Rural poverty in Brazil: do different approaches produce different results?

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Abstract: According to the World Bank, poverty affects almost half of the 6 billion inhabitants of the planet. Even presenting a completely distinct reality from many Asiatic and African countries, Brazil has considerable high poverty indicators. The majority of these indicators, however, are grounded on a monetary approach, which has its basis on the neoclassical microeconomic theory. According to this approach, income is the main criteria for classifying the individuals as poor. This classification is done, firstly, through the estimation of a poverty line. The poverty line, in turn, is a monetary representation of a given utility level – considered the minimum necessary to escape poverty situations. The various methods of determination of the minimum utility level (basic needs, food-energy intakes, etc.) are attempts to establish a consensus, in some way, about the definition of poverty. It is verified that the monetary approach is consolidated in the academic and political field. Even so, a question seems to persist: what is to be poor, in fact? There is no simple answer to that question. Many aspects (dimensions) are involved in that issue. And those aspects transcend income. We propose on this article to establish an empirical comparison between the monetary approach and a multidimensional approach, namely the Capability Approach, to discuss that question with respect to Brazilian rural areas. The monetary approach classifies people as poor, or not, based on the availability of income. In contrast, the Capability Approach takes into account the qualitative aspects of the people's life; it considers what people are able to do and to be – the functionings. To take forward our proposal we used microdata from the 2003 National Household Sample Survey (PNAD) – the most important database of socioeconomic indicators in Brazil. The main statistical procedure concerning the operationalization of the Capability Approach was the Factor Analysis. The objective of this statistical tool, in this case, was identifying (and assessing) an underlying multidimensional structure in the group of variables selected (representing the functionings) and perform an analysis of this structure. The results of our study point out considerable differences between the two approaches. One of it relates to the differences in the (qualitative) importance of income in the well-being assessment assigned to each approach. Another one detaches the importance of the multidimensional structures evaluated through the functionings (based on the Capability Approach).

Key-words: poverty, monetary approach, Capability Approach, multidimensional analysis.

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1. Introduction

One of the eight Millennium Development Goals, issued in 2000 by the countries that compose the United Nations, is to eradicate hunger and poverty until 2015. The objective of this goal is to reduce by half the number of people living on less than US$ 1,00 per day. This goal reflects, in some way, the intolerance that has been growing with respect to the presence of poverty. And this concerning is demonstrated even by developed countries and developing countries. An indicative of this position are the recurrent manifestations of institutions, as World Bank, in mentioning the results of public policies based on its effects on poverty reduction.

The World Bank indicates that 1,1 billion people live in extremely poverty condition, i.e., live on less than US$ 1,00 per day. Asia and Africa are the continents that offer the major contribution to that amount – in Africa half of the population is extremely poor. Approximately half of the 6 billion inhabitants of the planet, however, are considered poor, which means that they are living on less than US$ 2,00 per day. Specifically about rural poverty, the International Fund for Agrarian Development has pointed out in the Rural Poverty Report 2001 that there were around 1,2 billion people considered extremely poor in the world and 75% of this total were found in rural areas (FIDA, 2001).

In Brazil, according to the National Household Sample Survey (PNAD)[3], there were in 2003 39,9 million people considered extremely poor (22,7% of the total population) and 81,4 million people were said to be poor (46,3% of the total population). The reality in rural areas, notwithstanding, is quite peculiar: 44,8% of the population is said to be extremely poor (12,3 million people) and 71,4% is considered poor (19,6 million people) [4]. These indicators corroborate previous studies, as FIDA (2001), ECHEVERRIA (2000) and DE JANVRY & SADOULET (2001), which point out that the rural poverty is relatively greater than urban poverty.

These presented indicators are fundamental basis for the anti-poverty manifestations by organizations as United Nations, World Bank, governments and NGO's. However, demonstrating a kind of paradox, at the same time those indicators are constantly quoted and the poverty reduction is relentlessly proclaimed there is a crescent debate surrounding the signification of poverty. What is to be poor, in fact? The answer to this question has crucial importance as guide for any action on this matter.

During the 50's and 60's the economic growth was the main target of the economic policy and planning. The poverty reduction, when contemplated, was seen just as direct benefiting from economic growth. In the 70's, actions more directly concerned with poverty begin to take place. These actions, however, were concentrated in assistance policies. Nowadays, the debate is found in another level. There is more clarity about the seriousness of this social problem and its various dimensions. Nevertheless, it is not enough to solve the question quoted above: how to classify an individual as poor or not? What would be the more appropriate poverty line?

According LADERCHI, SAITH & STEWART (2003):

> "The current approach to the identification of poverty and policy formulation is rather messy: on

[3] Special tabulations conducted by the authors based on the microdata of the survey. It was considered the household income *per capita*.

[4] For other references about this subject see BARROS, HENRIQUES & MENDONÇA (2000), CORRÊA (1998), KAGEYAMA & HOFFMAN (2000).

> the one hand, there is acknowledge of its multidimensionality, combined with a pick and choose approach in advocacy with little consistency across studies. On the other hand, in practice, the monetary approach mostly retains its dominance in description and analysis, both nationality and internationality" (p. 3)

Although the considerable volume of research and scientific production, in which a more precise definition to this phenomena is searched, the traditional approach (monetary) still retains great popularity. This approach has been performing a central role as guide for policy makers and has been influencing many researchers.

The question underlying this debate is related to the informational space considered. The debate about poverty is based on the choice of an informational set that is capable to define if an individual is poor or not (income, utility, social exclusion, etc.). It is in this direction that the work of the Indian economist Amartya Kumar Sen points out. He proposes a different manner of analyzing well-being, using a quite different informational space SEN (1992, 2000) – the Capability Approach. According to Sen, the well-being of a person should be evaluated based on the freedom that she/he has to lead the life that with justice valorizes. This means that what should be observed is what the person is able to do or to be. This way, Sen contributes for an alternative definition of poverty, taking into account an informational base wider than that utilized in the monetary approach. This base is, naturally, multidimensional.

