a loan that his sisters took and were about to default in.

According to the loan collector, the reason for default was that his new project wasn't working well. The borrower has stated that he bought a used car and it has been further damaged. Currently it sits idle in his workshop, as he no longer uses it. The borrower was working with two microprojects simultaneously and his lack of experience in the second

project was the main reason for default. It can be deduced that experience in a project lowers the probability of a delinquent loan. This is supported by the OLS multiple regression analysis applied by Onyeagocha (2012) that verified that a potent factor in loan repayment is the length of experience in a microproject.

6- Lack of training and experience

The above mentioned illiterate borrower's main reason for default was a result of lack of experience in how to use this car and how to run the project well. This car became a liability since its loan has to be repaid while it doesn't generate any revenue. This shows that the borrowers with no years of experience in the business tend to become delinquent borrowers. Hence, a negative relationship exists between years of experience and defaulting. This is in accordance with Zaini's (2009) findings that borrowers who have a higher probability of defaulting are those who did not have any training related to their microproject.

Meanwhile, this borrower's car workshop was still working and that could have allowed repayment. However, as a consequence of three to four hours of electricity cuts after the revolution per day and with electricity being a major input, the project's revenue is decreasing and he is unable to pay the loan installments.

7- Weak regulations against the defaulters

Another reason for defaulting is that there are different legal actions taken against the borrowers. The probability of default is higher for non-regulated MFIs; Frisancho (2012) found that the amount of outstanding debt for unregulated MFIs was almost double that of regulated MFIs. MFIs have to be regulated continuously by the Egyptian Financial Services authority and the Central Bank of Egypt, to ensure that these MFIs are performing well and are monitoring their borrowers and hence increase the probability of the borrowers' repayment.

For example, Resala obliges the borrower to sign a trust receipt with the loan amount that he/she borrowed. When asked what they do with this receipt, the reply was that it is just used as a tool of force against the borrower so that he/she will pay, however no legal action is taken against the borrower. For Tanmeyah on the other hand, in case the borrower defaults after 90 days, the borrower's documents are sent to court. The court then obliges the borrower to pay, but doesn't imprison him/her. In case the borrower knows that he will not be

imprisoned or that no legal action will be taken against him/her that will increase the probability of default. Hence, unified stringent regulations should be applied by all MFIs against defaulters to increase the probability of loan repayment.

8- In-fraud risk

Given that MFIs have weakly defined policies and regulations, exposure to fraud is possible. Fraud risk happens when the worker in a MFI deceitfully gains advantage of the borrower or the MFI to increase his financial gain. For instance, the microfinance staff might charge borrowers an unofficial fee for applying to the loan or might collect the money but does not deposit it. The loan officer might also take advantage of those who delay their payment and charge them higher amounts for the unpaid installments. As a result of money changing hands, exposure to fraud becomes inevitable. All MFIs experience fraud by their staff members (Churchill, 2001). Fraud risk is more prevalent in institutions that operate at a large scale with a large number of clients and hence tracking individual cases becomes a daunting task. From the interview with Tanmeyah's manager, he confirmed that there is fraud risk and that it accounts for almost 10% of the total loan amounts that haven't been paid to the MFI.

9- Insufficient monitoring from the MFI

Furthermore, MFIs efficiently monitor the debtors only at the time they start taking the loan. Once an applicant is eligible to take a project, the MFI carries out a project evaluation and then starts to offer the equipments needed. This MFI doesn't offer training sessions to the borrowers, a condition that might be necessary for the success of some microprojects. In addition, current successful borrowers don't advise the new borrowers on how to carry out their projects.

The MFI appoints several members to research to the applicants' project and examine their wealth conditions. Once per month, the MFI member checks on how the project is heading and collects the monthly loan installment. The problem lies in that the MFI does not provide any advice to the borrower if they see that his project is starting to fail. When I asked why is this the case, the reply was " As long as the borrower is able to repay the loan then the borrower has the right to do whatever he/she wants in the project. Once the

borrower starts defaulting, I start pressuring him to repay". When asked why you don't help them improve their project at the time when you monitor them and realize the project is starting to fail and he answered sarcastically that he is not a counselor, that's not his job.

Monitoring therefore becomes detrimental in order to mitigate moral hazard problems. A solution proposed by Nawai (2013), who found that insufficient monitoring can lead to higher probabilities of default is to have peer monitoring. Loan monitoring is enhanced by peer monitoring which is present in group lending, but is not present in many Egyptian MFIs.

