Impact of Housing Program on Social Conditions: Evidence from *Minha Casa Minha Vida* Program Lotteries in Brazil

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Abstract

For a long time, housing policies have been instituted in an effort to improve the quality of life of the poorest citizens. In developing countries, urbanization has increased the number of slums, supporting the creation of housing programs like the Minha Casa Minha Vida (MCMV) program, launched in 2009 in Brazil. The program was intended to provide better housing conditions for low-income families. To reduce the construction costs, however, the houses were built in areas outside of the cities, far from the business and employment centers. In this paper, we took advantage of a random selection of families in Rio de Janeiro (one of the most important cities in Brazil) and São José do Rio Preto (a big city in São Paulo state, Brazil) to evaluate the impact of the Minha Casa Minha Vida program on social conditions. By combining two administrative databases, we were able to measure changes in the labor market for both groups, those selected and not selected (for the program). The first conclusion was that even with a random-selection criterion like the lottery, the program did a bad job selecting the beneficiary families, benefiting only the ones least linked to the labor market. Individuals with better job conditions chose to remain in their current house, regardless of its structural condition or the characteristics of the neighborhood. To the beneficiary, the program negatively affected the labor supply, reducing the likelihood that the beneficiary would be able to be formally employed. Also, the program increased the proportion of families receiving income subsidies from the government. This work is one of the first articles to analyze microdata from MCMV, providing an essential measure of the program's impact.

Keywords: housing policy, labor market, *Minha Casa Minha Vida*

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1. Introduction

Housing is the primary source of wealth for low-income families, particularly in developing countries. Consequently, it has received the attention of governments across the world in the form of the adoption of housing policies to benefit vulnerable families. According to UN-Habitat, 3 billion people will need new houses or improvements in their urban infrastructure by 2030, which represents about 40% of the world's population (Habitat, 2005). Housing programs attempt to improve access to quality housing under different justifications and in different ways. In developing countries, including Brazil, the housing issue is severe. About one-third of their urban populations lives in poor housing (Habitat, 2016).

A possible and conventional explanation for slums (Brazilian *favelas*), tenements, and other kinds of poor-quality residences is that low-income families are willing to live in substandard housing in polluted or flood-prone areas, on slopes or ridges, and in other inhospitable geographical environments if this allows them to be close to the better employment opportunities in the city center (Glaeser, 2011; Glaeser et al., 2008). From this point of view, the residents of substandard housing have a strong preference for being close to the labor market, which is their compensation for the conditions. Thus, the state-built houses will cost more than poor households want to pay, or be located where they will not want to live. When not prevented by the program policies, the subsidy will only create an incentive to deviate, because the beneficiaries will remain in their original residences and rent out the new houses to other families. If such actions are not allowed, the families will prefer to not receive the subsidy and to not move to the new locations. In this instance, demand-side subsidies or cash-transfer programs are more appropriate interventions than government-built housing (Glaeser et al., 2008).

According to Marx et al. (2013), many people continue to live in bad housing because they are "trapped in poverty" and cannot move on to the formal urban houses. From this point of view, substandard residences are the product of multiple market and policy failures (mainly governance and coordination problems) that obstruct the inhabitants' capital accumulation and human-development opportunities. Most low-income families live in houses with dirt floors, poor-quality roofs, and walls constructed out of waste materials such as odd boards, cardboard, tin, and plastic. These houses do not provide proper protection from inclement weather, are not secure, and are not pleasant to live in. Many have insufficient access to services such as clean water, sanitation, and electricity (Habitat, 2003; Marx et al., 2013). Living in such residences constitutes a form of poverty trap for a majority of the residents, most of whom find themselves stuck there for generations (Galiani et al., 2017).

The two causes proposed for remaining in tenements are not antagonistic to each other and may represent the conditions of different families. Households linked more closely to the labor market would prefer to remain in precarious housing, even if they were awarded a subsidy in the form of a new property, since the cost of the change would include the loss of their current job position. In contrast, less-connected families, with less-formal jobs, less-permanent ones, or more mobility associated with their work, could consider the subsidy as an increase in personal wealth, and therefore prefer to accept it. These beneficiary families may or may not find new jobs after the move.

A growing body of literature is trying to analyze the impact of housing programs on the labor market, mainly considering the effects of the labor supply. The economic theory

yields ambiguous predictions about the effect's sign for the housing programs. As pointed by Jacob and Ludwig (2012), the standard static labor supply model predicts a reduction in labor supply through both income and substitution effects. Some works have concluded that housing programs may be neutral, or even increase the work supply by reducing the price of complements to work (e.g., residential stability, housing or neighborhood quality, proximity to jobs) or because of the particular nonlinear budget frontiers created by the program (Shroder, 2002). Jacob and Ludwig (2012) estimated the effects of means-tested housing programs on the labor supply using data from a randomized housing-voucher waiting-list lottery in Chicago. They found that among working-age, able-bodied adults, housing-voucher use reduces labor-force participation and quarterly earnings, and increases participation in theTemporary Assistance for Needy Families program.