So, as already detached by LADERCHI, SAITH & STEWART (2003), it is established an impasse: at one hand the observation that poverty is multidimensional, and, at the other hand, the continued fidelity to the monetary approach (unidimensional). Explanations for that dichotomy can have many roots. However, we believe that two reasons are fundamental: i) the hardness in the operationalization of multidimensional approaches, given that they are generally based on complex concepts, e.g., "freedom"; and, ii) the fact that many attempts of formulation of multidimensional indicators have indicated that the variable income was the one which responded for the major part of the explained variance of the indicator among the different poverty situations – what corroborates for the utilization of income as a proxy for all the other dimensions.

This paper aims to make an empirical comparative between the monetary approach and the Capability Approach. In doing so, our objective is to contribute with the debate in two specific ways: i) a discussion of the effective empirical differences between the two approaches and its relation with the debate of the poverty definition; and, ii) a contribution to the operationalization of the Capability Approach, which is an important and actual topic in the research agenda of development economists.

We will work with the Brazilian rural areas. The reason for this option is, as quoted before, the peculiarity of rural environment with respect to this subject. We believe that a multidimensional approach is more adequate to explore in a deeper way these peculiarities. Furthermore, we believe that the proper differences between the two approaches should be considerably important in rural areas.

2. Theoretical Referential

Given that the present paper deals with an empirical comparison between two different approaches, it is important to bear in mind the core theoretical aspects assigned

to each one. The theoretical aspect, beyond doubt, is essential for a better understanding of the possible empirical differences found.

2.1. The monetary approach

This approach identifies and assesses poverty based on the lack of income, given a specific reference point – a poverty line. These poverty lines can be established through a wide range of methodologies[5], taking into account basic needs, food-energy intake, wage level, etc. All these methodologies, in turn, are settled on the basis of the microeconomic theory. More specifically, it is derived from the consumer utility[6] maximization problem. The central idea of this problem is to establish the maximum level of utility given the prices and the budgetary restriction of the consumer. But this problem can be seen from another point of view: to find the minimum expenditure necessary to meet a specific utility level pre-determined as the minimum needed to escape poverty.

This utility level is the poverty line, in fact. This is the final result searched by all the methodologies of poverty line estimations. It reflects the consensus, in some way, about who will be considered poor or not. What is effectively observed, after all, is that minimum expenditure (regarding a utility referential point): if one earns less than that amount, then she/he is said to be poor.

In accordance with LADERCHI, SAITH & STEWART (2003), the main assumption that sustain the solution of this problem and its translation in monetary terms is that "… with appropriately devised tools, uniform monetary metrics can take into account all the relevant heterogeneity across individuals and their situations". To accomplish that, other assumptions should be made: i) utility is an adequate definition of well-being; ii) monetary expenditures are a satisfactory measure of utility; iii) decrease in utility implies "poverty"; and, iv) that is a good justification for a poverty line.

Bearing in mind all these assumptions, we can talk about the various poverty measures regarding the monetary approach. The most basic measure is the proportion of poor (P0). It indicates the proportion of people that are below the estimated poverty line. Through this measure no distinction can be made among the people considered poor. So, there is no reference to the intensity of poverty – just extension is evaluated.

Another well-known measure is the P1, which is the "mean income gap". It is used to evaluate the intensity of poverty. This measure calculates the income difference between the individuals and the poverty line. The measure named P2, in turn, aims to incorporate, besides extension and intensity, the distributive question in the poverty evaluation – it is called "squared mean income gap". Examples of P2 measures are the Sen Index (SEN, 1981) and the FGT Index (FOSTER, GREER & THORBECK, 1984).

Finally, there exists another important element regarding the monetary approach that should be mentioned. Many studies associate income to some qualitative variables aiming to qualify this approach to capture the heterogeneity among the individuals. This procedure correlates variables that sketch health, education, housing, etc., with the variable income. What should be observed is the nature of the correlation: it is not a systemic correlation. It is just an instrumental correlation trying to show, in a unidimensional way, that more income implies better health, education, etc.

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[5] For a good revision about concepts and implementation of poverty lines refers to RAVALLION (1998) and HAGENAARS & VAN PRAAG (1985).

[6] "Utility" is seen as satisfaction or happiness, regarding to an interpretation of well-being. For more details see SEN (1985) and VARIAN (1992).

Summarizing this section, four points should be especially clear regarding to the monetary approach: i) *strictly based on income*; ii) *established under strong assumptions of the microeconomic theory*; iii) *given that assumptions, aims to capture the heterogeneity of the individuals just observing income*; and, iv) *based on the estimations of poverty lines through different criterions (translated in monetary terms).*

2.2. The Capability Approach

The multidimensional approach, proposed by Amartya Sen, is focused neither in income nor in any other commodity bundle reference point. The main proposal of the Capability Approach is analyzing well-being based on the individual's 'being', i.e., on what she/he can achieve – beings and doings (SEN, 1985, 1992, 2000). In such case, we can verify a considerable enlargement of the informational space considered in the well-being assessment in relation to which assigned to the monetary approach.

The basic foundation of the Capability Approach is to evaluate people well-being based on the freedom that they have of being and doing what judge to be better, according principles of justice. For example, consider the act of eating meat. Someone can avoid to eat meat because of some religious principle or because she/he is vegetarian. However, another individual would like to eat meat, but she/he simply does not have it. The final situation is the same: none eats meat. But the reason is completely diverse. In the first case there exists the possibility of choice, while in the second case does not.

The Capability Approach has its central focus effectively on this freedom of choice. According this perspective, the ability of choice is linked to the quality of life. Following this way, it is possible to capture important elements such as: personal heterogeneities, environmental diversities, variations in the social environment, different personal perspectives of life and intra-family distributions (SEN, 2000).

