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School of Business

**UNDERSTANDING THE SAVING BEHAVIOR OF POOR HOUSEHOLDS:
EVIDENCE FROM EGYPT**

A Thesis Submitted to

Economics Department

In partial fulfillment of the requirements for
the degree of Master of Arts in Economics

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Under the supervision of:

Dr. Samer Atallah

December 2015

ACKNOWLEDGMENTS

First and foremost, thanks Allah for granting me the strength, patience and persistence throughout my master's journey.

I am deeply grateful to my supervisor **Dr. Samer Atallah**, Assistant Professor of Economics, American University in Cairo, for his valuable guidance, encouragement and support throughout this research. It honors me to work under his supervision.

I would like to thank my readers, **Dr. Mohammed Bouaddi** and **Dr. Mohamed El-Komi**, Assistant Professors of Economics, American University in Cairo, for the time they dedicated to read my research and give me valuable comments.

I owe my sincere gratitude to **Dr. Adel Beshai**, Professor of Economics and Director of Graduate Studies, American University in Cairo, for supporting me during my study period and for being such a great professor and adviser.

Last but not least, I am grateful to my family and friends who continuously supported me. This study would not have been possible without their support, love and care.

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The American University in Cairo
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UNDERSTANDING THE SAVING BEHAVIOR OF POOR HOUSEHOLDS: EVIDENCE FROM EGYPT

Imane Abdel Fattah Helmy

Under the supervision of Dr. Samer Atallah

ABSTRACT

Given that there is a recent growing interest in mobilizing savings of poor households, this study investigates the factors that affect household saving in Egypt using a probit model. It uses data of the Egypt Labor Market Panel Survey (ELMPS) carried out in 2012. Also, it tests the impact of accessing credit on informal and formal saving. The results of the study show that the determinants of informal saving are quite different from formal saving. For example, access to credit significantly increases the probability of saving among the poor. However, credit increases informal saving while it has an insignificant effect on formal saving. This suggests that there is little evidence on the mutually reinforcing relationship between formal borrowing and formal saving since there is a weak incentive to convert informal savings of the poor into formal deposits. Females have higher tendency to save, yet they save informally which highlights the need for gender-sensitive saving products. Also, health emergencies have a significant negative effect on informal saving of poor households while insurance reduces the use of savings as Out Of Pocket (OOP) expenditures on health. Therefore, policies in Egypt should develop an inclusive financial system that increases awareness and confidence in the financial market and improves access to financial services.

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ABBREVIATIONS AND ACRONYMS

ABA: Alexandria Business Association:

ABWA: Assiut Business Women's Association:

ASBA: Assiut Businessmen Association

CEOSS: Coptic Evangelical Organization for Social Services

DBACD: Dakahlya Businessmen's Association for Community Development

ESED: Egyptian Small Enterprise Development Foundation

FMF: First Microfinance Foundation

MFI: Microfinance institution

NGO: Non-Governmental Institution

NSBA: North Sinai Businessmen Association

RADE: Regional Association to Develop Enterprise in Sohag

ROSCA: Rotating Saving and Credit Association

SBACD: Sharkia Businessmen's Association for Community Development

SCDA: Sohag Community Development

Chapter One: Introduction

Different theories attempted to explain household's saving behavior. However, there is little agreement on which theory offers the most comprehensive explanation. In developing countries, many arguments highlighted the limitations of traditional saving theories in explaining the saving behavior of poor households. Therefore, this study aims at understanding the saving behavior of poor households in Egypt and identifying key determinants of saving. Differentiating between the determinants of informal and formal saving is a contribution of this study since the determinants of informal saving in developing countries are rarely tackled in the literature. Furthermore, there is a noticeable gap in the literature that addresses the synergy between access to credit and saving. Hence, this paper will test the impact of access to credit on the saving of poor households including informal and formal saving.

Poor households have different needs for financial products to mitigate risks, cope with shocks, finance life-cycle events and invest in business. Nevertheless, three out of every four adults in developing countries do not save in formal financial institutions (Kendall, 2010a). Given their limited options in the formal financial sector, they often have resort to informal arrangements. Studies showed that poor households could actively save if they have access to affordable and convenient saving products. Recently, formal microsaving products started to gain more recognition. Governments, institutions and donors, believing that access to saving will empower the poor and enable them to better manage their financial affairs, adopted microsaving programs and policies.

Understanding key determinants of saving will guide financial institutions in designing tailored saving products that meet the needs of poor households and compete with informal saving. This study will also provide policy implications to mobilize formal savings of poor households in Egypt. The study uses a probit model to analyze micro level data of the Egypt Labor Market Panel Survey (ELMPS) that was carried out in 2012 on a sample of 12,060 households including 49,186 individuals.

The rest of this paper is organized as follows. Chapter Two discusses household saving theories and provides an overview of the saving behavior of poor households in developing countries including informal saving and formal saving, known as

microsaving. This will be followed by discussing saving in Egypt. Chapter Three presents the research problem and objectives. Afterwards, model specification and data will be discussed in Chapter Four. Chapter Five and Six presents the descriptive statistics and estimation results respectively. Finally, Chapter Seven concludes the paper and discusses policy implications.

Chapter Two: Literature review

This chapter is divided into three sections. The first section provides an overview of theories related to household's saving behavior followed by discussing empirical studies that tested these theories in developing countries. It also explains other micro determinants that affect the decision of saving. The second section focuses on saving by poor households including informal and formal saving which is known as 'microsaving'. It discusses the historical evolution of microfinance, explores empirical evidence on the impact of microsaving and the potential interaction between credit and saving. The final section discusses poor household's saving in Egypt.

2.1. Determinants of household's saving

2.1.1. Theories of household's saving

National saving includes public and private saving. Household saving typically constitutes a major part of private saving compared to private corporations (Gersovitz, 1988; Rehman, Bashir, & Faridi, 2011). Saving is an important way to improve the well-being of household. It allows households to smooth consumption in case of high income volatility and increase the opportunity to invest in physical and human capital (Ashraf et al., 2003). For households, the tradeoff between current and future consumption results in saving (Sturm, 1983).

There are numerous motives leading to the decision of saving. For instance, saving for retirement aims at financing future consumption when income decreases or becomes zero (life-cycle). Also, households save when there is uncertainty about future income (precautionary saving) or when they intend to leave bequests (Sturm, 1983; Gersovitz, 1988). Additional motives include, improvement (increasing consumption) or intertemporal substitution (enjoying interest), investing in business or accumulating down-payment of durables (Browning & Lusardi, 1996; Coleman, 1998; Karlan & Morduch, 2009).

Income is identified as a significant determinant of saving. Early saving theories that identified current income as a key determinant of saving started by the standard

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Keynesian model. This model implied that saving depends on current income *ceteris paribus*. When income increases, part of the increase is used for consumption while the rest is saved. Therefore, as equation 1 shows, when income increases, saving rate increases:

$$S_t = a + sY_t + \varepsilon \qquad (1)$$

such that S_t denotes savings in period t while Y_t is the income in period t and s is a constant marginal propensity to save (MPS) that ranges from zero to one. As income increases, average propensity to save (APS) increases (Mikesell & Zinser, 1973; Liu & Hu, 2012).

The tests of this equation showed that saving increase with income at a decreasing rate. A potential explanation is that a shift in household's income to higher levels will introduce households to modern consumption opportunities leading to a decreasing saving rate (Mikesell & Zinser, 1973; Liu & Hu, 2012). The implication of Keynesian theory is that low income households save lower ratio of their income compared to high income families. Different theories, that attempted to explore the relationship between income and saving, were contradictory. For instance, it was found that the poor consume at their subsistence level, yet they often have little saving to smooth consumption in case of income shocks (Schmidt-Hebbel, Webb, & Corsetti, 1992; Meghir, 2004).

Income fluctuations can also affect saving. An insightful theory supporting this notion was introduced by Friedman (1965), the permanent income hypothesis. Permanent income hypothesis has the below linear form:

$$S_t = a_0 + a_1 Y_{Pt} + a_2 Y_{Tt} \qquad (2)$$

such that S_t is savings and Y_{Pt} is permanent income in period t while Y_{Tt} is transitory income. The common definition of permanent income is long-term expected income that does not take into consideration temporary influences like weather or rainfall gains. Transitory income denotes the difference between actual income Y_t and permanent income.

The implication of permanent income hypothesis is that individuals do not consume transitory income ($MPS_T = 1$) so temporary changes in transitory income will directly affect household saving (Schmidt-Hebbel et al., 1992; Meghir, 2004). Friedman

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based his work on the intuition that income is more volatile than consumption. Consumption is based on long-term expectations about income since households prefer to smooth consumption over time and avoid short-term fluctuations (Meghir, 2004). The implication of this theory on household behavior is that household will save today if their income is higher than the future and vice versa. For example, in economic crises current income becomes lower than future income so people dissave to cover current consumption (Berry, Williams, & Waldron, 2009).

Income uncertainty also determines saving as indicated by Leland (1968). He defined precautionary saving as additional saving due to uncertainty about future income. When there is higher uncertainty about future income, the marginal utility of expected consumption in the future becomes higher leading to more saving at the present time (Deaton, 1997; Loayza, Schmidt-Hebbel & Servén, 2000; Jongwanich, 2010). For instance, if a household is working on a temporary basis or expects to lose the job, current saving will increase (Berry et al., 2009). Coleman (1998) added that precautionary saving is witnessed in all stages of life. For example, students who are uncertain about earning as expected in the future can save while elderly who wish to save for protection against shock could also have precautionary saving.

Age is another determinant of saving that was recognized by the life-cycle hypothesis developed by Modigliani and Brumberg (1954). This theory was mainly concerned with the motive of saving for retirement. It assumed that agents prefer to smooth consumption over their life span. Therefore, they save when they are young and working by consuming less than the disposable income while dissaving take place when they are old and retired (Figure 1). By this way, wealth is maximized at retirement age then decreases as consumption increases after retirement. Hence, saving is positive at young age, negative at old age and averaging zero if no bequests are made or received during the life time.

This theory assumes that there is zero population and income growth. Thus, the dissaving of elderly offset the saving of young population. If this assumption is relaxed, the net saving will be positive due to a larger young population earning income compared to retired one. Also, if per capita income is growing, saving will increase to maintain

future level of consumption since households aim at smoothing their consumption over life time (Mikesell & Zinser, 1973). This theory shows that household saving behavior is determined by the length of income earning period, retirement duration, market interest rate, time preference and risk aversion (Sturm, 1983).

Figure 1 Life-Cycle Hypothesis
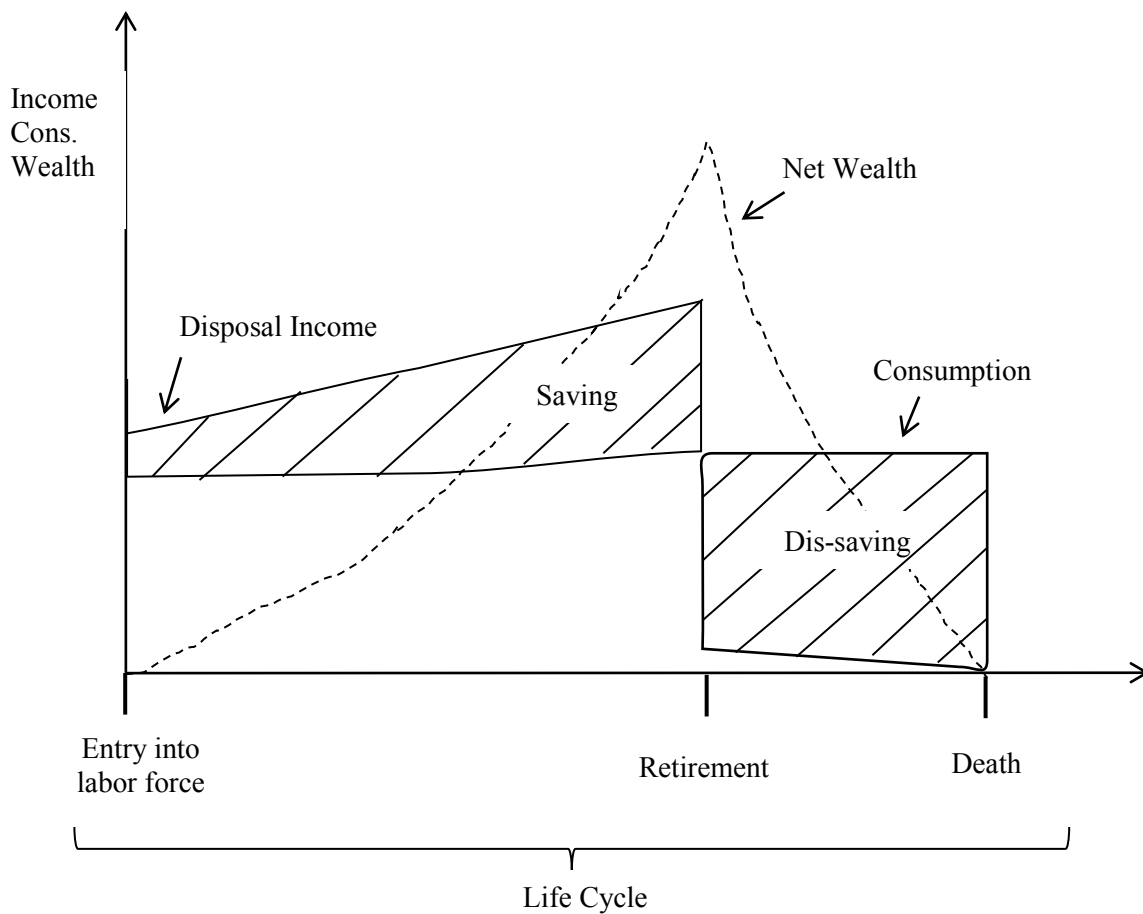
Source: Sturm (1983)

Based on life-cycle hypothesis, Diamond (1965) presented an Overlapping Generation Model (OLG) by extending the analysis of Samuelson (1957). The model assumed that there are three markets (labor, output and capital) and two living generations who are overlapping. Each person lives for two periods of time. The person works during the first period so the time is divided between leisure and work. During the second period, the person retires then dies by the end of period. Since there are no

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transfers or bequests, the wage, earned at the first period, is divided between consumption and saving. In the second period, the consumption of the person is financed by savings plus interest rate (Romer, 2011).

