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Social Mobility in Brazil:

An analysis of the first generation of beneficiaries of the Bolsa Família *Program*

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Summary

This research investigates indicators suggestive of social mobility at the base of the Brazilian social pyramid and its determinants after the implementation of the *Bolsa Família* program (PBF). We focused on the cohort of dependents aged 7 to 16 years in December 2005, who are followed for more than a decade, until 2019. Based on administrative data, we analyzed two main indicators, namely: (i) future emancipation from social programs of the federal government and (ii) entry into the formal labor market. The results show that in 2019, 20% of these PBF dependents in 2005, then aged between 21 and 30 years, remained as beneficiaries of the program, while 64% had exited the Single Registry. Similarly, 45% of them accessed the formal labor market at least once between 2015 and 2019. These results are indicative of a relative social mobility at the base of Brazil's income distribution for PBF beneficiaries. Additionally, we evaluated the quality of formal employment within this group compared to non-beneficiaries of the BFP in the period, along with other indicators suggestive of social mobility. All suggest a significant socioeconomic improvement of those who were beneficiaries of the PBF in 2005. In addition, we sought to understand the association between demographic and socioeconomic variables of the municipalities with indicators suggestive of social mobility. The results indicate great regional differences in Brazil, with the Northeast region presenting the lowest mobility. In consonance, it is estimated that better health and education structures are important factors for greater social mobility of individuals in the municipalities.

1 Introduction

In 2019, approximately 13 million Brazilian families were beneficiaries of the *Bolsa Família* Program (PBF). One of the largest and most successful cash transfer programs in the world, the PBF stood out for its ability to focus with relatively low budgetary cost, thus being an important policy for the reduction of poverty and extreme poverty in Brazil in recent decades (Souza et al., (2019).

In fact, several studies show that conditional cash transfer programs (CCTP), along the lines of the PBF, are successful in reducing poverty and inducing improvements in health and education (Fietz et al., 2021; Bastagli et al., 2019; Fiszbein et al., 2009), leading to a reduction in social inequality. The same has been observed for PBF evaluations over the years (Campello and Neri, 2013; Souza et al., 2019; Silva, 2018). It is, however, in the recent period, almost two decades after the implementation of the PBF in 2003, that it becomes possible to empirically evaluate the results of the PBF in the long term (Millán et al., 2019). More specifically, whether beneficiaries were able to ascend socially by overcoming a vicious cycle of poverty (Nurkse, 1953) and thus ceasing to depend on the welfare system (Torgovitsky, 2019; Chay et al., 1999;Card and Hyslop, 2005).

This study is one of the first to analyze indicators of social mobility of PBF beneficiaries over more than a decade. To this end, we followed the cohort of dependent PBF beneficiaries aged between 7 and 16 years in December 2005[1] over more than a decade, until 2019. The two indicators suggestive of social mobility of the individuals analyzed are their future emancipation from social programs of the federal government and their entry into the formal labor market.

To this end, a set of administrative data is used: the Single Registry for Social Programs (*CadÚnico*), the Payrolls of the *Bolsa Família* Program and the Annual Record of Social Information (RAIS), as well as socioeconomic and demographic data at the level of municipalities computed based on the Demographic Census and the United Nations Development Program (UNDP). The results show that in 2019, 20% of those who were dependent on the PBF in 2005, then aged between 21 and 30 years, remained as beneficiaries of the program, while 64% had exited the Single Registry. We still see that 45% of them accessed the formal labor market at least once between the years 2015 and 2019. In addition, we evaluated the quality of formal employment to which this group belongs, when compared with non-beneficiaries of the PBF in the period, and other indicators suggestive of social mobility. All suggest a significant socioeconomic improvement of those who were beneficiaries of the PBF in 2005, substantiating the thesis of a relative social mobility at the base of the income distribution of Brazil for

[1]In 2005, the maximum age to be considered a dependent in the PBF was 15 years. However, the benefit was often only withdrawn, in practice, when they had already completed 16 years of age at the end of the school term. Therefore, we chose to include individuals aged 16 years to contemplate this transition period of dependent status.

the beneficiaries of the PBF.

As a way to better understand the factors associated with social mobility in Brazilian municipalities, we still estimate regressions at the municipal level. The dependent variable is the rate of social mobility of individuals in the municipality, evaluated as a probability, and as explanatory factors, a set of demographic and socioeconomic variables of this geographical division. Thus, a proxy is estimated of the environment of accumulation of human capital to which the generation that was between 7 and 16 years of age in 2005 was exposed. The results suggest great differences between the regions of Brazil, with the Northeast region presenting the lowest indication of mobility. In consonance, it is estimated that better health and education structures are important factors for greater social mobility of individuals in the municipalities. We also observed the role migration to places of better socioeconomic indicators plays for these groups. These results contribute to a growing literature concerned with the determinants of social mobility in developing countries (Britto et al., 2022; Sandberg, 2012).

The debate is complex and fruitful, as policies for the economic inclusion of the poorest must recognize the specificities of the "poverty trap"[2] and realize that to unleash the productive potential of people living in poverty it is necessary to remove multiple restrictions through a multidimensional response (Andrews et al., 2021). Economic inclusion involves the gradual integration of individuals and families into broader economic and community development processes, aimed at strengthening their resilience and leveraging future opportunities. It is in this sense that conditional cash transfer programs can promote social mobility. The rules and conditionalities of CCTPs – Conditional Cash Transfer Programs - cover a wide range of requirements that can enable individuals and families to overcome poverty in a sustained manner, in addition to the additional income given (Fietz et al., 2021). Like the PBF, most CCTPs have conditionalities in health, education and income.

Accordingly, Bastagli et al. (2019) and Fiszbein et al. (2009) observe in several contexts that CCTPs have significant effects in reducing monetary poverty and income inequality (Soares et al., 2009); while promoting an improvement in the indicators of education (García and Saavedra, 2022), health (Walque et al., 2017), savings (Gertler et al., 2012), employment and an empowerment of the target population (Andrews et al., 20 21), given their conditionalities. It is also noteworthy that on average no significant unwanted side effects are observed, such as disincentive to work and an increase in fertility. In the long term, Araujo and Macours (2021) and Oliveira and Chagas (2020) find positive effects on schooling and participation in the formal labor market, as mixed results for incomes, with significant heterogeneities according to individual characteristics. It should be noted that there is no study in the current literature, to the authors' knowledge, that analyzes social mobility on the basis of income distribution in Brazil, of the beneficiaries of the PBF, in the long term and its determinants at the level of the municipalities. These are the main contributions of this article.

[2]the vicious cycle of poverty, as in Nurkse (1953).

The structure of the text follows along these lines: section 2 presents the main issues of interest of this study; section 3, the population of interest; section 4, the data used in the analyses; section 5, a characterization of the population in the sample analyzed; section 6, the indications of social mobility in the period between 2005 and 2019; section 7, comparatively presents the conditions of access to formal employment; section 8, other indicators that substantiate the thesis of social mobility of PBF dependents; section 9, the main determinants of social mobility in municipalities; section 10, the role of migration; and, finally, section 11, the conclusions and final considerations of this research.

2 Issues of interest to the study

The social mobility of individuals is the main issue of interest in this article. Here, it is measured by two indicators suggestive of mobility: the future emancipation of social programs from the federal government, more specifically being in the Single Registry, and the entry into the formal labor market, included in the Annual Record of Social Information.[3] Figure 1 presents a summary of how these indicators suggestive of mobility are observed. In addition, heterogeneities arising from individual characteristics, from the municipalities and regions in which the beneficiaries reside are exposed.

With regard to the emancipation of individuals from social programs, we analyzed not only the exit from the payroll of the PBF, but also from the Single Registry (*CadÚnico*). This measure indicates that these individuals have ceased, albeit temporarily[4], to meet the requirements established for *CadÚnico*[5], thus of social programs of the federal government that focus on poor and extremely poor families. Being outside the Single Registry may result from the following reasons: i) individuals who as young adults have income higher than the defined limits; ii) those who, even though they were within the criteria, did not update their records; iii) those who died in the period analyzed. Note that the first group can be decomposed into two very distinct subgroups: i) those who structurally managed to get out of poverty and have a low probability of returning to it; ii) those who are temporarily outside the "poverty line" but any change in their current situation, even for a short time, can put them back in the eligibility criteria, such as having a child or losing their job. The first subgroup would represent the group of individuals that we could call emancipated and to them we could designate the expression social mobility. Note, however, that with the available data we cannot say anything about this, other than the fact that they are no longer in the *CadÚnico*.

Regarding the insertion of individuals in the formal labor market, we use the Annual Report of

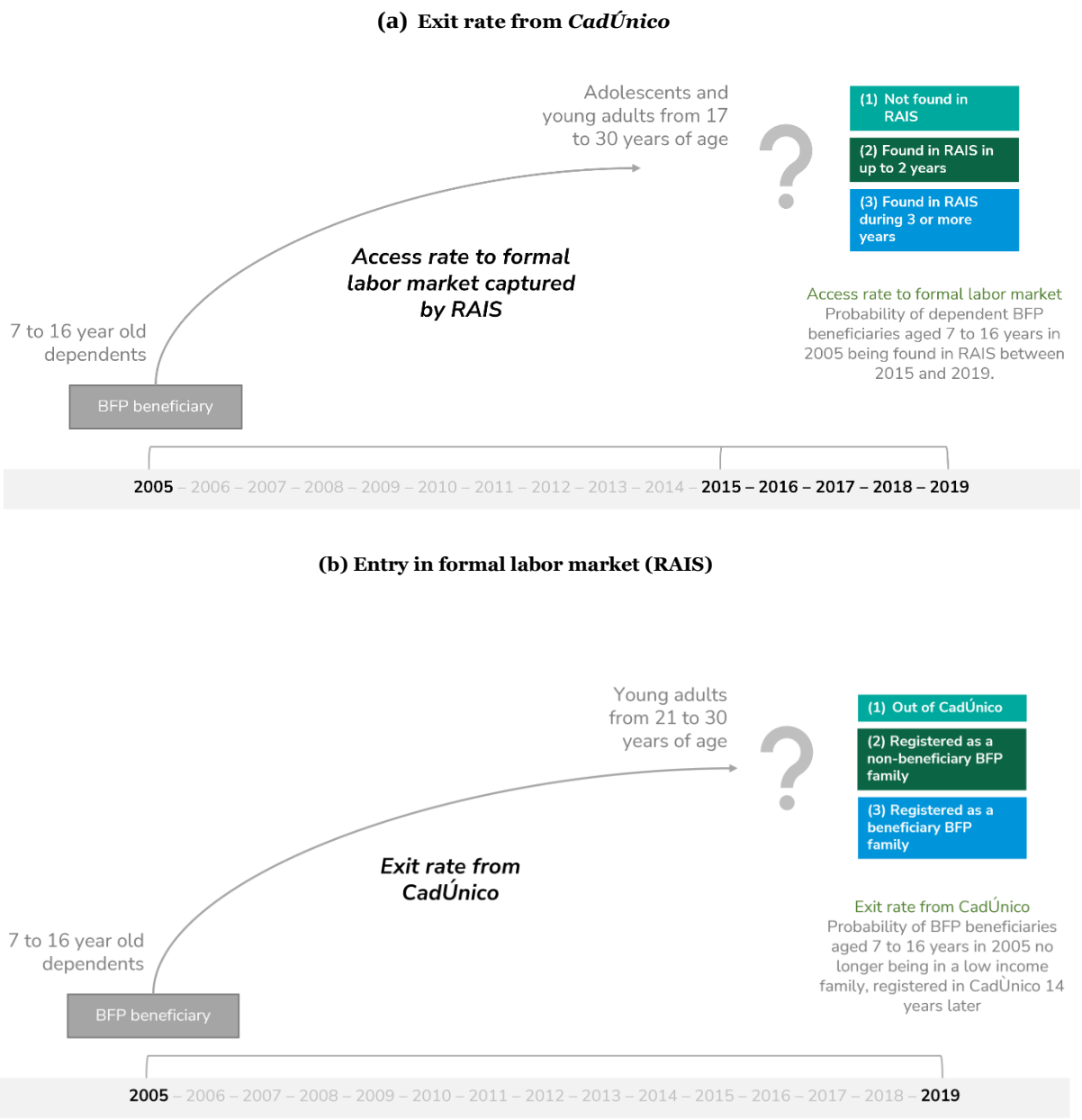
[3] Although they are not perfect proxies to measure the social mobility of PBF beneficiaries, we will see that the data provide strong indications of this.

[4] It is noteworthy that, since 2009, the transfer is paid for a minimum period of two years, regardless of variations in family income, respecting the rule of having a family income of less than half a minimum wage per person.

[5] The requirement for being on the register was to have a family income of less than half a minimum wage per person in this period.

Social Information (RAIS) between the years 2015 and 2019. We observed in which years and for how long individuals appear in RAIS. Thus, three situations of access to the formal labor market are analyzed: i) individuals never found in RAIS, ii) those found in RAIS for up to 2 years; iii) and those found in RAIS for 3 years or more. The divisions aim, in addition to evaluating access to the formal labor market, to measure in an approximate way the intensity of this employment bond, more or less strong, according to the number of years in which the individuals were found in the RAIS.

Chart 1: Issues of interest: indicators suggestive of social mobility



Source: Own elaboration.

3 Population of interest of the study

This research aims to analyze the social mobility of beneficiaries of the *Bolsa Família* Program and its determinants in the long term. Thus, the population of interest consists of young people dependent on the PBF aged between 7 and 16 years when observed on the PBF payroll in December 2005. These more than eleven million individuals are followed over more than a decade, until 2019, in order to observe and estimate the factors associated with the social mobility of individuals.

3.1 The *Bolsa Família* Program

We will begin with a brief history of the PBF throughout the analysis period. The *Bolsa Família* Program was established in October 2003, by Provisional Measure No. 132 (Brazil, 2003), as a way to administratively unify and expand four other existing social programs within the federal government[6] and consolidate the Single Registry for Social Programs, created in 2001 (Brazil, 2001) with the objective of identifying all low-income families in Brazil.

The management of the program is decentralized and shared between the Union, the Units of the Federation and the municipalities, as established by Law No. 10,836/2004 (Brazil, 2004b) and regulated by Decree No. 5,209/2004 (Brazil, 2004a). The selection of families is made in an automated way by the federal government based on the information recorded by the municipalities in the Single Registry. The registration does not imply, however, in an immediate entry of the families in the program and receipt of the benefit. The financial benefits are transferred monthly to the beneficiary families, considering the *per capita* monthly income of the family, the number of children and adolescents up to seventeen years of age and the existence of pregnant and nursing mothers.[7] The PBF adopted two lines of eligibility, poverty and extreme poverty, which allowed access to distinct benefits at its inception.

In 2005, the guidelines defined by Law No. 10,836/2004 were still in force. Families in poverty were those with monthly *per capita* income equal to or less than 100 reais, while extremely poor, those with monthly *per capita* income equal to or less than 50 reais. The basic or fixed benefits, in the amount of 50 reais, were granted only to extremely poor families; on the other hand, the variable benefits, in the amount of 15 reais, were granted by the existence in the family of children from zero to fifteen years of age, pregnant and/or nursing mothers - respecting a maximum limit of three benefits (45 reais) per family.

Over the years, the PBF has undergone adjustments and updates, such as the addition of

[6] namely, the programs created between 2001 and 2003: National School Grant, Food Grant, Gas Aid and Food Card; linked to four different ministries: Education, Health, Mines and Energy; and Food Security and Fight against Hunger, respectively.

[7] The program has undergone changes in its design over the years, with the introduction of the benefit for adolescents up to 17 years of age in 2007 - with effect in 2008; the expansion of the limit from three to five children in 2011 - with the effective inclusion of benefits per pregnant woman and per nursing mother; and the introduction of the Benefit for Overcoming Extreme Poverty in 2012 - universalized in 2013.

variable benefits paid to adolescents aged between sixteen and seventeen, and the Overcoming Extreme Poverty Benefit (BSP). In 2019, the rules updated by Decree No. 9,396/2018 (Brazil, 2018) were in force. Families in poverty were those with monthly *per capita* income equal to or less than 178 reais, while extremely poor, were those with monthly *per capita* income equal to or less than 89 reais. The basic or fixed benefits, amounting to 89 reais, were granted only to extremely poor families; on the other hand, the variable benefits, in the amount of 41 reais, were granted by the existence in the family of children from zero to fifteen years of age, pregnant and/or nursing mothers - respecting a maximum limit of five benefits per family. Also, the variable benefit linked to adolescents with sixteen and seventeen years of age, in the amount of 48 reais - respecting a maximum limit of two benefits per family; and the BSP for families already benefiting from the PBF, but who, even receiving the other types of benefits, remained with a monthly *per capita* income of less than 89 reais. There was no pre-established value for the BSP, since it was calculated on a case-by-case basis, so that each family could overcome the situation of extreme poverty, exceeding the income of 89 reais per person per month.

3.2 Characterization of the population of interest

The population of interest of this study, children and adolescents dependent on the PBF aged between 7 and 16 years when observed on the PBF payroll in December 2005, total 11,628,308 individuals who have been followed for more than a decade, until 2019. This group comprises 73% of the approximately 16 million dependent beneficiaries of the PBF in 2005. Note that due to legal issues regarding the creation and extinction of the municipality of Pinto Bandeira in the state of Rio Grande do Sul[8], eight of these dependent beneficiaries residing in that municipality in 2005 were discontinued from the statistics related to the rates of exit and permanence in the *CadÚnico* that used locality information only from the PBF Payroll. In the case of analyses of access to the formal labor market from the RAIS, information on the location of employment is also used that overrides this omission. Therefore, there is this small difference of eight beneficiaries between the analyses with the data of *CadÚnico* (11,628,300 people) and with those of RAIS (11,628,308 people).

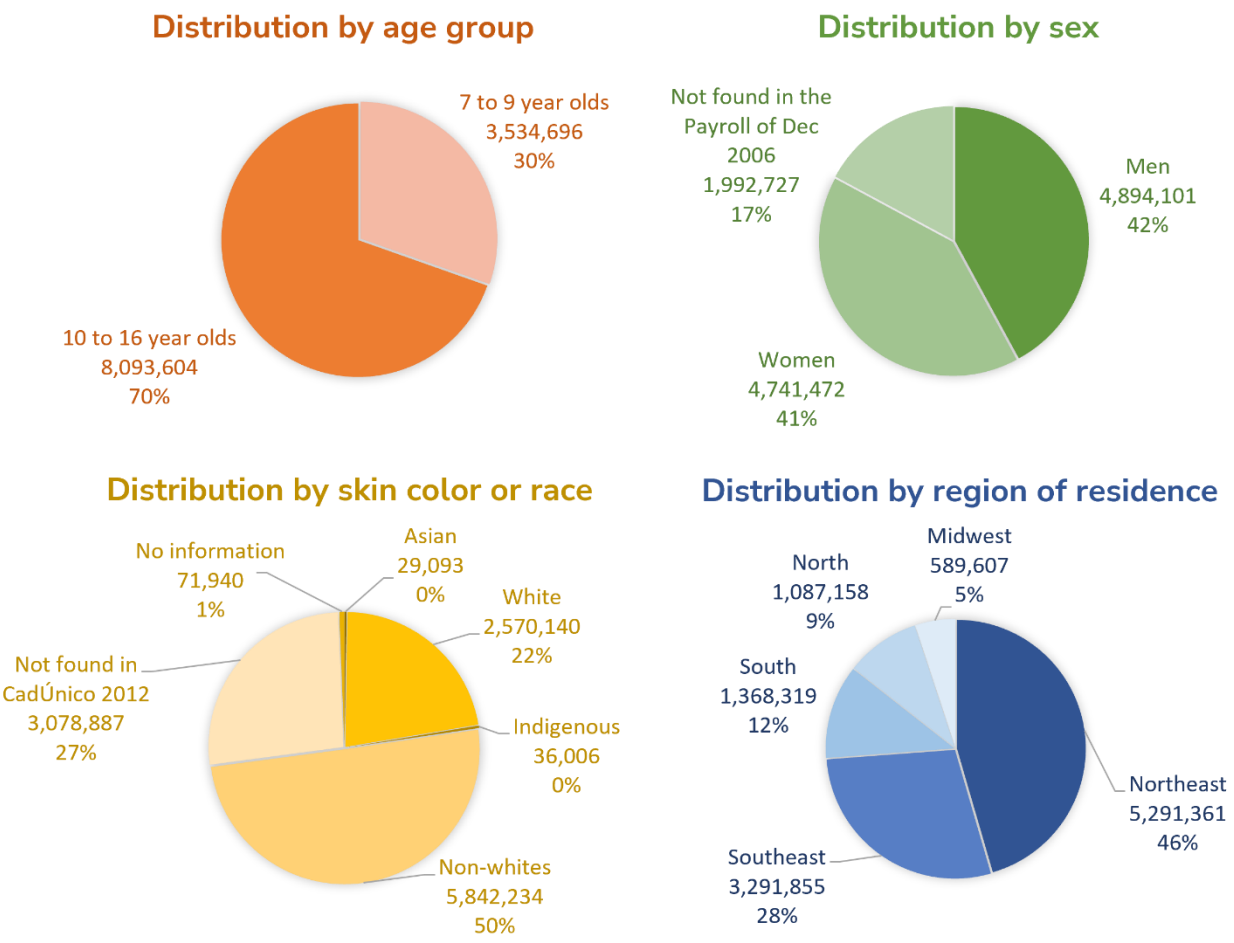
As a way to characterize the population studied, Charts 2 and 3 provide information on the dependents and holders of the PBF observed in 2005. Chart 2 shows that the predominant profiles of the 7 to 16-year-old dependents of the PBF in 2005 were 70% aged between 10 and 16 years; 46% lived in the Northeast region; 50% were non-whites (brown or black)[9] and 42% were men[10].

In addition, Chart 3 presents a profile of the education level of the holders of the beneficiary

[8]The municipality of Pinto Bandeira in Rio Grande do Sul, which in 2005 was a district of the municipality of Bento Gonçalves, was elevated to the category of municipality in 2001, extinct in 2003 by a decision of the Federal Supreme Court and was elevated again to the category of municipality in 2013.

[9]In the case of skin color or race, the characteristic can only be observed from 2012 onwards, when the variable is available in the Single Registry. Therefore, it is not possible to identify the result for a portion of the population studied (27%) which are the dependent beneficiaries aged 7 to 16 years who were in the Payroll in 2005, but not in *CadÚnico* in 2012.