Besides the freedom principle, other two central components of this approach should be explored: functionings and capabilities. The functionings are the constitutive elements of the person's being. They are the beings and doings that the people achieve. In evaluative terms, it means to identify a variety of aspects, from "elementary things as being adequately nourished, being in good health, avoiding escapable morbidity and premature mortality, etc., to more complex achievements such as being happy, having self-respect, taking part in the life of the community, and so on" (SEN, 1992, p.39).

Closely linked to the notion of functioning is the notion of capability to function. "It represents the various combinations of functionings (beings and doings) that the person can achieve. Capability is, thus, a set of vectors of functionings, reflecting the person's freedom to lead one type of life or another" (SEN, 1992, p. 40). So, concerning well-being, the relation between functioning and capability[7] occurs as follows: if the achieved functionings constitute the person's well-being, the capability to achieve this functionings represents the person's freedom to generate well-being.

In his *Commodities and Capabilities* (1985), Sen presents a more formal definition of functionings and capabilities. Letting x_i be a vector of commodities possessed by the person i – selected from a set X_i – and assuming that these commodities are converted into a vector of characteristics by the individual through the

[7] As pointed out by ROBEYNS (2003) it is important to quote a methodological note: every person has just one *capability set* (sometimes refereed just as *capability*) – it is the set that contains all the possibilities of life available to the individual. However, *capabilities* represent potential functionings, alternative functionings. The *capability set* of a person is composed by *capabilities*, we can say.

function c_i and then utilized considering a utilization function f_i – chosen from a set F_i that represents the options of utilizations available to the individual in consideration of her/his abilities – the functionings can be expressed as follows:

$$b_i = f_i(c(x_i))$$

So, b_i is the functioning depending on the characteristics of the commodities possessed by the individual i and on the utilization of these elements performed by the individual. The capability set depends on these two elements as well. It can be expressed as follows:

$$Q_i(X_i) = [b_i \mid b_i = f_i(c(x_i)), \text{ for some } f_i(\,.) \in F_i, \text{ and for some } x_i \in X_i]$$

The capability set Q_i is, thus, a set of functionings that depends mainly on the characteristics of the commodities and on the utilization of them by the individual. Considering this formal structure we are leaded to acknowledge that look just commodities is not enough. It should be especially clear that the characteristics of the commodities vary from individual to individual according her/his real abilities in using these characteristics. Following the classical example proposed by Sen: a bicycle is not useful for a cripple.

Given the definitions of functionings and capabilities, a question arises concerning the evaluative exercise: what is the more adequate element for evaluation, functioning or capability? Sen considers that to evaluate capabilities is more adequate than just look the achieved functionings. However, Sen himself acknowledges that capabilities are far more complicated of being evaluated than functionings do. In the currently literature both functionings and capabilities have been used (KUKLYS, 2003, LELLI, 2001, MARTINETTI, 2000). But, other points must be considered before the choice of the evaluative space: availability of data, purpose of the study, etc.

Another open question regards to what functionings (or capabilities) should be considered. Sen does not propose any previous list of basic capabilities[8]. He alerts that the evaluative exercise is inescapable and important because it offers a more open discussion around values instead of hiding it under an implicit structure (SEN, 2000).

Finally, the question regarding the operationalization of the Capability Approach is considerably new. There is any consolidated method to deal with this approach empirically. The empirical implementation of the Capability Approach – and other approaches that work on complex concepts – can be considered frontier of research in the human development field. This paper intends to present a contribution to the operationalization of the Capability Approach.

Following what has been done in the previous section, the main elements of the Capability Approach that should be especially clear are: i) *based on the principle of freedom and on the notion of functionings and capabilities*; ii) *aims to capture the heterogeneity among the individuals through functionings and capabilities (not just income or commodities)*; and, iii) *operationalization is still complex and not yet consolidated*.

[8] Professor Martha Nussbaum proposes a list of basic capabilities (NUSBAUM, 2000, 2003). However, the purpose of the list is different from just identify or assess poverty – it is related to universal rights.

3. Methodology

The objective of this paper, as indicated before, is to conduct an empirical comparison between the two approaches, the monetary approach and the Capability Approach, applied to Brazilian rural areas. Each approach counts on a specific statistical methodology that will be explained in the sequence. The database, however, is the same for both: the National Household Sample Survey (PNAD). In this work we will utilize the microdata of the PNAD 2003.

3.1. The database

The National Household Sample Survey (PNAD) is conducted by the Brazilian Institute of Statistics and Geography (IBGE). It is considered by the researchers[9] the more complete survey regarding socioeconomic information in Brazil nowadays. The survey counts on a wide set of information regarding, for example, income, education, occupation, migration, housing conditions and health. The PNAD is conducted annually since 1967 (excepted in years of census).

Although its great importance, this survey faces some limitations and critical points. We will not scrutinize them here because of the limitation of space. However, it is important to say that these problems do not condemn the use of this survey. These problems demand, in summary, that the researchers take some precautions about the classification of rural and urban areas, the definition of work occupation, and the composition of incomes[10].

A fundamental observation regarding the PNAD is that it is a survey that is not designed to capture functionings or capabilities at all. In Brazil we do not have any survey with wide coverage that is designed to deal with functionings (or capabilities). In reality, in the world there are few surveys that offer information closer to that demanded by the Capability Approach. Examples of these surveys can be found in Italy (MARTINETTI, 2000) and Belgium (LELLI, 2001).

One of the intended contributions of the present study is the attempt of operationalization of the Capability Approach based on a national coverage survey not specifically designed to capture functionings. It can seem ingenuity in principle, but even considering all the limitations the results can be interesting and useful. In the sequence we present the statistical procedures concerning each approach.

3.2. The monetary approach

Concerning the monetary approach we will deal with three main aspects concerning income: distribution, poverty lines and observation of qualitative variables in relation to income. We will analyze the income distribution using the *total personal income* (including wages, pensions, governmental transfers, etc.) of the individuals at least 10 years old. The income distribution analysis is based on the estimation of the income percentiles and on the estimation of the Gini Index[11].