Despite the importance of the problem, there is a lack of good empirical evidence about the efficiency of these programs and their effects on the families benefiting from them, especially in developing countries. This paper intends to fill this gap by analyzing the responses of the individuals that were randomly selected by the *Minha Casa Minha Vida* (My House My Life, henceforth MCMV) program in the cities of Rio de Janeiro (RJ), and São José do Rio Preto (SJRP), Brazil. The program, launched in 2009, has contracted almost 5 million housing units. It has become the main Brazilian housing program, reaching an annual cost of over US$3.6 billion. We provide one of the first estimates of the effect of the MCMV on the labor supply and participation in social programs. Additionally, this is one of the first articles to explore the lotteries that took place in Rio de Janeiro and in São José do Rio Preto to select the beneficiaries of the program.

We took advantage of a benefit from the beneficiary selection process, which is done through a lottery. The randomization of the participants in MCMV provides a rare source of exogeneity. The economic theory dealing with housing programs is ambiguous about the households' decision to accept the benefit or not, as already pointed out in Glaeser (2011) and Marx et al. (2013) discussion. Among the recipients, there is also lack of evidence related to the potential effects of housing benefits on the labor supply and other economic indicators, such as participation in social programs (Jacob and Ludwig, 2012; Shroder, 2002). However, some recent studies, having overcome problems of endogeneity, state that housing assistance can reduce the labor supply available to beneficiaries (Jacob and Ludwig, 2012; Wood et al., 2008).

The results show that individuals moving to MCMV projects have a reduced likelihood of being formally employed, both in Rio de Janeiro and São José do Rio Preto. Estimates indicate that the adverse effect on formal employment is 3.3% in SJRP and from 4-6% in RJ. However, the wages of beneficiaries who remained employed do not appear to have been affected. Furthermore, the program has a positive impact on participation in *Bolsa Família*, Brazil's main income-transfer program, indicating that the economic situation of the beneficiary families has worsened. Estimates point to a positive effect of 4% in São José do Rio Preto and up to 7

This work is divided into four sections, in addition to this Introduction and the Conclusion. The first section reviews the literature on housing programs and MCMV in particular. The second section introduces the databases that were used and also describes the housing lotteries used in Rio de Janeiro and São José do Rio Preto. The third section presents the methodology used to analyze the data, and the fourth section presents the results for the cities of Rio de Janeiro and São José do Rio Preto. It is shown that in both

cities the treatment and control groups are comparable, that the MCMV program negatively impacts the regular employment rate, and that it positively affects participation in *Bolsa Família*.

2. Empirical Evidence on Housing Assistance Programs

2.1. Housing program and selection issues

Slums, tenements, and precarious residences are associated with the worst face of poverty. However, the traditional view of bad housing suggests that these conditions are a transitory phenomenon mainly present in fast-growing economies (Galiani et al., 2017). As developing economies approach the steady state, economic development progressively transforms informal settlements into formal neighborhoods. Glaeser (2011) argued that bad housing in large cities represents accessibility opportunities to low-income families, who move there voluntarily, usually to avoid subsistence-level living in rural areas. Slums, tenements, and the like provide a way for low-income families to improve their labor productivity by taking advantage of the benefits of agglomeration, economies of scale, and networks offered by large cities. The higher labor productivity compensates them for their temporarily bad housing conditions, and the opportunities for agglomeration allow them to gradually improve their living conditions and eventually convert the residences into a non-slum neighborhood or migrate out of the slums into formal housing within the city. Thus, cities do not make people poor but instead attract poor people; in this view, the emergence of slums is attributed to the willingness of the poor to live in substandard housing, even hostile environments, if doing so gets them closer to employment opportunities (Galiani et al., 2017). Indeed, it is a mistake to idealize the bad housing, although it represents economic opportunities to low-income families. It also reveals public failures, calling for initiatives to provide better public goods for the residents, such as clean water and honest police, as well as better roads, and means of transportation to connect the bad housing area with the more prosperous parts of the city.

Marx et al. (2013) argued that bad housing is due to multiple market and policy failures (mainly governance and coordination problems) that prevent the residents from accumulating capital or developing opportunities. Such accommodations are built with poor materials such as dirt floors, poor-quality roofs, and walls of cardboard, tin, and plastic. Certainly these houses do not provide proper protection from inclement weather and do not represent adequate welfare conditions. Many have insufficient access to services such as clean water, sanitation, and electricity (Habitat, 2003). Additionally, living conditions like these could make access to financing difficult. Banks may hesitate to provide a loan of the necessary size to a person working in an irregular sector and without collateral. Thus, life in slums may constitute a form of "poverty trap" for a majority of the residents, most of whom find themselves stuck there for generations (Marx et al., 2013).

