

An Evaluation of the *Bolsa Familia* Program in Brazil: Expenditures, Education and Labor Outcomes

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Abstract

The *Bolsa Familia*, created in 2003, is a program of conditional income transfer to families in a situation of poverty, and aims to immediately mitigate the poverty by direct income transfer. The purpose of this paper is to present the first results of an impact evaluation of the *Bolsa Familia* program on various dimensions. Results are presented for household indicators of education, work and expenditures, and are based on data of the first round of the survey for the Impact Evaluation of the *Bolsa Familia* program (AIBF). Using the propensity score matching method, there are not many statistically significant results for the differences between our comparison groups. Nevertheless, the significant results are, in general, favorable to the beneficiaries of the program.

1. INTRODUCTION

The *Bolsa Familia*, created in 2003, is a program of conditional income transfer to families in a situation of poverty, and aims to immediately mitigate the poverty by direct income transfer. The break in the inter-generational cycle of poverty is expected by means of conditionalities, which reinforce the practice of social rights in the health and education areas, and which potentially help fight future poverty by investing in the development of human capital. Recent studies (ROCHA, 2004; SOARES, 2006; FERREIRA, LEITE & LITCHFIELD, 2006) evidence the potential effects of the transfer programs on reducing the inequalities and poverty in the country, stressing the importance of this kind of policy.

The criteria of eligibility of the *Bolsa Familia* are based on the definition of a situation of families in poverty, with children under 15 years old, pregnant and nursing mothers, and families in extreme poverty¹, with or without children, pregnant and nursing mothers. For families in a situation of extreme poverty, the allowance is based on a value of R\$50 for those without children, pregnant and nursing mothers, and adds a variable of R\$15 for each

¹ In October 2005, those families with a monthly per capita income of R\$50,01 to R\$100 were defined in a situation of poverty, and families in a situation of extreme poverty were those with a monthly per capita income of R\$50 or less.

occurrence, until a ceiling of three. For families in a situation of poverty, the values of the allowances are only the variables.

The purpose of this paper is to present the first results of a preliminary impact evaluation of the *Bolsa Familia* program on various dimensions, as a result of relaxing the budget restraints and operation of behavioral aspects relating to the conditionalities of the program.

Results are presented for household indicators of education, work and expenditures. All results are based on the data of the first round of the field survey for the Impact Evaluation of the *Bolsa Familia* program (AIBF), performed in November 2005. Although, by definition, the first round of a survey cannot be used to do the final impact evaluation, a basic exploration is made of the estimated differentials between the treatment and comparison groups, which help to give quite a preliminary perspective of the potential impacts of the program. This methodological restraint must be borne in mind when interpreting the results².

2. THE AIBF SURVEY

2.1. SAMPLE DESIGN

Data collection for the evaluation of the *Bolsa Familia* program adopted the procedure in which the household sample was distributed in unequal proportions, according to three strata. The first stratum consists of households with beneficiary families in the program, and is called “cases”. The second stratum, called “control type 1”, consists of the households with families enrolled in the Single Registry, but not yet beneficiaries of the program. Lastly, the third stratum, called “control type 2”, congregates the households without beneficiary or registered families³.

The size of the sample was defined to be representative of three large areas of the country – the Northeast (NE) region, the Southeast and South regions (SE-SOUTH) and the North and Midwest regions (NO-CO). Using this stratification, the goal was set to obtain 15,000 interviews throughout Brazil. With this total, the sample was distributed in 3% of cases, 60%

²It is also important to emphasize that this is a summary of the main results obtained in this first stage of research, the descriptive analysis of the data being deleted from the text.

³ To produce the information required to obtain this threefold division, an earlier screening was done. In this way, all census sectors sampled were “recensused” using such information to obtain the predefined proportions of cases, controls type 1 and controls type 2.

of controls type 1, and 10% of controls type 2. After defining the regional strata, the Primary Sampling Units (PSUs)⁴ were then defined within each large region.

The data collecting operation occurred in November 2005. This resulted in a total of 15,240 questionnaires collected during the field work.

2.2. DATA COLLECTION AND TREATMENT

The household groups were reclassified in terms of eligibility, treatment and comparison, in accordance with the information collected in the questionnaires. It is worth pointing out that this reclassification, however, does not interfere in the sample weight and probability of selecting the household defined in the sample plan. The household classification according to the eligibility criterion considered two levels of per capita household income. The first level included the households that on the date of the survey earned a monthly per capita household income of R\$100 or less. This sum coincides with the official income limit defined for eligibility to the program. The second level of income considered households that earned a per capital household income of R\$200 or less. This income level, above the maximum limit of official eligibility, was used to guarantee the sample representativeness in all groups, including the treatment group⁵. It should be mentioned that the operationalization of the definition of permanent household income as close as possible to that used in the Registry includes the earnings from work, retirement and old age pension, and alimony. Within each sub-sample of eligible households, the first defined group called “Treatment” consists of the households that claim they currently receive the *Bolsa Familia* allowance. The first group of comparison, called “comparison 1” (C1) consists of households that currently receive other allowances⁶. The second comparison group, called “comparison 2” (C2), consists of households that said they have never received any kind of allowance, although registered in a public program. The remainder of the sample under study consists of households that did but no longer receive some kind of allowance, and households whose per capita household income is more than R\$200. The total sample contains 15,240 households, including 4,435 in the Treatment group, 3,496 in the C1 group and 4,941 in the C2 group, plus 2,368 households

⁴ See report for details on the definition of the PSUs, in CEDEPLAR & SCIENCE, 2005.

⁵ The R\$100 section would guarantee the presence of only 55% of the sample, while the R\$200 section guarantees 83%. Specifically for the treatment group, around 70% of the sample households have a per capita earning of R\$100 or less and 95% of R\$200 or less.