Deaton (1989) argued that some of the aforementioned theories have limited application in developing countries where the demographic structure is different. The size of household is larger in poor countries and when grandparents, children and grandchildren live at the same household, there is lower motive to save for retirement due to intergenerational transfers. Also, in developing countries, income is mostly coming from agriculture activities so uncertainty is higher which hinders the accurate estimation of long-term income. Due to credit constraints, households face difficulties in borrowing so a primary motive for poor households is to save for consumption smoothing. As result, saving in developing countries better fits precautionary saving instead of saving for retirement or bequest.

2.1.2. Empirical evidence of household's saving

This section presents key contribution of empirical studies that aimed at testing the aforementioned theories in developing countries. These empirical studies have not reached a decisive conclusion about which theory offers the most comprehensive explanation of the saving behavior of poor households. For instance, an empirical study in India, using time series data from 1950 to 1962, showed that current income has a positive signifficant effect on saving in rural and urban areas (Choudhury, 1968).

Wen and Ishida (2001) investigated rural saving in China by analyzing data of farm households from 1979 to 1998 using Ordinary Least Squares (OLS). The study found a positive significant relationship between current income and saving at 1% significance level. In additon, Ahmad and Asghar (2004) found that current income has a major significant impact on saving using OLS technique to analyze Pakistan Integrated Household Survey of 14,307 households in 1998-99. In Morocco, Abdelkhalek et al. (2010) analyzed household data of 300 households using OLS and instrumental variables. The results of the study supported the standard Keynesian model.

On the other hand, Burney and Khan (1992) pointed out that income has insignificant impact on saving using data of household income and expenditure survey in Pakistan. Rehman et al. (2011) reached the same conclusion by analyzing data of 293 Pakistanian households who were selected using stratified random technique in 2009-2010. Likewise, Liu and Hu (2012) tested the Keynesian theory using panel data of family surveys from thirty one urban and rural regions in China during the period from 1990 to 2009. The findings of the paper indicated a positive relationship between household saving ratio and income, yet the results were not significant in the rural model.

Early empirical studies attempting to test life-cycle hypothesis included the study of Kelly and Williamson (1968) that was conducted in Indonesia using cross-sectional data of 490 households in 1959. The findings of the study showed little evidence on life-cycle hypothesis in rural and urban Indonesia. Also, the empirical work of Deaton (1992), using household data of Côte d'Ivoire in 1985-1987 and Thailand in 1986, found weak evidence on life-cycle hypothesis. The data did not show the expected dissaving at old age and even in urban Thailand, there was evidence of saving after the age of 40.

Recent studies included the study of Abdelkhalek et al. (2010) in Morocco and Rehman et al. (2011) who found evidence of life-cycle hypothesis only among higher income group in Pakistan. This finding supported the limitation of life-cycle hypothesis in developing countries as suggested by Deaton (1989). Likewise, the papers of Liu and Hu (2012) in China found weak evidence on the relationship between age and saving.

Other studies in Chile, Pakistan and Kenya found significant evidence supporting the life-cycle hypothesis (Burney & Khan, 1992; Butelmann & Gallego, 2001; Ahmad & Asghar, 2004; Kibet et al., 2009). Their analysis showed that saving and age exhibit an inverted U-shape relationship since saving increases at young age till reaching a certain threshold then decreases. In Vietnam, Newman et al. (2008) analyzed surveys of 2,324 households in 2006. The findings of the paper supported life-cycle hypothesis.

Some studies conducted in developing countries to test the permanent income hypothesis found larger estimates of marginal propensity to save out of transitory income compared to permanent income. However, these studies were challenged by selecting sound proxies for permanent and transitory income while avoiding measurement error.

The results of studies differed according to the way of defining permanent and transitory income (Snyder, 1974). For instance, studies supporting permanent income hypothesis like Bhalla (1980) in India used lagged income and assets as measure of permanent income while Musgrove (1979) in Colombia, Ecuador and Peru used education.

Using data about weather and rainfall in India, Wolpin (1982) found evidence supporting permanent income hypothesis. A study in Thailand by Paxson (1992) used time series data to estimate the marginal propensity to save out of transitory income resulting from rainfall shocks. The findings suggested that the marginal propensity to save out of transitory income range between 0.73 and 0.83. Thus, the extra income from transitory rainfall is saved while consumption is positively affected by permanent income which is supporting permanent income hypothesis.

Nevertheless, studies that used lagged income (two-year average income) found weak evidence on permanent income hypothesis (Friend & Taubman, 1966; Choudhury, 1968). Gupta (1970) criticized these papers for using one single measurement of permanent income and using nominal data of some variables instead of real data. Therefore, he analyzed the same models using real data and defining permanent income as two-year moving average of real per capita income and three-year moving average. Still, the results pointed out that the marginal propensity to consume out of transitory income is higher than permanent income.

Using estimate of prudence as proxy of household's motive to accumulate precautionary savings, the study indicated a positive relationship between prudence and saving. By analyzing household panel data, additional studies found evidence on precautionary saving that increases as uncertainty about future income increases (Skinner, 1987; Kazarosian, 1997; Carroll & Samwick, 1998). Using household data of rural Pakistan from 1986 to 1991, Lee and Sawada (2010) found strong evidence of precautionary saving particularly among poor households who face frequent income shocks.

Moreover, Liu and Hu (2012) found that precautionary saving theory has stronger power in explaining household saving behavior in China compared to Keynesian and life-cycle hypothesis which supports the argument of Deaton (1989). Even though Dynan

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(1993) found evidence on precautionary motives, the estimated parameter was too small which was not consistent with previous studies. However, the paper was criticized for using four-quarter panel data which is too short to capture income uncertainty (Kazarosian, 1997).

Additional determinants of saving were identified by studies like Sturm (1983), Suruga and Tachibanaki (1991), Burney and Khan (1992), Butelmann and Gallego (2001), Ahmad and Asghar (2004), Abdelkhalek et al. (2010), Rehman et al. (2011), Kahn (2013). High young and old dependency ratio has a significant negative impact on saving. Stable occupation has a positive impact on saving while wealth (e.g. owning a house) increases the rate of saving (Chowa, Masa, & Ansong, 2012).

Attaining high education was found to reduce saving rates since people with low educational attainment are more risk averse than educated persons so they save more for the future (Burney & Khan, 1992; Kahn, 2013). Additional explanation was offered for this inverse relationship by Rehman et al. (2011). They mentioned that highly educated households prefer to highly educate their children so they use their savings to finance educational expenditures.

Sex of the head of household has been considered as a determinant of saving. It was expected that women save more for children education and household well-being. Nevertheless, empirical studies found that male headed households are able to accumulate more savings since female headed households receive lower income (Ahmad & Asghar, 2004; Kibet et al., 2009; Abdelkhalek et al., 2010). Nevertheless, the study of Abdelkhalek et al. (2010) indicated that women save more by taking into account an interaction term between gender and income while Kahn (2013) found no significant difference between the two sexes.

Life expectancy is positively associated with saving while debts lead to increased saving rate to cover the repayment (Suruga & Tachibanaki, 1991; Burney & Khan, 1992; Kahn, 2013). Gersovitz (1988) agreed with Deaton (1992) by indicating that intergenerational links affect household saving behavior in developing countries more than developed nations. Family members play signifcant role in insuring against risk in case of market imperfections and liquidity constraints. Therefore, the family structure

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allowing for intergenerational transfer decreases the motive to accumulate savings. The empirical studies of Kelly and Williamson (1968) as well as Musgrove (1979) supported this argument.

More recent studies like Oberta (2006) used instrumental variable to estimate the saving function of households in Pakistan. The study showed that increasing the number of children has a significant negative effect on saving. Also, similar findings were indicated by Ahmad and Asghar (2004), Abdelkhalek et al. (2010) and Rehman et al. (2011). On the other hand, Kahn (2013) reported mixed findings because higher family size increases saving if children contribute to wealth.

Based on the aforementioned discussion, saving is particularly important for households in developing countries who face frequent income shocks and high liquidity constraints. In the absence of well-developed credit and insurance markets, saving becomes a significant mechanism that protects households against emergencies and finances their investment or life-cycle events. Therefore, the next section of the paper will be concerned with saving mobilization of poor households in developing countries.

2.2. Saving behavior of poor households in developing countries

2.2.1. Informal saving

The most common form of saving by poor households is informal saving. Mechanisms of informal saving include saving at home (cash, livestock, gold, jewelry, assets) and reciprocal lending or Rotating Saving and Credit Association (ROSCA) (Hulme et al, 2009). Informal saving also includes parties like moneylenders, relatives, friends, neighbors and saving groups (Rutherford, 1996; Bayulgen, 2008; Mawa, 2008).

According to Rutherford (1996), ROSCA is the most commonly used type of informal saving in the world. For example, more than fifty percent of adults in Africa are members of ROSCAs (Kendall, 2010a). In its basic form, ROSCA is formed by a group of people who collect their savings and pay a lump sum amount to one person. Afterwards, turns are changed over time in a rotating manner. The order of getting the lump sum amount could be decide by agreement, lottery or auction. Also, informal saving

could be time-bound and conditional on certain events like Christmas, marriage or funeral funds (Rutherford, 1996).

Advantages of informal saving include availability and accessibility without the need to travel long distance as well as lower cost since there are no opening fees. However, informal saving usually faces the risk of theft, loss or spending on needy family and friends under social pressure. Also, informal saving that involves networks of neighbors and friends lacks privacy and requires intensive coordination. As result, accessible formal saving accounts could be more effective if regulated by secured financial institutions since the poor will be tempted to save more in secure and private arrangements (Kendall, 2010b).

Rutherford (1996) indicated that the poor prefer to use formal financial services but if they are not available, they make their own arrangements. Thus, informal saving is widespread in developing countries where financial and insurance markets are underdeveloped and exclude the poor (Rutherford, 1999; Hulme et al, 2009). When barriers to save are reduced and the poor have access to affordable and reliable formal products, they are motivated to save in order to cope with emergencies and finance life-cycle events (Aportela, 1999). Therefore, the next section will discuss formal saving in developing countries which is known as microsaving.

2.2.2. Formal saving of poor households: microsaving

The concept of microfinance was used interchangeably with microcredit which offers the poor, who do not have access to credit, a small amount of money as a collateral-free loan. Over the years, microfinance evolved to include more comprehensive services like microsaving and microinsurance (Stewart et al., 2010; Duvendack et al., 2011). In this context, microfinance is defined as offering small financial services to the poor who had been excluded by conventional financial systems due to the high risk and administrative costs (Schreiner, 2003; Bayulgen, 2008; Mawa, 2008).

The major players in microfinance industry are categorized into: semi-formal players such as Non-Governmental Organizations (NGOs) and Microfinance Institutions (MFIs). Formal players include public and private banks, insurance companies and post

office (Elahi & Rahman, 2006; Bayulgen, 2008; Mawa, 2008). The main clients of microfinance are the economically active poor who have little income as well as basic skills and need financial services to help them manage their money or run their own income generating activities (Rutherford, 1996).

The majority of microfinance clients are women since they are more vulnerable and have less access to formal financial services. Also, there is a common belief that women invest more than men in activities that have better impact on the welfare of the whole household (Brau & Woller, 2004; World Bank, 2008). This belief was supported by empirical studies like Hassan and Guerrero (1997), Pitt and Khandker (1998) and Zhibin (2008).

Originally, microfinance started with providing access to credit giving that the credit market in developing countries is divided into formal institutions that are often reluctant to lend the poor and informal lenders who lend the poor with extremely high interest rates (Jaffer, 1999). Additionally, Matin, Hulme and Rutherford (2002) argued that the poor live in a 'mini-economy' where production, consumption, borrowing and saving are very small. This increases the per unit transaction cost of formal credit providers. Moreover, the risk associated with offering financial services to the poor is high due to the fluctuating earnings from instable jobs, natural shocks and sudden medical expenses.

A key problem in providing credit is asymmetric information resulting from lack of credit history of the poor. This asymmetry leads to adverse selection, which is "*the inability of lender to differentiate between low and high risks borrowers*" as well as moral hazard which is "*the tendency for some borrowers to divert resources to projects that reduce their likelihood of being able to repay the loan and the inability of the lender to detect and prevent such behavior*" (World Bank, 2008, p.114). Hence, MFIs use joint-liability (group lending) as a tool to reduce the risk of adverse selection and moral hazard through peer pressure and networking (World Bank, 2008).

