# Targeting and Coverage of the Bolsa Família Programme: Why Knowing What You Measure is Important in Choosing the Numbers*

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## 1. Introduction

The targeting coverage trade-off has always been something of a quandary for progressive cash transfers, particularly those that are not entitlements. Undue inclusion errors mean that families or individuals whose need is not so great are being paid at the expense of either other budgetary priorities or at the taxpayer's expense. Undue exclusion errors mean that those who are in need, sometimes in desperate need, are not being helped by the State.

This trade-off is somewhat less extreme for entitlements. If the law says that families whose income is under a quarter of a minimum wage are entitled to a given cash allowance, then all those whose income falls under that line should receive it. The trade-off still exists as measurement error still occurs, but the discussion centers only upon the inclusion criteria. Most Conditional Cash Transfers (CCTs), however, are not entitlements.

When cash transfers of any kind are not entitlements, the targeting-coverage trade-off becomes more dramatic. In addition to inclusion criteria, coverage targets must be set and met. These coverage targets are usually set ex-ante and estimated before administrative records have given a clear idea of what is happening at the micro household level. Since these Cash Transfer programs have suffered (or benefitted) from very high political visibility, it becomes difficult to change coverage targets once these are announced.

Our objective in this text is to illustrate these quandaries using Latin America's largest Condition Cash Transfer programme, the Brazilian *Bolsa Família*. To do this, we will first quickly describe how the programme came to be and its targeting mechanisms. In section 3 we will discuss the size of the programme according to different criteria (this is important in deciding whether it is too small or just right). It the following section we will evaluate how good *Bolsa Família* is a reaching the poor and only the poor. Section five discusses the concept of income volatility and why the poor suffer especially hard from uncertainty about tomorrow's revenues. The next section discusses *Bolsa Família's* marginal targeting and explains why this is the correct concept to use in estimating how big it should be to cover all the poor.

## 2. The Bolsa Família Programme and Its Targeting Mechanisms

The Bolsa Família (PBF) was created by the Federal Government in October of 2003. Far from being a radical novelty on the Brazilian social policy scene, the PBF was more an excellent managerial initiative whose objective was to unify initially four, and eventually five, pre-existing targeted cash transfer programmes. These programmes were the *Programa Bolsa Escola*, the *Programa Bolsa Alimentação*, *Auxílio Gás* and the *Programa Nacional de Acesso à Alimentação* (also known as *Cartão Alimentação*). A fifth CCT programme, the *Programa de Erradicação do Trabalho Infantil* (Child Labor Eradication Programme – PETI), was not fully incorporated until December 2005.

Before the unification under the PBF, each of the above programmes had its own implementing agency, information system, and financing source. There was little communication or cooperation, and sometimes considerable animosity, between managers of the different programmes. This meant that it was possible for one family to

receive all five benefits and another, with the exact same socioeconomic profile, be left out of all five. The transfer amounts were different among the programmes, which meant that the Federal Government could be paying different amounts for families in identical situations. The justification for these differences was that, in spite of being targeted at the same audience – the poor – the programmes had different objectives. This lame argument was used and abused by the opponents of unification, who feared that their specific objectives (and, of course, political clout) would be hampered by unification.

The *Bolsa Família* Programme unified inclusion and exclusion criteria, transfer amounts, implementing agency, and, perhaps most importantly, the information system. As of today, families whose per capita income is inferior to R$ 140 receive R$ 22 for each child aged 14 or less, up to a maximum of three children per family, and another R$ 33 for each teenager 15 to 16 (16 is the minimum age for paid labour in Brazil), up to a maximum of two per family. In addition, families whose per capita income comes short of R$ 70 get another R$ 68, independently of household composition. The implementing agency is the *Secretaria Nacional de Renda para a Cidadania* (National Citizenship Income Secretariat – Senarc) of the *Ministério de Desenvolvimento Social e Combate à Fome* (Ministry of Social Development – MDS). The *Caixa Econômica Federal* (CEF), a federal bank, is in charge of making the payments. Perhaps the most important step in the unification process was a unified information system and registry, called the *Cadastro Unico* (CadÚnico). The CadUnico was actually set up in 2001, and therefore two years before the PBF itself, but due to inter-agency strife was largely theoretical before 2003. The creation of *Bolsa Família* brought the CadÚnico into the limelight as the single information system responsible for deciding who would and who would not receive PBF benefits. In conclusion, the PBF today counts on a legal mandate and operational structure that allow better targeting and larger coverage than before. In 2003, the first coverage target was also set up: eleven million families.

Even after the 2003 unification, however, the minimum income system in Brazil is more than just the PBF. The *Benefício de Prestação Continuada* (Continuous Benefit – BPC), mandated by the *Lei Orgânica de Assistência Social* (Social Assistance Organic Law – Loas) is actually bigger in budgetary terms than the PBF. In spite of using different eligibility criteria, using different information systems, being run by different agencies, and even using different definitions of what is a household (sound familiar?) they are both cash transfers targeted at the poor. The transfer amounts are also very different. The BPC pays exactly one minimum wage, which as of today is R$ 510, which is more than the double of the R$ 200, which is the most any family can be paid under the *Bolsa Familia*. The argument for such a difference is that the PBF is an income complementation programme whereas the BPC is an income substitution programme for elderly or disabled individuals in poor families. Since the BPC is part of the minimum income system, it will also be analyzed in this text, but we will concentrate on how it compares and relates to the PBF.

The targeting and coverage of the *Bolsa Família* Programme is, of course, the subject of this text. We will concentrate on the years for which we have information on PBF from household surveys, and these years are 2004 and 2006. In September of these two years, the *Pesquisa Nacional por Amostra de Domicílios* (*National Sample Household Survey* – Pnad) surveys included a supplement on cash transfer programmes that will allow the analysis we are interested in.

In 2004, the PBF was a programme in expansion. Its coverage had not yet reached the initial eleven million family target and every year more families were added to the

programme. According to administrative records, this target was reached only in 2006. From 2006 up to the beginning of 2009, the PBF remained at eleven million families, and new families were added only at the expense of others losing their benefits. Our hypothesis is that this expansion benefited both programme coverage and its targeting. It is to be expected that a programme expansion lead to both better coverage among the eligible and worse targeting. This is why we investigate both whether PBF succeeded in including *only* the poor (according to PBF definition) and whether it was successful in including *all* the poor.

*Why coverage targets?*

The use of targeting mechanisms in social policy is justified on efficiency grounds, so that more resources are concentrated upon the most needy (COADY; GROSH; HODDINOTT, 2004). This means that targeting can be seen as a mechanism for increasing impact upon the poor, given limited resources. Targeting can also be justified independently of resource limitation if equality is seen as an end *per se* (SOARES *et al*., 2007). Finding and privileging those most in need, however, is not a trivial process and has side effects both upon those in charge of the targeting and upon the eligible and non-eligible populations. Programme managers face the administrative costs of investigating families to find out their income and behaviors and significant political costs, as the inevitable errors will provide ready ammunition to their political adversaries. For families, targeting may create some kind of stigma and the required behavioral changes may also entail costs (COADY; GROSH; HODDINOTT, 2004).

As far as *Bolsa Família* is concerned, the most significant cost is most certainly administrative. Maintaining a registry with detailed household and family information on almost twenty thousand families in a country as vast and diverse as Brazil is not an easy administrative task. The use of pre-existing municipal administrative structures, however, makes the task much easier and much cheaper. In 2007, the administrative budget for the PBF was R$ 232 million, which is about 2,6% of the programme's total budget. Since Brazil is highly decentralized and federative country, beneficiary selection is a joint task of the Federal and municipal governments. The Social Development Ministry provides municipal administrations with a standard registry form, loosely modeled upon household survey questionnaires, to collect information on household demographic composition and income. If a given family is eligible, in theory it should be given a *Bolsa Família* benefit; otherwise, it simply remains registered in the CanÚnico, which is also used by other smaller social programmes.

