DOES TRANSFORMATION OF MICROFINANCE INSTITUTIONS ACHIEVE DUAL MISSIONS: POVERTY REDUCTION AND FINANCIAL SUSTAINABILITY?

By

KIM, Daehong

THESIS

Submitted to

KDI School of Public Policy and Management

in partial fulfillment of the requirements

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MASTER OF DEVELOPMENT POLICY

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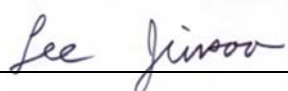MASTER OF DEVELOPMENT POLICY

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ABSTRACT

DOES TRANSFORMATION OF MICROFINANCE INSTITUTIONS
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This study aims to assess the impact of institutional transformation of microfinance institutions (MFIs) on poverty alleviation and financial sustainability, using cross-country and panel data sets from the Microfinance Information Exchange (MIX) Market and the World Bank data. The analysis was conducted using pooled OLS with two-stage least squares (2SLS) and random effects regressions. In order to achieve this aim, the analysis was undertaken with respect to two criteria. On one hand, it examines whether the impact of transforming the legal status of MFIs from non-profits to for-profits on poverty alleviation; and on the other hand, from unregulated non-profits to regulated for-profits with regards to the dual missions: poverty reduction and financial sustainability. The results of the analysis suggest that, taking into account endogeneity with loans of MFIs, a country with higher loans from non-profits tends to have larger effects on reducing poverty than that of for-profits. With respect to regulation on MFIs, the net impact of unregulated non-profits on poverty alleviation is still larger than that of regulated for-profits. Especially, only the unregulated for-profits have a significant and positive impact on improving self-sustainability. This evidence implies that since unregulated non-profit MFIs, compared to regulated for-profit MFIs, more effectively reduce poverty with financially stable operation, the institutional transformation of MFIs should be carefully conducted in order to achieve a higher social impact of serving the poorest of the poor at a financially sustainable manner, helping them to overcome poverty.

Keywords: Microfinance Institutions (MFIs), Transformation, Poverty Reduction, Financial Sustainability, Profit Status, Regulation

ACKNOWLEDGEMENT

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1. INTRODUCTION

1.1 Purpose of the Thesis

The primary purpose of this study is to assess and compare the impact of non-profit and for-profit microfinance institutions (MFIs) on poverty reduction and financial sustainability. In particular, this assessment examines which type of institutional nature for MFIs is more effective in delivering financial services to the poor in order to fight poverty.

1.2 Statement of Problem

There has been heated debate on the institutional nature of MFIs in recent years: should MFIs focus mainly on poverty alleviation or be making profit? This debate reflects the question on what should be the priority of MFIs: poverty reduction or financial sustainability.

In the early 1980s, Muhammad Yunus founded the Grameen Bank, the first organized microfinance institution (MFI) and a non-profit entity to provide financial services to low income households that had been conventionally excluded from the formal banking system. Over the past few decades, microfinance markets have grown and have been considered as a crucial instrument for poor entrepreneurs to start and expand their businesses, helping them to generate income, and overcoming poverty. Under such conditions, the United Nations (UN) declared 2005 as the International Year of Microfinance, and in the following year 2006, the Grameen Bank was awarded the Nobel Peace Prize for their efforts in providing microcredit as means of fighting poverty (Grameen Bank, 2014).

However, as microfinance has developed to meet varying demands (e.g. insurance and savings) from clients and investors, it has been challenged for following reasons: (1) providing loans to the low-income clients would cause high operating costs (to reach the poor

clients in rural area); (2) low rate of return on loan (or high loan default rate); and (3) higher dependency on donor's subsidies, which is closely related to financial self-sufficiency in operating MFIs. According to the Microfinance Information Exchange (MIX) Market database, financial self-sufficiency (in the microfinance context) refers to when "an institution has enough revenue to pay for all administrative costs, loan losses, potential losses and funds". Indeed, Mersland and Strøm (2010) indicated that "around 41% of MFIs are not financially self-sustainable according to a survey by the Micro Banking Bulletin on the basis of the MIX 2006 benchmark data set of 704 MFIs". MFIs have been under pressure to change their operating strategies and draw more attention to transformation into for-profits (from non-profits) to be financially self-sustainable and viable (Wagenaar, 2012). According to the MIX Market in 2009, the number of the for-profit MFIs was 490 out of the 1,161 MFIs (roughly 42%), and make up two-thirds of total assets (more than $65 billion worth) (Roberts, 2013). In this respect, some scholars have argued that profit-oriented MFIs would perform better than non-profits in achieving their social and financial missions—poverty reduction and financial self-sustainability—since the institutional transformation of MFIs can bring more deposits, independence from donors, better management, and finally better financial services to the clients (Mersland and Strøm, 2010)

Moreover, in some cases, regulations on MFIs have also been regarded as a countermeasure to preserve financial viability for MFIs. The main objective of imposing regulations in the microfinance sector is to operate safe and sound MFIs by addressing market failures, information asymmetries between depositors, financial intermediaries, and borrowers. For instance, depositors are often exposed to the threat of acerbating the security of their deposits since financial institutions utilize and invest the deposits in risky profit-making business unexplained to the depositors (Yu et al., 2014). Also, in the same manner, it can be observed in lending and deposit tasks that financial institutions hardly identify the

creditworthy clients due to the fact that only the clients know their own capacity and willingness to repay. In this regard, MFIs are more vulnerable to the clients mostly consisting of entrepreneurial poor who may not fulfill their obligations to repay. To avoid such systemic risks, regulatory measures of MFIs should not only monitor MFIs' activities to improve the safety of depositors, but also remove the risk of having potential defaulters when running MFIs (Ledgewood et al, 2013). The most representative regulation on MFIs is capital adequacy ratio[1] measuring whether MFIs have "a sufficient level of capital required to absorb potential losses while providing financial sustainability" (Ledgerwood, 1998, p.224). This could be a safeguard to sustain the viability of MFIs.

Hence, to secure financial sustainability for MFIs, the transformation into for-profit MFIs or regulation of MFIs seems necessary. Examples of this transformation can be found that El Salvador MFI known as Financiera CALPIA successfully transformed from an NGO into a small, strictly targeted group-oriented formal bank. The bank achieved high return on equity measuring profitability and its institutional stability, and now it has gained attention as a credit worthy institution in the country (Ledgerwood, 1998). Besides, Bolivia MFI, Banco Sol transforming its legal status from a community-based lending program to a for-profit commercial bank has successfully made financial performance by lending loans to around 100,000 borrowers, and approximately 99.5% of them has been repaid (Gonzalez-vega et al. 1997).

The assertions in favor with institutional transformation of MFIs however, are criticized for that if the transformation process proceeds in microfinance industry, the transformed MFIs would target better-off clients in order to achieve the commercial and financial objectives: profitability and financial sustainability, and loss of the original social

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[1] Total capital/risk-weighted assets (Ledgerwood et al, 2012, p. 338)

mission of lending loans to the low socio-economic class of the society as well as to reduce poverty. This is commonly referred to as '*mission drift*' (Mersland and Strøm, 2010) in microfinance industry that MFIs shift their main focus from serving the impoverished to fight poverty to making profit as well as achieving financial self-sufficiency.

1.3 Importance of Issue

Even though the practice of '*mission drift*' is the source of heated debate in the field of microfinance, there has been no empirical study evaluating the impact of different nature of microfinance institutions—non-profits and for-profits on the one hand; and unregulated non-profits and regulated for-profits on the other—with regards to the dual missions of poverty reduction and financial sustainability. This study aims to fill such gap and determine which legal status of microfinance institutions (MFIs) has made the most contributions on poverty alleviation by reaching the poor households as well as financial sufficiency.

Such study is necessary and important when effective strategies and plans of MFIs need to be devised for both poverty reduction and financial sustainability by NGOs, government financial agencies, and international development organizations.

1.4 Research Questions

This paper attempts to investigate whether transformation of MFIs achieve the goals of fighting poverty worldwide and financial self-sustainability. First, it tests whether for-profit MFIs reduce poverty more significantly than non-profit MFIs do (i.e. for-profits target the poorer clients than non-profits). Second, taking into account of regulatory requirement on MFIs, it tests whether a regulated for-profit MFI has a more significant impact on alleviation

of poverty and financial sustainability than an unregulated non-profit MFI. Specific questions are as follows:

1.4.1 Non-profit MFIs vs. For-profit MFIs

➢ Social Mission: Poverty Reduction

A. *Do non-profit MFIs reduce poverty?*

B. *Do for-profit MFIs reduce poverty?*

C. *Are for-profits more effective in reducing poverty than non-profits?*

1.4.2 Unregulated non-profit MFIs vs. Regulated for-profit MFIs

➢ Dual Missions: Poverty Reduction and Financial Sustainability

1.4.2.1 Poverty reduction

A. *Do unregulated non-profit MFIs reduce poverty?*

B. *Do regulated for-profit MFIs reduce poverty?*

C. *Are regulated for-profits more effective in reducing poverty than unregulated non-profits?*

1.4.2.2 Financial sustainability

A. *Do unregulated non-profit MFIs achieve financial sustainability?*

B. *Do regulated for-profit MFIs achieve financial sustainability?*

C. *Are regulated for-profits more financially self-sustainable than unregulated non-profits?*

1.5 Organization of the Paper

The rest of this paper is organized as follows: The second section reviews various literature in the related area. The third section describes estimation methodology and data used in this study. The fourth section discusses the analysis results of the impact of for-profit MFIs on poverty reduction in comparison with non-profit MFIs. The following section reports on further analysis of the results using profit status and regulation of MFIs. Finally, the conclusion and recommendations are presented in the last section.

2. LITERATURE REVIEW

Most studies on microfinance have focused on estimating social welfare of borrowers such as income, health, education and women empowerment in a particular MFI or region at the micro-level. Some studies have discussed social and financial performance of the transformed MFIs since the trend of the institutional transformation of MFIs has emerged in recent years. With this regards, literature review is divided into three parts: first part is on theoretical framework of institutional transformation of MFIs; second, studies of transformation (commercialization) of MFIs; the final part discusses the studies of poverty reduction in microfinance sector.

2.1 Theoretical Framework of Institutional Transformation of Microfinance Institutions

The concept of the institutional transformation of MFIs has not been generalized yet in related studies. Broadly, it implies "a change in legal status from an unregulated non-profit or non-governmental organization (NGO) into a regulated for-profit institution with enhanced service quality and product offering."[2] This could also be referred to as a process of transformation from informal to formal MFIs (Srnec et al, 2008). The related literature often uses the term 'transformation' and 'commercialization' interchangeably. According to the MIX Market data, the term 'commercialization' refers to "the move by MFIs to provide services on a financially self-sufficient basis and under prevailing commercial principle and regulation." Christine (2001), one of the first scholars studying the commercialization in microfinance sector, defines commercialization as consisting of three main features: *regulation, competition*, and *profitability*. In this study, the term 'transformation' is mainly

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[2] Srnec, Divisová, and Svobodivá , "The Transformation Process in Microfinance institutions," Agricultura Tropica et Subtropica, May 12, 2008. Quoted in UNITUS, "Acceleration model," Accessed November, 23, 2007, http://www.unitus.com/sections/aboutus/aboutus/_os_goals.asp

used for clarity since it could more clearly reflect on the status change of institutional structure in MFIs.

The assessment of institutional transformation of a MFI on its performance is originally derived from the debate between the welfarist and the institutionalist, referred to as the *Microfinance Schism* (Morduch, 2000). According to the welfarist, since reaching the poorest of the poor with the view of reducing poverty materially and non-materially is the key objective of the MFIs in spite of the subsidy dependency, the assessment on MFIs should be measured by borrowers' welfare. On the other hand, the institutionalist insist that the performance of MFIs should be assessed by the expansion of financial services to low income class and operate MFIs at a financially self-sustainable base (Bhatt & Tang, 2001).

Theoretically, the debate is closely linked to the trade-off between depth of outreach and financial sustainability. The term 'outreach' as a financial indicator of MFIs is divided into two dimensional approaches: breadth and depth of outreach. While breadth of outreach measures how many borrowers are being served, depth of outreach measures how poor are the borrowers or who is actually being served (Rosenberg, 2009). The major proxy for breadth of outreach is number of active borrowers. For depth of outreach, average loan size is mainly used based on the assumption that the smaller loan size, the deeper outreach or the poorer the borrowers because smaller loan would be lent to poorer clients. Also, the percentage of female borrowers often measures depth of outreach since they are often regarded as relatively poorer than male borrowers (Olivarse-Polanco, 2005).

Thus, not-transformed MFIs would provide smaller loans to worse-off clients and target more female clients (deeper outreach), while transformed MFIs would lend larger loans to better-off clients and the larger number of borrowers (shallower and broader outreach) in order to operate MFIs for financial sustainability. In other words, the original purpose of

microfinance—serving the poorest of the poor so that they overcome poverty—would be abandoned or become tainted towards serving the non-poor clients to achieve better financial performances in terms of operational efficiency, profitability, productivity, and especially sustainability. It seems that the dual missions of serving the destitute and achieving financial sustainability cannot coexist, and the trade-offs are necessarily followed.