⁶ With the R\$200 section in eligibility, the beneficiaries of the School Grant program consist of 50% of this group, those who receive gas vouchers represent another 35%; 5% receive from BPC, 3% receive from PETI, 3% receive from the Food Grant and the rest receive other types of allowance.

not classified in any of the groups. The justification for forming two comparison groups is to be able to investigate two different types resulting from the program. The first type, involving the comparison of the treatment group with the C2 group, is characterized as a *pure* preliminary result of the program, inasmuch as it compares the beneficiary households of the *Bolsa Familia* with similar households in terms of probability of participating in the program, but which do not receive any kind of cash transfer. In the second comparison, the results obtained in the sample of beneficiaries of the *Bolsa Familia* were analyzed in relation to the beneficiaries of other programs. This analysis should be very careful, since this second group is quite heterogeneous in terms of income transfer and presence of conditionalities. In this first work the results considering the different partitions of this C1 group were not analyzed according to the different social programs. Lastly, it should be stressed that the analysis is based on the self-statement of the households who receive social program allowances. In the C1 group, consisting of beneficiaries of other programs, for example, information problems may arise that alter the differentials between the groups.

2.3. EVALUATION METHODOLOGY

The word evaluation refers to measuring the impact of interventions, such as the participation in a training program or receiving a cash transfer from a social program, on the effects of interest. The word effect refers to changes in the status of the relevant variables. The key problem in impact evaluation is the inference of a causal connection between treatment (the participation in a certain program) and the effect (CAMERON & TRIVEDI, 2005). The relevance of impact evaluations is direct, since their effects can be associated with social programs or improvements in existing programs to achieve the objectives of the social policy.

Since the *Bolsa Familia* program was not implemented randomly among the eligible families, so that the design of the program is not experimental, it was decided to do this preliminary impact analysis using a quasi-experimental method⁷. The chosen technique was *Propensity Score Matching* (PSM), which compares outcomes of similar families in the treatment group

⁷ The evaluation method is based on the comparison between the participants and non-participants in the program. Due to the fact that participating has not been designed randomly, according to ATTANAZIO *et al* (2004), a simple comparison between these two groups could be quite wrong for two reasons. First, *ex-post* differences in the results could simply reflect pre-program differences. Second, the effect of the program may be a function of background variables (household head's education, number of children, etc.), which may be different between the treatment and control groups. These problems can be solved using the propensity score matching method that seeks to compare participating and non-participating families that are similar in terms of the observable characteristics.

with the comparison or control group⁸. To find similar families among the treated and untreated, it is presumed that participation in the program is determined by observed characteristics. Therefore, the probability of participation in the program is calculated conditioned to those characteristics and is worked with those families with similar estimated probabilities.

Using the terminology of HECKMAN, ICHIMURA & TODD (1997), the treatment status of an individual is represented through a dummy D variable that is equal to 1 if the individual is a beneficiary of the program and 0 if he does not participate. Also Y_{1i} represents the interest variable (expected outcome) for individual i , should he be treated (1), and Y_{0i} the same variable, if this individual is exposed to control (0). The effect of the treatment on the individual i can then be calculated as follows:

$$\Pi_i = Y_{1i} - Y_{0i}$$

and the average impact of training on the participants would be:

$$\Pi_i = E [Y_{1i} - Y_{0i} | D_i = 1]$$

In evaluation literature, $E [Y_{1i} - Y_{0i} | D_i = 1]$ is called treatment effect or average treatment effect on treated (ATT). Therefore:

$$E (Y_{1i} - Y_{0i} | D_i = 1) = E (Y_{1i} | D_i = 1) - E (Y_{0i} | D_i = 1)$$

The problem is that the counterfactual outcome of an individual under treatment $E (Y_{0i} | D_i = 1)$ cannot be observed, since an individual can only be treatment or control at a specific point in time. In other words, the same individuals cannot be observed in the two situations, since the situation of the participants cannot be observed if they did not participate. Consequently certain hypotheses must be imposed in order to estimate ATT. One way is to substitute the expected outcome of the individual who participated if he were not to have participated $E (Y_{0i} | D_i = 1)$, with the expected outcome of the individuals who in fact did not participate $E (Y_{0i} | D_i = 0)$. However, since the choice of participants in the program was not done randomly, it cannot be presumed that substituting $E (Y_{0i} | D_i = 1)$ for $E (Y_{0i} | D_i = 0)$ will give a non-biased estimate, because it is improbable that $E (Y_{0i} | D_i = 1) = E (Y_{0i} | D_i = 0)$. This

⁸ The essential problem of impact evaluation is that the results of the participants are not observed if they had not participated. In this way a comparison group is used to identify the counterfactual of what would have occurred without the program. The comparison group must be representative of the treatment group, with the difference that the former does not participate in the program.

improbability is due to the existence of bias, which appears due to differences in the observable characteristics and the differences in the non-observable attributes between the treatment and control groups.

When taking into consideration the observable characteristics of the selection process and the characteristics that potentially influence the outcomes of interest in the treated individuals, the last equation can then be rewritten as:

$$E(Y_{1i} - Y_{0i} | D_i = 1, X) = E(Y_{1i} | D_i = 1, X) - E(Y_{0i} | D_i = 0, X)$$

In this equation, X represents a vector of the observable characteristics. According to the generally adopted identification hypothesis, the selection process occurs in accordance with observable characteristics, so that people with these identical characteristics have the same probability of being allocated as treatment or control. This means that:

$$(Y_{0i}, Y_{1i} \perp D_i | X) \text{ and } E(Y_{0i} | X_i, D_i = 1) = E(Y_{0i} | X_i, D_i = 0)^9$$

where \perp denotes independence, meaning that the potential outcomes are regardless of the participation in the program given the observable characteristics X – this hypothesis is known as Conditional Independence Hypothesis.

The objective of matching is to find an ideal comparison group in relation to the treatment group based on a sample of non-participants. The proximity ratio between the groups is measured in terms of observable characteristics. The method consists basically of using the characteristics of the treated units as a basis to find units in a non-experimental control group that have the same characteristics, previously defined in the treatment group. Next, the effects of treatment are estimated (effect of the program) using the difference between the average outcomes of the treatment and control groups. The comparison group is matched to the treatment group using a series of observable characteristics or the propensity score.