Scholars like Pitt and Khandker (1996), Hermes and Lensink (2007) and Dercon (2009) argued that lack of financial services is a major constraint that prevents the poor from pursuing valuable opportunities and keeps them in the trap of poverty. In the

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absence of well-functioning financial market, the poor who are "unbankable" have resort to informal networks like moneylenders, relatives, neighbors and friends (Jaffer 1999; McKernan, 2002; Banerjee & Duflo, 2007).

Following these arguments, microcredit became one of the highest priorities on development agendas after the first microcredit program, Grameen Bank (GB), was founded by Muhammed Yunus in 1970s in Bangladesh (Anslinger, 1997; Elahi & Rahman, 2006). There are common features shared among microcredit programs. For instance, the size of the loan is usually small and the repayment period is short. In addition, a common purpose of the loans is to finance income-generating activities (Elahi & Danopoulos 2004).

Given the global scope of microcredit, there is increasing number of studies measuring its impact. Using different survey designs like treatment versus control group (with or without intervention), longitudinal studies (before or after intervention) and Randomized Control Trial (RCT), studies found mixed evidence on the impact of microcredit (Duvendack et al., 2011). As Bangladesh has constantly kept the lead in offering microcredit services since the establishment of GB, several studies attempted to investigate the impact of microcredit in Bangladesh. Some empirical studies found positive impact of microcredit on income, employment, wealth, asset ownership and women empowerment (Khandker & Chowdhury, 1996; Pitt & Khandker, 1998; Hossain, 2000; Amin et al., 2003; Ghosh & Wright, 2005; Osmani, 2007; Haque & Yamao, 2008).

Other studies examined the impact of microcredit in developing countries like Zimbabwe, India, Zambia and Philippines. These studies supported the positive effect of microcredit on the well-being of poor household including income, health, children education and the improvement of women decision-making (Barnes, Keogh & Nemarundwe, 2001; Chen & Snodgrass, 2001; Copestake, Bhalotra, & Johnson, 2001; Kondo et al., 2008).

Nevertheless, some studies found that microcredit has insignificant impact on the well-being of households after correcting for selection bias (Coleman, 1999; Khandker, 2003). By the same token, RCT studies showed that microcredit have insignificant impact on education and health (Banerjee et al., 2009; Karlan & Zinman, 2009). More recent

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RCT studies in Bosnia, Ethiopia, India, Mexico, Mongolia and Morocco found that microcredit does not have significant impact on income, children status and women empowerment (Attanasio et al., 2015; Angelucci, Karlan, & Zinman, 2015; Augsburg et al., 2015; Banerjee et al., 2015a; Crépon et al., 2015; Tarozzi et al., 2015). Therefore, Banerjee, Karlan and Zinman (2015b) concluded that microcredit does not have 'transformative effects' even if it has average positive impact on household.

Even though access to credit assists the poor in facing different shocks, microcredit increase the risk of debt. Therefore, offering saving products to the poor is considered as a 'safer' intervention to mitigate the long-term debt (Stewart et al., 2012). In some cases, microcredit led to falling prey to 'never-ending cycle of debts' due to high interest rates. As result, MFIs started to offer microsaving products to assist poor households in running their business without costly debts (Ashraf et al., 2003).

The historical focus of microfinance movement on microcredit was originated from the assumption that the poor can not save. Nevertheless, this assumption was challenged by numerous studies. The poor can save, yet they require specific products that meet their needs due to their low irregular income and distant location (Karlan & Morduch, 2009). As indicated by Bayulgen (2008) providing loans is a crucial part of microfinance, yet microsaving is equally important since saving allow the poor to keep money for future investments or shocks.

Microsaving allows low-income persons to save small frequent amounts of money through saving products with low opening fees (Hulme et al., 2009). Poor households often find difficulties in having lump sum cash to be used in investment (e.g. running business or acquiring productive assets) and life-cycle events (e.g. marriage, birth, education). Weather shocks, health emergency and loss of job are common shocks that have particular adverse effect on poor households (Kendall, 2010a).

Therefore, saving has high return by protecting the poor against income shocks and reducing risk of employing stressful risk coping strategies like decreasing consumption, getting children out of school and sale of assets. Also, frequent savings can be converted into lump sum amounts to meet the anticipated needs and special events of poor households (Rutherford, 1999; Hulme et al., 2009; Kahn, 2013).

Given the previously mentioned debate about the impact of microcredit and whether it opens new opportunities for borrowers or trap them in a debt-cycle, claims about shifting MFIs operation to other services like microsaving started to increase (Rogg, 2000). Some studies indicated that saving could be more beneficial for the poor as it helps in paying back loans, smoothes consumption and finances education and investment (Chen & Snodgrass, 2001; Adjei et al., 2009; Karlan & Morduch, 2009; Stewart et al., 2010).

The wide belief that the poor can not save was challenged by the introduction of formal microsaving products in developing countries and the high take up realized for these products compared to other financial services including loans. For instance, in 2012, there were 72 million clients of microsaving products compared to 94 million microcredit clients (Karlan, Ratan & Zinman, 2013). In Indonesia, when Bank Rakyat Indonesia (BRI) introduced microsaving products, they attracted ten times higher number of clients compared to borrowers. Furthermore, surveys from different countries showed that having access to saving account is reported as the highest financial need of the poor (Kendall, 2010b).

The study by Banerjee and Dufflo (2007), 'The economic lives of the poor', analyzed household surveys of thirteen developing countries[1]. The findings indicated that poor households are able to save if there is access to convenient saving accounts. They spend substantial amount of their annual income on life-cycle events as well as social and religious festivals which increase the potential of mobilizing savings. Twelve out of thirteen countries in the survey had less than fourteen percent of poor household with access to saving accounts. Therefore, they have resort to informal ROSCAs and self-help groups (Banerjee & Dufflo, 2007).

The poor have uneven cash flow while their needs require lump-sum amounts (e.g. investment or special event). Therefore, they are able and willing to save if there is a secured and convenient place that meets their financial needs and converts their small amounts into lump sum. Nevertheless, there are barriers to save like long geographical

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[1] Countries included in the study: Cote d'Ivoire, Guatemala, India, Indonesia, Mexico, Nicaragua, Pakistan, Panama, Papua New Guinea, Peru, South Africa, Tanzania, and Timor Leste (East Timor).

distance of saving institution which increases transaction costs of poor households (Rutherfold, 1996; Karlan & Morduch, 2009; Karlan et al, 2013). Some studies attempted to explore the effect of expanding services through closer branches to the poor, mobile branches, deposit collectors and ATM cards. The studies in India, Mexico and Kenya found significant positive effect of removing distance barriers due to reducing cost of time and money (Aportela, 1999; Burges & Pande, 2005; Flory, 2011; Schaner, 2013).

Additional barriers include unaffordable saving accounts with high opening fees, minimum balance and withdrawal fees as well as the complicated procedures (Hulme et al., 2009; Karlan et al, 2013). Moreover, lack of trust or confidence in formal institutions and low financial literacy act as barriers of saving. When these barriers are removed, the poor are eager to save through formal secured channels (Aportela, 1999; Rutherford, 1999; Kendall, 2010b; Karlan et al, 2013).

In order to accommodate the needs of low-income persons, microsaving products have some common features like: being convenient, easy to access, require payment of small frequent sums and low opening fees (Mutesasira et al., 1998). Also, saving can be offered as compulsory products in order to get a loan or as voluntary product (Stewart et al., 2012). Forced saving are more common and they are used by MFIs as collateral to secure loans so their refund is restricted while voluntary saving are more flexible (Brau & Woller, 2004).

The literature of microsaving could be mainly divided into two types. The first type includes studies assessing the demand of microsaving as well as profiling potential clients. These studies commonly use financial diaries to get in-depth information about household profiles and their financial lives (Bakeine, 2001; Rutherford, 2002; Ruthven & Kumar, 2002; Collins, 2005). Other studies that used randomized control trials indicated that when the poor have access to saving products with low or zero opening fees, there is high uptake and intensity of account usage even if there are interest-free accounts (Duflo, Kremer & Robinson, 2009; Ashraf et al., 2010; Dupas & Robinson, 2010; Brune et al., 2011). This uptake was even higher compared to credit products. Dupas and Robinson (2010) found that women have higher tendency to save for investing in business which

was explained by the authors as the result of reduced pressure on women from their networks.

The second type of studies focused on the impact of microsaving. Studies measuring the impact of microsaving on the welfare of poor households vary from RCT and natural experiment to client interviews and focus groups. These studies found positive impact of microsaving on poverty reduction, education, resistance to health shocks, food expenditures, decision-making of women within household and purchase of durable goods (Kervyn, 2001; Ashe, 2005; Burgess & Pande, 2005; Ashraf et al., 2010; Dupas & Robinson, 2010; Prina, 2013). Nevertheless, there is a limited number of impact assessment studies about microsaving compared to microcredit (Stewart et al., 2010; Kendall, 2010b).

2.2.3. The synergy between access to credit and saving

According to Karlan et al. (2013) the interaction between borrowing and saving received little attention from researchers even though they are simulatenously offered by financial institutions to form saving habits that last even after the loan is fully paid. Also, Stewart et al. (2012) mentioned that there is lack of evidence on the impact of credit on voluntary saving since the majority of studies focused on the common compulsory saving required by financial institutions.

Theories of household saving imply that access to credit will reduce saving because the motive of precautionary saving or saving for investment will decline. Savers will be discouraged to reduce current consumption to save for investment or life cycle events (Rogg, 2000). Additionally, even though entrepreneurs are encouraged to save any additional profit from the projects financed by credit, the debt repayment could be a barrier leading to decreased saving of borrowers (Stewart et al., 2012).

The paper of Deaton (1992) argued that barriers to borrow do not imply that households can not save. On the contrary, liquidity constraints increase current saving in order to secure future expenditures. For instance, when there is limited access to credit, household has to save the whole amount to get durable goods or houses. Coleman (1998)

added that potential liquidity constraints in the future can affect saving even if households are not currenty facing liquidity constraints. When households are aware that they will not be able to borrow money in the future to cover any emergency, their current consumption and saving are influenced. Nevertheless, Gersovitz (1988) argued that households are not better-off due to liquidity constraints because higher saving is different from improved welfare.

Chaudhuri (1999) analyzed longitudinal data of three villages in India and showed that acess to credit reduces saving. Similar findings were reported by a study in Kenya that used multi-stage sample technique to select 359 households from seven districts (Kibet et al., 2009). Additionally, the empirical findings of Jongwanich (2010) showed that access to credit decreases the saving rate. By the same token, Lee and Sawada (2010) used household panel data and found that liquidity constraints in Pakistan increase precautionary saving.

Even though Erulkar and Chong (2005) compared between 'before and after' data of borrowers in Kenya and found out that credit increased saving, using the same methodology in Indonesia and Peru showed that there is negative impact of credit on personal saving (Dunn & Arbuckle, 2001; Takahashi, Higashikata & Tsukada 2010). Moreover, the study of Adjei et al. (2009) in Ghana indicated that the longer the period of participation in microcredit program, the lower the saving. Finally, a study in Bosnia and Herzegovina using the rigorous methodology of RCT pointed out that credit decreased saving particularly among business owners and highly educated households (Augsburg et al., 2012). On the other hand, empirical evidence from Uganda and Zimbabwe showed that access to credit increased the level of saving (Barnes, Keogh & Nemarundwe, 2001; Barnes, Gaile & Kibombo, 2001).

Aportela (1999) reported limited evidence on the 'crowd-out' effect that occurs when access to formal financial services reduces informal saving. By the same token, Barnes et al. (2001) indicated that in Uganda poor households prefer to keep their savings in informal channels even if they borrow formally. On the other hand, the study of Rogg (2000) analyzed data of three countries (Ecuador, El Salvador and Paraguay) and found out that access to credit encourage borrowers to save in formal accounts with positive

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return instead of saving in livestock, jewelry or assets. The author explained these results by suggesting that poor borrowers have increased confidence in the financial market which motivates them to open formal saving accounts.

2.3. Saving by poor households in Egypt

Microfinance services in Egypt are mostly microcredit services provided to the poor in order to start their business or scale-up an existing one. Microsaving products are provided in a limited scope by the post office since the legislations prohibit NGOs and MFIs from collecting saving deposits. By the same token, microinsurance is provided by few insurance companies (United Nations, 2008; Sanabel, 2010a).

Microcredit started in Egypt in 1950's by lending agriculture loans through the governmental bank, Principal Bank for Development and Agricultural Credit (PDRAC), followed by the Initiative of the Productive Families (Planet Finance, 2008). The industry began to actively and strongly operate when two main programs were initiated by the National Bank for Development (NBD) and Alexandria Business Association (ABA) followed by a several institutions (USAID, 2009).

The channels that are mainly used to provide microcredit are banks supervised by the Central Bank of Egypt (CBE) as well as more than 300 MFIs and NGOs (Sanabel, 2010a). The banks include private banks like National Bank of Development and Bank of Alexandria as well as public ones, Banque Misr and Banque du Caire, Nasser Bank and PDRAC. One of the major stakeholders of the market in Egypt is the Social Fund for Development (SFD) founded in 1991 as a quasi-governmental institution to support Egyptian MFIs through loans, subsidies and technical assistance (USAID, 2009; CBE & SFD, 2005; Planet Finance, 2008). Table 1 summarizes some indicators of key players (Mix Market, 2015).