Figure 1. The Outreach and Impact of Institutional Transformation on Poverty Line[3]
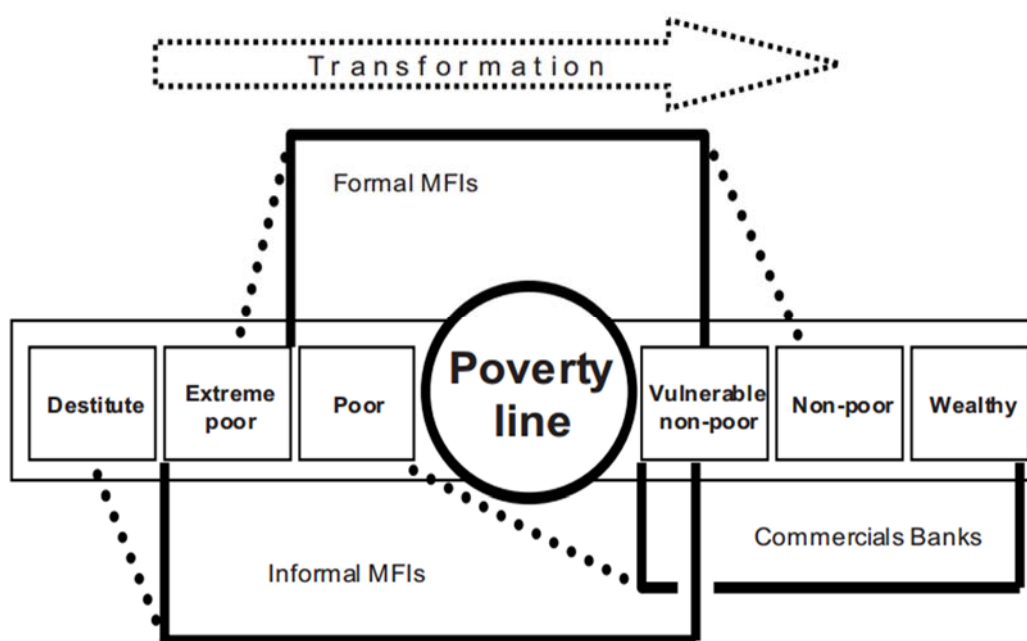
Source: Microfinancegateway (2006)

Figure 1 shows how the transformation process of MFIs switch the main target clients from the poor households (deeper outreach) to the non-poor including less poor clients (broader outreach). This analytical framework on transformation should be confirmed and proven by empirical studies. Thus, following sections explore the empirical literature of the transformation as well as poverty reduction in microfinance sector.

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[3] Srnec, Divisová, and Svobodivá , "The Transformation Process in Microfinance institutions," Agricultura Tropica et Subtropica, May 12, 2008. Quoted in Microfinancegateway, "Helping to improve Donor Effectiveness in Microfinance," Accessed April, 23, 2006, http://www.microfinancegateway.org

2.2 Studies in Transformation (Commercialization) of Microfinance Institutions

2.2.1 Profit Status of Microfinance Institutions

A few empirical studies that used the profit status for transformation of MFIs identified the relationship between profit status of MFIs and performance indicators (outreach and financial sustainability). Roberts (2012) observed whether or not for-profit MFIs charge higher interest rate than non-profit MFIs by conducting OLS (Ordinary Least Squares) based on 258 MFIs for 2009 from MIX Market database and Social Performance Reports. A dummy variable was used for the legal profit status of MFIs. It was revealed that even if for-profit MFIs put higher interest rate on MFI clients, it does not necessary lead to profitability and thus financial sustainability since the stronger profit-orientation is highly correlated with higher cost in MFIs. The author thus concluded that transformation should be more focused on reducing operating costs to achieve financial self-sufficiency.

Wagenaar (2012) focused more on *mission drift* using average loan size and a percent of female borrowers as proxies for depth of outreach. The author employed panel data estimation using 1,558 MFIs over 15 years to capture causal relationship between profit status and charter type of MFIs and depth of outreach indicators. Especially, it was specified for the category of MFIs' profit status: first, MFIs that do not transform; and secondly among transformed MFIs, remaining non-profit as well as becoming for-profit. The charter type was classified into five: NGOs, Banks, Credit Union/Cooperatives, NBFIs (non-banking financial institutions), and others. The results showed that average loan size of transformed for-profit MFIs is significantly larger than that of non-profits, and the for-profit MFIs have a lower proportion of female borrowers. This suggests that outreach of for-profits is shallower than that of non-profits. In case of the charter type, most for-profit MFIs, Banks and NBFIs have higher average loan size and a lower fraction of female borrowers than those of NGOs. These results confirm that *mission drift* does indeed occur in microfinance sector.

Downey and Conroy (2014) simply compared the mean value of several financial performance indicators such as a percentage of female borrowers, average loan size, profit margin, expenses, operational self-sufficiency, interest rates, and a proportion of risky loans between non-profits and for-profits. The division of the profit status for MFIs was based on funding source—whether or not MFIs are funded by shareholder's capital. The data of 460 MFIs was from MIX Market. They found evidence that there is significant difference in profit margin, operational self-sufficiency, and expenses between the two different profit statuses of MFIs. Interestingly, the better performance in terms of financial profitability was captured in non-profit MFIs. No evidence was found on the significant difference in outreach measures (a percentage of female borrowers and average loan size). The implication is that non-profit MFIs have higher financial performances (profit margins and operational self-sufficiency) with equal outreach measures.

2.2.2. Regulation and NGOs of Microfinance Institutions

Regulatory status and type of MFIs (NGOs) for the transformation process has been dealt with in recent literature. Olivarse-Polanco (2005) investigated the causal relationship between the institutional type of MFIs and average loan size (depth of outreach). Unregulated NGOs and regulated financial institutions were used as a dummy variable for the type of MFIs. To closely observe the movement of outreach, three measures of loan size were applied in the study: average outstanding loan / GDP per capita; dollar-years of resources from loan / dollar years of resources from income to adjust for time; and average outstanding loan / GDP per capita of the poorest 20% to adjust for inequality of income distribution in a county. The data sets were utilized of 30 Latin America MFIs over 1999 to 2001 from MIX Market data, conducting OLS (Ordinary Least Square). The paper indicates that there is no significant link between the type of MFIs and all three loan measures.

A study by Hartarska and Nadolnyak (2011) using data for 114 MFIs from 62 countries examined the impact of regulation on MFI's performances, operational self-sufficiency (financial revenue / financial expense + loan Loss Provision + operating expense) and breadth of outreach (number of active borrowers). A dummy variable was taken for regulatory involvement and type of MFIs (NGOs). The researchers revealed that regulated MFIs and NGO MFIs do not show better financial performances in terms of operating MFIs and reaching the larger number of poor clients.

Unlike other studies that used a dummy variable of whether or not MFIs are regulated, Yu, Damji, Vora, and Anand (2014) utilized capital adequacy ratio[4] as a proxy for regulation requirement on MFIs, applying OLS (Ordinary least square), Difference-in-Difference, and IV (Instrumental Variable). They tested first the causal links between regulation on MFIs (capital adequacy ratio) and profitability (return on assets, yields on gross loan portfolio, and write-off ratio), and secondly outreach (a percentage of female borrowers) and profitability (return on assets). The data sets were 2,409 MFIs over the period of 1995 - 2012 and were gathered from MIX Market and World Bank database. The results show that regulation requirement on MFIs increases profitability for MFIs' operation and decrease the outreach to female borrowers who are relatively poorer clients. Not only that, the more female borrower are served, the less profit the MFIs have. Hence, they concluded that there is trade-off between serving the poor clients and achieving better financial performance (profitability).

Evidence gathered by Abrar and Javaid (2014) also confirmed the trade-off between outreach and financial sustainability. The author employed 382 MFIs in 70 countries for 2003 to 2009 conducing random effects estimation. It was examined the causal relationship between outreach (average loan size) and financial characteristics (operational self-

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[4] Total capital/risk-weighted assets (Ledgerwood et al, 2012, p. 338)

sufficiency, repayment risk, reciprocal of productivity). Both the regulatory involvement and legal status (NGO) of MFIs were taken as dummy variables. The results show that average loan size is positively and significantly correlated with those various financial variables leading to transformation (or commercialization). It implies that as MFIs lend larger loans to (better-off) borrowers, MFIs become more financially self-sustainable. Conversely, MFIs lend smaller loans to (worse-off) clients, MFIs get the lower level of financial performance. In particular, regulation on MFIs do strongly effect on increasing average loan size, meaning that regulated MFIs target the better-off households. Thus, the authors concluded that regulation on MFIs results in trade-off between outreach and financial performance.

From the literature above, the three things are clearly identified. First, studies of transformation utilized diverse methodologies and data sets to observe the institutional transformation of MFIs. Second, some studies tried to identify the effect of transformed MFIs on either financial performance measuring profitability and financial self-sufficiency or outreach measures such as average loan size and a proportion of female clients, while other literature utilized both financial sustainability and outreach measures. Third, mixed results were reported and thus the controversy over *mission drift* of MFIs has been still unresolved and remains in question with the recent growth of microfinance industry.

2.3 Studies in Impact of Microfinance on Poverty Reduction

Most of the studies on microfinance are based upon the micro-level data. Much less empirical studies of poverty reduction have been carried out to examine whether or not the success of microfinance is dependent on the macroeconomic structure using cross-country and macroeconomic variables due to reliability of macro data. Yet, several studies found a significant relationship between financial services to the marginal clients (gross loan

portfolio[5]) of MFIs and poverty measures (FGT indices[6]). Imai, Giha, Thapa and Annim (2010, 2012) used data sets from 2003 and 2007 covering 61 countries by applying Pooled OLS (Ordinary Least Squares) with an IV (Instrumental Variable), and Random effects regression models to check the causal relationship between financial services of MFIs (gross loan portfolio) and poverty (FGT indices). The results indicate that gross loan portfolio is significantly and negatively associated with poverty measures (poverty headcount ratio, poverty gap, and poverty squared gap), which means a rise in financial services to the low income households (gross loan portfolio) has a significant impact on poverty reduction. Kwak and Lee (2013) also utilized Pooled OLS and IV models by using 78 countries through the six regions of the world for 2010. They found out that a country with higher gross loan portfolio from MFIs have a significant impact on poverty reduction.

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[5] The outstanding principal balance of all of an MFI's outstanding loans, including current, delinquent, and restructured loans, but loans that have been written off. (Consultative Group to Assist the Poor (CGAP), 2003, p.6)
[6] Foster-Greer-Thorbecke consists of three poverty measures: (i) poverty headcount ratio: the proportion of the population that is poor, (ii) poverty gap: the extent to which individuals fall below the poverty line, (iii) squared poverty gap: the squares of the poverty gaps relative to poverty line (Poverty Manual, All, JH, 2005, p.69-74)

3. METHODOLOGY AND DATA

3.1. Methodology (Model specification)

The analysis in this study adopts methods used by Imai, Giha, Thapa and Annim (2010, 2012) and Das and Khan (2011). The data sets are from 68 countries MFIs from around the world for 2002, 2005, 2008, 2010, and 2011. Pooled OLS (Ordinary Least Squares) with an Instrumental Variable (IV) and Random effects regressions are applied to estimate the impact of microfinance on poverty reduction on the basis of MFIs' profit status. The empirical models in this study are of the following forms:

$$Pov_{it} = \beta_0 + \beta_1 nGLP_{it} + \beta_2 GDPpc_{it} + \beta_3 Domc_{it} + \beta_4 REG_{it} + \varepsilon_{it} \qquad (1)$$

$$nGLP_{it} = \delta_0 + \delta_1 nOER_{it} + \theta_{it} \qquad (2)$$

where, in the equation (1), *Pov* represents FGT (Foster-Greer-Thorbecke) indices: (i) poverty headcount ratio, (ii) poverty gap, and (iii) squared poverty gap; *nGLP* is (i) log of gross loan portfolio and (ii) log of gross loan portfolio per borrower in non-profit MFIs. *GDPpc* indicates log of GDP per capita (at 2005 constant USD); *Domc* is domestic credit provided by financial sector as a share of GDP; *REG* is the regional dummies (EAP, ECA, MENA SA, and SSA); the number of countries and time observation denote i=1,···, N, and t=1,···,T, respectively; ε and θ are error terms. The equation (2) tests potential endogeneity of gross loan portfolio and validity of an instrument in MFIs. *nOER* is operating expense ratio (operating expense/average gross loan portfolio) of non-profit MFIs.

$$Pov_{it} = \beta_0 + \beta_1 pGLP_{it} + \beta_2 GDPpc_{it} + \beta_3 Domc_{it} + \beta_4 REG_{it} + \varepsilon_{it} \qquad (3)$$

$$pGLP_{it} = \delta_0 + \delta_1 pOER_{it} + \theta_{it} \qquad (4)$$

nGLP and *nOER* are replaced by *pGLP and pOER* in the equation (3) and (4) to observe the impact of for-profit MFIs on poverty reduction.

$$Pov_{it} = \beta_0 + \beta_1 \boldsymbol{aGLP}_{it} + \beta_2 GDPpc_{it} + \beta_3 Domc_{it} + \beta_4 REG_{it} + \varepsilon_{it} \qquad (5)$$

Lastly, equation (5) examines the aggregate effect of MFIs on poverty alleviation by using aggregate gross loan portfolio of MFIs ($\boldsymbol{aGLP}_{it}$) as a substitute for *nGLP* or *pGLP*.