If a family receives a PBF benefit after municipal social workers have ascertained its need, it receives this benefit for two years. After two years, the family is once again visited by the social workers, who check if its socio-economic conditions have changed or remained the same. If these conditions have changed for the better, the benefit is cancelled; otherwise they stay in for another two years.

The information on the CadÚnico form is the responsibility of municipal employees who then send the data either online or in paper, to the *Caixa Economica Federal* (CEF – the Federal Bank in charge of payments). The CEF consolidates the data and turns it over to the Ministry, which decides who is eligible. The list of beneficiaries is then turned over to the CEF, and the payments are made.

There is, however, one cog in the smooth working of the machine described above. There are both national and municipal targets (limits), based upon ex-ante poverty

estimates. Since these estimates almost never coincide with numbers received from the municipal authorities, there are many municipalities that cannot find enough poor people to fill their quota and even more municipalities in which there are not enough benefits to go around. Lindert *et al*. (2007) argue that the municipal quotas are important to keep mayors from registering their populations in an indiscriminate form. Quotas, by imposing limits, also impose costs, thus forcing mayors to select only the eligible. This argument, of course, pre-supposes that the poor or those acting for them are able to muster the necessary social control mechanisms at the local level. This is a very questionable assumption and there is no empirical evidence that this in fact happens.

The first municipal targets were based upon the 2000 Demographic Census and the 2001 Pnad survey. The poverty line is, of course, the PBF eligibility line (R$ 100, which was close to ½ of the minimum wage in 2002) and the family per capita income is calculated using the same methodology used in the 2000 Census. In 2006, the quotas were recalculated taking into account the improving income distribution as measured by the 2004 Pnad (LINDERT *et al*., 2007). Note, however, that the Pnad survey allows for estimation with some precision only at the state level – individual municipalities cannot even be identified in the Pnad microdata. Needless to say, imputing poverty estimates for over five thousand municipalities three or four or more years after their families' incomes were measured involves a lot of guesswork.

The municipal quotas are subject to negotiation. Benefits can be transferred from municipalities that cannot meet their quotas to those that exceed them. This transfer is neither automatic nor limitless, but there is some room for negotiation. What has been an iron number is the eleven million target or quota for the whole country. From 2006 to 2009, in spite of strong evidence of incomplete coverage, the number of benefits was not allowed to increase.

There are also no quotas for inscription in the CadÚnico.

Who provides the information upon which the benefit is granted varies from municipality to municipality. In some municipalities, the information is strictly self-declared. In others, social workers verify earnings directly. In still others, information on expenditures is used as verification. Nevertheless, from the point of view of the Federal Government all the information in the CadÚnico is considered self-declaratory. The Ministry performs some additional tests using pension and formal labor market data. In other words, PBF follows a verified, or at least partially verified, means test.

Some authors, such as Coady, Grosh and Hoddinott (2004) consider verified means testing the gold standard in targeting methods. Still, PBF is the only CCT in Latin America to provide benefits based on self-declared information and this led to fears that its targeting might not be quite as good as those of other programmes that use indirect methods, such as composite indices, for beneficiary selection. In spite of their admiration for verified means testing, Coady, Grosh e Hoddinott (2004) state that in less developed countries, where informal income is more important, indirect methods may be better. Nevertheless, Soares *et al*. (2007) show that when PBF targeting is compared to that of other programmes, such as *Chile Solidario* or *Progresa*, it fares no worse. Soares *et al*. (2007), Hoffmann (2007), and Barros *et al*. (2007), among others, show that *Bolsa Familia* is by far the most progressive income source in Brazil and 80% of transfers go to the 23% poorest individuals.

Soares, Ribas and Osório (2007) compare *Bolsa Família* results with those found by Coady, Grosh e Hoddinott (2004) and show that PBF is among the ten best targeted among the 122 programmes analyzed. Barros *et al*. (2008) show that 40% of PBF targeting performance is explained 40% by inscription into the CadÚnico alone, and only another 4% are explained by the targeting process that occurs after that step. In other words, most of PBF performance is essentially self-selection by those who sign up to for it. There are two possible explanations for this: municipal social workers are very effective at identifying and discouraging non-eligible families from signing up or non-eligible families are simply not interested.

## 3. How big is *Bolsa Familia*?

If the Bolsa Família Programme is judged according to the volume of resources at its disposal, then it is a relatively modest programme. In 2006, PBF transfers accounted for a mere 0.69% of household income as measured by household surveys and an even less impressive 0.35% of Gross Domestic Product. The other big targeted transfer programme, the BPC, was also modest at 0.53% of household income and 0,.41% of GDP. The fact that BPC is larger than PBF according to official financial data and smaller according to household surveys is due to under-reporting in household surveys. The BPC has some characteristics of a pension and many individuals report BPC income as pension income in household surveys.

**Table 1 – Size of *Bolsa Família* and *Benefício de Prestação Continuada***

| Bolsa Família | | | |
|---|---|---|---|
| Criterion | 2004 | 2006 | Change |
| Number of families (Cad Único) (millions) | 9,0 | 11,1 | 2,1 |
| Number of families (Pnad) (millions) | 6,3 | 9,0 | 2,7 |
| Percentage of families in Brazil (Pnad) | 12,5 | 16,8 | 4,3 p.p.[a] |
| Number of people (Pnad) (millions) | 31,7 | 42,7 | 10,9 |
| Percentage of Brazilian population (Pnad) | 17,9 | 23,4 | 5,4 p.p. |
| Percentage of total family income (Pnad) | 0,49 | 0,69 | 0,20 p.p. |
| Percentage of GDP (Siafi/Sidor) | 0,30 | 0,35 | 0,05 p.p. |
| Benefício de Prestação Continuada | | | |
| Criterion | 2004 | 2006 | Change |
| Number of families (Cad Único) (millions) | 2,0 | 2,4 | 0,5 |
| Number of families (Pnad) (millions) | 0,7 | 1,2 | 0,5 |
| Percentage of families in Brazil (Pnad) | 1,5 | 2,2 | 0,8 p.p. |
| Number of people (Pnad) (millions) | 3,1 | 4,7 | 1,6 |
| Percentage of Brazilian population (Pnad) | 1,8 | 2,6 | 0,8 p.p. |
| Percentage of total family income (Pnad) | 0,28 | 0,53 | 0,24 p.p. |
| Percentage of GDP (Siafi/Sidor) | 0,30 | 0,41 | 0,12 p.p. |

Sources: CadÚnico, Ministério da Previdência e Assistência Social (Social Security Ministry – MPAS), 2004 e 2006 Pnads, Castro et al. (2008) and Diretoria de Estudos Sociais (Disoc) of Ipea.

In any case, when compared to 7% of GDP spent by social security or 2.3% by pensions of federal employees, the 0.76% transferred jointly by PBF and BPC appear quite small. Table 1 shows that BPC as a proportion of household income grew by 0.24, and PBF by 0.20, percentage points from 2004 to 2006. In terms of proportion of GDP, growth was 0.12 for BPC and 0.05 for PBF. In conclusion, in spite of coming close, together, to one

percent of GDP, BPC and PBF are relatively lightweight budget items.

A second criterion to judge the size of a programme is its coverage or how many families and individuals are receiving benefits. Household survey and administrative records agree neither for PBF nor for BPC. In the case of BPC the reason is quite clear: many beneficiaries declare it as a pension and not as welfare. The reason behind the discrepancies in the PBF count is different. In September 2006, expansion process was in its last efforts and there were 1.5 million benefit cards in the mail and their owners had not yet received them, and consequently, had not yet been paid. The discrepancy between the household survey and administrative records may have been due to the fact that many cards were in the mail or with social workers still looking for the families. There are other minor factors that may have contributed as well, such as benefits given to indigenous peoples, landless peasants, *quilombolas*, those freed from slave labor or other specific groups who, due to geographical concentration, are not adequately covered by sample surveys.

