Depth of Outreach of Microfinance: An Empirical Approach Using Microdata

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Abstract: There are many designations used to categorise 'the poor'. Quite often, emphasis has been given only to monetary aspects of poverty. In order to deal with this problem we propose a multidimensional index of deprivations (or vulnerabilities) based on Census 2000 data-base because it allows us to focus our attention on *setores censitários*, the minor unit decision presented in a disposable microdata level. We use the index to point out where are concentrated the potential clients of Microfinance Institutions (MFIs), those ones who could be considered multidimensional deprived. Besides to provide a way to ranking the *setores censitários* according to their vulnerabilities, the index was used to mapping an important city of the metropolitan region of São Paulo (Guarulhos). Doing that we were able to establish what are the most deprived areas of the city which would be the best potential areas for the expansion of MFIs and commercial banks that have plans for downscaling.

Keywords: Microfinance, Multidimensional Poverty and Depth of Outreach.

Area: APS-B

Introduction

Does microfinance contribute to poverty reduction? Whereas few would deny the 'pro-poor' nature of microfinance schemes, not much has been done to show the specific impacts of microfinance on different sorts of poverty. Part of the problem is related to the large variety of designations used to categorise 'the poor'. Among them we could mention the following terms used in the literature to assess the poverty outreach of microfinance schemes: i) 'moderate' vs 'extreme' poverty (KHANDKER, 1998), ii) the 'hard-core' poor vs the poor (HASHEMI, 1997), iii) the 'middle' poor, the 'upper' poor and the 'core' poor (HULME and MOSLEY, 1997), iv) the 'economically active' poor (ROBINSON, 2001), v) the 'near-poor' and the 'not-poor' (REMENYI and QUINONES, 2000), vi) the 'destitute', the 'extremely' poor, the 'moderately' poor, the 'vulnerable' poor and 'the ultra-poor', vii) the 'vulnerable non-poor', the 'working-poor' and the 'entrepreneurial' poor (MOSLEY and ROCK, 2004), viii) the 'economically-active' poor (COPESTAKE, BHALOTRA and JOHNSON, 2001) and ix) the 'new' poor and the 'traditional' poor (Imp-Act, 2003) – to name just a few.

It is important to note that these taxonomies follow, in general lines, two basic principles of separation between different classes of poverty. The first principle is based on the notion of *depth* of poverty. Unsurprisingly, this has been a common theme in the literature and alternative classifications of poverty attempted to evaluate the impact of microfinance according to the intensity of poverty among the poor. However, quite often, emphasis has been given only to monetary aspects of poverty. Te second principle focuses instead on the idea that some types of poverty do not compromise the *agency-aspect* of the poor. Thus, concepts of 'the economically active' or 'the working' or 'entrepreneurial' poor refer to a potentiality enjoyed by some groups among the poor that can be particularly important for their participation in microfinance schemes.

It must be noted that these principles emphasise, correctly, the issue of *thresholds* in separating different groups of people in society. By doing so, they are relevant for targeting social policies and prioritising the welfare of some groups. And yet, they don't say much about the dimensions that could be used in assessing the outreach of policies. Because most

principles used to categorise the poor into different groups exclusively emphasise the monetary aspects of poverty, the whole debate about thresholds is limited to the choice of different 'lines'.

However, as argued here, in order to understand the impact of microfinance on the poor we should qualify the importance the depth of outreach in multidimensional terms. Beyond this important conceptual issue, this paper shows how the depth of outreach can be measured in a big city of the metropolitan region of São Paulo using the Census 2000 micro-data basis, the city of Guarulhos. The main assumption used here is that the MFIs of the region are interested in concentrating their activities on areas with elevated proportion of multidimensional poor families. To perform the mapping, an index of focus of microfinance activities (*IFM*) has been developed and applied to the region of interest. If there would information about where the MFIs are located, it would allow us to verify whether they were prioritizing the areas that present the higher potential for outreach.

This paper is divided as follow. The first section presents a short discussion about measures of outreach of microfinance services and a justifying of why to consider other dimensions. The section two describes the data and presents the methodology used to elaborate the *IFM* . Finally, the third section shows the results.

