

# Microfinance Institutions and Poverty Reduction: A Cross Region Analysis

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## ABSTRACT

The present study investigates the role of microfinance institutions (MFIs) are playing to reduce poverty by reaching the poor, financial sustainability and reaching women for 382 MFIS operating in seventy countries located in six regions of the world from 2005 t0 2011. The determinants of outreach (depth and breadth) and its cost (lending interest rate), women outreach and financial sustainability are examined. The results of the study indicate that as depth of outreach is inversely related with the cost of outreach and positively with sustainability. However, breadth of outreach has significant positive relation with cost of outreach and sustainability. Other factors like MFI size, capital structure, risk, regulation, group lending are significant contributor of outreach generally in all regions. The financial sustainability is positively related to interest rate and negatively to average loan size. The results support that providing credit to women would reduce the poverty level of the household. As the group lending, rural market, capital structure, risk and financial sustainability, MFI size, population density has positive impact on women outreach. The analysis indicate most of the regions: Africa, South Asia, East Asia, Latin America, and Middle East the breadth, depth, cost of outreach and women outreach is higher compare to base region Eastern Europe. The study also emphasis the need of both outreach and sustainability, as in order to survive in future, microfinance industry should be sustainable by reducing its transaction, operational and administrative cost against its lending interest rate and average profit

**Key words:** Outreach, Interest Rate, financial sustainability, women outreach.

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## 1. Introduction

The alleviation of poverty is one of the most debated issues among the academicians and policy makers. From 1950s to 1980s the poverty reduction program has been based on increase the participation of poor into the economy by better macroeconomic performance. Though the poor part of population mostly engaged in informal sector<sup>2</sup> is identified by researchers but has not become the part of economic models, government plans and policy (Robinson, 2001). Poverty reduction has been institutionalized in 1944 when World Bank was set up. The World Bank worked through governments and institutions by giving loans to developing countries called structural-adjustment programs. These programs were highly unsuccessful, created dependence on aid with little help to poor part of societies (Murdoch, 1999 and Diop et al., 2007).

This failure due to distrust in formal institutions give the beginning of a shift in development thinking that leads to the emergence of microfinance. The focus is support of the informal sector by providing credit to help people to pull them above the poverty line. Microfinance helps these informal micro-enterprises through micro-credit. The micro-credit approach to poverty reduction is “the provision of small loans to individuals, usually within groups, as capital investment to enable income generation through self-employment” (Weber, 2006). The informal businesses of poor are thought of as a type of un-met demand for credit. Poverty is now considered as the outcome of market failure<sup>3</sup>. Microfinance would correct the market failure, providing access to credit to the poor. Credit would create economic power that would generate into social power, lifting the poor out of poverty (Yunus, 1999).

Although there is a consensus that microfinance should aim to reach the poor, there are two opinions about reaching the poor. The first opinion is that microfinance should aim the poor close to poverty line as they are mostly having income producing activities. The improvement of their activities will promote jobs in the local community, and benefits will trickle down to the poorest. This second opinion is that in targeting the poorest even though the cost may be high.

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<sup>22</sup> Until 1980s the presence of in-formal microenterprises- street vendors, home workshops, market stalls, providers of informal transportation services- was generally perceived by policymakers and economists to be a result of economic dysfunction (Robinson, 2001).

<sup>3</sup> Market imperfections, asymmetric information and the high fixed costs of small-scale lending, decrease to reach of the poor to formal finance, thus the poor will chose the informal financial sector or to the worst case of financially excluded (Green, Kirkpatrick, & Murinde, 2006)

The argument is that the poorest are not capable to initiate any productive activity. The loan starts activity and enable the borrower to repay the loan and but save. Some methods to reach the poorest are by reaching the female, as they face more poverty than male, or to reach rural poor as they are more poor than urban areas (Diop et al., 2007).

The present study tries to answer this question by analyzing whether microfinance institutions have achieved their objectives of reaching the poorest, reaching the female and financially sustainable institutions in six regions and around the world. The main focus of this study is to find out the determinants of outreach in microfinance industry. The study explores the dimension of outreach depth or breath is more meaningful in alleviating poverty. The impact of other factors like cost, profitability, and MFI age, MFI size, lending methodology, regulation and risk on the outreach of MFIs is also investigated. The factors contributing to financial sustainability are investigated as maintaining sustainability for assuring future outreach in different regions of the world.

The study contributes to the existing literature by investigating depth, breath and cost of outreach of MFIs in reducing poverty, increasing empowerment opportunities and maintains sustainability in microfinance institutions. It also high lights that the tradeoff is required by MFIs in outreach and sustainability in order to perform microfinance activities for a longer period of time since the cost of outreach is higher that demands an optimal level of profitability that can be generated through efficient management of MFIs through cost cutting and achieving average on regular basis. The study also signifies that age, size, regulation, lending methodology and geographic location of MFIs also affect their outreach.

After brief introduction the remainder of the study is organized as follows. Section two reviews the relevant literature on the role of microfinance on poverty alleviation. Methodology and data used in the analysis is discussed in section three. The empirical results and their interpretation are provided in section four and last section offers conclusion.

## **2. Literature Review**

This section includes the review of most relevant literature on how microfinance institutions alleviate poverty and provide empowerment opportunities to the poorer of the society.

A study conducted by Christen and Drake (2002) on MFIs of Latin America shows a positive relationship between depth outreach measured by average loan size. Their study empirically support that MFIs in Latin America are most profitable, as their profitability is the mixture of three properties; large loan size, competition and regulations.

Olivares and Polance (2005) have analyzed average outstanding loans used as proxy for depth of outreach, as dependent variable with other explanatory variables like age of institution, lending methodology, sustainability, competition, and gender. Their results reported negative relationship between age and loan size which means that older MFIs give loan of small sizes. Another study conducted by Mersland and Strom (2009) document that average loan size is a main proxy of serving the poorest of the society. They find a positive relationship between average profit and average loan size indicating that the increase size of loan represent increase urge for profit by MFIs.