Whatever the data source, if the criterion for size is the number of people or families covered, then PBF and BPC are quite large. Almost ¼ of the Brazilian population (47.4 million people) lived in the 10.2 million families receiving a PBF benefit. The only social policies with higher coverage are the Universal Health System (SUS) that theoretically covers all Brazilians; public education, with 52.8 million students enrolled in all levels; and social security and its 21.2 million benefits. Note that these are universal policies that constitute the backbone of Brazilian social policy.

In spite of these numbers, there are still many eligible families not being covered by the *Bolsa Família* Programme. Before going into these numbers, we will judge PBF and BPC by still another yardstick: its impacts upon the income distribution from 2004 to 2006.

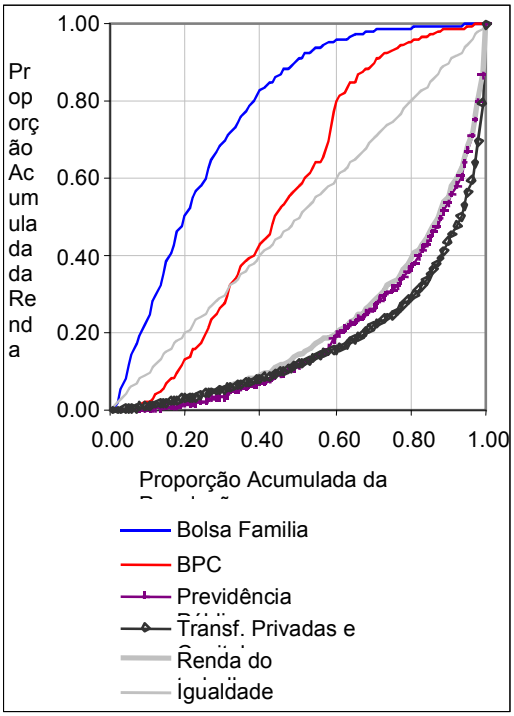
Estimates of the contribution of BPC and PBF to Brazilian inequality reduction are nothing new. SOARES al. (2006) SOARES al. (2007), HOFFMANN (2007), and BARROS al. (2007) all produced estimates of the surprisingly high inequality impacts of BPC and PBF. In this section we update these estimates.

A good method for estimating how much an income source contributes to inequality and/or its reduction is the use of Concentration Curves and the numbers that characterize them, Concentration Coefficients. How does one calculate a Concentration Curve?

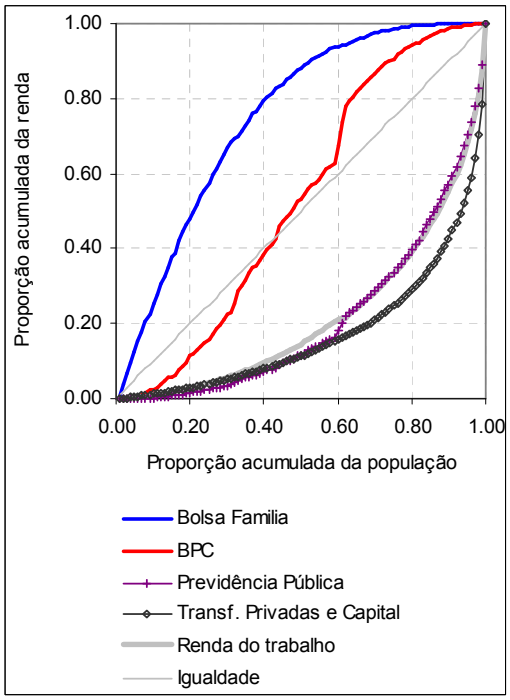
a. Order the population by total income, including the transfers whose Concentration Coefficient we wish to know;
b. On the vertical axis, accumulate the population (ordered by income) up to a given percentile;
c. On the horizontal axis, accumulate the resources transferred to that same population;
d. The resulting graph is the Concentration Curve.
e. The Concentration Coefficient is twice area between the Concentration Curve and the Line of Perfect Equality joining the points (0,0) and (1,1). The Concentration Coefficient of all income sources is also known as the Gini Coefficient.

**Graph 1 –Concentration Curves in 2004 and 2006**

Painel 1 – 2004




Painel 2 – 2006




Source: 2004 and 2006 Pnads.

Graph 1 shows that, both in 2004 and 2006, the Concentration Curve of the BPC is always below that of PBF. This means that the PBF transfer is mathematically and unequivocally more progressive than BPC. The reason for this is that the BPC transfer is much larger than the PBF one. It is so much higher that it takes most of its beneficiaries and places them relatively high on the income distribution. This is quite visible on Graph 1. There is a sharp increase in the BPC Concentration Curves at centile 59 in 2004 and centile 61 in 2006. These centiles correspond to the household incomes of R$ 260 and R$ 350 for 2004 and 2006, respectively, which are exactly the values of the minimum wage for these two years. The increase corresponds to handicapped and elderly people living alone and whose only income source is the BPC itself.

Calculating the contribution of transfers to the reduction of inequality is relatively simple. In mathematical terms:

$$G = \sum_k c_k \mu_k$$

where $G$ is the Gini Coefficient, $c_k$ represents the Concentration Coefficient of income source $k$ and $\mu_k$ is the participation of income source $k$ in total income.

**Table 2 – Relative Size and Concentration Coefficients of Income Sources**

| | 2004 | 2006 | Δ (p.p.) |
|---|---|---|---|
| Gini (*per capita* household income) | 0,569 | 0,560 | –0,010 |
| Income Component | | | |
| Concentration Coeficients | | | |
| Labour income | 0,567 | 0,563 | –0,004 |
| Public pensions | 0,598 | 0,578 | 0,039 |
| Capital income and private transfers | 0,649 | 0,654 | –0,013 |
| Targeted social transfers | –0,373 | –0,307 | 0,058 |
| BPC | –0,111 | –0,054 | 0,002 |
| Bolsa Família | –0,524 | –0,498 | 0,002 |
| | | | |
| Weight in Total Income | | | |
| Labour income | 76,5% | 76,0% | –0,0047 |
| Public pensions | 18,0% | 17,9% | –0,0012 |
| Capital income and private transfers | 4,8% | 4,9% | 0,0015 |
| Targeted social transfers | 0,78% | 1,22% | 0,0044 |
| BPC | 0,28% | 0,53% | 0,0024 |
| Bolsa Família | 0,49% | 0,69% | 0,0020 |

Source: 2004 and 2006 Pnads.

Table 2 shows that while labour earnings and pension income became less concentrated from 2004 to 2006, targeted cash transfers lost some of their progressivity. At the same time, these transfers increased in 56% their participation in total income, albeit from a very low baseline.

**Table 3 – Decomposition of Inequality Change Between 2004 and 2006**

| Income Component | Concentration Effect | Relative Size Effect | Total Efect |
|---|---|---|---|
| Labour income | –0,0003 | –0,3069 | –0,3072 |
| Public pensions | –0,0029 | –0,3536 | –0,3565 |
| Capital income and private transfers | 0,0133 | 0,0241 | 0,0374 |
| Targeted social transfers | –0,4003 | 0,0659 | –0,3343 |
| BPC | –0,1560 | 0,0233 | –0,1327 |
| Bolsa Família | –0,2167 | 0,0150 | –0,2017 |
| Total | –0,3626 | –0,5980 | –0,9606 |

Source: 2004 and 2006 Pnads.

Table 3 shows the decomposition of the changes in the Gini Coefficient from 2004 to 2006. The Coefficient fell almost one Gini point during this period, which is a reasonable fall in inequality, although at a slightly slower pace than from 2001 to 2004, when it fell about 0.7 Gini point per year (Barros (2007).

The most important and surprising finding in Table 3 is that targeted social transfers accounted for 1/3 of the fall in inequality over the two years. This is surprising because they account for less than 1% of total income. The PBF alone was responsible for 1/5 of the reduction. Labor and pension income contributed about 1/3 each, but they account for ¾ and 18%, respectively, of total household income. This high efficiency against inequality of BPC and PBF is due to the high progressivity of their benefits, which in its turn is a function of their excellent targeting mechanisms.