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[9] See SILVA (1999), CORRÊA (1998), WAQUIL & MATTOS (2002).

[10] In this paper, all these precautions were rigorously observed.

[11] This index respects the Pigou-Dalton criteria and is calculated by se following formula: $G = 1 - \frac{1}{n}\sum_{i-1}^{n}(\Phi_i + \Phi_{i-1})$. Where Φ_i represents the proportion of income accumulated until the *i*-th person. The index varies from 0 (perfect equity) to 1 (perfect inequality).

The analysis of poverty lines is based on the *household income*, instead of personal income. In this case we have considered all the individuals, inclusively those younger than 10 years. The information that interests us is the proportion of poor according two different poverty lines: US$/day (household income *per capita*) and Minimum Wage/month (total household income).

The last step of the analysis is the association of the income variable with some qualitative variables. These variables are: *years of study*, *housing conditions index* (HCI)[12] and a *health self-evaluation index*[13]. We will analyze some levels of income and the respective results of these variables. In doing so, we can discuss how well income works as a proxy for those qualitative variables.

3.3. The Capability Approach

Concerning the Capability Approach, we will deal with *achieved functionings*. The main justification for this choice is the availability of data (PNAD), as already discussed above. Although PNAD has not been designed for this end, we succeeded in extracting some indicators regarding achieved functionings. We managed to propose the analysis of three functionings, namely *study*, *health and mobility*, and *housing conditions*. These functionings are composed by nine variables altogether[14]. Detailed information about the functionings and its components are displayed in Table 1.

Each functioning, with its respective components, aims to evaluate what the individual "is" or "does" regarding the specific dimension. For example, in the case of the functioning "health and mobility" we try to assess whether the individual is healthy and whether she/he is capable of achieving quotidian basic tasks.

It is important to note that the set of variables does not count on any variable regarding income. The reason to do that should be clear considering the objective of this paper and what has been presented up to now. We are assessing *beings* through the Capability Approach. And beings cannot be assessed observing income. We are not affirming that income and functionings are uncorrelated. What is under investigation is the nature of this correlation. It will be analyzed in the next section.

The functionings will be analyzed using the Factor Analysis[15]. This technique is commonly used for two distinct (but complementary) objectives: to identify an underlying structure in a data set and, after identified this structure, to reduce the number of variables to a much smaller group of factors (that are numerical representation of the dimensions previously found). Regarding our study, the hypothesis is that the nine selected variables will be reduced to three dimensions (factors): precisely the three functionings pre-selected.

The factors are estimated as linear combinations of the observed variables according to the following model:

$$F_j = \sum_{i=1}^{p} w_{ij} x_i = w_{1j} x_1 + w_{2j} x_2 + ... + w_{pj} x_p$$

[12] This index varies from 0 to 5 – with 5 being the best and 0 the worse. It captures the availability (or not) of five items: piped water, refrigerator, electricity, sanitary and telephone.

[13] This index varies from 1 to 5 – "very bad" to "very good".

[14] We acknowledge that it is a small number of variables. But given the explained circumstances regarding the database it was the better we could do.

[15] This statistical tool has been used in a wide range of studies in the context of the social sciences. Regarding the Capability Approach, see LELLI (2001).

where w_{ij} are the factor coefficients, x_i are the observed variables and p the number of variables.

Table 1 – Functionings and its components

Functioning: STUDY
EDU_ALFA
If knows to read and write
Binary: (0) No (1) Yes (-) Not apply (children younger than 7)
EDU_ESTUDO
Position in relation to the High School
Binary: (0) Between 7-17 years old and is not studying, older than 17 and is not studying neither has concluded the High School
(1) Between 7-17 years old and is studying, older than 17 that is studying, or older than 17 that is not studying but has already concluded the High School
(-) Not apply (children younger than 7)
Functioning: HEALTH AND MOBILITY
SAU_AUTO
Self-evaluation of the own health status
Categorical: (1 - 5) very bad – very good
SAU_ATIVI
If has been hindered to realize some simple activity because of health problems
Binary: (0) Yes (1) No
SAU_DOENCA
If has some chronic disease
Categorical: (1) Three or more (2) Two (3) One (4) No one
SAU_MOBIL
If has some difficulty in realizing quotidian simple tasks
Categorical: (1) Does not succeed (2) Has considerable difficulties (3) Has just little difficulties (4) Has no difficulties
Functioning: HOUSING CONDITIONS
CMOR_AGUA
How is water supply
Categorical: (1) There is no piped water (2) There is piped water from source other than general system (3) There is piped water from general system
CMOR_TEL
If there is telephone
Binary: (0) No (1) Yes
CMOR_COMODI
If has comfortableness – wash machine and freezer
Categorical: (1) No one (2) Just one (3) Both

Source: elaborated by the authors.

The Factor Analysis is based on the correlations between the variables. So, the first step is to verify it. It is expected that the correlations are high enough. Low correlations indicate that there is no multidimensional structure underlying the data set – in this case the Factor Analysis does not fit. The adequacy of the Factor model can be verified by two tests: Bartlett's Test of Sphericity and the Kaise-Meyer-Olkim (KMO). The first one tests if the correlations between the observed variables are statistically different from 0 (if the correlation matrix is an identity matrix). The second, in turn,

compares the magnitudes of the observed correlations to the magnitudes of the partial correlations[16].

The next step is the extraction of the factors. In this study we will conduct the extraction through the Principal Component Analysis[17]. The number of factors to be extracted can be defined observing the total variance explained by each additional factor. The idea is to obtain a relatively high explained variance with the lower number of factors as possible. This procedure produces a matrix of factors – which displays the factors and the respective factors loadings assigned to each observed variable.

After extracted, the factors should be interpreted. In general, the first matrix of factors does not offer a logical interpretation, i.e., the factor loadings are disorderly distributed among the observed variables. So, it is necessary to conduct the factor rotation. This procedure arranges the factor loadings in a different way, offering a more logical comprehension of the factors.