Since the main aim of microfinance institutions (MFIs) is to provide financial services to the poor households for overcoming poverty reduction, the study on performance assessment of MFIs should be approached from the welfarist's perspective centered on reducing poverty (Morduch, 2000). The recent empirical studies on microfinance used average loan size as a major proxy to measure the poverty level of individual clients (depth of outreach). However, Ledgerwood (1999) raises concern that the use of average loan size may lead to biased results because it may not reflect the level of borrowers' welfare (the level of poverty). In this sense, this study attempts to directly measure poverty reduction with FGT indices (poverty headcount ratio, poverty gap, and poverty squared gap) instead of using average loan size. The average loan size (gross loan portfolio) is utilized as a proxy for financial support from MFIs to the marginal clients. Moreover, aggregate average loan size of MFIs is used to capture the total (volume/size) impact of MFIs on poverty eradication.

Furthermore, the previous studies with regards to poverty reduction did not consider for the institutional transformation of MFIs. Hence, the institutional nature of MFI is applied in the analysis based on the two criteria. On the one hand, it examines whether the impact of transforming the legal status of MFIs from non-profits to for-profits first on poverty alleviation in the next section; and on the other hand, from unregulated non-profits to regulated for-profits with regards to the dual missions of MFIs: poverty reduction and financial sustainability in the fifth section. More specific description on data sets is followed below.

3.2. Data Description

3.2.1.1 Dependent variables

Povcal Net in World Bank reports FGT[7](Foster-Greer-Thorbecke) indices: poverty headcount ratio, poverty gap, and squared poverty gap index over every 3[8] years from 1981 on the basis of 2005 PPP (Purchasing Power Parity) and USD 1.25/day poverty line. To address the limitation occurred at macro-level studies that cannot capture the activities of the poorest of the poor (Morduch, 1999), this study examines headcount ratio (absolute poverty), poverty gap (depth of poverty), and squared poverty gap (severity of poverty) measuring the different level of poverty (Imai et al., 2012).

3.2.2 Independent variables

With the object of measuring microfinance activities, gross loan portfolio (GLP) (divided by the number of active borrowers: average loan balance per borrower) is mainly used in this study, implying that it measures actual funds disbursed to clients of MFIs. The GLP is adjusted for inflation (at 2005 constant USD) standardizing macro-level data sets for comparison. Based on Microfinance Information Exchange (MIX) Market data reporting the profit status of MFIs, the GLP are generated into two: each GLP of non-profit MFIs and for-profit MFIs. In the equation (1), GDP per capita and domestic credit as share of GDP are also included as a measure of economic growth and financial development given that those variables play a role of reducing poverty. Lastly, regional dummies are utilized to control unobservable regional characteristics (Imai et al., 2012). These data sets are derived from Microfinance Information Exchange (MIX) and World Bank Indicator (WDI).

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[7] Povcal Net in World Bank reports FGT indices [Headcount Ratio (%), Poverty Gap (%), and Squared Poverty Gap(%)]

[8] FGT indices of 2010 are available in the world bank web site (http://iresearch.worldbank.org/PovcalNet/index.htm?1,0)

3.2.3 Instrumental Variable

In the equation (1) and (3), IV (also known as 2SLS) is needed to address the issue of reverse causality. For instance, an increase in gross loan portfolio would improve the poverty level in a country. Conversely, the improvement of poverty in a county would reduce gross loan portfolio due to the fact that people overcoming poverty do not need to borrow loans from MFIs (Kwak and Lee, 2013). Thus, gross loan portfolio is likely to be endogenous in the equation (1) and (3), so that this study uses an instrument, operating expense ratio (operating expense/average gross loan portfolio) which is mainly used to measure operating efficiency when comparing MFIs (Consultative Group to Assist the Poor (CGAP), 2003). This ratio would be negatively related to gross loan portfolio in that an increase in operating expense for MFIs may decrease loans lending to clients. To serve as a valid instrument, the variable must be correlated with the endogenous variable, gross loan portfolio, and at the same time, not be correlated with FGT indices (headcount ratio, poverty gap, and squared poverty gap). In this regard, the validity tests of the IV are conducted and presented in Tables 3 to 5 (Wooldridge, 2010, p.513-540)

4. RESULTS

Through the comparison of performance indicators between non-profit and for-profit MFIs, it can be clarified how the activities of the two different types of MFIs have proceeded in recent years. With this in mind, first the recent trends in financial performance of MFIs are visited on the basis of the profit status over the regions. The next is followed by multivariate regression results from Tables 3 to 8, including descriptive statistics (by regions) in Tables 1 and 2.

4.1 Trends of Financial Performance of Microfinance Institutions

Trends of the important components related to size and outreach to clients in MFIs such as gross loan portfolio, number of active borrowers, and percent of female borrowers are described from Figures 1 to 3 below, showing how these factors of non-profits and for-profits change over the recent years.

Figure 2. Trends of Gross Loan Portfolio – *Size of MFIs*
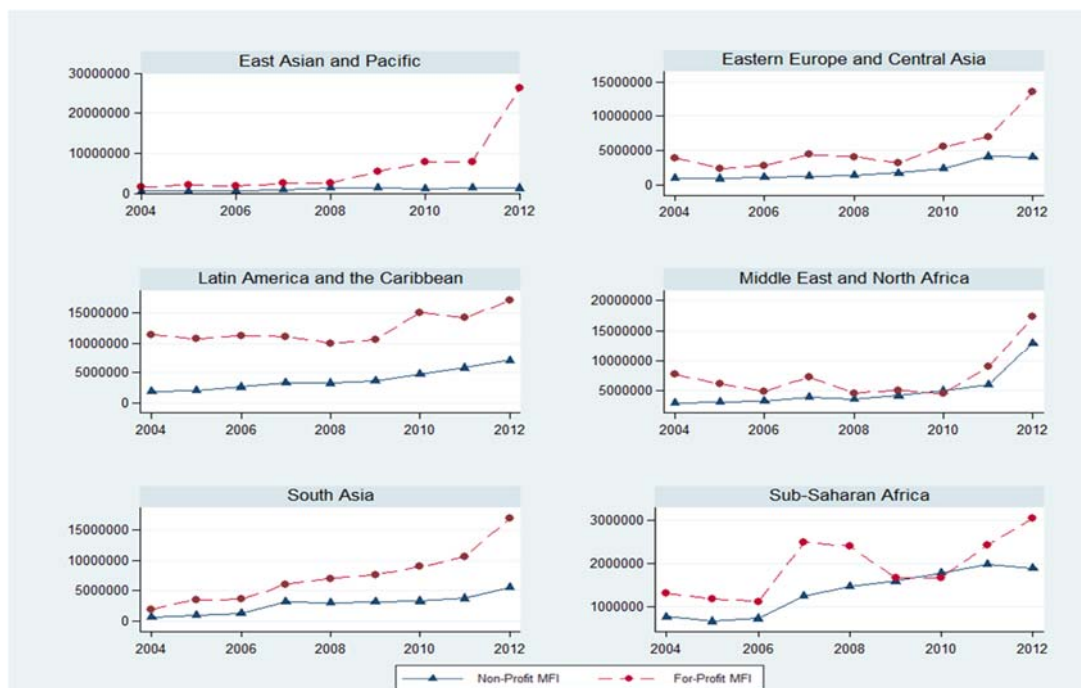
Source: self-compilation from MIX Market data

As depicted in Figure 1, in general, gross loan portfolio (GLP) increased over all the six regions from 2004 to 2012 regardless of the profit status in MFIs. This confirms that microfinance markets had grown during the period. Specifically, the for-profits lent larger loans than the non-profits over the last several years except the year 2010 in the Middle East and North Africa (MENA) and Sub-Saharan Africa (SSA). This indicates that, in general, the size of for-profit MFIs was larger than that of non-profit ones. Also, the slope in the for-profit MFIs between 2011 and 2012 had dramatically risen for the regions, meaning that the size of for-profit MFIs had significantly expanded. In this regard, this could imply the active movement of for-profit MFIs to expand the business in the microfinance sector during the period.

Figure 3. Trends of Number of Active Borrowers - *Breadth of Outreach*
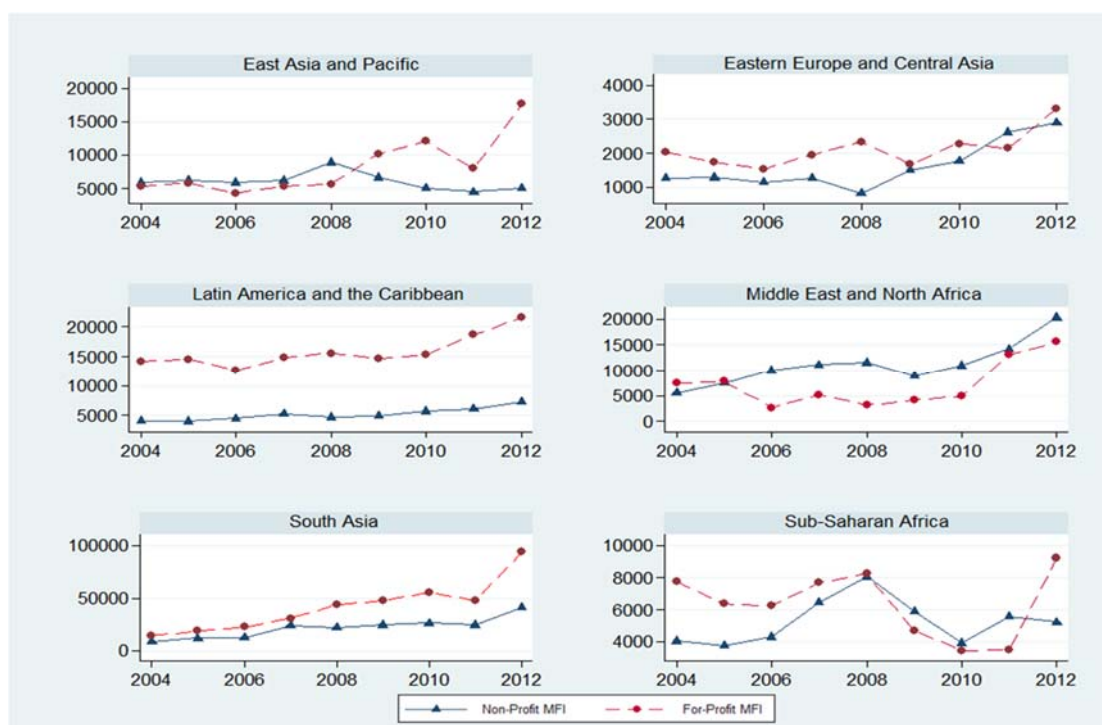
Source: self-compilation from MIX Market data

Number of active borrowers indicates that "the number of individuals who currently have an outstanding loan balance with the MFI or are responsible for repaying any portion of the gross loan portfolio" (Consultative Group to Assist the Poor (CGAP), 2003), basically

measuring the scale (or breadth) of outreach. Unlike the trends of gross loan portfolio above, the Figure 2 shows the mixed results by regions. First of all, for-profit MFIs in the two regions, SA and LAC reached more active borrowers from 2004 to 2012. An interpretation of this is that the better-off clients would have been targeted more in SA and LAC since the profit-oriented MFIs may access the better-off clients to increase profitability through more stable and higher rate of returns on loans. As described in Figure 1, regarding 2011 and 2012, an increase in the number of borrowers was more significant for the for-profit MFIs over the regions except the MENA, and therefore this could confirm the increasing the extent to movement of the profit-oriented MFIs in this sector.

Figure 4. Trends of Percent of Female Active Borrowers - *Depth of Outreach (Gender)*
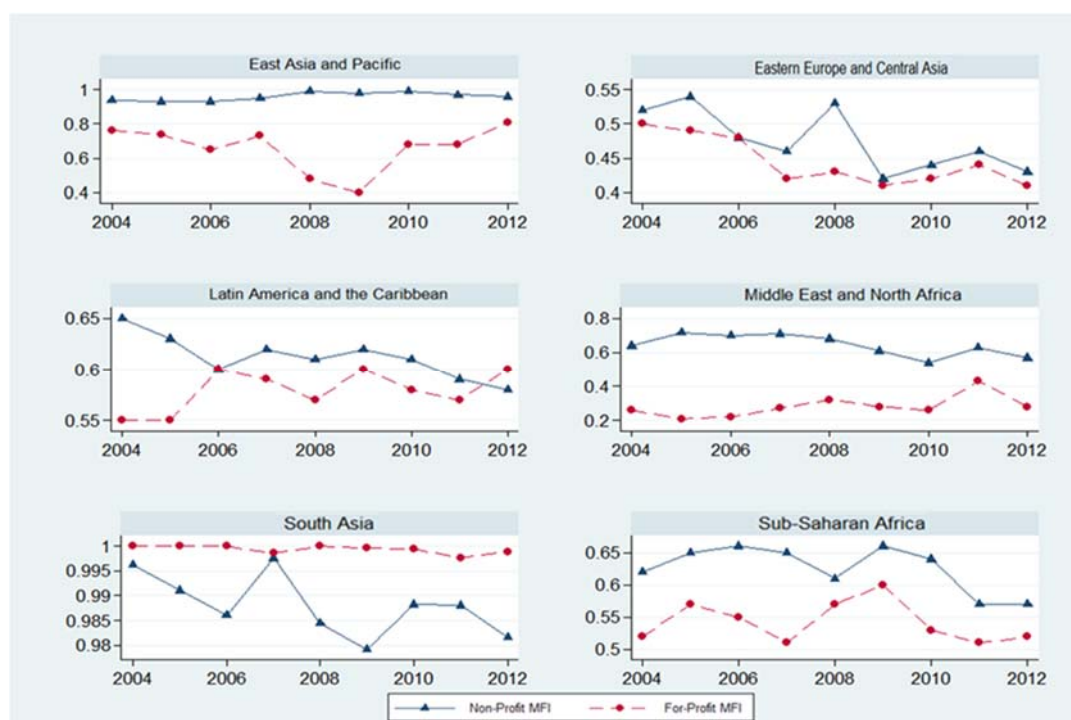
Source: self-compilation from MIX Market data

As explained above, since female borrowers in general are regarded as relatively poorer than male ones, the number of female clients in MFIs could be a good proxy for measuring depth of outreach. In Figure 4, non-profit MFIs overall reached more female

borrowers except SA. In case of LAC, more female borrowers were reached by for-profit MFIs only in 2012. As confirmed by findings of microfinance literature (Dacheva and Gotwalt, 2007; Wagenaar 2012;Yu et al., 2014), this can be interpreted that non-profit MFIs reach more female borrowers as well as marginalized clients in the society (*deeper outreach*).