10- Lack of financial planning

Another factor why some debtors were unable to pay was because they were unable to calculate their revenues and expenses well. Magali (2013) found that lack of financial planning was one of the factors affecting credit default risks in Tanzania. Similarly, those who are not educated and did plan for their project before receiving the loan had a slightly more than double the probability of defaulting compared to those who were engaged in financial planning (Addisu, 2006).

Most of those who were interviewed were not able to say how much they spend on their house per day. Also, they have been unable or unwilling to accurately say how much revenue they earn. This happened when I asked the barber how much do you earn and he started by saying it depends on the market. He then said 20 EGP per day and after that he claimed that it was 50. Most of these rural clients are illiterate and do not calculate their revenues and expenses and consequently might be unable to determine how they will pay their monthly installments. This was clear in one of the interviews, where the interviewee when asked how you will repay the remaining installments said "I'll pay them, I'll do my best," and when I asked him what the means for doing so are, utter silence was what I received.

These borrowers may need the MFI to guide them on how to repay. This happened with one of the clients who refused at first to take a loan because he thought he wouldn't be able to pay. What Tanmeyah's loan officer did was that each day, he would collect from the borrower 30 EGP and at the end of the month the loan officer will collect 50 EGP. The borrower was amazed that he is capable of paying the loan and that he doesn't feel financially burdened by the loan since the 30 EGP daily don't affect much his profit. Microlenders must therefore plan how the loan installments will be paid, and lack of planning will result in

higher probabilities of default. These are all the reasons affecting loan repayment according to the interviews. Hence, MFIs should not lend to those who are unwilling to repay, but should lend to those who are willing to pay.

5.3. Lending to the disadvantaged

Those who are willing to repay, may include borrowers who are not only poor but are also disadvantaged. An important distinction has to be made between the borrower's health condition at the time of applying to the loan and at the time of paying the loan. A borrower who is already at a disadvantage at the time of applying to the loan will be able to carry out the project by gaining one of his family member's help in the project or a worker's help. However, those who become ill after the loan was received may not have enough time to search for those who can help them with the loan.

To illustrate, Person A knew about this MFI from his friends and decided to take a loan two years ago. This is his second 3,000 EGP loan that he used to expand his already existing blacksmith workshop. The startup capital for this project was from inherited money. Despite his upper limb amputation, he was able to develop his workshop and repay all his loans on time. His amputation did not hinder him from working as a blacksmith with the help of his brother. This shows that repayment depends mainly on the willingness of the borrower to work and repay the loan. After successfully repaying all the installments, he decided to take another loan of 4,000 EGP and once again, he is successfully paying the monthly installment of 417 EGP.

He stated that although he faced a loss of 1,850 EGP in one of the months as a result of miscalculating his expenses, his commitment to the MFI made him resort to his acquaintances in order to repay his loan installment. As a result of his commitment, the second loan was of higher value. To contrast that, the unsuccessful borrower who was hospitalized suddenly had no time to search for a worker to substitute him in the project. As long as the borrower doesn't have to spend on sudden illness or doesn't need someone to completely substitute him/her, a poor health status doesn't affect the success rate of paying the loan on time. Hence, MFIs should lend even to those who are disadvantaged since they either engage in a project that suits their medical needs or seek for others help and hence that doesn't negatively affect repayment.

5.4. Policy actions and recommendations

It is clear that social norms play a role in payment. The number of people in the household for one of the interviewees was almost 20. This could possibly be a burden on the borrower. In addition, most of the interviewees spend on their mother which was sometimes an obstacle in their repayment, as expenses were high. In addition, several male borrowers refused that their wife would work and increase the income for the family; in some cultures, it is seen as demeaning for the man to have his wife work.

It was also viewed by most of them that despite interest rate although it might be forbidden according to Islamic religion, they are forced to borrow from this MFI and those other sources of lending available to them such as banks also charge interest rates. When asked why do they approach this MFI while it charges 11% higher interest rates than conventional banks, the answer was that these MFIs have better registration procedures and require less official documents. In addition, since the banks require collaterals and a good credit history, these borrowers find no other alternative than the MFI as a solution for their poverty. This shows the importance of MFIs as formal lending institutions and that their role can not be underestimated.

The question remains however, how would these MFIs solve repayment problems and why don't they target the very poor. This MFI targets those who already have an existing project which means they are not that poor or that there is a poorer segment of society that they don't target. This shows that the MFI self-selects the clients based on those who are better off and that their main aim isn't poverty alleviation, since they don't reach to those who don't have projects.

