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IS THERE A MISSION DRIFT IN MICROFINANCE? SOME NEW EMPIRICAL EVIDENCE FROM UGANDA

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Abstract

This paper considers the possibility of mission drift in microfinance; a situation where Microfinance Institutions (MFIs) move away from targeting the poor and towards better-off clients. Using two different measures of poverty, the paper examines whether microfinance institutions in Uganda follow a developmental objective by expanding their access to poorer districts; and if the pattern observed varies across different types of MFIs. The analysis is conducted on 118 MFIs over the period 2009 – 2013; adopting a static count data model and dynamic regression approach. We find that MFIs in Uganda are more likely to target richer districts during earlier years; however, poorer districts tend to catch up over time. This finding suggests that MFIs may wish to signal an improved financial performance by first establishing branches in better-off districts and then only later reaching out to poorer districts, employing cross-subsidisation. We also show that Commercial Bank MFIs are more likely to increase their presence in poorer districts than other types of MFIs, suggesting that protection against regulation and greater access to capital markets may make commercial MFIs the most qualified institutions to expand outreach to the unbanked segment of the world's poorer population.

JEL Classification: G21, I32, C25

Keywords: microfinance, poverty, mission drift, count data model

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1 Introduction

Microfinance is considered as an important strategy to expand financial access to low income households. The mission of almost all Microfinance Institutions (MFIs) is to help to achieve development goals, such as reduce poverty and empower women via access to credit (Ledgerwood, 1999). Nevertheless, the microfinance industry is characterised by two opposing camps regarding the best way to provide financial services to the poor: these are the Welfarists and Institutionalists¹. According to the Welfarists, the goal of microfinance is to provide credit, typically at below market interest rates to the poor for self-employment economic activities, even if it requires the use of subsidies or donor funding. On the other hand, the Institutionalists consider the objective of microfinance as the provision of sustainable financial services to the poor without the use of subsidies. In a discussion about the debate between these two camps, Rhyne (1998) asserts that everyone involved in microfinance shares a basic goal: to provide credit and savings services to millions of poor people, but sustainability is the means to achieve it.

For some time now, there has been a major shift in emphasis from pursuing developmental objectives towards financial objectives. That is, MFIs are not just expected to reach the poor, but also attain financial sustainability (Mersland and Strom, 2010). The general argument is that these two objectives can be met if MFIs become commercialised through regulation and development of profit-seeking financial institutions (Daley-Harris, 2009). In principle, there can be a trade-off between outreach to the poor and achieving financial sustainability. For example, Cull et al. (2009) demonstrate that more commercially oriented MFIs focus on better-off clients. On the other hand, the two objectives can be complementary². Christen (2001) shows that once MFIs become commercialised and ultimately achieve financial sustainability, they are better able to reach the poor.

Despite, the growing concern on the best way to provide microfinance services, it is still somehow unclear which MFIs are actually targeting the poor and which objectives they are pursuing. Previous studies on mission drift in microfinance have examined the link between outreach to the poor (measured by average loan size or percentage of women borrowers) and financial sustainability, and suggest that mission drift occurs when in the pursuit of profitability; MFIs begin to provide larger average loan sizes to their clients or target richer communities. However, there exist a large body of evidence which shows no statistically significant evidence of mission drift when the link between outreach to the poor and financial sustainability is examined (e.g. Christen, 2001; Cull et al., 2007; Hishigsuren, 2007; Mersland and Strom, 2010). Another strand of research shows that most transformed socially oriented MFIs did not lose sight of their mission, but also achieved positive results, in terms improving governance, increasing

¹ Morduch (1998d) termed the differing viewpoints as the “microfinance schism”

² See Robinson (2001) for a detail discussion on this relationship.

their equity capital, achieving financial sustainability and greater outreach to the poor (Fernando, 2004). Although, evidence on mission is still uncertain, Christen (2001) explains that larger average loan sizes do not necessarily imply mission drift, but could simply be a function of several factors, such as the period of entry of an MFI, choice of strategy, or natural evolution of the target clients.

In this paper, we consider mission drift as the migration of MFIs away from poorer districts or a situation whereby MFIs avoid targeting poorer districts. Ledgerwood (1999) asserts that selecting a target market for microfinance services depends on the objective of the MFI. However, the rationale for selecting particular locations to undertake microfinance activities has not been explored empirically at length. Naturally, there can be no access to microfinance without the presence of the providers in a particular locality. Therefore, in this paper we seek to find out whether MFIs in Uganda follow a developmental objective by locating themselves in poorer districts. In addition, we examine if the pattern of movement differ across different types of MFIs. We address these issues empirically by considering the level of poverty in a district (proxied by poverty head count ratio and poverty gap index in separate estimations)³ and dummies for MFI types as the explicit determinants of MFIs' branch expansion and growth across the districts of Uganda.

This study focuses on Uganda for several reasons. Microfinance is considered as an important part of the broad growth strategies in the country. The development of Uganda's microfinance sector began in the mid-1990s following the establishment of many specialised microfinance Non-Governmental Organisations (NGOs) in the country; but the existing banking laws did not cover microfinance activities then. Given the importance attached to microfinance, a policy document on microfinance was approved by the Government of Uganda in 1999. The main objective of this policy document is to improve financial access to the poor as well as ensure the growth and sustainability of MFIs by enabling them to mobilise public deposits and private capital for those that meet the regulatory requirements outlined in the policy document⁴. In spite of this move to formalise microfinance activities in the country, it is still uncertain where these MFIs create access and the incentives that drive them. Therefore, this study could help shed light on the factors which influence the location decisions of MFIs as well as add to the existing debate on mission drift.

³ The poverty head count ratio measures the incidence of poverty. A major limitation of that is that it does not tell how close or far the poor is from a poverty line. To overcome this limitation, we used the poverty gap index as an alternative measure of poverty which reflects the intensity or depth of poverty.

⁴ Uganda's Experience with Tiered Banking Regulation by David L. Kalyango (http://www.finmark.org.za/wp-content/uploads/pubs/Paper_Kalyango_tiered_04.pdf): Accessed on 22/04/2015.

This study builds on the existing literature in two main ways. First, we conduct a static analysis on how district level poverty affects the expected count of MFI branches in a district. To the best of our knowledge, this is the first study that employs count data model to address the above mentioned research objective. Second, by adopting a dynamic regression approach, the study examines how district level poverty affects the growth of branches across districts, and whether the observed pattern of growth varies across different types of MFI. To achieve the underlined objectives, we obtained an unbalanced panel data on number of MFI branches across the districts of Uganda for the periods 2009/10, 2011/12 and 2013/14 from Association of Microfinance Institutions in Uganda (AMFIU). In addition, district level data which reflect the demand side of our analysis were extracted from the 2002 Population and Housing Census conducted by the Uganda Bureau of Statistics; these include information about poverty, population, sex ratio and occupation. Again, we control for the total number of commercial banks in each district, distance (i.e. from an MFI head office to a district capital) and regional dummies in each of our estimations.

The results from our static analyses can be summarised as follows: first, using poverty head count ratio as a measure of poverty, we do not find any statistically significant evidence of mission drift, except for the period 2009 where MFIs have better access in richer districts. Alternatively, if we consider the extent and severity of poverty (measured by the poverty gap index), we observe that MFIs were less likely to have access in poorer districts; we find this very strongly and statistically significant in 2009 and 2011, and by 2013 the pattern gets weaker. Using either measures of poverty, we show that Tier 1 MFIs (i.e. Commercial Bank MFIs) were more likely to open branches in poorer districts in 2013 than do Tier 4 MFIs (i.e. SACCOs and NGOs). Consistent with this observation, the results from the dynamic analysis indicate that, on average the growth of branches for Commercial Bank MFIs is greater in poorer districts, while the relationship is weak for other MFIs.

The remainder of this paper is organised as follows. The next section discusses the relevant literature, while Section 3 describes the situation of the microfinance sector in Uganda. Section 4 explains the methodology used in this study, data and descriptive statistics on key variables. Section 5 discusses the empirical results. The final section provides some concluding remarks to this study and presents a number of policy implications.

2 Review of Relevant Literature

The success of a microfinance programme largely depends on the interaction between the characteristics of the programme and the context in which the programme is implemented (Carlton et al., 2001). Therefore, the choice of location for a particular MFI is fundamental in ensuring the success of that

institution. Bhat et al. (2014) emphasise that firms usually take into account their own characteristics, the attractiveness of a market and the presence of other competitors when deciding where to locate or expand their branch network. Although understanding the factors which influence the location of a firm is a subject of a large body of literature, not much effort has been made to understand these factors in the microfinance literature.