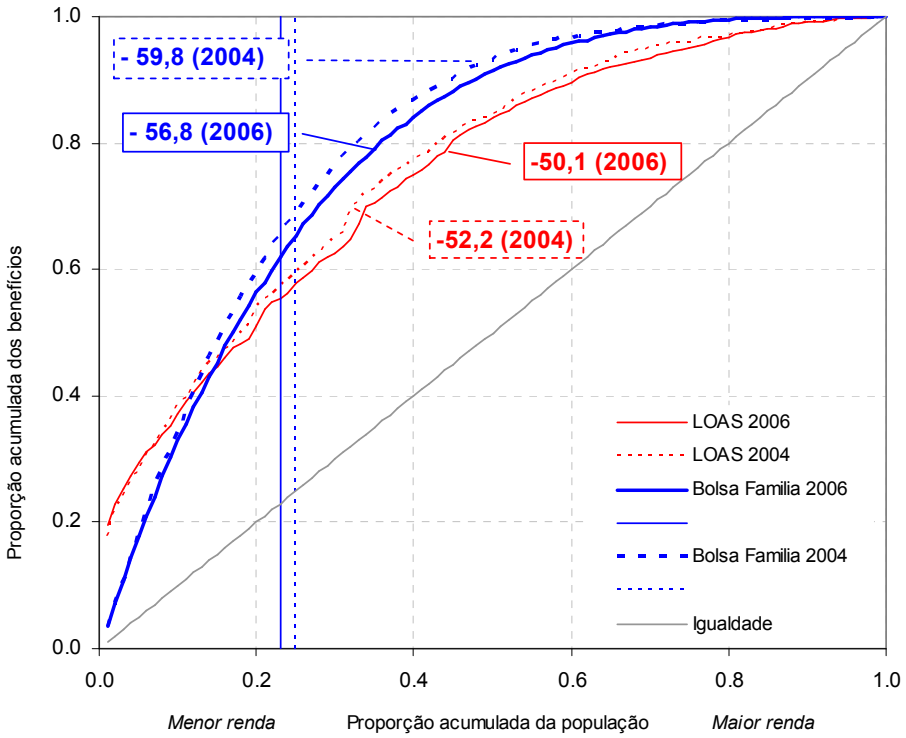
## 4. How Good is Bolsa Família Targeting?

There are various standard tools for evaluating targeting of income transfers. One, whose advantage is that is sensitive to changes along the entire income distribution, is the Incidence Curve and the number that characterizes it, the Incidence Coefficient. They are calculated in the same manner as their analogues, the Concentration Curve and Coefficient, but with one important difference: individuals and their incomes are ordered according to their income net of the transfer whose incidence is being evaluated. The eligibility criterion for targeted social transfers is household income without the transfer itself. If it were not, there would be a contradiction between the criterion and the benefit.

To calculate incomes net of targeted social transfers using the Pnad household surveys, we used the identification technique pioneered in Soares al. (2006). It consists of using the information from the supplemental questionnaire on income transfers to extricate transfer income from the "other income" category in which it is buried.

Incidence and concentration analysis are complementary. While the Incidence Curve shows the distributive impact of the first Real transferred, the Concentration Curve shows the distributive impact of the last Real transferred. When the question being answered is on the performance of an executing agency in reaching those in direst need, the correct approach is the Incidence Curve. When the question is on which program should have its budget increased, the correct approach is the Concentration Curve.

**Graph 2 –BPS and PBF Incidence Curves in 2004 and 2006**




Source: 2004 and 2006 Pnads.

Graph 2 shows that there was a small deterioration in the targeting of both BPC and PBF from 2004 to 2006. If decreasing returns applies to social transfer targeting, then this is no surprise, as both their budgets and coverage became much larger over the two year period. This means that the modest fall in the Incidence Coefficient is not a negative result per se. If the PBF Incidence Coefficient ( - 0.568) in 2006 is compared to its analogues in Mexico (Oportunidades; - 0.56) or Chile (Chile Solidario; - 0.57), it does not fare badly.

Another way of evaluating targeting performance is the hit/miss ratio, which is the proportion of families or individuals receiving a transfer who are or are not eligible for it. Table 4 shows that in 2004 and 2006, respectively, 42.5% and 49.2% of families receiving Bolsa Familia benefits had incomes above the eligibility cutoff at the time. In 2004, the cutoff was either R$ 50 for families without children or R$ for families with children, but in 2006 the cutoff lines were R$ 60 and R$ 120. This means that almost half of PBF families did not meet program criteria.

**Table 4 – Bolsa Família Targeting**

| | People | | | Families | | |
|---|---|---|---|---|---|---|
| 2004 | Non eligible | Eligible | Total | Non eligible | Eligible | Total |
| Among all | | | | | | |
| PBF non beneficiary | 70,1 | 12,0 | 82,1 | 77,9 | 9,6 | 87,5 |
| PBF beneficiary | 7,0 | 11,0 | 17,9 | 5,3 | 7,2 | 12,5 |
| Total | 77,0 | 23,0 | 100,0 | 83,2 | 16,8 | 100,0 |
| Among only beneficiaries | 38,8 | 61,2 | 100,0 | 42,5 | 57,5 | 100,0 |
| | People | | | Families | | |
| 2006 | Non eligible | Eligible | Total | Non eligible | Eligible | Total |
| Among all | | | | | | |
| PBF non beneficiary | 68,6 | 8,0 | 76,6 | 76,6 | 6,6 | 83,2 |
| PBF beneficiary | 10,5 | 12,8 | 23,4 | 8,3 | 8,5 | 16,8 |
| Total | 79,2 | 20,8 | 100,0 | 84,9 | 15,1 | 100,0 |
| Among only beneficiaries | 45,1 | 54,9 | 100,0 | 49,2 | 50,8 | 100,0 |

Source: 2004 and 2006 Pnads.

Half? This is quite a high number whose incoherence with the excellent Incidence Coefficients needs explanation. Actually, the whole number needs explanation. A hit miss ratio of half appears pretty bad for *any* programme, not only one whose claims to excellent targeting have just been made.

The two most common explanations for this elevated targeting error are fraud or mistakes committed by municipal social workers. Fraud exists. There is no doubt of it. Elected politicians, their families and friends have been found on Bolsa Família payrolls. Nevertheless, in spite of exhaustive investigation by both the National Audit Office and the media, the cases of fraud number in the few hundreds, which is completely insignificant when compared to eleven million benefits. Even if for every case of fraud discovered, there are another ten unnoticed, it is still not a relevant explanation for targeting errors in Bolsa Família.

Honest and semi-honest mistakes are probably more relevant. First of all, there are completely unbiased and honest mistakes – reading a 7 as a 1 or a 9 as a 0, transposing the wrong column from the paper to the computer. Their result is to add a random error

which may explain some of the targeting error.

There are also semi-honest mistakes. Potential beneficiaries have a very clear incentive to fudge their incomes downward a bit on the CadÚnico form, but no such incentive exists for the anonymous information gathered by household surveys. Furthermore, social workers may identify a family as poor even if it formally does not meet the criteria and they may fudge information one way or the other. For example, an agricultural family may be in the middle of harvest time when interviewed, and thus their income exceeds the PBF limit, but the social worker knows that in another three months they will be penniless. The social worker will then fudge their income downward so as to make sure they have some income in the coming tough months, thereby improving the real targeting of the PBF.

As opposed to explicit fraud, it is very hard to quantify the prevalence of honest and semi-honest recording mistakes. Only a sample survey specially designed with re-interview procedures would allow that.

Finally, there is a third reason – one that is difficult to separate from recording error: income volatility. By income volatility we mean uncertainty with relation to income. The Pnad inquires about income for a given month (September) of a given year and does not necessarily reflect well the socioeconomic situation of that family over a longer time period. It may well be that many families, while observed as non-poor by the Pnad, were in reality highly vulnerable to poverty and thus eligible for PBF benefits.