Chart 2: Profile of PBF dependents in 2005



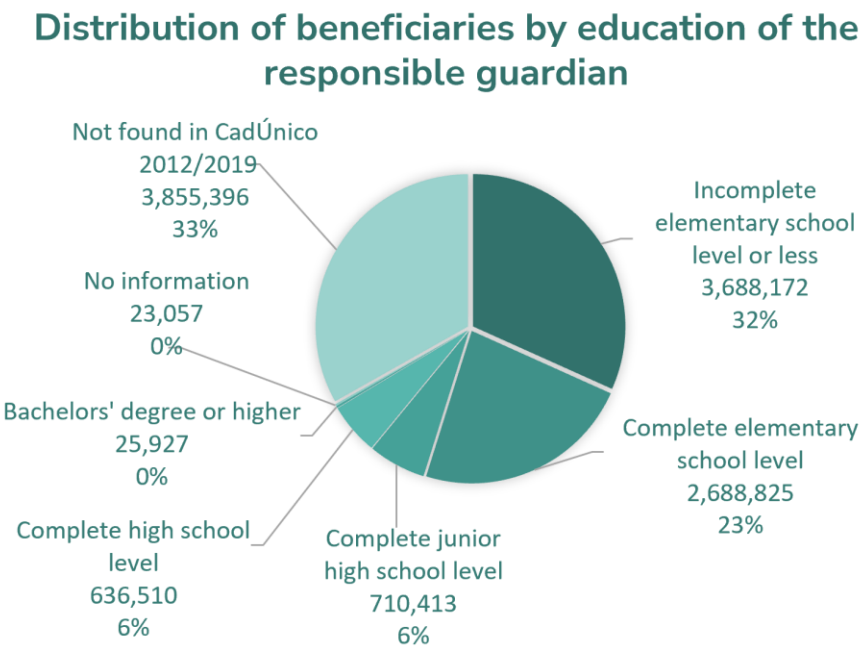
Source: Own elaboration, based on the data identified from the Single Registry for Social Programs of the Federal Government and the Payroll of the Bolsa Família Program, of the Ministry of Citizenship and of Social Development.

families of the group analyzed in 2005.[11] It can be observed that only 6% had completed high school, while the vast majority, 55%, had only completed elementary school or less.

[10]In the case of sex, the characteristic can only be observed from 2006 onwards, when the Payroll of the *Bolsa Família* Program introduced this variable. Therefore, it is not possible to identify the result for a portion of the population studied (17%) who were dependent beneficiaries aged 7 to 16 years who were in the Payroll in 2005, but not in 2006.

[11]In the case of the education of the person in charge, it is not possible to identify the result for a portion of the population studied (33%) – dependent beneficiaries aged 7 to 16 years who were in the Payroll in 2005, and whose education of the holders was not found in the Single Registry 2012-2019. We considered the education of the holder of 2005 reported in the oldest Single Registry after migration to version 7, where this characteristic was recorded with greater precision. Since it is not possible to observe the schooling in 2005, the education of the holder we used may be overestimated if the parents or guardians have acquired more years of education between 2005 and 2012. On the other hand, knowing that more educated individuals are more likely to have already left the register in 2012, there is the possibility that a significant fraction of those not found have completed high school or higher education, underestimating this population in the analyzed stratum.

Chart 3: Profile of PBF holders in 2005



Source: Own elaboration, based on the data identified from the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, of the Ministry of Citizenship/Social Development.

4 Data

This article combines restricted-access administrative data with publicly available data from various government sources to analyze the social mobility of individuals on the basis of Brazilian income distribution, more specifically the beneficiaries of the PBF. The set of data at the municipal level is also used to estimate the determinants of social mobility observed through indicators suggestive of such.

4.1 Single Registry (CadÚnico)

The Single Registry for Social Programs of the Federal Government (*CadÚnico*) is a database that identifies and characterizes the universe of low-income families in Brazil organized by the current Ministry of Development and Social Assistance, Family and Fight against Hunger (MDS)[12]. Initially established by Decree No. 3,877/ 2001 (Brazil, 2001), *CadÚnico* emerged as an important tool to support the formulation and implementation of public policies to promote the improvement of the lives of these families. To the extent that it gathers a broad set of information, it provides managers with knowledge of the risks and vulnerabilities to which the poor and extremely poor population is exposed. This database focuses on low-income families, defined as those who have a monthly income per person (*per capita* income) of up to half a minimum wage or total family income of up to

[12]Entre os anos de 2019 e 2022, chamava-se Ministério da Cidadania; é também conhecido apenas como Ministério do Desenvolvimento Social.

three minimum wages. After updates, Ordinance No. 177/2011 (Brazil, 2011) changed the classification of family members and migrated the information of the beneficiaries of the *Bolsa Família* Program to version 7 of the registry. Thus, the *CadÚnico* began to bring a broad set of socioeconomic and demographic variables of the families/people registered and, particularly important for this research, cadastral variables - mainly the NIS/PIS, which allow to follow the individuals over the years, as well as link with other administrative bases. For this research we used the active registers of families and individuals inserted in them, having as reference the month of December between the years 2012 and 2019, a period for which we have access to the data.

4.2 Bolsa Família Program Payrolls

The payrolls of the PBF are the administrative records made by the Ministry of Social Development/Citizenship containing information of the beneficiaries of the PBF. In them we observed detailed information about the types of benefits (*i.e.*, basic benefit, variable 0-6 years, variable 7-15, variable young, pregnant/nursing and benefit to overcome extreme poverty) and amounts received by the holders of the families. In addition to information about benefits, the payrolls contain the date of birth and gender of dependents and holders[13], as well as unique identifiers (NIS/PIS) that allow you to track individuals over time and combine with other administrative data. We use information from the December payrolls of each year from 2005 to 2018 as a proxy for annual data.

4.3 Annual Report of Social Information (RAIS)

The Annual Report of Social Information (RAIS), managed by the Ministry of Labor and Employment, is the administrative registry that provides detailed information about all companies in the Brazilian formal sector and their respective employees. The RAIS contains unique identifiers of employees, such as the number of the Social Integration Program - PIS, which allow us to follow the workers over time and link with the other bases. In addition, it brings a series of demographic information of employees, such as age, sex, skin color/race, level of education, length of employment in the company, salary, occupation, number of hours worked, type of work contract, nationality, date of admission, date of dismissal, causes of dismissal, among others. In this research we used the annual data of RAIS for the period between the years 2015 and 2019.

[13]Since 2006, reason for us to use this data from the payroll of the PBF, instead of the one available in *CadÚnico*.

4.4 Census/PNUD

In addition, we used a set of information aggregated at the municipal level, from the Atlas of Human Development of Municipalities. Atlas Brazil is the product of a partnership between the United Nations Development Program (UNDP), the Institute of Applied Economic Research (IPEA) and the João Pinheiro Foundation (FJP). The platform allows consultation of the Municipal Human Development Index (MHDI) and more than 200 human development indicators of Brazilian municipalities and states. The indicators are population, education, housing, health, work, income, and vulnerability, with data extracted from the Demographic Censuses of 1991, 2000 and 2010, of the Brazilian Institute of Geography and Statistics (IBGE). For this research, we used the information from the year 2000, because it is the period before the PBF, as explained in section 9.1. The variables were used individually and in sets in order to compose the explanatory factors of the main econometric model.[14]

4.5 Mortality Information System (SIM)

The Mortality Information System (SIM), developed by the Ministry of Health, is the main longitudinal administrative registry on mortality in the country. Its primary source is data from individuals' death certificates. Its long time series provides information regarding mortality in Brazil and the causes of illness that led individuals to death. The records from the SIM system contain socioeconomic data, place of residence and occurrence, fetal and non-fetal deaths, conditions and causes of death, and information on external causes of deaths.

In this research, we used the records of deaths between October 2005 and December 2019, by year of birth and sex of the individuals. This data is used to estimate the number of individuals by characteristics who died between 2005 and 2019, not being observed in the databases of beneficiaries of social programs and formal workers in later years.

4.6 Continuous National Household Sample Survey (PNADC)

The Continuous National Household Sample Survey (PNADC) is conducted by the Brazilian Institute of Geography and Statistics (IBGE). Its main objective is the quarterly collection of data on the workforce of a sample of Brazilian households. Thus, it allows the production of indicators for a quarterly and longitudinal monitoring of the Brazilian workforce; in addition to other complementary and supplementary information according to specific demands. The PNADC has covered the entire national territory since 2012. Its sample was planned to produce results for Brazil, Major Regions, Units of the Federation, Metropolitan Regions, Integrated Development Region (RIDE) and Capital Municipalities.

[14]Table 14 of Appendix A contains the complete list of available variables.

For this study, we used the population numbers by population strata and the income information of workers between 2015 and 2019. The population figures were used together with the mortality data from the SIM in order to estimate the mortality rates by subgroups of the population. Data on income were used to observe the annual income distribution of all jobs by Unit of the Federation and in fifths of national income distribution.

5 Selection and representativeness of the sample of PBF beneficiaries

Some steps were adopted in this research so that the set of individuals analyzed over the years was the most representative of the population at the base of the Brazilian social pyramid. This section details the treatment given to the *CadÚnico* databases and the PBF payrolls, in addition to estimating their representativeness of the Brazilian population.

5.1 Selection of the sample of PBF beneficiaries

Initially, we restricted the observations of the Single Registry only to cases of cadastral information in the "registered" situation.[15] In this sense, Table 1 shows the total number of families/households and people with a "registered" situation.[16] In particular, it is observed that the number of registered families was approximately 25 million in 2012 and 29 million in 2019. Similarly, it is observed that the total number of individuals in the "registered" category ranges from approximately 81 million in 2012 to 76 million in 2019. Regarding the beneficiary families of the Bolsa Família Program, approximately 55% of those with active and updated registration in *CadÚnico* received the benefit in 2012. This figure fell to approximately 46% for this same group in 2019.

Table 1: Number of Families and People with active and updated registration in *CadÚnico* and Beneficiaries of the PBF

Number of	2012	2013	2014	2015	2016	2017	2018	2019
Families in *CadÚnico*	25,069,565	27,200,920	29,172,487	27,326,122	26,457,577	26,950,657	26,913,965	28,884,068
Beneficiaries of PBF	13,753,753	13,961,477	13,980,407	13,969,145	13,560,232	14,001,335	13,760,882	13,228,012
People in *CadÚnico*	81,296,647	84,291,793	88,181,941	80,793,612	77,829,927	76,464,300	73,570,482	76,415,223

Source: Own elaboration, from the data identified from the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, of the Ministry of Citizenship/Social Development.

[15] This restriction is fundamental to ensure the quality of the information generated, since the Excluded Registers deal with the stocks of information that have not been completely discarded from the database, but that have also not been updated. In the same way that other categories of registration are extremely rare, less than 0.1%, indicating only to be an informational flow.

[16] The distribution of people and families benefiting from the PBF according to the cadastral situation can be observed in Appendix A, Tables 11 and 12.

Another relevant characterization for the analysis of the sample can be observed in Figure 4, which shows the number of people registered as holders or dependents and the total amount committed by the federal government to the PBF over the years 2004 to 2018. One can observe a constant expansion of the program in number of people and amount committed by the federal government over the period. However, there was a reconfiguration of the beneficiary families as of the year 2012, with a reduction in the number of dependents and stability in the number of beneficiary holders.

5.2 Representativeness of the sample

We can observe the significant volume of people and resources mobilized by the PBF. For the analyses proposed in this research, however, it is relevant to understand how representative they will be of the Brazilian population at the base of the social pyramid. A common way found in the literature is to estimate the coverage rate of the PBF of the eligible Brazilian population over the years, thus the portion of the population that the sample of beneficiaries comprises.[17]

A first challenge is to observe the total number of families belonging to the lowest stratum of the Brazilian social pyramid and which ones are beneficiaries of social programs. Most studies in the literature use family income data captured by household sample surveys conducted by the IBGE for this purpose. This data enables the estimation of the distribution of families within income brackets in Brazil, specifically those benefiting from social programs. We used as reference the article by Souza *et al.* (2019) which deals with the subject. The authors estimate a PBF coverage rate of 46% in 2005, which reaches about 60% between the years 2012 and 2017, as can be seen in Figure 24 of Appendix A.[18] Still, such results should be analyzed with caution. The authors highlight that there is a significant underreporting of the number of PBF beneficiaries reported in household surveys, with estimates between 30% and 35% lower than the administrative data suggest[19], that is, the coverage rate of the program is significantly higher than that estimated by them when comparing the number of beneficiaries of the administrative records of *CadÚnico* and the payrolls of the PBF with the data from the National Household Sample Survey (PNAD).

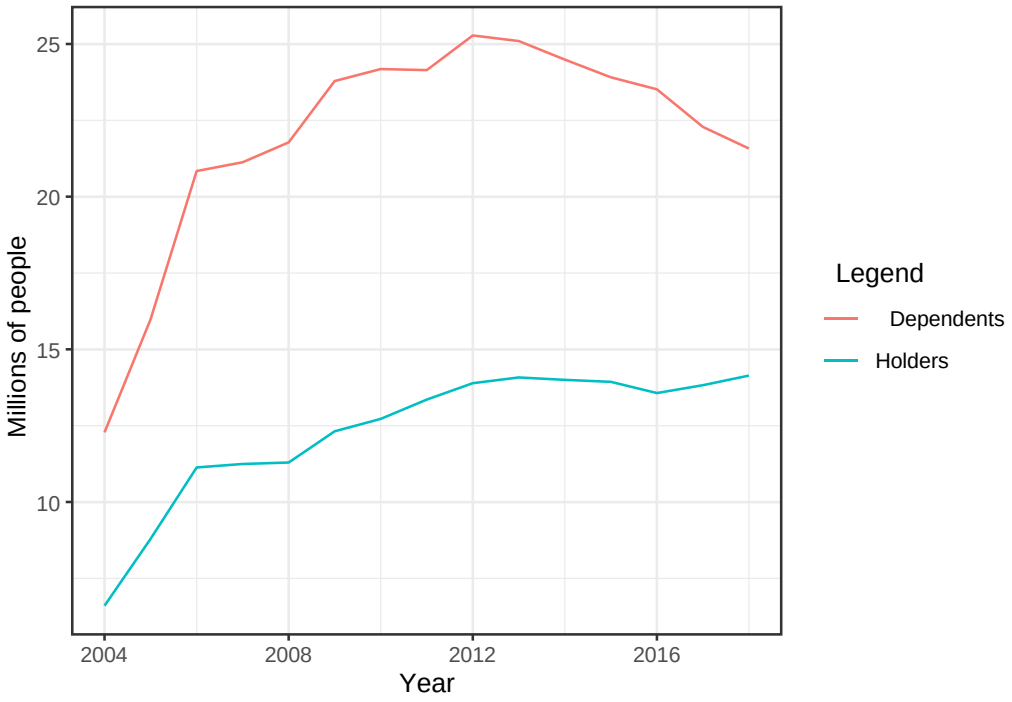
This leads us to conclude that the majority of the Brazilian population at the base of the social pyramid is contemplated by the PBF over the years. Thus, analyzing indicators suggestive of social mobility of PBF beneficiaries is representative of the majority of the Brazilian population in this social stratum.

[17]Eligibility criteria can be found in section 3.1.

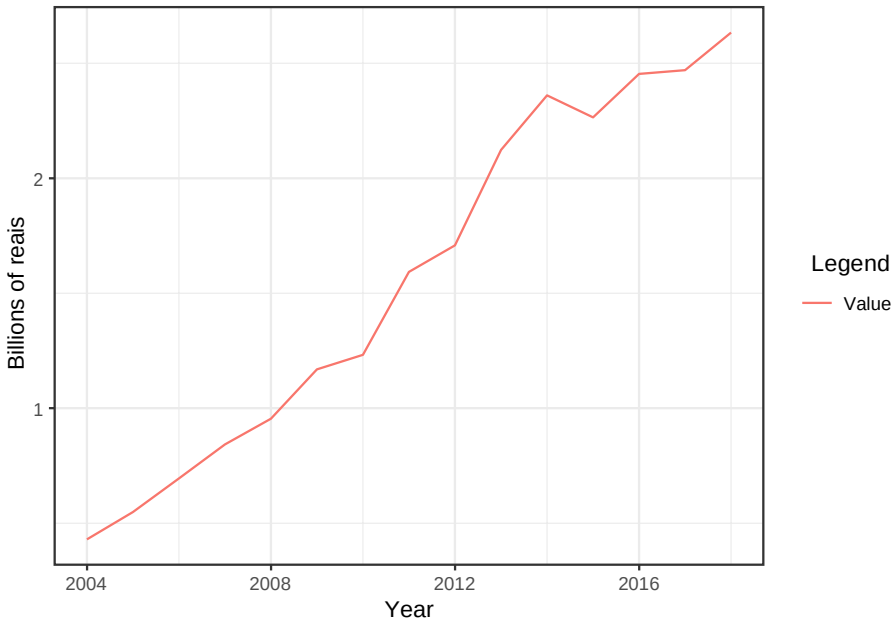
[18]The coverage rate of the PBF is calculated by the authors as the percentage of beneficiaries among the poorest 20% of the population, defined based on the net per capita household income of PBF transfers in the PNADs.

[19]This fact can be seen in Chart 25 of Appendix A

Chart 4: Number of people and total value of PBF benefits



(a) Number of dependents and holders over the years



(b) Evolution of the total value of benefits over the years

Source: Own elaboration, based on the data identified from the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, of the Ministry of Citizenship/Social Development.

6 Indicators suggestive of social mobility in the period between 2005 and 2019

This section presents a characterization of the indicators suggestive of social mobility of the beneficiaries, dependent on the PBF more than a decade after they began to receive the benefit. Dependents aged between 7 and 16 years, when in 2005, are followed until the year 2019, then aged between 21 and 30 years. It can be observed that 64% of these were outside the Single Registry in 2019, no longer being beneficiaries of social programs of the federal government. Similarly, it is observed that 45% of them accessed the formal labor market at least once between the years 2015 and 2019. These results are indicative of a significant social mobility in the base of the income distribution of Brazil for the beneficiaries of the PBF in the period analyzed.

6.1 Exits from the Single Registry

As explained in section 2, there are several reasons for an individual to fail to present active registration in *CadÚnico* over the years. Table 2 presents the situation in 2019 of the dependent beneficiaries in 2005 regarding their appearance in the Single Registry and/or being on the PBF payroll. In 2019, about 7.45 million of them, 64% of the total, were no longer found in the Single Registry, that is, they were no longer beneficiaries of social programs of the federal government. Among the approximately 4 million people who followed in the registry, 2.4 million of these, 20% of the total, remained as beneficiaries of the PBF, now as holders; while 1.6 million, 14% of the total, remained on the registry, but were not on the payroll of the PBF. The latter did not meet the requirements to receive the PBF, but possibly were still eligible for other social programs of the federal government, so they are observed in the registry.

Table 2: Registration status, in 2019, of dependent beneficiaries of the PBF aged between 7 and 16 years when in 2005

Situation observed	Number of beneficiaries	Distribution (%)
Total	11,628,300	100%
Remain beneficiaries of the PBF	2,372,528	20%
Registered non-beneficiaries of PBF	1,628,291	14%
Not found in *CadÚnico*:	7,627,481	66%
Deceased (estimate)	176,376	2%
Out of *CadÚnico* (Exit rate)	7,451,105	64%

Source: Own elaboration, from the data identified from the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, of the Ministry of Citizenship / Social Development. Note: The group of "Not found in *CadÚnico*" is subdivided between the deceased and those who left the registry for other reasons, such as lack of cadastral update and non-compliance with the requirements of the program. Mortality estimation based on data from the Mortality Information System and the population of PNAD/IBGE.

The exit rates of the *CadÚnico* and the payroll of the PBF present significant heterogeneity in relation to the characteristics of the beneficiaries. Table 3 shows higher exit rates for older white men in the analysis cohort, those whose guardians had a higher educational level and who lived in the center-south regions of the country. While 69% of men left the registry, only 55% of women did so. Similarly, 67% of dependent beneficiaries aged 10 to 16 in 2005 were no longer on the registry in 2019, while the exit rate for dependents aged 7 to 9 in 2005 was 58% in 2019. For whites, the exit rate from the registry was 65%, while for non-whites it was 54%, 51% for Asians and 46% for Indigenous peoples. Still, about 62% of dependent beneficiaries whose guardians had completed junior high school or a higher level of education, were not found in the registry in 2019; while this proportion drops to 56% for those whose guardians had not completed the elementary school level. With regard to regional differences, while the exit rate from the registry was higher than 70% in the center-south regions of the country, there was an exit rate of 61% in the Northern region and 58% in the Northeastern region of the country. These regions had a proportion of individuals still benefiting from the PBF in 2019 more than double the permanence rate of the center-south regions. It is worth mentioning that we do not present the exit rates of *CadÚnico* for those with unknown characteristics due to non-declaration or lack of information in the Registry, as informed in section 5.

6.2 Exits from the Single Registry in the territory

As suggested in table 3, there is a significant heterogeneity of the indicator of exits from the Single Registry in the Brazilian territory. This section provides an in-depth look at this analysis.

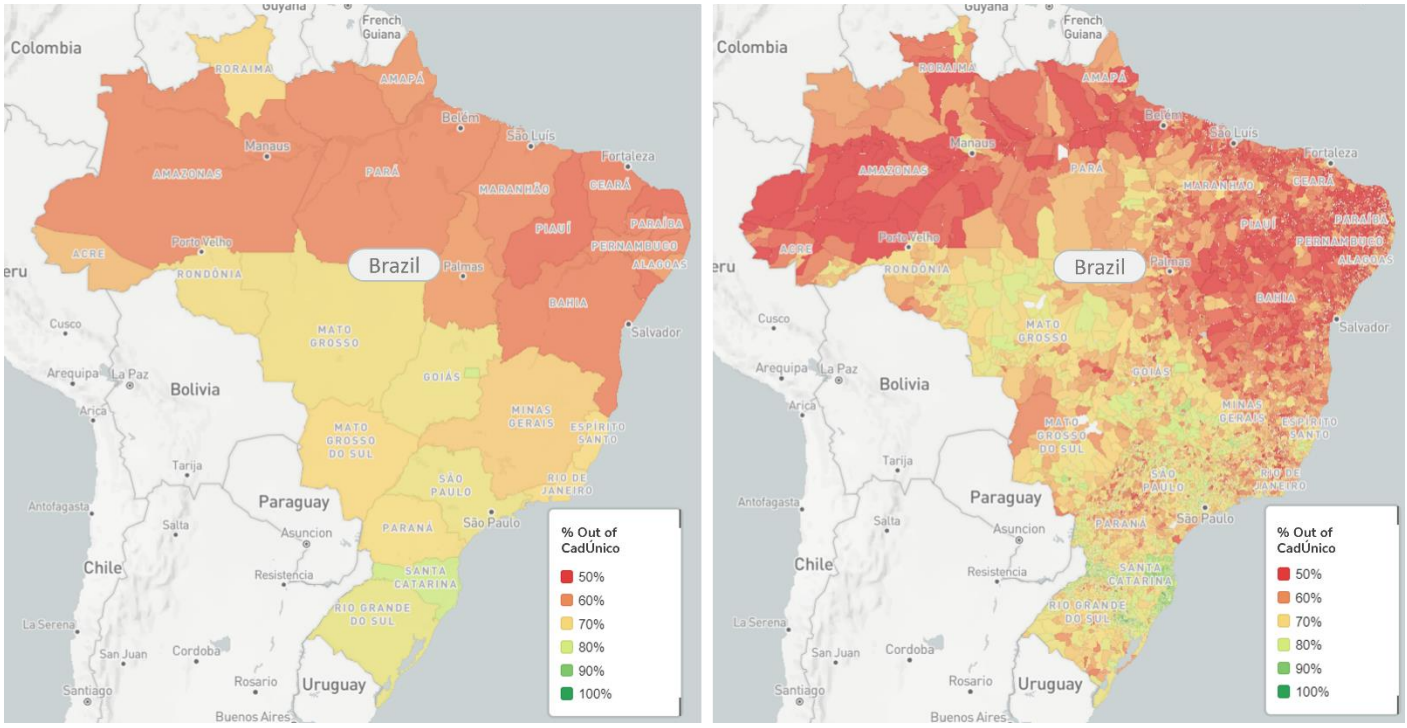
We begin by presenting in Chart 5 the maps with the exit rate of *CadÚnico* by Unit of the Federation and by municipalities in Brazil. In addition to the significant regional differences, it is possible to observe a great heterogeneity between the municipalities of the same Unit of the Federation. Even greater differences are observed between municipalities in different states and regions.