The propensity score is the probability of a family or household to receive the transfer from the *Bolsa Familia* program. There is no point in using the propensity score when participation in the program is random, but rather when it depends stochastically on a vector of observed X characteristics. This vector X corresponds to the focus criteria of the program, so that the

⁹ For further details, see HIRANO, IMBENS & RIDDER (2000).

propensity score $p(X)$ is defined by measuring the conditional probability of treatment, $D = 1$ ¹⁰:

$$p(X) = \Pr[D = 1 | X]$$

Thus, the use of the propensity score is a practical solution for the problem of matching multi-dimensionality, since the latter is now based on a scalar. ROSENBAUM & RUBIN (1983) showed that

$$E(Y_1 - Y_0 | D = 1, P(X)) = E(Y_1 | D = 1, P(X)) - E(Y_0 | D = 0, P(X))$$

If the treatment and expected outcomes are conditional independents to the pre-treatment variables, the latter will also be conditional independents to the probability of receiving treatment, given the observable characteristics, that is, conditional to the propensity score.¹¹ ROSENBAUM & RUBIN (id.) also show that by adjusting the differences between the treatment and control units only using the propensity score, then any bias associated with the differences in the observable previous variables is removed. A premise that must be assumed is the so-called “balancing condition”, represented as

$$D \perp X | p(X)$$

This condition implies that the distribution of the propensity score is the same between the treatment and control samples. The distribution of characteristics that determine this score is also the same in both samples. The samples of treated and control are, therefore, in equilibrium or balanced.

Another premise refers to the existence of a common support. This condition requires the existence of units from both treatment and control groups in order to compare each X characteristic. This assures that for each treated individual there is another matched non-treated individual with similar X values. (HECKMAN, LALONDE & SMITH, 1999). Therefore, the individuals must have a probability of being participants or non-participants situated between 0 and 1, and cannot be equal to the extremes (perfect prediction).

¹⁰ To address the problem of the dimensionality of matching, ROSENBAUM & RUBIN (1983) developed the method known as *Propensity Score Matching*. These authors showed that such a method can be implemented by using a single control variable, the propensity score. The propensity score $P(x)$ is defined as the conditional probability of an individual to receive the treatment given his observable X characteristics.

¹¹ See ROSENBAUM & RUBIN (1983) or IMBENS (2000) for proof.

The propensity score was estimated using a parametric model of binary choice¹², namely a *probit* model. As explanatory variables of this probit model, those variables were selected that, by hypothesis are relevant in determining the treatment and were not altered because of it; or rather, variables that determine the participation in the program but are orthogonal to treatment. After estimating the propensity scores, sub-groups are obtained within the control group that have similar score values to those of the individuals in the treatment group. Next, a test is done for each block $i = 1, \dots, k$ of the propensity score, if an average of each predicted variable used in the model does not differ between treatment and control. If the average of one or more variables differs, then a less parsimonious model should be specified to estimate the propensity score. However, if every test for each variable within each interval shows that the averages do not differ significantly, then a final number of blocks is defined and the ATT is then calculated. The objective of this estimate is to find a control group that is as similar as possible to the treatment group in terms of the propensity score, given the observed characteristics.

In this paper, since each impact evaluation is carried out on different sub-groups of the household sample, the estimate of a single propensity score might not fulfill the condition of equilibrium in some analyses. Therefore, for each sub-sample used, a different propensity score was calculated, using a set of explanatory variables that obey the condition of equilibrium.

The set of selected variables seeks, therefore, to characterize the household conditions in terms of eligibility for the program and in some cases to act as control for calculating the effects of the treatment on the treated. After calculating the propensity scores, it is necessary to use a matching method, that is, some method that helps define which controls are for each treated unit.

The average effect of treatment on the treated is given by the following equation:

$$ATT = E \{ E[Y_{1i} | D_i=1, p(X_i)] - E[Y_{0i} | D_i=0, p(X_i)] | D_i=1 \}$$

where the first term is estimated through the treatment group and the second term through the average outcome of the matched comparison group (in $p(X)$). The estimate of the propensity

¹² The propensity score method helps reduce, but not eliminate the bias created by the non-observable factors. The extent to which the bias is reduced depends crucially on the wealth and quality of the control variables where the propensity score is calculated and matching done (BECKER & ICHINO, 2002).

score is not enough to estimate the average effect of the treatment. This is because the probability of finding two individuals with exactly the same propensity score value is, in principle, zero since $p(X)$ is a continuous variable.

The ATT will be estimated considering the use of the common support for all observations. If the common support is not fulfilled in the treatment group, that is, if some individuals have characteristics that are only found in the treated individuals or $P(X)=1$, then these individuals will be discarded and the ATT estimated only for those that have $P(X)<1$.

In this study three matching techniques were used to analyze the robustness of the results: the Nearest Neighbor Matching (NNM) with and without replacement and the Radius Matching (RM), but only the differentials are reported, considering the NNM technique with replacement.

In NNM, for each treated unit an untreated unit is found with the closest propensity score, that is, the matching is done to minimize the absolute difference between the propensity score of the treated and untreated unit. Formally, consider that p_i and p_j denote the propensity score of the treated and untreated units, respectively. The set of matched untreated units with the treated units is given by:

$$C(i) = \min_j \|p_i - p_j\|,$$

$C(i)$ can be calculated with and without replacement. When replacement is permitted, it means that the same untreated individual cannot be matched with more than one treated individual.

In the case of the radius matching method, each treated unit is matched only with the untreated unit for which the value of the propensity score is within a predefined limit (r) around the value of the propensity score of the treated unit. So the set of untreated units matched with the treated units is given by:

$$C(i) = \{p_j \mid \|p_i - p_j\| < r\}.$$

The decision to report only the results obtained from the NNM with replacement is justifiable for three reasons: 1) it is easier to interpret the results, since the magnitude of the differentials found can vary between the techniques; 2) as many observations as possible of treatment are used since the sample of the comparison groups is smaller than that of the treatment groups; if

the NNM method without replacement were to be chosen some observations would not be considered; 3) by using the radius matching method there is an arbitrariness in the choice of the distance parameter.

3. PRELIMINARY ASSESSMENT OF RESULTS

This section presents the results of the preliminary analysis of the differentials between the beneficiaries of the *Bolsa Familia* program and the comparison groups considering various household indicators. This analysis is preliminary inasmuch as the impact name is only really valid when the treated samples are seen in two moments of time. Even if the observable characteristics are controlled using the matching technique, part of the difference in the result observed can still be attributed to non-observable characteristics of the treatment and control groups. The variables were chosen so that the probability of participating in the program was estimated with as many variables as possible and to consider two criteria: orthogonality to the result of the program and control variables for analyzing the estimated average differential. The choice of analyzing the differentials using indicators calculated for the household is because of the program design: the household is the eligible for the program. In this sense, the probability of participating in the program must be calculated for the household, so that the households are matched and not the individuals¹³.