## 5. Income Volatility and Targeting

The Brazilian literature does not boast of many estimates of income volatility, but there are a few. Barros, Mendonça and Neri (1995) estimate that between 1982 and 1992 15% of the population crossed the poverty line in one direction or another. Their work suffers from some limitations – it is only valid for six metropolitan regions and ignores nonlabor income. They use the *Pesquisa Mensal de Emprego* (Monthly Employment Survey – PME), which contains a panel allowing direct measurement of income volatility, but only covers the six largest metropolitan regions and only contains information about labor incomes. Barros, Mendonça and Neri deserve credit, however, for pointing out that poor people not only have limited access to income but that the little access they do have is highly uncertain.

Ribas and Machado (2007) use pseudo-cohorts from the Pnad survey to estimate the percentage of poor that often cross the poverty line due to idiosyncratic income changes. They conclude that between 1993 and 2003, about 27% of the urban poor were temporarily poor. Ribas (2007) goes further showing that the share of this transitory poverty in total poverty has been increasing over time. Finally, Ribas and Machado (2008) estimate poverty entry and exit rates in the same metropolitan regions as Barros, Mendonça and Neri (1995). The database used is again the Monthly Employment Survey (PME), but they innovate in that they impute nonlabor income as well. They find an extremely high income volatility among the poor. Thirty-one (31%) of the poor in 2005 were no longer poor a month later and 50% had left poverty a year later. Twelve (12%) of the population crossed the poverty line in one direction or another from one month to the next. Over the period of one year, 15% did.

The poverty rate if defined as people who were poor in one of two consecutive months is six percentage points, or 1/3, higher than the poverty rate defined as individuals poor in any given month. If the same comparison is made defining poverty as those poor in

one of two months one year apart, then the poverty rate is 40% higher than the single month poverty rate.

Finally, the poverty return rate is also high. In 2005, 46% of those who left poverty in a given month were back in it the next one. Another 14% returned to poverty two months after leaving it. Likewise half of those who entered poverty were out the following month. The very clear conclusion is that poverty is neither static nor limited to a single episode. People at risk of becoming poor are constantly crossing the poverty line in both directions.

Ribas (2007), however, does not use Bolsa Familia poverty lines but rather his own, relative lines. But it is not difficult to replicate his methodology using the PBF cutoff lines. The methodology is not difficult and involves imputing incomes into the PME survey using the Pnad survey to find the coefficients.

1. We look for all variables that are common to the PME and Pnad. It is important that they not only have the same name but be asked in the same way, as we know that how you ask a question will influence the answers you get. There are quite a few, since the household composition, education and labor market participation questionnaires are quite similar in the two surveys.
2. Using, in the Pnad survey, which has national coverage, only the six metropolitan areas also covered in the PME, four equations are estimated:
    a. A probit to find the covariates of the probability of receiving pensions.
    b. Least squares to find the value of pensions, for those who receive them.
    c. A probit to find the probability of receiving other income.
    d. Least squares to find the value of this other income, for those who receive it.
3. Using the coefficients estimated above, the four variables are imputed in the PME.
4. Every imputation requires a residual. For lack of a better option a random residual was used for all individuals.

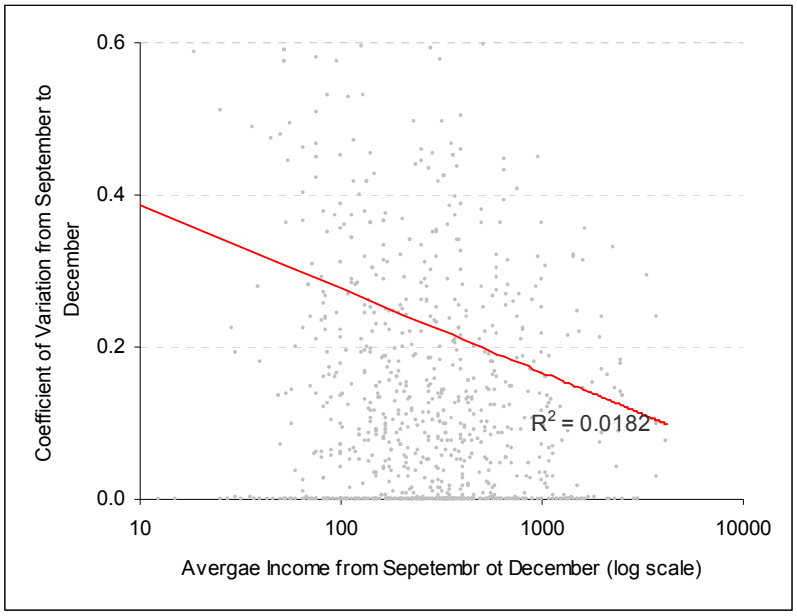
The resulting nonlabor incomes are pooled to produce per capita household income, now complete with pensions and other income.

The random residual is kept constant for each individual throughout the four PME interviews. This means that imputed income will change only if an observed variable changes its value.

Graph 3 shows the Coefficient of Variation (average/standard deviation) of each individual's per capita income. Both the average and the standard deviation are defined over the four interviews in the PME panel. If all members of the household keep their income during these four months, then the Coefficient of Variation is zero.

Graph 3 shows clearly that the Coefficient of Variation for household income falls as income increases. In other words, the poor suffer much more income volatility than the rich. The explanatory power is not high, showing that various other factors are relevant predictors of volatility.

**Graph 3 – Coefficient of Variation of Income as a Function of Average Income**




Source: PME.

More importantly, the procedure above allows us to define households as eligible or not eligible for Bolsa Familia, albeit with one important limitation. The criteria for eligibility involve income net of Bolsa Família income, but our imputation method does not allow the identification of PBF income. This is, however, a small limitation since the objective of the exercise is not estimate number of eligible individuals but rather the volatility of their incomes.

Once individual incomes are defined, we defined as poor the individuals who live in households whose per capita incomes fall below R$ 100 up to 2005 and R$ 120 from 2006 onwards. These are of course, the income criteria for PBF benefits for families with children.

Figure 1 – Rotational Scheme

| Month | Rotational Group | | |
|---|---|---|---|
| August | K7 | | |
| September | K7 | K8 | |
| October | K7 | K8 | L1 |
| November | K7 | K8 | L1 |
| December | | K8 | L1 |
| January | | | L1 |

Beginning in September of each year after the creation of the PBF – 2004 to 2007 – we followed three PME rotational groups, entering in August, September, and October, for the four months that make up the panel.

Figure 1 shows the rotation scheme for year 2007. Group K7, for example, entered in August and was interviewed for the second time in September, but we consider this second interview as an October interview. This occurs since it is part of the three rotational groups whose entry is centered in September (the month of the Pnad interview). In Figure 1, October is shown by a black border and December by a double red border. In other words, for the four months beginning in September of each year, we followed a moving average of three rotational groups. We used three groups to increase the sample.

If the above discussion seems complicated, do not worry. It is not necessary to understand the details of how each cohort was assembled to understand the results below.

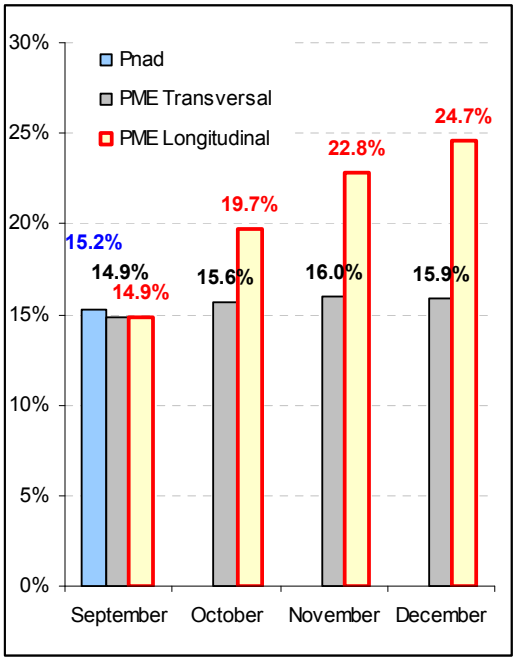
For each month, we defined two poverty measures: transversal and longitudinal. Transversal poverty is the poverty measure we are used to: the percentage of people whose per capita household income falls beneath the PBF poverty (eligibility) line in a given month. Longitudinal poverty is the proportion of people whose per capita household incomes fell below the same line during any of the *n* months following September, when the panel we assembled begins. Thus, for September, the two measures coincide, but for December, the longitudinal measure is made up of individuals who were poor in any one of the four months between September and December.