Only a limited number of researches have been reported on factors which influence the location decisions of MFIs. For example, Ray and Mahapatra (2014) using OLS examine the factors that influence penetration of MFIs among Indian states. Their analysis shows that MFIs penetrate into states with higher per capita GDP, better rural infrastructure (measured by proportion of rural roads), lack adequate banking facility and states where there exist low human capital (measured by literacy rate). More recently, Vanroose (2015) examines in Peru how local factors influence the probability for a district to have an MFI by adopting a logit regression. The author finds that districts with higher levels of development have higher probability of having an MFI. Again, she observes that the likelihood of MFIs expanding into unserved markets is higher for areas with higher levels of development. Furthermore, Vanroose establishes that MFIs are more inclined to move to districts with commercial bank presence. She further notes that the presence of one type of MFI in a district positively influences the presence of other MFIs.

The decision to establish a financial institution, such as an MFI or open a new branch in a given locality within a set of localities can be influenced by the characteristics of the institution and the attributes of the locality where the firm is sited. Bhat et al. (2014) explain that agglomeration economies and agglomeration diseconomies can affect the decision of a firm to establish itself in a particular area. According to the authors, agglomeration economies are the perceived benefits that firms can obtain when they decide to locate closer to each other due to factors such as availability of raw materials, skilled labour and readily available markets; whereas agglomeration diseconomies are the negative effects that firms might experience when they choose to cluster around a specific area. The negative effects can occur as a result of intense competition and congestion effects on infrastructure, which increases per unit cost of production.

Studies have shown that motivated by profit, commercially oriented financial institutions focus on better off clients or tend to locate themselves in the richer areas of a country where they are more likely to succeed (Burgess and Pande, 2005; Cull et al., 2009). Alternatively, one would expect that not-for-profit organisations which are socially oriented will be driven to poorer regions where their impact can be felt. For example, many microfinance institutions that emerged in the early 1990s operated as NGOs with the intention to meet the financial needs of the poor (Armendáriz de Aghion and Morduch, 2010). Some

researchers claim that many of these institutions have started adopting purely commercial approaches to banking, while others strive to achieve both financial and developmental objectives (Hudon and Perilleux, 2014; Battilana and Dorado, 2010).

Focusing on three different MFIs in Bangladesh⁵, Zeller et al. (2001) examine the determinants of formation and outreach of MFIs. The authors find that generally MFIs avoid moving to remote areas, but tend to establish their offices in areas with better access to infrastructure and banks. Again, their study reveals that within the more developed areas, MFIs mostly tend to reach out to women who reside in poorer villages. Zeller et al. (2001) establish further in their study some major differences between the selected MFIs in relation to their target group and the type of services they provide. They note that commercially oriented MFIs (e.g. BRAC) lend to women for both agricultural and non-farm activities, while savings and loan MFIs (e.g. ASA) largely lend to women engage in off-farm activities. Corsi et al. (2006) assert that microfinance is perceived as a gender sensitive tool aimed at targeting women, because lending to women leads to higher repayment rates, greater social and economic impacts as compared to men. For these reasons, one would expect that areas with a higher proportion of females might become more attractive to MFIs.

Another important factor in location decisions of businesses is the influence of market size, proxies by population. This can positively influence the demand for financial services and consequently the expansion of an MFI branches in an area. Barros (1995) in his study on the banking sector in Portugal asserts that a higher demand for financial services will induce profit oriented banks to increase their branch network. Therefore if MFIs want to expand their scale of outreach, they are more likely to establish their branches in populated areas, where the demand for financial services would be higher. Hence, one would predict a positive relationship between population and the expected count of MFIs in a given district. Varoose (2015), for example finds that, in Peru districts with a larger population are more likely to receive an MFI branch.

In addition, the influence of market accessibility on the location decision of firms has not really been explored in the literature on location decisions of MFIs. The proximity of an MFI to an important market may help reduce transaction or monitoring cost and consequently help improve the performance of loan portfolio. Presbitero and Rabellotti (2014) show that moral hazard increases with distance, because monitoring becomes more expensive for MFIs. Similarly, distant borrowers have greater incentives to

⁵These MFIs are the Bangladesh Rural Advancement Committee (BRAC), the Association for Social Advancement (ASA), and Rangpur Dinajpur Rural Services (RDRS).

adopt moral hazard or opportunistic behaviours, such as diverting borrowed money for investment towards consumption because the probability of being detected decreases with distance. For this reason, one would expect remote areas to be less attractive place for MFIs to expand their access. Some studies consider the effect of market accessibility on location decisions of firms by considering the geographical or travel distance to an important market. Pedrosa and Do (2011) explain that greater distances affect credit markets in several ways. For instance, there is actual transportation cost to deliver financial services to clients or cost of monitoring loans to borrowers. Hence, these costs might affect the level of branch expansion.

Furthermore, like many developing countries, the microfinance industry in Uganda operates under a 'tiered approach'. The tiered approach considers microfinance as a line of business and it identifies four categories of institutions that can engage in microfinance services. A major feature of this framework is that it considers the fact that it may be necessary to regulate different MFIs in a different manner. Moreover, the institutions under each tier can upscale from one tier to the other subject to meeting the regulatory requirements under that tier. Given the differences between MFIs, we hypothesise that these individual characteristics might influence their organisational objective and consequently their locational choice of branches. Therefore in this study, we seek to find out how district poverty levels in Uganda affect the location decisions of MFIs; and whether the pattern observed varies across different types of MFIs. The next section of the paper describes the microfinance sector in Uganda.

3 The Microfinance Sector in Uganda

In Uganda, the term microfinance is understood as a sub-sector of the financial sector which offers financial products aimed at low income households in both rural and urban areas. This product can be offered by any of the form of financial institution in the country, ranging from formal, semi-formal and informal financial institutions. Although informal sources of finance had existed in Uganda for several decades in many forms such as money lenders or Rotating Savings and Credit Associations (ROSCA), compared to other well-developed countries like Bangladesh, Bolivia or India, the microfinance sector in Uganda is fairly new. The first recognised MFIs in Uganda emerged in the mid-1980s; these are Uganda Women's Finance Trust (established in 1984, but has been acquired by Finance Trust Bank on 11th November 2013) and Centenary Rural Development Trust (founded in 1986, but latter transformed into Centenary Rural Development Bank in 1993). With increased interest from donors and NGOs realising that microfinance can make a greater impact on reducing poverty, many specialised microfinance NGOs were established in the mid- 1990s to provide loans to low income households (Carlton et al., 2001).

In November 1996, the Association of Microfinance Institutions in Uganda (AMFIU) was formed to promote networking among local MFIs and international organisations as well as strengthen the effort of these MFIs in the area of government policy formulation. AMFIU also publishes data on the various microfinance institutions in Uganda, where they are located in the country, their branch network and the types of products they offer in every two years. Other duties performed by AMFIU include building the capacity of its members, developing industry standards and performance monitoring systems. It also organises symposia for microfinance institutions and their clients. As at December 2014, AMFIU had a total membership of 128 MFIs.

The microfinance sector in Uganda currently operates under “tiered approach” following the approval of the Bank of Uganda policy statement on microfinance regulation in July 1999 by the Government of Uganda. Prior to the issuance of this policy document, the existing banking laws in the country did not cover microfinance operations. For this reason, the main objective of the policy is to improve access of the poor to financial services and ensure sustainability of MFIs by allowing these institutions the right to mobilise public deposits and access commercial funding, particularly for those that meet the regulatory requirements. The MFIs in Uganda differ in their mission and vision. Hence, these affect their mode of operation, sources of funding and target clients. The microfinance policy document therefore defines who and what should be regulated and how the regulation ought to be implemented⁶. The next sub-section describes the institutional types of MFIs in Uganda based on the tiered framework.

3.1 The Institutional Types of MFIs in Uganda:

Tier 1

This involves commercial banks which are regulated by the Bank of Uganda (BoU) and have incorporated microfinance programmes as part of their activities. Currently, there are 25 commercial banks in Uganda. However, it is only the Centenary Rural Development Bank and Equity Bank which target the poor through microfinance programmes. Centenary Rural Development Bank is a Ugandan-owned Catholic-affiliated institution established for the purpose of providing financial services to underserved markets in Uganda. Equity Bank on the other hand, is a Kenya-owned bank which purchased Uganda Microfinance Limited in 2008. By end of December 2013, these banks had a total of 56 and 31 branches respectively⁷ within the country. According to the 2008 Uganda Microfinance Industry

⁶ Uganda’s Experience with Tiered Banking Regulation by David.L.Kalyango (http://www.finmark.org.za/wp-content/uploads/pubs/Paper_Kalyango_tiered_04.pdf): Accessed on 22/04/2015.