3.1. EDUCATION INDICATORS

Various studies show that the economic returns for children who continue to attend school are relatively high and offer the opportunity for them to escape poverty. As part of the educational component of the *Bolsa Familia* program, there is a conditionality that children between 6 and 15 years old regularly attend school.

The hypothesis within the framework of human capital is that schooling is paid by the families partly to increase the student's future productivity and, consequently, the decision to study would be affected by the balance between the current costs of opportunity and anticipated future productive earnings, based on achieving an additional level of education (SCHULTZ, 2000). According to this hypothesis, poor families have more restraints to invest in their children's education at a socially desirable level due to the limited credit and information. The idea of the *Bolsa Familia* program is to compensate these restrictions,

¹³ As especificações dos modelos utilizados podem ser solicitadas aos autores.

transferring public funds directly to the poor families. It is therefore configured as a complementary social policy for education policies to promote interventions in the provision of school services, aiming directly at better access and quality of the public school system and thereby increase the educational coverage in the country.

This section analyzes the differentials between the comparison groups on household education indicators of children between 7 and 14 years old: school attendance, dropouts, progression and allocation between work and study¹⁴. In this program, most allowances are associated with the children attending and staying in school. The fact that the allowances are conditions to this attendance implies a lower price of schooling. This tends to imply, for the children, an increase in time at school and in reducing the participation of the time spent in other activities, assuming that school and work are substitutes. Concerning the progression indicator, which may be considered the most qualitative, the impact is neither obvious nor immediate, since a reduction in the dropout rate may lead, in the first instant, to further repetition.

3.1.1. ATTENDANCE

Table 1 reports the results for the proportion of girls and boys in the household that did not attend school in the last month. Positive differences, indicating a lower attendance of the *Bolsa Familia* beneficiaries, are found in relation to the comparison 1 group. In other words, there is a difference in favor of the beneficiaries of other programs in the estimated models, especially in Brazil as a whole. This would mainly be due to the school attendance conditionality also required by other programs, such as the School Grant and PETI, whose existence is prior to the *Bolsa Familia*, and they may be presenting therefore a more consistent lasting effect. It is found that this differential is higher among the poorer families. The differentials are observed more strongly among the men and these women, especially in the South/Southeast. The differential between men is more visible in the poorest group of the Northeast region.

On the other hand, the results show a few negative differences, which indicate a higher attendance rate of the *Bolsa Familia* beneficiaries in relation to the comparison 2 group. In other words, there is a favorable difference of the *Bolsa Familia* beneficiaries compared to the

¹⁴ Since the result indicators are expressed in percentages, the differences must be interpreted in terms of percentual points. Only the robust significant results are presented using the application of the aforementioned matching techniques.

children in households that do not participate in any program, for the children in the Southeast/South and for women in the Northeast region.

Table 1: Significant differentials between the comparison groups on the proportion of children in the household that did not attend school in the last month: Brazil and Regions, 2005

| Groups Eligibility (up to) | Treatment and Comparison 1 | | | Treatment and Comparison 2 | | |
|--------------------------------|----------------------------|-----------|-----------|----------------------------|--------|-------|
| | R\$200 | R\$100 | R\$50 | R\$200 | R\$100 | R\$50 |
| Brazil – Total | 0.027 ** | 0.038 *** | 0.049 *** | | | |
| Brazil – Men | | 0.035 * | 0.044 * | | | |
| Brazil – Women | 0.027 ** | 0.040 *** | 0.059 *** | -0.034 ** | | |
| Northeast – Total | | | | | | |
| Northeast – Men | | | 0.079 ** | | | |
| Northeast – Women | | 0.073 ** | | -0.066 ** | | |
| North/Midwest – Total | 0.038 * | | | | | |
| North/Midwest – Men | | | | | | |
| North/Midwest - Women | | | | | | |
| Southeast/South – Total | | | | -0.063 ** | | |
| Southeast/South – Men | | | | | | |
| Southeast/South – Women | 0.056 ** | 0.078 ** | 0.108 ** | | | |

Source: AIBF, 2005.

Note: * significant value at 10%; ** significant value at 5%, *** significant value at 1%.

3.1.2. SCHOOL DROPOUT RATES

The results for the household proportion of girls and boys who dropped out of the education system between 2004 and 2005 are given in table 2. Positive differences, indicating a higher dropout rate of *Bolsa Familia* beneficiaries, are found only among the men in the North/Midwest region in relation to the comparison 1 group. In other words, in this case, there is a favorable difference for the beneficiaries of other programs in the estimated models. But the vast majority of the significant differentials is favorable to the program, inasmuch as they are negative, showing a lower dropout rate of the *Bolsa Familia* beneficiaries, especially in relation to the comparison 2 group. In other words, there is a favorable difference for the *Bolsa Familia* beneficiaries in relation to the children in households that do not participate in any program, for the children in the Southeast/South and women in the Northeast region.

Table 2: Significant differentials between comparison groups on the proportion of children in households that dropped out of the education system between 2004 and 2005; Brazil and Regions, 2005.

| Groups Eligibility (up to) | Treatment and Comparison 1 | | | Treatment and Comparison 2 | | |
|-------------------------------|----------------------------|--------|-------|----------------------------|-----------|------------|
| | R\$200 | R\$100 | R\$50 | R\$200 | R\$100 | R\$50 |
| Brazil – Total | | | | -0.010 ** | -0.016 ** | -0.021 *** |
| Brazil – Men | | | | | -0.012 ** | -0.018 ** |
| Brazil - Women | | | | -0.014 ** | | |
| Northeast - Total | | | | -0.017 ** | | -0.032 *** |
| Northeast – Men | | | | | -0.021 * | 0.060 * |
| Northeast - Women | | | | | | -0.041 * |

| | | | | |
|--------------------------------|-----------|----------|----------|----------|
| North/Midwest - Total | | | | -0.012 * |
| North/Midwest – Men | 0.0123 * | 0.0125 * | 0.0174 * | |
| North/Midwest - Women | -0.024 ** | | | |
| Southeast/South - Total | | | | |
| Southeast/South – Men | -0.009 * | | | |
| Southeast/South - Women | | -0.018 * | | |

Source: AIBF, 2005.