Egypt is considered as the biggest microcredit market in the Middle East and North Africa (MENA) region in terms of outreach (Mix market, 2015). Also, the Egyptian market was ranked as the second in terms of productivity with an average of 270 borrowers per loan officer. Nevertheless, there is a huge demand gap since Egypt

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reaches only 5% of the potential clients who could achieve 20 million persons (United Nations, 2008).

As for the lending methodologies, individual lending represents the biggest share of portfolio, yet group lending increased since 2009 which opposed the decline in MENA region (Sanabel, 2010a). Regarding the depth of outreach, it is measured through the percentage of women borrowers to total borrowers reached within the country and the average loan balance as a percentage of GNI per capita (Sanabel, 2010b). The depth of outreach has been increasing over the years due to the increased percentage of women borrowers that reached 67% in 2013 (Mix Market, 2015).

Few impact surveys were conducted in Egypt to test the welfare effect of microcredit (Iqbal & Riad, 2004; Nader, 2007; Abou-Ali et al., 2009).The results of these surveys showed that microcredit increases income, food expenditures and reduces poverty rate. A national impact survey of microfinance was conducted on a sample of 2,500 microfinance clients. The findings indicated that microcredit has a positive impact on welfare including asset ownership, consumption expenditure, quality and quantity of food as well as children education (Planet Finance, 2008).

Despite this promising market of microcredit, microsaving products are offered only through few formal institutions like the post office. Given its high outreach (more than 3,600 branches and more than 13 million saving account holders) and low-cost process, national postal authority is considered as the main player in the market (Planet finance, 2008; United Nations, 2008). The postal services include saving books that require an opening balance of 10 EGP, investment books that starts from 100 EGP and golden accounts for larger amount starting from 10,000 EGP (USAID, 2009).

Given that legislations prohibit NGOs and non-bank institutions from accepting savings while banks are reluctant to handle small savings due to high administrative cost, the majority of savings of this disadvantaged segment are informal (United Nations, 2008; Sanabel, 2010b). The national impact survey showed that thirty-one percent of 2,500 poor households save while 10% only had formal saving account. Thus, large amounts of saving are kept at home or saved through ROSCAs (Planet Finance, 2008).

Table 1 Indicators of key players in microcredit market (Egypt)

MFI	Loans (USD)	Active Borrowers	Assets (USD)	Percentage of Female Borrowers	Borrowers per staff member	Number of outstanding loans
ABA	60,929,049	234,371	87,460,638	53 %	195	234,371
ABWA	5,281,522	16,527	5,282,173	92%	116	15,947
Tadamun	7,216,805	60,451	16,249,144	100%	193	60,451
ASBA	61,854,750	225,289	124,506,173	82%	116	225,289
Banque du Caire	35,347,222	93,516	2,121,766	21%	123	225,000
CEOSS	10,163,510	53,859	11,859,400	67%	273	53,859
DBACD	32,048,776	117,950	43,796,606	53%	169	117,950
ESED	16,300,861	70,640	29,467,808	71 %	118	70,640
FMF	5,014,048	18,654	4,096,087	55%	89	15,673
Future	1,419,373	10,451	1,531,921	100%	149	10,470
Lead Foundation	22,888,032	141,233	38,380,723	86%	174	141,233
NSBA	667,285	5,055	2,121,807	80%	43	5,055
RADE	2,248,960	12,735	3,213,942	89%	137	13356
SBACD	12,241,449	24,603	18,173,640	44%	53	30923
SCDA	784,561	1,951	1,112,002	47%	78	1,951

Source: Mix Market (2015)

ROSCAs are perceived to be the best form of saving that covers marriage cost or health emergencies. It is worthy to mention that women prefer ROSCAs and cash at home, while men prefer saving in bank or post office accounts. This highlighted the need for gender sensitive saving products that combine informal and formal features (Planet Finance, 2008).

2.4. Conclusion

This chapter highlighted different motives of household saving and discussed key theories explaining household's saving behavior. Income, income fluctuation, uncertainty and age are main determinants of saving. Additional determinants included family size, dependency ratio, gender, occupation and education. Nevertheless, empirical evidence on

determinants of poor household saving in developing countries is mixed. This suggests potential limitations of traditional saving theories in developing countries. Furthermore, there is little evidence on the determinants of informal saving and whether they are similar to formal saving even though informal saving is the most common form of saving in developing countries.

Microfinance emerged in developing countries where households face frequent income shocks and high liquidity constraints due to the absence of well developed markets. Microfinance started by lending microcredit to the poor in order to establish income generating activities then it was expanded to microinsurance and microsaving. Early evidence on the impact of microcredit on household well being was positive. Nevertheless, when recent rigorous methodologies were employed and selection bias was corrected, weak evidence on the significant effect of microcredit was found.

This controversy about the impact of microcredit paved the way to introduce formal saving products. Microsaving products mobilize small frequent savings of poor households to protect them against emergencies and finance their investment or life-cycle events. The literature indicated potential positive impact on welfare of low income households in developing countries.

Chapter Three: Research problem

There is inconclusive evidence on the determinants of poor household's saving. Thus, there is a need to understand the saving behavior of poor households in developing countries which is the main purpose of this study. Additionally, the determinants of informal saving in developing countries are rarely tackled in the literature. Likewise, the synergy between access to credit and saving of poor households need to be further explored. The potential negative effect of access to credit needs to be taken into consideration while designing and evaluating microfinance programs. However, the literature focused on the impact of microcredit or microsaving while giving little attention to the interaction between credit and saving.

3.1. Research objectives

This paper will tackle the previously mentioned gap in the literature by attempting to understand the saving behavior of poor households in Egypt and determining the factors that affect saving. Moreover, this study will contribute to understanding the determinants of different forms of saving, formal and informal. Also, the study will test the impact of access to credit on the saving behavior of poor households. Linking saving to credit can highlight new way of designing and evaluating the impact of microfinance programs. This will be contrasted to the case of credit constrained to explore the effect of liquidity constraint on saving behavior.

3.2. Research questions

1. What factors affect the decision of Egyptian poor households to save?
2. How does access to credit affect saving behavior of poor households?
3. How different are the determinants of informal saving compared to formal saving?

3.3. Significance of the study

Answering these questions will contribute to the literature on saving in developing countries. Differentiating between informal and formal saving is a contribution of this study. As indicated by Karlan and Morduch (2009) focusing on one channel or the overall saving could result in concluding that saving is increasing while in fact one type of saving could be increasing at the expense of the other type. Moreover, understanding key determinants of saving will guide financial institutions in designing tailored saving products that meet the needs of poor households. The current study will also contribute to better understanding the micro factors influencing saving in Egypt which will affect the policies that target poor households.

According to the recent figures of 2013, 26.3% of the population is living below the national poverty line since their monthly income is less than 325 EGP. Almost half of these poor live in rural areas (CAPMAS, 2014). Poor households often have rescue to informal saving since they can not access formal institutions that are unwilling to deal with small savings. From the recent figures about the potential demand of microfinance, the Egyptian market is a fertile ground for formal microsaving. Understanding the saving behavior of poor households in Egypt and the synergy between credit and saving is the first step required to design better saving products that target the large pool of poor in Egypt.

If the availability of microsaving products increased in Egypt, large amount of savings will be mobilized for investment. Finally, financial institutions dealing with poor households need to decide about combining credit and saving products or operating based on 'saving-first' approach. This approach builds a good base of clients with saving history then provides them with credit instead of the current 'credit-first' approach.

Chapter Four: Methodology

4.1 Model specification

Including saving as the dependent variable is more suitable for understanding the determinants of saving since the analysis of saving behavior is often based on household decision (Jongwanich, 2010). In order to answer the first and second research questions, the following probit model in equation 3 will be used:

$$Pr\ (S_{ij} = r) = F(\alpha + \beta_1 CREDIT_i + \beta_2 X_i + \beta_3 H_j + \beta_4 EMERG_j + \beta_5 INSU_j) \qquad (3)$$

S_{ij}: binary variable as *r* takes the value of 1 if individual *i* in household *j* is saving and 0 otherwise. A key advantage of this binary variable is that it does not suffer from measurement error and underestimation of saving rate witnessed in developing countries (Deaton, 1997).

In order to explore the factors affecting the decision of poor households to save, the below exogenous variables are included in the model:

$CREDIT_i$: this variable reflects access to formal credit. It takes the value of 1 if the individual, aged 15 years and above, had access to credit during the past year and 0 if individual did not have access to credit or applied for a loan but the application was rejected due to insufficient collateral (credit-constrained). The parameter of this variable will capture the effect of access to credit on the probability of saving which is the second research question of this study.

X_i: vector of socio-economic characteristics of individual *i*:

> **$EDUC_i$:** educational level of individuals whose age is ten years and above. Educational variable takes the value of 1 if the respondent is educated (read and write, less than intermediate, intermediate, above intermediate and holding university degree) and 0 if the respondent is illiterate.

> **$EMPLOY_i$** : denotes the employment status during the last three months. It ranges from being employed, unemployed and out of labor force.

> **AGE_i:** age of individual to captures life-cycle effect.

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SQAGE$_i$: age squared of individual.

MARRIED$_i$: the marital status of individual is determined by whether the respondent is single (including being divorced, widow and engaged) or married.

UNCER$_i$: proxy of income uncertainty of individual. This variable reflects the degree of uncertainty of future income. There is high uncertainty if the respondent suffers from disability, longstanding illness or chronic diseases and if there low employment stability (temporary, seasonal and casual).

GENDER$_i$: dummy variable that takes the value of 1 if the respondent is female and 0 otherwise.

H$_j$: vector of household characteristics:

RURAL$_j$: proxy of geographical location that takes the value of 1 if the household is located in rural area and 0 if in urban area.

HSIZE$_j$: household size which measures the number of person living at the household.

SPECIAL$_j$: a variable that reflects the occurrence of special events in household *j* such as wedding, engagement, births, feasts and ceremonies.

QPOOREST$_j$: this variable is added as a proxy of the wealth status of households. It controls for the quintile of wealth that ranges from 1 (poorest) to 5 (richest). Quintiles of wealth were calculated in the dataset based on wealth score determined by a number of factors including: number of rooms, total area and material of house as well as assets ownership (fridge, freezer, dishwasher, TV, satellite, video, radio, air conditioner, microwave, cooker, fan, heater, camera, car, bicycle, scooter, computer, cellphone, wireless router). If the household pertains to the poorest quintile, this variable will take the value of 1 and 0 otherwise.

EMERG$_j$: measures the occurrence of emergency in household *j* like deaths and health shocks.

INSU$_j$: indicates whether any individual in household *j* is covered by health insurance (private, employment, syndicate or university).

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Additionally, the sample is divided into poor individuals (quintiles 1 and 2) and rich individuals (quintiles 4 and 5) to explore whether the determinants of saving will differ among quintiles. Equation 3 is used but to look at the effect income within poor and rich quintiles, equation 3 is modified by substituting **QPOOREST$_j$** by the variable:

INCOME$_i$: the level of monthly income of individual i. This variable adds basic wage from primary and secondary job (if applicable), remittances, donations (cash and monetary value of in-kind assistance), pensions, social assistance form religious or non-governmental institutions as well as returns on land and buildings.

In order to address the third research question, equation 4 is used to differentiate between determinants of informal and formal saving, the model will be also estimated as below:

$$\mathbf{Pr\ (SINFOR_{ij} = \mathit{r}) = F(\alpha + \beta_1 CREDIT_i + \beta_2 X_i + \beta_3 H_j + \beta_4 EMERG_j + \beta_5 INSU_j)} \quad (4)$$

SINFOR$_{ij}$: the dependent variable takes the value of 1 if the individual saves informally (e.g. cash at home, gold, jewelry, livestock and ROSCA). Additionally, the model will be estimated including formal saving (**SFOR$_{ij}$)** as a binary dependent variable that takes the value of 1 in case of saving in formal channels (e.g. post office, Nasser Social Bank, private and public banks).

Probit regression will be applied to estimate coefficients using the method of maximum likelihood. By maximizing the log likelihood function, efficient and consistent estimates will be obtained from the probit model that assumes that disturbances follow the standard normal distribution. Thus, parameters will measure the effect of exogenous variables on the probability that households save ($\Pr(S_i) = 1$). This estimation method was selected given that the model has a binary dependent variable which should be estimated using non-linear regression methods like probit regression (Stock & Watson, 2010).

4.2 Data

The analysis of the present study is based on micro level data of the Egypt Labor Market Panel Survey (ELMPS) that was carried out in 2012 by the Central Agency for Public Mobilization and Statistics (CAPMAS). ELMPS 2012 represents the third round of the longitudinal panel survey that was conducted in 1998 and 2006. It worth mentioning that the wealth score previously mentioned was calculated in the dataset and sample weights were added to ensure that the sample of ELMPS is representative of the population (Assaad & Krafft, 2013).

Using two-stage stratified random sample, the survey interviewed a final sample of 12,060 households including 49,186 individuals. The previous rounds of the survey collected data about the background of parents, education, employment, unemployment, job characteristics, geographic mobility, earnings, fertility and women's status. ELMPS 2012 added questions about life events, marriage, migration, health, information technology, saving and borrowing.