⁷ Information retrieve from the 2013 Annual Report of these Banks.

Assessment Report⁸, this category of MFIs engage in wholesale lending to Microfinance Depository Institutions (MDIs) and other MFIs as well as reach out to traditionally microfinance clientele areas.

The report further notes that Centenary Rural Development Bank has over 80% of its clients in microfinance portfolio. Again, these institutional types of MFIs have developed strategies aimed to reach out to more low income households and rural areas in Uganda. Commercial banks which offer microfinance services are required to separate out their microfinance loan portfolio as well as subject it to regulation under the Microfinance Deposit-Taking Institutions (MDI) Act 2003. According to the Bank of Uganda directives, the minimum capital requirement for this class of financial institutions has been about US\$ 2 million (Shs4 billion) since January 2003.

Tier 2

These are credit institutions regulated by the Bank of Uganda. Unlike commercial banks, they are not allowed to offer demand deposits withdrawal or foreign exchange services. However, they are permitted to take deposits from customers in the form of savings account, offer collateralised and non-collateralised loans to savings and non-saving clients. Currently, there are 3 institutions categorised as Tier 2 in the Ugandan financial sector. Out of this, 2 of them: namely Post Bank and Opportunity Bank Uganda offer microfinance as a product in their lending portfolio. A financial institution which operates under this tier is required to have a minimum capital of about US\$ 500,000 (Shs1 billion).

Tier 3

This refers to the class of microfinance institutions which are regulated under the Microfinance Deposit-Taking Institutions Act 2003. Institutions that fall under this category are known as Microfinance Deposit Taking Institutions. These institutions serve low income households with broad range of financial services. They offer lending and saving products to their clients, but cannot provide checking accounts or engage in transactions involving foreign currencies. Again, they provide services like money transfer and micro insurance to their clients. The minimum capital requirement for institutions which operate under this tiered approach is Shs500 million, equivalent to about US\$ 250,000. Before mid-November 2013, there were four of these institutions in Uganda namely Ugandan Finance Trust Limited, FINCA Uganda, Pride Microfinance, and Uganda Agency for Development (UGAFODE) Microfinance Limited. However, on 11th November 2013 a Tier 1 financial institution in Uganda, Finance Trust was granted the

⁸ Uganda Microfinance Industry Assessment, August 2008
(<http://www.rfspug.org/downloads/industryassessment2008.pdf>): Assessed on 23/04/2015.

operating licence to acquire Ugandan Finance Trust Limited, thereby reducing the number of Tier 3 MFIs to 3.

Tier 4

This class of institutions do not operate under the control of the Bank of Uganda. It is made up of Savings and Credit Co-operatives (SACCOs) and credit-only institutions which are not regulated which are not allowed to take deposits from the public, but can offer collateralised or non-collateralised loans. These institutions are not-for-profit making organisations usually established by donor driven international organisations. Tier 4 MFIs form the largest component of the microfinance sector in Uganda. However, the actual number of institutions in this category is usually difficult to determine in the country.

In order to ascertain the extent to which microfinance programmes are spread in Uganda, the Ministry of Finance and Economic planning with both technical and financial support from the UK Department for International Development (DFID) conducted a comprehensive census on the operational outlets (i.e. stand-alone institutions or branches) of MFIs in Uganda in 2006. The survey revealed a total of 1,208 active outlets from 818 financial institutions. Tier 4 MFIs dominated the microfinance sector with 74.9% of the total active outlets, followed by Tier 3 MFIs (8%), Tier 2 MFIs (2.6%), Tier 1 MFIs (2.2%), while non-MFIs had about 12.3% of the outlets (MoFPED, 2006).

3.2 Financial Inclusion in Uganda

The level of financial development in Uganda has been improving in recent times. Figure 1 summarises FinScope study report of 2013 in Uganda⁹. It shows that access to both formal and informal sources of finance increased from 70% in 2009 to 85% in 2013. Although access to formal banks and informal sources declined by 1% and 11% respectively from 2009 to 2013, access to non-bank financial institutions increased remarkably from 7% in 2009 to 34% in 2013. This growth was as a result of increased use of mobile money transfer services in the country. The survey reveals that in rural areas the use of informal financial services dominates at 35% followed by non-bank financial institutions (32%) and formal banks (17%). However, in urban areas, non-bank financial institutions serve about 40% of the population followed by formal banks (36%) and informal financial institutions (14%).

Furthermore, the FinScope study as reported in Figure 1 shows that in 2013, about 54% of Uganda's adult population have access to formal financial institutions while 15% have no access to any form of financial service. Similarly, the survey shows that the proportion of adult population that obtained credit from only

⁹ Uganda 2013 Finscope III Survey Report Findings: Unlocking Barriers to Financial Inclusion https://www.bou.or.ug/opencms/bou/bou-downloads/Financial_Inclusion/Finscope-Report-2013.pdf, accessed on 17/04/2015.

formal banks increased marginally from 5% in 2009 to 6% in 2013, while the proportion of those who received credit from only non-bank financial institutions increased from 2% to 7% during the same periods. However, the share of the adult population that obtained credit from informal sources decreased from 27% in 2009 to 20% in 2013. Furthermore, the survey reveals that the proportion of adult population who could not access credit in 2013 (about 65%) was far higher than the level of exclusion for saving (6%).

Uganda's Vision 2040 report notes that lack of access to credit is the biggest challenge affecting the growth of the economy¹⁰. The report notes that the supply-side factors which influence access to finance in the country include inadequate infrastructure for financial services, limited bank branches and poor access to rural financial services. Conversely on the demand side, low levels of creditworthiness and enterprise management capacity contributes to higher interest rates on loans. The Government's strategy to increase access to finance as outlined in the Vision 2040 document include measures that remove the bottlenecks of doing business and strengthen regulatory procedures to encourage efficient functioning of the financial sector.

In order to understand the extent of financial inclusion in Uganda and the factors which drive MFIs to a particular locality, Mudd et al. (2012) from Haverford College adopted mapping technologies with a directory of MFIs branches published by AMFIU. The authors discovered that MFIs are unevenly distributed in Uganda; they are concentrated in densely populated areas, particularly in the south-western areas of the country. They also found comparable areas of population density, but with relatively little coverage of the MFIs, especially in the north-central areas. Again, it was observed that the locations of the MFIs follow major roads. Furthermore, the authors discovered a relatively high level of poverty in the south-western areas where MFIs are concentrated¹¹. These results seem to suggest that MFIs in Uganda are driven to areas where there are high levels of potential clients and better infrastructure.

Methodology

4.1 Conceptual Model

According to Gourieroux et al. (1984), the classical linear regression model provides inadequate results when modelling a discrete variable denoting the number of occurrences of an event. This is because the shape of the observation set is not linear, hence the classical assumption of normality of the error term

¹⁰ Uganda Vision 2040 (<http://npa.ug/wp-content/themes/npatheme/documents/vision2040.pdf>, assessed on 17/04/2015).

¹¹ Available from <http://ds.haverford.edu/wp/mappingmicrofinance/files/2012/07/Microfinance-Mapping-Project-Uganda.pdf>, accessed on 17/04/2015.

cannot hold. For this reason, most researchers examining the location decisions of firms use count data models. The advantage of count data model over other estimation techniques is that it takes into account the fact that the number of a particular event occurring in a given time period can only be whole numbers (Arauzo-Carod et al., 2010). Moreover, the number of branches of a particular MFI in a given district is truncated at zero rather than censored at zero; hence using estimation techniques such as Tobit might produce biased results (Carlson and Mitchener, 2005).