Table 3: Situation in 2019 of dependent beneficiaries aged 7 to 16 years in 2005, by characteristics

Characteristic	Nr. in PBF	% in 2005	Nr. in *CadÚnico* but not in PBF	% in 2005	Nr. out of *CadÚnico*	% in 2005
			By age group in 2005			
7 to 9 year olds	845,850	24%	579,848	16%	2,067,246	59%
10 to 16 year olds	1,526,678	19%	1,048,443	13%	5,383,860	67%
Total	2,372,528	20%	1,628,291	14%	7,451,105	64%
			By sex			
Men	742,198	15%	661,897	14%	3,376,119	69%
Women	1,342,923	28%	753,562	16%	2,616,416	55%
Total	2,085,121	22%	1,415,459	15%	5,992,535	62%
			By skin color or race			
Asian	8,274	28%	4,795	17%	14,872	51%
Indigenous	13,892	39%	4,521	13%	16,461	46%
White	427,221	17%	424,492	17%	1,669,931	65%
Non-white	1,609,327	28%	969,756	17%	3,183,893	55%
Total	2,058,714	24%	1,403,564	17%	4,885,156	58%
			By region in Brazil			
Midwest	64,980	11%	87,083	15%	425,630	72%
South	138,089	10%	193,618	14%	1,009,766	74%
North	273,165	25%	138,836	13%	660,532	61%
Southeast	445,533	14%	484,971	15%	2,308,451	70%
Northeast	1,450,761	27%	723,783	14%	3,046,727	58%
Total	2,372,528	20%	1,628,291	14%	7,451,105	64%

Source: Own elaboration, from the data identified from the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, of the Ministry of Citizenship / Social Development. Note: The total number of individuals by characteristics does not add up to the total number of dependent beneficiaries aged between 7 and 16 years in 2005 for all characteristics given the limitations and availability of information presented in section 5.

Chart 5: Exit rate of *CadÚnico* in 2019 according to place of residence of PBF beneficiaries aged 7 to 16 years in 2005

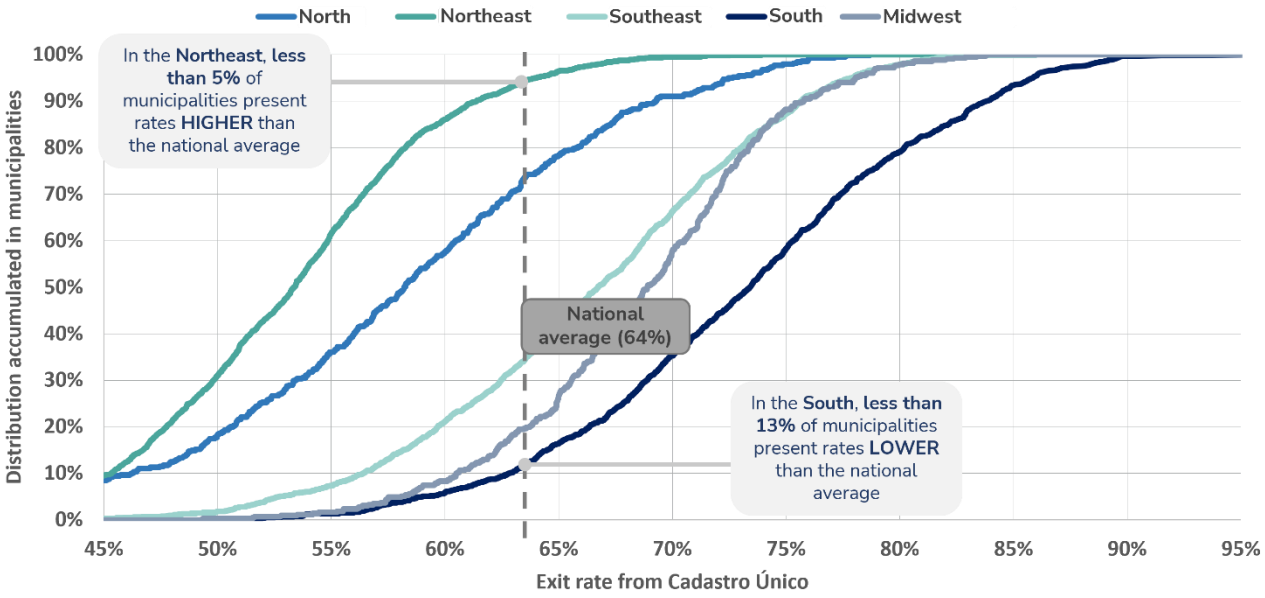


(a) According to the Unit of the Federation of residence **(b) According to the Municipality of residence**

Source: Own elaboration, from the data identified from the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, of the Ministry of Citizenship / Social Development. Note: The legend represents ranges of values. For example, places filled with red have percentages ranging from 0% to 50%, orange between 50.1% and 60%, and so on.

In fact, the maps suggest that the social mobility capacity of PBF beneficiaries presents great variability depending on their municipalities of residence. Chart 6 shows the distribution of municipalities by region of origin of the beneficiaries, according to the exit rate of the *CadÚnico* observed at the municipal level in 2019.[20] The percentage of municipalities with an exit rate from *CadÚnico* above the national average is only 5% in the Northeast region, while in the South region it is 87%. In the North they add up to 25%, while in the Southeast and Midwest they reach 63% and 78% above the national average, respectively. We can observe that not only the different characteristics of individuals affect their capacity for social mobility, but the characteristics of the areas in which they reside do so as well.

Chart 6: Distribution of municipalities by region according to the exit rate of the Single Registry in 2019



Source: Own elaboration, from the data identified from the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, of the Ministry of Citizenship/Social Development.

The differences between the municipalities may be even more significant when observed in Table 4 and Chart 7. They present the municipalities with the five largest and the five lowest exit rates from the Single Registry by region of Brazil and by size in number of inhabitants, in the former, and by Unit of the Federation, in the latter. As previously noted, the highest rates of exit from the registry in municipalities in the central-south regions are significantly higher than in the municipalities with the highest rates in the North and Northeast regions; the opposite was observed for the municipalities with the lowest exit rates among these regions. Regarding the size of the municipalities by number of inhabitants, there is a greater variability between the highest and lowest rates of exit from the registry to smaller municipalities in relation to the larger ones.

[20]Municipalities with fewer than 100 dependent beneficiaries aged 7 to 16 years in 2005 were not considered so that the results are not distorted by the statistics of these municipalities and to ensure greater robustness in data analysis.

While the difference between the highest exit rate, Tupandi in Rio Grande do Sul, and the lowest, Milagres do Maranhão in Maranhão, among the municipalities with less than 20 thousand inhabitants, is 67.7 percentage points; this difference is reduced to 20.8 percentage points between the municipalities with the highest exit rate, Goiânia in Goiás, and the lowest exit rate, Fortaleza in Ceará, for the municipalities with more than 500 thousand inhabitants.

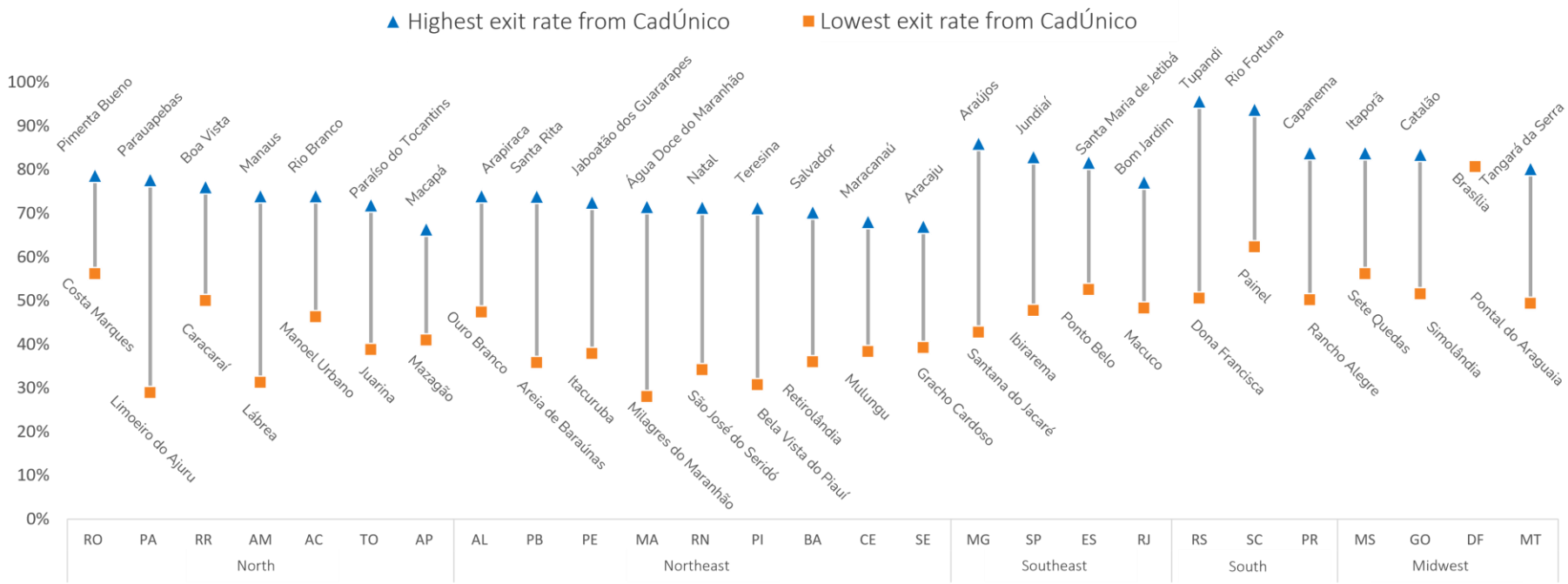
Table 4: Higher and Lower exit rates from *CadÚnico* in 2019 of dependent PBF beneficiaries in 2005 at the level of municipalities by characteristics

	By region of Brazil									
	North		Northeast		Southeast		South		Midwest	
Order	Municipality	Rate	Municipality	Rate	Municipality	Rate	Municipality	Rate	Municipality	Rate
1st Highest	RO - Pimenta Bueno	78.7%	AL - Arapiraca	73.9%	MG - Araújos	86.0%	RS - Tupandi	95.7%	MS - Itaporã	83.8%
2nd Highest	PA - Parauapebas	77.6%	PB - Santa Rita	73.8%	MG - Divinópolis	84.4%	SC - Rio Fortuna	93.7%	GO - Catalão	83.4%
3rd Highest	RO - Cabixi	77.1%	PE - Jaboatão dos Guararapes	72.5%	MG - Ouro Fino	83.6%	RS - Nova Boa Vista	91.5%	GO - Davinópolis	82.9%
4th Highest	RR - Boa Vista	76.0%	PE - Recife	72.5%	MG - Carmo do Cajuru	83.5%	SC - Dona Emma	90.6%	GO - Goiânia	82.4%
5th Highest	RO - Chupinguaia	76.0%	MA - Água Doce do Maranhão	71.5%	SP - Jundiaí	82.9%	SC - Pouso Redondo	89.8%	MS - Ivinhema	82.1%
1st Lowest	PA - Limoeiro do Ajuru	28.9%	MA - Milagres do Maranhão	28.0%	MG - Santana do Jacaré	42.7%	PR - Rancho Alegre	50.1%	MT - Pontal do Araguaia	49.3%
2nd Lowest	AM - Lábrea	31.3%	PI - Bela Vista do Piauí	30.7%	MG - São João do Manhuaçu	44.1%	PR - Sertaneja	50.4%	GO - Simolândia	51.5%
3rd Lowest	PA - Faro	31.8%	PI - Cocal dos Alves	32.0%	MG - Pedra Dourada	44.6%	RS - Dona Francisca	50.6%	GO - Damolândia	51.6%
4th Lowest	PA - Muaná	34.2%	RN - São José do Seridó	34.1%	MG - Imbé de Minas	44.6%	RS - São João do Polêsine	51.2%	GO - Campinaçu	52.8%
5th Lowest	AM - Silves	34.3%	RN - Jundiá	35.1%	MG - Curral de Dentro	45.2%	PR - Novo Itacolomi	52.0%	GO - Jesúpolis	53.5%
	By size of the municipality in number of inhabitants									
	Up to 20,000 inhabitants		>20,000 to 50,000 inhabitants		>50,000 to 200,000 inhabitants		>200,000 to 500,000 inhabitants		>500,000 inhabitants	
1st Highest	**RS - Tupandi**	**95.7%**	SC- Timbó	89.2%	SC - Brusque	88.8%	SC - Joinville	84.7%	**GO - Goiânia**	**82.4%**
2nd Highest	SC - Rio Fortuna	93.7%	SC - Pomerode	88.9%	SC - Içara	86.9%	MG - Divinópolis	84.4%	SP - Ribeirão Preto	81.3%
3rd Highest	RS - Nova Boa Vista	91.5%	SC - Braço do Norte	87.4%	SC - Concórdia	86.5%	SP - Jundiaí	82.9%	MG - Uberlândia	80.7%
4th Highest	SC - Dona Emma	90.6%	SC- Indaial	87.1%	SC - Tubarão	85.7%	SC - Blumenau	82.4%	DF - Brasília	80.6%
5th Highest	SC - Pouso Redondo	89.8%	SC - Laguna	86.0%	SC - Balneário Camboriú	85.1%	SP - Mauá	81.5%	SP - Guarulhos	77.9%
1st Lowest	**MA - Milagres do Maranhão**	**28.0%**	PA - Limoeiro do Ajuru	28.9%	PA - Cametá	41.0%	PA - Santarém	55.3%	**CE - Fortaleza**	**61.6%**
2nd Lowest	PI- Bela Vista do Piauí	30.7%	AM - Lábrea	31.3%	BA - Conceição do Coité	45.7%	CE - Juazeiro do Norte	57.6%	BA - Feira de Santana	64.1%
3rd Lowest	PA - Faro	31.8%	PA - Muaná	34.2%	PA - Abaetetuba	46.4%	BA - Juazeiro	60.4%	MA - São Luís	64.5%
4th Lowest	PI- Cocal dos Alves	32.0%	AM - Santo Antônio do Içá	35.0%	CE - Tianguá	49.3%	PE - Caruaru	62.1%	PA - Belém	66.0%
5th Lowest	RN - São José do Seridó	34.1%	PA - Oeiras do Pará	37.7%	RN - Açu	49.3%	RJ- Campos dos Goytacazes	63.7%	PB - João Pessoa	68.4%

Source: Own elaboration, from the data identified from the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, of the Ministry of Citizenship / Social Development.

Note: The exit rate of *CadÚnico* at the municipal level is given for the proportion of dependent beneficiaries aged between 7 and 16 years in 2005 who are no longer observed in the Single Registry in 2019. Municipalities with fewer than 100 dependent beneficiaries aged 7 to 16 years in 2005 were not considered so that the results are not distorted by the statistics of these municipalities and to ensure greater robustness in data analysis.

Chart 7: Municipalities with higher and lower exit rates from *CadÚnico* by UF



Source: Own elaboration, from the data identified from the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, of the Ministry of Citizenship / Social Development.
Note: The exit rate of *CadÚnico* at the municipal level is given by the proportion of dependent beneficiaries aged between 7 and 16 years in 2005 who are no longer observed in the Single Registry in 2019. Municipalities with fewer than 100 dependent beneficiaries aged 7 to 16 years in 2005 were not considered so that the results are not distorted by the statistics of these municipalities and to ensure greater robustness in data analysis.

6.3 Access to the formal labor market

In addition to an emancipation from social programs of the federal government, another indicator suggestive of social mobility evaluated is the insertion of the same beneficiaries in the formal labor market in the future, according to section 2. Table 5 presents the situation of PBF dependent beneficiaries aged 7 to 16 years in 2005 with regard to their being found in the formal labor market between 2015 and 2019. About 5.2 million (45%) of these were found in RAIS in these years at least once; Among which about 3.4 million (30%) were in the formal market for three years or more and almost 1.8 million (15%) for up to two years. Conversely, around 6.4 million of them (55%) were not found in RAIS between 2015 and 2019. It should be noted that this data, however, does not indicate that these individuals were not working, only that they were not in formal jobs.[21]

Table 5: Situation in RAIS between 2015 and 2019 of beneficiaries dependent on the PBF aged 7 to 16 years in 2005

Situation	Beneficiaries	Distribution (%)
Total	11,628,308	100%
Not found in RAIS	6,433,105	55%
Found in RAIS between 2015 and 2019:	5,195,203	45%
in 1 year	1,670,871	8%
in 2 years	905,573	8%
in 3 years	892,818	7%
in 4 years	875,040	8%
in 5 years	850,901	14%

Source: Own elaboration, based on data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.

The insertion in the formal labor market also presented significant heterogeneity in relation to the characteristics of the beneficiaries. Table 6 shows higher rates of access to the formal labor market, and more continuously, for men, whites, older within the analysis cohort, those whose guardians had a higher educational level when dependent beneficiaries in 2005 and from the central-south regions of the country. Same characteristics that led to higher indicators suggestive of social mobility for those who emancipated themselves from social programs - came out of *CadÚnico*.

While 34% of men were in RAIS for three or more years between the period of 2015 and 2019, only 24% of women were as well. Similarly, 52% of dependent beneficiaries who were aged 10 to 16 years in 2005 were not found in RAIS in the period, while those aged 7 to 9 years in 2005 numbered 62%. With regard to skin color or race of beneficiaries, insertion in the formal labor

[21] In fact, they were possibly inserted in informal activities of the economy.

market for three years or more was the case for 38% of whites, 28% of non-whites, 28% of Asians and only 18% of the Indigenous population. Greater differences are still observed when the dimensions sex and color or race are combined. While 42 percent of white men entered the formal labor market for three years or more, only 23 percent of non-white women did the same; non-white men and white women had the same rate, at 33 percent.

Again, the education level of the holders was a factor highly correlated with insertions in the formal labor market. While 62% of dependent beneficiaries whose holders did not have complete elementary school were not found in RAIS between 2015 and 2019, this proportion drops to about 50% for those whose holders had completed junior high school or a higher level of education. Regional differences were also significant. The highest proportion of beneficiaries from the southern region of the country, 43%, were found in RAIS for three years or more, while 70% of those from the North region and 63% from the Northeast region were not found even once in RAIS in the period between 2015 and 2019. It is worth mentioning that there is a certain limitation of the analyses by characteristics of the individuals given the lack of information in the registry or by non-declaration, as reported in section 5.

Table 6: Situation of access to the formal labor market (RAIS) between 2015 and 2019 of dependent beneficiaries aged 7 to 16 years in 2005 by characteristics

Characteristics	Not found in RAIS	Found in RAIS for up to 2 years	Found in RAIS for 3 years or more
		By age group in 2005	
7 to 9 years	62%	17%	21%
10 to 16 years	52%	15%	33%
		By sex	
Men	49%	17%	34%
Women	61%	15%	24%
		By skin color or race	
Asian	56%	16%	28%
White	45%	17%	38%
Indigenous	69%	13%	18%
Non-white	55%	17%	28%
		By skin color or race and sex	
White man	40%	18%	42%
Non-white man	49%	18%	33%
White woman	50%	17%	33%
Non-white woman	62%	15%	23%
		By region of Brazil	
North	70%	13%	17%
Northeast	63%	14%	23%
Midwest	47%	17%	36%
Southeast	45%	17%	38%
South	40%	17%	43%

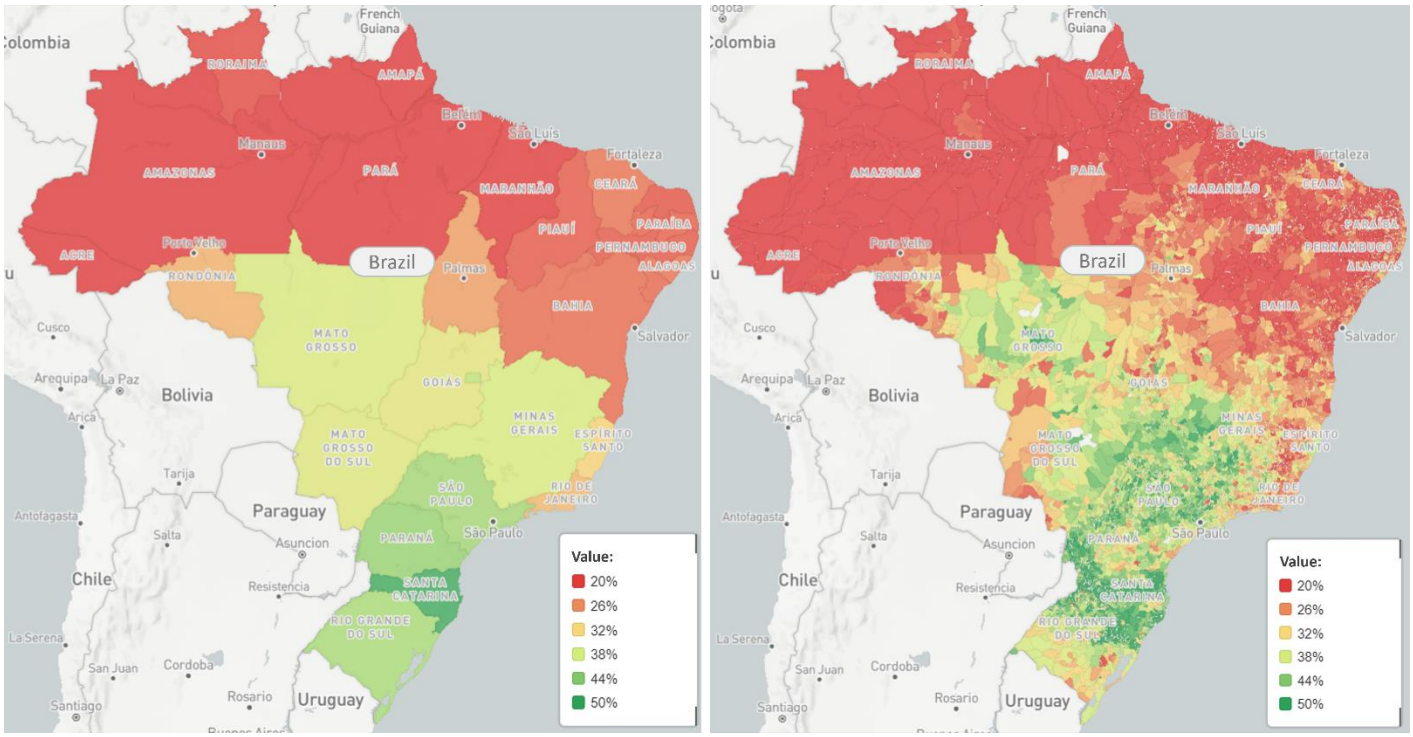
Source: Own elaboration, based on data identified in the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship/Social Development, respectively.