From Glaeser's (2011) point of view, people living in bad houses have a strong preference for being close to the labor market, which is their compensation for enduring their disagreeable living conditions. Such people may not want to participate in a housing program that subsidizes the purchase of a new house if it is too expensive or located where they do not want to live. When the program policies do not prevent it, the subsidy will create an incentive to deviate, because the beneficiaries will remain in the bad housing and rent out the new houses to other families. If the program prevents such actions, the families will prefer to not receive the subsidy and not move to the new houses. According to

this reasoning, demand-side subsidies or cash-transfer programs could be more appropriate interventions than government-built housing. On the other hand, Marx et al.'s (2013) point of view justifies public intervention to correct the market failures, and eventually offer houses to the poor people or give them rent vouchers.

The two views are not antagonistic to each other. They could represent the social conditions of different families. It is possible that households closely linked to the labor market will prefer to remain in their slums near the Central Business District, even if they are awarded a subsidy in the form of a new property. If the costs of change imply a loss of their current positions in the labor market and accessibility to other market goods, they may prefer finally to remain in their bad houses. On the other hand, less-connected families, with less-formal jobs or more mobility in their job or work requirements, could consider the subsidy as an increase in their intertemporal income, and therefore prefer to change. These beneficiary families may or may not revise their status as labor suppliers after the move. If this hypothesis is right, only the poorest households among the low-income families will accept new houses far from the center of the city.

2.2. Impact of housing program on compliers

As we have implied, merely subsidizing the acquisition of a new house, often far from the original home location and also far from job centers, may not solve the problems of low-income families; rather, it may create others.

Several studies have sought to analyze what happens to individuals who receive housing assistance, whether in the form of vouchers[1], predominant in the USA, or in the direct provision of housing, which has dominated the housing policies in developing countries (Buckley et al., 2016). Despite the existence of significant literature on housing programs, few studies have succeeded in isolating causal relationships among the programs. The vast majority suffer from problems of endogeneity, which arise from the fact that the recipients typically choose whether or not to participate in the programs (Collinson et al., 2015).

Studies that manage to overcome the problems of endogeneity show that housing assistance usually improves housing quality, both in the case of vouchers (Jacob and Ludwig, 2012; Wood et al., 2008) and that of public housing (Currie and Yelowitz, 2000). Also, they also show that the share of income spent on rent decreases substantially (Jacob and Ludwig, 2012).[2] As significant as the direct effects of housing programs on the quality of housing and accessibility to benefits are the indirect effects that this type of assistance can generate. The idea that housing assistance generates positive externalities is one of the main reasons for the existence of this type of benefit. If housing assistance does not bring in any gains other than the reduction in rent and improvement of housing quality, it is possible that a cash transfer would be more efficient.[3]

There is much empirical evidence from the housing programs in the United States. The country has a long history with housing programs dating back to the early twentieth

[1]In this case, the individual rents the dwelling in the private market and the government subsidizes part of the rent.

[2]Jacob and Ludwig (2012) used the fact that the selection for program beneficiaries in the city of Chicago was via lottery. Currie and Yelowitz (2000) used a gender-specific instrumental variable for the children of families who participated in the public housing program.

[3]For a discussion of in-kind and cash transfers, see Currie and Gahvari (2008).

century. At first, the housing assistance was mainly through units built and managed by the government, locally known as "the projects," which were rented to families who needed them. This type of assistance was widely criticized in the country for two main reasons. First, these residential complexes were built in areas that were already occupied by the poor, which could lead to a higher concentration of poverty and intensify racial segregation in the cities. Also, over time, these settlements were associated with places of high crime and poverty (Currie and Yelowitz, 2000).[4]

One of the major externalities that economists expect is an effect on the individuals' participation in the labor market. It was for this purpose, and after decades of criticism about the location of public housing, that the United States government created the Moving to Opportunity (MTO) program. Designed as an experiment, the program selected families by lottery and provided a subsidy for them to move to areas of low poverty. One of the main effects awaited by the formulators of the program was the impact on the employment rate. Many studies have shown that housing programs affect the labor supply, and physical and mental health of the recipients (Chetty et al., 2016; Jacob and Ludwig, 2012; Ludwig et al., 2013; Susin, 2005; Wood et al., 2008). In the end, the evaluations did not find a significant impact of the effect of MTO on the employment rate of the participating adults (Kling et al., 2007; Chetty et al., 2016). Particularly noteworthy are the works of Jacob and Ludwig (2012); Chetty et al. (2016) and Jacob et al. (2015). The first paper showed that the voucher housing benefit of the Section 8 program reduced the probability of being employed by 4% and income by $329. The effect on the employment rate remained negative up to eight years after the granting of the housing benefit. Also, the housing benefit significantly increased the proportion of people receiving other government assistance, such as that from Temporary Assistance for Needy Families (TANF).[5] The identification of the estimates was guaranteed by the selection of the beneficiaries in the city of Chicago, which was done by lottery.