Wagenaar (2012) has worked on institutional transformation and mission drift in microfinance institutions. According to him, there is huge pressure from donors on microfinance institutions to be profitable. Due to this reason some MFIs have transformed from nonprofit to profit oriented institutions. He argues that financial sustainability may lead toward less reaching to the poorest of the poor. Results show that transformed MFIs have significantly higher loan size and have lower percentage of female borrowers. This shows that transformation effects outreach that cause deviation from social mission towards profitability. Cull *et al.* (2011) investigate regulated and non-regulated microfinance institutions. The results show that regulated MFI has high loan size than non-regulated NGO type microfinance institutions. The operating cost increases as loan size decreases by lending to poorer segment. To minimize or absorb this operating cost MFI are more tempted towards better off clients and restrict outreach to poorer segment and increases loan size is reported. Therefore, regulated microfinance institutions are more likely to experience deviation from social mission than non-regulated NGO type institutions.

Rashid *et al.* (2011) find positive impact of microfinance on poverty alleviation. They show that increased fund, lower interest rate and accessible financial services made microfinance important and effective for poverty reduction. Another study of Zacharias (2008) shows that average cost and efficiency goes in opposite direction. He addressed the issue of economics of scale in microfinance institutions and finds evidence of scale efficiencies. His study focuses on

the operational cost and size relationship finds that bigger firm is associated with smaller cost. The study finds that average loan size and average cost are negatively co-related thus suggesting that increase in average loan and firm size reduces the operational cost.

Robert *et al.* (2011) examine the tradeoff between outreach and efficiency of MFIs. They find that MFIs operating in countries with good financial development are more efficient. They find that outreach is negatively related with efficiency suggesting that MFIs with small loan size are less efficient. Their findings showed that efficiency can only be obtained when MFI will focus less on poor segment.

Cull *et al.* (2007) find not a significant relationship between loan size and profitability. For individual lender results reveal that higher profit leads towards lower outreach resulting in crowding out the poorer clients. Village micro banks put more focus on advancing small loans to the very poor and bear high average cost and receive more subsidies. Few individual lending institutions strive best for both profitability and higher outreach to the poor; fulfilling their ultimate promises, but these are exceptional cases. Finally their results showed that MFIs with higher profits lead toward weak level of outreach and kicks out the very poor from financial schemes.

Armendariz and Szafarz (2009) empirical work on Latin America and south Asia show that poverty oriented MFIs may deviate from their mission neither because of progressive lending nor because of cross subsidization. It is not only the result of transaction cost but also due to their own mission fulfilling strategy and other region specific characteristics. According to their findings if all loans are identical then transaction cost only affects the number of loans not the size of loan. Secondly if there are two types of clients, poor and unbanked wealthier clients, having different transaction cost then mission drift on the loyalty of MFIs with outreach maximization objective. Finally MFIs may use unbanked wealthier clients for purpose of cross subsidization for poor showing strong commitment with outreach.

Ghosh and Tassel (2008) observe that MFIs may drift from their mission and start focusing on profitable less costly borrowers in order to attract more profit oriented investors. Their results show that funded by profit oriented donors charge higher interest rates. According to their findings poverty gap ratio is the reason for not reaching the poor...

Higher interest rates are mainly due to very heavy transaction cost that arises when lending small amounts to poor people is observed by Gonzalez (2010). He further states that

Microfinance interest rates normally range between 20 to 70% per year, depending on the nature of the activity, however they can touch very high level, as high as 90% per year. Strom and Mersland (2007) find no significance difference between nonprofit organization and shareholder owned MFIs in terms of financial performance and outreach. They do not find any evidence that shareholder owned firm produces more better results in terms of outreach or profitability than nonprofit organizations. So their study clearly indicates that it is MFIs own vision and mission that make MFI good or bad at becoming profit orienting or setting maximum outreach as basic objective. They find that group lending is expensive but results in maximum outreach; on the other hand individual lending is better for financial sustainability. In defining the sustainability of MFIs the role of interest rates cannot be under-valued.

Fernando (2006) shows that the Human Development Index (HDI) is a measure that ranks countries on the basis of human development. It has four levels ranging from "very high, "high, "medium", and "low, human development countries. This Index relatively measures of education, literacy, standards of living and life expectancy for countries worldwide. According to Kai (2009) for measuring the impact of economies of scale, another explanatory variable population density has been introduced, the higher value of the index shows, more population concentration. The value can range from 0 (the population would be equally scattered all over county or region) to 100 (all population would be concentrated in one area of the country or region) considering the effect of economies of scale, a higher value of index may lead to reduce the operational costs, thus increasing productivity. Add a line about the findings of HDI and PDP in two studies.

### **3 Methodology and Data**

The methodology, variable construction, data and data sources are discussed in this section

#### **3.1 Methodological Framework**

The main focus of this study is to examine that microfinance institutions are playing their role to reduce poverty. The microfinance institutions objectives include; outreach to the poor and institutional financial sustainability and impact on poverty reduction (Zeller et al., 2002, Schreiner, 2002). The different dimensions of outreach are discussed in the literature (Schreiner, 2002) and followed by several studies investigating outreach and financial sustainability

(Mersland and Strom 2008; Woller 2006; Woller and Schreiner, 2002) and many recent studies) and used by performance evaluation and impact assessment studies by donors like USAID (Mersland and Strom 2008).

The breadth of outreach indicates the number of poor served by a microfinance institution<sup>4</sup>. It is expected that the larger the number of borrowers the better the outreach and more the poorest population is served. The number of active borrowers is used to capture breadth of outreach in the present study.

The depth of outreach captures the value of net gain of a borrower as a client of MFI program and it is based on the argument that outreach must be measured not just by total number of borrowers but on the number of poor borrowers<sup>5</sup>, as their relative level of poverty is also considered. The average loan size has been used as a proxy measure of breadth of outreach and smaller loans indicate poorer borrowers are served, all other things being equal<sup>6</sup>. The average loan size captures the depth of outreach in the present study following Schreiner (2001) and others.