Finally, it is possible to calculate the factor scores. These scores will be the "variables" that substitute the original set of observed variables. The scores are estimated as follows:

$$F_{jk} = \sum_{i=1}^{p} w_{ij} x_{ik} = w_{1j} x_{1k} + w_{2j} x_{2k} + ... + w_{pj} x_{pk}$$

where x_{ik} is the standardized value of the observed variable i for the observation k, and w_{ij} is the factor loading of the variable i factor j.

Regarding the purpose of the implementation of this technique in the present study, we can make two different (although complementary) analyses: i) the identification of the functionings through its respective components defined *a priori*; and, ii) to explore the idea of dimensions of well-being.

Aside the Factor Analysis, we will proceed the Cluster Analysis. It aims to identify homogeneous groups in relation to the factors previously estimated. So, we can analyze patterns according to these groups. Cluster Analysis gathers similar observations, i.e., it clusters observations that are closer in the n-dimensional space – in this case, n is the number of factors. The analysis implemented in this paper is based on the Square Euclidean Distance. The measure of the distance between the observation k and the observation l is:

$$D_{k,l}^2 = \sum_{i=1}^{p} (x_{i,k} - x_{i,l})^2$$

The smaller the distance between two observations, the more similar they are – then, it is more probable that they fit the same cluster.

4. Analysis

4.1. The monetary approach

The objective of this section is to analyze the basic results from the monetary approach: income distribution, proportion of poor and qualitative variables in

[16] The statistical structure of these tests can be found in HAIR, *et alii* (1998) and MULAIK (1972).

[17] This method extracts factors forming linear combinations of the observed variables. Given the space limitation we will not explain in detail this method. See HAIR, *et alii* (1998), MULAIK (1972) and MAXWELL (1977).

correlation to income. As indicated before, the analysis regards to 2003. Considering that we are not working with time series we will use the urban areas as a comparative point sometimes.

In 2003 the mean income in rural areas in Brazil was US$ 114,97 per month[18]. This amount is considerable lower than the one observed in urban areas, US$ 245,32. This sort of differences has already been indicated by various studies in Brazil as WAQUIL & MATTOS (2002) and CORRÊA (1998). The state of Rio Grande do Sul, for example, presents the same income differential: the mean income, in 2003, regarding rural areas was US$ 165,02 and in urban areas was US$ 390,10.

The percentiles of income in Brazilian rural areas already point out an asymmetric distribution (Table 2). The main information displayed in this table is that the mean income is above the 50º percentile (almost reaching the 75º percentile). It means that more than 50% of the rural population earns less than the average.

Table 2 – Percentiles of income
Brazil, rural, 2003 (US$ of 09/2003)

Mean Income	114,97
1º Percentile	5,14
10º Percentile	11,99
25º Percentile	41,10
50º Percentile	82,19
75º Percentile	121,92
90º Percentile	205,48
99º Percentile	767,12

Source: Special tabulations of PNAD/IBGE.
Estimations made by the authors.

This asymmetric distribution is also elucidated by the Gini Index (Table 3). Just as a matter of comparison we have estimated the Gini Index for the state of Rio Grande do Sul. As observed in this table, although its lower mean income, the rural area counts on an income distribution more symmetric than urban areas do. It is true even for Brazil as for the state of Rio Grande do Sul.

Table 3 – Gini Index - 2003

Brazil	
Rural	0,51
Urban	0,57
Rio Grande do Sul	
Rural	0,45
Urban	0,54

Source: Special tabulations of PNAD/IBGE.
Estimations made by the authors.

The last step regarding the income distribution analysis is the appropriation of income (Table 4). In rural areas, only 19,1% of the total income is appropriated by the 50% poorer. However, the more impressive information in this table is that 41,5% of the total income is appropriated by the 10% richer. In urban areas this concentration of income is more accentuated: 46,1% are owned by the 10% richer.

[18] Prices of 09/2003.

Table 4 – The appropriation of income (%)
Brazil, 2003

Rural	
1% poorer	0,1
10% poorer	0,6
50% poorer	19,1
50% richer	80,9
10% richer	41,5
1% richer	13,8
Urban	
1% poorer	0,1
10% poorer	0,8
50% poorer	14,8
50% richer	85,2
10% richer	46,1
1% richer	12,8

Source: Special tabulations of PNAD/IBGE.
Estimations made by the authors.

Table 5 shows the proportion of poor according three different poverty lines[19] for rural and urban areas. The differences between rural and urban areas are perceptible in all the lines estimated. Regarding the well known "extremely poverty" line (1 US$/day) the proportion of poor is 18,6% in urban areas and 44,8% in rural areas – a quite impressive difference. The same magnitude of disparity is observed in the 2 US$/day line. These numbers conduct to a conclusion, already indicated by other studies[20], that rural poverty is relatively bigger than urban poverty.

Table 5 – Poverty lines – Brazil, 2003

	Number of poor	Proportion (%)
Rural		
1 US$/day*	12.355.418	44,8
2 US$/day*	19.676.267	71,4
1 Minimu Wage/month**	6.780.654	24,6
População Total	27.548.821	
Urban		
1 US$/day*	27.580.136	18,6
2 US$/day*	61.751.069	41,6
1 Minimum Wage/month**	14.794.849	10,0
População Total	148.438.791	

Source: Special tabulations of PNAD/IBGE.
Estimations made by the authors.
* Household income *per capita*
** Total household income

The next block of analysis in the monetary approach context refers to the association of some qualitative variables with the variable income. Table 6 presents a summary of the three selected variables for both rural and urban areas. Rural areas

[19] As indicated in the theoretical referential, there exist a wide range of methodologies for poverty lines estimations. However, our proposal is not concerned with those methodologies. So, we have opted for these wide used poverty lines based directly on monetary indicators: US$/day, used by World Bank, and Minimum Wage/month, commonly used in Brazil.
[20] See WAQUIL & MATTOS (2002, 2003), ECHEVERRIA (1998).

count on a better result just in health, while urban areas present better indicators in housing conditions and years of study.