Bhat et al. (2014) recognise that various forms of discrete probability distributions may be used in modelling count data. These include Poisson distribution, negative binomial distribution and zero inflated Poisson and zero inflated negative binomial models. The Poisson regression model is one of the most widely used models in studies of this nature. This model predicts the probability of an independent event occurring in a given time period and relates this probability to a vector of regressors (Caballero, 2012). Thus, in the basic Poisson model, the probability of observing Y_{ij} branches for the i^{th} MFI in district j is given by:

$$Prob(Y_{ij}) = \frac{e^{-\lambda_{ij}} \lambda_{ij}^{Y_{ij}}}{Y_{ij}!} \quad (1)$$

Where λ_{ij} is the Poisson parameter, denoting the expected value of Y_{ij} . The Poisson distribution is a non-linear regression model whose parameters are estimated through maximum likelihood methods or by using a log likelihood function. The fundamental assumption of the Poisson model is that the mean of the outcome variable Y_{ij} is equal to its variance. Thus,

$$\lambda_{ij} = E(Y_{ij}) = Var(Y_{ij}) = e^{X'_{ij}\beta} \quad (2)$$

The X_{ij} in equation (2) denotes exogenous variables correlated with the outcome variable Y_{ij} and β represent the unknown parameters. Taking the logarithm of both sides of equation (2) gives:

$$\ln \lambda_{ij} = \alpha_0 + \beta X_{ij} \quad (3)$$

The assumption of the Poisson distribution that the mean of the outcome variable and its variance are the same would imply a variance-mean ratio of one. Gourieroux et al. (1984) shows that the conditional mean of the outcome variable Y_{ij} , the exogenous variables X_{ij} and their related conditional variances cannot vary independently. Therefore, if the population being observed is overly dispersed, the use of Poisson may bias the estimates of the standard errors. A possible way to overcome the limitation of the Poisson

distribution is to use the negative binomial distribution model. This model allows the variance of the process to differ from the mean. The use of negative binomial distribution requires that an error term be introduced in equation (3), which gives the equation below:

$$\ln \lambda_{ij} = \alpha_0 + \beta X_{ij} + \varepsilon_{ij} \quad (4)$$

The error term in equation (4) captures the effects of omitted regressors which are independent from the exogenous variables, X_{ij} . Unlike the Poisson which has the same mean and variance as λ , the mean of the negative binomial regression is λ , but its variance can be specified as $\lambda(1 + \alpha\lambda)$; where α denotes the dispersion parameter. The negative binomial regression reduces to Poisson regression as α approaches zero; however, it shows over dispersion when α is greater than zero.

In principle, each MFI could decide to have a branch in any of the 112 districts in Uganda. However, in cases where there are excess zeros in the counts of the outcome variable, the use of Poisson or negative binomial regression models might render the estimated coefficients to be biased. This is because both models assumed that the zero counts and positive count values follow the same data generating process. For studies where there are excess zeros, the zero inflated regression models (i.e. either zero inflated Poisson or zero inflated negative binomial) are used. These models suggest that the excess zeros are generated by a different process from the positive count values. Hence, the excess zeros can be modelled independently. This is similar to a two-part model whereby the first part is a logit model for predicting the excess zeros and the second part follows a Poisson or negative binomial distribution.

4.2 Empirical Model and Specification of Variables

In order to test the hypotheses of this study, we employ both a static and a dynamic regression approach. Our dataset contains information on 118 uniquely identified MFIs operating in Uganda during the periods for this study. For the current study, we rely on some assumptions. First, we assume that an MFI decides on the number of branches to have in each of the 112 districts in Uganda subject to a number of constraints and motivating factors. Second, we consider all MFIs as being described by one decision making rule in each of the districts, therefore our total number of observations is the product of number of MFIs, number of districts and the 3 data point periods for our study (representing 39,648 observations). Our dependent variable is measured by the number of branches of the i^{th} MFI in district j at time t . The discrete and non-negative nature of this outcome variable calls for the use of count data model. Following the intuition gained on count data models, the expected number of branches of the i^{th} MFI in district j at time t follows an exponential function of district level exogenous variables (X_{jt}), MFI specific

characteristics (Z_i) and a random error term ε_{ij} . For our static analysis, we estimate the expected counts of an MFI branches by the following function:

$$Y_{ijt} = f\{\beta_1 Poverty_{ijt} + \beta_2 MFITier_{ijt} + \beta_3 Poverty_{ijt} \times MFITier_{ijt}\} \quad (5)$$

The left hand side of equation 5 represents the number of branches of MFI i in district j in period t . On the right hand side of equation 5 we have a measure which reflects the incidence of poverty (i.e. poverty head count ratio) or intensity of poverty (poverty gap index) for district j at period t . Again, $MFITier_{it}$ are dummies which denote the institutional type of MFI i in Uganda. In addition to the variables in equation (5), we control for the following district level characteristics: Sexratio measured by the proportion of female to male population, Population of a district, occupation (i.e. proportion of the population engage in agriculture and fishery activities), distance between an MFI head office and a district capital, the total number of commercial banks; we also control for regional level dummies in the estimation. The reason for this is to control for the unique, but unobserved characteristics that some regions might have over their counterparts, hence makes them become attractive destinations for MFIs. We estimate our regression for each of the sample periods. The rational is to examine how the covariates vary across the sample periods over time.

In our dynamic regression analysis, we seek to understand how the expansion of MFIs took place in Uganda and ascertain which factors influence the growth of MFI branches in a district. Our dependent variable is measured as the rate of change of the number branches of MFI i in district j between the preceding year and the current year. In particular, we investigate how the level of poverty in a district and the differences in MFIs affect growth of branches in a district. The dynamic function can be expressed as:

$$growthY_{ijt} = f\{\beta_1 Poverty_{ijt} + \beta_2 MFITier_{ijt} + \beta_3 Poverty_{ijt} \times MFITier_{ijt} + \beta_4 Y_{ijt-1} + \beta_5 Z_{jt-1}\} \quad (6)$$

The left hand side of equation (6) represent the rate of change in branches for MFI i in district j between the current period and the preceding period. The right hand variables are same as described in equation (5). In addition to that, Y_{ijt-1} is the previous year's count of branches for MFI i in district j and Z_{jt-1} represents the previous year's total number of branches for MFIs in district j . Thus, we examine if the number of branches of a particular MFI in the preceding year in a given district can explain the variation of count of MFI branches across districts. The level of competition within the microfinance sector has increased in recent times. Hence, we examine whether the presence of other MFIs in a district influence the expected count of branches for a given MFI in a district. The use of lag of total number of branches

for these MFIs in a district helps remove any concerns about the endogeneity of these variables. Again, we include the control variables described in equation (5) in our dynamic regressions.

4.3 Data and Descriptive Statistics

The current study relies on two main sources of data on individual MFIs and district in Uganda. The data about MFIs are obtained from a directory produced by the Association of Microfinance Institutions in Uganda (AMFIU)¹². It contains an unbalanced panel data from 2009 – 2013. These include the names and types of MFIs, where they are located and their number of branches per district. For the period under review, there are a total of 118 uniquely identified MFIs from AMFIU dataset. Data about districts is extracted from the 2002 Population and Housing Census conducted by the Uganda Bureau of Statistics. They include information about population, sex ratio (gender composition of the population), adult literacy rate, occupation, and poverty. In addition, we assembled data on number of commercial bank branches for each the districts of Uganda across the sample period. Furthermore, we obtained data about the distance from an MFI's head office to each of the district capital of Uganda using GlobeFeed distance calculator.

Uganda's microfinance industry continues to experience a sustained increase in number of MFIs and access points as shown in Table 1. There were 78 MFIs at the end of 2009, as compared to 83 and 90 in 2011 and 2013 respectively. Similarly, the number of branches increased from 401 in 2009 to 587 in 2013. Between these years, the increase in branches occurred in all the categories of MFIs in Uganda, but at different rates. Tier 4 MFIs appear to dominate Uganda's microfinance industry based on number of branches. For each of the sample period, they had over 50 percent of the total industry branches. In terms of rate of increase in branches, they appear to be doing better than the other MFIs between 2009 and 2011. They grew by 39.1 percent while Tier 1, 2, and 3 MFIs grew by -44.6 percent, 38.5 percent and 13.6 percent respectively¹³. Nonetheless, from 2011 – 2013 Tier 1 MFIs expanded their branches more quickly than the other MFIs; they grew by 34.2 percent, followed by Tier 4 (23.9%), Tier 3 (16%) and Tier 2 (11.1%). Furthermore, the proportion of districts with an MFI presence also increased consistently from 50 percent in 2009 to 76.8 percent in 2013. Based on these observations, we can argue that the microfinance industry in Uganda is expanding due to the entrance of new firms during the period under review.

¹² This organisation is an umbrella network of microfinance providers in Uganda. It produces a directory on microfinance institutions Uganda in every two years. Therefore we only have annual data for the periods 2009, 2011 and 2013.

¹³ The negative growth rate for Tier 1 MFIs between 2009 and 2011 can be attributed to missing branches for Equity Bank in most of the districts in 2011 compared to 2009 according to AMFIU dataset.

Table 2 reports the descriptive statistics of key variables used in our regressions. The average number of branches per district is about 4, while the average number of branches per an MFI in a district is about 0.037. On the average, about 42 percent of the population in Uganda are below the national poverty line, while the poverty gap index shows that the average intensity of poverty is about 17 percent. About 75.5 percent of the active population¹⁴ are engaged in agriculture and fishery economic activity, while the rest are engaged in non-farm activities. There is a higher concentration of MFI branches in the Eastern Region (28.6%), followed by Northern (26.8%), Western (23.2%) and Central (21.4%). The average distance from an MFI head office to a district capital is about 336.52 km.