The following models are estimated to examine the effect of MFI specific factors and country specific factors on the number of active borrows and average loan size. The number of active borrowers indicator of breadth of outreach is adopted by Armendariz *et al.* (2011) and other studies. Average loan size is also widely used in assessing the MFI goal to reach the poor by Cull *et al.* (2007); Bhatt and Tang (2001), Schreiner (2002), Mersland and Strøm (2010) and several other studies.

$$InCC_{it} = \alpha + \beta1Age_{it} + \beta2Cap_{it} + \beta3Group_{it} + \beta5Reg_{it} + \beta6Risk_{it} + \beta7Sizge_{it} + \beta8Profit_{it} + \beta9Int_{it} + \beta10Rural_{it} + \beta11Cost_{it} + \beta12Hdi_{it} + \beta13Pdp_{it} + v_i + \epsilon_{it}. \quad (1)$$

$$AVGLS_{it} = \alpha + \beta1Age_{it} + \beta2Cap_{it} + \beta3Group_{it} + \beta5Reg_{it} + \beta6Risk_{it} + \beta7Sizge_{it} + \beta8Profit_{it} + \beta9Int_{it} + \beta10Rural_{it} + \beta11Cost_{it} + \beta12Hdi_{it} + \beta13Pop_{it} + v_i + \epsilon_{it}. \quad (2)$$

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<sup>4</sup> Studies have used the number of borrowers as measures of microfinance breadth of outreach (Mersland and Strom, 2008, 2009; Hermes *et al.*, 2008 and others).

<sup>5</sup> Navajas *et al.*, (2000). Hulme and Mosley (1996) and many recent work.

<sup>6</sup> (Mersland and Strom, 2009; Cull *et al.*, 2007; Adongo and Stork 2006; Hartarska, 2005; Woller and Schreiner 2002; Schreiner, 2001).

In equation (1) CC is the number of active borrowers which measures the breadth of outreach and it is related with the capital structure, average profit, average cost, size of MFI, age of MFI, portfolio at risk. A set of dummy variables include: group lending will take 1 and zero for individual lending, operates in rural market take 1 and zero for urban market, regulated will take one and unregulated zero. To measure country specific difference Human Development Index (HDI) and Population Density per square meter (PDP) are used. HDI is a measure that ranks countries on the basis of human development. It has four levels ranging from "very high", "high", "medium", and "low", human development countries. This Index relatively measures of education, literacy, standards of living and life expectancy for countries worldwide. For measuring the impact of economies of scale, another explanatory variable population density has been introduced, the higher value of the index shows, more population concentration. The value can range from 0 (the population would be equally scattered all over county or region) to 100 (all population would be concentrated in one area of the country or region) considering the effect of economies of scale, a higher value of index may lead to reduce the operational cost<sup>7</sup>

In equation (2) Avgls is average loan size that captures the depth of outreach, and set of explanatory variables are same as in equation (1). Average profit and loan size are related, the expectations are that as loan size increases profit of MFI also increases which leads MFI to less reach the poor (Mersland, 2009). Average cost is also related with the loan size of MFI. Increasing cost increase sustainability risk for MFI loan size also increases and less reach to poor clients (Dlamini, 2012). The size of the institutions matters a lot in its profitability and performance. The size is catered by total asset value. As MFIs increases its operations, its assets increases in the form of account receivables. Assets are important in efficiencies that are why asset is added in the model.

### **3.2 Determinants of Cost of Outreach**

The cost of outreach to an MFI client refers to interest rate paid and other related costs as a result of receiving financial services from MFIs. The cost of outreach is the highest amount the borrower would agree to bear to get the loan (Navajas *et al*, 2000). Therefore, all things being

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<sup>7</sup> List of variables is presented in Table A1.



equal, the less the cost of outreach the more clients will be willing to borrow. Interest charges are used as a measure of cost to clients (Mersland and Strom, 2008 and others).

The Financial sustainability is the ability of MFI to cover all its operating and financing costs from revenue mostly from the return of loans portfolio (Tellis and Seymour, 2002 and Thapa *et al*, 1992). The amount of return will depend on the interest rates charged and the volume of loan outstanding which in turn depend on average loan and the number of loans remaining outstanding. This would mean that, all things being equal, the more clients MFIs have that take loans, at the same or higher interest rates the higher the revenue. On the other side the higher the cost incurred to serving its clients would mean a reduced profitability to an MFI. This implies that in order to achieve sustainability, the MFIs that target poorer borrowers „must charge higher interest rates“ (Conning, 1999). Charging higher interest rates, which could lead to profitability, may however, price the poorest out of the microfinance services and thereby adversely affecting the attainment of the social objective of the MFIs (Morduch, 2000).

Due to interdependence of interest rate, average loan size and financial sustainability, these three models are estimated simultaneously.

$$INT_{it} = \alpha + \beta 1 Age_{it} + \beta 2 Cap_{it} + \beta 3 Group_{it} + \beta 5 Reg_{it} + \beta 6 Risk_{it} + \beta 7 Sizgeit + \beta 8 FS_{it} + \beta 9 Avgl_{it} + \beta 10 Rural_{it} + \beta 11 Cost_{it} + \beta 12 Hdi_{it} + \beta 13 Pdp_{it} + v_i + \epsilon_{it}. \quad (3)$$

$$AVGLS_{it} = \alpha + \beta 1 Age_{it} + \beta 2 Cap_{it} + \beta 3 Group_{it} + \beta 5 Reg_{it} + \beta 6 Risk_{it} + \beta 7 Sizgeit + \beta 8 FSS_{it} + \beta 9 Int_{it} + \beta 10 Rural_{it} + \beta 11 Cost_{it} + \beta 12 Hdi_{it} + \beta 13 Pdp_{it} + \epsilon_{it}. \quad (4)$$

$$FSS_{it} = \alpha + \beta 1 Age_{it} + \beta 2 Cap_{it} + \beta 3 Group_{it} + \beta 5 Reg_{it} + \beta 6 Risk_{it} + \beta 7 Sizgeit + \beta 8 INT_{it} + \beta 9 Avgl_{it} + \beta 10 Rural_{it} + \beta 11 Cost_{it} + \beta 12 Hdi_{it} + \beta 13 Pdp_{it} + v_i + \epsilon_{it}. \quad (3)$$

The interest rate (INT), and average loan size (Avgl) and financial sustainability (FSS) are estimated simultaneously. The set of explanatory variables are the same as discussed above for equation (1)

### 3.3 Determinants of Women Outreach

Most participants in the informal sector are believed to be women (Liedholm and Mead, 1995). Although female are about 50 percent of the world’s work force, and contribute about 67 percent

of the world's work, but only 10 percent of the world's wages are earned by them and belong 1 percent of its wealth. Most female are doing same work as male do, but females face more poverty within the household than male, but their work is mostly not visible nor paid (Fernando, 2006b). It is believed that providing credit to the women by MFIs will reduce the poverty of the household. The following equation estimates the determinants of outreach to women.