Table 6 – Means and standard deviations of the qualitative variables – Brazil, 2003

	Mean	Stand. Dev.
Rural		
Housing Condition Index (HCI)	3,12	1,23
Self-evaluation of own health status	3,91	0,79
Years of study	4,03	3,27
Urban		
Housing Condition Index (HCI)	4,37	0,83
Self-evaluation of own health status	3,99	0,76
Years of study	6,69	4,58

Source: Special tabulations of PNAD/IBGE.
Estimations made by the authors.

However, in Table 7 there are the results that interest us the most. It displays the results of those three variables according to different levels of income for rural areas. As can be observed there is an improvement in the HCI and in the number of years of study when the income level increases. So, we could say that higher income implies better housing conditions and more years of study. Regarding the self-evaluation of health status, however, we do not found this absolute linear behavior – although it is true for the higher income levels. In some way, it can be explained by the subjective nature of the variable (captured by the question "how is your health?")[21].

Table 7 – Means of the qualitative variables according income levels – Brazil, rural, 2003

	HCI	Years of study	Self-evaluation of own health status
Up to half MW*	2,72	3,45	3,97
More than half MW – one MW	3,43	4,30	3,82
More than one MW – two MW	3,87	5,33	3,82
More than two MW	4,28	7,12	3,91

Source: Special tabulations of PNAD/IBGE.
Estimations made by the authors.
* MW=Minimum Wage

Just to close this section, we would like to summarize the main results found in the analysis based on the monetary approach. So, considering the results, we are able to indicate that the Brazilian rural areas have the following characteristics: i) *mean income relatively low*; ii) *there exists income concentration*; iii) *a relatively high proportion of people are considered poor and/or extremely poor*; and, iv) *the higher is the level of income, the better are the results of the qualitative variables* (justified exception to the health status). More discussions about these results will appear in the section dedicated to the comparative between the monetary approach and the Capability Approach.

[21] This question will be discussed in next sections.

4.2. The Capability Approach

As already mentioned, the operationalization of the Capability Approach will be conducted through a Factor Analysis. The first step was to verify the adequacy of the model – observing the correlation matrix and the adequacy tests (Annex 1). The majority of the correlations found cannot be considered high. Nevertheless, they are not low enough to condemn the use of the Factor Analysis. The Bartlett's Test of Sphericity has shown that the correlation matrix is statistically different from an identity matrix. The Kaise-Meyer-Olkin (KMO) test, in turn, has indicated a level of adequacy of 0,72. This level is considered medium – a good level of adequacy should stay above 0,80[22].

After these preliminary analyses and considerations we concluded for the utilization of the Factor Analysis. So, we proceeded the extraction the factors. According to the results (Annex 1), three factors were identified. These three factors accumulate 56,3% of the total variance of the data set[23]. After the orthogonal rotation (through the Varimax method), we have obtained the Matrix of Rotated Factors displayed in the Table 8.

Table 8 – Matrix of Rotated Factors*

	Factor 1	Factor 2	Factor 3
EDU_ALFA		0,374	0,59
EDU_ESTUDO			0,77
SAU_AUTO	0,724		0,27
SAU_ATIVI	0,697		-0,37
SAU_DOENCA	0,683		0,34
SAU_MOBIL	0,723		
CMOR_AGUA		0,686	
CMOR_TEL		0,705	
CMOR_COMODI		0,748	

Source: Special tabulations of PNAD/IBGE.
Estimations made by the authors.
* Values lower than 0,20 were suppressed from the table.

Paying attention to the higher loadings (the observed values in the table) concerning each factor we can interpret what they represent. In Table 8 the interpretation appears clearly. The factor 1 is related to the variables concerning health – the proposed functioning *health and mobility*. Factor 2 is linked to the variables that compose the functioning *housing conditions*. And, finally, factor 3 is related to those variables that are components of the functioning *study*. So, we have confirmed the hypothesis that those components are, in fact, strictly related to the functionings previously assigned. For a visual intuition of the spatial distribution of the factors see Graph 1.

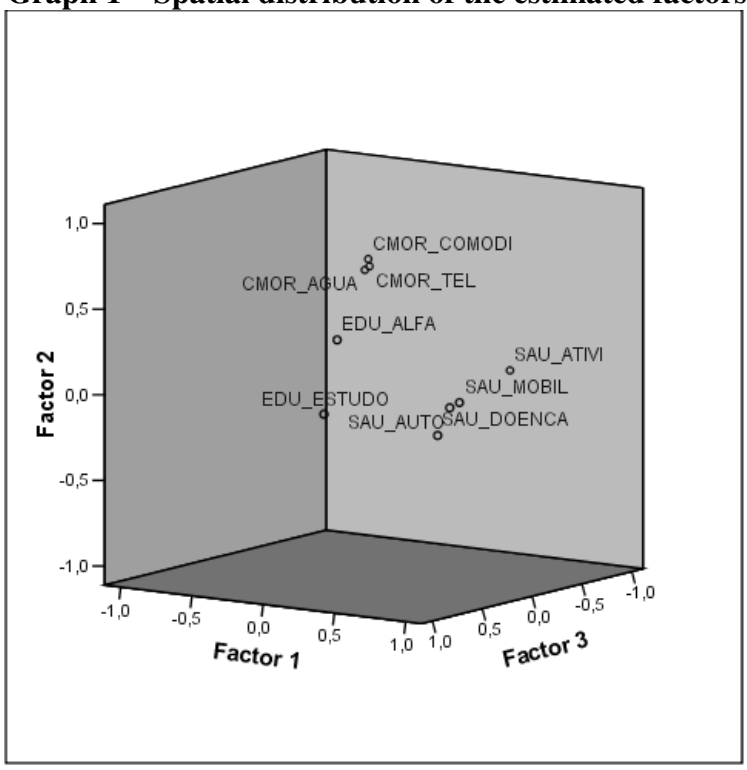
The next step is the estimation of the factor scores. Aside the estimation indicated in the methodology section of this paper, we have ranged the estimated scores

[22] We believe that the relatively low adequacy shown by KMO is due to the fact that the variables are either binaries or categorical. In cases like this, the Pearson Correlation Coefficient can be lower than when continuous variables are used. For more details about this matter see FACHEL (1986) and BARTOLOMEW (1988).