The results are shown in Graph 4. For all years shown, the longitudinal poverty rate in December is substantially higher than the transversal rate. For example, in December of 2004, the transversal rate is 15.9% but the longitudinal rate is 24.7%, about 2/3 higher. By definition, longitudinal poverty is higher than transversal poverty. The surprise is that it is so much higher.

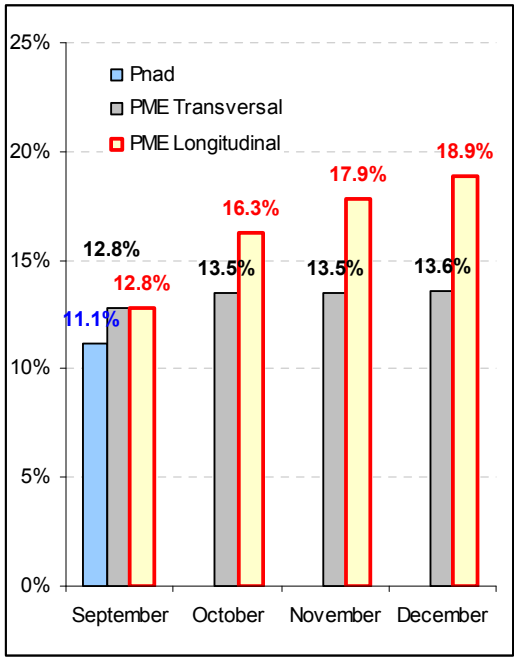
The second result is that the month to month increase in longitudinal poverty compared to transversal poverty is decreasing. In 2007, for example, there is an increase of 3.6 points from September to October, 1.8 points from October to November, and 1.2 points from November to December. These decreasing marginal increments are to be expected. As time passes, households at risk of falling into poverty will have already spent at least one month in poverty.

**Graph 4 – Longitudinal and Transversal Poverty**

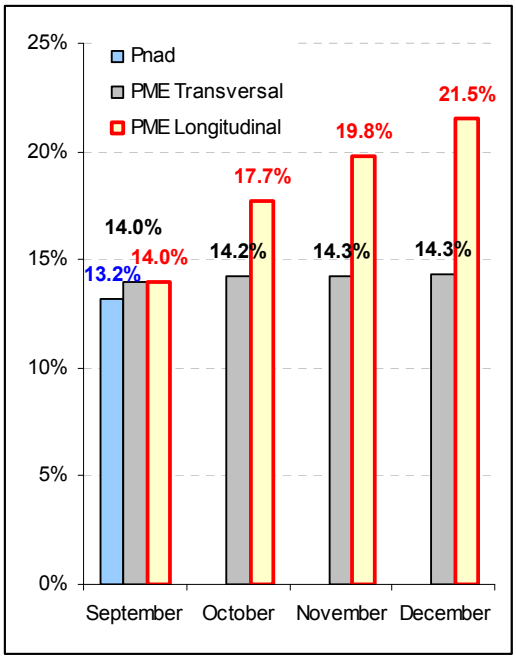
Panel 1 – 2004



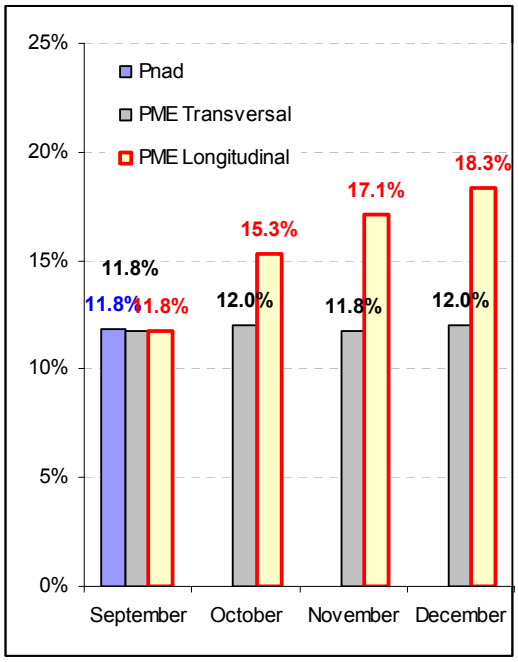

Panel 2 – 2005



Panel 3 – 2006




Panel 4 – 2007




Source: PME.

Can these estimates be generalized to the country as a whole? Probably not. Alas, no longitudinal survey exists in Brazil for non-metropolitan areas, but we believe that in rural areas volatility will probably be higher and in medium cities lower. What is true with no doubt is that the poor face considerable uncertainty about tomorrow's income.

Are these estimates biased? Two effects lead to a negative bias. The first is that only families whose demographic composition remained intact throughout the four months are used. Since demographic changes in a household are an important source of income volatility, these almost certainly make up a less volatile sub-sample.

The second effect is that the same random residuals drawn for the first month are kept throughout the remaining three in imputing nonlabor income. This is the same as supposing that nothing that is nonobservable changes during the four month period. While it is probably a better procedure than re-drawing new residuals each month, it makes for another downward bias.

Notwithstanding these downward bias sources, there is an important source of upward bias: measurement error. If individuals do not know exactly what their income is – which is likely when dealing with the urban self-employed – there may be considerable measurement error of labor incomes. A street vendor not only takes home different incomes each month, but also probably knows with precision yesterday's take but not last month's. This increases the volatility of observed incomes but not that of real incomes.

Two sources of negative bias and one of positive bias. What is the net bias? Impossible to know with certainty, but it is likely to be positive. We have no solid empirical evidence of this, but we believe that income volatility of the poor is slightly less than our estimates suggest, but still quite significant.

What is the meaning of this for Bolsa Família? As we explained above, PBF coverage targets were calculated using a survey in cross-section, the Pnad. But PBF benefit rules are not cross-sectional. Eligible families receive their benefits when eligible and keep them for two years, when the socioeconomic condition of the family is once again evaluated. This means that the PBF poverty definition is a two-year longitudinal definition.

Longitudinal definition and cross-section targets. The two will never match. The amount of people in need will always be greater than the targets. This is, in fact, what happens.

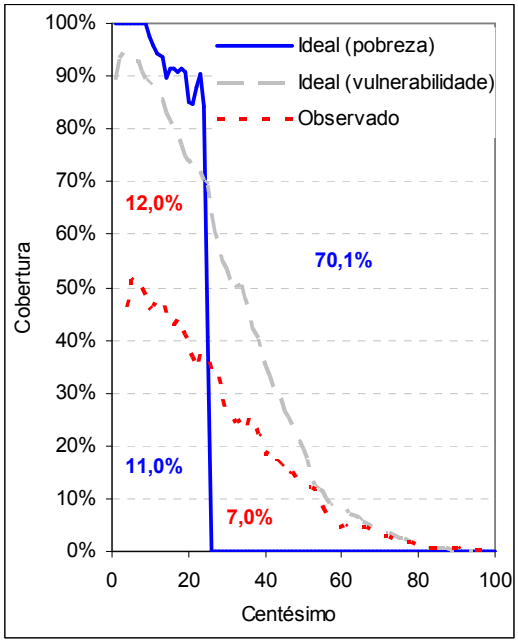
## 6. Cross-Sectional Coverage

We have shown thus far that: a) PBF benefits are highly progressive; b) this progressivity leads to strong inequality reducing effects; c) incoherent definitions of poverty lead to the impression that there are targeting problems. But do these problems really exist? We can go beyond hit/miss ratios and look at where on the income distribution are the PBF beneficiaries and non-beneficiaries.