The second paper examined the children of the families benefiting from the MTO program. The beneficiaries were selected by lottery and required to move to areas of low poverty, providing a fairly unique source of exogeneity in the literature that analyzes the effects of neighborhoods. The results showed that children who grew up in neighborhoods of lower poverty, benefited by the program, earned up to 30% more than those in the control group, who grew up in poor neighborhoods. Also, these children were more likely to attend college than those in the control group.

Finally, Jacob et al. (2015) took advantage of a randomized housing-voucher lottery in Chicago in 1997 to examine the long-term impact of housing assistance on a wide variety of child outcomes, including schooling, health, and criminal involvement. With a baseline of families living in unsubsidized private housing, the voucher generated substantial changes in both housing and material consumption; but the researchers found that the receipt of housing assistance had little, if any, impact on the neighborhood, school quality, or a wide range of important child outcomes.

Housing programs are increasingly important in developing countries. Buckley et al. (2016) identified 16 developing countries that have launched multibillion-dollar housing

[4]These criticisms led the United States to prioritize voucher-based housing programs, reducing adherence to the public housing model.

[5]TANF is a benefit for poor families in the United States, providing financial assistance to low-income families with young children.

programs in recent years.[6] However, there is very little empirical evidence from these countries in the economic literature. Barnhardt et al. (2017) studied a housing program in India that, like Brazil's, has increased its spending in recent years. The program offered nicer houses on the outskirts of the city at a monthly cost well below the rent for slum dwellers in the center of Ahmedabad, to beneficiaries selected by lottery. Because of the distance to these new homes, a third of the winners chose not to move. Also, 32% of the winners moved but returned to the slums in ten years. The main reasons given for giving up the benefit were linked to the isolation of the dwellings. After 14 years, the winners of the lottery did not show any improvement regarding income or human capital, and the social ties of the winners were significantly impaired, suggesting that the program did not generate long-term economic benefits.

Alzúa et al. (2016) analyzed a housing lottery in Rosario, Argentina. They found a reduction in registered employment by more than seven percentage points, especially for women and beneficiaries over 50 years of age. They also designed and conducted a household survey among a sample of beneficiaries in order to understand the underlying mechanisms and welfare implications of these results. All in all, their results indicated an income effect and confirmed the registered falls in formal employment and labor-force participation. They did not find an increase in irregular work contracts, although the perceived access of the beneficiaries to local job opportunities was significantly reduced. Similarly, Franklin (2018) studied a large-scale housing lottery in Ethiopia. Houses were built on the outskirts of the city, and most of the beneficiaries came from slums near the city center. The study found no significant effects on labor-market outcomes such as income and hours worked. They also showed that the lottery winners reported lower levels of social interaction, similar to Barnhardt et al. (2017).

In Brazil, Bueno et al. (2018) studied the effect of MCMV housing subsidies on the beneficiaries political preferences. Using the housing lotteries that occurred in Rio de Janeiro in 2011 and 2013, they discovered, contrary to expectations, that the program generated an anti-incumbent (negative) political effect on the participants. They also showed that the lottery winners reported lower life satisfaction than the non-winners. These surprising results are consistent with the difficulties of program implementation and an overall evaluation of the MCMV program.

Given the inconvenient locations of the housing projects in developing countries, the lack of participation in the labor market could be due to the spatial-mismatch hypothesis. Kain (1968) called attention to the adverse effects of spatial segregation on the labor supply of individuals. Urban populations living in areas far from (and poorly connected to) employment centers have great difficulties in finding and maintaining good jobs, which impairs their performance in the labor market. These bad outcomes can be caused by mechanisms like the following: (i) workers may reject jobs involving a long commuting time; (ii) the efficiency of the job search may decline given the enormous distance to the jobs; (iii) workers who live too far away from the jobs may choose to slow down their search efforts; (iv) the costs of looking for a job can be very high, causing workers to restrict their search to closer neighborhoods; (v) employers may not hire (and may dismiss) employees whose productivity would be reduced by long commutes; and (vi) these individuals may cost more for firms, if they compensate for the costs of transportation and other factors.

[6] Among them: Brazil, India, South Africa, and Colombia.

The effects on this population may include longer commuting time, lower wages, and higher unemployment (Gobillon et al., 2007).

2.3. Minha Casa Minha Vida and housing issues in Brazil

Brazil has been undergoing an intense urbanization process since the second half of the twentieth century. In 60 years, the urban population has grown from 36% to 84% of the total population of the country. The agglomeration of people in slums, regions with high poverty that lack an adequate infrastructure, is one of the main consequences of fast urbanization. Currently, about 6% of the Brazilian population lives in *favelas*. In the large cities the problem is even bigger: in Rio de Janeiro, 22% of the people lives in *favelas*; in Belém, this number reaches 54% (Censo, 2010). Inadequate housing, which is not just confined to slums, is another problem associated with this intense urbanization. It is estimated that the housing deficit in 2010 in Brazil was 6.9 million houses (Jõao Pinheiro, 2016).[7] About 84% was in urban areas, with 63% (more than 3.5 million houses) concentrated in households with an income level of up to 3 minimum wages (MW).