Note: * significant value at 10%; ** significant value at 5%, *** significant value at 1%.

3.1.3. SCHOOL PROGRESSION

Table 3 presents the results for the proportion of girls and boys in the household that were approved between 2004 and 2005. Positive differences, suggesting a potential positive effect of the program due to higher approval of the *Bolsa Familia* beneficiaries, are found only among the women in the South/Southeast, in relation to the comparison 1 group, and between the poorest women in the Northeast, in relation to the comparison 2 group. Nevertheless, the majority of the significant differentials of the *Bolsa Familia* are negative, indicating a lower approval rate of the *Bolsa Familia* beneficiaries, especially in relation to the comparison 2 group.

Table 3: Significant differentials between comparison groups on the proportion of children in households that were approved between 2004 and 2005; Brazil and Regions, 2005.

| Groups Eligibility (up to) | Treatment and Comparison 1 | | | Treatment and Comparison 2 | | |
|--------------------------------|----------------------------|-----------|-----------|----------------------------|------------|-----------|
| | R\$200 | R\$100 | R\$50 | R\$200 | R\$100 | R\$50 |
| Brazil – Total | | | | -0.023 ** | -0.039 *** | -0.034 * |
| Brazil – Men | | | | -0.041 *** | -0.046 ** | -0.059 ** |
| Brazil - Women | | | | | -0.054 *** | |
| Northeast - Total | | | | | | |
| Northeast – Men | | | | | | |
| Northeast - Women | | -0.077 ** | -0.070 ** | | | 0.114* |
| North/Midwest - Total | | | | -0.042 ** | -0.072 *** | -0.075 * |
| North/Midwest – Men | -0.054 * | | | -0.053 * | -0.107 *** | -0.113 * |
| North/Midwest - Women | -0.053 * | | | | -0.067 ** | |
| Southeast/South – Total | | | | | | |
| Southeast/South – Men | | | | -0.052 * | | |
| Southeast/South – Women | 0.063 ** | | | | | |

Source: AIBF, 2005.

Note: * significant value at 10%; ** significant value at 5%, *** significant value at 1%.

In the latter case, this difference could be interpreted as unfavorable for the *Bolsa Familia* beneficiaries, but caution should be taken in this interpretation since the mere fact that these beneficiary children in the program have less dropouts, that is, staying in the school system one year after the other, may be leading to a lower approval rate at first glance. Follow-up and evaluation at subsequent points in time may show different evidence.

3.1.4. SCHOOL AND WORK

Table 4 reports the results for the proportion of girls and boys in the households that said they only currently study, compared to those who stated that they only work, work and study and neither work or study.

Positive differences, indicating further time allocated to the study of the *Bolsa Familia* beneficiaries, are found in relation to both comparison groups, suggesting quite a favorable difference for the *Bolsa Familia* beneficiaries, and with greater intensity between those in a situation of extreme poverty. The fact that the majority of *Bolsa Familia* beneficiaries are associated to families with children, who must attend school, implies that the value of the children's time in the job market is reduced, and consequently their participation in the workforce tends to drop. The positive differentials are observed between men and between women, except in the South/Southeast. In this region negative differentials are noted in relation to the comparison 2 group. In addition to this group, a negative differential is found between the women in the Northeast. This negative differential does not imply less school attendance, as seen in table 13, but may be a reflection of the conciliation between work and study.

Table 4: Significant differentials between comparison groups on the proportion of children in households that only study; Brazil and Regions, 2005.

| Groups Eligibility (up to) | Treatment and Comparison 1 | | | Treatment and Comparison 2 | | |
|--------------------------------|----------------------------|---------|----------|----------------------------|-----------|-----------|
| | R\$200 | R\$100 | R\$50 | R\$200 | R\$100 | R\$50 |
| Brazil – Total | 0.019 *** | 0.015 * | 0.025 ** | 0.014 ** | 0.020 *** | 0.036 *** |
| Brazil – Men | 0.026 *** | 0.018 * | 0.034 * | 0.023 *** | 0.030 *** | 0.048 *** |
| Brazil – Women | 0.016 *** | | 0.020 ** | | | |
| Northeast – Total | 0.029 * | | | | | |
| Northeast – Men | 0.059 ** | 0.041 * | | | | |
| Northeast - Women | | | | -0.037 * | | |
| North/Midwest - Total | | | | 0.023 ** | 0.031 ** | 0.045 ** |
| North/Midwest – Men | | | | | 0.064 ** | |
| North/Midwest - Women | | | | | 0.030 ** | 0.06 *** |
| Southeast/South – Total | | | | | -0.024 ** | |
| Southeast/South – Men | | | | | -0.024 * | |
| Southeast/South – Women | | | | | -0.031 ** | |

Source: AIBF, 2005.

Note: * significant value at 10%; ** significant value at 5%, *** significant value at 1%.

3.2. LABOR INDICATORS

The purpose of this section is to analyze differences between the *Bolsa Familia* beneficiaries and comparison groups in the supply of adult labor in the households, both in terms of the occupation condition – proportion of adults who worked in the last month – and in terms of

the proportion of adults who looked for a job in the last month¹⁵. These two aspects configure the condition of the household's economic activity. The interest is to ascertain whether the *Bolsa Familia* creates negative labor incentives by reducing the participation in the workforce of men and women in the household. If, on the contrary, there was an increase in this participation, the most immediate impact would be on the demand for labor and subsequently on the actual occupation of the adult members of the household.

The analysis of the effect of the *Bolsa Familia* on adult labor supply may have various perspectives, since it is determined by the income level of the household, although the level of allowances is not affected by the labor decisions of the household members, which could be an implicit lack of incentive to work.

One hypothesis is that the main effect of the *Bolsa Familia* on the supply of adult labor represents an income effect, according to which an increase in the income due to the cash transfers would increase the demand for all normal goods, including consumption and leisure, and would reduce the economic need for labor, leading to a short working day¹⁶. Therefore, the *Bolsa Familia* would have the effect of reducing the labor supply. However, if the family labor supply is considered, the decisions relating to allocation of time of all members of the household are affected by the value of everyone's time. That fact that *Bolsa Familia* allowances are mostly associated with families with children, who must attend school, implies that the value of the children's time in the labor market is reduced. So taking into consideration the less available labor in the household due to the reduction in the children's labor, the labor supply of the other household members should increase, both in terms of hours in the market work and domestic activities. It may have an additional impact for women, associated with fulfilling the conditionalities of the program, which may take up more of her time, and this would have the effect of shortening the time available for work or reducing her leisure time (PARKER, SKOUFIAS, 2000).