1. Why Depth of Outreach?

There are two indicators that are commonly used as proxies to measure the depth of outreach of MFIs: (i) the average value of loans, and (ii) the average value of the loan as a proportion of the GNP/capita (adjusted for purchasing power parity) (see Microbanking Bulletin, 2005; LEDGERWOOD, 1998).

The first measure is usually used as an approximated indicator of the absolute poverty of customers. The programs focused on the poorer should prioritize small value loans, in this case, not over 120 dollars. The second indicator is used as a proxy of relative poverty, since it is defined as a percentage of the GNP/capita adjusted for purchasing power parity. The rationale is simple: institutions that intend to reduce poverty through microfinance should give preference to customers that demand values not over 25% of the GNP/capita. (LEDGERWOOD, 1998).

It must be noted that both measures are based on monetary variables. Behind this simple acknowledgement comes the fact that MFIs evaluate its customers poverty based on an unique variable, although literature on poverty already has strong evidence that the correlation among some variables, such as life expectancy, schooling and infant mortality, and GNP/capita is not too elevated (SEN, 1999; UNDP, 2006). It is undeniable that the poorest people generally demand lower loans, however it is not possible to establish any casual relationship from these relations; that is, means and ends must not be confused. (SEN, 1999). In other words, it can be argued that monetary parameters are imperfect indicators of human well-being and that, for this reason, we should be looking directly at the impact of microfinance on people's capabilities or constituents of well-being, rather than focusing on their monetary expressions.

Therefore, the option for unidimensional indicators and, particularly, for many monetary variables is far from being uncontroversial. Moreover, as Schreiner (1999: 7) points out, "Direct measurement of depth through income or wealth is difficult". This poses a challenge for every research that attempts to evaluate the impact of microcredit. But this has not prevented conclusions to be made. For instance, Hulme and Mosley (1996) argue that the poorest are less likely to benefit from microcredit, using monetary criteria for assessing depth. Whereas some programmes fail to target those living in extreme poverty (they do not think

about the poorest of the poor when defining their eligibility criteria), others simply do not succeed in bringing the poorest on board (for problems of self-exclusion of the poorest or lack of sustainability of their participation). As a result, as suggested by Copestake, Bhalotra and Johnson (2001: 86), "recipients of microcredit tend to be bunched around the poverty line, but with more above than below it".

However, once again one important limitation of this 'lack-of-depth' argument is that it classifies the poor based only on income-criteria. This means that if the incomes of the poor do not rise, programmes cannot be considered 'successful'. But what about the other impacts? Nussbaum (2000) in *Women and Human Development* shows how microcredit has boosted self-esteem of poor women in India fostering their sense of community. Microcredit helped human development by reducing sex discrimination and improving people's perception of the role of women in society. In order to appreciate the multidimensional impact of microcredit a new approach is needed. The main solution for that is the use of multidimensional indicators of deprivation (depth of outreach), which purpose is to evaluate if services offered by institutions reach the poorest. In addition, these tools help institutions on their selection process for customers and to follow up permanently their performances concerning the activities focus.

As it can be verified below, a variety of tools has been used to identify and to systematise the different scales of poverty impacts. Each tool focuses on a set of particular dimensions, providing guidance according to their chosen criteria. A brief summary of the most used tools in microfinance include:

i) CGAP Poverty Assessment: it is based on a comparison of poverty scores between targeted and control groups that are contextualised within national poverty incidence indicators. Single poverty indicators are derived by using principal component analysis (see CGAP, 2004). Copestake et al (2005) have extended this methodology towards further elaboration of 'poverty correlates'[1]. By using observable household characteristics that correlate well with levels of income, it is then assumed that one can reliable infer the poverty status of individuals;

ii) Prizma Poverty Scorecard: it is composed of eight non-monetary indicators, such as education, residence, employment status, family size, consumption of meat, consumption of sweets, household assets (such as colour tv or cd player) and possession of a family vehicle. Those scorecards are then used to determine the relative and absolute poverty of participating households. Although not strictly based on monetary indicators, those measures focus on an assessment of living standards of the poor (see for instance Imp-Act 2003);