In addition, this MFI charges a high interest rate because it is a partner with the Arab Gulf bank which mandates this interest rate. The higher the interest rates charged, the higher the monthly loan installment which increases the probability of the debtor defaulting. In addition, this MFI doesn't ensure that the loan is spent on the microproject itself, contrary to Resala which doesn't lend the borrower the money, but rather purchases the equipment needed. This assures that the loan is used for its correct purpose rather than being used for other purposes. Hence, in Tanmeyah's case, the level of efficiency will increase and Tanmeyah will have fewer delinquent loans if it buys the expansion equipment to the borrowers, especially that the loan officer has stated that 90% of his clients don't use the loan for the project itself.

5.5. Conclusion

To sum up, the reasons for inefficient loan repayment for individual lenders is clearly demand and supply - sided. Successful loan payment depends on willingness to pay, increased revenue as a result of project expansion and resorting to other sources of finance at times of financial constraints. The results show that not paying the loan on time can be attributed to several causes, mainly the unwillingness and/or inability of the borrower to pay. These causes are demanded sided (i.e. the debtor is the reason for not paying) or supply-sided (i.e. lack of timely payment is a result of the MFI policies).

The demand-sided reasons include personal shocks, shocks in the economy, using the loan for a different purpose than expanding the project, the borrowers' willingness to pay/attitude towards their loan, managing several projects at once and lack of financial planning. The supply- sided reasons include lack of training and experience, weak regulations against the defaulters, in-fraud risk, poor monitoring and enforcement of regulations by the MFI and high interest rates. The problem is more supply-sided than demand-sided since most of the above mentioned factors for default can be attributed to moral hazard. The MFI however is reluctant to find a solution to the moral hazard problem since that increases its cost.

Furthermore, the Egyptian Gulf Bank and Citadel Capital are shareholders of the MFI Tanmeyah. The Egyptian Gulf Bank mandates that an interest rate of 25% is to be charged on any loan (Tanmeyah, 2010). This however defies the role of an MFI which is to alleviate poverty, it was clear that the aim of this MFI was to generate profit since they were charging them an interest rate of 25%, which is higher than that charged by banks.

Being indebted seemed to be a way several resort to in order to repay the loan, however that defies the aim of the MFI. The aim is to get the poor out of their poverty and not immerse them further by making them indebted either to the MFI or to their relatives. Other ways include decreasing household consumption and looking for other sources of finance such as sons/daughters' wages and social insurance to pay. Again, these are all temporary solutions to pay on time and the borrowers should not have to resort to these tools in order to pay. Hence, MFIs should take a greater role in ensuring that these borrowers are both willing and able to pay, as well as offer the right incentives to its successful borrowers.

Chapter Six

Conclusion and Policy Implications

This chapter aims to summarize the findings of the paper and explain the main drawbacks of the model. First of all, this paper applies the mixed method approach in an attempt to answer what are the factors that affect the microloan repayment rate for Egyptian MFIs. The quantitative analysis involves a maximum likelihood estimation of a probit model based on a sample size of 1,0001 borrowers from two Egyptian MFIs; MEK and Resala. This paper uses evidence from 12 interviews conducted with Tanmeyah's borrowers to complement the findings of the qualitative model and include variables in the model that are country -specific.

Aiming at reviving financial resources, this paper searches what are the socio-demographic characteristics and loan characteristics that affect microcredit loan repayment for Egyptian MFIs. The results show that willingness to pay is an important determinant in timely repayment. The reasons for untimely repayment attributes to factors related to both the borrower (demand-sided) and the MFI (supply-sided). Most of the reasons for default are a result of moral hazard, which indicates that the repayment problems are more supply-sided than demand-sided.

According to the probit model, the findings indicate that the repayment period, type of project and MFI lending policies are the loan characteristics that affect repayment. The borrower's socio-demographic characteristics that affect repayment include the borrower's income, whether the borrower has a job and the location of the microproject. The final factor that contributes to timely repayment is the macroeconomic environment. The borrowers who were affected by the 25th January Revolution had a 27% higher probability of defaulting compared to those who were not affected by the Revolution.