Programs have been created in Brazil in recent decades to deal with the housing issues. The most important one, before MCMV, was the National Housing Bank (BNH, in Portuguese), created in 1964 to provide home-ownership subsidies for low and middle-income families. In 22 years, until its extinction in 1987, this program financed the construction of 4.3 million new housing units, with 2.4 million of them destined for the poorest households (Bonduki, 2008). After the program ended, the country went decades without a national strategy to fight the housing problem.

The MCMV federal housing program was launched in 2009 with the goal of reducing the country's housing deficit. The program is aimed at families with incomes between 0 and10 minimum wages. In 7 years, the program has accumulated 4.9 million contracted housing units, of which 3.5 million have already been awarded to recipients. The program is divided into three main segments, according to the incomes of the beneficiary families:

- Segment I builds homes for families with incomes of up to US$400/mo (3 MW);
- Segment II is for families with incomes between 3 and 6 MW; and
- Segment III is for families with incomes of from 6 up to 10 MW.

Also, as additional criteria for participating in the program, families can neither own property financed by *Caixa Econômica Federal* nor have financing with any other financial agent. Although most of the housing deficit is concentrated in families with up to 3 MW, only a third of the units were delivered to this income bracket. The distribution of housing units by income bracket over time can be seen in Figure 1.

[FIGURE 1 HERE]

In addition to the family-income criterion, the three program segments have different selection methods for beneficiaries. The subsidies for families in Segment I are very high,

[7]Houses that are in precarious condition are considered as part of the housing deficit and also households: a) containing two or more families, and b) with a family income of up to 3 MW where the cost of the rent exceeds 30% of it. For more details, see Jõao Pinheiro (2016).

reaching 90% of the houses' values, and the monthly installments extend for up to 120 months. This is not the case for Segments II and III, which offer little or no subsidy. The selections of recipients for Segment I are made by the municipalities in which the projects are built. As the demand for housing usually exceeds supply, the program rules determine that families who are eligible for the program be registered and randomly selected to obtain housing by the City Halls. For the other two segments, the families themselves look for houses that belong in the program and check their own eligibility (Marques and Rodrigues, 2013).

There are 11,375 housing projects for Segment I in Brazil, a total of 1.76 million housing units. Big cities can have dozens of projects. São Paulo has contracted 40 projects to date, and Rio de Janeiro has 100. In Segment I, the project and its execution are the responsibility of a private party. The prefectures of each municipality select the beneficiaries, and *Caixa Econômica Federal* provides the subsidies.

The program has had considerable problems associated with the location of the houses. To reduce the overall costs, the houses are built in peripheral neighborhoods, areas that lack public infrastructure, employment opportunities, commerce, public transport, health clinics, and schools (Marques and Rodrigues, 2013; Rolnik et al., 2015; Pequeno and Renato, 2013). This problem was also pointed out by the recipients in the Ministry of Development's official survey in 2013 (Brasil, 2014) .[8]

3. Database

The analysis is based on different data sources. The list of recipients of the Minha Casa Minha Vida program was obtained from Caixa Econômica Federal (CEF), an official bank responsible for controlling the credit housing contracts. The list contains the names, social security numbers (CPFs), contract dates, and data on the project. For the analysis, we concentrate on the data from Segment I. Information on the lotteries in Rio de Janeiro and São José do Rio Preto was obtained on the City Halls' websites. The database includes the people enrolled in the lottery and those who won. In Rio de Janeiro, the lottery took place in 2011; in São José do Rio Preto, in 2013. [9] For socioeconomic variables, we consider data from the Annual Social Information Report (RAIS), an administrative database of the federal Ministry of Labor and Employment, and the administrative database known as the Single Registry of the federal Ministry of Social Development.

The RAIS database has information about individuals' current job, such as salary, the sector of activity, and dates of hiring and firing. It also contains characteristics like gender, age, schooling, and skin color. The information is restricted to regular contracts.[10] The Single Registry contains information on Brazilian families living in poverty or extreme poverty. The information contained in this database is much more comprehensive than

[8]The problem of location repeats the experience of the BNH, which also prioritized the construction of large housing complexes on the outskirts of cities in places with little urbanization (Bonduki, 2008).

[9]Some houses were allocated by another criterion than the lottery which prevents us from using our identification strategy to analyze their data. These individuals were excluded from the analysis.

[10]Although informality is still relevant in the country, the formal employment rate for the analyzed population ranged from 50% to 58% between 2010 and 2014. Also, between 2006 and 2014, 75% of the analyzed individuals appeared in RAIS at least once. That is, only one-quarter of all individuals did not hold a formal job in this period.

that in RAIS, as it is not only about the household head but also the whole family. Also, it includes individuals working in the informal labor market, and information about the participants in the Bolsa Família program, the main Brazilian income-transfer program.[11]

For Rio de Janeiro, the analysis is restricted to the RAIS database, since incorporating information from the Single Registry would bias the sample. The individuals who have become beneficiaries of the program are different from those who were not randomly selected. As only the recipients were registered in the Single Registry, using the information from that would make the treatment and control groups unbalanced. In the case of São José do Rio Preto, the socioeconomic characteristics of individuals are from the Single Registry. With this database, information is obtained on 99% of the sample.