Since the section of saving and borrowing was added recently to the questionnaire, the cross-sectional round of 2012 is the only round used in the current paper. This section is addressed to those who are above 15 years old including 32,626 individuals. Cross-sectional data is more suitable for testing the saving behavior as it takes into consideration different household characteristics like age, occupation and wealth (Suruga & Tachibanaki, 1991). The fieldwork of ELMPS 2012 took place from March to June 2012. The survey was carried out by 39 teams in addition to two teams that were responsible for quality control (Assaad & Krafft, 2013).

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Chapter Five: Descriptive statistics

The first section of this chapter presents the demographic characteristics of the sample while the second section discusses the saving and borrowing behavior of respondents.

5.1. Demographic characteristics

Out of the sample of this study, 56% live in rural areas. Those who live in Cairo and Alexandria account for 19% of the sample while 42% live in Upper Egypt and 39% live in Lower Egypt. As for gender, 50% of the respondents are female. The summary statistics of key variables are presented in table 2. The median age of respondents is 26 years. This indicates that there might be a high potential for saving in this economic active age according to life cycle hypothesis. On average the household is composed of 5 persons while some families have up to 21 persons, mainly in rural areas. Other descriptive statistics about education and marital status are presented in the appendix (table A and table B respectively).

Table 2 Summary statistics

Variable	Observations	Mean	Std. dev.	Min	Max
Age (years)	49,186	26	19	0	106
Household size (persons)	49,186	5	2	1	21
Formal Loan (EGP)	876	14,320	18530	180	>100000
Size of Installment (EGP)	876	7,110	24047	10	>100000
Informal Loan (EGP)	1,165	6,292	12985	10	>100000
No of ROSCAs	1,766	1.11	0.47	1	5
Size of ROSCA (EGP)	1,766	330	539	1	12,000
No of members of ROSCA	1,766	14	7	2	90

Source: Author's Calculations

Regarding the employment status of respondents, 53% of them are out of labor force, 43% were employed during the last 3 months and 4% are unemployed. Out of the employed respondents, 75% had permanent jobs while 25% had temporary and seasonal jobs. Moreover, the main economic activities are agriculture (30%) followed by trade (13%) and manufacturing (11%). Those who are working in the private sector account for 75% of the sample while 25% work in government or public institutions.

A closer look at the demographic characteristics by wealth quintiles indicates that poor quintiles are living in rural areas while richest quintiles live mostly in urban areas (figure 2). Furthermore, there is a large discrepancy in educational attainment that varies from the ability to read and write for the lowest quintile to the above intermediate level for the highest quintile (table 3). The low income earned by poor quintiles could be partially explained by the lack of decent of jobs that provide satisfactory income. Within the lowest quintile, 30% of those who worked during the past 3 months had casual jobs compared to 3% of highest quintile. Also, 13% of lowest quintile had work related insurance as opposed to 64% of highest quintile.

Figure 2 Distribution of wealth quintile by region
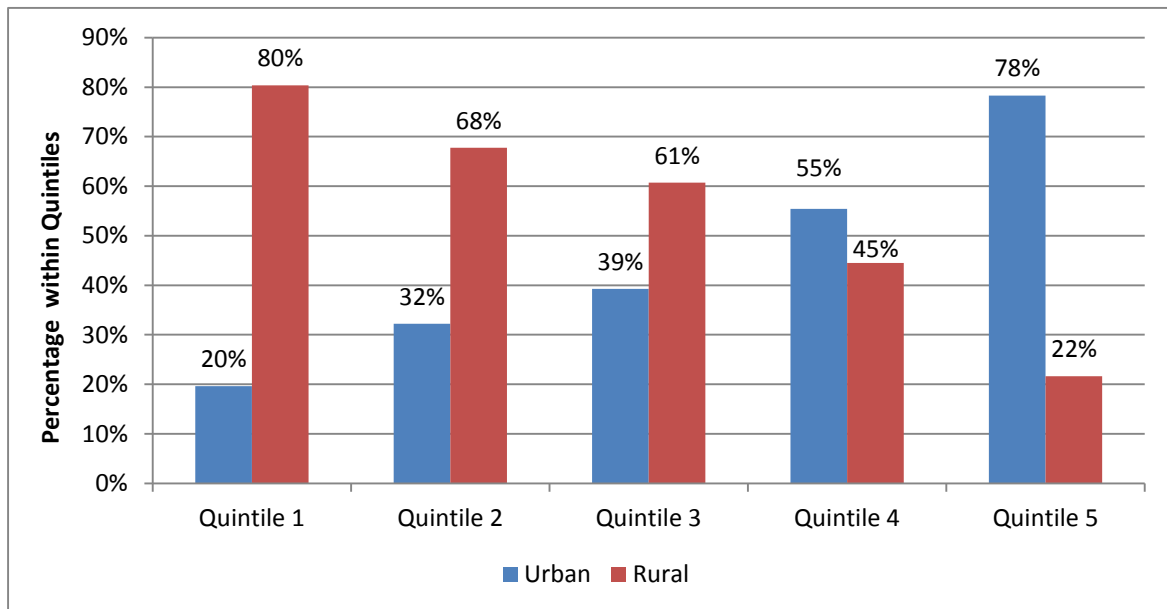
Source: Author's Calculations

Table 3 Summary statistics by quintile (mean values)

Variable	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Age (years)	27	25	25	25	28
Educ (categories)	2	3	3	4	5
Household size (persons)	5	5	5	4	4
Monthly Income (EGP)	979	1,056	1,204	1,482	7,119
Formal Loan (EGP)	8,809	10,459	13,304	16,025	25,086
Size of Installment (EGP)	7,843	5,925	4,633	8,796	8,811
Informal Loan (EGP)	4,891	5,888	5,322	6,908	10,562
No of ROSCAs	1.16	1.13	1.11	1.08	1.12
Size of ROSCA (EGP)	213	217	259	318	475
No of members of ROSCA	14	14	14	14	14

Source: Author's Calculations

5.2. Saving and borrowing

Questions about saving and borrowing were addressed to individuals who are above 15 years (32,626 individuals). The analysis indicated that 29% of them are saving (9,357 individuals). Wealthier households have higher tendency to save, 51% of savers were women while 69% of those who save were living in urban areas. As for educational level, 38% of savers were university graduates followed by 31% who attained intermediate education, 12% less than intermediate, 11% illiterate, 5% above intermediate and 3% who can read and write.

ROSCAs, gold and cash at home are the most common forms of saving followed by public banks and the post office (figure 3). A closer look at saving forms by wealth quintiles shows that lower quintiles tend to save informally while their formal saving is concentrated in the post office. As households gets richer, informal saving decreases in the favor of formal accounts in public and private banks (figure 4).

Figure 5 and Figure 6 indicate the percentage of formal versus informal saving by gender and region respectively. Males have higher tendency to save formally in public banks and the post office while females save more informally (ROSCAs, gold and cash). In urban areas, households prefer to save in public banks followed by gold and post office while in rural areas cash at home is followed by gold and post office. The analysis indicated that the top motives of participating in ROSCAs with friends, family or work colleagues are debt repayment (28%), marriage (16%) and house renewal (13%).

Figure 3 Percentage of different forms of saving
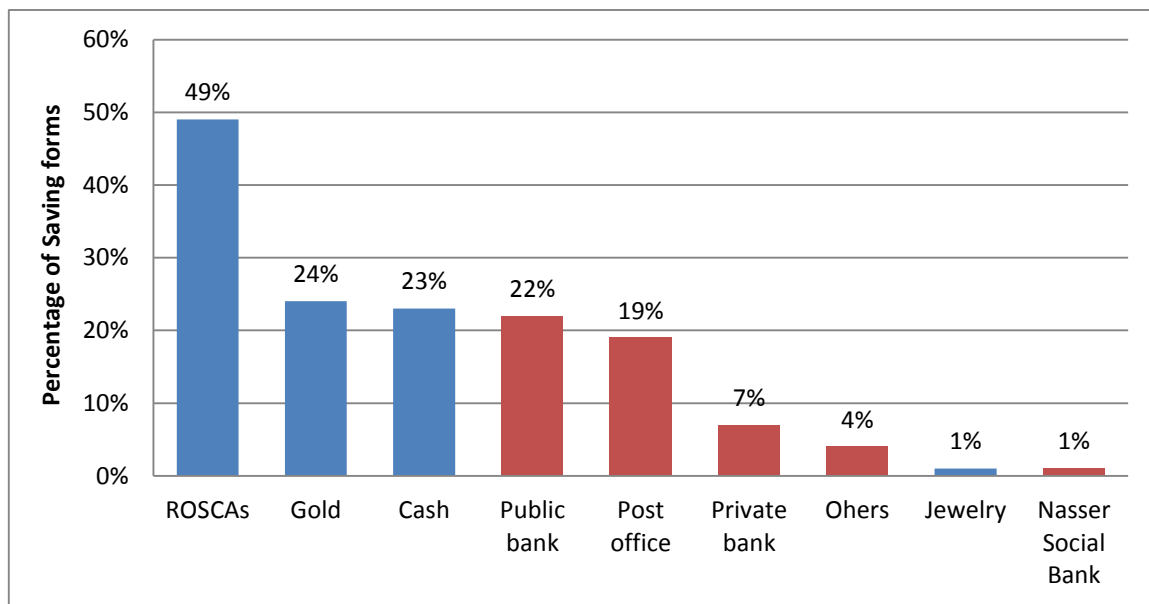
Source: Author's Calculations

Figure 4 Percentage of different forms of saving by quintile
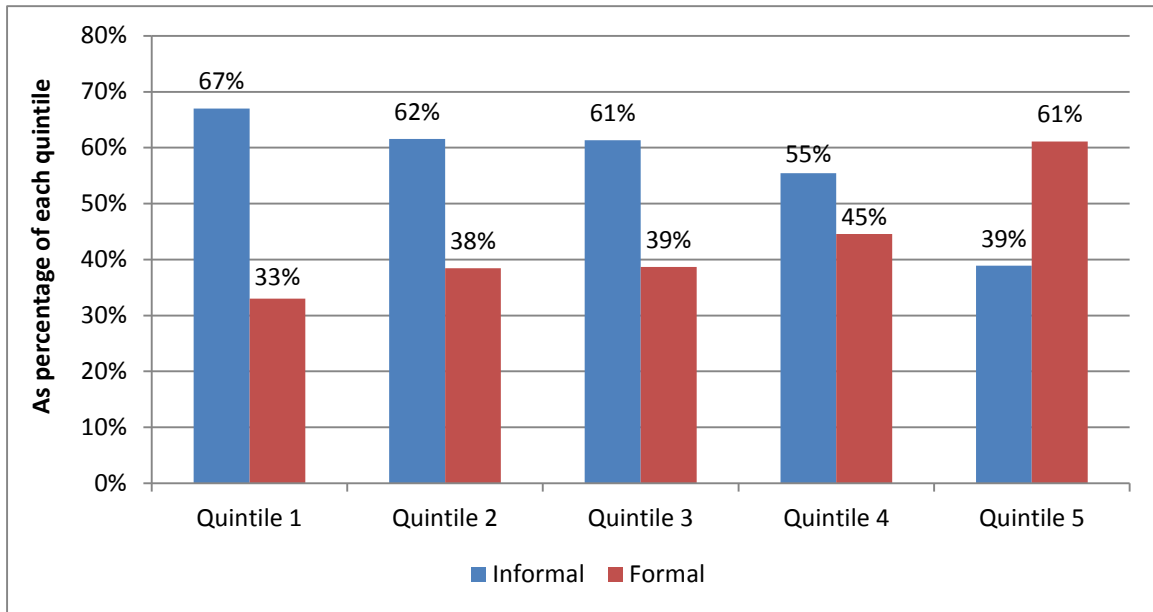
Source: Author's Calculations

Figure 5 Percentage of saving forms by gender
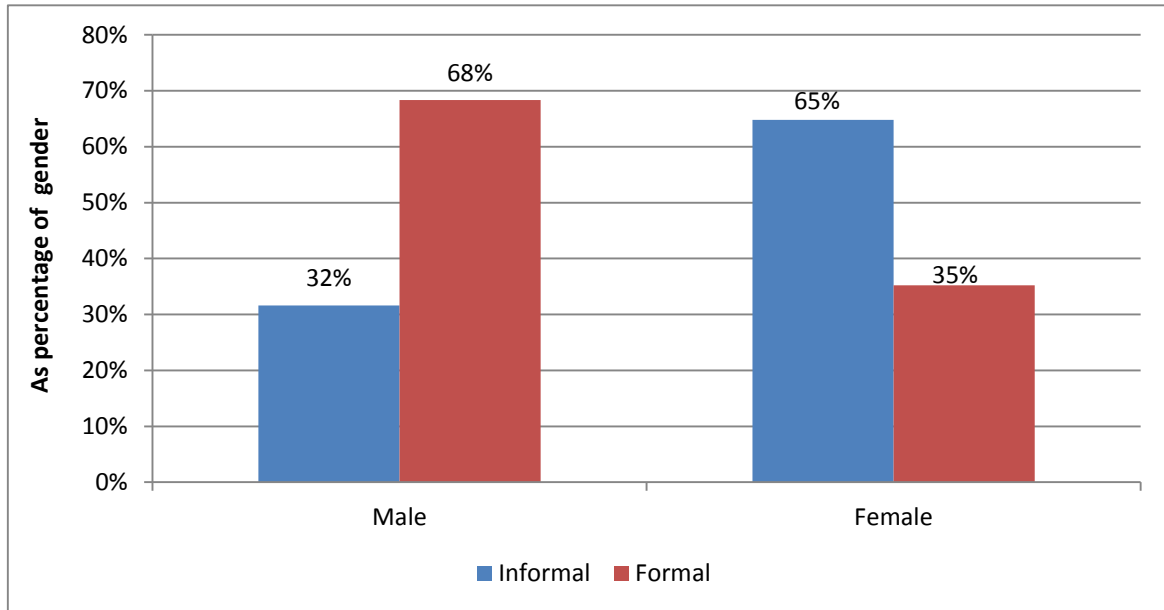
Source: Author's Calculations