Overall, gross loan portfolio rose in both non-profits and for-profits from all over the world, and especially the gap of slope in gross loan portfolio between non-profits and for-profits had been wider by the two regions, LAC and SA than by the other regions in 2011 and 2012. This implies that the size of MFIs increased over the period 2004 -2012, and the size of for-profit MFIs was much larger than that of non-profits especially in LAC and SA over the period 2011-2012. Secondly, except MENA, the number of active borrowers in for-profit MFIs was bigger than that of non-profit MFIs in 2012. Also, for-profit MFIs in LAC and SA had continuously reached more borrowers than non-profit from 2004 to 2012. This indicates that broader outreach of the for-profits was observed over all the regions in 2012 and in LAC and SA over 2004 to 2012. Lastly, the proportion of female borrowers to total number of active borrowers was larger in non-profits than for-profits over the world with the exception of LAC and SA during the period 2004 to 2012. As expected, deeper outreach was observed in non-profit MFIs. Thus, in general, it can be concluded that the growing active movement in for-profit MFIs for recent years 2004 to 2012 in the world based on the trends results: larger size of MFIs and broader outreach that may accompany with shallower outreach. In particular, the activities of for-profit MFIs were more intense in these two regions, LAC and SA.

4.2 Descriptive Statistics (by region)

Table 1 presents descriptive statistics of the data, comprising mean, standard deviation, minimum, and maximum of the observations used in this study. Table 2 shows descriptive statistics by regions and profit status of MFIs that can simply compare the level of poverty and capture activities of MFIs over the world in the data sets.

Table 1. Descriptive Statistics: Non-profits vs. For-profits

Variable	Obs.	Mean	Std. Dev.	Min	Max
Poverty headcount ratio	328	25.54	25.41	0.01	87.83
Poverty gap	320	11.06	14.42	0.01	90.50
Squared poverty gap	312	5.82	8.31	0.01	57.34
Log of GLP (Non-profits)	325	14.45	1.43	7.45	17.83
Log of GLP per borrower (Non-profit)	324	6.15	1.25	0.96	9.58
Operating expense ratio (Non-profit)	308	0.37	0.39	0.05	3.35
Log of GLP (For-profit)	312	15.84	1.99	9.97	20.66
Log of GLP per borrower (For-profit)	283	6.81	1.64	2.88	13.02
Operating expense ratio (For-profit)	285	0.30	0.25	0.02	1.60
Log of GLP (Aggregate)	335	16.35	1.93	9.78	21.06
Log of GLP per borrower (Aggregate)	335	6.60	1.46	2.84	12.86
Log of GDP per capita	340	7.11	1.06	4.96	9.11
Domestic credit	335	38.52	32.74	-24.92	185.47

Table 2. Descriptive Statistics by Regions (2002, 2005, 2008, 2010, and 2011)

Regions		Poverty headcount (%)	Poverty gap (%)	Squared poverty gap (%)	Gross loan per borrower ($)		No. of MFIs		No. of active borrowers		Domestic credit	Gross domestic product per capita
					Non-profit	For-profit	Non-profit	For-profit	Non-profit	For-profit		
EAP	Total No.	25	25	25	20	16	21	20	21	19	25	25
	No. of Countries	5	5	5	5	5	5	5	5	5	5	5
	Mean.	22.31	5.36	1.84	311.85	4069.78	12.43	15.05	11514.52	13303.3	45.20	1229.42
	Std. Dev.	9.00	2.90	1.33	196.53	10242.81	12.87	11.02	11728.56	16304.8	52.76	737.38
ECA	Total No.	61	54	48	66	62	68	69	67	68	70	70
	No. of Countries	14	14	14	14	14	14	14	14	14	14	14
	Mean.	4.28	1.34	0.65	2269.12	13534.83	6.94	6.67	5638.64	9767.3	35.60	2953.098
	Std. Dev.	7.62	2.26	2.26	2694.26	57090.40	10.97	5.79	7604.31	11075.9	22.11	1674.41
LAC	Total No.	82	82	82	82	69	82	79	82	77	85	85
	No. of Countries	17	17	17	17	15	17	17	17	17	17	17
	Mean.	10.12	4.45	2.77	917.39	2021.92	12.50	7.25	8130.99	39411.7	48.42	3717.88
	Std. Dev.	13.02	6.70	4.41	792.49	2154.17	11.23	10.31	7671.52	69016.5	24.08	2353.06
MENA	Total No.	20	19	17	19	14	20	17	20	16	20	20
	No. of Countries	4	4	4	4	4	4	4	4	4	4	4
	Mean.	2.68	0.55	0.22	756.98	5790.07	5.90	1.53	13630.35	8514.5	53.14	1703.61
	Std. Dev.	3.37	0.66	0.23	633.05	7387.24	2.53	0.51	17544.80	8030.5	46.24	729.50
SA	Total No.	25	25	25	25	24	25	25	25	25	25	25
	No. of Countries	5	5	5	5	5	5	5	5	5	5	5
	Mean.	29.43	7.43	2.64	212.34	201.75	24.20	15.08	22423.00	1092103.0	52.30	780.48
	Std. Dev.	16.37	5.40	2.26	164.21	87.37	18.77	19.09	28642.16	2287764.0	11.58	400.28
SSA	Total No.	115	115	115	112	98	112	102	112	100	110	115
	No. of Countries	23	23	23	23	23	23	23	23	23	23	23
	Mean.	51.65	24.10	12.54	558.23	1141.06	4.88	5.41	12555.59	24933.4	25.41	767.12
	Std. Dev.	20.66	16.24	9.94	704.27	2016.68	3.61	8.18	26163.55	53726.4	34.14	1116.24
Total	Total No.	328	320	312	324	283	328	312	327	305	335	340
	No. of Countries	68	68	68	68	66	68	68	68	68	68	68
	Mean.	25.54	11.06	5.82	967.40	4386.979	9.23	7.34	10782.09	111094.40	38.52	2044.93
	Std. Dev.	25.41	14.42	8.31	1514.47	27215.18	11.20	10.15	19115.22	708315.60	32.74	2010.25

Note) **EAP**: East Asia and Pacific. **ECA**: East Europe and Central Asia.   **LAC**: Latin America and the Caribbean. **MENA**: Middle East and North Africa. **SA**: South Asia. **SSA**: Sub-Saharan Africa.

Examining the mean value of poverty level (poverty headcount ratio, poverty gap, and squared poverty gap) in Table 2, as expected, SSA experienced the most severe poverty over the world, followed by SA. Also, all levels of poverty in SSA are even worse than the average level of the world poverty, playing a role of big hurdles for the alleviation of poverty. In other words, SSA would be a key region that can improve poverty worldwide through MFIs' activities. However, the average number of MFIs in SSA had not yet been at the topmost, but at the lowest position. In case of the other regions, MENA as the only region that non-profit MFIs had more borrowers than for-profits (breadth of outreach) shows the lowest poverty state. LAC records the highest GDP per capita, and at the same time the standard deviation is the largest over the world. This may point out that LAC experienced the high level of income inequality.

Like the percentage of female borrower used as a proxy for MFIs' depth outreach, the size of loan per borrower (gross loan portfolio divided by number of active borrower) is an important indicator that can identify who is being targeted (depth of outreach) by the MFIs. The non-profit MFIs would provide small loans to the poorer (deeper outreach) while the for-profits would target the better-off clients for securing the rate of return with high interest rate (shallower outreach) (Olivares-Polanco, 2005). Among the regions except for SA, average loan per borrowers of for-profit MFIs is larger than that of non-profit MFIs, implying that for-profits mainly provided large loans to the better-off clients.

On the contrary, the average number of active borrowers measuring the breadth of outreach in for-profits MFIs is approximately ten times larger than non-profits in the total sample. In this regard, taking into account the fact that on average, the number of non-profit MFIs is bigger than that of for-profits, it can be summarized that the smaller number of for-profits reached out to more and better-off clients with larger loans, whereas the larger number

of non-profits provided smaller loans to the less number of clients that would be mostly the worse-off. Therefore, the recent trend of *mission drift* is indirectly confirmed that the transformation into for-profits may lead the MFIs to target the better-off customers with larger loans.

4.3 Regression Results

Tables 3 to 8 present the regression analysis results testing the hypothesis of the relationship between gross loan portfolio (GLP) and three different poverty indicators (poverty headcount ratio, poverty gap, squared poverty gap) measuring the different level of poverty (incidence, depth, and severity) in the non-profits, for-profits, and aggregate MFIs. Tables 3 to 5 show the pooled OLS results with regional dummies using an instrumental variable, operating expense ratio (operating expense / average gross loan portfolio) as a proxy for operating efficiency of MFIs. The results of random effects regression are presented in Tables 6 to 8.

Table 3. Pooled OLS Regression Results: Non-profits vs. For-profits *(Dependent Variable: Poverty Headcount Ratio)*

MFIs Profit Status	Non-profit MFIs			For-profit MFIs			Aggregate MFIs	
Explanatory variables	Log of GLP	Log of GLP per borrower	Log of GLP per borrower with IV	Log of GLP	Log of GLP per borrower	Log of GLP per borrower with IV	Log of GLP	Log of GLP per borrower
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log of GLP (Non-Profit)	-0.734 (0.566)							
Log of GLP per borrower (Non-Profit)		-2.094*** (0.794)	-10.40*** (2.375)					
Log of GLP (For-Profit)				-0.253 (0.413)				
Log of GLP per borrower (For-Profit)					-0.226 (0.621)	-8.878*** (3.353)		
Log of GLP (Aggregate)							-0.339 (0.453)	
Log of GLP per borrower (Aggregate)								-0.567 (0.613)
Log GDP per capita	-11.71*** (1.312)	-11.01*** (1.306)	-7.555*** (1.576)	-11.91*** (1.400)	-11.52*** (1.455)	-8.203*** (1.986)	-11.85*** (1.280)	-11.66*** (1.303)
Domestic credit	-0.01000 (0.0198)	-0.0159 (0.0206)	-0.0344 (0.0306)	-0.00909 (0.0261)	-0.0180 (0.0263)	0.0204 (0.0424)	-0.00741 (0.0210)	-0.0114 (0.0203)
EAP	14.20*** (1.952)	13.58*** (1.847)	8.957* (4.724)	13.12*** (1.908)	14.47*** (2.045)	5.632 (6.892)	14.45*** (1.803)	14.34*** (1.791)
ECA	5.200*** (1.800)	6.811*** (1.828)	13.36*** (4.342)	5.163*** (1.899)	5.392*** (1.922)	4.382 (5.154)	5.610*** (1.726)	5.692*** (1.713)
LAC	14.67*** (1.983)	14.80*** (1.870)	15.15*** (3.720)	14.54*** (2.128)	14.17*** (2.230)	3.562 (6.434)	15.00*** (1.928)	14.68*** (1.911)
SA	16.90*** (3.005)	15.62*** (2.952)	10.46** (4.749)	16.79*** (3.010)	17.76*** (3.483)	-5.898 (10.52)	17.27*** (2.969)	16.28*** (3.047)
SSA	35.43*** (2.246)	35.56*** (2.182)	34.96*** (3.760)	35.06*** (2.387)	35.96*** (2.699)	23.07*** (7.101)	35.69*** (2.203)	35.47*** (2.259)
Constant	100.2*** (11.98)	97.34*** (9.445)	124.3*** (12.39)	95.11*** (11.92)	89.57*** (10.18)	133.7*** (20.7)	95.68*** (11.15)	92.91*** (9.11)
Observations	309	308	293	296	267	247	319	319
Adj. R-sq	0.769	0.773	0.687	0.769	0.766	0.611	0.771	0.771
D-W-Hausman test			0.000			0.0009		
Weak identification test (F-statistic)			49.83			15.27		

Note 1) Robust standard errors in parentheses
2) *** p<0.01, ** p<0.05, * p<0.1
3) 'Middle East and North Africa' (MENA) is excluded to avoid multicollinearity

Table 4. Pooled OLS Regression Results: Non-profits vs. For-profits (*Dependent Variable: Poverty Gap*)