iii) Index of Fulfilment of Basic Needs: it focuses on four characteristics of households, namely, housing, education, access to health services and access to public services (NAVAJAS et al, 2000). Each dimension is constituted of clusters of observable proxies, such as i) source of water, ii) presence of an indoor toilet, iii) access to electricity and iv) type of fuel used to cook food for access to public services. As the Prizma Poverty Scorecard, it is multidimensional and it avoids direct relation to income as an informational space. And yet, it is interesting to note that most variables refer to a form of resource, such as those illustrated above. The underlying assumption here is that there is a direct relation between people's holding of resources and their levels of well-being;

iv) CASHPOR Housing Index: it is a quick assessment method based on a classification of houses according to three characteristics, namely, size, physical condition or building materials and material of the roof. Gibbons and Meehan (2006: 6) illustrate the discriminatory powers of this index, noting how "Poor households tend to live in medium-sized houses with reinforced mud walls of between five and

eight feet in height and having a permanent roof of used tiles. The poorest households live in small huts with mud walls of less than five feet with an impermanent roof of thatch." Despite some general critiques that the Housing Index might be exposed to (see Poverty Measurement Discussion Group, Paper 2), its simplicity is remarkable. It must however be noted that it focuses on a resource-based assessment of poverty;

v) Freedom from Hunger: it consists of a set of methods that aim to assess absolute poverty. It distinguishes four food security scales (food secure, food insecure with hunger, moderate hunger, severe hunger), exploring the universal aspects of "behaviours that consistently characterise the phenomenon of food insecurity and hunger, such as anxiety that food or money may be insufficient, the experience of running out of food without money for more, substituting fewer or cheaper foods, and reduced food intake, i.e. fewer and smaller meals" (Imp-Act, 2003: 9). Similar to the other tools, Freedom from Hunger stresses the importance of resources as an indicator of well-being. In this case, the emphasis is justified on the grounds of concern with absolute poverty.

The list could be extended with further references to other tools, such as the Participatory Wealth Ranking (PWR) or Detailed Geographic Targeting (PRADAN), but the principles used by these different tools would be very similar (that is, they are based on non-monetary, multidimensional measure of living standards of the poor), allowing for some idiosyncratic variations (like the inclusion of environmental considerations in PRADAN's Geographic Targeting). For more on those tools see Imp-Act (2003). A variety of selection criteria serves as proxies to inform the elaboration of eligibility standards. As pointed out earlier, the great majority of these criteria is resource-based.

But taking the issue of multidimensional impact seriously would take us much further, searching for more specific and systematic criteria for classifying poverty depth according to the 'quality of deprivation' suffered by the poor. A starting point is provided by Schreiner (1999) and Ledgerwood (1998) who suggest the use of the following variables to verify the depth of outreach of institutions (in terms of their qualitative impact on the poor):

i. Gender (woman);
ii. Location (rural);
iii. Schooling (low);
iv. Ethnicity (minorities);
v. Home size (small and in precarious conditions);
vi. Public services (lack of access); and
vii. Loan and transaction costs.

A multidimensional reading of outreach would be much more informative than a monetary reading of poverty. Instead of simply saying that the poorest of the poor are those who have, on a common monetary scale, lower levels of income, we can try to see the qualitatively different attributes that characterize the multidimensional deprivation of the poor. The criterion that emerges from this discussion for assessing the outreach of MFIs is simple: a MFI can be considered focused on the poorest if its clients are predominantly women, have low schooling level, belong to minorities, live in small and precarious houses located in the rural area without proper access to public services (such as drinking water, sewage network, etc). Now, the interesting aspect of building these profiles is that they do not need to be always the same. An empirical investigation and analysis of the profile of the poor may antecede the formulation of context-specific profiles.

In this paper, the following variables (dimensions) were chosen to demonstrate the main argument developed here about the usefulness of multidimensional outreach: gender, the

income and schooling of the head of household, home location and the presence of piped water and sewage network. It is, actually, a preliminary attempt to verify if MFIs operate in areas where people suffer from these multidimensional deprivations.