3.2.1. OCCUPATION

The results of the proportion of working adults in the household are presented in table 5. Positive differences, which show further participation in the labor market of the *Bolsa*

¹⁵ Again, since the result indicators are expressed in percentages, the differences must be interpreted in terms of percentual points. Only robust significant results are presented, after applying the aforementioned matching techniques.

¹⁶ Considering the adult labor supply in that moment and using a static model in which individual utility depends on consumption and leisure, and individuals allocate their time between work and leisure.

Familia beneficiaries are seen in relation to those who receive no allowance (comparison 2 group), except among the poorest in the North/Midwest region. Significant differences in terms of less participation in the workforce of the program's beneficiaries are found among the women compared to those in beneficiary households of other programs (comparison 1 group). The lower occupation of these women might suggest that there is a lack of incentive to work due to the income effect or more allocation of their time to domestic activities. However, it is again important to take care with this interpretation, since, at first glance, the labor supply may increase due to the increase in searching a job, which will be tested in the next section. It should be mentioned that again the largest differentials are between the families in a situation of extreme poverty.

Table 5: Significant differentials between comparison groups on the proportion of those in the household occupied (15-64 years old), Brazil and Regions, 2005

| Groups Eligibility (up to) | Treatment and Comparison 1 | | | Treatment and Comparison 2 | | |
|--------------------------------|----------------------------|-----------|------------|----------------------------|-----------|-----------|
| | R\$200 | R\$100 | R\$50 | R\$200 | R\$100 | R\$50 |
| Brazil – Total | | | -0.057 *** | | 0.026 *** | 0.031 ** |
| Brazil – Men | 0.024 * | | | 0.017 * | 0.034 ** | |
| Brazil - Women | -0.030 * | -0.027 ** | -0.044 * | 0.020 ** | 0.043 *** | 0.035 * |
| Northeast - Total | | -0.033 * | | | | |
| Northeast – Men | | | | | | |
| Northeast - Women | | -0.044 * | | | | |
| North/Midwest - Total | | | | | | -0.050 * |
| North/Midwest – Men | | | | | | |
| North/Midwest - Women | | | | 0.034 * | | |
| Southeast/South – Total | | | | | 0.047 *** | 0.068 ** |
| Southeast/South – Men | 0.052 ** | | | | 0.051 * | |
| Southeast/South – Women | -0.056 ** | | | | 0.055 ** | 0.137 *** |

Source: AIBF, 2005.

Note: * significant value at 10%; ** significant value at 5%, *** significant value at 1%.

3.2.2. SEARCHING A JOB

Table 6 presents the results for the proportion of people in the household who state that they are searching a job. Every significant difference found was positive, suggesting a strong differential of the program in terms of increasing the search for a job, principally among the families with per capita income up to R\$200. These results suggest the confirmation of the hypothesis that there is an increase in the supply of family labor, at first glance, gauged by the labor demand. Therefore, this tends not to confirm the hypothesis of a lack of incentive to work due to the receipt of cash transfers. The only negative differential found refers to the poorest women in the South/Southeast, between the treatment group and comparison 2 group.

In this case, the counterpart seems to be the increase in labor supply found through the previous occupation indicator, which was highly positive for these women.

Table 6: Differentials between comparison groups on the proportion of people in the household searching a job (15-64 years old), Brazil and Regions, 2005

| Groups Eligibility (up to) | Treatment and Comparison 1 | | | Treatment and Comparison 2 | | |
|--------------------------------|----------------------------|-----------|-----------|----------------------------|---------|----------|
| | R\$200 | R\$100 | R\$50 | R\$200 | R\$100 | R\$50 |
| Brazil – Total | 0.030 *** | 0.029 *** | 0.045 *** | 0.015 ** | | |
| Brazil – Men | 0.021 ** | | | 0.017 * | | |
| Brazil - Women | 0.033 *** | 0.032 *** | 0.046 ** | 0.015 * | | |
| Northeast - Total | 0.024 * | | | | | |
| Northeast – Men | | 0.036 * | | | | |
| Northeast - Women | | | | | | |
| North/Midwest - Total | 0.003 * | | 0.054 * | 0.024 ** | 0.033 * | |
| North/Midwest – Men | | | | | | |
| North/Midwest - Women | 0.028 * | | 0.079 * | 0.031 ** | | 0.054 * |
| Southeast/South – Total | 0.031 ** | | | | | |
| Southeast/South – Men | | | | | | |
| Southeast/South – Women | 0.034 ** | | 0.061 * | | | -0.071 * |

Source: AIBF, 2005.

Note: * significant value at 10%; ** significant value at 5%, *** significant value at 1%.

3.3. EXPENDITURES INDICATORS

In general it is expected that the transfers received from the program have a positive effect on the consumer expenditures, given that such transfer increase the available family income. ATTANAZIO & MESNARD (2005) argue, however, that this effect is not as immediate as it seems. First, the available income will not necessarily increase by the same amount of the transfers received, since the conditions imposed by the program can reduce other forms of earnings, such as the income from child labor. Second, the sums received may not all be spent on consumer goods, since the families may decide to take a fraction, use it to pay current debits or invest in productive activities. It is understood that the increase in expenditures, and consequently in consumption, is intended to attenuate the adversities of the poorest families. The well-being of these families can be measured in the immediate “relief” in terms of consumption and, thus, on the adverse conditions confronting them. Despite the existence of the conditionality¹⁷, the transfer of monetary resources to the poor families does not necessarily mean that they will be spent as expected. The families may use part of these funds

¹⁷ According to Attanazio *et al* (2005), there are several reasons by the conditioned transfer programs are unable to obtain the desired effects, as follows: a) the fact that the program exists does not mean that the target families will participate; b) the cost of monitoring the fulfillment of the conditionalities can be relatively higher than the transfer sums.

to buy tobacco, alcoholic beverages and other goods for adult or, likewise, allocate most of the resources to other members of the family in detriment to the children¹⁸.