MFIs Profit Status / Explanatory variables	Non-profit MFIs			For-profit MFIs			Aggregate MFIs	
	Log of GLP	Log of GLP per borrower	Log of GLP per borrower with IV	Log of GLP	Log of GLP per borrower	Log of GLP per borrower with IV	Log of GLP	Log of GLP per borrower
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log of GLP (Non-Profit)	-1.160** (0.555)							
Log of GLP per borrower (Non-Profit)		-2.236*** (0.671)	-5.889*** (1.542)					
Log of GLP (For-Profit)				-0.735* (0.390)				
Log of GLP per borrower (For-Profit)					-0.491 (0.529)	-4.045** (2.010)		
Log of GLP (Aggregate)							-0.812* (0.424)	
Log of GLP per borrower (Aggregate)								-0.656 (0.513)
Log GDP per capita	-6.120*** (0.926)	-5.490*** (0.913)	-4.087*** (1.015)	-5.994*** (0.998)	-5.786*** (1.099)	-3.796*** (1.210)	-6.064*** (0.902)	-5.963*** (0.938)
Domestic credit	-0.00220 (0.0135)	-0.00945 (0.0146)	-0.0146 (0.0198)	-0.00237 (0.0184)	-0.0159 (0.0195)	0.00381 (0.0254)	0.00545 (0.0145)	-0.00486 (0.0147)
EAP	1.486 (1.190)	1.205 (1.187)	-0.618 (3.062)	1.078 (1.200)	2.412* (1.414)	-0.961 (4.049)	1.301 (1.149)	1.614 (1.146)
ECA	2.263* (1.354)	4.114*** (1.389)	7.432** (2.938)	2.202 (1.380)	1.986 (1.345)	1.697 (3.174)	2.835** (1.261)	2.655** (1.158)
LAC	7.430*** (1.330)	7.806*** (1.276)	8.382*** (2.465)	7.614*** (1.425)	6.840*** (1.502)	2.246 (3.772)	8.055*** (1.279)	7.481*** (1.205)
SA	1.130 (1.431)	-0.0125 (1.435)	-2.067 (3.076)	1.684 (1.438)	1.104 (1.863)	-7.815 (6.095)	2.041 (1.386)	0.709 (1.462)
SSA	15.28*** (1.615)	15.71*** (1.580)	15.63*** (2.476)	15.45*** (1.676)	15.90*** (1.825)	10.22** (4.107)	15.81*** (1.553)	15.67*** (1.536)
Constant	63.04*** (10.44)	55.25*** (6.908)	67.60*** (8.087)	56.95*** (9.449)	47.65*** (7.558)	60.86*** (12.02)	58.33*** (9.142)	49.36*** (6.672)
Observations	301	300	286	288	260	241	311	311
Adj. R-sq	0.607	0.628	0.566	0.602	0.589	0.484	0.606	0.599
D-W-Hausman test			0.0113			0.0331		
Weak identification test (F-statistic)			49.36			14.67		

Note 1) Robust standard errors in parentheses
2) *** p<0.01, ** p<0.05, * p<0.1
3) 'Middle East and North Africa' (MENA) is excluded to avoid multicollinearity

Table 5. Pooled OLS Regression Results: Non-profits vs. For-profits (*Dependent Variable: Squared Poverty Gap*)

MFIs Profit Status	Non-profit MFIs			For-profit MFIs			Aggregate MFIs	
Explanatory variables	Log of GLP	Log of GLP per borrower	Log of GLP per borrower with IV	Log of GLP	Log of GLP per borrower	Log of GLP per borrower with IV	Log of GLP	Log of GLP per borrower
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log of GLP (Non-Profit)	-0.844** (0.385)							
Log of GLP per borrower (Non-Profit)		-1.330*** (0.460)	-4.653*** (1.074)					
Log of GLP (For-Profit)				-0.396 (0.260)				
Log of GLP per borrower (For-Profit)					0.0878 (0.340)	-3.302** (1.457)		
Log of GLP (Aggregate)							-0.414 (0.284)	
Log of GLP per borrower (Aggregate)								-0.0630 (0.341)
Log GDP per capita	-3.522*** (0.562)	-3.169*** (0.559)	-1.967*** (0.704)	-3.381*** (0.604)	-3.417*** (0.652)	-1.710** (0.868)	-3.508*** (0.552)	-3.584*** (0.581)
Domestic credit	-0.00457 (0.00755)	-0.00875 (0.00840)	-0.0135 (0.0139)	-0.00644 (0.0110)	-0.0160 (0.0111)	0.00363 (0.0188)	-0.000355 (0.00847)	-0.00587 (0.00824)
EAP	-0.215 (0.820)	-0.184 (0.785)	-1.415 (2.146)	-0.456 (0.838)	0.557 (0.856)	-2.100 (2.944)	-0.286 (0.769)	0.0428 (0.716)
ECA	0.866 (0.942)	2.206** (0.940)	5.609** (2.188)	0.766 (0.921)	0.422 (0.837)	0.668 (2.435)	1.274 (0.825)	1.009 (0.742)
LAC	4.685*** (0.923)	5.027*** (0.862)	6.007*** (1.800)	4.570*** (0.973)	4.346*** (0.936)	0.593 (2.726)	4.988*** (0.868)	4.721*** (0.785)
SA	-0.851 (0.899)	-1.380 (0.857)	-2.883 (2.148)	-0.557 (0.841)	-0.228 (1.060)	-8.193* (4.351)	-0.311 (0.789)	-0.640 (0.847)
SSA	7.501*** (1.021)	7.953*** (0.967)	8.279*** (1.785)	7.764*** (1.044)	8.253*** (1.105)	3.536 (2.956)	7.932*** (0.952)	7.973*** (-3.584***)
Constant	38.84*** (7.192)	32.00*** (4.429)	43.32*** (5.548)	32.05*** (6.212)	25.62*** (4.495)	39.04*** (8.691)	32.82*** (6.116)	27.35*** (4.167)
Observations	293	292	278	280	254	235	303	303
Adj. R-sq	0.523	0.527	0.404	0.510	0.499	0.183	0.512	0.505
D-W-Hausman test			0.0004			0.0017		
Weak identification test (F-statistic)			47.74			14.27		

Note 1) Robust standard errors in parentheses
2) *** p<0.01, ** p<0.05, * p<0.1
3) 'Middle East and North Africa' (MENA) is excluded to avoid multicollinearity

Tables 3 to 5 describe the pooled OLS results with regional dummies for each poverty measures: poverty headcount ratio, poverty gap, and squared poverty gap. When the regional dummies are not controlled for, GDP per capita may be overestimated because the income level in a country or each region may be a major determinant of poverty level, and thus, the omitted variable bias occurs in the estimation models. Also, as explained earlier, an instrument, operating expense ratio for the equations using loan per borrower is utilized to address the potential reverse causality problem in the column (3) and (6) of Tables 3, 4, and 5 with the validity test results. Durbin-Wu-Hausman tests for endogeneity suggest that there is endogeneity in the equations that loan per borrower is indeed endogenous, and then an IV is necessary. The weak identification test to check whether there is low correlation between loan per borrower and operation expense ratio indicates that the IV is strong enough based on F-statistics results that if $F > 10$, an IV is strong. To support this, correlation matrix and first-stage regression results are given in Appendices 2 and 3. The correlation matrix presents that all explanatory variables are significantly correlated with poverty variables such as poverty headcount ratio, poverty gap, and squared poverty gap. An instrument is also highly and negatively correlated with the endogenous variable (Log of GLP per borrower). There is no need to use the Sargan over-identification test because the one instrument for loan per borrower is used (Wooldridge 2010, p.513-540).

In the columns (1) and (3) of Table 3, log[9] of GLP in the non-profit and for-profit MFIs are negatively associated with poverty headcount ratio (incidence of poverty), but not significant. In case of log of GLP per borrower in the column (2) and (5), only non-profit MFIs' loan is negative and significant at 1% level while for-profit MFIs' loan is insignificant. However, controlling for the endogeneity issue by using an IV, it was found

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[9] This is called the semi-elasticity of the dependent variable (poverty measures) with respect to the independent variable (gross loan portfolio) using natural log (Wooldridge, 2010, p. 191)

out that log of loan per borrower of the both types of MFIs are negative and significant at 1% level, implying that log of loan per borrower reduces poverty. That is, when loan per borrower of non-profit MFIs increase by 1%, poverty (headcount ratio, percentage term) is reduced by 0.104%. A rise of 1% in loan per borrower of for-profit MFIs alleviates poverty by 0.089%. Yet, log of GLP and GLP per borrower in aggregate MFIs are insignificant. Log of GDP per capita is, as expected, negative and significant at 1 % level in all the estimations. Conversely, the coefficients of domestic credit measuring financial development in a country are all insignificant. Regional dummies turned out that all regions are positive and significant. This indicates that all regions (EAP, ECA, LAC, SA, and SSA) over MENA have higher poverty headcount ratio. These results are consistent with the descriptive statistics by regions of table 2 that MENA has the lowest poverty level in the world.

Table 4 reveals the result of the use of poverty gap (depth of poverty) as a dependent variable in the pooled OLS. Log of GLP in the non-profits and for-profits in the column (1) and (4) are negative and significant at each 5% and 10% level. For the log of GLP per borrower, non-profits are solely negative at 1% statistical significance. Using an IV in columns (3) and (6), it was found out that log of GLP per borrower is negatively and significantly associated with poverty at 1% and 5% level in each non-profits and for-profits. Log of GLP in aggregate MFIs is negative and significant at 10% level whereas log of GLP per borrower is negative, but not significant. Like the Table 3, log of GDP per capita is negative at 1% statistical significance while domestic credit is insignificant in the all estimations. Also, in case of regional dummies that are statistically significant, the results are consistent with the mean value of poverty level in descriptive statistics by regions in Table 2. Specifically, in columns (3) of table 4, the coefficient estimate of regional dummies where are positive and statistically significant are SSA (0.156), LAC

(0.0838), and ECA (0.0743). In Table 3, among those three regions, SSA has the highest poverty gap (0.0241), LAC is the second (0.0445), and ECA is the lowest (0.0134).

Table 5 observes the results replacing poverty gap in Table 4 with squared poverty gap (severity of poverty). Log of GLP and GLP per borrower are only statistically significant in non-profit MFIs with negative sign. Yet, the inclusion of the IV for non-profits and for-profits where non-profits (0.0465) has a slightly lager impact on poverty reduction than that of for-profits (0.033) shows the consistent results with Tables 3 and 4. An interpretation is that a 1% increase in loan per borrower of non-profit MFIs improves poverty severity in a county by 0.0465%, and at the same time when for-profit MFIs lend more loans by 1%, the poverty is alleviated by 0.033%. In all the equations of Table 5, not only log of GDP per capita but also domestic credits turned out the same results of Tables 3 and 4 that log of GDP per capita is negative and significant, on the other hand, domestic credits is insignificant. Besides, the same results in regional dummies of Tables 3 and 4 are observed in the Table 5 that the LAC and SSA that have significant values actually experience the severer poverty than MENA. Unexpectedly, however, log of GLP per borrower with an IV in SA turned out that it is negative and significant, which implies that SA has lower poverty level than MENA. This is inconsistent with descriptive statistics results by regions in Table 2. Therefore, this result may be biased, and needs to be tested with advanced regression techniques.

In sum, log of GLP per borrower with an IV are negatively and significantly associated with all poverty measures (poverty headcount ratio, poverty gap, and squared poverty gap) in the two different nature of MFIs. This implies that MFIs reduce poverty in all different level. In other words, not only non-profits but also for-profits reach out to the poorest of the poor, and thus reduce poverty. In particular, non-profit MFIs have a slightly lager impact on poverty reduction than that of for-profit, meaning that non-profit MFIs

may reach out to the poorer households or lend more loans to them for fighting poverty than for-profit MFIs.

However, the results of pooled OLS regressions may be biased since the time-constant or time-varying unobserved factors are not controlled in the models, which may cause serial correlation between explanatory variables and error terms (omitted variable bias). To eliminate the unobserved effects on the models, fixed effects (FE) and random effects (RE) estimations are applied in this analysis; fixed effects control for time-constant variables and random effects controls for time-varying variables. The decision on which one to use can be made by the Hausman test (1978). Basically, it tests the null hypothesis that there is no systematic difference between the two models (i.e. ***Test: H_0: difference in coefficients not systematic.)*** The test results are given in Tables 6 to 8, indicating that since the null hypothesis is not rejected, random effects models would be more appropriate to be used in our models except for the one model in column (3) of Table 6 that rejects the null hypothesis. This is because standard error of the random effects is less than that of the fixed effects, implying that random effect estimate would be more efficient.

Based on this, Tables 6 through 8 report the results of the random effects regressions using poverty headcount ratio, poverty gap and squared poverty gap, respectively in the same manner that the pooled OLS results are described in Table 3 to 5.