Figure 6 Percentage of saving forms by region
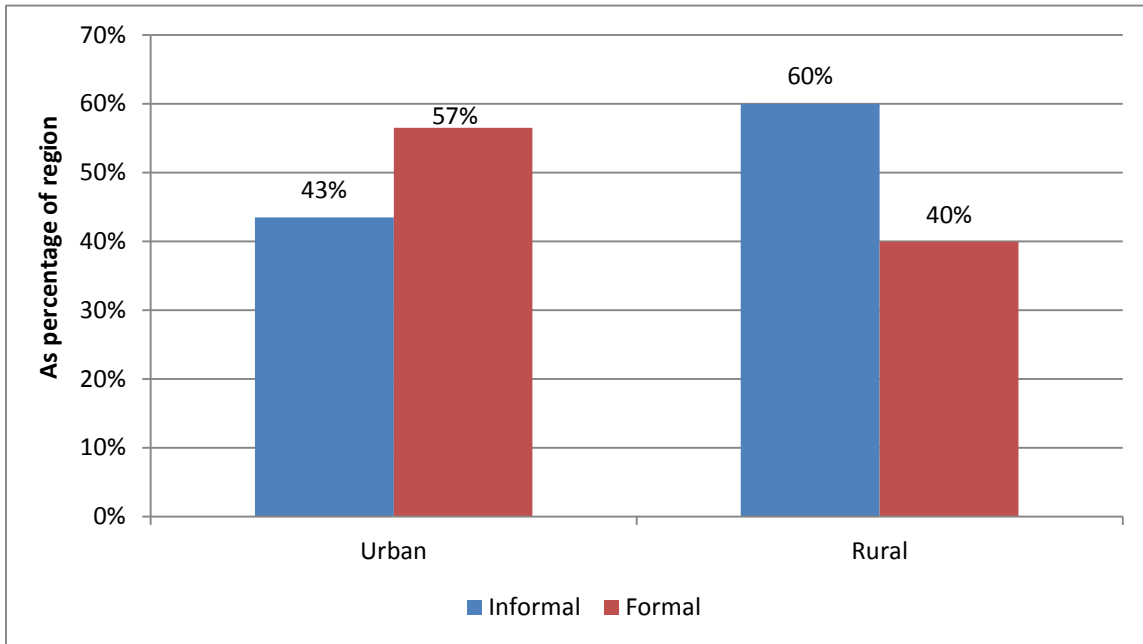
Source: Author's Calculations

As for borrowing, 4% of those who are above 15 years old borrowed informally during the past 12 months (1,300 individuals) compared to 2% who borrowed formally (650 individuals). Similar to saving, informal borrowing is more common among poor households who face liquidity constraints due to lack of collateral (Figure 7). For instance, 24% of rejected applicants of formal loans due to insufficient collateral were households of lowest quintile as opposed to 19% of highest quintile. Also, the average loan size, either formally or informally, increases as the mean income increases (table 3).

Figure 8 and Figure 9 indicate the percentage of formal versus informal borrowing by gender and region respectively. In contrast to saving, males and females as well as individuals in urban and rural areas borrow more informally compared to formal loans. This could be due to the interest rate charged on formal loans since 92% of those who borrowed informally indicated that they did not pay interest or fees on these loans compared to 2% of those who borrowed from formal sources. The most common sources of informal loans are relatives and friends. Neighbors and local money lenders are available only for lowest 1st and 2nd quintile. The top reasons for informal borrowing

include high cost of living followed by medical emergency which shows that informal borrowing is mostly used to finance consumption of households.

On the other hand, public banks are the most common source of formal loans, followed by agriculture credit bank, Nasser Social Bank, NGOs and private banks. Agriculture credit bank, public sector banks and NGOs are the top borrowing sources for the lowest quintile while highest quintile borrow mostly from public and private banks. Reasons for formal borrowing differ from informal borrowing since the top reasons of formal loans include marriage followed by debt repayment and funding an enterprise; which justifies the large average size of formal loans compared to informal loans.

**Figure 7 Percentage of different forms of borrowing by quintile**

Source: Author's Calculations

Figure 8 Percentage of borrowing forms by gender
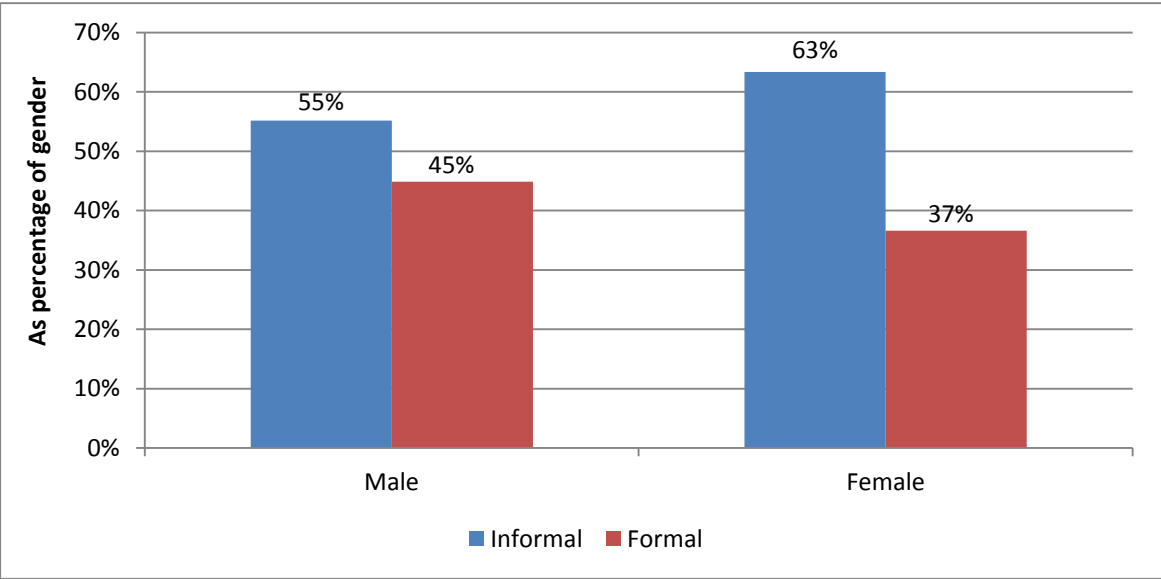
Source: Author's Calculations

Figure 9 Percentage of borrowing forms by region
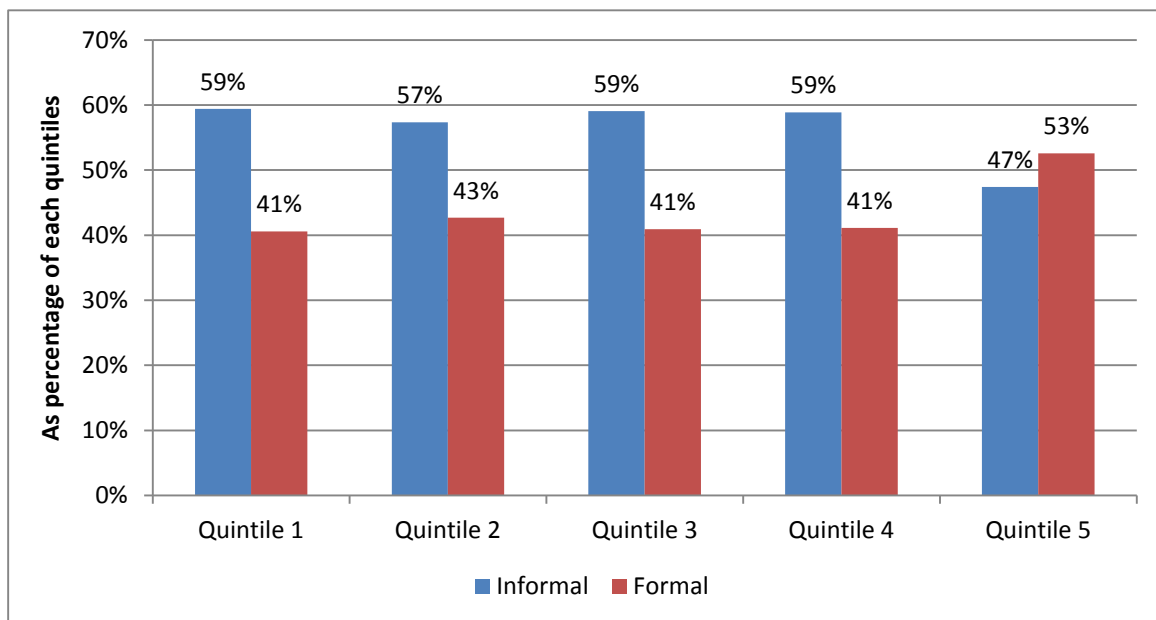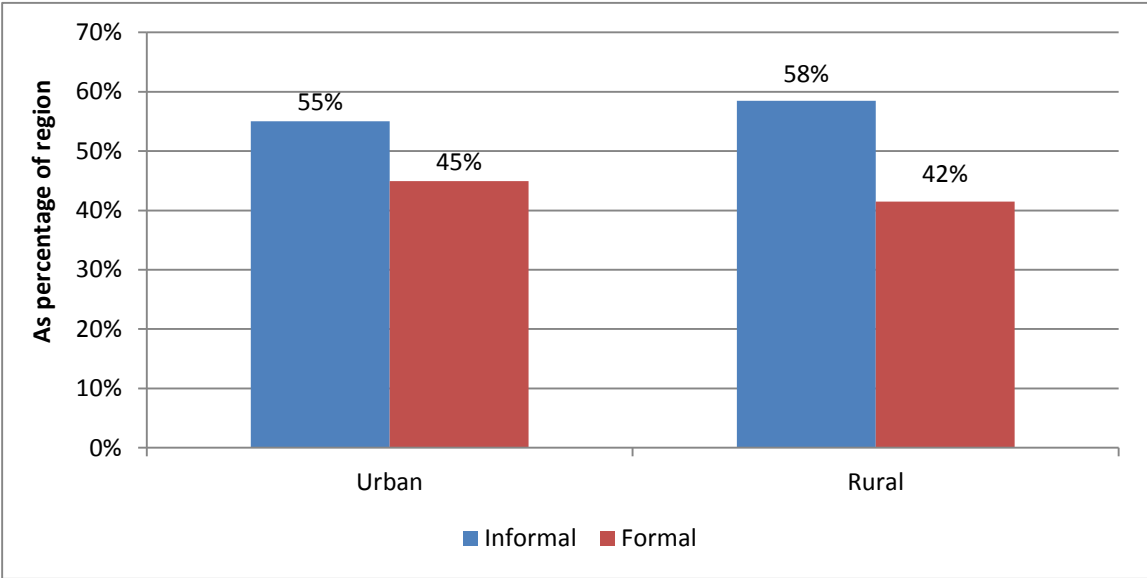

Source: Author's Calculations

Chapter Six: Estimation results

This chapter presents the results of the probit regression used to investigate the factors affecting the saving behavior of poor households. The first section of this chapter discusses the impact of access to credit on saving followed by the impact of individual characteristics in the second section. The impact of household characteristics and health shocks will be discussed in the third and fourth sections respectively. Afterwards, robustness tests will be presented.

6.1. Borrowing

The maximum likelihood and marginal effect estimates of the aforementioned probit model (equation 3) are presented in table 4. Results suggest that access to credit increases the probability of saving at 5% significance level by 3% on average. This positive coefficient supports the empirical studies of Barnes, Keogh and Nemarundwe (2001) in Uganda as well as Barnes, Gaile and Kibombo (2001) in Zimbabwe.

In order to explore the effect of borrowing on different types of saving, the log likelihood function of informal saving (S_iINFOR) and formal saving (S_iFOR) were maximized to estimate the parameters of equation 4 (table 4). The results suggest that credit increases informal saving at 5% significance level while it has an insignificant effect on formal saving. A closer look at this coefficient by wealth quintile will point out that this result is robust to poor quintiles (table 5). On the other hand, credit increases informal and formal saving significantly among rich quintiles (table 6). It is worthy to note that the effect of credit is higher for the rich since credit increases the probability of saving by 3% compared to 1% for the poor.

These findings suggest that while access to formal credit motivates rich quintiles to save more informally and formally, the poor prefer to keep their informal arrangements of saving even if they are borrowing from formal institutions like MFIs or banks. This implies that there is little evidence on the crowd-out effect which is similar to the findings of Aportela (1999) and Barnes et al. (2001). A potential explanation could be that poor borrowers in Egypt have not reach the desired level of confidence in the

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financial market that motivates them to have formal saving accounts. Another potential reason might be that the poor prefer to save away from the formal financial institutions to avoid using these savings for repaying the installments of the loan or covering defaults.