2. Multidimensional Index of Depth of Outreach:

In order to build the multidimensional index of depth of outreach for microcredit institutions (IFM), we focus on mapping the metropolitan region of São Paulo using Census 2000 data-base for the following variables (dimensions): gender, the income and schooling of the head of household, home location and the presence of piped water and sewage network. The variables are not important per se here, but should be seen as an illustration to characterize the operation of the method and justification of the argument. It is, as already mentioned, an attempt to verify if MFIs operate in the areas that are most deprived in these variables.

2.1. Database and variables

The variables have been disaggregated at a sectorial Census level, including approximately, units of 300 households. This is the lowest aggregation level in Census 2000 basis. Considering that, the sample of this work involved 21.744 households.

As already mentioned, the IFM has six variables, three related to household characteristics and three related to families characteristics. Table 1 gives the details of the dimensions of family variables.

Table 1 – Family variables and dimensions

	Not vulnerable (= 0)	Vulnerable (=1)
Water supply (*v*1)	**a. General network; and b. General network – channelled in at least one room.**	**c. General network – channelled only in the property or land; d. Fountain or well water (in the property); e. Fountain or well water – channelled in at least one room; f. Fountain or well water – channelled only in the property; g. Fountain or well water – not channelled ; and h. another way.**
Canal type (*v*2)	**i. General network of Sewage or pluvial; and j. Septic pit.**	**k. Rudimentary pit; l. Ditch; m. river, lake or sea; n. another.**
Location (v*3*)	**Urban**	**Rural**

Source: Elaborated from Census sector aggregate of Census 2000 universe results tabbed for RMSP by the Center for Metropolitan Studies (from the portuguese, CEM).

These dimensions originated a score (score_1), which was defined as:

$score\_1 = v1 + v2 + v3$,

Where *v*1 synthesizes the dimensions related to the *water supply* variable, which was generated by the weighted average of *a* to *h* dimensions. That is,

$$v1 = \sum \alpha_i (c_i + d_i + e_i + f_i + h_i),$$

Where α_i represents the *n*th household; *v*2 in turn represents the dimensions related to canal type variable. The variable was generated following the same procedure, that is:

$$v2 = \sum \alpha_i (k_i + l_i + m_i + n_i)$$

Finally, the variable *v*3 is simply a weighted average of the households located in the urban area and in the rural region. Table 2 gives the details of the dimensions of family variables.

Table 2 – People (or families) variables

	Not Vulnerable (=0)	Average Vulnerability (0.5)	Vulnerable (=1)
Gender (*v*4)	**A. Men responsible for households**		**B. Women responsible for households**
Education (*v*5)	**C. 12 years or more of study**	**D. Second degree complete**	**E. People responsible for the household – without instruction or until first degree complete**
Income from the head of household (*v*6)	**F. More than two minimum wages**		**G. Until two minimum wages**

Source: Elaborated from Census sector aggregate of Census 2000 universe results tabbed for RMSP by the Center for Microfinance Studies (from the portuguese, CEMF).

These variables generated the second score (score_2):

$$score\_2 = v4 + v5 + v6,$$

Where *v*4, *v*5 and *v*6 are weighted average of the gender, education and income dimensions, respectively.

The final score (score_f) was obtained through an arithmetic average of the scores 1 and 2, that is:

$$score\_f = \frac{1}{2}(score\_1 + score\_2)$$

It should be noted, therefore, that the final score is an aggregation rule of the six variables. It must emphasized that the option for the arithmetic average was deliberate and followed the argument that all the index dimensions are equally important. (LELLI, 2001).