Table 6. Random Effects Regression Results: Non-profits vs. For-profits
(Dependent variable: Poverty Headcount Ratio)

MFIs Profit Status / Explanatory variables	Non-profit MFIs		For-profit MFIs			Aggregate MFIs	
	Log of GLP	Log of GLP per borrower	Log of GLP (FE)	Log of GLP	Log of GLP per borrower	Log of GLP	Log of GLP per borrower
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log of GLP (Non-profit)	-0.663 (0.459)						
Log of GLP per borrower (Non-profit)		-1.111* (0.598)					
Log of GLP (For-profit)			0.972** (0.481)	0.398 (0.414)			
Log of GLP per borrower (For-profit)					0.0844 (0.531)		
Log of GLP (Aggregate)						-0.272 (0.360)	
Log of GLP per borrower (Aggregate)							-0.383 (0.513)
Log GDP per capita	-18.69*** (1.726)	-18.18*** (1.754)	-22.55*** (3.804)	-19.34*** (1.712)	-19.10*** (1.889)	-19.24*** (1.725)	-19.12*** (1.767)
Domestic credit	0.0259 (0.0434)	0.0206 (0.0431)	0.000740 (0.0555)	0.00424 (0.0431)	0.00524 (0.0463)	0.0294 (0.0425)	0.0273 (0.0421)
Constant	166.2*** (11.80)	160.1*** (11.24)	169.7*** (23.69)	155.7*** (11.60)	159.5*** (11.93)	165.0*** (11.16)	162.3*** (11.17)
Observations	309	308	296	296	267	319	319
Number of countries	68	68	68	68	65	68	68
Hausman RE, FE Test ($\chi 2$) p-values	[0.8404]	[0.3283]	[0.0477]		[0.0631]	[0.7160]	[0.3259]

Note 1) Robust standard errors in parentheses ( )
    2) *** p<0.01, ** p<0.05, * p<0.1
    3) P-values in parentheses [ ]
    4) Hausman test: Random effects should be used in the analysis

In Table 6, the effect of loan per borrower on poverty alleviation is significantly observed in only non-profit MFIs at 10% level. In the column (3) that is the most appropriate to use fixed effects, the log of GLP in for-profit MFIs is even positively associated with poverty headcount ratio at 5 % statistical significance. This implies that for-profit MFIs even exacerbate poverty level. As examined in the pooled OLS results, the aggregate MFIs do not have any significant impact on reducing poverty.

Table 7. Random Effects Regression Results: Non-profits vs. For-profits
(Dependent Variable: Poverty Gap)

MFIs Profit Status	Non-profit MFIs		For-profit MFIs		Aggregate MFIs	
Explanatory variables	Log of GLP	Log of GLP per borrower	Log of GLP	Log of GLP per borrower	Log of GLP	Log of GLP per borrower
	(1)	(2)	(3)	(4)	(5)	(6)
Log of GLP (Non-profit)	-1.359*** (0.340)					
Log of GLP per borrower (Non-profit)		-1.978*** (0.444)				
Log of GLP (For-profit)			-1.098*** (0.311)			
Log of GLP per borrower (For-profit)				-1.254*** (0.404)		
Log of GLP (Aggregate)					-1.265*** (0.261)	
Log of GLP per borrower (Aggregate)						-1.416*** (0.378)
Log GDP per capita	-1.359*** (0.340)	-8.090*** (1.123)	-8.441*** (1.136)	-8.268*** (1.264)	-8.335*** (1.098)	-8.267*** (1.146)
Domestic credit	-1.359*** (0.340)	0.000295 (0.0293)	0.00737 (0.0304)	-9.67e-05 (0.0328)	0.0288 (0.0288)	0.0155 (0.0289)
Constant	92.21*** (7.842)	79.98*** (7.184)	87.44*** (7.962)	77.62*** (8.008)	89.17*** (7.326)	77.87*** (7.226)
Observations	301	300	288	260	311	311
Number of countries	68	68	68	65	68	68
Hausman RE, FE Test ($\chi 2$) p-values	[0.7326]	[0.6569]	[0.6142]	[0.7143]	[0.5942]	[0.4151]

Note 1) Robust standard errors in parentheses ( )
2) *** $p<0.01$, ** $p<0.05$, * $p<0.1$
3) P-values in parentheses [ ]
4) Hausman test: Random effects should be used in the analysis

For the poverty gap measuring the outreach to the poorer segments of society, Table 7 shows that log of GLP and GLP per borrower in all the equations are negative and statistically significant at 1% level. In other words, MFIs have a significant impact on alleviating poverty regardless of the profit-status. Looking more closely at the results, loan per borrower in non-profit MFIs has slightly stronger effects to reduce poverty relative to for-profit MFIs and even aggregate MFIs.

Table 8. Random Effects Regression Results: Non-profits vs. For-profits
(Dependent Variable: Squared Poverty Gap)

MFIs Profit Status	Non-profit MFIs		For-profit MFIs		Aggregate MFIs	
Explanatory variables	Log of GLP	Log of GLP per borrower	Log of GLP	Log of GLP per borrower	Log of GLP	Log of GLP per borrower
	(1)	(2)	(3)	(4)	(5)	(6)
Log of GLP (Non-profit)	-0.778*** (0.161)					
Log of GLP per borrower (Non-profit)		-0.995*** (0.211)				
Log of GLP (For-profit)			-0.611*** (0.155)			
Log of GLP per borrower (For-profit)				-0.670*** (0.199)		
Log of GLP (Aggregate)					-0.676*** (0.125)	
Log of GLP per borrower (Aggregate)						-0.691*** (0.183)
Log GDP per capita	-4.333*** (0.683)	-4.078*** (0.702)	-4.261*** (0.694)	-4.272*** (0.770)	-4.028*** (0.687)	-4.249*** (0.709)
Domestic credit	-0.00329 (0.0163)	-0.00678 (0.0163)	-0.00327 (0.0167)	-0.00682 (0.0180)	0.00880 (0.0158)	0.00392 (0.0161)
Constant	47.43*** (4.610)	40.61*** (4.543)	45.36*** (4.679)	40.43*** (4.944)	44.60*** (4.417)	39.89*** (4.550)
Observations	293	292	280	254	303	303
Number of countries	67	67	68	65	68	68
Hausman RE, FE Test ($\chi 2$) p-values	[0.9643]	[0.8989]	[0.9505]	[0.8197]	[0.4378]	[0.4616]

Note 1) Robust standard errors in parentheses ( )
2) *** p<0.01, ** p<0.05, * p<0.1
3) P-values in parentheses [ ]
4) Hausman test: Random effects should be used in the analysis

Taking into account inequality among the poor in the poverty measure (Poverty Manual, All, JH, 2005, p.73), the analysis results of squared poverty gap (severity of poverty) are given in the Table 8 above. As shown in Table 7, log of GLP and GLP per borrower in non-profits, for-profits and aggregate MFIs are negatively associated with the poverty measure at 1% statistical significant. Not only that, the provision of loan per borrower for non-profit MFIs puts the largest effect on the improvement of poverty among the MFIs.

5. FURTHER ANALYSIS ON TRANSFORMATION OF MFIs

To closely explore the transformation of institutional structure in microfinance, regulatory involvement of MFIs is also applied to evaluate the effect of MFIs on reducing poverty. Specifically, it tests whether a regulated for-profit MFI has more significant impact on poverty alleviation than an unregulated non-profit MFI. Moreover, it is worthwhile to test whether or not regulated for-profits do achieve the higher level of financial sustainability since a MFI could no longer remain without financial soundness for stable management even though it helps the poor households to overcome poverty.

To this end, the same methods used in assessing the impact of profit MFIs above are applied in this section. The data sets are 37 countries MFIs over 2002, 2005, 2008, 2010, and 2011 on the basis of MIX (Microfinance Information Exchange) data reporting the profit and regulation status of MFIs and World Bank Indicator. The analyses could more firmly identify the transformed status of a MFI, its impact on not only poverty alleviation but also financial sustainability in microfinance sector. The final empirical models are written as follow:

$$Pov_{it} = \beta_0 + \beta_1 \boldsymbol{u.nGLP}_{it} + \beta_2 GDPpc_{it} + \beta_3 Domc_{it} + \beta_4 REG_{it} + \varepsilon_{it} \qquad (6)$$

where, *u.nGLP* is (i) log of gross loan portfolio and (ii) log of gross loan portfolio per borrower in unregulated non-profit MFIs, which is replaced by *r.pGLP* and *aGLP* in order to capture the effect of regulated for-profits and aggregate *MFIs*.

$$\boldsymbol{OSS}_{it} = \beta_0 + \beta_1 \boldsymbol{u.nGLP}_{it} + \beta_2 GDPpc_{it} + \beta_3 Domc_{it} + \beta_4 REG_{it} + \varepsilon_{it} \qquad (7)$$

All things being equal in the equation (6), *Pov* (FGT indices) is substituted by *OSS*[10] (operational self-sufficiency) measuring whether or not a MFI can earn enough revenue to cover its total costs in the equation (7) (Ledgerwood, 1998, p.217). That is, the ratio, OSS is utilized as a measurement of financial sufficiency of MFIs to observe the effect on financial

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[10] Financial Revenue/ (Financial Expense + Net Loan Loss Provision Expense + Operation Expense) (MIX, 2015)

sustainability of MFIs. A ratio of more than 100% presents a MFI is operationally self-sufficient, implying that it does not need outside financial support for its stable operation.

Table 9 provides descriptive statistics of the variables from unregulated non-profits and regulated for-profits utilized in this study. List of countries and correlation matrix are shown from Appendices 4 and 5.

Table 9. Descriptive Statistics: Unregulated non-profits vs. Regulated for-profits

Variable	Obs.	Mean	Std. Dev.	Min	Max
Poverty headcount ratio	167	23.08	24.44	0.02	87.72
Poverty gap	164	9.41	12.2	0.01	52.76
Squared poverty gap	163	5.085	7.37	0.01	57.34
Log of GLP (Unregulated non-profit)	168	14.57	1.344	11.19	18.14
Log of GLP per borrower (Unregulated non-profit)	166	5.88	1.03	3.44	8.72
OSS (Unregulated non-profit)	164	1.1	0.649	0.15	7.63
Log of GLP (Regulated for-profit)	157	16.79	2.06	11.39	22.38
Log of GLP per borrower (Regulated for-profit)	154	7.049	1.68	2.96	13.02
OSS (Regulated for-profit)	156	1.142	0.27	0.53	3.16
Log of GLP (Aggregate)	169	16.88	1.94	11.45	22.38
Log of GLP per borrower (Aggregate)	167	6.73	1.57	2.99	12.79
Log of GDP per capita	170	7.26	0.99	5.31	9.12
Domestic credit	170	40.09	29.37	-16.13	143.63

The results of random effects regression in the equation (6) are described as below from Tables 10 through 12. As already confirmed by the results using profit status of MFIs, log of GLP and GLP per borrower have significantly negative effects on poverty measures: poverty headcount ratio, poverty gap, and squared poverty gap regardless of profit and regulatory status of MFIs. Also, except for Table 9 using poverty headcount ratio as a dependent variable, on average, regulated for-profit MFIs have less significant effects on reducing poverty than unregulated non-profit ones. Specifically, the coefficient of log of GLP per borrower in aggregate MFIs is the largest (-1.789) in Table 9. For the poverty gap utilized in Table 10, the coefficient value (-1.065) in log of GLP per borrowers for unregulated non-profits MFIs is slightly larger than that (-0.843) for regulated for-profits at each statistical significance 5% and 1%. Lastly, Table 11 shows the same results that the coefficient (-0.562) of unregulated non-profits is bigger than that (-0.497) for regulated for-profits Hence, taking into account both profit sand regulation status, the effect of not-transformed MFIs (unregulated non-profits) on poverty alleviation is still larger.

In the Table 9 above, the mean values of OSS in unregulated non-profits and regulated for-profits are larger than 1 (100%), which indicates that the both types of MFIs are financially self-sustainable. For reference purpose, when running two sample t-test, the results[11] shows that there is no significant difference of OSS between unregulated non-profits and regulated for-profits. Table 13 presents the estimation results of the two different forms of MFIs on financial sustainability. Based on the results of Hausman test in Table 13, Random effects would be more appropriate in using Log of GLP for unregulated nonprofits and regulated for-profits while fixed effects would be preferred to use for Log of GLP per

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[11] The mean difference between the two samples is 0.0375288. As P-value (0.504) in Pr (|T| > |t|) row (under Ha: diff ! = 0) is larger than 0.05. We fail to reject the null hypothesis that there is no difference of OSS between the two samples.

borrower from the two different natures of the MFIs. Interestingly, only the Log of GLP per borrower from unregulated nonprofits is positively and statistically significant at 5% level. This implies that an increase of 1% in loan per borrower from unregulated nonprofit MFIs improves the level of operational sustainability by 0.002%. In other words, even unregulated non-profits are able to achieve financial sustainability. This may supports the assertion by Besley and Ghatack (2004) that socially mission-oriented firms (nonprofits) perform better when staffs are fully motived by the mission with strong financial support from donors. Moreover, regulation on MFIs does not guarantee better financial sustainability (Olivarse-Polanco ,2005; Hartarska, V., & Nadolnyak, D.,2007; Hartarska and Ndolnyak, 2011).