5 Results

5.1 Static Analysis

To determine if MFIs follow a developmental objective by targeting poorer districts, we first discuss the results from our static analysis. We employed the four different count data models explained in the methodology in this analysis: the Poisson, Negative Binomial, Zero Inflated Poisson and Zero Inflated Negative Binomial for each of the sample period used in this study. Subsequently, we run the ‘countfit’ command in STATA to choose the best fitting model for our data¹⁵. The outputs from this command as reported in Figure 2 suggest that the zero inflated negative binomial model is better than the other three models. Hence, in this section we discuss the estimates from the zero inflated negative binomial regression.

Table 3 summarises the regression output from the count model estimated for the years 2009, 2011 and 2013. It investigates the impact of poverty in terms of the incidence of poverty (proxied by the poverty head count ratio) on the number of branches of an MFI per district as described in equation (5). This specification helps us to examine whether the incidence of poverty in a district affects the expected count of branches of an MFI in that district. The coefficients can be interpreted as the percentage change in the dependent variable (number of branches) due to a one-unit change in the independent variable. Column 1 of Table 3 shows that in 2009 the location of branches was negatively correlated with poverty. For instance, a one-unit increase in the proportion of poor people in a district significantly reduces the expected number of branch opening by 1.31 percentage points. This suggests that in 2009 MFIs were

¹⁴ In Uganda, the active population consist of economically active persons aged 14 – 64 years.

¹⁵ Countfit produces a graph which plots the residuals from the tested models. Models with lines closest to zero are indicative of good-fitting models.

mainly targeting richer districts within Uganda and not the poorer districts as such. However, this correlation becomes positive by 2013, though not statistically significant.

Furthermore, we investigate if the effect of poverty on branch opening varies across different types of MFI by examining the interaction effect of poverty head count ratio and dummies for MFI tiers on expected count of branches in a district. The results as shown in column 2, 4 and 6 of Table 3 indicate that except for 2009 and 2011, Tier 1 MFIs were more likely to open branches in poorer districts than the other MFIs. This relationship is strong and clearly statistically significant in the 2013 regression. For, example a one-unit increase in poverty head count ratio increases the expected count of branches in a district by 2.81 percentage points for Tier 1 MFIs, but only 0.59 percentage points for Tier 4 MFIs; the difference between these estimates is statistically significant. Thus, compared to Tier 4 MFIs which are non-commercialised in Uganda, Tier 1 MFIs (Commercial Bank MFIs) are better able to reach out to poorer districts. This finding is in line with that of Fernando (2004) and Cull et al. (2007) that MFIs can stay true to their mission even if they attain commercial status or ultimately pursue financial objectives. Moreover, this result confirms Christen and Drake (2002) assertion that a more commercialised MFI industry is much able to target poorer communities since their profit motives drive them to become more efficient and more willing to seek out new markets for their loan products.

Looking at an alternative measure of poverty (i.e. the poverty gap index), which reflects the intensity of poverty in a district, column 1, 3 and 5 of Table 4 show that the location of branches was negatively correlated with poverty for each of the sample periods. Except for 2013, this relationship is statistically significant. Thus, during 2009 and 2011 MFIs were less likely to open branches in poorer districts. This finding and our previous finding when the poverty head count ratio was considered suggest that MFIs in Uganda were initially targeting richer districts but, by 2013, the poorer districts had caught up. An intuition behind these findings might be that MFIs desiring to improve their financial performance begin to establish their branches in better-off districts; and subsequently reach out to poorer districts through cross-subsidization. Our results thus support the recent finding by Vanroose (2015) that MFIs desiring to improve their financial performance are more likely to target districts with higher levels of development.

Next, column 2, 4 and 6 of Table 4 report the regression results for 2009, 2011 and 2013 respectively when the interaction between dummies for MFI types and poverty gap index is considered. The effect of poverty on branch location for Tier 1 MFIs is statistically significant in 2013, but not significant for the periods 2009 and 2011. Column 6 of Table 4 indicates that Tier 1 MFIs were more likely to open branches in poorer districts than the other MFIs in 2013. The estimated coefficient shows that a one-unit increase in the poverty gap index increases the expected count of branches for Tier 1 MFIs in a district by

2.86 percentage points. By contrast, the estimated effect of poverty (i.e. measured by poverty gap index) on branch locations for Tier 4 MFIs is about -0.69 percentage points. This finding is consistent with our earlier observation (when the poverty head count ratio is used) that Tier 1 MFIs are more likely to open branches in poorer districts than the other MFI types.

Turning towards the control variables in the static regressions as shown in Tables 4.3 and 4.4, we mainly see a pattern which is consistent across each of the sample periods. Besides, the signs of the coefficients are fully in line with our expectation and findings from other studies. The expected count of MFI branches is positively correlated with higher proportion of female population in a district. This finding confirms the existing gender bias in microfinance. Empirical evidences suggest that women are more likely to invest their loans to improve the welfare of their entire families as well as repay these loans than men (D’Espallier et al., 2011; Kevane and Wydick, 2001; Khandker et al., 1995). Hence, an MFI desiring to achieve the dual objective of outreach and financial sustainability would be more likely to expand access to female clients; indeed, many MFIs in Uganda specifically target women (Carlton et al., 2001). The results also suggest that districts with higher levels of population are more likely to experience an increase in MFI branches. This observation is in line with the expectation that an increase in population in a given districts will increase the demand for services, such as credit, savings, insurance among others and consequently induces an increase in the supply of financial services in that district.

Furthermore, the results show that MFIs were less likely to open branches in districts with greater proportion of the active population engaged in agriculture and fishery activities. This observation is strong and statistically significant at 1 percent level in 2013, but statistically insignificant for 2009 and 2011 static regressions. Like many developing countries, majority of the active population in Uganda are engaged in farm activities. Hence, given that MFIs are less attracted to areas whose population are actively engaged in agriculture, this might limit the capacity of farmers to invest in technologies and inputs required to increase their productivity. Munyambonera et al. (2012) assert that despite the importance of agriculture to Uganda economy, only about 10 percent of farmers have access to credit. The authors explain that both demand and supply side factors account for the very low access and use of credit by farmers in the country. The demand side factors include lack of collateral and perceived high risk in agriculture while the supply factors consist of weak institutional framework, policy inconsistency on agricultural financing, high interest rates and limited financial literacy. Again, our results suggest that distance play an important role in the development of microfinance institutions in Uganda. As expected, we find that districts which are farther away from an MFI’s head office have a lower chance to receive an MFI branch. This relationship is statistically significant at 1 percent level for each of the sample periods.

5.2 Dynamic Analysis

The dynamic analysis examines whether poverty influences the annual rate of growth of MFI branches in a district and whether this effect varies across different types of MFIs. Table 5 presents the regression results when the poverty head count ratio is considered. The results as reported in column 1, 3 and 5 of Table 5 show that ‘*ceteris paribus*’, the incidence of poverty in a district does not significantly influence the growth of MFI branches. Nevertheless, the effect of poverty on branch growth differs across MFI types. The pooled dynamic results as reported in column 6 of Table 5 indicate that, the growth of branches for Tier 1 MFIs is greater in poorer districts, while the relationship is weak for other MFI types. For instance, a one-unit increase in poverty head count ratio significantly increases the growth of branches for Tier 1 MFIs by 0.059 percentage points.

Similarly, Table 6 presents the dynamic results when the poverty gap index is used as a measure of poverty. The results are consistent with our earlier findings in Table 5 when the poverty head count ratio is considered. Column 1, 3 and 5 of Table 6 show that poverty gap index does not have a statistically significant influence on growth of branches in a district. However, the pooled dynamic regression results as reported in column 6 of Table 6 indicate that the effect of poverty (measured by poverty gap index) on branch growth varies across different types of MFIs. Tier 1 MFIs are likely to expand their branches more quickly in poorer districts than other MFIs. A one-unit increase in poverty increases the growth of Tier 1 branches in poorer districts by 0.166 percentage points. This relationship is statistically significant at 1 percent level. By contrast, the additional effect of poverty on branch growth for the other MFIs is negative and statistically significant. In Uganda, SACCOS and NGOs (Tier 4 MFIs) are generally regarded as not-regulated and not-for-profit MFIs, while Tier 1 MFIs are Commercial Bank MFIs which are for profit and regulated. Thus, this result suggests that commercially oriented MFIs do not focus on richer districts per se, but can expand more quickly in poorer districts.