The aforementioned are the reasons for timely repayment or lack thereof. The paper proposes several solutions to improve the microcredit repayment rate and hence increase the level of efficiency of MFIs and narrow the supply- demand gap. To start with, regardless of the intention of the borrower at the time of receiving the loan, willingness of the borrower to

pay back the loan is detrimental in affecting the repayment rate. If MFIs focus on lending to those who have a job and those with higher levels of income, then the repayment rate will increase, however that defies the main role of MFIs which is reaching the poorest, since the MFIs would be self-selecting its borrowers. However, regardless of the loan amount, MFIs should allow the borrowers a time period at the beginning of receiving the loan were they do not pay in order to allow the microproject to generate revenue. Then the number of times that the installments should be paid after the project has generated revenue should be minimized as the longer the repayment period, the higher the probability of default.

There are several limitations to this paper; lack of data was a major constraint and a sample selection bias might have occurred. In addition, the model was unable to capture some variables such as level of education as a result of data unavailability. Also, one of the main variables that affect loan repayment is willingness to pay, however such a variable is not quantifiable. The analysis could have been strengthened had the MFI(s) examined in the quantitative analysis been the same as those in the qualitative analysis. Moreover, the main disadvantage of the mixed method approach, as stated earlier, is that discrepancies might arise between the quantitative and qualitative findings. This is evident since based on the interviews, women were better than men in terms of timely repayment, however the probit regression indicates no differences in the repayment rates between both.

So Egyptian MFIs can be more socially and technically efficient by targeting those who are living in the rural areas. In addition, MFIs can be more efficient by focusing on group lending rather than individual lending, were group lending in Egypt represents only 23% of total lending as of the year 2009 (Triki, 2013). MFIs differ according to their aim; for - profit MFIs should charge lower levels of interest since the aim of these MFIs should be to alleviate poverty and not immerse the poor into higher levels of poverty. NGO-MFIs should continue looking at the social and economic impact of lending on the borrower, but should rely less on subsidies to guarantee their sustainability.

If Egyptian MFIs improve their means of lending and increase the level of efficiency, that will play a major role in contributing to their sustainability. The more efficient MFIs are, it is proposed by the literature that, the more sustainable they become. Their sustainability is vital given the inability of the poor to access other formal financial institutions. The more sustainable MFIs are, that entails that the supply-demand gap will be reduced and the standard of living of the borrowers will be enhanced. In the short-run, the poor will be

employed, have higher income and consequently enjoy higher levels of consumption and saving. In addition, the poor will gain access to schools and healthcare services. As a result of the increased savings, the level of investment and capital accumulation in the long-run in Egypt will rise.

Finally, microfinance supports projects with low market demand and low return and hence microfinance may have a minimal impact on poverty reduction (Khandker 2005). Poverty cannot be eradicated using a single policy measurement; hence, microfinance can only be a tool for fighting poverty, rather than the solution for the poverty problem. MFIs can be engines for change, but are kept outside of the vehicle. Even if microfinance is not the solution to the poverty problem, its importance can not be understated. Microfinance supports those who can not access commercial financial institutions as a result of their poverty. Improving the efficiency level of MFIs contributes towards solving the employment and investment problems in Egypt. Hence, although MFIs doesn't serve as a tool for core poverty removal, enhancing the efficiency of MFI is a means of advancing a vehicle of development. Choosing the appropriate way to lend to a customer is not a one-size fits all policy. These poor should not be kept outside of the credit cycle as that immerses them more into poverty and as Morduch stated, the problem is not in the ability of the poor to repay; they have an active financial life despite their poverty (Morduch, 2010).

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Appendix

Table A: Correlation Matrices

Loan Repay-ment	Age	Age Square	Gender	Marital Status	Household Size	Income
1.0000						
0.0488	1.0000					
0.0451	0.9871	1.0000				
0.0572	0.0846	0.0769	1.0000			
0.0435	0.0293	0.0165	0.6694	1.0000		
0.0677	0.1306	0.0901	0.2910	0.3785	1.0000	
0.0759	0.0110	0.0040	0.0822	0.1577	0.2089	1.0000
-0.0646	-0.0422	-0.0347	-0.1051	0.0039	-0.1234	0.3261
0.0123	-0.0056	-0.0099	-0.0192	-0.0124	-0.0303	0.1037
-0.0501	-0.0870	-0.0815	-0.2652	-0.2150	-0.0256	-0.0019
0.0938	-0.0605	-0.0806	0.3943	0.3579	0.1681	0.2158
0.0341	-0.0261	-0.0280	0.1165	0.0994	0.1158	0.1246
-0.1014	-0.0421	-0.0334	-0.0100	0.0132	-0.1091	0.1861
-0.1071	-0.0540	-0.0430	-0.0601	-0.0535	-0.0867	0.0929
-0.0136	0.0124	0.0048	-0.0321	-0.0316	-0.0423	-0.0238
-0.2035	-0.0657	-0.0591	-0.0931	0.0094	-0.1060	0.1163
0.2767	0.0966	0.0854	0.1418	0.0349	0.1751	-0.1688
0.0003	-0.0202	-0.0135	-0.1107	-0.0053	-0.1333	0.3228
-0.0003	0.0202	0.0135	0.1107	0.0053	0.1333	-0.3228
-0.1360	0.0404	0.0433	-0.0477	-0.0279	-0.1041	-0.0304