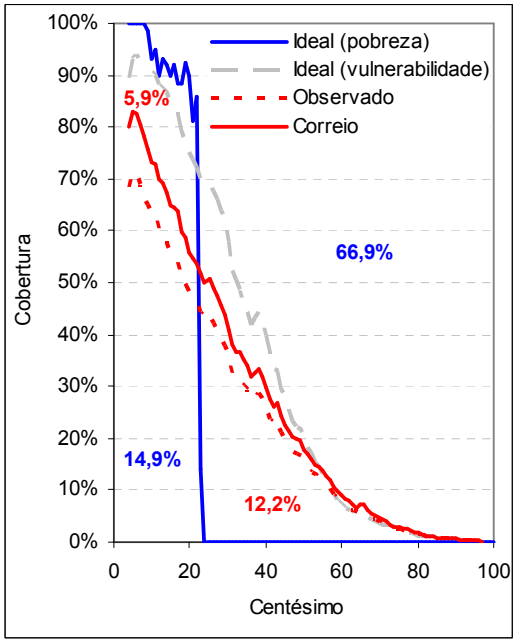
Table 4 shows that 57% of families that should be receiving a PBF benefit, according to the Pnad, were not on the payroll in 2004. More than half of the families whose per capita incomes were less than R$ 50 for the childless or less than R$ 100 for families with children, were not covered by the program. These numbers are not particularly serious since in 2004 the PBF was still a programme in expansion. However, with the expansion essentially over by September 2006, the programme was still not covering 44% of eligible families.

**Graph 5 – PBF Cross-Sectional (Transversal) Coverage by Income Centile**

Panel 1 – 2004




Panel 2 – 2006




Source: 2004 and 2006 Pnad.

Graph 5 shows PBF coverage by income centile in 2004 and 2006. The solid blue line represents the percentage of individuals in each centile that are eligible for PBF transfers, according to Pnad data. They are all those with per capita incomes inferior to R$ 60 (R$ 50 in 2004) and all those with per capita incomes inferior to R$ 120 (R$ 100 in 2004) with children under 15. It is noteworthy that almost 90% of the poorest households have children under 15. The dotted red line represents the actual PBF coverage by income centile. Due to sampling noise, the PBF coverage is calculated using a seven centile moving average. The gap between the two lines is a centile by centile measure of under-coverage according to the legal PBF definition.

The blue numbers in Panel 1 show the percentage of the population that are targeting hits: either those that should not be receiving PBF benefits and are not, in fact, receiving them or those that should be beneficiaries and, in fact, are. The red numbers show the misses: those that should receive but do not and those that should not but do. These are cross-sectional definitions, that do not take into account income volatility.

If we correct for the 1.5 million PBF cards in the mail in September 2006, it is possible to draw another beneficiary line. We cannot know in a sample survey whose cards were still in the mail, but we can suppose that the new cards obeyed the same income distribution as the previous benefits. If we distribute the 1.5 million cards according to the observed benefit distribution in 2006, the result is a new PBF benefit line. The blue and red numbers are analogous to those for 2004, but are calculated using this new benefit line. Exclusion error, for example, falls from 12% of the Brazilian population in 2004 to 6% in 2006. Under-coverage in the poorest decile falls from 3.5 million to two million people, and in the second decile, it falls from 9.6 to four million people.

Finally, we can count how many families are between the different lines of Panel 2 of Graph 5. Between the blue and red lines we have about 9.7 million people in two million households. This is an estimate of PBF under-coverage, but we know that, due to income volatility, it is not possible to achieve universal coverage of this population without (cross-sectional) leaks. Only a national longitudinal survey will allow us to measure the true leakage.

Before estimating how many people need to be included in PBF to achieve universal coverage among the target population, we must look at PBF's marginal targeting. This can be done by looking at its expansion between 2004 and 2006.

## 7. Bolsa Familia's Marginal Targeting

If we suppose that PBF's average and marginal targeting are the same, then we can conclude from the numbers in Graph 5 that 16 million beneficiaries would be enough to cover all poor families. The problem is that it is not at all clear that average and marginal targeting are the same. In general, they will not be the same as it is quite easy to find the first poor person in a country but quite difficult to find the last one. The bigger the dart, the harder it is to hit the target. This means that important number is not the average distribution of benefits or the average hit miss ratio of the eleven million beneficiary families but the marginal distribution of benefits or the marginal hit miss ratio. The price to be paid in terms of unwarranted inclusion for zero unwarranted exclusion must be calculated in marginal terms.

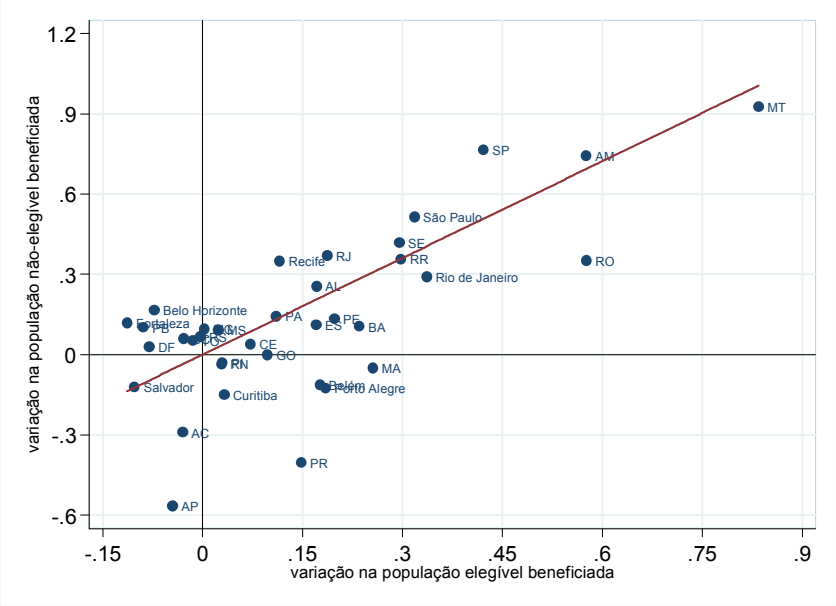
**Table 5 – PBF Marginal Targeting Estimate**

| | |
|---|---|
| Elasticity | 1.2003 |
| Standard error | 0.1937 |
| Prob. = 0 | 0.000 |
| Prob. = 1 | 0.309 |
| $R^2$ | 0.5270 |
| N | 36 |

Source: 2004 and 2006 Pnad.

Estimates of this marginal targeting can be obtained using the programme's expansion from 2004 to 2006. These are years in which CCT supplements exist in the Pnad questionnaire and there was a considerable expansion in coverage between them. One method of obtaining a rough estimate is to use aggregated data by state and metropolitan area. Brazil has 26 states, nine major metropolitan areas and the Federal District, which amount to 36 distinct geographical areas all of which allow significant estimates of coverage in the Pnad sample. We have, for each of these areas, two observations: 2004 and 2006. This means that we can use differences in differences with a log-linear regression adjustment on observed variables. The dependent variable is the variation in the number of (cross-sectional) non-eligible households receiving PBF benefits. We also used R$ 60 and R$ 120 poverty lines to eliminate variation due to changes in eligibility criteria The explanatory variable is the change in PBF coverage, using initial coverage as a control variable. The results can be found on Table 5.

**Table 6 – PBF Marginal Targeting Estimate**




Source: 2004 and 2006 Pnad.

The elasticity is basically one (1.2 with standard error of 0.2), which means that for every household included another, apparently non-eligible household, must also be

included. This also means that average and marginal coverage are the same. Finally, this also means that PBF must pay about 19 million benefits to achieve universal coverage among the poor.

Graph 6 shows the same as Table 6. While the horizontal axis shows the change in PBF coverage from 2004 to 2006, the vertical axis shows the price paid: the change in non-eligible beneficiaries. States and metro areas that fall below the regression line are more efficient than average since they managed to increase eligible coverage more than non-eligible coverage. Those above the line, on the contrary, are those states and metro areas where coverage among the non-eligible increased more than among the eligible. The slope of the regression line (close to one) is the average elasticity for the country as a whole.