6.4 Access to the formal labor market in the territory

Similar to what was observed in the exits of the Single Registry, table 6 shows a significant heterogeneity in access to the formal labor market in the Brazilian territory. This section provides an in-depth look at this analysis.

Chart 8 presents maps with rates of access to the formal labor market (RAIS) by Units of the Federation and by municipalities in Brazil. In addition to the significant regional differences, similar to those observed for the exits from *CadÚnico*, there is great heterogeneity between the Units of the Federation and between the municipalities belonging to them; and even greater differences between municipalities in different states and regions. In general, there is a large concentration of municipalities with higher rates indicative of social mobility of individuals in the center-south portions of the country.

Chart 8: Access to the formal labor market (RAIS) for three years or more between 2015 and 2019, according to place of residence in 2019;



(a) According to the Unit of Federation of residence (b) **According to the municipality of residence**

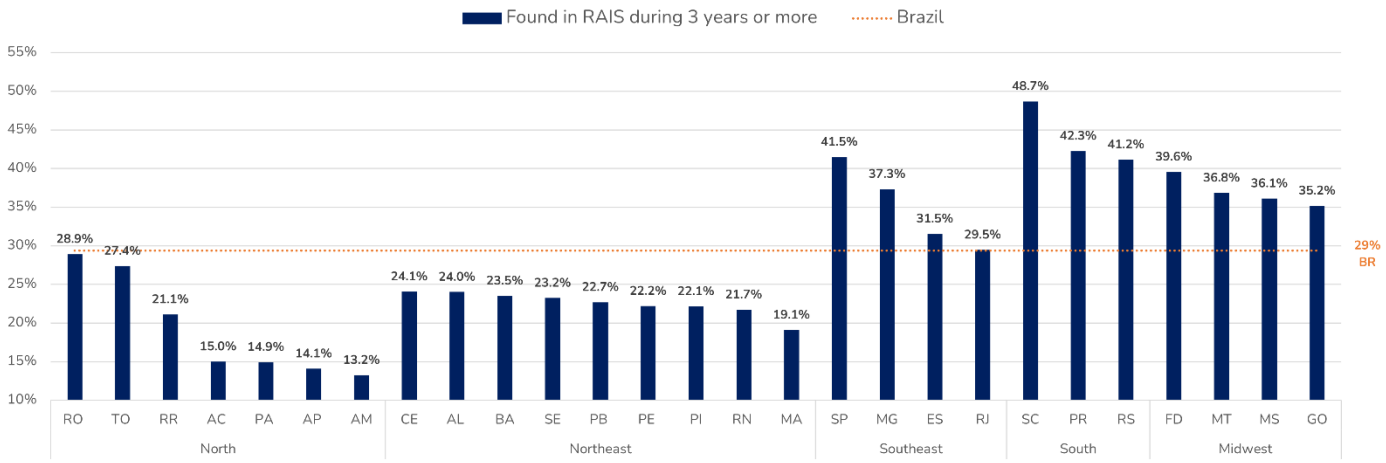
Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.
Note: The legend represents ranges of values. For example, places filled with darker red have percentages between 0% and 20%, orange between 20.1% and 26%, and so on.

In fact, the maps highlight that the social mobility capacity of the beneficiaries varies greatly depending on their municipalities of residence. Figure 9 shows the average rate of access to the formal labor market (RAIS) for three years or more between 2015 and 2019 according to the

Unit of Federation of residence. It is noteworthy that the municipalities of the Units of the Federation belonging to the North and Northeast portions of the country have an average rate below the national rate, of 29%, while the opposite is observed for municipalities located in Units of the Federation of the central-south regions.

Chart 10 also shows the distribution of the municipalities of residence by region of origin of the beneficiaries according to the rate of access to the formal labor market for three years or more between 2015 and 2019.[22] The proportion of municipalities with a rate of access to the formal labor market below the national average, of 29%, is greater than 95% in the Northeast region, while the exact opposite is observed in the South region, where less than 5% of the municipalities have a proportion lower than the national average. In the North they add up to about 87%, while in the Southeast and Midwest, there are only about 20% below the national average. Again, it can be observed that not only the different characteristics of individuals affect their capacity for social mobility, but also the characteristics of the areas in which they reside.

Chart 9: Rate of access to the formal labor market (RAIS) for three years or more between 2015 and 2019, according to the Unit of the Federation

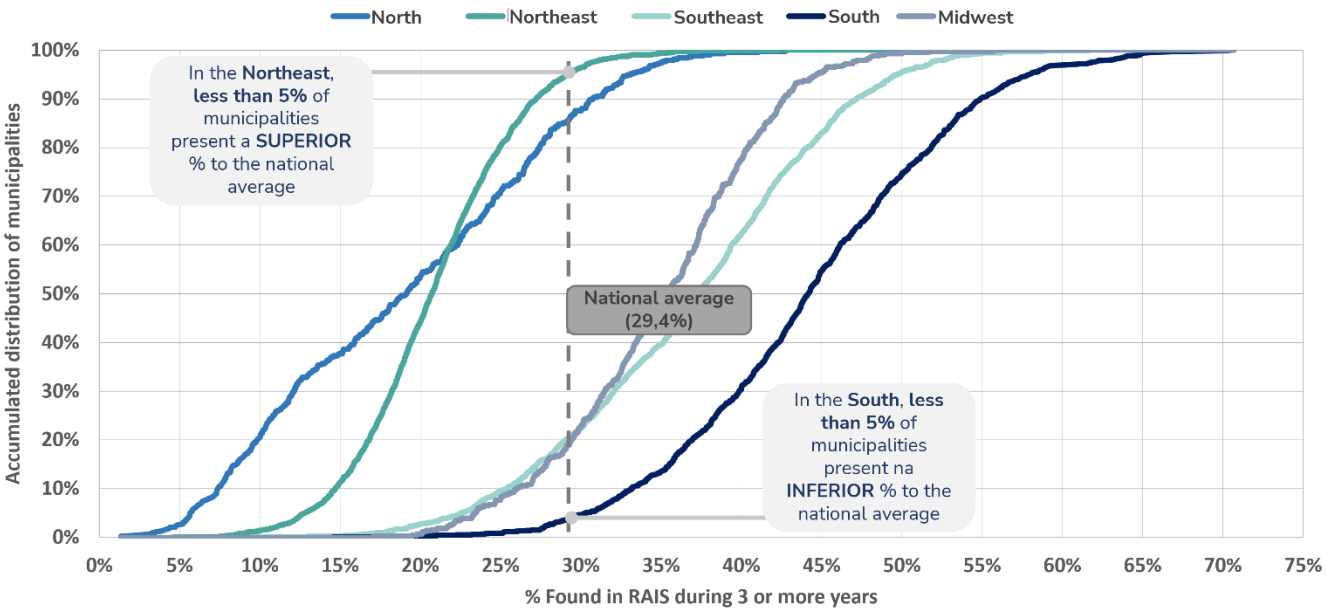


Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.

The extremes of the distributions by groups of characteristics of the municipalities can be observed in Table 7, which shows the municipalities with the five highest and the five lowest rates of entry into the RAIS for three years or more between 2015 and 2019. It is interesting to observe that the size dimension of the municipalities by number of inhabitants presents greater variability between groups than the region dimension of Brazil. While the difference between the largest, Mato Leitão in Rio Grande do Sul, and the smallest, Santa Rosa do Purus in Acre, rates of municipalities with up to 20 thousand inhabitants is 69.4 percentage points,

[22]Municipalities with fewer than 100 dependent beneficiaries aged 7 to 16 years in 2005 were not considered so that the results are not distorted by the statistics of these municipalities and to ensure greater robustness in data analysis.

Chart 10: Distribution of municipalities by region of origin according to access to the formal labor market for 3 years or more between 2015 and 2019



Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.

the same measure is only 37.5 percentage points for municipalities with more than 500,000 inhabitants, Uberlândia in Minas Gerais and Belém do Pará respectively. By region, again the center-south have higher rates for both the largest and the lowest regions in relation to the North and Northeast regions.

Finally, Chart 11 shows the highest and lowest rates of entry into RAIS by Unit of the Federation. The difference in level that these rates present are highlighted according to the Unit of the Federation and the regions of Brazil, with the lowest municipal rates in the states of São Paulo and Santa Catarina being close to the maximums of Roraima, Amazonas, Acre, and Amapá.

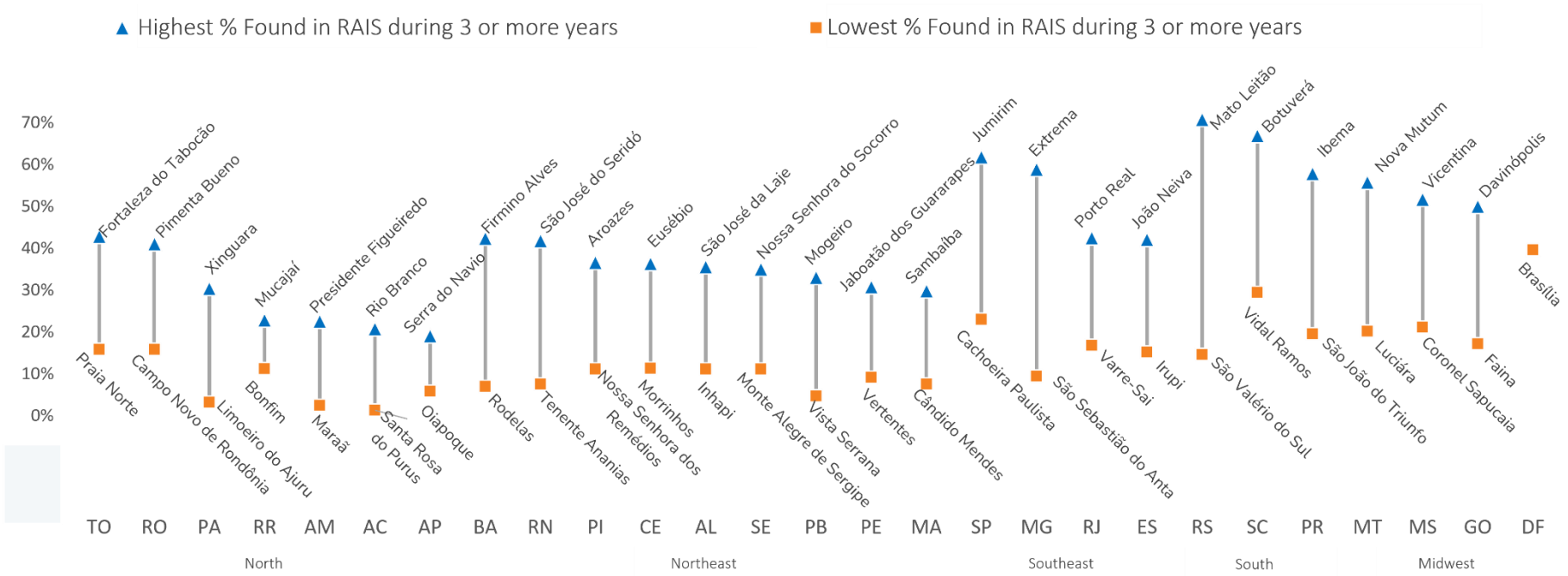
Table 7: Higher and lower rates of dependent beneficiaries in 2005 found in RAIS for three or more years in municipalities between 2015 and 2019 by municipality characteristics

	By region of Brazil									
	North		Northeast		Southeast		South		Midwest	
Order	Municipality	Rate	Municipality	Rate	Municipality	Rate	Municipality	Rate	Municipality	Rate
1st Highest	TO - Fortaleza do Tabocão	42.8%	BA - Firmino Alves	42.4%	SP - Jumirim	61.8%	RS - Mato Leitão	70.7%	MT - Nova Mutum	55.7%
2nd Highest	RO - Pimenta Bueno	41.0%	RN - São José do Seridó	41.7%	SP - Taguaí	61.5%	RS - Serafina Corrêa	69.9%	MS - Vicentina	51.7%
3rd Highest	RO - Primavera de Rondônia	38.9%	BA - Guajeru	37.3%	MG - Extrema	58.8%	RS - Bom Retiro do Sul	67.9%	GO - Davinópolis	50.0%
4th Highest	TO - Lajeado	38.1%	PI - Aroazes	36.6%	MG - Varjão de Minas	58.4%	SC - Botuverá	66.9%	GO - Portelândia	49.0%
5th Highest	TO - Juarina	37.6%	CE- Eusébio	36.3%	SP - Araçariguama	58.3%	SC - Luzerna	66.1%	MS - Aparecida do Taboado	48.5%
1st Lowest	AC - Santa Rosa do Purus	1.3%	PB - Vista Serrana	4.7%	MG - São Sebastião do Anta	9.4%	RS - São Valério do Sul	14.6%	GO - Faina	17.1%
2nd Lowest	AM - Maraã	2.4%	BA - Rodelas	6.9%	MG - Pedra Bonita	11.7%	PR- São João do Triunfo	19.5%	GO - Simolândia	19.5%
3rd Lowest	PA - Limoeiro do Ajuru	3.1%	PB - Salgadinho	7.1%	MG - Alto Caparaó	13.0%	RS - Dom Feliciano	19.9%	GO - Hidrolina	19.8%
4th Lowest	PA - Muaná	3.3%	RN - Tenente Ananias	7.5%	MG - Chalé	15.0%	RS - São José do Inhacorá	20.5%	GO - Flores de Goiás	20.1%
5th Lowest	PA - Bagre	3.6%	MA - Cândido Mendes	7.6%	ES - Irupi	15.1%	RS - Arroio do Padre	21.1%	MT - Luciára	20.1%
	By size of the municipality in number of inhabitants									
	Up to 20,000 inhab.		>20,000 to 50,000 inhab.		>50,000 to 200,000 inhab.		>200,000 to 500,000 inhab.		>500,000 inhab.	
1st Highest	**RS - Mato Leitão**	**70.7%**	SC - Pomerode	65.2%	SC - Rio do Sul	57.4%	SC - Blumenau	56.6%	**MG - Uberlândia**	**49.4%**
2nd Highest	RS - Serafina Corrêa	69.9%	SC - Timbó	64.0%	RS - Lajeado	57.3%	MG - Divinópolis	53.2%	SP - Campinas	44.8%
3rd Highest	RS - Bom Retiro do Sul	67.9%	RS - Carlos Barbosa	63.2%	SC - São Bento do Sul	56.6%	SP - Jundiaí	52.8%	MG - Belo Horizonte	43.9%
4th Highest	SC - Botuverá	66.9%	RS - Três Coroas	60.4%	SC - Jaguará do Sul	56.6%	SC - Joinville	51.7%	PR - Curitiba	43.8%
5th Highest	SC - Luzerna	66.1%	RS - Guaporé	59.5%	RS - Vacaria	55.8%	PR - Cascavel	50.8%	SP - São Bernardo do Campo	43.5%
1st Lowest	**AC - Santa Rosa do Purus**	**1.3%**	AM - Maraã	2.4%	PA - Igarapé-Miri	5.4%	AP - Macapá	16.8%	**PA - Belém**	**11.9%**
2nd Lowest	PA - Bagre	3.6%	PA - Limoeiro do Ajuru	3.1%	PA - Cametá	6.2%	PA - Santarém	17.6%	AM - Manaus	20.0%
3rd Lowest	PB - Vista Serrana	4.7%	PA - Muaná	3.3%	PA - Viseu	7.3%	AC - Rio Branco	20.7%	AL - Maceió	24.2%
4th Lowest	PA - Faro	4.9%	PA - Oeiras do Pará	3.9%	AM - Coari	7.3%	PA - Ananindeua	21.4%	BA - Feira de Santana	24.4%
5th Lowest	AM - Santa Isabel do Rio Negro	5.4%	PA - Porto de Moz	4.1%	PA - Breves	9.2%	BA - Juazeiro	22.2%	PE - Recife	25.2%

Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.

Note: The rate of found in RAIS at the municipal level is given by the proportion of dependent beneficiaries aged between 7 and 16 years in 2005 who were observed for three or more years in RAIS between the years 2015 and 2019. Municipalities with fewer than 100 dependent beneficiaries aged 7 to 16 years in 2005 were not considered so that the results are not distorted by the statistics of these municipalities and to ensure greater robustness in data analysis.

Chart 11: Municipalities with higher and lower rates of access to the formal labor market (RAIS) for three or more years between 2015 and 2019 by UF



Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.

Note: The rate of those found in RAIS at the municipal level is given by the proportion of dependent beneficiaries aged between 7 and 16 years in 2005 who were observed for three or more years in RAIS between the years 2015 and 2019. Municipalities with fewer than 100 dependent beneficiaries aged 7 to 16 years in 2005 were not considered so that the results are not distorted by the statistics of these municipalities and to ensure greater robustness in data analysis.

7 Conditions of access to the formal labor market

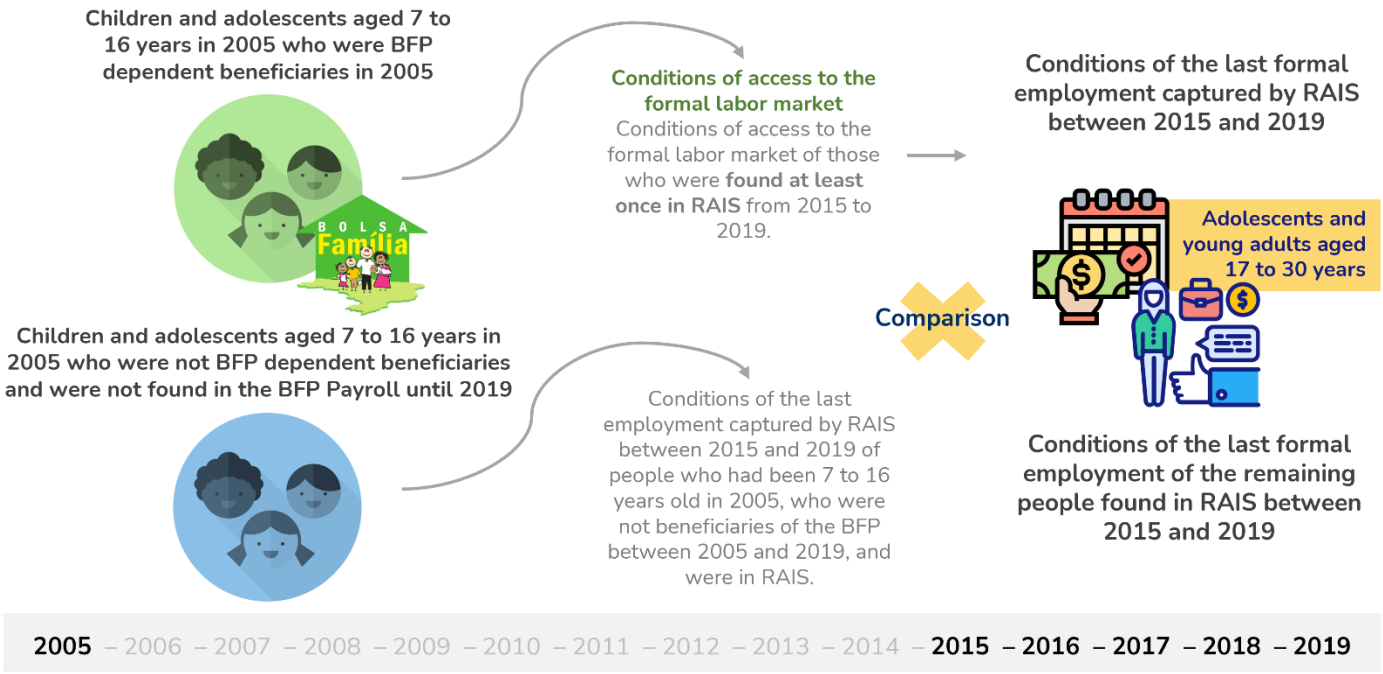
Previous analyses indicate a significant socioeconomic improvement of the beneficiaries of the PBF after more than a decade of the program. A significant portion of poor and extremely poor children aged between 7 and 16 years in 2005 presented not only future emancipation from social programs - exits from *CadÚnico*, but also entered the formal labor market - entered the RAIS. These indicators suggest that a generation of minor beneficiaries of the PBF entered adulthood in a better socioeconomic situation than that of their childhood phase.

However, they are not able to determine how much the life trajectory of the PBF beneficiaries differed from the rest of the Brazilian population, more specifically from the non-beneficiaries of the program. In the following sections, we present additional indicators that corroborate the idea that, although not directly observed, there are significant indications that the beneficiaries of the PBF presented social mobility in the period analyzed due to having participated in the program.

7.1 Characterization of the analysis

We begin by analyzing the conditions of access to the formal labor market of dependent beneficiaries aged 7 to 16 years in 2005. The question of interest, expressed in Chart 12, is given by a comparison with average employment characteristics of the Brazilian population not benefiting from the PBF, namely: level of remuneration, quality of occupation, length of employment and size of the company to which they were inserted. More specifically, identifying those who accessed formal employment as captured by RAIS, we compared the dependent beneficiaries of the PBF with people of the same age group, aged 17 to 30 years, found in RAIS between 2015 and 2019, who were not identified as poor in 2005 and were not part of the PBF until 2019.

Chart 12: Question of interest: Comparison between the conditions of access to the formal labor market of beneficiaries dependent on the PBF in 2005 and the rest of the population.



Source: Own elaboration.

The comparison between these two heterogeneous groups of the population should consider previous characteristics of the individuals possibly related to the labor market variables analyzed. Table 8 presents the average characteristics of PBF dependent beneficiaries in our interest group and the comparison group. We can note that the proportion of men was about 16 percentage points higher in the group of beneficiaries who accessed the formal labor market compared to non-beneficiaries. In addition, the proportion of non-white beneficiaries found in the formal labor market was about 13 percentage points higher than that of non-beneficiaries, who had whites as the majority group in reverse. Finally, we observed that the group of beneficiaries with higher education was about 12 percentage points lower than that of non-beneficiaries.

By comparing this information with the general characteristics of the interest group, presented in Figure 2, we corroborate stylized facts from the labor market literature. We observed that women, i.e., non-white women and those with less schooling are the people who have the greatest difficulty in accessing the formal labor market. We can still go further – we observed that for the population at the base of the Brazilian social pyramid, PBF beneficiaries, a proportion almost four times smaller of people who accessed the labor market did not have higher education, when compared to the average of the non-beneficiary Brazilian population. Such characteristics of the analyzed groups will be directly related to the conditions that access the formal labor market.