3.1. The housing lotteries in Rio de Janeiro

Rio de Janeiro is the second biggest city in Brazil, with 6.7 million people. The city has the most of the beneficiaries of Segment I of the MCMV program. Currently, 27,843 families are benefited in the city. Between 2009 and 2012, 48 projects were inaugurated, 36 of which were used for the resettlement of families living in high-risk areas and areas that would be renovated by the city.[12] The remaining 12 projects were provided for families who lacked housing and were on the city's waiting list to receive it (Cardoso and Lago, 2015). The total cost of these housing projects reached R$225 million (US$59 million) (Caixa Econômica Federal, 2016). The units were priced at about R$51,644.00 (about US$13.6 thousand) and had a square footage of about 45m^2.

The city selected the 3,934 beneficiaries for the second group through a raffle. In Brazil, the lotteries are regulated by the government, the most traditional being the federal lottery operated by *Caixa Econômica Federal*, the same bank that provided credit for the housing contracts. If the last two digits of a participant's registration number were the same as the last two digits of the federal lottery draw, then the family was selected, and public agents contacted them.

To avoid a self-selection problem in the data, we restricted the analysis to the three raffles in which the participants came from the general registry of the Secretary of Housing of the municipality of Rio de Janeiro (Lotteries 003, 006, and 009).[13] Table 1 shows the number of people who participated in each lottery, as well as those who were randomly selected, and the compliance rate, that is, the proportion of people selected who agreed to move to the new house.

[TABLE 1 HERE]

In the three lotteries considered, 23.5 thousand people were selected from among more than 360 thousand to fill vacancies in the program. These individuals were contacted by phone or letter by public agents who offered them a house.[14] About 16.8% of all selected individuals effectively became beneficiaries of the program. However, the compliance rate

[11] All MCMV beneficiaries must be enrolled in the Single Registry. Therefore, this database contains complete information about the individuals and their families who benefited from the program.

[12] Rio de Janeiro hosted the 2014 World Cup and the 2016 Olympics. There were several interventions in the city that motivated the resettlement of thousands of families, most of them to houses built by the MCMV program (Cardoso and Lago, 2015).

[13] The remaining lotteries which occurred in 2011 were for seniors and people with disabilities, and the number of selected individuals was very small (417).

[14] It is critical to note that although each housing lottery has had more people enrolled than the

varied widely by lottery. This variation can be explained by the location of the houses offered in each lottery.[15] The first lottery, which had the highest compliance rate, offered more vacancies in projects near public transportation in neighborhoods with more available services than the second lottery. Also, most of the units in the last lottery were vacancies that were not filled in the first two lotteries. We include supplementary material in this paper that shows the division of the beneficiaries of each project by lottery. Figure 2 shows the locations of the projects in each lottery.

[FIGURE 2 HERE]

Due to the differences in compliance rate and the different composition of the list of participants in each lottery, the analysis was done separately for each lottery.[16] When accepting the housing unit, the family goes through a verification of income and the compliance requirements for the program. This verification is made independently of City Hall by *Caixa Econômica Federal*. After approval, the family waits for the completion of the house.

The houses were delivered throughout 2012 at different addresses in the West Zone of Rio de Janeiro city (Figure 2. The distances from these complexes to the city center, where jobs are concentrated, varies between 20km and 30km on a straight line, making travel to this region quite costly (Cardoso and Lago, 2015). The project areas have a smaller number of jobs and a concentration of the low-income population of the city. Several studies have criticized the location of these residential complexes, highlighting the concentration of low-income families in areas with little infrastructure and few urban services (Cardoso and Lago, 2015).

3.2. The housing lottery in São José do Rio Preto

São José do Rio Preto is one of the most populous cities in the state of Sao Paulo, with more than 450,000 people. Currently, the city has about 6,556 housing units in MCMV Segment I, making it the city with the seventeenth-most beneficiaries. In 2013, São José do Rio Preto selected 2,508 families to participate in MCMV Segment I, of which 2,356 were selected randomly by a widely publicized raffle open to the public.[17]

The information on participants in São José do Rio Preto was obtained from the City Hall. The lists contain the names and CPFs of all individuals who participated in the lottery and all of those who won. Using the CPFs, we merge the participant information to the two confidential datasets of the Single Registry and RAIS.