3. Results

To generate the results needed to achieve the georeferencing, a normalization rule was used so that the index would stay restricted between 0 and 100. Then, the IFM was obtained as:

$$IFM = \frac{(score\_f)_i - (score\_f)_{\min}}{(score\_f)_{\max} - (score\_f)_{\min}} x100,$$

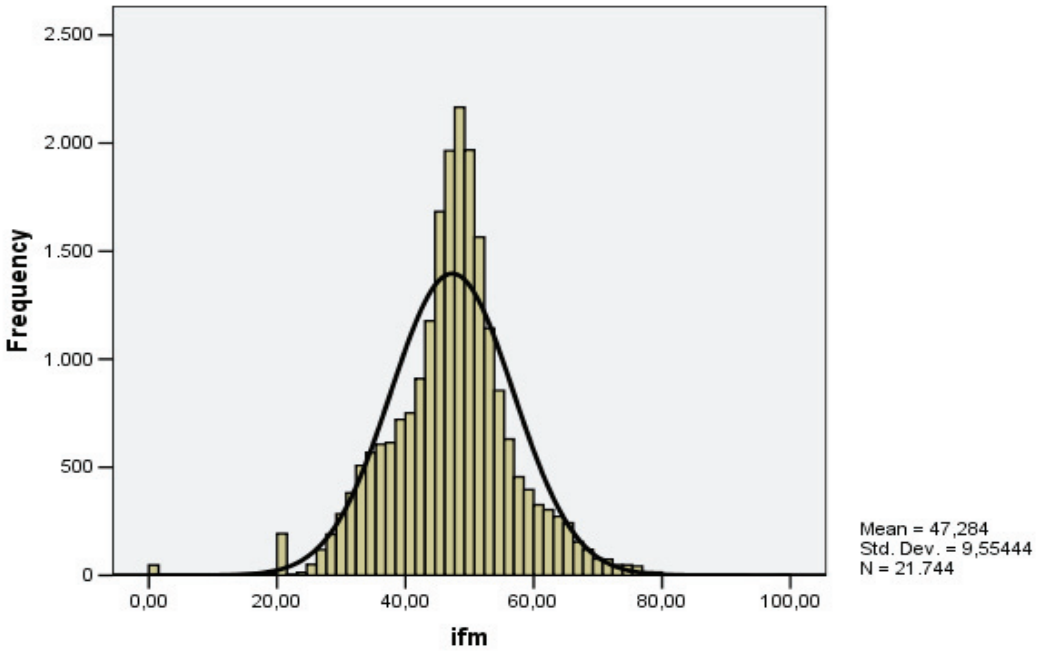
Where: $(score\_f)_i$ represents a *n*th observation of the final score; $(score\_f)_{\min}$ illustrates the minimum value of the final score; and $(score\_f)_{\max}$ is equal to the maximum value of the final score.

Table 3 – Descriptive Statistics of IFM

Mean		47,2840
Mode		20,75
Median		47,7527
Std. Deviation		9,55444
Minimum		0,00
Maximum		99,89
Percentiles	20	40,1002
	40	46,0530
	60	49,3007
	80	53,4934
Cases		21744

Source: Elaborated from Census sector aggregate of Census 2000 universe results tabbed for RMSP by the Center for Microfinance Studies (CEMF).

According to the table above, 20% of the households are located in Census sectors with low vulnerability, with lower or equal value to 40.1002. These would be the one fifth less poor households, in conformity to the IFM. The poorest fifth (20%), however, shows a IFM among 53,5 and 99,89.