Furthermore, we ascertain whether MFIs choose to enter a new market when making the decision to open a new branch or expand within the locality where they already have an established presence. Our result as reported in Table 5 and 6 show a statistically significant negative effect of the number of branches of an MFI in the preceding period on branch growth. This means that in Uganda, MFIs do not necessarily extend their branches considerably in a district where they already have an established presence, but might choose to enter new markets in subsequent periods. A possible explanation to this finding is that by expanding into new markets, MFIs can benefit from economies of scale in the use of their resources. Aguirregabiria et al. (2014) explain that credit and deposit risk can be spatially correlated, hence geographic diversification of risk may require financial institutions to have branches in several geographical areas.

Again, by controlling for the total number of MFIs in the preceding period for a district, the results suggest that districts with greater number of MFIs becomes less attractive place for branch growth. Nonetheless, this finding is statistically insignificant. In addition, our pooled dynamic regression results as shown in column 6 of Table 5 and 6 suggest that districts with greater proportion of its active population employed in agriculture and fishery activities are likely to experience slower growth in MFI branches. This observation is consistent with our earlier finding under the static analysis that the expected count of branches of an MFI in a district is negatively correlated with the proportion of the active population whose main economic activities are agriculture and fishery.

6 Conclusion

The motivation for this paper stems from the increasing commercialisation in microfinance and the growing concern that this transformation might lead to a mission drift. The main argument against commercialisation is that MFIs desiring to improve their financial performance might forgo extending microfinance services to the poor in favour of richer clients. To add to the debate, we examine if MFIs in Uganda follow a developmental objective by targeting poorer districts and whether the pattern observe varies across different types of MFIs. Thus, using two different measures of poverty (i.e. the poverty head count ratio and poverty gap index), we explore if the incidence or intensity of poverty in a district is a significant determinant of an MFI branch opening and growth; and whether the relationship observed varies across different types of MFIs.

We performed two different kinds of analysis in this chapter. First, we conduct a static analysis to ascertain how poverty and differences in MFI, based on their institutional types influence the expected count of branches in a district at a particular point in time. Count data model is used to perform this analysis. Second, by adopting a dynamic approach, we investigate how the aforementioned covariates affect the growth of MFI branches within the districts of Uganda. Under each of these analyses, we first examine how the individual effects of poverty and dummies for institutional types affect the level of branch expansion and growth across the districts of Uganda. Subsequently, we consider the interaction effects of district level poverty and dummies for MFI types on branch expansion and growth.

Our findings from the static analysis raise two main issues. First, using the poverty headcount ratio as a measure for poverty, we observe that the location of branches at the start of the sample is negatively correlated with poverty. This observation is very strong and statistically significant in the 2009 static regressions. However, this correlation becomes positive by 2013, though not statistically significant. Similarly, using the poverty gap index as a measure for poverty, the results indicate that except for 2013,

the location of branches is negatively correlated with poverty. Our results therefore suggest that MFIs in Uganda were initially targeting richer districts; however, by 2013 the poorer districts had caught up. These results could be explained by the recent findings by Ray and Mahapatra (2014) and Vanroose (2015) that MFIs which aim to improve their financial performance are more likely to create access in districts with higher levels of per capita income and development. This is because such richer districts lower the risks MFIs might face as well as reduces their cost of business and consequently improves their financial performance. Second, by considering the interaction between each of the measures for poverty and dummies for MFI types, the results shows that Commercial Bank MFIs (Tier 1) are more likely to open branches in poorer districts than the other MFIs. Except for 2009 and 2011, this observation is statistically significant for the 2013 static regressions. Consistent with the above observations, the estimates from our dynamic analysis suggest that the growth of branches for Tier 1 MFIs (Commercial Bank MFIs) is greater in poorer districts than the other MFIs.

Overall, we can conclude that although the advocates of social mission for microfinance consider the ongoing process of commercialisation in the microfinance industry as a mission drift, the result established in this study brings some good news to the microfinance sector. It suggests that full-fledge commercially oriented MFIs can still fulfil their development goals by having a strong positive response to targeting poorer districts. The reason is that, commercialisation provides MFIs the opportunity to adopt good banking principles and by so doing attract funds from commercial sources or are able to diversify their services which might be impossible to achieve otherwise. For example in Uganda, Tier 4 MFIs are not regulated. This therefore prohibits them from engaging in most retail banking services such as deposit mobilisation, micro insurance, payments systems, remittances services etc. With these different services, not only would regulated and transformed MFIs have enough funds to expand their outreach to the poor, but they would be able to meet the needs of the poor clients they seek to serve.

The findings from this study bring forward a number of policy implications that might be useful for policy makers and practitioners in the field of microfinance. First, commercial microfinance could be pursued as a strategy to reach the unbanked segment of the world's poor population. Therefore, protection against regulation, access to public deposits and commercial funds could limit the capacity of lower tiered MFIs to expand their scale of operations as well as fulfil their developmental goals. Second, the recent bill put before Ugandan parliament for approval to ensure that Tier 4 (SACCOs and NGOs) become regulated¹⁶ might be helpful to improve financial stability and reinforce public trust in the microfinance sector. Ultimately, this would help increase the funds available to these MFIs and consequently expand

¹⁶ Edward Kayiwa (June 17, 2015). "SACCOs seek speedy regulation" (<http://www.newvision.co.ug/news/669898-saccos-seek-speedy-regulation.html>) Accessed on 29/06/2015.

their access to the poor. Nevertheless, policy makers need to be aware of the downsides of regulation. Many of these Tier 4 MFIs specialise in very small transactions, therefore frequently reporting to a regulatory authority about their activities and financial position might appear to be costly on their part. Apparently, many of these MFIs might absorb the cost of regulation by reducing their outlets to markets that tend to be more costly to serve per dollar lent. Similarly, to absorb this cost and maintain their profit, there is the tendency that MFIs might be forced to raise their interest rates or increase their average loan sizes. All these factors might cause the exclusion of some potential borrowers, especially very low income households. We acknowledge that some MFIs in Uganda receive support from the government in the form of subsidies or tax exemptions¹⁷. However, we could not examine the role of policy in the form of subsidies and tax incentives on location decisions of MFIs due to limited data on these variables. Further studies on location decisions of MFIs could benefit a lot when such data become available in the near future.

¹⁷ Claver Ndushabandi, 6th July 2015: “Museveni Abolishes Taxes On Saccos”
(<http://chimpreports.com/museveni-abolishes-taxes-on-saccos/>) accessed on 13/07/2015.