In São José do Rio Preto, 99% of the individuals who participated in the lottery were already registered in the Single Registry. Therefore, it is possible to obtain better

previous one, not all who participated in the previous one are in the subsequent one. For instance, 25,316 people who participated in Lottery 003 did not participate in Lottery 006. Of them, 24,321 came back to register for Lottery 009. The available documentation does not make it clear why this happened. Instead, they simply declare that all participants in the lottery come from the general registry of the Municipal Secretary of Housing.

[15]There may also be other factors that explain low compliance, such as not meeting the program's income criteria.

[16]Individuals randomly selected in the other lotteries are kept in the sample, e.g., in the sample of Lottery 003, we keep all individuals randomly selected in Lotteries 006 and 009. In the supplementary material, we show that excluding these individuals does not alter the results.

[17]The other families were chosen because of their socioeconomic characteristics.

information on almost all of the families in the treatment and control groups in SJRP than is the case in RJ. This allows a much better characterization of the families and gives more precision to the results.[18] The total cost of the two projects in SJRP was almost R$170 million (US$45 million).[19].

Despite having different names, the two housing complexes were contiguous and had the same characteristics. As in Rio de Janeiro, the housing complexes were located outside the city center, the region where the formal jobs are concentrated, as shown in Figure 3. Each house was 41m^2 and appraised at about BR$68,000 (US$18,000). All homes had access to basic sanitation, drinking water, and electricity. The recipients started moving into the complexes in April 2014. In 2015, a health unit and a school were established in the neighborhood (da Cunha, 2014).

[FIGURE 3 HERE]

4. Methodology

Selection bias is the main issue in estimating causal treatment relationships. If there is no source of exogeneity, any study comparing recipients of some program with non-beneficiaries will be subject to selection bias. In the case of welfare programs for low-income individuals, this bias is almost always negative. Individuals who participate in social programs tend to have a greater vulnerability regarding the labor market, income, and other factors. Therefore, a simple comparison between the variables of individuals who participate and who do not participate in a government program is biased (Angrist and Pischke, 2009). Randomizing the selection to the program solves the endogeneity problem. In this case, the treatment (randomly selected) and control (not selected) groups are comparable, and any variation after treatment in the variables of interest can be attributed to the program in question. In this work, as the selections for *Minha Casa Minha Vida* Segment I in both Rio de Janeiro and in São José do Rio Preto were random, a simple comparison between the treatment and control groups guarantees a non-biased estimate of the effect of having been offered participation in the MCMV, which is known in the literature as an *intent-to-treat effect*.

The estimate of this effect consists primarily in calculating the differences between the means of the treatment and control groups. In this way, an equation of the following type could be estimated:

$$y_{it} = \alpha_t + \beta^{ITT} d_{it} + \mathbf{x}'_{it}\delta + \varepsilon_{it} \tag{1}$$

where y_{it} indicates the dependent variables (labor income, labor-market participation, and participation in the Bolsa Família program), α_t is time fixed effects, d_{it} is a dummy variable, indicating whether the individual was randomly selected to participate in MCMV, and $\mathbf{x}_{it}$ is a k-dimensional vector of control variables, including a constant term.

If the randomization was successful, then $E(d_{it}\varepsilon_{it}) = 0$ and the parameter β^{ITT} identifies the effect of being randomly selected to participate in MCMV (*receiving an offer*) and the variables of interest. However, not all of the individuals selected to participate

[18]We also constructed a sample made only with variables from RAIS, similar to the Rio de Janeiro analysis, to mimic what was done there.

[19]Of this total, the federal government payed R$120 million (US$31.5 million), and the municipal government the remaining amount (da Cunha, 2014).

accepted the offer. As pointed out before, people would prefer staying close to the business center instead of moving to a new house far away. Families' social position impacts their decision to accept the offer or not. If the costs of change imply a loss in their labor-market positions and the accessibility to other market goods, these families ultimately prefer to remain in bad houses. In contrast, less-connected families could consider the subsidy as an opportunity (an increase in their long-run income), opting to accept the change. Therefore, the estimation of the ITT effect in equation 1 underestimates the actual effect of participating in MCMV.

Because of this compliance issue, a two-stage methodology is used, where the results of the lottery are used as an instrumental variable for participation in the program. If the lottery was genuinely random, and if the offer has any impact on those who decided not to participate in the program, then we can identify the effect of the program on its beneficiaries (Angrist and Pischke, 2009).

Consider c_{it} to be a variable indicating if the i-th individual accepted the house offer in the t-th period (complier). We could estimate the effect of the treatment on the treated (the effect of accepting the house) using an equation relating the variable of interest and the c_{it} indicator. However, this variable is clearly endogenous. If the lottery was successful, we could approach the problem with this system of equations:

$$\begin{aligned} c_{it} &= \lambda_t + \mu d_{it} + \mathbf{z}'_{it}\pi + \nu_{it} \\ y_{it} &= \theta_t + \beta^{TOT} c_{it} + \mathbf{x}'_{it}\gamma + \epsilon_{it} \end{aligned} \tag{2}$$

where y_{it} and $\mathbf{x_{it}}$ are defined as in (1), and $\mathbf{z}_{it}$ is an l- dimensional vector of control variables for the selection equation, which may include some or all of the variables in $\mathbf{x}_{it}$. We assume that

i $E(\nu_{it}|d_{it}, \mathbf{z}_{it}) = 0$;

ii $E(\epsilon_{it}|d_{it}) = 0$;

iii $E(\nu_{it}\epsilon_{it}|d_{it}) = 0$; and

iv $l \geq k$.