Table 8: Characteristics of PBF dependent beneficiaries in 2005 and of the group of non-beneficiaries with the same age group found in RAIS between 2015 and 2019

Characteristics	Beneficiaries (i)	Non-beneficiaries between 2005 and 2019 (j)	Difference (i-j)	Total nr people
	5.195.203	13.174.588		
		By age group in 2005		
7 to 9 year olds	25.9%	24.5%	1.4%	
10 to 16 year olds	74.1%	75.5%	-1.4%	
		By sex		
Men	58.6%	42.8%	15.8%	
Women	41.4%	57.2%	-15.8%	
		By skin color/race		
Asian	0.5%	0.6%	-0.1%	
White	34.9%	44.1%	-9.2%	
Indigenous	0.2%	0.2%	0.0%	
Non-white	46.8%	33.9%	12.9%	
Not defined	17.5%	21.3%	-3.8%	
		By schooling		
Incomplete Elementary School or less	2.1%	0.9%	1.2%	
Complete Elementary School	1.8%	0.8%	1.0%	
Incomplete Junior High School	5.7%	2.6%	3.1%	
Complete Junior High School	19.7%	13.8%	5.9%	
Complete High School	66.1%	65.3%	0.8%	
Bachelor's degree or higher	4.6%	16.5%	-11.9%	

Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.

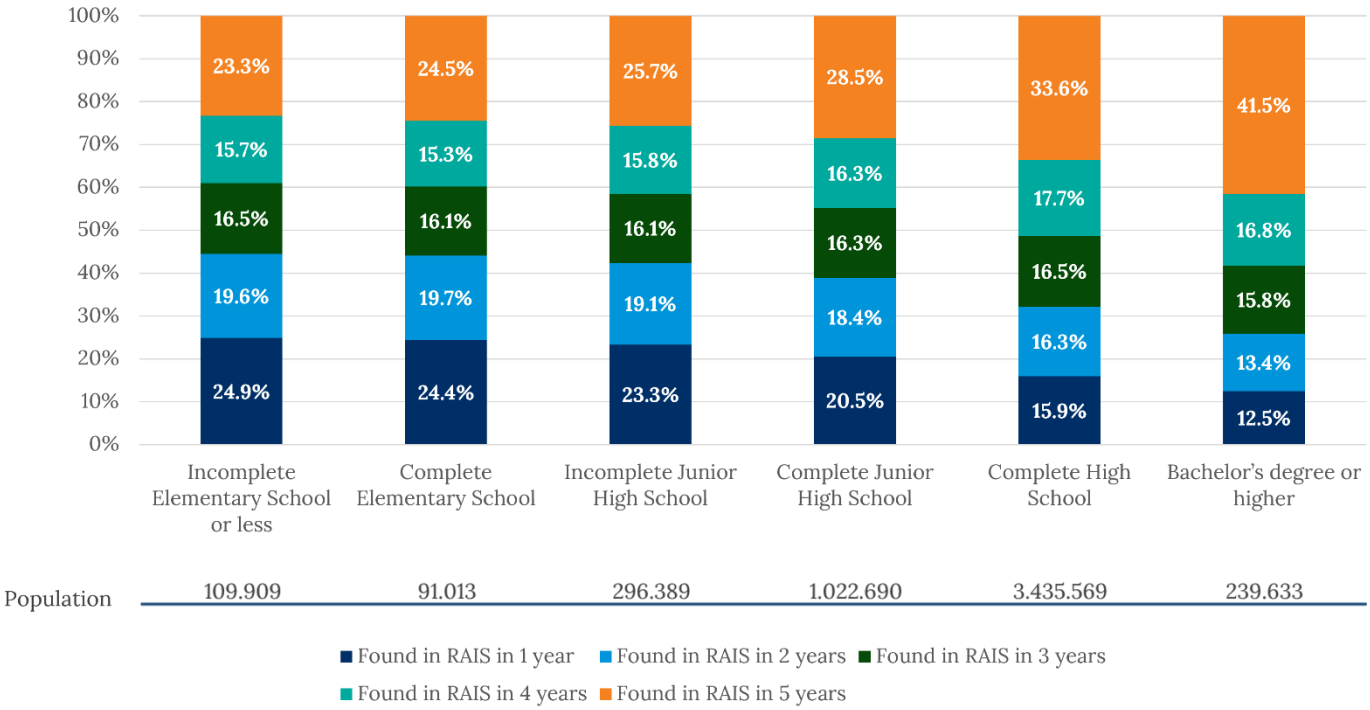
The relationship between schooling and access to the formal labor market is of significant importance. Thus, Chart 13 shows the distribution of PBF dependent beneficiaries aged 7 to 16 years in 2005 by number of times they were found in the RAIS between 2015 and 2019 according to schooling. We can note that most of the beneficiaries when observed between 2015 and 2019 had completed High School or Junior High School. In addition, there is the stylized fact that the higher the schooling, the greater the number of years that were observed with formal employment, *i.e.*, greater job stability. While 29% of people with complete elementary school were found during all the years analyzed, this percentage was 42% among those with complete higher education.

7.2 Conditions of access to employment

Considering these characteristics, we begin the comparisons of employment characteristics between the groups proposed by Chart 14, which presents the distribution of income levels in minimum wages and poverty line ranges. It can be observed that a significant portion of the group of beneficiaries who access the formal labor market are in lower-paid occupations, with more than half receiving between 1.01 and 1.50 minimum wages.

Even if we look only at individuals with complete higher education and compare the level

Chart 13: Distribution of dependent PBF beneficiaries aged 7 to 16 years in 2005 by number of times found in RAIS between 2015 and 2019 according to schooling.



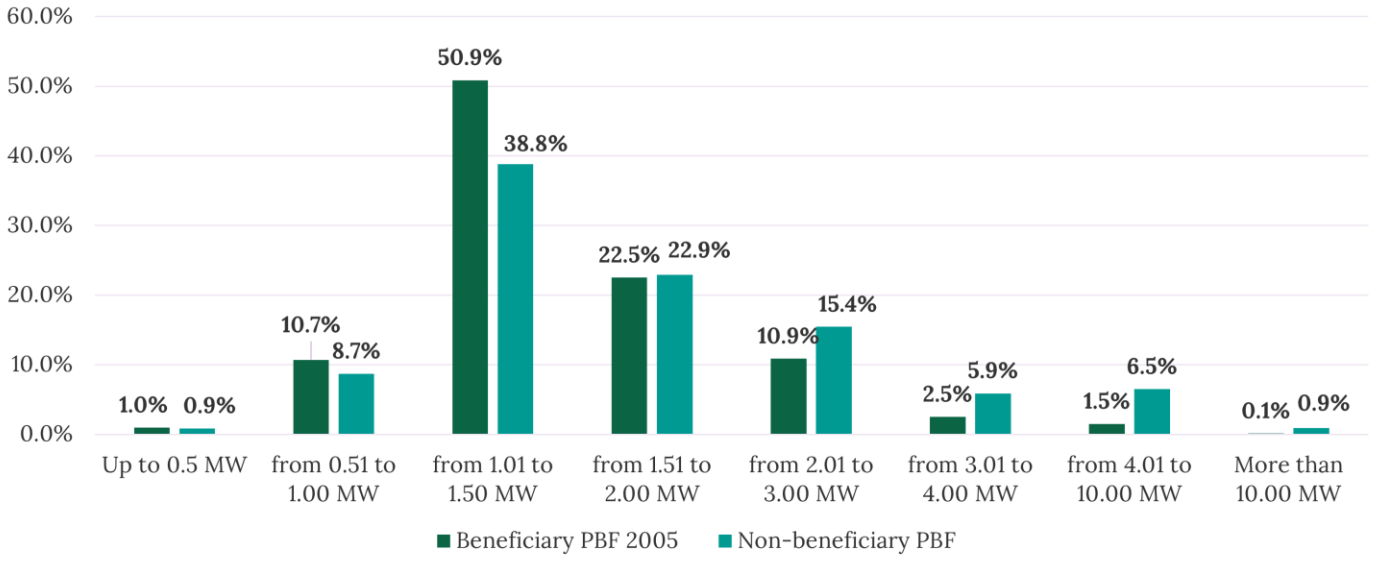
Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.

of compensation of those who were beneficiaries and those who were not, Chart 26 of Appendix A, it is notable that the average income is lower for them: 54% of those who were beneficiaries received up to 2 minimum wages, while this percentage was 34% for non-beneficiaries. Those who received more than four minimum wages totaled 12% and 29% among beneficiaries and non-beneficiaries, respectively. This fact corroborates the idea that there are other barriers to accessing better jobs and pay besides schooling. The literature shows that racial, sex and social prejudice are factors of significant relevance to understand such barriers to accessing the labor market.

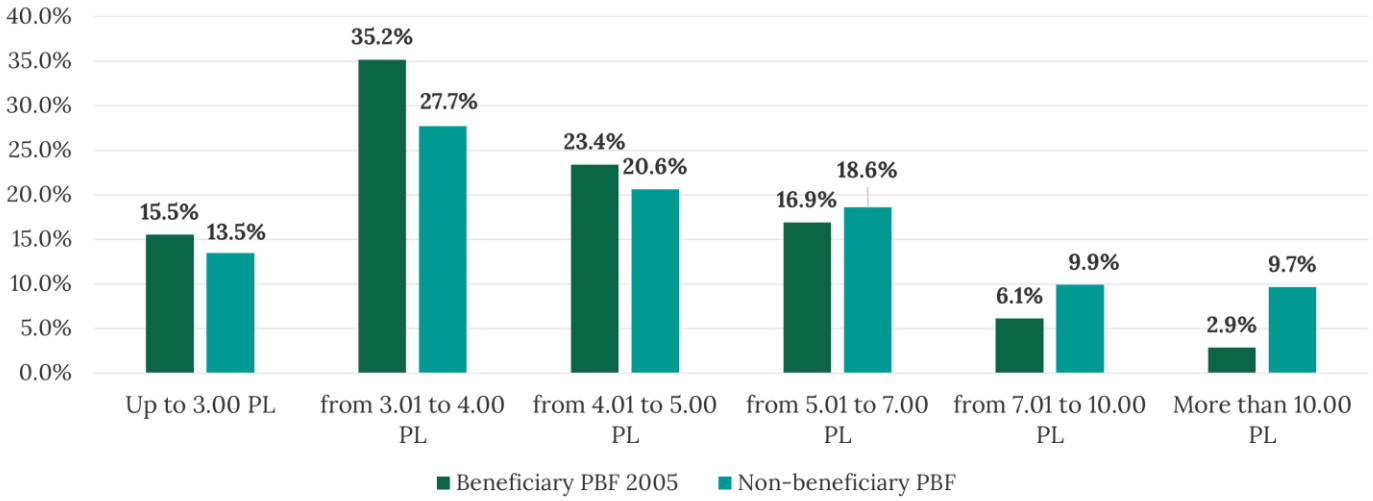
In like manner, Chart 15 shows the comparison between the position in the fifths of the distribution of national work remuneration given by the PNADC and RAIS between the groups. It should be noted that the higher the fifth of the distribution, the higher the salary received. It can be observed that the group of beneficiaries is concentrated in the smaller fifths of the distribution, while the group of non-beneficiaries presents a significantly higher participation in the higher fifths. Again, differences in sociodemographic characteristics of the groups may help explain the observed differences.

Another relevant indicator for the analysis of social mobility is presented in Chart 16. The length of stay in formal employment can represent a consolidated emancipation of individuals

Chart 14: Comparison between the levels of remuneration of dependent PBF beneficiaries in 2005 and those who were not PBF beneficiaries between 2005 and 2019



(a) Income in minimum wages

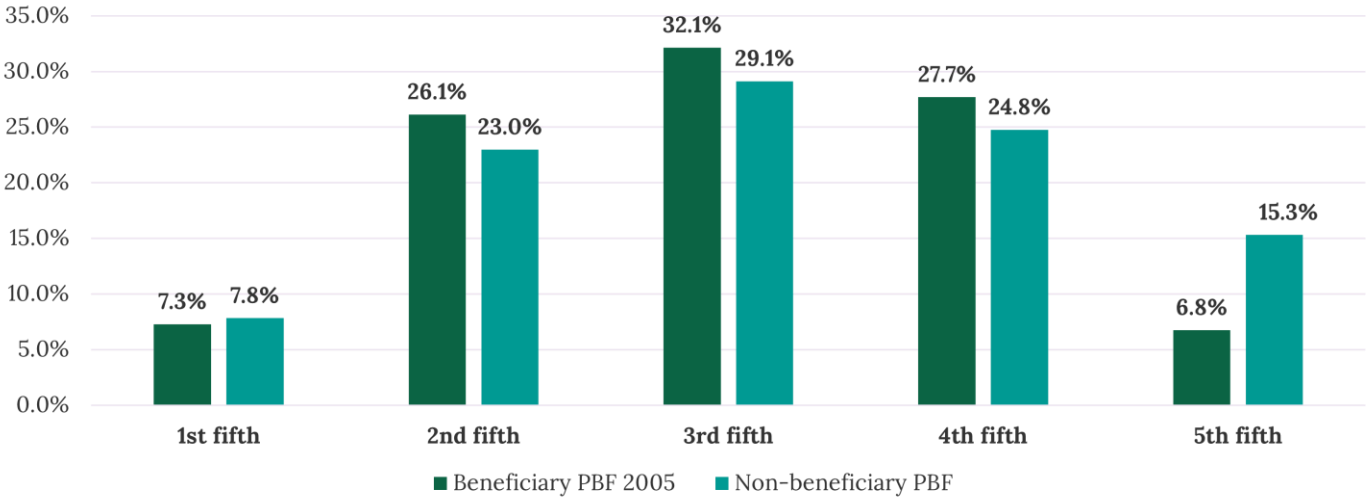


(b) Income in poverty line brackets

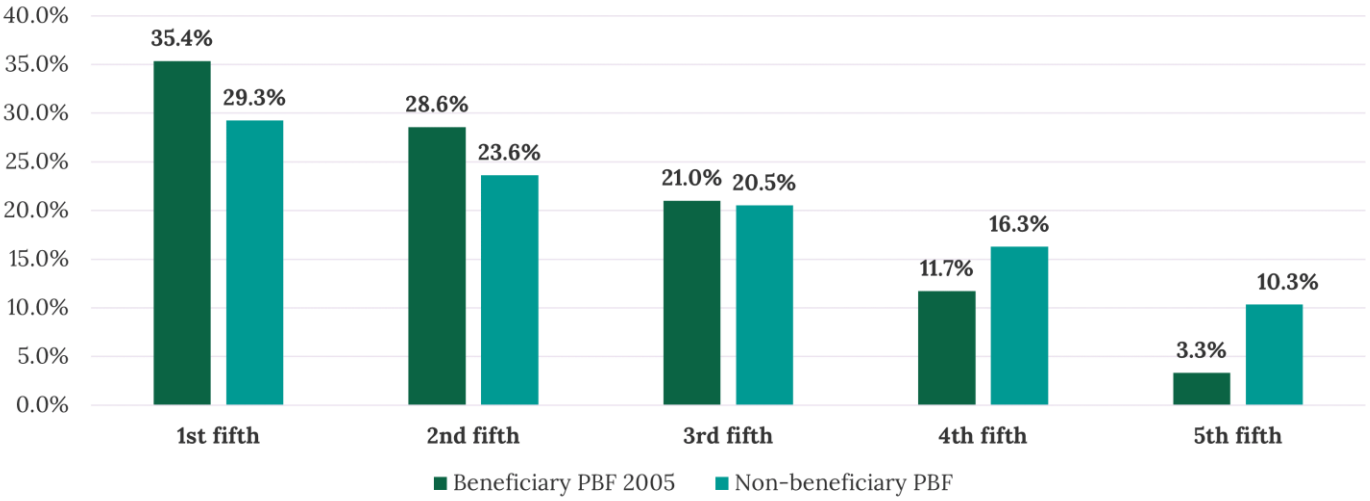
Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.
Note: Monetary values were based on the year 2019. The poverty lines were regionalized for rural and urban areas of the Units of the Federation and metropolitan regions, ranging from R$ 268.52 to R$ 434.09. The value of the national minimum wage in 2019 was R $ 998.00.

from social programs, because they began to have an average income higher than that of poverty and extreme poverty in a sustained way. Smaller differences can be observed between the length of stay in employment between the groups compared, despite a higher concentration of non-beneficiaries at the top of longer time spent in employment. This fact can be interpreted from the perspective that conjunctural aspects influence the length of stay in employment more than structural aspects, as observed in the previous graphs.

Chart 15: Comparison between the position in the fifths of the distribution of national work remuneration of PBF dependent beneficiaries in 2005 and those who were not PBF beneficiaries between 2005 and 2019



(a) Distribution of remuneration based on the PNADC



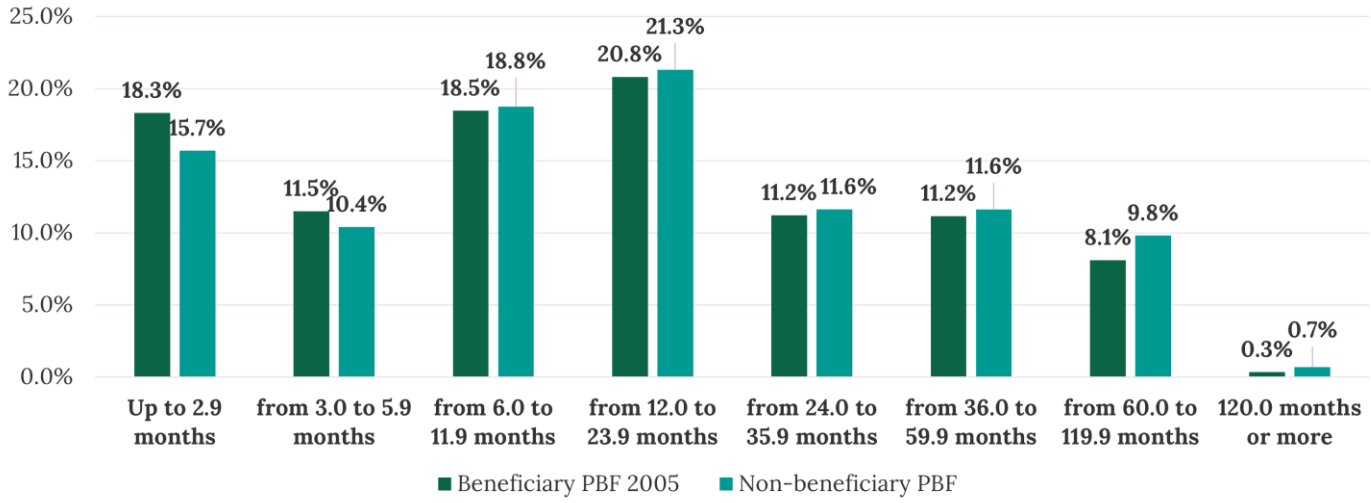
(b) Distribution of remuneration based on RAIS

Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively. In addition to data from the Continuous National Household Sample Survey (PNADC) conducted by IBGE.
Note: The amount of remuneration received is directly proportional to the position in the distribution of fifths of national work, that is, larger fifths contain individuals with higher remuneration.

The sector of economic activity and the size of the companies to which individuals are inserted can help to understand the differences observed. Chart 17 shows the size of the employer company in the industry, trade and services sectors for the comparison groups, in addition to the highlighted sectors of agriculture and public administration.[23] One can observe a distribution

[23]Table 13 of Appendix A presents the methodology used to define the size of companies by economic sector of operation

Chart 16: Comparison between the length of stay in the last job of PBF beneficiaries in 2005 and those who were not beneficiaries of the PBF between 2005 and 2019



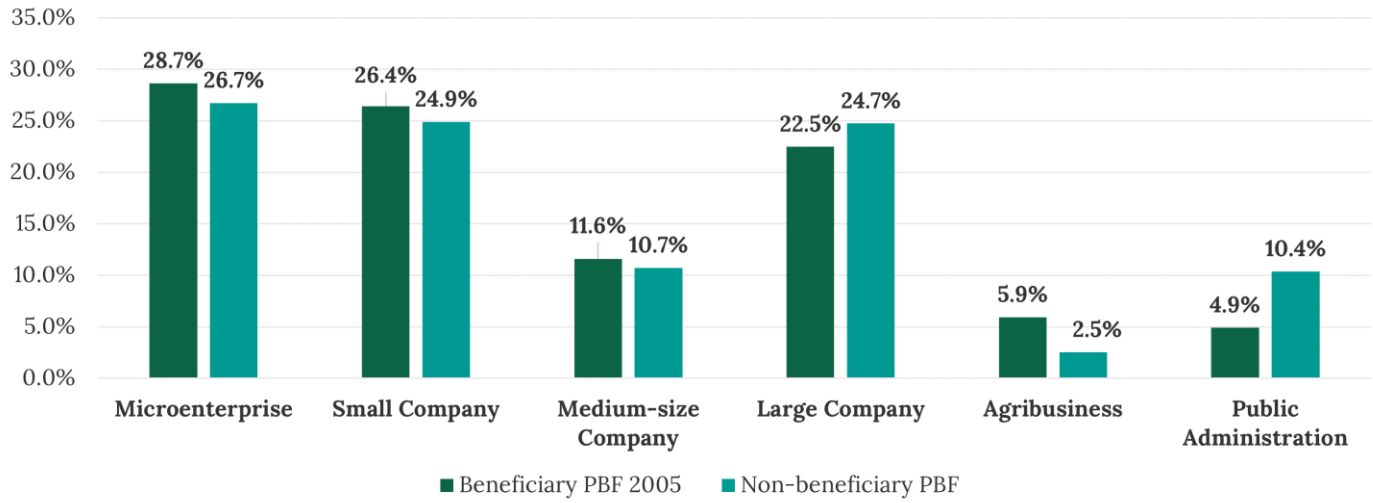
Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.

very similar between the group of beneficiaries and non-beneficiaries in the trade, industry, and service sectors. However, there are significant differences regarding the greater insertion of beneficiaries in the agricultural sector while non-beneficiaries have a greater predominance in public administration.

Another relevant aspect is how different levels of education affect employment in different sectors, Chart 27 of Appendix A. We observed that greater schooling displaces beneficiaries and non-beneficiaries from microenterprises, mainly increasing the occupation in public administration. Relevant differences occur among those with complete junior high school education, in which it is possible to verify greater performance of the beneficiaries (8.8%) in Agricultural activities, in relation to the non-beneficiaries (4.7%). Still, there is lower relative performance in activities of the Public Administration: 3.2% of the beneficiaries are in this activity, while 15.8% are non-beneficiaries. Finally, for those with complete higher education, the highest concentration of beneficiaries is in public administration (27%) and the highest concentration of non-beneficiaries is in large companies (30%).

Finally, Chart 18 presents an indicator of job quality among the comparison groups. While nearly half of the beneficiaries are in the first and second fifths of occupations with lower job quality, only 32% of non-beneficiaries are in those. Still, if we consider the last fifth of the occupations with higher quality, while only 2.2% of the beneficiaries are in them, this percentage is 9.4% among the non-beneficiaries.