The purpose of this section is to analyze the effects of the *Bolsa Familia* cash transfers on the expenditures of the beneficiary families and, therefore, on their and their children's welfare. In addition to the differences on the total expenditures, an analysis will be done on the consumer components (food, housing, clothing, education, health and other expenditures). The evaluation of the effects on each component of the expenditure and on specific items will help find how the beneficiary families allocate the resources from the program and whether the adults appropriate the resources desproportionally¹⁹.

Chart 1. Dependent Variables – Absolute Values

| Variables | Description |
|----------------------------------|---|
| Total expenditures | Total of all expenditures |
| Food | Expenditures with procuring food for consumption inside and outside the home. |
| Housing | Total of the following items: 1) Rent, services and charges 2) House maintenance 3) Furnishings 4) Domestic appliances and utensils 5) Procuring / repairing household goods 6) Domestic services |
| Clothing | Expenditures with female, male and children's clothing. |
| Travel | Expenditures with public and private transportation. |
| Toiletries and personal services | Expenditures with buying toiletries; |
| Health | Expenditures with appointments, tests, continuous and occasional medication, health plan/insurance and hospital admission. |
| Education | Expenditures incurred with monthly fees, school transportation, school material, enrollment fees, school uniforms and other school expenditures. |
| Tobacco and alcoholic beverages | Includes expenditures on cigarettes, tobacco and alcoholic beverages consumed inside and outside the home. |
| Miscellaneous | They refer to expenditures with registry offices, lawyer, labor contributions, parties, pensions, pocket money, etc. |

Chart 2. Dependent Variables: Specific expenditures – Absolute Values

| Variables | Description |
|------------------|---|
| Basic food | Expenditures from buying grains, cereals, flour, leguminous products and oilseeds; vegetables, greens and tubers; fresh fruit; dairy products and bakery goods. |
| Non-basic food | Expenditures with buying meat, poultry, fish and eggs; oil and fat; sugars, |

¹⁸ See an application for the case of the School Grant program in Brazil in RESENDE (2005).

¹⁹ In this case, indicators are expressed as absolute values in reais. Only the robust significant results after applying the aforementioned matching techniques are presented.

| | |
|-----------------|--|
| | spices and condiments; soft drinks and other. |
| Child health | Expenditures with consultations, tests, continuous and occasional medication, health plan/insurance and hospital admission for children 14 years old or under. |
| Adult health | Expenditures with consultations, tests, continuous and occasional medication, health plan/insurance and hospital admission for people 15 years old and over. |
| Child education | Included in this topic are expenditures with monthly fees, school transportation, school material, enrollment fees, uniforms and other expenditures with education for children of 14 and under. |
| Adult education | Included in this topic are expenditures with monthly fees, school transportation, school material, enrollment fees, uniforms and other expenditures with education for people of 15 or over. |
| Male clothing | Expenditures with male clothing and footwear. |
| Female clothing | Expenditures with female clothing and footwear. |
| Child clothing | Expenditures with children's clothing and footwear. |

With regard to the differentials between the treatment and comparison 1 groups, shown in tables 7 and 8, considering the households in a situation of extreme poverty, positive and significant differences are noted for Brazil in expenditure on education and children's clothing. For households in a situation of poverty, positive and significant differences are seen for Brazil in expenditure on health, education and children's clothing. It is also found that the treatment group has a lower total expenditure than the comparison 1 group.

With reference to the differentials between the treatment and comparison 2 groups, shown in the right-hand columns in tables 14 and 15, considering the families in a situation of extreme poverty, it is found that the treatment group has a higher total expenditure for Brazil, its largest proportion being spent on food consumption. In the North and Midwest regions, it is also found that there is a positive and significant differential on total expenditures, as well as on the expenditure variables on food, health and education. Among the families in a situation of poverty, it is found that the BF beneficiary families spend more on food and items of education and a strong emphasis on the positive differences on children's clothing. Considering the families with a per capita income of R\$ 200 or less, it is found that the families in the treatment group have a lower total expenditure than the comparison 2 group, but showing positive and significant differences on expenditures for Brazil. For the South and Southeast regions, negative differences are noted for total expenditure and spending on health and education.

Table 7: Differentials between comparison groups on household expenditures: Brazil and Regions, 2005.

| Groups Eligibility (up to) | Treatment and Comparison 1 | | | Treatment and Comparison 2 | | |
|---|----------------------------|------------|-----------|----------------------------|------------|------------|
| | R\$200 | R\$100 | R\$50 | R\$200 | R\$100 | R\$50 |
| <u>TOTAL EXPENDITURES</u> | | | | | | |
| Brazil | -392.49 *** | | | -461.02 *** | | 458.65 ** |
| Northeast | -710.06 *** | -521.14 ** | | | 470.15 ** | |
| North/Midwest | | | | | | 1296.87 ** |
| Southeast/South | | | | -758.93 *** | -601.60 * | |
| <u>FOOD</u> | | | | | | |
| Brazil | -142.82 *** | | | 105.67 ** | 278.12 *** | 388.22 *** |
| Northeast | -216.61 * | | | 142.44 * | 322.12 *** | |
| North/Midwest | | | | | | 588.01 *** |
| Southeast/South | -203.64 * | | | | | 450.51 *** |
| <u>HOUSING</u> | | | | | | |
| Brazil | | | | -172.02 *** | | |
| Northeast | | | | | | |
| North/Midwest | | | | | | |
| Southeast/South | | | | -212.19 ** | | |
| <u>TRANSPORTATION</u> | | | | | | |
| Brazil | | | -209.84 * | -140.93 ** | | |
| Northeast | | | | | | |
| North/Midwest | | | | | | |
| Southeast/South | | | | -299.98 *** | -387.06 ** | |
| <u>HYGIENE & PERSONAL SERVICES</u> | | | | | | |
| Brazil | | | 60.27 ** | -35.15 ** | | |
| Northeast | | | | | | |
| North/Midwest | | | | -99.09 *** | | |
| Southeast/South | | | 180.62 ** | | | |
| <u>HEALTH</u> | | | | | | |
| Brazil | -72.61 *** | | | -84.94 *** | | |
| Northeast | | -67.81 * | | | | |
| North/Midwest | | | | | | 111.09 * |
| Southeast/South | -95.50 * | | | -135.31 *** | | -315.13 ** |
| <u>EDUCATION</u> | | | | | | |
| Brazil | | | | -39.79 * | 31.80 ** | |
| Northeast | | | | | 50.43 *** | |
| North/Midwest | | | 87.39 ** | 49.45 * | 54.44 * | 128.90 *** |
| Southeast/South | | | | -70.24 *** | | |
| <u>CLOTHING</u> | | | | | | |
| Brazil | | | | | | 22.64 ** |
| Northeast | | | | 26.63 * | 34.37 *** | |
| North/Midwest | | | | | | |
| Southeast/South | | | | | | |
| <u>TOBACCO/ALCOHOL. BEV.</u> | | | | | | |
| Brazil | | | | | | |
| Northeast | | | | | 50.74 ** | |
| North/Midwest | | | | | | |
| Southeast/South | | | | | | |
| <u>MISCELLANEOUS</u> | | | | -54.60 *** | | |
| Brazil | | | | | | |
| Northeast | | | | | 33.63 ** | |
| North/Midwest | | | | | | |
| Southeast/South | | | | -55.31 * | -92.00 * | |