	Address	Indebtedness	Health Condition	Job
Address	1.0000			
Indebtedness	-0.0058	1.0000		
Health Condition	0.0488	-0.0005	1.0000	
Job	0.0968	0.0041	0.0402	1.0000
Loan Amount	-0.1711	0.0585	-0.0618	0.0248
Repayment period	0.6747	-0.0010	0.0417	0.0637
Manufacturing	0.1685	0.0147	0.0935	0.0273
Agriculture	0.1111	0.0126	0.0047	0.0354
Services	0.1961	0.0442	-0.0233	0.0518
Cattle	-0.3392	-0.0575	-0.0387	-0.0803
Interest Rate	0.8561	0.0078	0.0577	0.1548
MFI	-0.8561	-0.0078	-0.0577	-0.1548
Revolution	0.5528	-0.0207	0.0917	0.0310

	Loan Amount	Repayment Period	Manufacturing	Agriculture	Services
Loan Amount	1.0000				
Repayment period	-0.1229	1.0000			
Manufacturing	-0.0861	0.1193	1.0000		
Agriculture	-0.1082	0.0620	-0.0570	1.0000	
Services	-0.0012	0.1688	-0.3132	-0.1357	1.0000
Cattle	0.0903	-0.2649	-0.3166	-0.1371	-0.5739
Interest Rate	-0.1574	-0.7713	-0.1354	0.1186	0.21894
MFI	0.1574	-0.7713	0.1354	-0.1186	-0.21894
Revolution	-0.2616	0.6420	0.1067	0.1078	0.1045

	Cattle	Percentage of loan to be paid	MFI	Revolution
Cattle	1.0000			
Interest Rate	-0.3434	1.0000		
MFI	0.3434	-1.0000	1.0000	
Revolution	-0.2067	0.6152	-0.6152	1.000

Table B: Loan Repayment regressed on loan characteristics

Loan Repayment	Loan Characteristics
Loan Amount	0.0000217
	(0.80)
Repayment Period	-0.0451***
	(-4.67)
Manufacturing	-0.108
	(-0.36)
Services	-0.0458
	(-0.16)
Cattle	0.847*
	(2.95)
MFI	-1.211***
	(-5.23)
Constant	1.965***
	(4.77)
Number of Observations	975
Pseudo R^2	0.102

* p<0.01, ** p<0.05, *** p<0.001	
Standard Errors are in parentheses	

Table C: Loan repayment regressed on borrower characteristics, loan characteristics, and interaction variables

Loan Repayment	
Loan Amount	-0.0000205
	(-0.71)
Repayment Period	-0.0337**
	(-2.96)
Manufacturing	-0.155
	(-0.49)
Services	-0.136
	(-0.46)
Cattle	0.794*
	(2.61)
MFI	-2.048***
	(-5.45)
Age	-0.00992
	(-0.34)
Age Squared	0.000129
	(0.38)
Gender	0.179
	(0.41)
Marital Status	-0.0964
	(-0.30)
Household Size	-0.00149
	(-0.05)
Income	0.000354
	(1.88)

Address	-0.716*
	(-2.75)
Indebtedness	0.0000125
	(0.46)
Job	0.240**
	(2.14)
Health Status	-0.132
	(-1.20)
Revolution	-0.957*
	(-3.25)
Age*Gender	-0.0000715
	(-0.42)
Age* Marital Status	0.0000870
	(0.50)
Marital Status* Gender	-0.122
	(-0.31)
Constant	2.861***
	(3.36)
Number of Observations	955
Pseudo R^2	0.135
* p<0.01, ** p<0.05, *** p<0.001	
Standard Errors are in parentheses	