[23] This percentage is considered adequate. In general, Factor Analysis applied to Social Sciences problems respond for around 60% of the total explained variance (HAIR, *et alii* 1998).

into a scale 0 – 1[24]. It has been done for a better evaluation of the dimensions reflected by each factor. Note that the original variables were formulated following the principle that greater values denote better conditions in terms of well-being. So, the factors scores, ranged into a scale 0 – 1, can be interpreted as a well-being indicator: the closer to 1, the better the well-being evaluation.

Graph 1 – Spatial distribution of the estimated factors



Source: Special tabulations of PNAD/IBGE.
Estimations made by the authors.

The basic results of this procedure described above are displayed in Table 9. In evaluative terms this results do not offer much information. The table shows the mean scores (and standard deviations) of each factor (already ranged) and the mean of what we will call "general factor". This general factor is just an arithmetic mean of the three estimated factors. In our analysis it represents an aggregated indicator of well-being, in some way.

Table 9 – Means and standard deviations of the estimated factor scores – Brazil, rural, 2003

	Mean	Stand. Dev.
Factor 1 (Health)	0,83	0,16
Factor 2 (Housing)	0,30	0,18
Factor 3 (Study)	0,38	0,17
General Factor	0,51	0,10

Source: Special tabulations of PNAD/IBGE.
Estimations made by the authors.

[24] To do so, we have used the same formula used in the composition of the Human Development Index (HDI): $(x_i - x_{mínimo})/(x_{máximo} - x_{mínimo})$, where x_i is the factor score considered, $x_{mínimo}$ is the lower value in the data set and $x_{máximo}$ is the higher value in the data set.

Having the estimated factor scores (representing well-being) we have proceeded the Cluster Analysis. So, we obtained four homogeneous groups according to the three estimated factors[25]. The results are in the Table 10.

Table 10 – Means of the factor scores for each cluster
Brazil, rural, 2003

	Clusters			
	1	2	3	4
Factor 1 (Health)	0,89	0,85	0,42	0,85
Factor 2 (Housing)	0,24	0,22	0,23	0,55
Factor 3 (Study)	0,62	0,28	0,62	0,37
Proportion of the sample	16,6%	50,0%	7,2%	26,1%

Source: Special tabulations of PNAD/IBGE.
Estimations made by the authors.

This table shows the means of each factor in the four clusters. Beside that, it displays the proportion of the sample that the cluster represents, i.e., the size of the cluster. The bigger group (cluster 2) presents relatively high performance in the health factor (the second best), but the worst result regarding both housing factor and study factor. Cluster 4, in turn, is the second in size. It has a health factor as so good as the cluster 2, and responds for the best result in the housing factor.

The cluster with the worst performance in the health factor (cluster 3) is the same that has the best result in the study factor. Having the best indicator in the health factor, cluster 1 shares with cluster 3 the best indicator regarding study and the second best regarding housing.

What should be clear is that *there is no pattern*. So, the question that seems to persist in the context of this multidimensional approach is: who are the poor, after all? That is the question underlying this paper, in fact. Considering the structure of the operationalization of the Capability Approach proposed in this study, there is no unique (tight) answer to this question. The multidimensional idea is different from that of the poverty line. In the multidimensional analysis conducted here, we do not have any specific point that can be used as "referential" of some pre-determined pattern.

As could be observed based on the results of the Cluster Analysis, the homogeneous groups present quite different characteristics and it is impossible to say, *a priori*, "this group is better than that". Each group has its own multidimensional structures of well-being. This reasoning will be more discussed in the next section.

Following the example of the previous section, we would like to summarize the results obtained about the Brazilian rural areas from the Capability Approach perspective: i) *given the variables (components) selected to represent the functionings, we have verified that there exists, in fact, a multidimensional structure related*; ii) *this multidimensional structure observed generates homogeneous groups with distinct characteristics*; and, iii) *these different characteristics can be seen as multidimensional structures of well-being*.

[25] The mathematical method used to estimate the clusters was the *k-means*. In this method, the user determines *a priori* the number of clusters to be formed.

4.3. Comparing the two approaches

We have been detaching since the beginning of this paper that the monetary approach and the Capability Approach have theoretical foundations completely different. In the same way, the results generated by each approach – and the interpretation of it – have different meanings. These differences were always expected, in some way. However, there is a specific point that we would like to analyze more accurately: the role played by the variable *income* in both approaches. That is a crucial point in the distinction between monetary and Capability Approach.

Firstly, remember this important result obtained through the monetary approach: the higher the income level, the better the indicators of study, housing conditions and health (Table 7). We tried to make this same relation regarding the results of the Capability Approach. So, we estimated a correlation matrix between the factor scores and income. The results are displayed in the Table 11.

Table 11 – Correlation matrix*
Brazil, rural, 2003

	Factor 1	Factor 2	Factor 3	General Factor	Income
Factor 1 (Health)	1,00				
Factor 2 (Housing)	0,01	1,00			
Factor 3 (Study)	-0,03	0,04	1,00		
General Factor	0,53	0,62	0,59	1,00	
Income	**-0,04**	**0,31**	**0,03**	**0,18**	1,00

Source: Special tabulations of PNAD/IBGE.
Estimations made by the authors.
* Pearson coefficients. All sig. 1%.

What is perceived is that no correlation of the factor scores with income is considerably high. The correlation coefficient between the general factor (considered a aggregated well-being indicator) and income is just 0,18. This result contrasts with the result offered by the monetary approach mentioned above. The Capability Approach, analyzing the same aspects, has showed another kind of result.