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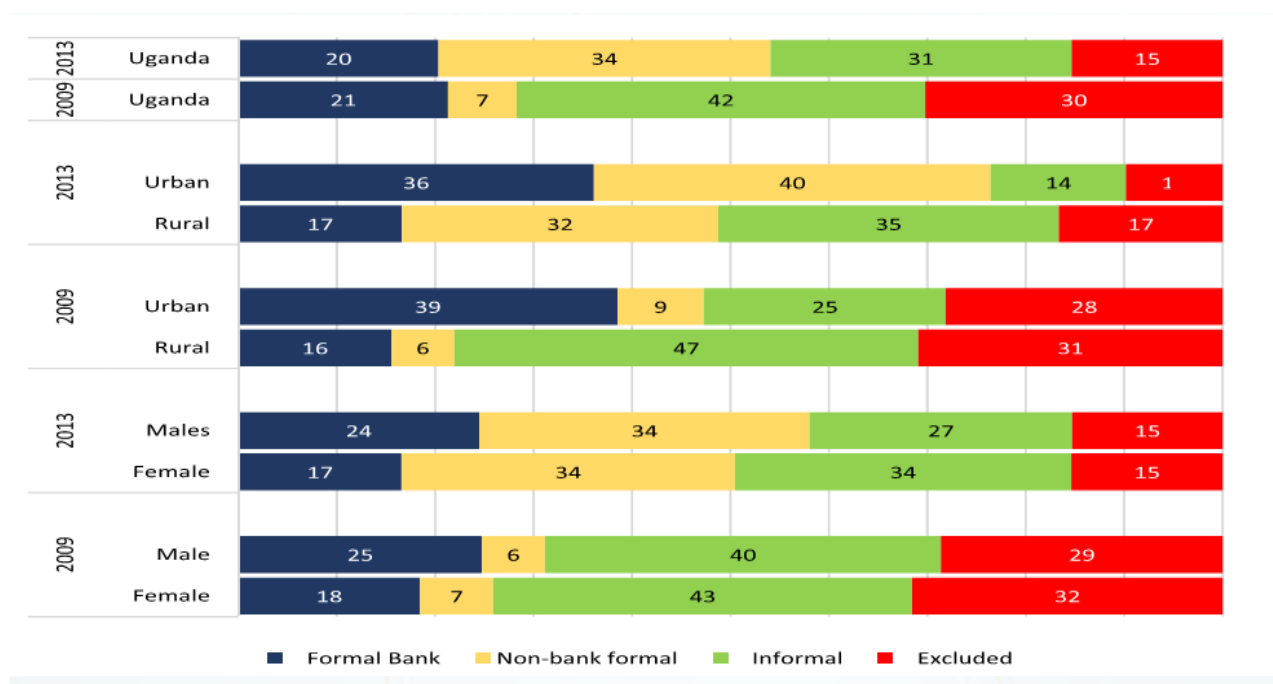
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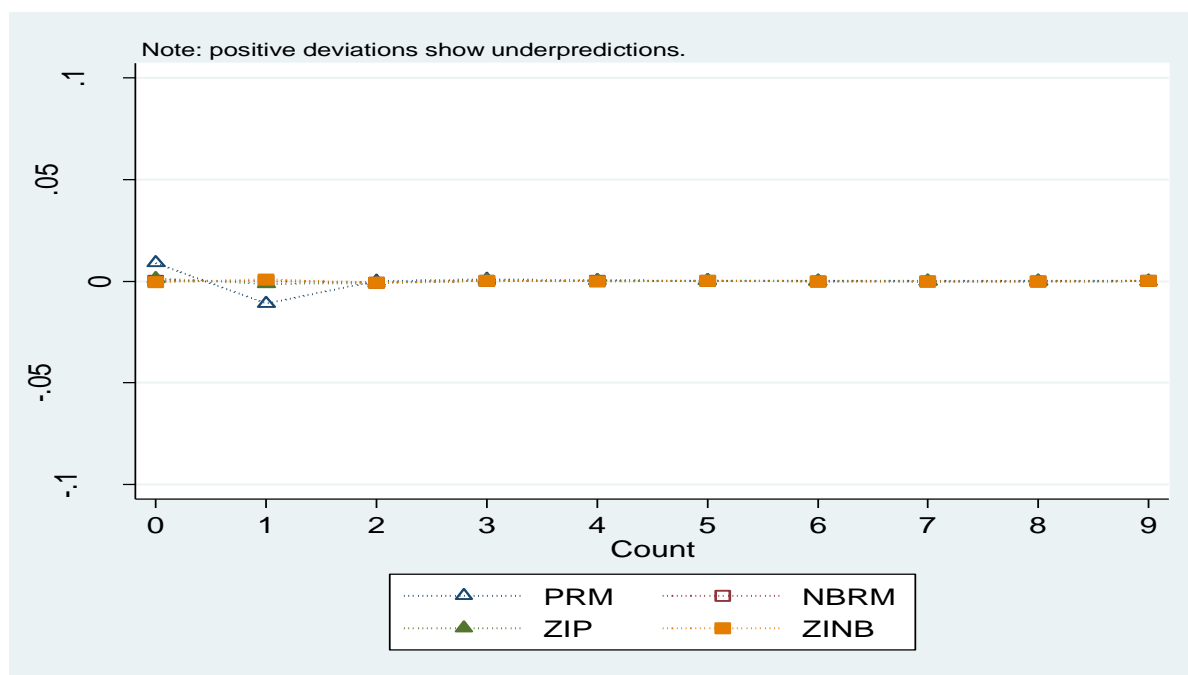
Appendix

Figure 1: Financial access strand in Uganda, between 2009 and 2013



Source: FinScope III Survey, 2013

Figure 2: Testing for best fitting count data model¹⁸



¹⁸ PRM: Poisson Regression model; NBRM: Negative binomial regression model; ZIP: Zero inflated Poisson; ZINB: Zero inflated negative binomial

Table 1: The Spread of MFIs in Uganda

MFI presence in the districts of Uganda	Growth Rate				
	2009	2011	2013	2009 – 2011	2011 – 2013
Total number of MFIs	78	83	90	0.064	0.084
Total Number of MFI branches	401	479	587	0.195	0.226
Tier 1	74	41	55	-0.446	0.342
Tier 2	26	36	40	0.385	0.111
Tier 3	66	75	87	0.136	0.160
Tier 4	235	327	405	0.391	0.239
Proportion of Districts with an MFI branch (out of 112 Districts)	0.500	0.616	0.768	0.232	0.247

Table 2: Summary Statistics on key Variables across Districts

Variable	Obs.	Mean	Std. Dev.	Min	Max
Number of branches per MFI	39648	0.037	0.310	0	17
Number of branches per district	39648	4.330	8.211	0	81
Poverty head count ratio	39648	0.417	0.204	0.04	0.971
Poverty gap index	39648	0.173	0.131	0	0.800
Tier 1 (Commercial Bank MFIs)	39648	0.017	0.129	0	1
Tier 2 (Credit Institutions)	39648	0.017	0.129	0	1
Tier 3 (Microfinance Depository Inst.)	39648	0.025	0.157	0	1
Tier 4 (SACCOs & NGOs)	39648	0.941	0.236	0	1
Sex Ratio	39648	1.004	0.046	0.655	1.113
lnPopulation	39648	12.084	0.635	10.456	13.989
Agric & Fishery Worker	39648	0.755	0.121	0.025	0.923
Distance	39648	336.518	173.063	0	912
Adult literacy rate	38232	0.611	0.146	0.084	0.889
Number of commercial bank branches	39648	3.193	15.764	0	211
Region 1 (Central)	39648	0.214	0.410	0	1
Region 2 (Eastern)	39648	0.286	0.452	0	1
Region 3 (Northern)	39648	0.268	0.443	0	1
Region 4 (Western)	39648	0.232	0.422	0	1

Table 3: Static Regression for Branch Expansion on District level Poverty Headcount Ratio and MFI Types (Dep. variable: Number of branches of MFI in a District)

	(1)	(2)	(3)	(4)	(5)	(6)
Main variables	2009	2009	2011	2011	2013	2013
PovertyHCountRatio	-1.310*	-0.026	-0.760	1.040	0.798	2.807**
	(-1.68)	(-0.02)	(-1.09)	(0.75)	(1.21)	(2.17)
Tier 2 (Credit inst.)	-1.100***	-1.250*	-0.212	-0.376	-0.552	0.099
	(-3.29)	(-1.90)	(-0.63)	(-0.56)	(-1.57)	(0.13)
Tier 3 (MDIs)	-0.492*	-0.187	0.180	0.763	-0.271	0.420
	(-1.80)	(-0.33)	(0.61)	(1.24)	(-0.88)	(0.65)
Tier 4 (SACCOs)	-2.797***	-2.267***	-1.963***	-1.275***	-2.088***	-1.263**
	(-12.87)	(-5.28)	(-7.99)	(-2.59)	(-8.41)	(-2.49)
Tier 2 & Poverty		0.542		0.506		-1.691
		(0.31)		(0.29)		(-0.92)
Tier 3 & Poverty		-0.901		-1.743		-1.807
		(-0.58)		(-1.06)		(-1.13)
Tier 4 & poverty		-1.648		-2.106		-2.218*
		(-1.43)		(-1.63)		(-1.84)
Control variables						
Sex Ratio	7.639***	7.707***	4.069**	4.043**	4.382**	4.307**
	(3.63)	(3.64)	(2.16)	(2.14)	(2.14)	(2.15)
Distance	-0.008***	-0.008***	-0.007***	-0.007***	-0.007***	-0.007***
	(-14.11)	(-14.04)	(-14.61)	(-14.66)	(-14.64)	(-14.70)
lnPopulation	0.525***	0.528***	0.675***	0.681***	0.427***	0.435***
	(2.98)	(2.98)	(4.35)	(4.38)	(3.11)	(3.17)
Employed in Agric	-0.394	-0.318	-0.228	-0.158	-1.820***	-1.762***
	(-0.59)	(-0.47)	(-0.37)	(-0.26)	(-2.94)	(-2.86)
DistNCommBranches	-0.003	-0.002	-0.000	-0.000	-0.003	-0.003
	(-0.65)	(-0.59)	(-0.12)	(-0.07)	(-1.45)	(-1.41)
Constant	-12.825***	-13.369***	-11.982***	-12.656***	-8.117***	-8.924***
	(-4.71)	(-4.81)	(-5.41)	(-5.56)	(-3.33)	(-3.69)
Regional dummies	Included	Included	Included	Included	Included	Included
Observations	12,744	12,744	12,744	12,744	12,744	12,744

z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Static Regression for Branch Expansion on District level Poverty Gap Index and MFI Types (Dep. variable: Number of branches of MFI in a District)