$$WC_{it} = \alpha + \beta_1 Age_{it} + \beta_2 Cap_{it} + \beta_3 Group_{it} + \beta_4 Avgls_{it} + \beta_5 Reg_{it} + \beta_6 Risk_{it} + \beta_7 Sizgeit + \beta_8 Profit_{it} + \beta_9 Int_{it} + \beta_{10} Rural_{it} + \beta_{11} Cost_{it} + \beta_{12} Hdi_{it} + \beta_{13} Pop_{it} + v_i + \epsilon_{it}.$$

Where WC is the percentage of women to the total credit clients, the set of explanatory variables are the same as defined in equation (2),

### **3.4 Cross Regional Differences**

The six regions are expected to be different in depth of outreach, its breadth, women outreach, cost of outreach and financial sustainability as indicator of future outreach. Therefore all six models reported above are estimated by including regional dummies. Among the six regions: Eastern Europe. Africa, South Asia, East Asia, Latin America, and Middle East, the Eastern Europe is taken as base category.

### **3.4 Estimation technique**

As this study uses the information for 382 microfinance institutions belonging to six regions over the period for the period 2005 to 2011 s, panel data estimation technique is suitable for this purpose. Empirical researches on possibly encounter two sources of discrepancies, missing variables and endogeneity biases. The generalized method of moment GMM estimator is more suitable as it deals with the problem of omitted variables and endogeneity biases. When panel data is used, the next question is whether the individual effect is taken as common, fixed or random factor. To compare the common effect and fixed effect models the F test is used. For that purpose two models are estimated separately: the common effect model in which the constant terms are all equal and the fixed effect model in which the intercepts are different. Then the F test is applied to check the null hypothesis that there is no difference in common effect model and fixed effect model. The generalized method of the moment model suggested by Arellano

and Bond (1991) and modified by Blunder and Bond (1998) is used as the estimation technique. The lag explanatory variables are used as instruments and the Sargen test is used to test the validity of the instrumental variables. The set of three equations (3), (4) and (5) are estimated simultaneously by GMM. The equation (6) that includes the regional dummies is estimated by OLS.

### **3.2 Data**

The data has been collected for 382 Micro finance institutions, located in 70 countries throughout the six regions of the world including: Eastern Europe, Africa, South Asia, East Asia, Latin America, and Middle East. The data is on annual basis covering the period 2005 to 2011. So it is an unbalanced cross section-time series panel data with 2424 observations from Microfinance Information Exchange (Mix) which is an authentic source providing uniform data all over the world<sup>8</sup>.

## **4 Empirical Results**

The effect of microfinance institution specific and country specific factors that influence the outreach to the poor and financial sustainability that is expected outreach of these institutions for 382 MFIS operating in seventy countries located in six regions of the world from 2005 to 2011. The panel data is used and generalized method of Moments of Blunder and Bond (1998) is applied as estimation technique. The analysis begins with the distribution of MFIs among different regions, type, regulated or unregulated and on the country level are presented in Table A1, A2, A3 and A4 respectively

### **4.1 Determinants of Breadth and Depth of Outreach**

The depth of outreach is captured by average loan size in most studies. Average loan size is also widely used in assessing the MFI goal to reach the poor by Cull *et al.* (2007); Bhatt and Tang (2001); Schreiner (2002) in their study. Mersland and Strøm (2010). The other variable the

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<sup>8</sup> The distribution of data of MFIs by region, by country, by lending method type and by regulations is given in the appendix

of outreach is number of active borrowers indicator of breadth of outreach in the study of Armendariz *et al.* (2011).

The results of factors determining the breadth of outreach are reported in Table 1. The results show that financial sustainability is positively and significantly related with the total number of active borrowers in South Asia, Latin America and Eastern Europe and overall regions. This means as increase in the number of borrows increase sustainability. The result is also in line with the results of Logotri (2006) but in contrast with Marsland and Storm (2008). The cost per borrower has negative and significant effect on total number of active borrowers in almost all regions and worldwide. Therefore, as cost increases MFIs serve less borrowers by giving larger loans to fewer clients. This is also consist with the Yunus (1999) observation that increasing cost may reduce micro loans to the core poor clients. The results also confirm by other studies including Mersland and Strom (2009). The age of an MFI has positive impact on number of active borrowers which is significant for almost all regions and also collectively indicating mature firm have more active clients. The large sized of MFI serve more active borrowers in all regions and collectively. The risk of repayment is inversely related to breadth of outreach but significant in Eastern Europe, Latin America and in world. Regulated firm have less clients but negative relationship is significant in South Asia, Latin America and in all regions together. Group lending relative to individual has positive effect in Africa, Latin America and worldwide showing that group lending increase the breadth of outreach When MFIs operate in rural markets the number of client increases and this increase is significant in Eastern Europe, Africa, Latin America and overall in six regions. Capital structure has no impact on the breadth of outreach. Increase in human development, population density also increases client served but this relationship is significant in South Asia and worldwide.

The results reported in Table 2 are the factors that affect depth of outreach measured by average loan size. The results show that financial sustainability has positive and significant effect on average loan size. As average profit increases loan size also increases and as average profit decreases average loan size also decreases. The result is consistent with the findings of Mersland and Strom (2011) and Freixas and Rochet (2008) model. The result shows that an MFI is able to earn higher profit when loan size is larger. This is in conformity with Yunus (1999) argument that big loan size creates more profit and this thing crowd out the poorer clients from credit scheme (Christen and Drake, 2002). The loan size increases with increase in cost significantly in

Latin America and worldwide, MFIS should increase its efficiency to minimize cost and to avoid mission drift. When an MFI is efficient, its cost is low and loan size is also small. This result is also in line with the cost findings of Mersland and Strom (2011), Freixas and Rochet (2008). The results indicate that average loan size increases as size of the MFI increases in all regions. This result is supported by Mersland and Strom (2011). MFI maturity has positive impact on loan size and significant for South Asia, Middle East, Latin America and worldwide.