Table 12 brings the means of the factor scores for each cluster (the same values which are in Table 10) adding the mean income. Repeating what has already been commented, there is no pattern regarding these four estimated clusters. No group can be said to be better than other. Now, we can observe the mean income for each cluster.

Table 12 - Factor scores and mean income for each estimated cluster
Brazil, rural areas, 2003

		Factor 1 (Health)	Factor 2 (Housing)	Factor 3 (Study)	General Factor	Income (US$)
Clusters	1	0,89	0,24	0,62	0,58	48,25
	2	0,85	0,22	0,28	0,45	44,57
	3	0,42	0,23	0,62	0,42	60,49
	4	0,85	0,55	0,37	0,59	111,23
	Total	0,83	0,30	0,38	0,51	63,30

Source: Special tabulations of PNAD/IBGE.
Estimations made by the authors.

The group with the higher mean income (group 4) presents the best result in the general factor. However, it is the second worst concerning the study factor. The group 2,

in turn, has the lower mean income and presents the same score as the group 4 in the health factor. The group that counts on the better factor score in the health factor is the worst in terms of income[26].

What can be inferred from these results is, once more, that there is no clear correlation pattern between income and the dimensions estimated through the Factor and Cluster Analysis. And this is in contrast to that results obtained from the analysis of the qualitative variables in the monetary approach. We propose two different, although complementary, explanations for these empirical conclusions.

The first one is related to the proper importance of the income in the determination of the qualitative aspects of the people's lives. The fact of the correlations between the estimated factors and income are too low indicates that the well-being multidimensional structures have a differentiated relation with income, i.e., income play a *relative importance* – note that this is different from affirming that income is not important.

The other proposed explanation has to do with the nature of the operationalization process: unidimensional or multidimensional. The factors representing health, housing conditions and study are, in fact, combinations of a set of variables – they are multidimensionally described. In the monetary approach, in contrast, there is just one variable – self-evaluation of health status, years of study and housing condition index. The Factor Analysis allowed us to capture in a more complete way the beings of the individuals in relation to the dimension investigated (health, housing and study).

Finally, all those observations lead us to mention the question of poverty definition in each approach. The monetary approach is able to inform a well-defined number of poor, specified based on a poverty line – reflecting the consensus on the poverty definition established on an implicit theoretical structure. Furthermore, some analysis on poverty can be made just observing income in association with that poverty line – demand attended by the poverty measures.

Concerning the Capability Approach – more specifically the empirical implantation of this approach conducted in this paper – we do not have too objective definition. What we have found are different structures of well-being. As already emphasized in the theoretical referential, the notion of poverty is different in the Capability Approach. It is related to a non well-defined referential point. It is related to the beings of the individuals that are too heterogeneous and complex to be tied – this claims, thus, for an open evaluative exercise.

5. Conclusion

The central objective of this paper was to establish a comparison between the monetary approach and the Capability Approach. The results point out two interesting aspects, one theoretical and another practical. With relation to the former, the analysis of the functionings (through the estimated factors) has resulted in distinct homogeneous groups with peculiar characteristics. These peculiarities demonstrate that there is neither

[26] An observation should be done regarding the housing factor: even the correlation coefficients and the results from this last table quoted should be analyzed taking some care. The reason for this comment is that the functioning "housing conditions" have an evident bias because of his components. All the components are resources, then directly correlated to income. We recognize this limitation in the context of the operationalization of the Capability Approach. But, considering that the database used has no functionings indicators about housing conditions, we judged to be interesting to maintain that components related to resources to refer that dimension.

a well-defined pattern of well-being nor strong correlations between the well-being indicators and income. Furthermore, this type of analysis does not permit to mention a specific frontier between poor or not poor. What can be observed are profiles of well-being, in fact.

This observation is linked to the practical aspect: public policies. This type of multidimensional analysis is capable to offer a different guide for public policies, either if we are talking about the definition of the policy or about the definition of the target. Besides it, we believe that this approach is a quite useful basis for evaluation of the public policies already implemented.

Finally, we would like to detach that all these results were found in rural areas. This type of multidimensional characterization is even more important if we observe that income has a different function in rural areas when compared with its importance in urban areas – the results presented in this paper reinforce this assertive, in some way.

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ANNEX 1

Correlation Matrix

	EDU_ALFA	EDU_ESTUDO	SAU_AUTO	SAU_ATIVI	SAU_DOENCA	SAU_MOBIL	CMOR_AGUA	CMOR_TEL	CMOR_COMODI
EDU_ALFA	1,000	,244	,197	,058	,149	,210	,209	,134	,210
EDU_ESTUDO	,244	1,000	,280	,072	,288	,165	,013	,057	,017
SAU_AUTO	,197	,280	1,000	,277	,475	,433	-,005	,003	,007
SAU_ATIVI	,058	,072	,277	1,000	,213	,237	,006	,004	,006
SAU_DOENCA	,149	,288	,475	,213	1,000	,462	-,062	-,058	-,082
SAU_MOBIL	,210	,165	,433	,237	,462	1,000	-,003	-,001	,001
CMOR_AGUA	,209	,013	-,005	,006	-,062	-,003	1,000	,272	,289
CMOR_TEL	,134	,057	,003	,004	-,058	-,001	,272	1,000	,348
CMOR_COMODI	,210	,017	,007	,006	-,082	,001	,289	,348	1,000

Source: Special tabulations of PNAD/IBGE. Estimations made by the authors.

Total Variance Explained – Factor Analysis

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2,338	25,983	25,983	2,338	25,983	25,983	2,059	22,883	22,883
2	1,744	19,381	45,364	1,744	19,381	45,364	1,708	18,983	41,866
3	,985	10,948	56,312	,985	10,948	56,312	1,300	14,446	56,312
4	,795	8,832	65,144						
5	,775	8,608	73,752						
6	,709	7,879	81,631						
7	,624	6,939	88,570						
8	,535	5,945	94,515						
9	,494	5,485	100,000						

Source: Special tabulations of PNAD/IBGE. Estimations made by the authors.