Chart 17: Comparison between the size of the employer company by sector of economic activity of the dependent PBF beneficiaries in 2005 and those who were not PBF beneficiaries between 2005 and 2019



Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.
Note: The size categories correspond to the sectors of commerce, industry, and services of economic activity, and were used as a reference to the methodology presented in the Yearbook of work in micro and small enterprises of the Brazilian Service of Support to Micro and Small Enterprises (SEBRAE) of 2013.

8 After all, do we observe social mobility of individuals?

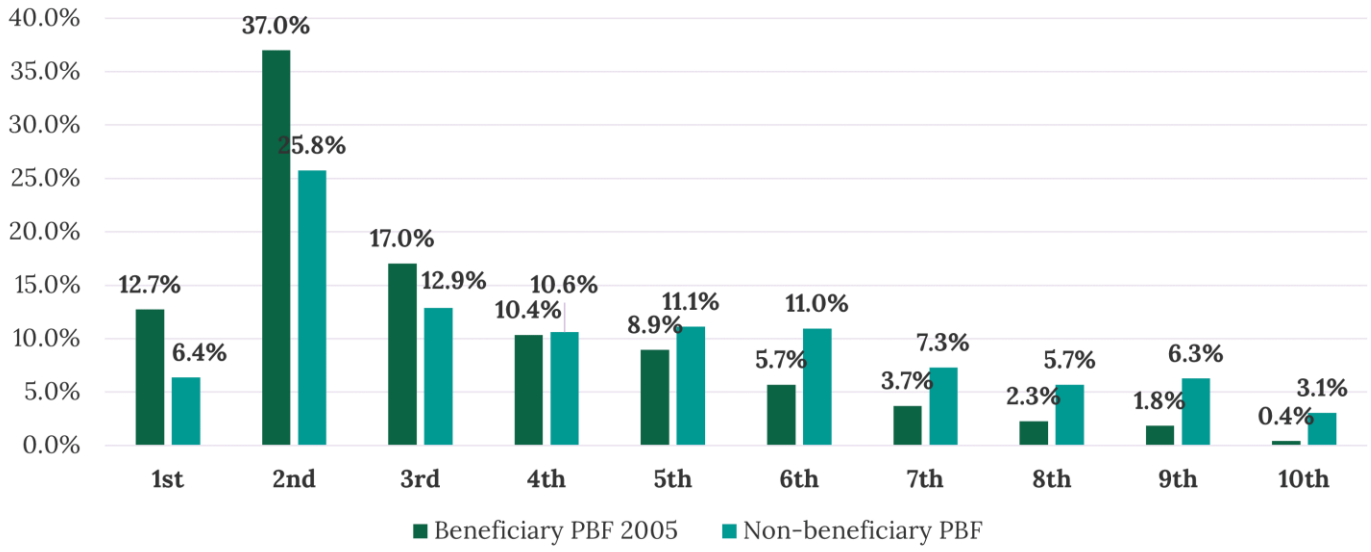
So far, we have worked with the definition of social mobility presented in Section 2, comprising those individuals who have structurally managed to get out of poverty and have a low probability of returning to it. The employment guarantees of continuous formal work in Brazil is an important way to ensure that these families are better off, with incomes higher than those in poverty and extreme poverty.

Thus, in this section we seek to understand how the rate of individuals outside the *CadÚnico* relates to the rate of individuals found in the formal labor market; in addition to conducting an analysis of how much better off individuals are than their guardians, who received the benefits in 2005.

8.1 Correlation between indicators suggestive of social mobility

Chart 19 shows the relationship between the emancipation of social programs of the federal government and employment in formal work at the municipal level, given by the correlation between the average rates of individuals who appeared in RAIS in some year between 2015 and 2019 and were not included in *CadÚnico* in 2019. There is a positive correlation between the measurement from the *CadÚnico* and those from the RAIS. The analysis suggests that, in fact, individuals emancipated from social programs of the federal government also have a high

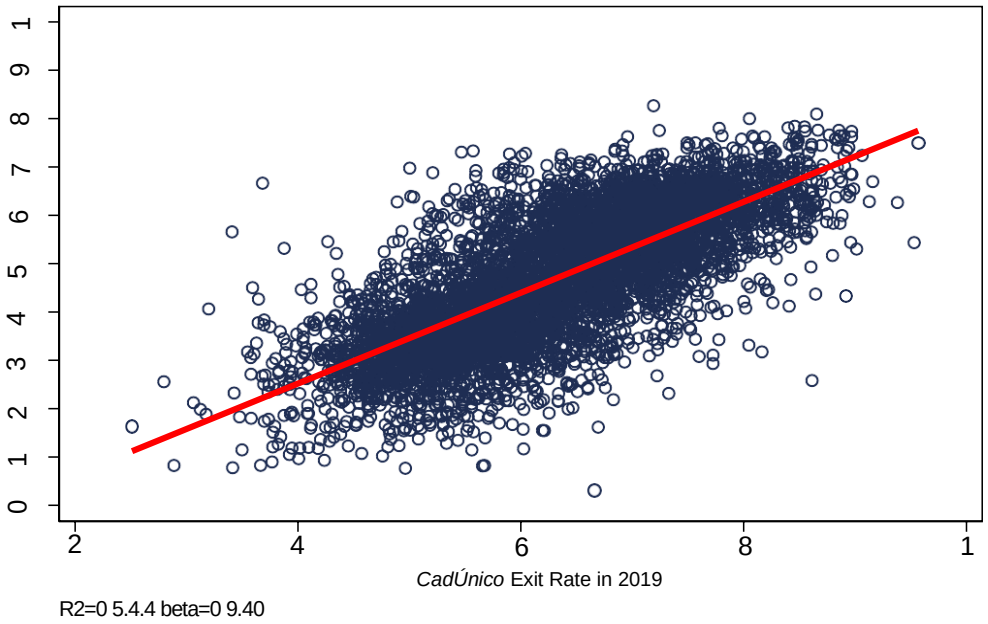
Chart 18: Comparison between the quality of employment of dependent PBF beneficiaries in 2005 and those who were not PBF beneficiaries between 2005 and 2019



Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.
Note: From the average taken between the average remuneration and the proportion of employed people with higher education in each combination of economic activity (CNAE 2.02 digits) and occupation (CBO 2002 4 digits), the results of these combinations were ordered increasingly and 10 quality groups of economic activity-occupation, the deciles of the distribution, were defined. Thus, the 1st group is formed by the economic activities-occupations of lower "quality" and the 10th group by those of higher "quality", considering the proposed criterion.

probability of being inserted in the formal labor market; corroborating the idea that the last measure suggestive of social mobility justifies and sustains what is suggested by the first.

Chart 19: Relationship between the average rates of individuals "being out of *CadÚnico*" in 2019 and "being found at some point in RAIS" between 2015 and 2019 at the municipal level



Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.
Note: The rate of found in RAIS (exit from *CadÚnico)* at the municipal level is given by the proportion of dependent beneficiaries aged between 7 and 16 years in 2005 who were observed for three years or more in RAIS between the years 2015 and 2019 (they were not included in *CadÚnico* in 2019). Municipalities with fewer than 100 dependent beneficiaries aged 7 to 16 years in 2005 were not considered so that the results are not distorted by the statistics of these municipalities and to ensure greater robustness in data analysis. Predicted values show the linear relationship between the variables of interest and is the result of the mathematical optimization process (MOP) that aims to find the best fit for the data set by trying to minimize the sum of squares of the differences between the estimated value and the observed data.

8.2 Intergenerational Mobility

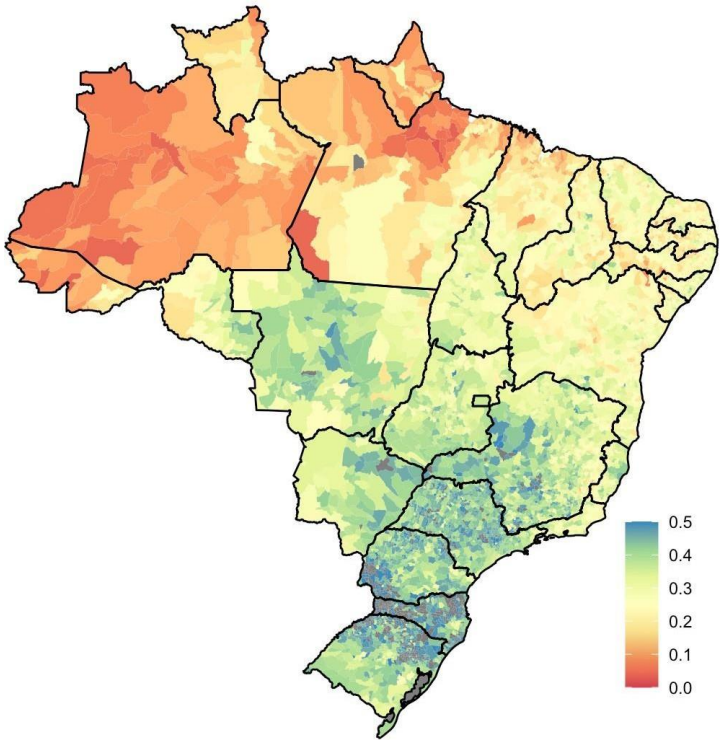
The intergenerational mobility of individuals seeks to compare the socioeconomic conditions of present generations with those of their parents or guardians in the past. In this study we used a proxy when comparing the income of parents (holders) in the past with that of children (dependents) years later. It is noteworthy that it is a measure capable of analyzing only formalized workers, because we performed the comparison with the RAIS data, and it does not enable the observation of specific differences in the life cycle of individuals, thus, of their stage in the labor market, given that the comparison does not follow age parameters. In addition, it does not show structural changes in the labor market, such as the real appreciation of the minimum wage over the period. In any case, we can observe that there is

suggestive social mobility of individuals in several Brazilian regions. We observed that children (dependents), as soon as they accessed the labor market in early adulthood, have received better remuneration than their guardians (holders) had in the past.

Again, we started based on individuals in the 2012 *CadÚnico*, aged between 16 and 20 years. Of these individuals, we observed those who presented in the RAIS of 2018 remuneration higher than that of their holders in the RAIS of 2012. The indicator of intergenerational mobility is given by the fraction at the municipal level of individuals in 2018 who received higher remuneration than the holders of their benefits when in 2012.

Chart 20 shows this fraction for Brazilian municipalities. We can notice a pattern of intergenerational mobility of the beneficiaries very similar to that observed by the indicators suggestive of social mobility in the previous sections. That is, we can observe that the same regions of the country in which there is a greater future emancipation of PBF beneficiaries, there is also greater insertion of them in the labor market, with remuneration higher than that received by their guardians in the past.

Chart 20: Proportion of individuals per municipality who earned in the RAIS of 2018 more than their PBF holders in 2012.



Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.
Note: The fraction at the municipal level is given by individuals in the 2018 RAIS who received higher remuneration than the holders of their benefits when in the 2012 RAIS.

9 Determinants of Social Mobility in municipalities

The previous sections show that the population and locational characteristics of the municipalities of residence of the PBF beneficiaries are highly correlated with their capacities for social mobility. This section seeks to deepen this analysis from estimates of which and how much the characteristics of the municipalities contribute to the differences in social mobility achieved in Brazilian municipalities.

9.1 Methodology

A set of regressions at the level of municipalities is estimated, having as dependent variable the fraction of individuals in the municipality that presented indicators suggestive of social mobility in the period studied; as explanatory variables, a set of demographic and socioeconomic variables of the municipalities measured in the year of the cohort of interest, 2005, or earlier, 2000 - obtained from the Census, aiming to mitigate possible problems of endogeneity contemporary to the implementation of the PBF. The set of explanatory variables includes the groups of municipal management, demographic, economic, youth and adult education and health.

As the dependent variable analyzed is given by a fraction of the aggregate of people in the municipality, those belonging to the cohort of interest, we chose to use a fractional logistic model (*fraclogit*) (Papke and Wooldridge, 1996). The parameters of interest, *i.e.*, the extent to which the groups of characteristics of the municipalities explain the observed social mobility, are estimated by a method of quasi-likelihood following the econometric model in a reduced way:

$$MOB_m = F(X'_m\beta) \quad (1)$$

where the dependent variable, MOB_m, can be considered in two complementary ways:
(i) fraction of dependents who are out of *CadÚnico* in 2019; (ii) fraction of dependents who are found in RAIS between 2015-2019. The explanatory variables, Xm, are measured in the year of the cohort of interest, 2005, or earlier, 2000 - when obtained from the Census. These variables were divided into the following blocks[24]: Demographic, Economic, Adult Education, Youth Education, Health, and other controls (including initial coverage of the PBF/*CadÚnico*). All explanatory variables are normalized[25], in order to allow a relative comparison of the relevance of each explanatory factor. In the Equation 1 model, the β's represent the relative importance of each explanatory factor, keeping all the others constant.

In the construction of the model, we followed two approaches. First, we used all the variables of the five groups simultaneously as explanatory variables. As for robustness, we adopted a strategy in which we first use all the variables within each group to compose an index (representative of the group)

[24]Table 14 of the appendix contains a complete list of available variables.
[25]by subtracting the mean and dividing the result by their standard deviation.

via a Principal Component Analysis (PCA) and then we included the PCA of each group as an explanatory variable of the model. Finally, we estimated the "Propensity Score", via the *fraclogit* model, and computed the forecast and the residues for each municipality. All models are estimated in the aggregate and by quintiles of the dependent variable.

9.2 Results

In order to understand the relationship between the output of the *CadÚnico* and its possible determinants, Table 9 presents the means of the explanatory variables of the model by quintiles of the dependent variable, *i.e.*, the probability of being outside the *CadÚnico*. Similarly, Table 10 presents the means of the explanatory variables of the model by quintiles of the probability of being in the formal labor market, *i.e.*, appearing in RAIS between the years 2015 and 2019.

It is estimated that better health and education structures are important factors suggestive of greater social mobility of individuals in the municipalities. For example, there is significant variation in the mean rates of these indicators, such as illiteracy and the proportion of households with bathrooms and running water, among the groups of municipalities by quintiles of dependent variables. This reflects how much the variation of such characteristics are correlated with the capacity of social mobility of individuals in the municipalities. In fact, it is observed that lower illiteracy rates are associated with greater social mobility, as well as higher rates of basic sanitation coverage in the municipalities.

The analysis of the previous results points in the same direction and even similar magnitudes of the relations between the average characteristics of the municipalities and the indicators suggestive of social mobility. In fact, the exit of individuals from the register of social programs of the federal government can be explained, with high probability, by their insertion in the labor market given the existing income conditionalities, as observed in Chart 19.

9.3 Predicted and Residual Exit from CadÚnico

In Table 9, we could observe how the characteristics of the municipalities relate to the fraction of individuals in the interest group outside the *CadÚnico* in 2019. Chart 21 shows how much these characteristics explain higher and lower rates of exit from the registry in 2019 in the territory. The upper maps present the analyses in which each characteristic is listed individually, and the lower ones use a Principal Component Analysis (PCA), in which we include the PCA of each group as an explanatory variable of the model only.

Again, we can observe significant heterogeneity between the regions of Brazil. While higher rates of mobility are observed in municipalities in the center-south regions of the country, which can be predicted by better local socioeconomic indicators, those in the North and Northeast regions have reduced rates of indicators suggestive of social mobility,

Table 9: Average of the explanatory variables of the model by quintiles of the variable "fraction outside the *CadÚnico* in 2019"

Variables	General Average	Q 1 average	Q 2 average	Q 3 average	Q 4 average	Q 5 average
— Dependent variable						
Adjusted *CadÚnico* exit rate	0.63	0.48	0.56	0.63	0.70	0.78
— Management Variable						
Census coverage for ages 7 to 16 years	1.05	0.83	0.88	1.02	1.17	1.36
— Demographic Variables						
Population (log)	9.39	9.14	9.35	9.32	9.51	9.65
Children and adolescent population (0-17 year olds)	8.38	8.24	8.44	8.31	8.41	8.50
Dependency ratio	62.44	72.82	69.90	61.96	55.34	52.16
— Economic Variables						
Per capita GDP (log)	8.61	7.97	8.21	8.63	9.03	9.24
Per capita GDP 2005 in relation to 2000	0.83	0.81	0.97	0.87	0.78	0.71
Degree of formalization of the occupied (18 years or older)	36.07	21.41	26.48	37.41	45.20	49.88
% Agricultural GDP	0.23	0.21	0.23	0.26	0.24	0.21
% Industrial GDP	0.15	0.11	0.13	0.14	0.18	0.21
% Services GDP	0.56	0.65	0.59	0.54	0.51	0.49
% of the extremely poor	20.73	37.58	31.86	18.51	9.65	6.03
% of the poor	41.11	63.35	56.93	40.16	26.72	18.37
% of those vulnerable to poverty	63.94	83.15	78.02	65.04	52.43	41.03
% of children vulnerable to poverty	74.98	90.66	86.69	76.96	66.03	54.57
Gini index	0.55	0.56	0.56	0.55	0.54	0.52
— Adult Education Variables						
Illiteracy rate - 25 years or older	27.60	42.37	38.48	26.85	17.90	12.37
% 25 years or older with complete junior high school (JHS)	19.42	12.81	14.48	19.41	24.01	26.38
% 25 years or older with complete high school (HS)	11.52	7.62	8.67	11.61	14.41	15.30
% of children in homes where no one has complete JHS	61.99	73.99	71.23	61.67	53.87	49.17
% of adults in homes where no one has complete JHS	56.77	68.80	65.95	56.10	48.71	44.29
— Youth Education Variables						
% of children out of school aged 4 to 5	53.30	46.10	51.44	57.18	57.57	54.19
% of children out of school aged 6 to 14	7.50	9.22	9.29	7.95	6.22	4.81
Net attendance rate in JHS	89.79	88.35	88.33	89.24	90.84	92.21
Net attendance rate in HS	26.65	12.49	16.70	27.02	35.40	41.66
Age-grade distortion in 2006, in JHS	30.78	44.82	39.90	29.51	22.25	17.42
Age-year distortion in 2006, in HS	47.13	66.82	59.53	45.92	35.52	27.88
IDEB final years	3.31	2.77	2.96	3.31	3.63	3.88
IDEB early years	3.61	2.81	3.11	3.67	4.13	4.37
IDEB elementary and JHS	3.46	2.79	3.04	3.50	3.88	4.12
— Health Variables						
% in households with bathroom and running water	62.65	33.53	44.55	66.26	81.41	87.52
% of people in households with water and sewage	13.45	22.73	19.44	12.80	7.66	4.63
% of the population in households with garbage collection	79.68	64.68	69.68	81.11	89.76	93.16
Infant mortality	32.77	46.98	41.91	31.22	23.50	20.25
Percentage of low-birth-weight births	7.22	6.47	6.88	7.35	7.77	7.62
— Other Variables						
% aged 18 years or older without JHS nor informal occupation	64.93	77.83	73.99	64.19	56.79	51.83
% in vulnerable households where no one completed JHS	44.18	61.74	57.47	43.76	32.90	24.99
% 15-24, neither study, nor work. and are vulnerable	19.03	24.27	23.44	20.07	16.28	11.10
% mothers head of households without complete JHS (children under 15)	13.60	16.07	16.51	14.30	11.63	9.49

Source: Own elaboration, from the data identified from the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, of the Ministry of Citizenship / Social Development.
Note: The exit rate of *CadÚnico* at the municipal level is given for the proportion of dependent beneficiaries aged between 7 and 16 years in 2005 who are no longer observed in the Single Registry in 2019. Municipalities with fewer than 100 dependent beneficiaries aged 7 to 16 years in 2005 were not considered so that the results are not distorted by the statistics of these municipalities and to ensure greater robustness in data analysis.

Table 10: Average of explanatory variables of the model by quintiles of dependent variables "fraction of those found in some year of RAIS between 2015 and 2019"

Variables	General Average	Q 1 average	Q 2 average	Q 3 average	Q 4 average	Q 5 average
— Dependent variable						
Appeared in SOME year at RAIS 2015-2019	0.47	0.28	0.38	0.47	0.56	0.65
Found in RAIS 2015	0.30	0.15	0.22	0.29	0.38	0.47
Found in RAIS 2019	0.34	0.19	0.26	0.34	0.42	0.50
Appeared in EVERY year at RAIS 2015-2019	0.17	0.07	0.11	0.16	0.22	0.29
— Management Variable						
Census coverage for ages 7 to 16	1.05	0.77	0.86	0.99	1.25	1.39
— Variáveis de Demográficas						
Population (log)	9.39	9.48	9.40	9.35	9.37	9.37
Children and adolescent population (0-17 years)	8.38	8.60	8.48	8.34	8.26	8.22
Dependency ratio	62.44	75.70	69.06	60.76	54.37	52.29
— Economic Variables						
Per capita GDP (log)	8.61	7.94	8.15	8.68	9.06	9.24
Per capita GDP 2005 in relation to 2000	0.83	0.86	0.93	0.92	0.77	0.67
Degree of formalization of the occupied (18 years or older)	36.07	18.76	24.92	37.15	47.15	52.40
% Agricultural GDP	0.23	0.22	0.22	0.25	0.24	0.22
% Industrial GDP	0.15	0.10	0.12	0.15	0.18	0.21
% Services GDP	0.56	0.64	0.61	0.54	0.51	0.49
% of the extremely poor	20.73	38.69	33.21	17.95	8.16	5.62
% of the poor	41.11	64.41	58.71	39.63	24.40	18.37
% of the vulnerable to poverty	63.94	83.50	79.39	64.31	50.39	42.10
% of children vulnerable to poverty	74.98	90.51	87.81	76.07	64.49	56.04
Gini index	0.55	0.57	0.56	0.55	0.54	0.51
— Adult Education Variables						
Illiteracy rate - 25 years or older	27.60	43.01	39.48	25.44	16.83	13.22
% 25 years or older with complete junior high school (JHS)	19.42	12.63	14.22	19.77	24.53	25.94
% 25 years or older with complete high school (HS)	11.52	7.36	8.57	11.78	14.73	15.18
% of children in homes where no one completed JHS	61.99	75.39	72.47	61.45	52.02	48.59
% of people in homes where no one completed JHS	56.77	70.40	67.02	56.04	46.84	43.53
— Youth Education Variables						
% of children aged 4 to 5 years out of school	53.30	49.61	49.87	58.07	56.72	52.22
% of children aged 6 to 14 out of school	7.50	11.30	9.07	7.64	5.23	4.25
Net attendance rate in JHS	89.79	86.42	88.53	89.46	91.69	92.87
Net attendance rate in HS	26.65	10.79	14.24	25.74	38.48	44.01
Age-grade distortion in 2006, in JHS	30.78	46.44	41.53	29.51	20.11	16.31
Age-year distortion in 2006, in HS	47.13	68.41	62.08	45.84	32.84	26.37
IDEB final years	3.31	2.78	2.85	3.33	3.70	3.91
IDEB early years	3.61	2.74	3.00	3.69	4.22	4.46
IDEB elementary and JHS	3.46	2.76	2.92	3.50	3.96	4.17
— Health Variables						
% in households with bathroom and running water	62.65	28.88	42.01	66.65	85.48	90.25
% of people in households with water and sewage	13.45	27.15	18.77	12.51	5.67	3.15
% of the population in households with garbage collection	79.68	60.51	69.69	81.42	92.35	94.43
Infant mortality	32.77	47.34	43.62	30.54	22.39	19.97
Percentage of low-birth-weight births	7.22	6.40	6.60	7.42	7.76	7.91
— Other Variables						
% aged 18 years or older without JHS nor informal occupation	64.93	79.19	75.20	64.31	55.10	50.81
% in vulnerable households and no one completed JHS	44.18	63.29	58.77	43.16	30.70	24.94
% 15-24, neither study, nor work. and are vulnerable	19.03	24.62	23.69	19.88	15.30	11.67