**Table 1: Results of Determinants of Breadth of Outreach Measured By Number of Active Borrowers**

	EAST ASIA		EASTERN EUROPE		MIDDLE EAST		SOUTH AFRICA		SOUTH ASIA		LATIN AMERICA		All world	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
C	3.40	1.37	-3.62*	-9.14	7.49	8.73	7.30*	8.46	-2.14*	-1.81	-3.75*	-9.59	1.38*	6.27
AGE	0.06*	2.45	0.01	0.40	0.05*	2.02	0.06*	2.35	0.02**	1.74	0.01	0.47	0.02*	4.95
CAP	-0.14	-0.24	0.19	1.33	-0.51	-1.03	-0.73	-1.50	-0.34*	-3.31	0.19	1.35	-0.55*	-7.49
GROUP	-1.42*	-3.16	0.12*	2.26	-0.19*	-2.96	-0.23*	-3.02	-0.30	-1.48	0.12*	2.29	0.40*	7.41
REG	-0.01*	-1.87	-0.18*	-2.94	-0.09	-0.27	0.17	0.56	0.30***	1.77	-0.19*	-3.03	-0.03***	-1.76
RISK	-0.51	-1.37	-0.67*	-5.28	-0.69	-1.21	-0.40	-1.03	-0.16	-0.61	-0.64*	-5.24	-0.18*	-4.21
FS	-0.21	-0.90	0.81*	4.58	-0.97	-0.82	-0.50	-0.62	0.50*	1.84	0.18*	4.59	0.61*	2.55
SIZE	0.22*	5.45	0.77*	4.86	0.22*	5.41	0.21*	5.16	0.60*	17.34	0.77*	5.02	0.55*	8.26
INT	0.96*	3.14	0.51*	3.85	0.32*	3.41	0.19*	2.77	0.08*	2.94	0.51*	3.92	0.73*	5.00
Rural	0.29	0.93	0.37*	6.65	0.06	0.17	0.05	0.13	0.39	0.70	0.37*	6.67	0.42*	6.81
Cost	-0.69*	-2.21	0.35*	8.14	-0.42*	-1.97	-0.79*	-1.98	-0.23	-1.25	0.32*	7.88	-0.05	-0.44
HDI	6.65	1.61	0.04	0.12	0.67	0.69	0.47	0.48	0.64*	2.87	0.22	0.62	-2.02*	-11.41
PDP	0.01	1.29	0.02	-0.19	0.01	-1.28	0.01	-1.40	0.01*	3.27	0.01	0.26	0.02*	7.21
R <sup>2</sup>	0.68		0.54		0.59		0.55		0.34		0.55		0.59	

Note: The \* indicates significance at 1%, \*\* significance at 5% and \*\*\* significance at 10

**Table 2: Results of Determinants of Depth of Outreach Measured by Average loan size**

	EAST ASIA		EASTERN EUROPE		MIDDLE EAST		SOUTH AFRICA		SOUTH ASIA		LATIN AMERICA		All world	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
c	-1.77	-1.60	1.18	2.29	0.52	3.87*	0.11	0.30	-0.18	-0.32	2.56*	10.95	0.41*	4.65
AGE	0.02	1.15	0.01	-0.03	-0.01	-2.91*	0.04	3.17*	0.01	0.86	0.01*	2.26	0.01*	3.26
CAP	-0.76*	-2.54	0.23	0.98	-0.15	-1.56	0.11	0.46	-0.07	-0.33	-0.39*	-3.25	0.09*	1.90
GROUP	0.06	0.21	0.15*	1.90	0.23	2.96*	-0.14	-0.67	-0.25*	-2.56	-0.11*	-2.46	-0.11*	-3.33
REG	-0.38**	-1.73	0.03	0.37	0.08	1.39	0.24	1.59	0.09	1.15	0.15*	3.04	0.22*	6.60
RISK	-0.28	-0.13	-0.39	-0.50	0.05	0.07	-1.40	-0.68	0.53	0.50	0.77*	3.74	0.42*	2.37
FS	-0.02	-0.01	1.34**	1.83	0.17	0.36	-1.45	-1.14	-0.07	-0.16	-0.99*	-2.68	-0.07	-0.45
SIZE	0.09*	5.02	0.01	1.07	0.02	2.82*	0.01	0.94	0.01	1.58	0.05*	12.15	0.05*	16.70
INT	-0.82*	-5.25	0.07	0.39	-0.03	-0.18	-0.06	-0.13	-0.41	-1.20	-0.12	-1.10	-0.17*	-1.98
Rural	-0.34*	-1.93	-0.06	-0.66	-0.26	-3.61*	-0.20	-1.06	-0.16	-0.90	-0.10*	-2.05	-0.14*	-3.65
Cost	0.88	1.30	-0.44	-1.52	-0.17	-0.73	-0.39	-0.63	-0.01	-0.09	-0.59*	-3.86	-0.29*	-3.71
HDI	1.92	1.01	-0.81	-1.12	-0.17	-0.96	0.38	0.80	0.88	0.79	-3.82*	-11.84	-0.72*	-6.80
PDP	0.01*	3.71	0.02*	-2.59	0.00	-5.15*	0.00	-1.22	0.01	-1.11	0.02*	-6.40	0.01*	-5.12
R <sup>2</sup>	0.43		0.44		0.38		0.35		0.35		0.32		0.39	

Note: The \* indicates significance at 1%, \*\* significance at 5% and \*\*\* significance at 10%.

## 4.2 Determinants of Cost of Outreach

The cost of outreach to an MFI borrowers is captured by real interest rate paid and other related costs as a result of receiving financial services from an MFI. The real interest has two sided affects; interest rate provides financial support and income to the MFI and on the other hand it increases cost of a loan facility to the poor. It inhibits the poor from accessing financial services. There is a relation between cost and interest rate. It is expected that increasing cost will increase the interest rate in order to cover the cost and be financially sustainable on the one hand (Dlamini, 2012). On the other hand, the less the cost of outreach the more borrowers are willing to get loan from the microfinance and smaller are loan size other things being equal. (Mersland and Strom, 2008). The interdependence between Interest rate, average loan size and financial suitability these three models are estimated simultaneously and generalized method of moments is estimation technique.