Main variables	(1) 2009	(2) 2009	(3) 2011	(4) 2011	(5) 2013	(6) 2013
PovGap Index	-2.121** (-2.17)	0.314 (0.20)	-1.811** (-2.34)	2.052 (1.45)	-0.351 (-0.61)	2.857* (1.80)
Tier 2 (Credit inst.)	-1.094*** (-3.29)	-0.965** (-1.98)	-0.225 (-0.67)	0.129 (0.27)	-0.573 (-1.63)	0.155 (0.27)
Tier 3 (MDIs)	-0.492* (-1.81)	-0.145 (-0.33)	0.170 (0.58)	0.891* (1.97)	-0.286 (-0.93)	0.399 (0.83)
Tier 4 (SACCOs)	-2.786*** (-12.88)	-2.352*** (-7.49)	-1.968*** (-8.01)	-1.264*** (-3.81)	-2.099*** (-8.44)	-1.506*** (-4.19)
Tier 2 & Poverty		-0.792 (-0.27)		-2.205 (-0.88)		-4.598 (-1.42)
Tier 3 & Poverty		-2.637 (-0.96)		-5.141* (-1.94)		-4.249 (-1.64)
Tier 4 & poverty		-3.453* (-1.88)		-5.092*** (-3.06)		-3.550** (-2.14)
Control variables						
SexRatio	7.039*** (3.47)	7.046*** (3.46)	3.673** (2.02)	3.663** (2.01)	4.698*** (2.73)	4.702*** (2.74)
Distance	-0.008*** (-14.12)	-0.008*** (-14.10)	-0.007*** (-14.59)	-0.007*** (-14.64)	-0.007*** (-14.99)	-0.007*** (-15.02)
lnPopulation	0.474*** (2.69)	0.475*** (2.69)	0.629*** (4.02)	0.626*** (3.98)	0.419*** (3.07)	0.431*** (3.14)
Employed in Agric	-0.631 (-0.97)	-0.539 (-0.83)	-0.362 (-0.61)	-0.260 (-0.44)	-1.649*** (-2.78)	-1.619*** (-2.73)
DistNCommBranches	-0.002 (-0.62)	-0.002 (-0.59)	-0.00 (-0.14)	-0.000 (-0.13)	-0.004 (-1.58)	-0.004 (-1.64)
Constant	-11.560*** (-4.32)	-11.961*** (-4.41)	-10.949*** (-5.02)	-11.545*** (-5.25)	-8.241*** (-4.17)	-8.964*** (-4.48)
Regional dummies	Included	Included	Included	Included	Included	Included
Observations	12,744	12,744	12,744	12,744	12,744	12,744

z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Dynamic Regression for Branch Growth on District level Poverty Headcount Ratio and MFI Types (Dep. Variable: Rate of change of branches of MFI in a District)

VARIABLES	(1) 2009 -2011	(2) 2009 – 2011	(3) 2011 –2013	(4) 2011 –2013	Pooled (5) 2009 – 2013	Pooled (6) 2009 – 2013
PovertyHCountRatio	0.001 (0.16)	0.065** (2.03)	-0.001 (-0.07)	0.029 (0.90)	-0.000 (-0.02)	0.059** (2.57)
Tier 2 (Credit inst.)	0.071*** (7.83)	0.136*** (6.59)	-0.035*** (-3.88)	0.019 (0.90)	0.021*** (3.23)	0.086*** (5.84)
Tier 3 (MDIs)	0.064*** (7.72)	0.142*** (7.54)	-0.029*** (-3.47)	-0.008 (-0.44)	0.021*** (3.50)	0.076*** (5.70)
Tier 4 (SACCOs)	0.034*** (5.26)	0.059*** (3.97)	-0.036*** (-5.56)	-0.025* (-5.485)	0.002 (0.32)	0.025** (2.35)
Tier 2 & Poverty		-0.157*** (-3.52)		-0.130*** (-2.90)		-0.156** (-4.93)
Tier 3 & Poverty		-0.189*** (-4.64)		-0.050 (-1.22)		-0.134*** (-4.64)
Tier 4 & poverty		-0.060* (-1.89)		-0.028 (-0.87)		-0.056** (-2.48)
Control variables						
lagNMFIBranches	-0.113*** (-36.44)	-0.114*** (-36.23)	-0.052*** (-17.48)	-0.053*** (-17.51)	-0.082*** (-37.93)	-0.083*** (-37.94)
lagNMFIDistrict	-0.000 (-0.19)	-0.000 (-0.14)	-0.000 (-1.42)	-0.000 (-1.41)	-0.000 (-0.60)	-0.000 (-0.56)
Sex Ratio	-0.003 (-0.14)	-0.003 (-0.13)	0.025 (1.15)	0.025 (1.14)	0.013 (0.83)	0.013 (0.83)
Distance	-0.000*** (-6.21)	-0.000*** (-6.19)	-0.000*** (-5.56)	-0.000*** (-5.55)	-0.000*** (-8.37)	-0.000*** (-8.35)
lnPopulation	0.003* (1.83)	0.003* (1.82)	0.003 (1.53)	0.003 (1.53)	0.003** (2.20)	0.003** (2.19)
Employed in Agric	-0.006 (-0.57)	-0.006 (-0.59)	-0.023** (-2.16)	-0.023** (-2.17)	-0.017** (-2.32)	-0.018** (-2.33)
DistNCommBranches	0.001*** (5.18)	0.001*** (5.17)	0.000** (2.23)	0.000** (2.23)	0.000*** (4.33)	0.000*** (4.32)
Constant	-0.052** (-2.02)	-0.079*** (-2.72)	0.004 (0.17)	-0.008*** (-0.27)	-0.023 (-1.27)	-0.048** (-2.31)
Regional dummies	Included	Included	Included	Included	Included	Included
Observations	13,216	13,216	13,216	13,216	26,432	26,432

z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Dynamic Regression of Branch Growth on District level Poverty Gap Index and MFI Types (Dep. variable: Rate of change of MFI branches in a District)

VARIABLES	(1) 2009 – 2011	(2) 2009 – 2011	(3) 2011 – 2013	(4) 2011 – 2013	Pooled (5) 2009 -2013	Pooled (6) 2009–2013
PovGap Index	0.002 (0.24)	0.253*** (5.16)	0.009 (1.12)	0.045 (0.91)	0.006 (0.98)	0.166*** (4.74)
Tier 2 (Credit inst.)	0.071 (7.83)	0.140*** (9.30)	-0.035*** (-3.88)	-0.009 (-0.62)	0.021*** (3.23)	0.071*** (6.67)
Tier 3 (MDIs)	0.064*** (7.72)	0.134*** (9.84)	-0.029*** (-3.46)	-0.016 (-1.13)	0.021*** (3.50)	0.066*** (6.81)
Tier 4 (SACCOs)	0.034*** (5.26)	0.078*** (7.17)	-0.036*** (-5.56)	-0.031*** (-2.84)	0.002 (0.33)	0.029*** (3.76)
Tier 2 & Poverty		-0.395*** (-5.73)		-0.150** (-2.16)		-0.291*** (-5.93)
Tier 3 & Poverty		-0.403*** (-6.49)		-0.077 (-1.22)		-0.263*** (-5.89)
Tier 4 & Poverty		-2.49*** (-5.04)		-0.033 (-0.67)		-1.58*** (-4.50)
Control variables						
lagNMFIBranches	-0.113*** (-36.44)	-0.113*** (-36.12)	-0.052*** (-17.48)	-0.053*** (-17.56)	-0082*** (-37.93)	-0.083*** (-37.92)
lagNMFIDistrict	-0.000 (-0.18)	-0.000 (-0.17)	-0.000 (-1.31)	-0.000 (-1.30)	-0.00 (-0.51)	-0.000 (-0.49)
Sex Ratio	-0.003 (-0.17)	-0.002 (-0.11)	0.026 (1.18)	0.026 (1.18)	0.013 (0.89)	0.013 (0.88)
Distance	-0.000*** (-6.22)	-0.000*** (-6.20)	-0.000*** (-5.67)	-0.000*** (-5.65)	-0.000*** (-8.46)	-0.000*** (-8.44)
lnPopulation	0.003* (1.84)	0.003* (1.83)	0.003 (1.60)	0.003 (1.60)	0.003** (2.28)	0.003** (2.27)
Employed in Agric	-0.006 (-0.58)	-0.006 (-0.59)	-0.023** (-2.14)	-0.023** (-2.14)	-0.017** (-2.30)	-0.017** (-2.31)
DistNCommBranches	0.001*** (5.16)	0.001*** (5.16)	0.000*** (2.16)	0.000*** (2.16)	0.000*** (4.28)	0.000*** (4.27)
Constant	-0.052** (-2.03)	-0.096*** (-3.53)	0.001 (0.05)	-0.005 (-0.17)	-0.025 (-1.37)	-0.053*** (-2.73)
Regional dummies	Included	Included	Included	Included	Included	Included
Observations	13,216	13,216	13,216	13,216	26,432	26,432

z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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