Table 10. Random Effects Regression Results: Unregulated non-profits vs. Regulated for-profits
(Dependent Variable: Poverty Headcount Ratio)

Institutional Transformation Status of MFIs	Unregulated non-profit MFIs		Regulated for-profit MFIs		Aggregate MFIs	
Explanatory variables	Log of GLP	Log of GLP per borrower	Log of GLP	Log of GLP per borrower	Log of GLP	Log of GLP per borrower
	(1)	(2)	(3)	(4)	(5)	(6)
Log of GLP (Unregulated non-profit)	-1.705*** (0.407)					
Log of GLP per borrower (Unregulated non-profit)		-1.713** (0.701)				
Log of GLP (Regulated for-profit)			-1.322*** (0.316)			
Log of GLP per borrower (Regulated for-profit)				-1.378*** (0.404)		
Log of GLP (Aggregate)					-1.592*** (0.335)	
Log of GLP per borrower (Aggregate)						-1.789*** (0.456)
Log GDP per capita	-21.12*** (2.338)	-21.87*** (2.416)	-20.71*** (2.365)	-21.05*** (2.498)	-19.88*** (2.396)	-20.26*** (2.439)
Domestic credit	0.0697 (0.0502)	0.0708 (0.0520)	0.0660 (0.0471)	0.0627 (0.0486)	0.0972* (0.0498)	0.0953* (0.0512)
Constant	198.7*** (15.39)	189.3*** (15.81)	192.8*** (15.69)	183.0*** (16.74)	190.6*** (15.41)	178.6*** (16.18)
Observations	165	163	154	151	166	164
Number of countries	37	37	37	36	37	37
Hausman RE, FE Test ($\chi 2$) p-values	[0.6676]	[0.0859]	[0.6228]	[0.6326]	[0.5240]	[0.5243]

Note 1) Robust standard errors in parentheses ( )
2) *** p<0.01, ** p<0.05, * p<0.1
3) P-values in parentheses [ ]
4) Hausman test: Random effects should be used in the analysis

Table 11. Random Effects Regression Results: Unregulated non-profits vs. Regulated for-profits
(Dependent Variable: Poverty Gap)

Institutional Transformation Status of MFIs	Unregulated non-profit MFIs		Regulated for-profit MFIs		Aggregate MFIs	
Explanatory variables	Log of GLP	Log of GLP per borrower	Log of GLP	Log of GLP per borrower	Log of GLP	Log of GLP per borrower
	(1)	(2)	(3)	(4)	(5)	(6)
Log of GLP (Unregulated non-profit)	-1.140*** (0.280)					
Log of GLP per borrower (Unregulated non-profit)		-1.065** (0.474)				
Log of GLP (Regulated for-profit)			-0.706*** (0.223)			
Log of GLP per borrower (Regulated for-profit)				-0.843*** (0.277)		
Log of GLP (Aggregate)					-0.868*** (0.227)	
Log of GLP per borrower (Aggregate)						-1.040*** (0.301)
Log GDP per capita	-9.125*** (1.395)	-9.440*** (1.451)	-8.971*** (1.452)	-9.008*** (1.518)	-8.656*** (1.449)	-8.672*** (1.467)
Domestic credit	0.0182 (0.0325)	0.0214 (0.0335)	0.0212 (0.0320)	0.0212 (0.0325)	0.0366 (0.0328)	0.0370 (0.0331)
Constant	91.44*** (9.399)	83.31*** (9.488)	85.32*** (9.646)	79.74*** (10.12)	85.37*** (9.361)	77.87*** (9.693)
Observations	162	161	152	149	163	162
Number of countries	37	37	37	36	37	37
Hausman RE, FE Test ($\chi 2$) p-values	[0.7327]	[0.4897]	[0.7243]	[0.6923]	[0.3467]	[0.5015]

Note 1) Robust standard errors in parentheses ( )
2) *** p<0.01, ** p<0.05, * p<0.1
3) P-values in parentheses [ ]
4) Hausman test: Random effects should be used in the analysis

Table 12. Random Effects Regression Results: Unregulated non-profits vs. Regulated for-profits
(Dependent Variable: Squared Poverty Gap)

Institutional Transformation Status of MFIs	Unregulated non-profit MFIs		Regulated for-profit MFIs		Aggregate MFIs	
Explanatory variables	Log of GLP	Log of GLP per borrower	Log of GLP	Log of GLP per borrower	Log of GLP	Log of GLP per borrower
	(1)	(2)	(3)	(4)	(5)	(6)
Log of GLP (Unregulated non-profit)	-0.646*** (0.145)					
Log of GLP per borrower (Unregulated non-profit)		-0.562** (0.249)				
Log of GLP (Regulated for-profit)			-0.455*** (0.128)			
Log of GLP per borrower (Regulated for-profit)				-0.497*** (0.161)		
Log of GLP (Aggregate)					-0.460*** (0.121)	
Log of GLP per borrower (Aggregate)						-0.545*** (0.161)
Log GDP per capita	-4.553*** (0.851)	-5.003*** (0.892)	-4.746*** (0.922)	-4.847*** (0.965)	-4.377*** (0.895)	-4.428*** (0.912)
Domestic credit	0.00135 (0.0176)	0.00419 (0.0184)	0.00789 (0.0188)	0.00676 (0.0192)	0.0128 (0.0179)	0.0134 (0.0182)
Constant	47.46*** (5.613)	44.54*** (5.859)	46.78*** (6.097)	43.47*** (6.454)	44.10*** (5.733)	40.38*** (6.068)
Observations	161	160	151	148	162	161
Number of countries	37	37	37	36	37	37
Hausman RE, FE Test ($\chi 2$) p-values	[0.6145]	[0.8764]	[0.8825]	[0.7719]	[0.3249]	[0.5466]

Note 1) Robust standard errors in parentheses ( )
    2) *** p<0.01, ** p<0.05, * p<0.1
    3) P-values in parentheses [ ]
    4) Hausman test: Random effects should be used in the analysis

Table 13. Fixed and Random Effects Regression Results
: Unregulated non-profits vs. Regulated for-profits
(Dependent Variable: Operational Self-Sufficiency)

Institutional Transformation Status of MFIs	Unregulated non-profit MFIs				Regulated for-profit MFIs			
Explanatory variables	Log of GLP (FE)	Log of GLP (RE)	Log of GLP per borrower (FE)	Log of GLP per borrower (RE)	Log of GLP (FE)	Log of GLP (RE)	Log of GLP per borrower (FE)	Log of GLP per borrower (RE)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log of GLP (Unregulated non-profit)	0.112** (0.0539)	0.0478 (0.0396)						
Log of GLP per borrower (Unregulated non-profit)			0.202** (0.0862)	-0.00966 (0.0839)				
Log of GLP (Regulated for-profit)					0.0142 (0.0171)	0.00360 (0.0123)		
Log of GLP per borrower (Regulated for-profit)							0.0260 (0.0166)	0.0215* (0.0118)
Log of GLP (Aggregate)								
Log of GLP per borrower (Aggregate)								
Log GDP per capita	-0.947** (0.453)	0.0558 (0.0880)	-1.063** (0.464)	-0.00966 (0.0839)	-0.259 (0.194)	0.0335 (0.0458)	-0.300* (0.155)	0.0190 (0.0343)
Domestic Credit	-0.00890 (0.00631)	-0.00472* (0.00282)	-0.00998 (0.00631)	-0.00416 (0.00254)	0.00271 (0.00238)	0.000441 (0.00136)	0.00332* (0.00185)	0.000730 (0.00102)
Constant	6.712** (2.838)	0.199 (0.765)	8.031*** (3.030)	0.436 (0.540)	2.668** (1.232)	0.841*** (0.324)	2.979*** (1.031)	0.821*** (0.224)
Observations	164	164	163	163	156	156	153	153
Number of countries	37	37	37	37	37	37	36	36
Hausman RE, FE Test ($\chi 2$) p-values	[0.0524]		[0.0043]		[0.4046]		[0.0241]	

Note 1) Robust standard errors in parentheses ( )
2) *** p<0.01, ** p<0.05, * p<0.1
3) P-values in parentheses [ ]

6. CONCLUSION AND POLICY RECOMMENDATION

Microfinance, introduced by Muhammad Yunus in 1987, has been regarded as an effective tool for poverty reduction for the poor entrepreneurs, and it rapidly expanded in developing countries over the last decade. With the proliferation of the microfinance industry, non-profit legal entities faced the issue of financial sustainability for their operation due to high operating costs to provide financial services to the destitute, high subsidy dependency, and low return rate on loans. With respect to the matter, transforming into for-profit entities has appeared as a major solution to serve the impoverished with better financial services. However, this new notion has been challenged and hotly debated with the label *mission drift*; that the original social mission serving the poorest of the poor for the poverty reduction would switch to targeting better-off clients to achieve financial sustainability by increasing profitability and operating efficiency. Even though activities of the for-profit MFIs have been largely grown in recent years, no empirical study has analyzed the impact of non-profit and for-profit MFIs on the dual missions: poverty reduction and financial sustainability. To fill this gap, this study aims to assess which legal status of microfinance institutions more significantly contribute on reducing poverty at a financially self-sustainable base.

In order to identify the recent activities in the both types of MFIs: for-profits and non-profits, financial performance of the MFIs were examined using gross loan portfolio (size of MFIs), number of active borrower (breadth of outreach), and the percentage of female active borrowers (depth of outreach) collected by MIX Market database from 2004 to 2012. Overall, for-profit MFIs tend to have more gross loan portfolio than non-profit MFIs in all regions. This indicates that the size of for-profits seems to be larger than that of non-profits. Second, in case of number of active borrowers, for-profits served more borrowers (*broader outreach*) than non-profits except for Middle East and North Africa. Yet, the both

types of the MFIs have the very similar trends in those regions. Third, while for-profit MFIs attracted more female borrowers in South Asia and Latin America and Caribbean only in 2012, non-profit MFIs in other regions and years had more female clients (deeper outreach). Therefore, based on the recent trend of the financial performance in MFIs, it can be confirmed that, in general, for-profit MFIs ran larger size of the business, targeted the bigger portion of clients (broader outreach), and served lower fraction of female borrowers (shallower outreach).

Second, for the empirical analysis, this paper adopts the estimation method used in the study of Imai, Giha, Thapa and Annim (2010, 2012) and Das and Khan (2011): Pooled OLS with two-stage least squares and Random effects regressions, and covers 68 countries for 2002, 2005, 2008, 2010, and 2011. According to the analysis, the non-profits, for-profits, and aggregate MFIs significantly reduce poverty. However, the overall net impact of non-profit MFIs on poverty (FGT indices) is slightly larger than that of for-profit MFIs and aggregate MFIs. These results are consistent with studies by Imai, Giha, Thapa and Annim (2010, 2012) and Kwak and Lee (2013) that a country with higher gross loans portfolio in microfinance institutions has a significantly negative impact on poverty measures (incidence, depth, and severity of poverty) controlling for other factors with significant regional effects. Also, controlling for endogeneity (an instrumental variable) associated with loans in each profit status of MFIs, the results of this study show that loan per borrower and poverty measures are significantly and negatively associated as well.

Furthermore, to firmly observe the effect of institutional transformation of MFIs on poverty reduction and financial sustainability, gross loan portfolio (GLP) and operational self-sufficiency (OSS) ratio are divided into two: each GLP and OSS of an unregulated nonprofit (non-transformed) MFI and a regulated for-profit (transformed) MFI. The analysis results made a final conclusion of this paper that on average, non-transformed MFIs have a

more significant impact on alleviating poverty and even financial sufficiency than transformed MFIs. Thus, given that non-transformed MFIs play a more significant role of poverty reduction with financially stable operation than transformed ones, the institutional transformation (or commercialization) of MFIs should be more carefully conducted in order to achieve a higher social impact of serving the poorest of the poor at a financially sustainable manner, helping them to overcome poverty. David Roodman (2012) offers significant insight into the transformation of MFIs that "The transformation of nonprofits may have been necessary historically as the pioneers felt their way to capitalism, but perhaps today's MFIs founders need not repeat history. If the destination of profit-making, why not just go directly?" (Due Diligence: An impertinent inquiry into microfinance, 2012, p.234*)*

However, these analysis results should not be generalized and applied to all other microfinance programs due to the shortcomings. First, since this study was conducted on macro-level data sets collected from MIX Market based on self-reporting system, it has limitation to closely observe the cases of the recipient borrowers in developing countries. Not only that, taking into account the fact that either non-profits strongly supported by donors or financially surviving not-for-profits would be included in the data sets, positive reporting bias may have an effect on the results. Second, since there are still varying definitions of the transformation or commercialization in related literature, the results may be different from this paper according to how to define institutional transformation of MFIs. Hence, given that this study puts first step forward exploring the impact of the institutional nature of MFIs on poverty reduction and financial sustainability, more concrete data sets on institutional transformation: for-profits and regulation of MFIs need to be used and estimated to conduct performance assessment for MFIs over the world.

APPENDICES

Appendix 1. List of Countries by Regions and Income Level
: Non-profits vs. For-profits

Low income countries		Lower middle income countries		Upper middle income countries		High income countries	
Country	Region	Country	Region	Country	Region	Country	Region
Burkina Faso	SSA	Armenia	ECA	Albania	ECA	Argentina	LAC
Burundi	SSA	Bangladesh	SA	Azerbaijan	ECA	Chile	LAC
Cambodia	EAP	Bolivia	LAC	Bosnia and Herzegovina	ECA	Russia	ECA
Congo, Democratic Republic of the	SSA	Cameroon	SSA	Brazil	LAC		
Ethiopia	SSA	Congo, Republic of the	SSA	Bulgaria	ECA		
Guinea	SSA	Cote d'Ivoire (Ivory Coast)	SSA	China, People's Republic of	EAP		
Haiti	LAC	East Timor (Timor-Leste)	EAP	Colombia	LAC		
Madagascar	SSA	El Salvador	LAC	Costa Rica	LAC		
Malawi	SSA	Georgia	ECA	Dominican Republic	LAC		
Mozambique	SSA	Ghana	SSA	Ecuador	LAC		
Nepal	SA	Guatemala	LAC	Jordan	MENA		
Niger	SSA	Honduras	LAC	Kazakhstan	ECA		
Rwanda	SSA	India	SA	Macedonia	ECA		
Sierra Leone	SSA	Indonesia	EAP	Mexico	LAC		
Sudan	SSA	Kenya	SSA	Panama	LAC		
Tanzania	SSA	Kyrgyzstan	ECA	Paraguay	LAC		
Uganda	SSA	Morocco	MENA	Peru	LAC		
		Nicaragua	LAC	Romania	ECA		
		Nigeria	SSA	Serbia	ECA		
		Pakistan	SA	South Africa	SSA		
		Palestine	MENA				
		Philippines	EAP				
		Senegal	SSA				
		Sri Lanka	SA				
		Tajikistan	ECA				
		Ukraine	ECA				
		Yemen	MENA				
		Zambia	SSA				

Note) This table is based on World Bank Income Classification.