Table 4: Regression estimates (All Quintiles)

	Dependent variable: S_i		Dependent variable: $S_i INFOR$		Dependent variable: $S_i FOR$	
	Max. Likelihood	Marginal Effect	Max. Likelihood	Marginal Effect	Max. Likelihood	Marginal Effect
CREDIT	0.156 (0.020)**	0.027	0.185 (0.010)**	0.030	-0.052 (0.655)	-0.003
Individual characteristics						
EDUC	0.341 (0.000)***	0.060	0.242 (0.000)***	0.035	0.643 (0.000)***	0.036
EMPLOY	0.298 (0.000)***	0.052	0.316 (0.000)***	0.046	0.140 (0.038)**	0.007
AGE	0.088 (0.000)***	0.0154	0.093 (0.000)***	0.135	0.0646 (0.000)***	0.003
SQAGE	-0.0009 (0.000)***	-0.0002	-0.001 (0.000)***	-0.0001	-0.0004 (0.006)**	-0.002
MARRIED	0.0077 (0.032)**	0. 001	0.110 (0.007)**	0.016	-0.315 (0.001)***	-0.017
UNCER	0.024 (0.046)**	0.004	0.075 (0.018)**	0.011	0. 135 (0.015)**	0.007
GENDER	0.243 (0.000)***	0.036	0.318 (0.000)***	0.050	-0.187 (0.001)***	-0.010
Household characteristics						
RURAL	-0.105 (0.000)***	-0.018	-0.053 (0.080)*	-0.007	-0.228 (0.000)***	-0.012
HSIZE	-0.065 (0.000)***	-0.011	-0.059 (0.000)***	-0.008	-0.056 (0.000)***	-0.003
SPECIAL	0.182 (0.000)***	0.031	0.180 (0.000)***	0.026	0.112 (0.137)	0.006
QPOOREST	-0.422 (0.000)***	-0.074	-0.365 (0.000)***	-0.052	-0.547 (0.000)***	-0.031
Health Emergency						
EMERG	0.114 (0.212)	0.019	-0.003 (0.097)*	-0.0005	0.267 (0.490)	0.0142
INSU	0.221 (0.000)***	0.038	0.216 (0.000)***	0.032	0.137 (0.008)**	0.007
n=	29,766		28,967		27,325	
BIC	6,491		14,906		5,600	

Figures in parentheses indicate P-value>z

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level

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Table 5: Regression estimates (Poor Quintiles)

	Dependent variable: S_i		Dependent variable: S_iINFOR		Dependent variable: S_iFOR	
	Max. Likelihood	Marginal Effect	Max. Likelihood	Marginal Effect	Max. Likelihood	Marginal Effect
CREDIT	0.123 (0.021)**	0.012	0.160 (0.011)**	0.014	-0.032 (0.909)	-0.005
Individual characteristics						
EDUC	0.152 (0.016)**	0.015	-0.114 (0.078)*	-0.010	0.315 (0.030)**	0.005
EMPLOY	0.299 (0.000)***	0.302	0.318 (0.000)***	0.028	0.059 (0.068)**	0.009
AGE	0.063 (0.000)***	0.006	0.082 (0.000)***	0.007	-0.032 (0.022)**	-0.0005
SQAGE	-0.0007 (0.039)**	-0.0007	-0.001 (0.037)**	-0.0009	0.0006 (0.087)*	0.941
MARRIED	0.157 (0. 816)	0.001	-0.004 (0.943)	-0.0004	-0.045 (0.731)	-0.0007
UNCER	0.051 (0.015)**	0.005	0.075 (0.197)**	0.068	-0.114 (0.376)	-0.001
GENDER	0.180 (0.007)**	0.018	0.238 (0.000)***	0.022	-0.202 (0.017)**	-0.003
INCOME	0.00013 (0.245)	0.0001	0.0001 (0.369)	0.0009	0.0001 (0.104)	0.305
Household characteristics						
RURAL	-0.026 (0.093)*	-0.002	0.032 (0.061)*	0.002	-0.002 (0.099)*	-0.430
HSIZE	-0.088 (0.000)***	-0.008	-0.082 (0.000)***	-0.007	-0.092 (0.002)**	-0.001
SPECIAL	0.108 (0.268)	0.011	0.109 (0.029)**	0.009	0.088 (0.966)	0.0001
Health Emergency						
EMERG	-0.019 (0.092)*	-0.001	-0.037 (0.086)*	-0.003	-0.218 (0.464)	-0.003
INSU	0.180 (0.005)**	0.018	0.171 (0.010)**	0.015	0.106 (0.043)**	0.002
n=	11,652		11,577		11,146	
BIC	2,590		4,220		916	

Figures in parentheses indicate P-value>z

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level

Table 6: Regression estimates (Rich Quintiles)

	Dependent variable: S_i		Dependent variable: S_iINFOR		Dependent variable: S_iFOR	
	Max. Likelihood	Marginal Effect	Max. Likelihood	Marginal Effect	Max. Likelihood	Marginal Effect
CREDIT	0.112 (0.025)**	0.028	0.151 (0.017)**	0.031	0.188 (0.023)**	-0.201
Individual characteristics						
EDUC	0.381 (0.000)***	0.095	0.176 (0.032)**	0.036	0.958 (0.000)***	0.102
EMPLOY	0.274 (0.000)***	0.068	0.307 (0.000)***	0.063	0.137 (0.011)**	0.014
AGE	0.106 (0.000)***	0.026	0.107 (0.000)***	0.022	0.083 (0.000)***	0.008
SQAGE	-0.001 (0.000)***	-0.0002	-0.001 (0.000)***	-0.0002	-0.0006 (0.003)**	-0.0007
MARRIED	0.131 (0.796)	0.003	0.224 (0.000)***	0.045	-0.404 (0.000)***	-0.043
UNCER	0.010 (0.816)	0.002	0.042 (0.369)	0.008	0.127 (0.081)*	0.013
GENDER	0.203 (0.000)***	0.050	0.368 (0.000)***	0.075	-0.217 (0.002)**	-0.023
INCOME	0.001 (0.051)**	0.0003	-0.001 (0.089)*	-0.0002	0.0008 (0.011)**	0.00008
Household characteristics						
RURAL	-0.071 (0.079)***	-0.017	-0.017 (0.069)*	-0.003	-0.207 (0.003)**	-0.022
HSIZE	-0.069 (0.000)***	-0.017	-0.057 (0.000)***	-0.011	-0.058 (0.001)**	-0.006
SPECIAL	0.156 (0.005)**	0.039	0.142 (0.019)**	0.029	0.144 (0.113)	0.015
Health Emergency						
EMERG	0.143 (0.241)	0.035	-0.021 (0.877)	-0.004	0.316 (0.420)	0.033
INSU	0.184 (0.000)***	0.046	0.178 (0.000)***	0.036	0.112 (0.087)*	0.012
n=	11,392		10,602		9,811	
BIC	2,433		7,706		3,857	

Figures in parentheses indicate P-value>z

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level

6.2. Individual characteristics

Education increases the probability of saving informally and formally at 1% significance level. However, this result differs among the poor since being educated decreases the probability of informal saving in favor of formal saving at 1% significance level. This could be due to increased awareness of formal saving. This result contradicts with the findings of Burney and Khan (1992), Rehman et al. (2011) and Kahn (2013) who found that high educational level has a negative effect on the saving behavior due to lower risk aversion and the high cost children education as previously mentioned in the literature review.

Employed individuals have a higher tendency to save informally and formally. This result is robust to the sub-sample of rich and poor. The positive significant coefficient of age and the negative coefficient of age squared shows that there is an inverted U-shaped relationship between age and probability of saving. In other words, the probability of saving increases as age increases but with a decreasing rate. This result is robust to formal and informal saving among rich quintiles. However, for poor households it is robust only to informal saving since the coefficients of formal saving indicate little evidence on life-cycle hypothesis. This finding supports the work of Deaton (1989) suggesting limited application of life-cycle hypothesis among the poor in developing countries as previously discussed in the literature.

Being married is a factor that contributes positively to informal saving at the expense of formal saving. This result is robust only to rich individuals. The positive coefficient of uncertainty supports the existence of precautionary saving among the sample in line with the studies of Skinner (1987), Deaton (1989), Kazarosian (1997) as well as Carroll and Samwick (1998) who suggested that saving in developing countries better fits precautionary saving instead of saving for retirement or bequest. A detailed look at the parameter of uncertainty among wealth quintiles will show that poor households tend to save more informally as income uncertainty increases while rich households save more formally.

Females have higher probability of saving at 1% significance level compared to males. By looking at types of saving, results indicate that females tend to save more

informally then formally. This tendency is noticed among poor and rich individuals. This result contradicts with the findings of the literature reporting lower savings among females (Ahmad & Asghar, 2004; Kibet et al., 2009; Abdelkhalek et al., 2010). The variable of income is introduced among poor and rich quintiles. Results show that higher income reduces informal saving in the favor of formal saving among rich individuals.

6.3. Household characteristics

The marginal effect estimates pointed out that living in rural areas decreases the probability of saving by 2 % on average. For poor households, living in rural areas contributes to increasing informal saving at the expense of formal saving. Larger families tend to save less informally and formally. This negative effect among all quintiles could be attributed to increased expenditures of larger families in line with the results of Ahmad and Asghar (2004), Oberta (2006) in Pakistan as well as AbdelKhalek et al. (2010) in Morocco. An additional reason could be the intergenerational link that reduces the motivation to save for retirement in developing countries as explained by Deaton (1992) and supported empirically by Kelly and Williamson (1968), Musgrove (1979) and Gersovitz (1998).

Special events increase the probability of saving prior to the event by 3% on average at 1% significance level. Nevertheless, this result is significant only for informal saving among poor and rich households. Finally, the probability of saving increases among wealthy households since pertaining to the poorest quintile reduces the probability of overall saving by 7% on average, informal saving by 5% and formal saving by 3% at 1% significance level respectively.

6.4. Health shocks

Health emergency significantly reduces the probability of informal saving among poor households while it has an insignificant effect on rich quintiles. This result indicates that health emergency does not have the same burden on poor and rich quintiles since poor households have higher tendency to use their informal savings as Out Of Pocket

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(OOP) expenditures to finance health shocks. These results could be justified by the absence of effective health insurance since 81% of poor quintiles indicated that they do not have any health insurance as opposed to 56% of the rich quintiles. In order to further explore the effect of health insurance on the probability of saving, the variable of insurance was included. Its positive significant coefficient shows that health insurance protects households against emergencies and reduces the use of savings as OOP expenditures on health (Wagstaff & Pradhan, 2005).

6.5. Robustness tests

Wald test indicated that the previously discussed coefficients are significantly different from zero at $Pvalue > chi2 = 0.000$. Additionally, the correlation matrix showed that there is no multicollinearity between explanatory variables (table C in the appendix). However, the negative correlation between employment and being a female reaches -0.492.

Furthermore, Ramsey test was conducted to test the specification of the model and whether there is omitted variable bias. The findings showed that the null hypothesis, model has no omitted variables, is not rejected. Also, the previously reported results are corrected for heteroskedasticity. The tables reported Bayesian information criterion (BIC) that could be used to compare between the different models since a lower BIC indicates better-fitting model. For instance, BIC shows that the model better fits poor quintiles compared to rich quintiles when informal and formal saving are the dependent variables.

In order to further explore the robustness of credit to different model specifications, saving was regressed only on credit and individual characteristics without gender then the latter was added to explore the gender effect. Likewise, saving was regressed on credit and household characteristics as well as credit and health shocks. This test was also conducted for informal and formal saving separately as well as poor and rich quintiles.

The maximum likelihood estimates and their significance level indicate that credit is robust to different model specifications among poor and rich quintiles. Moreover, the significance of the parameter of credit increases when household characteristics are

included compared to individual characteristics which might suggest that household characteristics like living in rural areas, family size and having a special event enforce the effect of credit on the probability of saving informally and formally (from table D to table G in the appendix). It worth mentioning that when the variable **QPOOREST** is included in the regression of formal saving, the positive maximum likelihood estimate of special events becomes insignificant (table F in the appendix).

The gender effect is a remarkable factor that turns the coefficient of credit from insignificant to significant when the dependent variable is the overall saving (table D in the appendix). Moreover, when regressing informal saving on individual characteristics including gender, the significance of the parameter of uncertainty increases which shows that informal precautionary saving is more evident among females (table E in the appendix).

Another interesting finding about gender is noticed regarding the informal saving behavior of the poor since adding the variable of gender turns the positive parameter of credit from insignificance to 10% significance level. This finding implies that the positive impact of providing access to credit on the probability of informal saving is enforced by being a poor female. Furthermore, the significance of the parameter of education increases from 10% to 1% significance level showing stronger effect of educating poor females on the probability of saving informally (table G in the appendix).

Chapter Seven: Conclusion and policy implications

The descriptive statistics highlighted that the top channels of saving among the sample were informal (ROSCAs, gold and cash at home). They were followed by formal saving at public banks and post office. These informal mechanisms were common among females and rural households. Moreover, poor households tend to save more informally while their formal saving is concentrated in the post office. As households gets richer, informal saving decreases in the favor of formal accounts in public and private banks.

By the same token informal borrowing is more common among poor households who face liquidity constraints due to lack of collateral. Also, informal borrowing could be preferred due to the interest rate charged on formal loans since 92% of those who borrowed informally indicated that they did not pay interest or fees on these loans compared to 2% of those who borrowed from formal sources.