The interest rate, average loan size and financial sustainability are determined by each other along with MFI specific variables size of MFI, experience, capital structure, regulated, risk, and country specific variables HDI and PDP. The results of determinants of interest rate that is measure of cost of outreach are displayed in Table 3. The results show that in all six regions and worldwide average loan size is inversely related with interest rate. Higher cost leads to less reaching the poor. Sustainability is positively related to interest rate. Size of MFI does not affect the interest rate in all regions but in all regions together it has small but positive and significant effect on interest rate. Risk of repayments negatively impact interest rate except Eastern Europe. Capital structure, group lending compared to individual, rural market compared to urban and regulation are not significant contributors of cost of outreach. PDP and HDI have no role on the interest rate charged from borrowers. The average loan size is negatively related to interest rate and positively to financial sustainability in most of the regions and other results are about the same as discussed in the above section. The simultaneously estimated results of determinates of average loan size are not reported in this paper.

In Table 4 presents the results of factors contributing to financial sustainability. The results indicate that the cost per borrower reduces the financial sustainability of the MFIs as suggested by the accounting theory that costs reduce profitability. Results of this study find negative relation with cost and this result is also supported by Conning (1999) that MFIs with higher costs per dollar loaned are less profitable and therefore, less financially sustainable. As



the case of type of lending group lending has no effect on sustainability but negative and significant effect for Latin America and all regions. This is not supported by the theory that MFI prefers group lending that ensures repayment and increase financial sustainability. This finding, although it contradicts Hartarska (2005), is in line with Mersland and Strom (2009); Armendariz and Morduch (2007); Cull *et al* (2007). It is expected that mature MFIs to be more sustainable than younger ones, but results indicate that the age of an MFI is not related to its financial sustainability. The results show positive relationship between MFI size and their financial sustainability that is contradiction with findings by Hartarska (2005), but in confirmation with Mersland and Strom (2009); Kyereboah-Coleman and Osei (2008); Cull *et al* (2007). The number of active borrowers which measures the breadth of outreach improves the financial sustainability of microfinance institutions that is consistent with the results of Logotri (2006). The repayment risk decreases the financially sustainable as expected. The rural market participation has no role of financial sustainability. The financial sustainability is positively related to interest rate and negatively to average loan size. The MFI size and experience makes MFI more financially sustainable. The capital structure, rural market, group lending are positive contributors indicating that in most of the regions and around the world financial sustainability and outreach has trade off.

**Table 3: Results of Determination of Interest Rate as Measure of Cost of Outreach**

	EAST ASIA		EASTERN EUROPE		MIDDLE EAST		SOUTH AFRICA		SOUTH ASIA		LATIN AMERICA		All world	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
C	-0.39*	-2.38	0.33*	2.73	-0.02	-0.31	0.01	0.03	0.03	0.32	0.32*	4.77	0.13*	6.46
AGE	0.01*	3.67	0.01	-1.23	0.01*	2.63	0.01*	2.56	0.01	-0.79	0.01*	-2.28	0.01	-1.12
CAP	-0.07	-1.59	0.07	1.29	-0.08**	-1.87	-0.08**	-1.86	-0.12*	-3.37	0.03	0.76	-0.01	-0.45
GROUP	-0.05	-1.26	-0.02	-1.25	0.01	0.24	-0.01	-0.37	-0.02	-1.15	-0.01	-0.68	-0.01	-1.13
REG	-0.01	-0.24	0.01	0.31	0.08*	2.88	0.08*	2.72	0.02	1.34	-0.01	-0.69	-0.01**	-1.77
RISK	0.74*	2.30	-0.28	-1.49	0.99*	2.70	0.93*	2.55	-0.10	-0.56	-0.24**	-1.82	-0.05	-1.28
FS	0.18	0.88	0.33**	1.89	0.34	1.46	0.03*	2.00	0.10	1.40	0.21*	2.03	0.14*	3.98
SIZE	0.01*	1.35	0.02	-0.81	0.01	0.02	0.01	0.51	0.02	1.43	0.01	0.95	0.01*	3.93
AVGLS	-0.06*	-5.25	-0.01*	-2.39	-0.01	-1.78***	-0.01	-0.28	-0.01	-2.20	-0.01	-1.80**	-0.01*	-1.98
Rural	-0.01	-0.48	0.02	0.73	0.01	0.28	0.01	0.29	-0.01	-0.38	0.01	0.68	0.03*	3.38
Cost	0.71*	8.87	0.26*	3.85	0.83*	9.71	0.84	9.77	0.02	1.17	0.07	1.66	0.01*	5.24
HDI	0.49**	1.82	-0.20	-1.18	-0.10	-1.14	-0.10	-1.11	0.11	0.63	-0.19	-1.97	0.03	1.13
PDPSM	0.02*	4.37	0.01	-1.60	0.01	-0.98	0.01	-1.08	0.02**	1.88	0.02	-1.31	0.02*	-3.47
R <sup>2</sup>	0.68		0.54		0.59		0.59		0.55		0.54		0.55	

Note: The \* indicates significance at 1%, \*\* significance at 5% and \*\*\* significance at 10%.