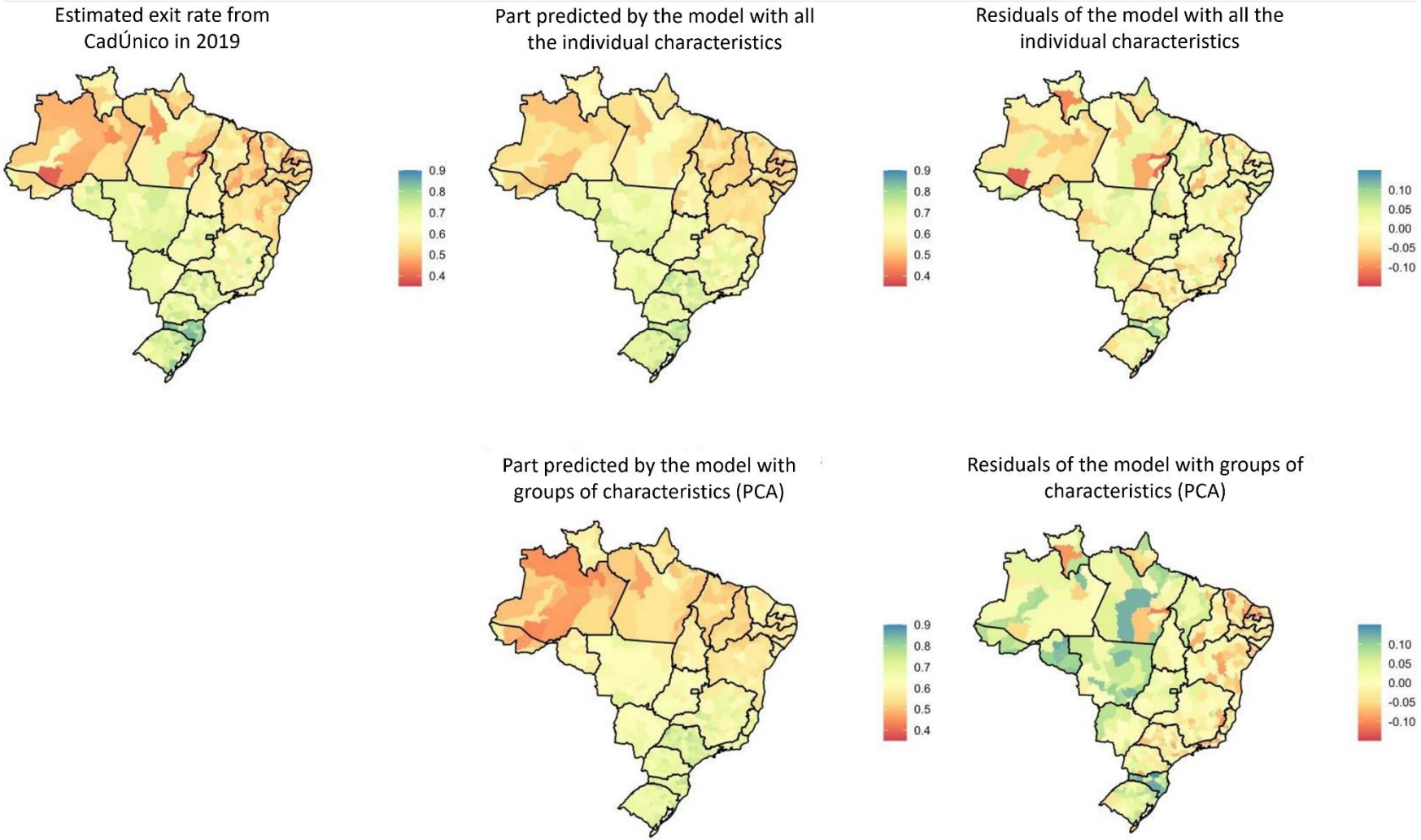
% mothers head of households without complete JHS (children under 15)	13.60	16.74	16.27	14.48	11.09	9.40

Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.
Note: The rate of found in RAIS at the municipal level is given by the proportion of dependent beneficiaries aged between 7 and 16 years in 2005 who were observed for three years or more in RAIS between the years 2015 and 2019. Municipalities with fewer than 100 dependent beneficiaries aged 7 to 16 years in 2005 were not considered so that the results are not distorted by the statistics of these municipalities and to ensure greater robustness in data analysis.

predicted by worse local socioeconomic indicators.

However, the maps present additional information. For a significant portion of the municipalities, there are unobservable factors, the residues, which help to explain the observed results. This means that there are still determining factors of the rate of social mobility of individuals that the municipal characteristics listed and fixed in time are not able to explain. The existence of characteristics of the municipalities that changed over the period analyzed could explain such observed differences. As examples, positive municipal income shocks associated with oil exploration or negative shocks associated with the occurrence of natural disasters.

Chart 21: Decomposition (predicted *versus* residual) of the probability of being out of *CadÚnico* in 2019 at the municipal level



Source: Own elaboration, from the data identified from the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, of the Ministry of Citizenship / Social Development.

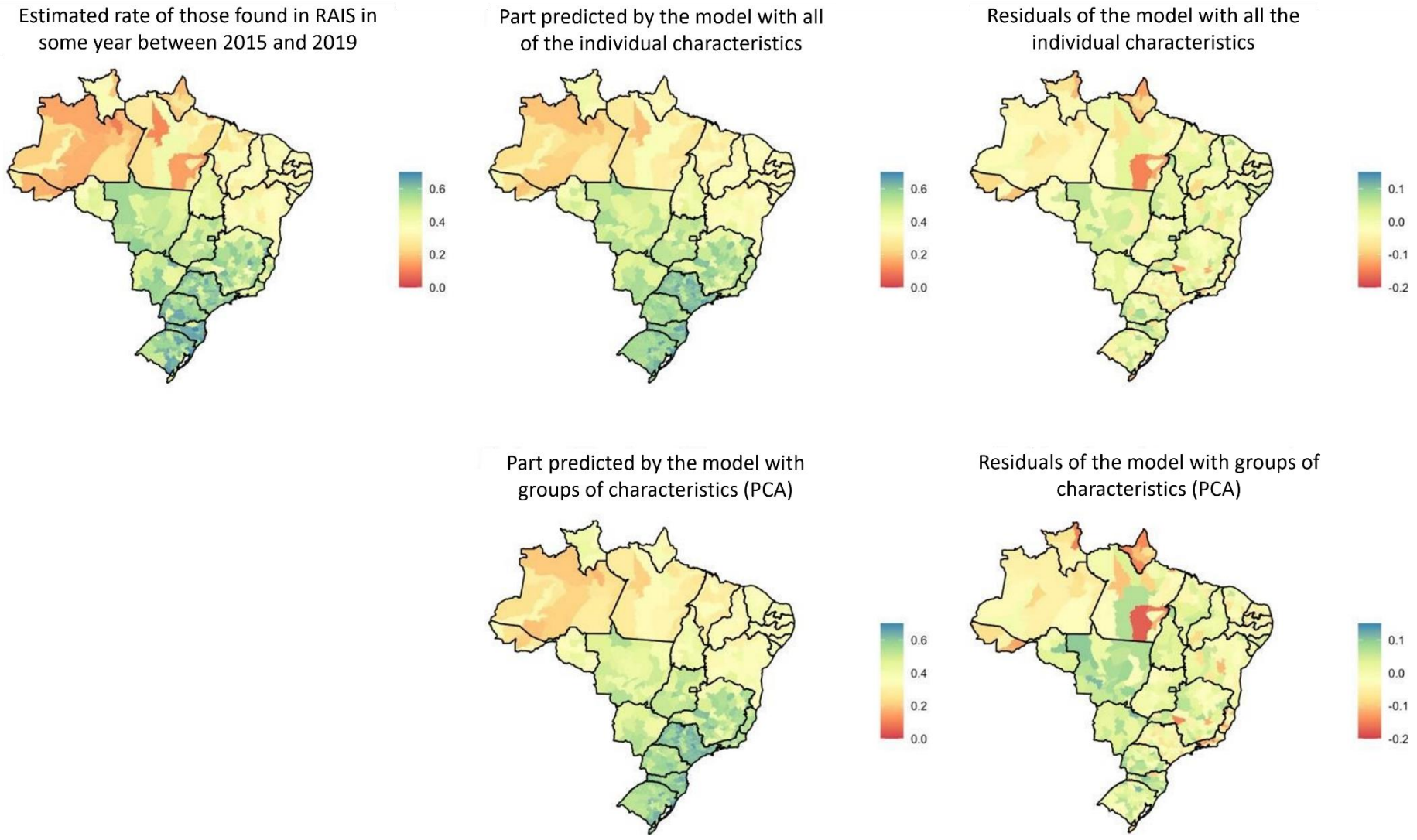
Note: The exit rate of *CadÚnico* at the municipal level is given for the proportion of dependent beneficiaries aged between 7 and 16 years in 2005 who are no longer observed in the Single Registry in 2019. Municipalities with fewer than 100 dependent beneficiaries aged 7 to 16 years in 2005 were not considered so that the results are not distorted by the statistics of these municipalities and to ensure greater robustness in data analysis. To facilitate the visualization of the results, the maps aggregate the municipal information by micro-regions. The upper maps use all the variables listed above as characteristics of the municipalities; the lower ones use a Principal Component Analysis (PCA), in which we include the PCA of each group as an explanatory variable of the model only.

9.4 Predicted and Residual Entry into the formal labor market

Similar to the provisions of the previous section, Chart 22 presents the information in Table 10 on maps of the Brazilian territory. We observed how the characteristics of the municipalities help explain the fraction of individuals in the interest group who accessed the formal labor market at some point between the years 2015 to 2019 at the municipal level. Again, we can observe significant heterogeneity between the regions of Brazil. While higher rates of this indicator suggestive of mobility are observed by municipalities in the center-south regions of the country, which can be predicted by better indicators of local socioeconomic status, those in the North and Northeast regions have lower rates of social mobility, predicted by worse local indicators.

The analysis of residues is also relevant for this indicator, since there are unobservable factors in a significant portion of the municipalities that help explain the observed results. In addition to local characteristics that have changed over time, we highlight, as suggested by Oliveira and Chagas (2018), the occurrence of migratory flows between individuals from different cities and regions, which may be associated with the social mobility indicator found.

Chart 22: Decomposition (predicted *vs* residual) of the probability of being in the formal labor market (RAIS) in some year between 2015 and 2019 at the municipal level



Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.

Note: The rate of found in RAIS at the municipal level is given by the proportion of dependent beneficiaries aged between 7 and 16 years in 2005 who were observed for three years or more in RAIS between the years 2015 and 2019. Municipalities with fewer than 100 dependent beneficiaries aged 7 to 16 years in 2005 were not considered so that the results are not distorted by the statistics of these municipalities and to ensure greater robustness in data analysis. To facilitate the visualization of the results, the maps aggregate the municipal information by micro-regions. The upper maps use all the variables listed above as characteristics of the municipalities; the lower ones use a Principal Component Analysis (PCA), in which we include the PCA of each group as only an explanatory variable of the model.

10 The role of migration

As we observed in the previous sections, there are unobservable factors in the models of municipal determinants of social mobility (residues) that are responsible for explaining significant differences between municipalities. In this section, we estimate the role of the migration of individuals in these indicators at the level of municipalities, having as reference the work of Oliveira and Chagas (2018).

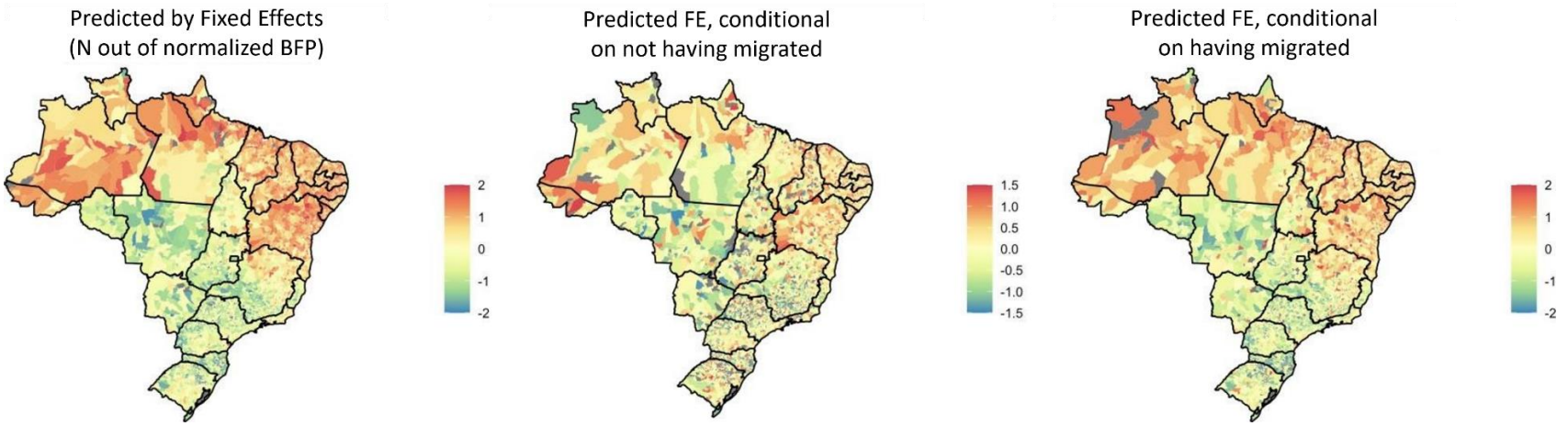
We perform the migration analysis in two steps. First, we start from the information of the holders of the beneficiaries of the PBF that appeared in the years 2005 and 2012. Of these individuals, some were observed in another municipality in 2012 - our migration indicator. Thus, we can observe two groups: those who migrated between 2005 and 2012, that is, they are on the payroll of the PBF of different municipalities between these years; and those who did not migrate between 2005 and 2012 and remained on the payroll of the same municipality. From these groups, two econometric models are estimated: i) conditional on Non-Migration, we regressed the probability of being out of the PBF in 2018 against the Fixed Effects of Municipality; (ii) conditional on Migration, we regressed the probability of being out of the PBF in 2018 against the Fixed Effects of Municipality of Origin and Municipality of Destination. The first analysis allows us to observe how much the local characteristics of the same municipality, in fact, affected the probability of social mobility suggested by the indicator coming out of the PBF sheet. The second analysis already allows us to observe how much the characteristics of the municipalities of origin and destination of migration differ in being responsible for explaining the variations of the indicator suggestive of social mobility.

In like fashion, we looked at how much migration can explain individuals' wage differences over time. We started from the individuals who were in *CadÚnico* in 2018, aged between 18 and 65 years and who were working in the week of the survey. Of these individuals, some were born in the municipality itself and others were not – our second indicator of migration. Again, we can observe two groups: those who migrated, that is, they are on the payroll of the PBF of a municipality different from the one of birth; and those who did not migrate and remained on the payroll of the same municipality of birth. From these groups, two econometric models are estimated: (i) conditional on Non-Migration, we regress log of the remuneration of the main salary against the Fixed Effects of Municipality; (ii) conditional on Migration, we regress log of the remuneration of the main salary against the Fixed Effects of Municipality of Origin (where they were born) and Municipality of Destination (where they reside). This analysis allows us to observe how much the characteristics of the municipalities fixed in time are responsible for explaining the variations in the salaries of individuals, conditional on having migrated or not; thus, the differentials between municipalities of origin and destination of migration.

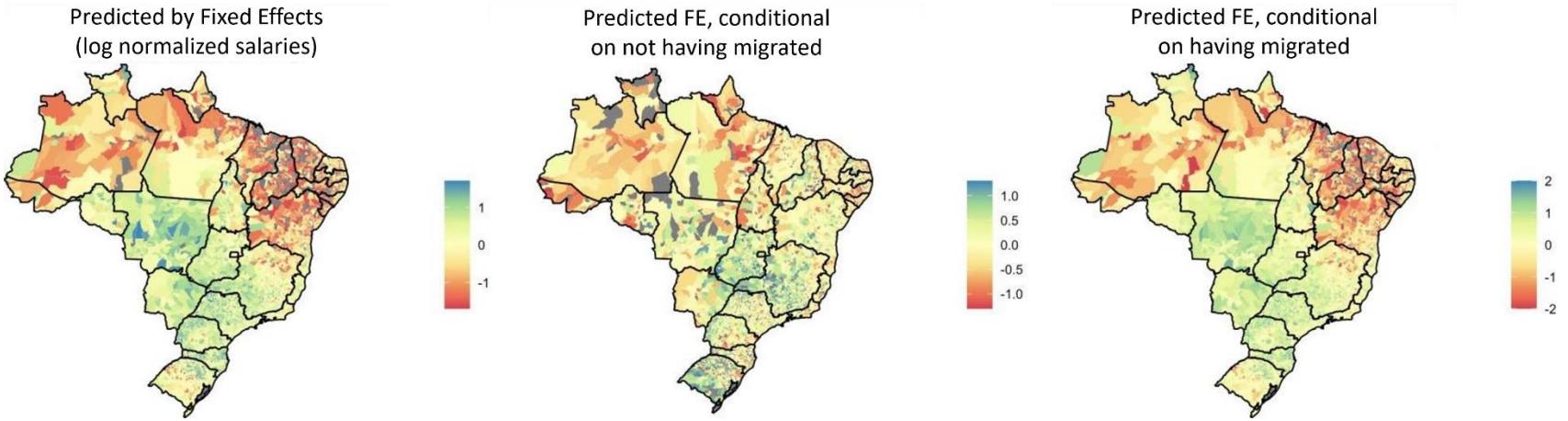
The maps shown in Chart 23 show the fixed effects estimated with normalized coefficients. We can observe that again municipalities in the North and Northeast regions, with worse socioeconomic indicators, represented, on average, lower wages, and a higher rate of individuals dependent on social programs in the future. The analysis of individuals who did not migrate indicates greater

heterogeneity of local characteristics in explaining the observed differences in the indicators, somewhat related to the randomness of the municipality where an individual is born. On the other hand, migration decisions lead individuals, on average, to places with better salary possibilities and not being listed as beneficiaries of social programs; consistent with the idea that individuals migrate, most of the time, in order to have better socioeconomic opportunities. We can conclude that migration decisions can represent significant socioeconomic improvements, even for PBF beneficiaries.

Chart 23: Analysis of the portion explained by the fixed characteristics of the municipalities for the beneficiaries of 2005 to be out of the PBF in 2018 and the Conditional on Non-Migration, the probability of being out of the PBF in 2018 against the Fixed Effects of Municipality



(a) Probability of being out of the PBF in 2018 - Portion predicted by the Fixed Effects of Municipalities



(b) Log of the remuneration of the main work - Portion predicted by the Fixed Effects of Municipalities

Source: Own elaboration, from the data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.

11 Conclusion

The analyses carried out in this survey allow us to conclude that a significant portion of the beneficiaries dependent on the PBF presented indicators suggestive of social mobility more than a decade after they began to participate in the program. We observed that 64% of these dependent beneficiaries in 2005 were outside the Single Registry in 2019. We still see that 45% of them accessed the formal labor market at least once between the years 2015 and 2019.

In addition, we evaluated the quality of formal employment to which this group belongs, when compared to non-beneficiaries of the BFP in the period. Despite presenting less advantageous employment conditions, the beneficiaries of the PBF in 2005 who accessed the formal labor market between 2015 and 2019 were certainly in a better socioeconomic situation than that of poverty and extreme poverty when in their childhood and youth.

From these analyses, we estimate the extent to which characteristics of Brazilian municipalities and regions are associated with the suggested social mobility observed. The results suggest great differences between the regions of Brazil, with the Northeast region presenting the lowest indication of mobility. In consonance, we observed that better health and education structures are important factors for greater social mobility of individuals in the municipalities.

We also observed the role of migration to places of better socioeconomic indicators of these groups. We can observe that migration decisions can represent significant socioeconomic improvements, even for PBF beneficiaries. However, it is also of great relevance to understand how migration decisions relate to whether or not individuals are beneficiaries of social programs, both before and after migrations, an analysis that will be explored in the future by this research project.