The results of regression suggest that the determinants of informal and formal saving are quite different. This is a contribution of this study since analyzing the overall saving could lead to wrong conclusions about the impact of credit and the determinants of saving. For instance, access to credit significantly increases the probability of saving among the poor. However, by looking at the different types of saving, it is indicated that credit increases informal saving while it has an insignificant effect on formal saving. On the contrary, it increases both formal and informal saving of rich households. These findings imply that the poor prefer to save informally even if they are interacting with formal institutions to borrow money. This could be due to the low level of confidence in the formal financial market in Egypt or fear of using savings to cover loan installments.

The saving behavior of poor households is positively affected by individual characteristics like employment and education that decreases the probability of informal saving in favor of formal saving. A potential explanation could be the increased awareness of formal saving among educated persons. Also, females have higher probability to save, yet they are saving more informally. Robustness tests indicate that including the variable of gender enforce the positive effect of access to credit, education and income uncertainty on informal saving. On the other hand, pertaining to the poorest quintile will significantly reduce the probability of saving.

Among poor households, evidence on life-cycle hypothesis was robust only to informal saving. On the other hand, the theory of precautionary saving was supported since poor households tend to save more informally as income uncertainty increases while rich households save more formally. These findings are in line with the work of Deaton (1989) who suggested limited application of some saving theories in developing countries. He argued that saving in developing countries better fits precautionary saving instead of saving for retirement or bequest due to the different demographic structure and higher credit constraints compared to developed countries.

Regarding household characteristics, rural households and large families have lower probability to save. Also, saving prior to special events, like weddings, feasts, ceremonies and births, is robust only to informal saving. Health emergencies have a significant negative effect on the informal saving of poor households who do not have access to health insurance compared to wealthy households. It worth mentioning that the previously mentioned household characteristics enforce the effect of credit on the probability of saving more than individual characteristics. This finding suggests that financial institutions could rely on household characteristics to market their saving products and increase their outreach.

The previously discussed findings indicate that the poor in Egypt can and do save, yet they keep their savings in informal channels. Therefore, policies in Egypt should improve access to formal financial services and aim at building an inclusive financial system. The research of Consultative Group to Assist the Poorest (CGAP) (2006) reviewed cases from Benin, Bosnia, Mexico, the Philippines and Uganda in order to identify the necessary policies to increase the outreach of formal saving services among the poor. The institutional policies included improving proximity of formal institutions since distance act as a barrier for poor households. This could be done by increasing the outreach of post offices, rural banks and introducing deposit collectors that succeeded in some countries like Indonesia and Sri Lanka in order to overcome the geographic concentration of financial institutions.

Furthermore, the transaction cost of accessing saving accounts could be reduced by accepting small balances and low or zero opening fees. Additionally, simplification of

the procedures required to open an account or access credit is a key to attract poor clients (Musona & Coetezee, 2001; Hulme et al., 2009; Chowa, Masa, & Ansong, 2012). In summary, incentives for the poor to mobilize savings include convenience, liquidity and quick access to saving accounts in order to face unexpected events (CGAP, 1998). Successful cases of banks that improved their outreach in developing countries included the Bank for Agriculture and Agricultural Cooperatives in Thailand (BAAC), the Banco Caja Social in Colombia (BCS), the Bank Rakyat Indonesia (BRI) that reached a larger number of the poor by locating their field units near the poor as well as offering simple products that can be easily understood (CGAP, 1998).

The use of technology, like smart cards and mobile phones, in order to introduce innovative saving products achieved promising results in different countries (Hulme et al., 2009). For instance, an initiative in Kenya by the UK Department for International Development (DFID), Vodafone and Commercial Bank of Africa aimed at improving access to formal financial products through a secured software that allow customers to make simple financial transactions using mobile phones. This initiative succeeded in attracting "geographically isolated populations" and reached nine million persons in three years (Pande et al., 2012).

In contrast to the widespread notion about compulsory savings, which are savings linked to loans to enforce saving habits and teach the poor to save, they act as collateral if loans are not repaid which increase the insecurity of accessing these savings. On the other hand, voluntary savings assume that the poor save and they only need effective formal financial channels that meet their specific needs (CGAP, 1997; Hulme et al., 2009; Tiwari, Singh, & Wright, 2014). Researchers found that individual, secured, voluntary and easy to access savings are more successful in reaching the poor compared to group, forced and locked-in saving accounts (CGAP, 1998). Accordingly, financial institutions should focus their efforts on designing and promoting financial products tailored to the poor instead of teaching them to save (CGAP, 1997).

Policies should also tackle a different aspect which is creating an enabling regulatory environment. In Egypt, MFIs and NGOs are not allowed to collect savings directly. In India, the same barrier was overcome by the "Business Correspond Model"

where MFIs collaborate with banks to offer microsaving products. This model succeeded in increasing financial inclusion and achieved higher outreach of poor clients (Tiwari et al., 2014). Therefore, since NGOs and MFIs in Egypt are considered as grassroots organizations, they can form strategic partnerships with banks to be able to tap the unmet needs and opportunities of the poor (Hulme et al., 2009). By the same token, potential partnerships with the post office should be considered as it is considered as a powerful formal saving tool for poor households in Egypt, particularly in rural areas.

The aforementioned institutional and regulatory reforms that are concerned with the supply side should go hand in hand with improvements in the demand side. This could be achieved by overcoming cultural barriers that decrease the uptake of formal financial services. For instance, financial literacy programs, particularly among women and low educated persons, increase the knowledge and understanding of financial services (Mujeri, 2015). Successful examples include the Reserve Bank of India that launched in 2007 an initiative to improve financial literacy by establishing free credit counseling centers. Likewise, in Uganda, USAID in partnership with rural SPEED attempted to increase financial awareness through different campaigns in radio, outdoor advertisement and theatre shows that are easy to understand (Pande et al., 2012).

In addition to the previously mentioned policies, the results of the current study indicate that females have higher tendency to save, yet they save more informally. This implies that there is a need to offer gender sensitive products tailored to the needs and constraints of women (Mujeri, 2015). These opportunities and challenges could be explored through gender-disaggregated data. Also, given that women have limited access over resources, they need increased direct access to financial services without husbands' intervention (Fletschner & Kenney, 2011). Furthermore, there is a need to encourage agriculture banks to lend in rural areas and form cooperatives to encourage saving among the rural poor households. As suggested by the findings of this study, saving products could be linked to particular goals like special events or saving for health emergencies.

Future researches could explore the saving behavior of rural population to identify the determinants of informal and formal saving among households living in rural areas. Land ownership and livestock are potential key variables that affect the saving behavior

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of rural households. Future researches could also conduct experimental research and use game theory to investigate formal and informal saving in Egypt.

Appendix

TABLE A: EDUCATIONAL ATTAINMENT (10 YEARS AND ABOVE)

Education	Percent
Illiterate	24
Read & Write	10
Less than Intermediate	23
Intermediate	28
Above Intermediate	3
University and Above	12
Total	**100**

Source: Author's Calculations

TABLE B: MARITAL STATUS

Marital	Percent
Less than minimum age	38
Never married	13
Married	43
Divorced/ Widowed	5
Total	**100**

Source: Author's Calculations

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TABLE C: CORRELATION MATRIX

	CREDIT	EDUC	EMPLOY	AGE	SQAGE	MARRIED	UNCER	GENDER	RURAL	HHSIZE	SPECIAL	QPOOREST	EMER	INSU
CREDIT	1.000													
EDUC	-0.004	1.000												
EMPLOY	0.120	0.001	1.000											
AGE	0.127	-0.365	0.195	1.000										
SQAGE	0.119	-0.365	0.141	0.986	1.000									
MARRIED	0.086	-0.151	0.211	0.427	0.351	1.000								
UNCER	0.042	-0.130	0.253	0.268	0.265	0.058	1.000							
GENDER	-0.105	-0.168	-0.492	0.002	0.006	0.085	-0.188	1.000						
RURAL	0.008	-0.184	0.078	-0.070	-0.069	0.060	0.025	0.008	1.000					
HHSIZE	0.004	-0.088	0.005	-0.070	-0.067	-0.116	-0.033	-0.033	0.166	1.000				
SPECIAL	-0.019	0.036	-0.003	0.005	0.008	-0.032	0.006	-0.004	-0.150	-0.028	1.000			
QPOOREST	0.008	-0.313	0.036	-0.009	-0.004	-0.022	0.101	0.000	0.311	0.103	-0.082	1.000		
EMER	0.011	0.007	0.003	0.008	0.008	0.008	0.006	0.003	-0.013	-0.031	-0.036	-0.016	1.000	
INSU	0.075	0.274	0.036	-0.053	-0.014	-0.174	-0.095	-0.164	-0.132	0.001	0.044	-0.191	0.005	1.000

TABLE D: MAXIMUM LIKELIHOOD ESTIMATES (ALL QUINTILES)

Dependent variable: S_i					
CREDIT	0.128 (0.107)	0.166 (0.035)**	0.401 (0.000)***	0.398 (0.000)***	0.294 (0.000)***
Individual characteristics					
EDUC	0.623 (0.000)***	0.676 (0.000)***			
EMPLOY	0.182 (0.000)***	0.396 (0.000)***			
AGE	0.086 (0.000)***				
SQAGE	-0.0008 (0.000)***	0.0002 (0.000)***			
MARRIED	0.140 (0.701)	0.168 (0.561)			
UNCER	0.041 (0.052)**	0.183 (0.034)**			
GENDER		0.234 (0.000)***			
Household characteristics					
RURAL			-0.305 (0.000)***	-0.149 (0.000)***	
HSIZE			-0.071 (0.000)***	-0.070 (0.000)***	
SPECIAL			0.205 (0.000)***	0.168 (0.000)***	
QPOOREST				-0.549 (0.000)***	
Health Emergency					
EMERG					0.142 (0.100)*
INSU					0.361 (0.000)***

 Figures in parentheses indicate P-value>z

 *Significant at 10% level, **Significant at 5% level, ***Significant at 1% level

TABLE E: MAXIMUM LIKELIHOOD ESTIMATES (ALL QUINTILES)

Dependent variable: S_iINFOR					
CREDIT	0.119 (0.089)**	0.166 (0.018)**	0.383 (0.000)***	0.386 (0.000)***	0.302 (0.000)***
Individual characteristics					
EDUC	0.461 (0.000)***	0.522 (0.000)***			
EMPLOY	0.156 (0.000)***	0.341 (0.000)***			
AGE	0.085 (0.000)***	0.079 (0.000)***			
SQAGE	-0.0009 (0.000)***	-0.0008 (0.000)***			
MARRIED	0.113 (0.006)**	0.101 (0.012)**			
UNCER	0.003 (0.072)*	0.028 (0.023)**			
GENDER		0.337 (0.000)***			
Household characteristics					
RURAL			-0.202 (0.000)***	-0.071 (0.012)**	
HSIZE			-0.063 (0.000)***	-0.061 (0.000)***	
SPECIAL			0.197 (0.000)***	0.164 (0.001)***	
QPOOREST				-0.463 (0.000)***	
Health Emergency					
EMERG					-0.064 (0.057)*
INSU					0.282 (0.000)***

 Figures in parentheses indicate P-value>z

 *Significant at 10% level, **Significant at 5% level, ***Significant at 1% level

TABLE F: MAXIMUM LIKELIHOOD ESTIMATES (ALL QUINTILES)

	Dependent variable: S_iFOR				
CREDIT	-0.038 (0.736)	-0.063 (0.574)	-0.249 (0.033)**	-0.256 (0.032)**	0.294 (0.343)
Individual characteristics					
EDUC	1.022 (0.000)***	0.988 (0.000)***			
EMPLOY	0.176 (0.001)***	0.099 (0.010)***			
AGE	0.067 (0.000)***	0.073 (0.000)***			
SQAGE	-0.0004 (0.000)***	-0.0005 (0.000)***			
MARRIED	-0.369 (0.000)***	-0.374 (0.001)***			
UNCER	0.171 (0.001)**	0.176 (0.001)***			
GENDER		-0.153 (0.009)**			
Household characteristics					
RURAL			-0.503 (0.000)***	-0.341 (0.000)***	
HSIZE			-0.076 (0.000)***	-0.073 (0.000)***	
SPECIAL			0.146 (0.043)**	0.106 (0.143)	
QPOOREST				-0.671 (0.036)**	
Health Emergency					
EMERG					0.291 (0.027)**
INSU					0.413 (0.000)***

Figures in parentheses indicate P-value>z

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level

TABLE G: MAXIMUM LIKELIHOOD ESTIMATES (POOR QUINTILES)

Dependent variable: S$_i$INFOR				
CREDIT	0.106 (0.345)	0.144 (0.098)*	0.267 (0.018)**	0.248 (0.000)***
Individual characteristics				
EDUC	0.139 (0.019)*	0.196 (0.001)***		
EMPLOY	0.193 (0.001)***	0.313 (0.000)***		
AGE	0.069 (0.000)***	0.065 (0.000)***		
SQAGE	-0.0007 (0.000)***	-0.0007 (0.000)***		
MARRIED	-0.008 (0.991)	-0.001 (0.981)		
UNCER	0.067 (0.019)**	0.094 (0.077)*		
GENDER		0.236 (0.000)***		
Household characteristics				
RURAL			-0.010 (0.085)*	
HSIZE			-0.066 (0.000)***	
SPECIAL			0.110 (0.026)**	
Health Emergency				
EMERG				-0.046 (0.081)*
INSU				0.084 (0.015)**

Figures in parentheses indicate P-value>z

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level

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