**Table 4: Results of Determination of Financial Sustainability as Measure of Future Expectation of Outreach**

	EAST ASIA		EASTERN EUROPE		MIDDLE EAST		SOUTH AFRICA		SOUTH ASIA		LATIN AMERICA		All world	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
C	-4.25	-1.50	-0.12	-0.62	-0.31	-0.49	-0.41	-0.66	0.87*	3.00	0.28*	2.49	0.30	3.48
AGE	0.02	0.72	0.01	0.79	0.02	-0.18	0.01	0.30	0.02	-0.96	0.01	-0.96	0.01*	-2.83
CAP	0.20*	3.58	0.10	1.13	1.23	2.89	0.32*	3.09	0.31*	2.71	0.12*	2.20	0.25*	8.76
GROUP	-0.20	-0.47	-0.04	-0.15	0.06	0.17	0.01	0.03	-0.04	-0.78	-0.05*	-2.48	0.02	-0.16
AVGLS	-0.30*	-1.90	0.05*	0.28	-0.10	-0.23	-0.09	-0.59	-0.02	-0.53	-0.04*	-3.16	-0.08*	-2.32
REG	0.29	0.64	-0.10*	-0.32	0.08	2.11	0.21	0.81	-0.06	-1.54	-0.07*	-3.02	-0.04*	-2.04
RISK	-3.29	-0.94	-0.18	-0.66	-1.55	-0.44	-1.49	-0.42	-1.05	-1.54	0.13	0.59	-0.36*	-3.36
SIZE	0.09*	1.99	0.06*	2.11	0.04	1.44	0.03	1.27	0.06*	11.92	0.01*	7.09	0.05*	7.91
LOG(CC)	-0.29*	-3.16	0.27*	4.09	0.80*	2.15	0.77*	2.16	0.20*	2.93	0.31*	7.05	0.01	0.83
INT	-0.19	-1.21	-0.07	-0.95	-1.16**	-1.84	-0.90	-1.05	-0.14	-0.85	-0.08	-1.53	0.01	0.22
Rural	-0.54*	-1.91	0.03	0.86	-0.24	-0.75	-0.34	-1.03	0.06	0.68	-0.03	-1.22	-0.04	-1.53
Cost	-0.17	-1.50	0.28*	2.39	-0.15*	-2.10	-0.57	-0.54	-0.22*	-5.23	0.10	1.34	0.16	1.98
HDI	11.81*	2.58	0.18	0.69	0.22	0.27	0.36	0.44	-1.58*	-2.84	-0.29**	-1.88	0.05	0.04
PDPSM	0.01*	2.51	0.01	-0.11	0.03	0.71	0.01	0.51	0.02	-0.39	0.01*	-1.99	0.02***	1.72
R-squared	0.44		0.68		0.39		0.40		0.72		0.67		0.60	

Note: The \* indicates significance at 1%, \*\* significance at 5% and \*\*\* significance at 10%.

### **4.2.3 Determinants of Women Outreach**

This goal of microfinance to reach and empower women as majority of the world's poor is women and work in informal sector. It is believed that providing credit to women would reduce the poverty level of the household. The results show that group lending, rural market, capital structure, risk and financial sustainability, MFI size, population density have positive impact on women outreach. Age has no effect on reaching the women and has effect on all regions together. Regulated MFI target not to the poorest section as collateral is required, therefore these MFIs have less women client and HDI has positive effect. The results lead to conclusion that in case of women financial sustainability and outreach are met simultaneously to some extent.

**Table 5: Results of Determination of Women Outreach**

	EAST ASIA		EASTERN EUROPE		MIDDLE EAST		SOUTH AFRICA		SOUTH ASIA		LATIN AMERICA		All world	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
C	0.32	1.14	0.17*	2.40	0.53*	3.42	0.53*	3.45	0.39	1.62	0.14*	1.92	0.10*	3.13
AGE	-0.01	-0.67	0.01*	3.66	0.02	-0.12	0.02	-0.18	-0.01*	-5.52	0.03	3.68	0.01	-0.06
CAP	0.04	0.34	0.18*	4.77	-0.02	-0.22	-0.01	-0.11	-0.52*	-5.91	0.17*	4.73	0.04*	2.02
GROUP	-0.03	-0.32	0.04*	3.29	-0.13	-1.41	-0.13	-1.41	-0.01	-0.22	0.05*	3.33	0.13*	10.63
Profit	0.06	0.76	-0.10*	-6.65	-0.04	-0.66	-0.05	-0.86	-0.07*	-2.25	-0.10*	-6.66	-0.16***	-1.80
RISK	-0.35	-0.41	-0.20	-1.35	-0.56	-0.62	-0.59	-0.66	-0.39	-0.69	-0.20	-1.34	0.35*	5.17
ROA	0.88	1.61	0.69*	6.05	0.82	1.49	0.81	1.47	-0.14	-0.77	0.69*	6.02	0.74*	12.51
SIZE	0.02	2.50	0.02*	13.43	0.02*	3.01	0.02*	3.26	0.06	4.74	0.02*	13.55	0.02*	20.70
INT	0.56	2.66	-0.02	-0.69	0.45*	2.13	0.52*	3.27	0.07	1.28	-0.02	-0.71	0.02	0.04
Rural	0.21	3.01	0.11*	7.68	0.16**	1.88	0.16*	1.90	0.01	0.13	0.11*	7.67	0.09*	6.55
Cost	-0.04	-0.15	0.72*	5.24	0.13	0.49	0.32*	1.98	0.07**	1.83	0.72*	15.08	0.36*	12.14
HDI	0.80	3.91	0.27*	2.78	0.13	0.64	0.13**	1.72	0.54**	1.79	0.23*	2.30	0.22*	5.33
PDP	0.01	-1.11	0.02	-0.40	0.01	-0.62	0.01	-0.57	0.01*	3.28	0.01	0.08	0.01*	6.05
R-squared	0.44		0.68		0.39		0.40		0.72		0.67		0.60	

Note: The \* indicates significance at 1%, \*\* significance at 5% and \*\*\* significance at 10%.

#### 4.2.4 Cross Regional Differences

Among the six regions Eastern Europe is taken as base category. The analysis indicate five regions the depth of outreach is negative. As to depth outreach, AVGLS has a significant negative impact on cost of outreach (interest rate). The results show the fact that the smaller is the size of loan, the higher is the interest charged on these loans. According to Cull et al. (2007) a simple indicator is average loan size showing that the small size of loans symbolize that MFI is targeting poor customers. The reason is that well off customers are not attracted in small loans and in line with the results of Cutler (2010) and Rosenberg et al. (2009). The variable for breadth outreach by number of active borrowers and women borrowers has also shown significant positive impact on lending interest rate and in line with the findings of Hermes et al. (2009).

With regard to dummy variables lending methodology shows that those MFIs who mostly lend to individuals generally charge significantly high rates of interest so the cost of outreach is higher and these results are in line with the findings of Cull et al (2008) showing that individual-based lenders are more profitable as to group lenders since they charge higher interest rates. As to MFIs lending type group lending have low rate and no collateral compare to individual, who on average charge lower cost of outreach (interest rates) .As to regions MFIs who are operating in East Asia, Africa, Middle East, South Asia and Latin America are charging relatively low interest rates as to Eastern European MFIs, who normally charge significantly high rates of interest so their cost of outreach and sustainability is higher.

As to control variables, MFI size, age and capital structure show positive impact on breadth of outreach dimension capture through number of active borrowers and women borrowers. Whereas age human development index (HDI) and population density (PDPSM) and risk has significant inverse effect on depth and breadth of outreach.