EAP: East Asia and Pacific **ECA**: East Europe and Central Asia **LAC**: Latin America and the Caribbean **MENA**: Middle East and North Africa **SA**: South Asia   **SSA**: Sub-Saharan Africa

Appendix 2. Correlation Matrix Based on Profit Status of MFIs
: Non-profits vs. For-profits

	Poverty headcount	Poverty gap	Squared poverty gap	Non-profit MFIs			For-profit MFIs			Aggregate		Log of GDP per capita	Domestic credit
				Log of GLP	Log of GLP per borrower	Operating expense ratio	Log of GLP	Log of GLP per borrower	Operating expense ratio	Log of GLP	Log of GLP per borrower		
Poverty head count ratio	1.0000												
Poverty gap	0.8359 (0.0000)	1.0000											
Squared poverty gap	0.7996 (0.0000)	0.9716 (0.0000)	1.0000										
Log of GLP (Non-profit)	-0.2716 (0.0000)	-0.3082 (0.0000)	0.2902 (0.0000)	1.0000									
Log of GLP per borrower (Non-profit)	-0.4358 (0.0000)	-0.4 (0.0000)	-0.3497 (0.0000)	0.5491 (0.0000)	1.0000								
Operating expense ratio (Non-profit)	0.3102 (0.0000)	0.3138 (0.0000)	0.3524 (0.0000)	-0.3535 (0.0000)	-0.3398 (0.0000)	1.0000							
Log of GLP (For-profit)	-0.346 (0.0000)	-0.3872 (0.0000)	-0.3551 (0.0000)	0.4271 (0.0000)	0.2782 (0.0000)	-0.0926 (0.1168)	1.0000						
Log of GLP per borrower (For-profit)	-0.4515 (0.0000)	-0.3886 (0.0000)	-0.2935 (0.0000)	0.3508 (0.0000)	0.5597 (0.0000)	-0.148 (0.0165)	0.5902 (0.0000)	1.0000					
Operating expense ratio (For-profit)	0.4045 (0.0000)	0.3873 (0.0000)	0.3982 (0.0000)	-0.2467 (0.0000)	-0.2714 (0.0000)	0.4557 (0.0000)	-0.2590 (0.0000)	-0.3164 (0.0000)	1.0000				
Log of GLP (Aggregate)	-0.341 (0.0000)	-0.3704 (0.0000)	-0.3246 (0.0000)	0.6323 (0.0000)	0.431 (0.0000)	-0.1373 (0.0000)	0.9257 (0.0000)	0.6405 (0.0000)	-0.2618 (0.0000)	1.0000			
Log of GLP per borrower (Aggregate)	-0.4725 (0.0000)	-0.3952 (0.0000)	-0.3065 (0.0000)	0.3976 (0.0000)	0.714 (0.0000)	-0.1628 (0.0000)	0.5959 (0.0000)	0.9465 0.0000	-0.3079 0.0000	0.6726 0.0000	1.0000		
Log of GDP per capita	-0.7774 (0.0000)	-0.6659 (0.0000)	-0.6039 (0.0000)	0.2739 (0.0000)	0.4731 (0.0000)	-0.1244 (0.0000)	0.354 (0.0000)	0.4865 (0.0000)	-0.1813 (0.0000)	0.3696 (0.0000)	0.5228 (0.0000)	1.0000	
Domestic credit	-0.3604 (0.0000)	-0.3388 (0.0000)	-0.3263 (0.0000)	0.1803 (0.0000)	0.1084 (0.0000)	-0.0942 (0.0000)	0.3615 (0.0000)	0.2555 (0.0000)	-0.0777 (0.1947)	0.3512 (0.0000)	0.2086 (0.0001)	0.4754 (0.0000)	1.0000

Note) P-values in parentheses

Appendix 3. First Stage Regression Results
: Non-profits vs. For-profits
(Dependent variable: Log of GLP per borrower)

(1) Dependent variable of the second stage: *Poverty Headcount Ratio*

MFIs Profit Status	Non-profit MFIs	For-profit MFIs
Explanatory variables	Log of GLP per borrower	Log of GLP per borrower
Operating expense ratio	-0.932***	-1.353***
	(0.1321)	(0.118)
Log of GDP per capita	0.3608***	0.39***
	(0.0766)	(0.118)
Domestic credit	-0.002	0.005*
	(0.002)	(0.003)
EAP	-0.576**	-0.954**
	(0.27)	(0.469)
ECA	0.721***	-0.162
	(0.233)	(0.3913)
LAC	0.211	-1.051***
	(0.223)	(0.383)
SA	-0.809***	-2.635***
	(0.269)	(0.438)
SSA	0.026	-1.075***
	(0.225)	(0.399)
Constant	3.906***	5.256***
	(0.56)	(0.864)
Observations	293	247
Adj. R-sq	0.442	0.413

Note 1) Robust standard errors in parentheses
2) *** p<0.01, ** p<0.05, * p<0.1

(2) Dependent variable of the second stage: *Poverty Gap*

MFIs Profit Status	Non-profit MFIs	For-profit MFIs
Explanatory variables	Log of GLP per borrower	Log of GLP per borrower
Operating expense ratio	-0.926***	-1.335***
	(0.132)	(0.348)
Log of GDP per capita	0.347***	0.403***
	(0.077)	(0.121)
Domestic credit	-0.002	0.005*
	(0.002)	(0.003)
EAP	-0.518*	-0.831*
	(0.274)	(0.482)
ECA	0.793***	-0.009
	(0.241)	(0.412)
LAC	0.281	-0.938**
	(0.228)	(0.401)
SA	-0.757***	-2.503***
	(0.272)	(0.452)
SSA	0.078	-0.942**
	(0.229)	(0.415)
Constant	3.928***	5.03***
	(0.566)	(0.884)
Observations	286	241
Adj. R-sq	0.432	0.406

Note 1) Robust standard errors in parentheses
    2) *** p<0.01, ** p<0.05, * p<0.1

(3) Dependent variable of the second stage: *Squared Poverty Gap*

MFIs Profit Status	Non-profit MFIs	For-profit MFIs
Explanatory variables	Log of GLP per borrower	Log of GLP per borrower
Operating expense ratio	-0.918***	-1.331***
	(0.133)	(0.353)
Log of GDP per capita	0.346***	0.392***
	(0.078)	(0.122)
Domestic credit	-0.002	0.006*
	(0.002)	(0.003)
EAP	-0.395	-0.741
	(0.284)	(0.501)
ECA	0.892***	0.091
	(0.258)	(0.442)
LAC	0.402*	-0.837**
	(0.24)	(0.423)
SA	-0.634**	-2.42***
	(0.283)	(0.47)
SSA	0.195	-0.851*
	(0.241)	(0.436)
Constant	3.816***	4.993***
	(0.575)	(0.902)
Observations	278	235
Adj. R-sq	0.417	0.388

Note 1) Robust standard errors in parentheses
　　 2) *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix 4. List of Countries by Regions and Income Level
: Unregulated non-profits vs. Regulated for-profits

Low income countries		Lower middle income countries		Upper middle income countries		High income countries	
Country	Region	Country	Region	Country	Region	Country	Region
Cambodia	EAP	Bolivia	LAC	Brazil	LAC	Chile	LAC
Congo, Democratic Republic of the	SSA	East Timor (Timor-Leste)	EAP	Bulgaria	ECA	Russia	ECA
Haiti	SSA	El Salvador	LAC	China, People's Republic of	EAP		
Malawi	SSA	Ghana	SSA	Colombia	LAC		
Sierra Leone	SSA	Honduras	LAC	Dominican Republic	LAC		
Sudan	SSA	India	SA	Ecuador	LAC		
Tanzania	SSA	Indonesia	EAP	Macedonia	ECA		
Uganda	SSA	Kenya	SSA	Mexico	LAC		
		Nicaragua	LAC	Panama	LAC		
		Nigeria	SSA	Paraguay	LAC		
		Pakistan	SA	Peru	LAC		
		Palestine	MENA				
		Philippines	EAP				
		Sri Lanka	SA	Haiti			
		Yemen	MENA	Uganda			
		Zambia	SSA				

Note) This table is based on World Bank Income Classification.

EAP: East Asia and Pacific **ECA**: East Europe and Central Asia **LAC**: Latin America and the Caribbean **MENA**: Middle East and North Africa **SA**: South Asia   **SSA**: Sub-Saharan Africa

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Appendix 5. Correlation Matrix Based on Profit Status and Regulation of MFIs
: Unregulated non-profits vs. Regulated for-profits

	Poverty headcount	Poverty gap	Squared poverty gap	Unregulated non-profit MFIs			Regulated for-profit MFIs			Aggregate		Log of GDP per capita	Domestic credit
				Log of GLP	Log of GLP per borrower	Operational Self-Sufficiency	Log of GLP	Log of GLP per borrower	Operational Self-Sufficiency	Log of GLP	Log of GLP per borrower		
Poverty head count ratio	1.0000												
Poverty gap	0.9648 (0.0000)	1.0000											
Squared poverty gap	0.9145 (0.0000)	0.9801 (0.0000)	1.0000										
Log of GLP (Unregulated non-profit)	-0.1252 (0.1091)	-0.0732 (0.3549)	-0.0262 (0.7413)	1.0000									
Log of GLP per borrower (Unregulated non-profit)	-0.4358 (0.0000)	-0.3384 (0.0000)	-0.2816 (0.0000)	0.5055 (0.0000)	1.0000								
Operational Self-Sufficiency (Unregulated non-profit)	-0.1409 (0.0746)	-0.1185 (0.1382)	-0.0960 (0.2314)	0.1195 (0.1276)	0.2716 (0.0005)	1.0000							
Log of GLP (Regulated for-profit)	-0.3866 (0.0000)	-0.3282 (0.0000)	-0.2946 (0.0000)	0.3650 (0.0000)	0.4288 (0.0000)	0.0097 (0.9046)	1.0000						
Log of GLP per borrower (Regulated for-profit)	-0.3361 (0.0000)	-0.2509 (0.0000)	-0.1988 (0.0000)	0.3404 (0.0000)	0.6215 (0.1178)	0.1278 (0.1178)	0.6369 (0.0000)	1.0000					
Operational Self-Sufficiency (Regulated for-profit)	-0.2859 (0.0003)	-0.2849 (0.0004)	-0.2855 (0.0004)	0.0573 (0.4789)	0.1707 (0.0337)	0.1600 (0.0482)	0.0917 (0.2548)	0.2946 (0.0002)	1.0000				
Log of GLP (Aggregate)	-0.3107 (0.0000)	-0.2539 (0.0011)	-0.2033 (0.0095)	0.5087 (0.0000)	0.5207 (0.0000)	0.0476 (0.5450)	0.9734 (0.0000)	0.6885 (0.0000)	0.0897 (0.2653)	1.0000			
Log of GLP per borrower (Aggregate)	-0.4137 (0.0000)	-0.3337 (0.0000)	-0.2782 (0.0004)	0.3462 (0.0000)	0.7175 (0.0000)	0.1406 (0.0733)	0.7293 (0.0000)	0.9404 (0.0000)	0.2376 (0.0000)	0.7729 (0.0000)	1.0000		
Log of GDP per capita	-0.7941 (0.0000)	-0.7111 (0.0000)	-0.6557 (0.0000)	0.0475 (0.5412)	0.4117 (0.0000)	0.0476 (0.5446)	0.3728 (0.0000)	0.3491 (0.0000)	0.1786 (0.0257)	0.3245 (0.0000)	0.4114 (0.0000)	1.0000	
Domestic credit	-0.3863 (0.0000)	-0.3855 (0.0000)	-0.3807 (0.0000)	-0.0690 (0.3742)	0.1239 (0.1118)	-0.0957 (0.2230)	0.2128 (0.0000)	0.1942 (0.0158)	0.0764 (0.3434)	0.1268 (0.1006)	0.1546 (0.0460)	0.4598 (0.0000)	1.0000

Note) P-values in parentheses

Appendix 6. Source of Data

Variable	Source	URL
FGT Indices (Foster-Greer-Thorbecke)	World Bank	http://iresearch.worldbank.org/PovcalNet/index.htm?0
GDP per capita (at 2005 constant USD)	World Bank	http://databank.worldbank.org/data/views/reports/tableview.aspx
Domestic Credit Provided by Financial Sector (% of GDP)	World Bank	http://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS
Gross Loan Portfolio	Microfinance Information Exchange	http://www.mixmarket.org/
Number of Active Borrowers	Microfinance Information Exchange	
Number of Microfinance Institutions	Microfinance Information Exchange	
Operating Expense Ratio	Microfinance Information Exchange	
Operational Self-Sufficiency	Microfinance Information Exchange	

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