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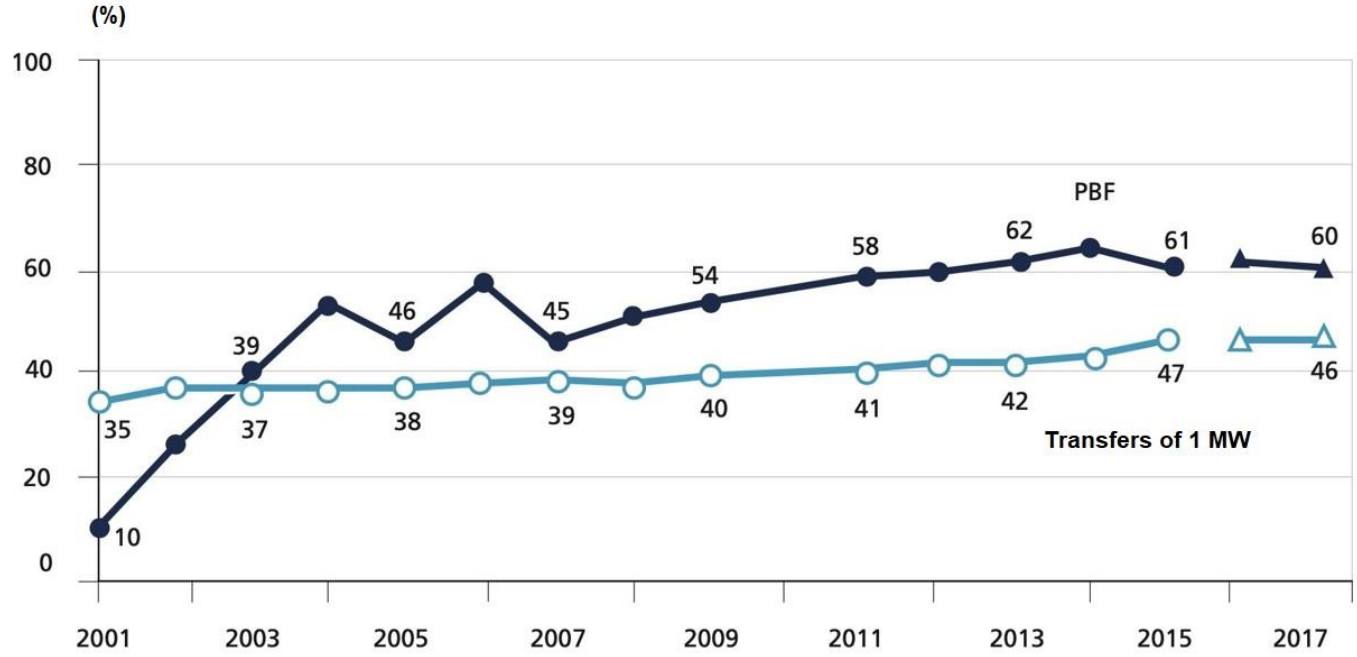
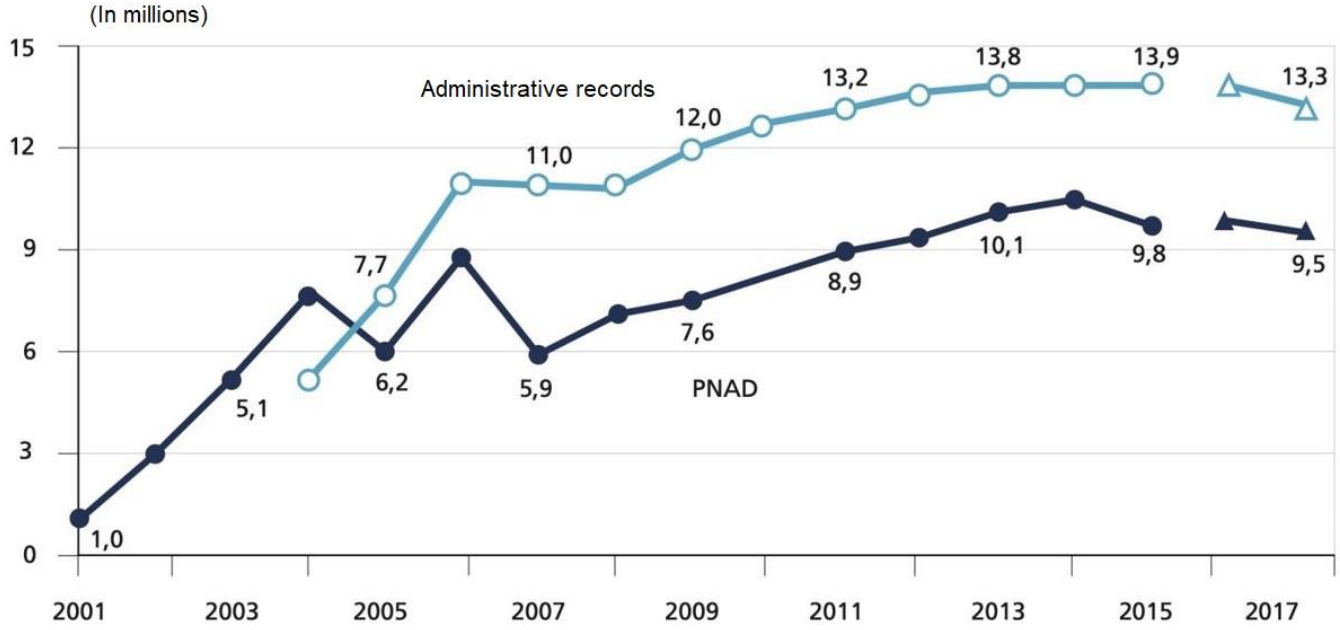
A Tables and Additional Charts

Chart 24: Coverage of the PBF and transfers of one minimum wage (Social Security and BPC) among the poorest 20% by the PNADs (2001-2017)



Source: Adapted from Souza et al. (2019), chart 3, page 15. Elaborated from the data of the PNADs (2001-2015), Continuous PNADs (2016-2017).
Note: PNAD information includes the predecessor programs of the PBF and excludes the rural areas of the states of the Northern region (except Tocantins) until 2003. The population among the poorest 20% was defined based on net household income per person of each benefit.

Chart 25: Beneficiary families of the PBF in the administrative records and in the PNADs (2001-2017)



Source: Adapted from Souza et al. (2019), chart 1, page 11. Elaborated from the data of the PNADs (2001-2015), Continuous PNADs (2016-2017) and data of the Social Information Matrix of the Secretariat of Evaluation and Information Management (SAGI/MCidadania).
Note: PNAD information includes the predecessor programs of the PBF and excludes the rural areas of the states of the Northern region (except Tocantins) until 2003. Information from the administrative records includes only the PBF and refers to September (2001-2015) and June (2016-2017).

Table 11: Distribution of families/households according to cadastral status

Families	**2019**	**2018**	**2017**	**2016**	**2015**	**2014**	**2013**	**2012**
Nr. of Obs.	53,187,644	48,770,064	44,112,029	40,015,875	37,612,900	35,439,01	32,897,119	30,243,128
Number of observations by cadastral state code (cod_es_cadastral_fam)								
in registration	13,663	42,970	53,378	19,001	21,474	30,052	42,670	31,483
no civil registration	951	1,368	2,197	3,200	2,921	2,579	1,915	1,410
registered	28,884,068	26,913,965	26,950,657	26,457,577	27,326,122	29,172,487	27,200,920	25,069,565
excluded	24,288,962	21,811,761	17,105,797	13,536,097	10,262,383	6,233,896	5,651,614	5,140,670

Source: Own elaboration, from the data identified from the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, of the Ministry of Citizenship/Social Development.

Table 12: Distribution of people according to cadastral situation

People	2019	2018	2017	2016	2015	2014	2013	2012
Number of Observations	175,995,622	165,016,862	153,645,158	143,935,709	136,994,748	130,429,631	123,179,294	115,543,894
Number of observations by cadastral state code (cod_es_cadastral_fam)								
in registration	21,344	57,641	70,109	28,182	39,751	41,850	64,146	44,659
no civil registration	8,997	11,678	18,794	26,150	31,310	30,985	23,474	13,384
registered	76,415,223	73,570,482	76,464,300	77,829,966	80,793,612	88,181,943	84,291,806	81,296,980
excluded	99,118,459	90,957,954	76,731,894	66,002,780	55,969,699	41,979,054	37,949,178	34,083,210
awaiting assignment nis	2,141	64,957	75,444	48,630	56,600	38,418	19,617	9,425
awaiting characterization change	0	0	0	0	103,775	157,376	768,224	66,185

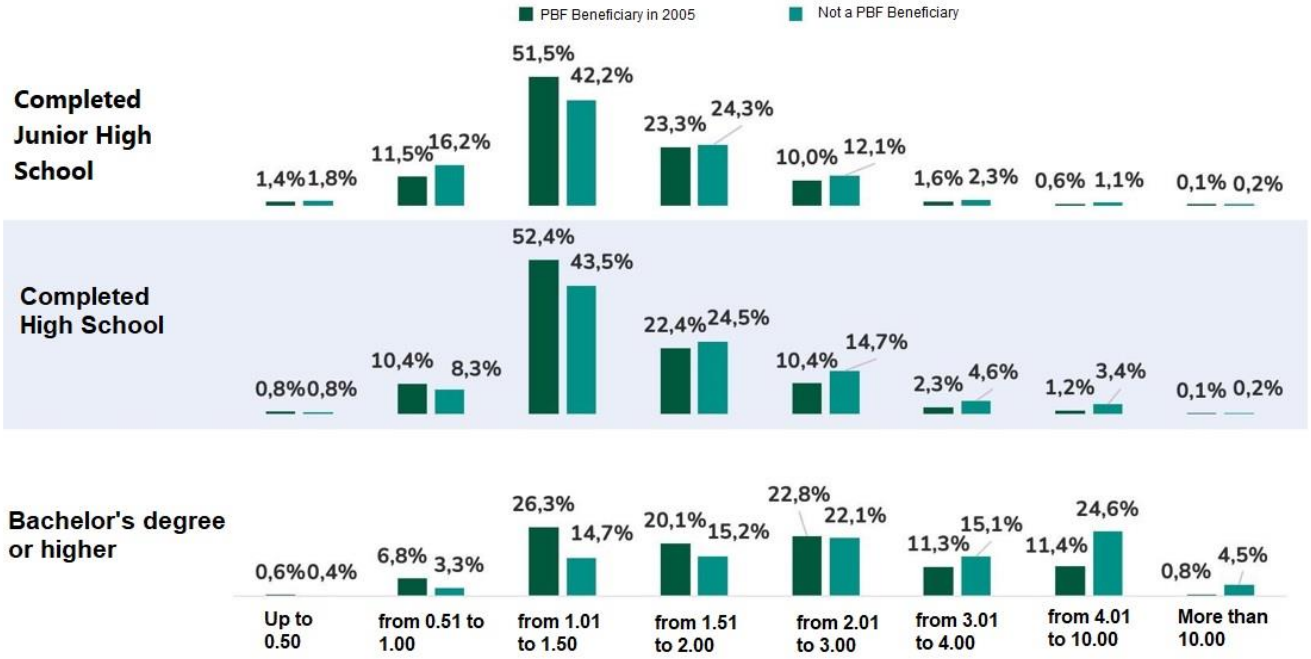
Source: Own elaboration, from the data identified from the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, of the Ministry of Citizenship / Social Development.

Table 13: Methodology for defining the size of companies by economic sector

Size	Industry Sector (i)	Trade and Services (ii)
Microenterprise	up to 19 people occupied	up to 9 people occupied
Small company	from 20 to 99 people occupied	from 10 to 49 people occupied
Medium-size company	from 100 to 499 people occupied	from 50 to 99 people occupied
Large company	500 people occupied or more	100 people occupied or more

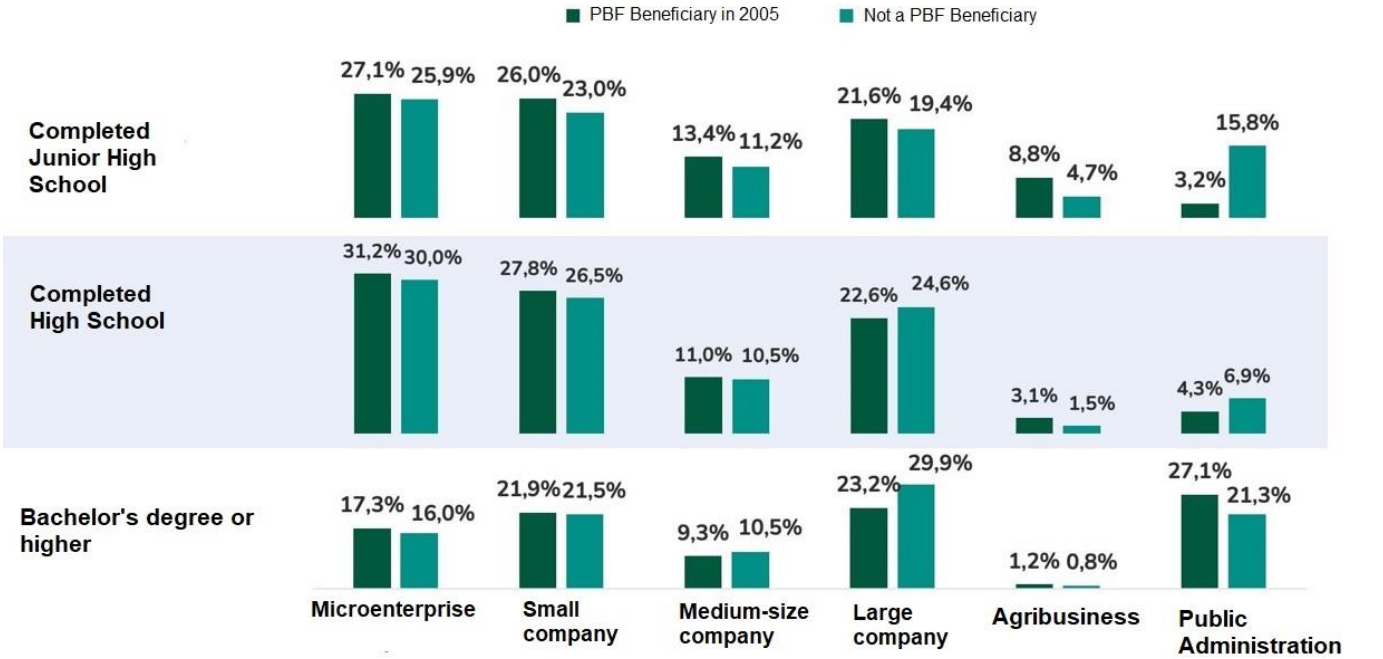
Source: Own elaboration, based on the methodology for defining the size of companies by sector of economic activity presented in the Yearbook of work in micro and small enterprises of the Brazilian Service of Support to Micro and Small Enterprises (SEBRAE) of the year 2013.
Note: (i) The same size boundaries were used for the construction sector; (ii) The service sector does not include public administration and domestic service. Divisions related to agriculture were also excluded, due to the fact that this sector is underrepresented in RAIS, as indicated by SEBRAE.

Chart 26: Comparison between the levels of remuneration of dependent PBF beneficiaries in 2005 and those who were not PBF beneficiaries between 2005 and 2019 - by level of schooling.



Source: Own elaboration, from the data identified from the Annual Social Information Report (RAIS), the Single Registry for Social Programs of the Federal Government and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.
Note: Monetary values were based on the year 2019. The value of the national minimum wage in 2019 was R$ 998.00.

Chart 27: Comparison between the size of the employer company by sector of economic activity of dependent PBF beneficiaries in 2005 and those who were not PBF beneficiaries between 2005 and 2019 - by level of schooling.



Source: Own elaboration, from data identified from the Annual Report of Social Information (RAIS), the Single Registry for Social Programs of the Federal Government, and the Payroll of the *Bolsa Família* Program, made available by the Ministry of Labor and Employment, and the Ministry of Citizenship / Social Development, respectively.
Note: The size categories correspond to sectors of economic activity - trade, industry, and services. The methodology used as reference was that presented in the Yearbook of work in micro and small enterprises of the Brazilian Service of Support to Micro and Small Enterprises (SEBRAE) of the year 2013. The activity of domestic services was not presented in the visualization because it was residual: 358 dependent beneficiaries aged 7 to 16 years and 548 non-beneficiaries of the same age group were in this activity.

Table 14: Dictionary of variables - PNUD data

Variable	Complete name
codmun7	Municipality Code
espvida	Life expectancy at birth
fectot	Total fertility rate
mort1	**Mortality up to one year of age**
mort5	Mortality up to five years of age
razdep	Percentage of the population under 15 years of age and of the population aged 65 years and older in relation to the population aged 15 to 64 years
sobre40	Probability of survival up to the age of 40 years
sobre60	Probability of survival up to the age of 60 years
t_env	Aging rate
e_anosestudo	Expectation of years of study at the age of 18 years
t_analf11a14	Illiteracy rate of the population aged 11 to 14 years
t_analf15a17	Illiteracy rate of the population aged 15 to 17 years
t_analf15m	Illiteracy rate of the population aged 15 years or older.
t_analf18a24	Illiteracy rate of the population aged 18 to 24 years
t_analf18m	Illiteracy rate of the population aged 18 years or older.
t_analf25a29	Illiteracy rate of the population aged 25 to 29 years
t_analf25m	**Illiteracy rate of the population aged 18 years or older.**
t_atraso_0_basico	Percentage of the population aged 6 to 17 years attending basic education who do not have age-grade delay.
t_atraso_0_fund	Percentage of the population aged 6 to 14 years attending elementary and JHS who do not have age-grade delay.
t_atraso_0_med	Percentage of the population aged 15 to 17 years attending high school who do not have age-grade delay.
t_atraso_1_basico	Percentage of the population aged 6 to 17 years attending basic education with a 1 year age-grade delay.
t_atraso_1_fund	Percentage of the population aged 6 to 14 years attending elementary or JHS with a 1 year age-grade delay.
t_atraso_1_med	Percentage of the population aged 15 to 17 years attending high school with a 1 year age-grade delay.
t_atraso_2_basico	**Percentage of the population aged 6 to 17 years attending basic education with a 2 year age-grade delay.**
t_atraso_2_fund	Percentage of the population aged 6 to 14 years attending elementary or JHS with a 2 year or more age-grade delay.
t_atraso_2_med	Percentage of the population aged 15 to 17 years attending high school with a 2 year age-grade delay.
t_fbbas	Gross basic education attendance rate
t_fbfund	Gross elementary and JHS attendance rate
t_fbmed	Gross high school attendance rate
t_fbpre	Gross preschool attendance rate
t_fbsuper	Gross higher education attendance rate
t_flbas	Net basic education attendance rate
t_flfund	Net elementary and JHS attendance rate
t_flmed	Net high school attendance rate
t_flpre	Net preschool attendance rate
t_flsuper	Net higher education attendance rate
t_freq0a3	School assistance rate to the population aged 0 to 3 years
t_freq11a14	School assistance rate to the population aged 11 to 14 years
t_freq15a17	School assistance rate to the population aged 15 to 17 years
t_freq18a24	School assistance rate to the population aged 18 to 24 years
t_freq25a29	School assistance rate to the population aged 25 to 29 years
t_freq4a5	School assistance rate to the population aged 4 to 5 years
t_freq4a6	Percentage of the population aged 4 to 6 years attending school
t_freq5a6	Percentage of the population aged 5 to 6 years attending school
t_freq6	School assistance rate to the population aged 6 years
t_freq6a14	School assistance rate to the population aged 6 to 14 years
t_freq6a17	School assistance rate to the population aged 6 to 17 years
t_freqfund1517	Percentage of the population aged 15 to 17 years attending elementary or JHS
t_freqfund1824	Percentage of the population aged 18 to 24 years attending elementary or JHS
t_freqfund45	Percentage of the population aged 4 to 5 years attending elementary school

t_freqmed1824	Percentage of the population aged 18 to 24 years attending high school
t_freqmed614	Percentage of the population aged 6 to 14 years attending high school
t_freqsuper1517	Percentage of the population aged 15 to 17 years attending higher education
t_fund11a13	Percentage of the population aged 11 to 13 years attending JHS or who have already completed JHS
t_fund12a14	Percentage of the population aged 12 to 14 years attending JHS or who have already completed JHS
t_fund15a17	Percentage of the population aged 15 to 17 years who completed JHS
t_fund16a18	Percentage of the population aged 16 to 18 years who completed JHS
t_fund18a24	Percentage of the population aged 18 to 24 years who completed JHS
t_fund18m	Percentage of the population aged 18 years or older who completed JHS
t_fund25m	Percentage of the population aged 25 years or older with complete JHS
t_med18a20	Percentage of the population aged 18 to 20 years with complete high school
t_med18a24	Percentage of the population aged 18 to 24 with complete high school
t_med18m	Percentage of the population aged 18 years or older with complete high school
t_med19a21	Percentage of the population aged 19 to 21 years with complete high school
t_med25m	Percentage of the population aged 25 years or older with incomplete HS
t_super25m	Percentage of the population aged 25 years or older with a college degree
gini	Gini index
pind	Proportion of extremely poor
pindcri	Proportion of extremely poor children
pmpob	**Proportion of poor**
pmpobcri	Proportion of poor children
ppob	Proportion of those vulnerable to poverty
ppobcri	Proportion of children vulnerable to poverty
prentrab	Percentage of income from labor income
rdpc	Average per capita income
rind	Average per capita household income of the extremely poor
rmpob	Average per capita household income of the poor
rpob	Average per capita household income of those vulnerable to poverty
theil	Theil Index - L
cpr	Percentage of occupied persons aged 18 and over who are self-employed.
emp	Percentage of occupied persons aged 18 and over who are employers
p_agro	Percentage of those occupied in the agricultural sector
p_com	Percentage of those occupied in the trade sector
p_constr	Percentage of those occupied in the construction sector
p_extr	Percentage of those occupied in the mineral extraction sector
p_formal	**Degree of formalization of the work of occupied persons**
p_fund	Percentage of those occupied with complete JHS education
p_med	Percentage of those occupied with complete HS education
p_serv	Percentage of those occupied in the service sector
p_siup	Percentage of those occupied in industrial utilities service sectors
p_super	Percentage of those occupied with complete higher education
p_transf	Percentage of those occupied in the processing industry
t_ativ	Activity rate of people aged 10 years and older
t_ativ1014	Activity rate of people aged 10 to 14 years
t_ativ1517	Activity rate of people aged 15 to 17 years
t_ativ1824	Activity rate of people aged 18 to 24 years
t_ativ18m	Activity rate of persons aged 18 years and older
t_ativ2529	Activity rate of people aged 25 to 29 years
t_des	Unoccupied rate of the population aged 10 years and older
t_des1014	Unoccupied rate of the population aged 10 to 14 years
t_des1517	Unoccupied rate of the population aged 15 to 17 years
t_des1824	Unoccupied rate of the population aged 18 to 24 years
t_des18m	Unoccupied rate of the population aged 18 years and older

t_des2529	Unoccupied rate of the population aged 24 to 29 years
theiltrab	Theil-L index of labor income
trabcc	Percentage of those occupied aged 18 years or older who are employed under a
formal contract trabpub	Percentage of those occupied aged 18 years or older who work in the public
sector .trabsc	Percentage of those occupied aged 18 years or older who are employed without a
formal contract	
t_agua	Percentage of the population living in households with running water
t_banagua	**Percentage of the population living in households with toilets and running water**
t_dens	Percentage of the population living in households with a density of more than 2 people per
dormitory t_lixo	Percentage of the population living in urban households with garbage collection service
t_luz	Percentage of the population living in households with electricity
agua_esgoto	% of people in households with inadequate water supply and sewage
parede	% of people in households with walls other than masonry or rigged wood
t_crifundin_todos	% of children living in households in which none of the residents has completed JHS.
t_fora4a5	% of children aged 4 to 5 years who do not attend school
t_fora6a14	% of children aged 6 to 14 who do not attend school
t_fundin_todos	% people who live in households in which no resident has completed JHS.
t_fund_todos	% of people in households vulnerable to poverty and in which no one has complete JHS.
t_fundin18minf	% of people aged 18 years or older without complete JHS and in informal occupation
t_m10a14cf	Percentage of women aged 10 to 14 years who had children
t_m15a17cf	Percentage of women aged 15 to 17 years who had children
t_mulchefefif014	Percentage of mothers heads of household, without complete JHS and with at least one child under 15 years of age
nest_ntrab	% of people aged 15 to 24 who neither study nor work and are vulnerable to poverty.
t_ocupdesloc_1	% of people in households vulnerable to poverty and spending more than one hour commuting
t_rmaxidoso	% of people in households vulnerable to poverty and dependent on the elderly
t_sluz	% of people in households without electricity
t_pea18m	Economically active population aged 18 years or older
t_urb	Urban population
pop	Total population residing in permanent private households
i_escolaridade	Sub-index of elementary and JHS education of the adult population - MHDI
Education i_freq_prop	Sub-index of school attendance of the young population - MHDI Education
m	Municipal Human Development Index - MHDI
idhm_e	Municipal Human Development Index - Education Dimension
idhm_l	Municipal Human Development Index - Longevity Dimension
idhm_r	Municipal Human Development Index - Income Dimension

Source: Own elaboration, from the Dictionary of variables made available by the United Nations Development Program (UNDP).
Note: Available at: https://www.dropbox.com/scl/fi/0po5ao0qvz004r0861363/dicionario_PNUD.xlsx?dl=0&Rlkey=V1vs2129y4aq1a7js4kml24t9.