Table 5: Results of Regional Differences in outreach

	Interest Rate		ALS		Credit Clients		Women Borrower	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
C	0.15	10.20	0.09	1.34	-0.39**	-1.82	-0.06	-1.66
AGE	0.01***	-1.73	0.01*	2.96	0.01*	3.46	0.01	-0.94
CAP	-0.02	-1.40	0.02	0.40	-0.30*	-4.44	0.12*	6.41
GROUP	0.01	-0.53	-0.12*	-3.76	0.15*	3.00	0.11*	8.90

REG	-0.01	-1.04	0.21	6.08	-0.18*	-2.70	-0.03*	-2.50
RISK	-0.07**	-1.88	0.28***	1.63	-1.16*	-4.70	0.37*	5.50
SIZE	0.01*	4.28	0.04*	14.36	0.54*	5.46	0.03*	5.50
Avgls	-0.01*	-2.78						
INT			-0.24*	-2.78	0.36*	6.38	0.12*	8.26
Rural	0.03*	2.86	-0.18*	-4.70	0.03*	2.86	0.12*	8.26
EFF	0.07*	4.00	-0.40*	-5.58	0.83*	4.09	0.58*	10.23
HDI	0.03	1.13	-0.72*	-6.80	-0.01	-0.05	-0.06	-1.11
PDP	0.02*	-3.47	0.01*	-5.12	0.01*	2.93	0.01	-0.50
DAF	0.02	0.23	0.17*	3.13	1.33*	13.90	0.09*	3.59
DEAP	0.04*	2.46	-0.05	-0.72	1.71*	15.67	0.24*	8.18
DLA	0.02***	1.78	-0.11*	-2.37	0.55*	7.84	0.05*	2.67
DMENA	0.04*	2.67	-0.33*	-4.48	1.29*	12.51	0.13*	4.72
DSA	-0.08*	-6.14	-0.46*	-8.20	2.15*	23.26	0.34*	14.31

Note: The \* indicates significance at 1%, \*\* significance at 5% and \*\*\* significance at 10%.

## 5 Conclusions

The present study tries to find out the main determinants of outreach in microfinance industry. It also highlights the impact of outreach of MFIs on sustainability by conducting a cross region analysis of 382 MFIs covering six regions of the world. In this study two approaches are used for estimations. As in the sample MFIs belong to different countries and regions. We have conducted estimations for each of the region separately and for the world as a whole, first. Second for robustness check regional dummies are introduced in all the models

The overall results of the study indicate that as depth of outreach is inversely related with the cost of outreach and positively with sustainability. However, breadth of outreach has significant positive relation with cost of outreach and sustainability. Other factors like size, capital structure, risk, regulation, group lending are significant contributor of outreach generally in all regions. The results support that providing credit to women would reduce the poverty level of the household. As the group lending, rural market, capital structure, risk and financial sustainability, MFI size, population density has positive impact on women outreach. Among the six regions Eastern Europe is taken as base category. The analysis indicate five regions: Africa, South Asia, East Asia, Latin America, and Middle East the breadth of outreach is positive compare to base

region Eastern Europe. The depth of outreach is also more than Eastern Europe except is East Asia and Pacific. The financial sustainability is less than base region but significant only in Africa and South Asia. Cost of outreach is higher in all the regions compare to Eastern Europe. The study also emphasis the need of both outreach and sustainability, as in order to survive in future, microfinance industry should be sustainable by reducing its transaction, operational and administrative cost against its lending interest rate and average profit.

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## Appendix

**Table A1 MFIs on Regional Basis**

<b>S.No</b>	<b>Region</b>	<b>Frequency</b>	<b>%</b>
1	East Asia and the pacific	20	5.235
2	Eastern Europe and central Asia	74	19.372
3	Middle east and north Africa	22	5.759
4	South Africa	56	14.660
5	South Asia	49	12.827
6	Latin America and the Caribbean	161	42.147
	Total	382	100

**Table A2 MFIs on the Basis of Legal Status**

<b>S.No</b>	<b>Legal status</b>	<b>Frequency</b>	<b>%</b>
1	Bank	36	9.424084
2	Credit union/cooperatives	41	10.73298
3	NBFI	140	36.64921

4	NGO	165	43.19372
	Total	382	100

**Table A3 MFIs on the Basis of Lending type**

S.No	Lending Types
1	Group lending
2	Individual lending
3	Village banking

**Table A4 MFI on the Basis of Countries**

S.No	Country	No of MFIs	S.No	Country	No of MFIs
1	Albania	3	36	Kyrgyzstan	5
2	Angola	1	37	Lebanon	1
3	Argentina	2	38	Mali	3
4	Armenia	4	39	Magnolia	1
5	Azerbaijan	10	40	Morocco	7
6	Bangladesh	4	41	Mexico	13
7	Benin	4	42	Moldova	1
8	Bolivia	24	43	Mongolia	2
9	Bosnia And Herzegovina	9	44	Montenegro	1
10	Brazil	6	45	Mozambique	1
11	Bulgaria	2	46	Nepal	6
12	Burkina Faso	1	47	Nicaragua	14
13	Cameroon	2	48	Nigeria	3
14	Chile	2	49	West Bank And Gaza	1
15	Colombia	11	50	Pakistan	4
16	Cambodia	11	51	Palestine	2
17	Costa Rica	1	52	Paraguay	4
18	East Timor	2	53	Peru	38
19	Ecuador	28	54	Philippines	4
20	Egypt	6	55	Rwanda	2

21	El Salvador	3	56	Republican Dominica	2
22	Ethiopia	6	57	Russia	7
23	Gambia	1	58	S Africa	3
24	Georgia	6	59	Senegal	5
25	Ghana	3	60	Serbia	2
26	Guatemala	6	61	Sudan	1
27	Guinea	1	62	Tajikistan	6
28	Haiti	2	63	Tanzania	5
29	Honduras	2	64	Togo	2
30	India	35	65	Trinidad & Tobago	1
31	Indonesia	1	66	Tunisia	1
32	Jordan	3	67	Uganda	4
33	Kazakhstan	6	68	Uzbekistan	3
34	Kenya	9	69	Vietnam	2
35	Kosovo	6	70	Venezuela	1