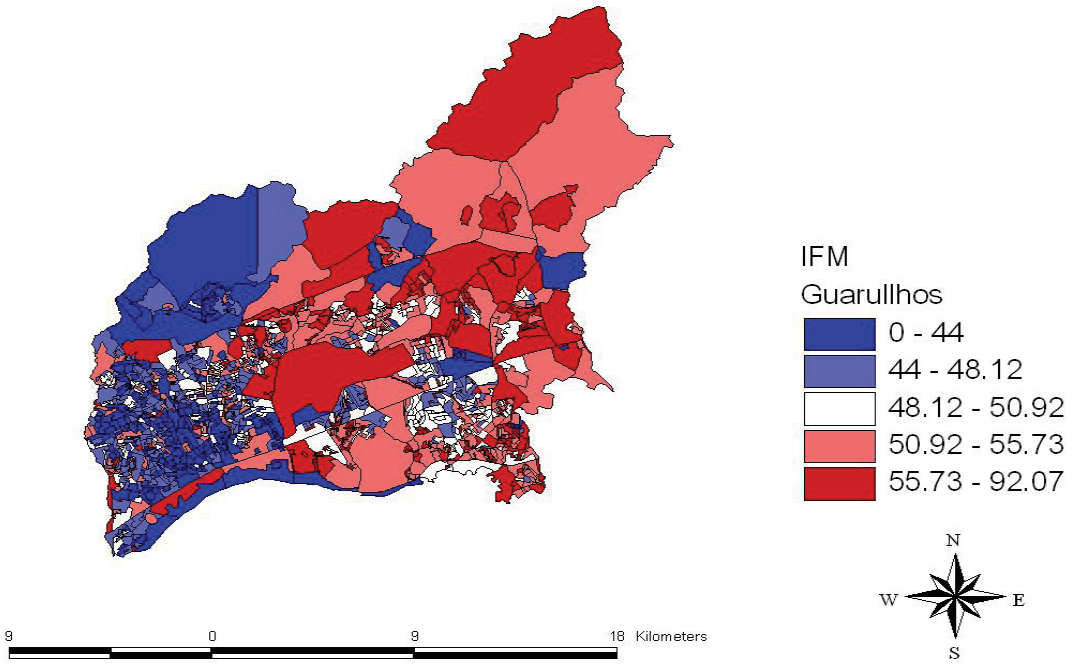


PICTURE 1 – IFM Histogram
Source: Elaborated from Census sector aggregate of Census 2000 universe results tabbed for RMSP by the Center for Metropolitan Studies (CEM).

According to the histogram, we note the IFM has a distribution very similar to a normal curve, although the mode is significantly different from the mean and the median. The maps below show the vulnerability of the Census sectors according to IFM and the spacial location of the MFIs. Index high values correspond to most vulnerable regions, that is, where poverty depth is higher.

3.1 An Empirical application of *IFM*

The map below refers to Guarulhos, one of the most representative cities of São Paulo State, the richest State of Brazil. According to the Brazilian Institute of Geography and Statistics (IBGE), Guarulhos has the second largest population of São Paulo State, with 1.072.717 of habitants. In 2005, its real GDP was about 13.62 billion of reais (or about US$ 5,6 billion using nominal exchange rate between real/dolar of 2005)[2], which represented 19% of São Paulo State GDP. The picture 2 points out the most deprives areas of Guarulhos, which could be focused not only by MFIs that plan to expand their operation activities but also by commercial banks in the process of downscaling.



Picture 2 - Multidimensional Index for Microfinance Institutions Focusing (IFM) for São Paulo metropolitan region and location of the MFIs.
Source: Elaborated from Census sector aggregate of Census 2000 universe results tabbed for RMSP by the Center for Metropolitan Studies (CEM).

Therefore, the next step of our research involves extending this methodology to others areas of Sao Paulo State, mainly where there are available data of micro enterprises. It is believed that it could shed some light on focalization of services of microfinance institutions and to speculate about potential impacts on poverty reduction.

Concluding Remarks

The main purpose of this paper was to raise the concern that monetary assessments of the depth of outreach of microfinance initiatives might not produce enough information about the overall impact of MFIs on reducing poverty. Empirically, its main objective was to develop an analytical tool in order to evaluate the depth-of-reach of MFIs when applied to specific areas, such as cities, provinces or even countries. In our case, the geographic region that has been chosen was the city of Guarulhos, which is the second most populated São Paulo State.

Evidence from the available literature shows that poverty has many definitions and empirical analysis will always be sensible to a proper definition. We developed a multidimensional index that was built based on the public data of Census 2000, which coves the whole country. For this reason it would possible to replicate our analysis for other areas.

We believe that a future research agenda would include not only the replication just cited but also an accurate study of the factors that underlie the MFIs expansion in each area, such was the presence of traditional financial institution. In addition, impact studies could use the multidimensional analysis in order to test the whether microcredit plays a role for reducing poverty in Brazil.

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[1] As defined by Copestake et al (2005: 708-9), "A poverty correlate is a household characteristic that reliably captures much of the variation in income across different households." The objective of poverty correlates is to estimate income poverty when data about income might not be very reliable.
[2] These data are available at www.ipeadata.gov.br