Using the above results to estimate the coverage necessary to leave no poor family behind, the number is 19 million. This obviously requires a radical review of both the national and municipal targets for PBF. Perhaps a specific investigation of those states and metro areas that were exceptionally efficient in increasing their coverage may yield some lessons for the others and somewhat improve the PBF targeting, but it is unlikely that large gains will be made. This is because most of the coverage price to be paid is just a function of income volatility of the poor.

## 7. Conclusion

The Bolsa Família Programme is, by far, the most important piece of the Zero Hunger initiative, whose objective is that no Brazilian pass the day without knowing from where his or her next meal will come from. This means that a reliable income source must exist for the poorest Brazilians so they are able to buy food for themselves and their children. However, estimating at eleven million the number of poor/eligible families/households ignores the fact that the population who is vulnerable to poverty due to uncertainty about future incomes is much larger than the poor, as defined by a cross-sectional definition of poverty.

The fact that PBF designers and managers (and just about everyone else, to be fair) ignored this elementary issue has led to a queue of two million families who were eligible for benefits but were not receiving them. This queue lasted from 2006 to 2009, when the financial crisis provided a political excuse for increasing the PBF target above the initial eleven million. How many children effectively went hungry due to this error in design is anyone's guess. How many kids had their futures compromised or even died we will never know. The political and moral imperatives which led to Zero Hunger are at odds with the implementation of Bolsa Família coverage targets. These imperatives are clear: it is perfectly acceptable to allow a family whose income is temporarily slightly above R$ 120 to receive its meager benefits, but it is completely unacceptable to allow even one life to be extinguished or one future ruined because someone made a conceptual error in defining programme quotas. A family whose income is R$ 150 may be highly vulnerable to poverty.

Today the eleven million limit has thankfully been exploded and no other self-imposed folly has taken its place. The Ministry increased PBF quotas in 2009 and 2010 and no one appears to have even noticed. Today the quota is at thirteen million and, due to improvements in the labor market, this is probably close to what is necessary for full coverage.

An important result is that PBF marginal and average targeting efficiency are the same. This is coherent with an interpretation that the targeting problems are due to wrong measurement of poverty and not to targeting problems *per se*. After all, if PBF has basically the lowest Coefficient of Concentration on record, its targeting cannot be so bad.

## 8. References


BARROS, R. P.; CARVALHO, M.; FRANCO, S.; MENDONÇA, R. *A queda recente da desigualdade de renda no Brasil.* Rio de Janeiro: Ipea, 2007 (Texto para Discussão, n. 1.258).

_____. *A importância das cotas para a focalização do Programa Bolsa Família*. Niterói: Faculdade de Economia, Universidade Federal Fluminense, 2008 (Texto para Discussão, n. 238)

BARROS, R. P.; MENDONÇA, R.; NERI, M. C. Duration of spells of poverty. In: ENCONTRO NACIONAL DE ESTUDOS DO TRABALHO, 4., 1995. *Anais*... Abet, 1995. v. 1, p. 217-238.

CASTRO, J. A.; RIBEIRO, J. A.; CHAVES, J. V.; DUARTE, B. C.; SIMÕES, H. B. *Gasto social e política macroeconômica: trajetórias e tensões no período 1995-2005*. Brasília: Ipea, 2008 (Texto para Discussão, n. 1.324).

CHAUDHURI, S.; JALAN, J.; SURYAHADI, A. *Assessing household vulnerability to poverty from cross-sectional data*: a methodology and estimates from Indonesia. New York: Economics Department, Columbia University, 2002 (Discussion Paper, n. 102).

COADY, D.; GROSH, M.; HODDINOTT, J. *Targeting of transfers in developing countries*: review of lessons and experience. Washington, DC: World Bank, IFPRI, 2004.

CORSEUIL, C. H.; FOGUEL, M. N. *Uma sugestão de deflatores para rendas obtidas a partir de algumas pesquisas domiciliares*. Rio de Janeiro: Ipea, 2002 (Texto para Discussão, n. 897).

DUREYA, S. *Children's advancement through school in Brazil*: the role of transitory shocks to household income. Washington, DC: RES, Inter-American Development Bank, 1998 (Working Paper, n. 376).

DUREYA, S.; LAM, D.; LEVISON, D. Effects of economic shocks on children's employment and schooling in Brazil. *Journal of Development Economics*, v. 84, n. 1, p. 188-214, 2007.

ELBERS, C.; LANJOUW, J. O.; LANJOUW, P. Micro-level estimation of poverty and inequality. *Econometrica*, v. 71, n. 1, p. 355-364, 2003.

FREITAS, A.; SAWYER, D.; CARVALHO, J. A. M.; QUEIROZ, B. L.;

AGOSTINHO, C. S.; MÁXIMO, G. C. Avaliação do efeito da mudança do conceito de família BPC. In: VAITSMAN, J.; PAES-SOUZA, R. (Orgs.). *Avaliação de políticas e programas do MDS – resultados*, v. 2. Brasília: MDS, 2007, p. 237-253.

HOFFMANN, R. Transferências de renda e redução da desigualdade no Brasil e em cinco regiões, entre 1997 e 2005. In: BARROS, R. P.; FOGUEL, M. N.; ULYSSEA, G. (Orgs.) *Desigualdade de renda no Brasil*: uma análise da queda recente, v. 2). Brasília: Ipea. 2007. p. 17-40.

LINDERT, K.; LINDER, A.; HOBBS, J.; BRIÈRE, B. *The nuts and bolts of Brazil's Bolsa Família Program*: implementing conditional cash transfers in a decentralized context. Washington, DC: World Bank, 2007 (Social Protection Discussion Paper, n. 709).

RAVALLION, M. *How relevant is targeting to the success of an antipoverty program?* Washington, DC: World Bank, 2007 (Policy Research Working Paper, n. 4.385).

RIBAS, R. P. A caracterização da pobreza urbana ao longo do tempo: aplicação do modelo idade-período-coorte na estimação das tendências de privações crônica e transitória no Brasil. *Revista Brasileira de Estudos da População*, v. 24, n. 1, p. 139-161, 2007.

RIBAS, R. P.; MACHADO A. F. *Distinguishing chronic poverty from transient poverty in Brazil:* developing a model for pseudo-panel data. Brasília: International Poverty Centre, 2007 (Working Paper, n. 36).

_____. A imputação da renda não-trabalho na Pesquisa Mensal de Emprego (PME/IBGE) e seu proveito em análises dinâmicas de pobreza e desigualdade. In: ENCONTRO NACIONAL DE ESTUDOS POPULACIONAIS, 16., 2008. *Anais*... Caxambu: Abep, 2008.

RIBAS, R. P.; HIRATA, G. I.; SOARES, F. V. *Debating targeting methods for cash transfers*: a multidimensional index vs. an income proxy for Paraguay's Tekoporã programme. Brasília: International Poverty Centre, 2008 (Evaluation Note, n. 2).

RUBIN, D. Assignment to treatment group on the basis of a covariate. *Journal of Educational Statistics*, v. 2, n. 1, p. 1-26, 1977.

SOARES, F. V.; RIBAS, R. P.; OSÓRIO, R. G. *Evaluating the impacto of Brazil's Bolsa Família*: cash transfer programmes in comparative perspective. Brasília: International Poverty Centre, 2007 (Evaluation Note, n. 1).

SOARES, F. V.; SOARES, S.; MEDEIROS, M.; OSÓRIO, R. G. *Programas de transferência de renda no Brasil*: impactos sobre a desigualdade. Brasília: Ipea, 2006 (Texto para Discussão, n. 1.228).

SOARES, S.; OSÓRIO, R. G.; SOARES, F. V.; MEDEIROS, M.; ZEPEDA, E. *Programas de transferência condicionada de renda no Brasil, Chile e México*: impactos sobre a desigualdade. Brasília: Ipea, 2007 (Texto para Discussão, n. 1.293).

WORLD BANK. *Brazil*: measuring poverty using household consumption. Poverty Reduction and Economic Management Sector Unit, 2006 (Report, n. 36358-BR).