Source: AIBF, 2005.

Note: * significant value at 10%; ** significant value at 5%, *** significant value at 1%.

Table 8: Differentials between comparison groups on specific household expenditures; Brazil and Regions, 2005.

| Groups Eligibility (up to) | Treatment and Comparison 1 | | | Treatment and Comparison 2 | | |
|---------------------------------|----------------------------|------------|-----------|----------------------------|-------------|------------|
| | R\$200 | R\$100 | R\$50 | R\$200 | R\$100 | R\$50 |
| <u>BASIC FOOD</u> | | | | | | |
| Brazil | | | | -103.90 *** | | |
| Northeast | | | | | | |
| North/Midwest | | | | -130.50 ** | | |
| Southeast/South | | | | | | |
| <u>NON-BASIC FOOD</u> | | | | | | |
| Brazil | -81.51 *** | | | -114.87 *** | | |
| Northeast | | | | | | |
| North/Midwest | | | | | | |
| Southeast/South | -168.96 *** | | | | | |
| <u>CHILD HEALTH CARE</u> | | | | | | |
| Brazil | 28.45 *** | 27.98 * | | | | |
| Northeast | | | | 31.57 *** | | |
| North/Midwest | 46.46 * | 51.36 * | | | | |
| Southeast/South | | | | | | |
| <u>ADULT HEALTH</u> | | | | | | |
| Brazil | -101.06 *** | -57.76 ** | | -116.79 *** | -80.61 ** | -81.72 * |
| Northeast | -80.85 ** | -57.73 * | | | | |
| North/Midwest | -94.60 ** | | -151.29 * | | | |
| Southeast/South | -125.52 *** | | | -176.94 *** | -278.47 *** | -374.47 ** |
| <u>CHILD EDUCATION</u> | | | | | | |
| Brazil | 23.19 *** | 22.36 ** | 25.92 * | | | |
| Northeast | | | | | | |
| North/Midwest | | 37.76* | 83.20 ** | 39.97 ** | 53.39 * | |
| Southeast/South | | | | -27.75 * | | |
| <u>ADULT EDUCATION</u> | | | | | | |
| Brazil | -15.50 ** | | -20.22 * | -56.64 *** | | |
| Northeast | | | | | | |
| North/Midwest | | | | | | |
| Southeast/South | | | -29.50 * | -38.63 ** | | -91.32 ** |
| <u>MALE CLOTHING</u> | | | | | | |
| Brazil | -17.06 *** | -14.29 ** | | -13.94 *** | -8.90 * | |
| Northeast | -21.98 * | -13.43 * | | | | |
| North/Midwest | | | | -27.24 * | | |
| Southeast/South | | -21.82 * | | | | |
| <u>FEMALE CLOTHING</u> | | | | | | |
| Brazil | -15.78 *** | -17.52 *** | -19.30 ** | | | |
| Northeast | -14.71 ** | -15.71 ** | | | | |
| North/Midwest | -16.92 ** | | | | | |
| Southeast/South | | | | | | |
| <u>CHILD CLOTHING</u> | | | | | | |
| Brazil | 16.92 *** | 57.74 *** | 17.48 ** | 21.27 *** | 16.12 * | 31.94 *** |
| Northeast | | 18.99 ** | 15.53 ** | 27.66 *** | 25.54 *** | 15.94 * |
| North/Midwest | | 33.82 * | | 33.46 ** | 25.23 * | 47.47 ** |
| Southeast/South | 20.63 * | | | 16.47 ** | | |

Source: AIBF, 2005.

Note: * significant value at 10%; ** significant value at 5%, *** significant value at 1%.

4. FINAL COMMENTS

This paper is the first effort to explore the results of the estimated differentials for a preliminary impact evaluation of the *Bolsa Familia* program. Interpretation of the results takes into account the methodological restraint on using a cross-section survey, with retrospective and contemporary variables. It should also be mentioned that the choice of the analytical technique was a determining factor for the obtained results. The longitudinal survey design, and a second round of field survey work that will accompany the households in the treatment and comparison groups, will help advance the evaluation of more consistent impacts, and it will be possible to apply other analytical techniques and methods, as well as explore other outcomes.

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ANNEX: VARIABLES USED IN SPECIFICATION OF BALANCED MODELS OF PROPENSITY SCORE

dummy non-white head of family
dummy poor quality household
dummy medium quality household
dummy presence of someone 60 years old or more
dummy mother of literate head
dummy women head of family present
height in meters of female head of family*
dummy male head of family present
height in meters of male head of family*
number of members in household
proportion of children between 0 and 13 years old
dummy couple with children under 14 years old
dummy head with 3 years study or less
dummy head with 4 years study or less
dummy head with 7 years study or less
dummy head under 50 years old
dummy receives a visit from health agent
dummy household in urban area
dummy head with less than 10 years in county
dummy head with less than 5 years in county
dummy head lived first 14 years in rural area
dummy Northeast region
dummy North or Midwest region

Notes: * Variable interacting with the dummy of presence of person in household.
All variables were selected from a larger set. In this set, there were other characteristics that did not balance in the estimates of the propensity scores.