The assumptions are intuitive: (i) is the identification assumption for the selection equation as function of control variables and the lottery. (ii) and (iii) are the traditional instrumental-variable assumptions; and (iv) is the rank-condition assumption for identification.

The first equation in the system permits the verification of which conditions are relevant to the winners in deciding to accept or reject the house. Predetermined conditions may influence their choice. Our central hypothesis is that only the most impoverished families among those drawn will be willing to move to the new house. To verify the impact of the MCMV program on the treated individuals, we used the exogeneity from the lottery embodied in the first equation to instrumentalize the second equation. By assumption (iii) above, the system equation can be estimated using the two-stage approach.

Under the assumptions (ii) and (iii) above, β^{TOT} captures the program's local average treatment effect (LATE): that is, the average effect of participating in MCMV on those individuals who moved after wining the lottery. However, individuals in the control group

do not have access to the program.[20] This means that β^{TOT} represents the average effect of the MCMV program on the treated, known in the literature as the treatment-on-the-treated effect (Angrist and Pischke, 2009).

For the dependent variable in the second equation, we analyze three different dimensions. For the first dimension, employment, we use a dummy variable to indicate whether the individual was formally employed in a given year, which corresponds to whether the individual appeared in the RAIS database that year. Furthermore, as a robustness test, we estimate the impact on two other variables of labor-market participation. For the first variable in the robustness test, the employment information in the RAIS database is transformed into a quarterly panel, so the dependent variable indicates whether the individual was employed in a given quarter. For the second variable, we use a dummy variable, already present in the RAIS database, that indicates whether the individual was formally employed on the last day each year (12/31).

The second dimension we analyze is income, for which we use the average wages of the individual that year as recorded in the RAIS database; finally, the third dimension we check is participation in *Bolsa Família*: the data indicating if the individual received the benefit comes from the Single Registry.

Time (year or quarter) fixed effects are also included in the control macroeconomic effects, as business-cycle co-movement. The control variables $\mathbf{x_{it}}$ are used for greater precision in the estimates and include variables found in RAIS and the Single Registy such as gender, schooling, and age. The sets of control variables are different for the two cities analyzed below: in Rio de Janeiro, the RAIS control variables are used, while in Rio Preto, the control variables come from the Single Registry.

5. Results

5.1. Characteristics of treatment and control groups

We merged individuals' data from the lottery databases with data from RAIS and the Single Registry for the years 2006 to 2014. We successfully linked 75% of the total sample to people from Rio de Janeiro, and more than 98% of the total sample to people from São José do Rio Preto. Table 2 shows the balance between the treatment and control groups for all lotteries in RJ and SJRP. The balance permits the conclusion that the lotteries were random. The treatment and control groups are quite similar in almost all of the characteristics that we get from RAIS (RJ) or RAIS and Single Registry (SJRP). A few variables present significant differences at 5% or 10%, but the F-statistic of a regression where the dependent variable indicates whether the individual had won is quite low for the three lotteries, indicating that there are no significant differences between the two groups.

[TABLE 2 HERE]

Most of the individuals participating in the program were female, middle-aged (35 to 37 years old), white or brown people with high school completed, with average wages that were a little more than minimum wage. More than half (57%) of the individuals in Rio

[20] MCMV participants in the housing projects who were not selected by the lotteries were excluded from the samples in both cities.

de Janeiro had some regular work before the lottery, while in São José do Rio Preto only 38% did. These workers were predominantly in the service sector of the economy.

The house characteristics seem to be similar between the control and treatment groups (Table 3, columns (4)-(6)) in terms of the number of people or families included in the household, number of rooms and infrastructure conditions: running water, access to sewer system, access to garbage collection, masonry walls, electricity, sidewalks around the house, and cement or ceramic floor. Also, when considering budget allocations, the groups are similar regarding what is spent on power, water, sanitation, rent, and transportation. Only in respect to the spending on food do the groups seem different, but the difference is less than US$2 (R$6.40). A comparison between the treated and control groups in Rio de Janeiro is impaired due to a selection problem in the data (columns (1)-(3)). The house and budget characteristics are found only in the Single Registry database, which is unavailable for the study of Rio de Janeiro. Table 3 exhibits the evidence for this selection problem, where the control group always seems to be in worse condition than the treatment group. Of course, only the more impoverished families in the control group were enrolled in the Single Registry, while all of the families in the treatment group were.

[TABLE 3 HERE]

Tables 2 and 3 show that the treatment and control groups are balanced, which is a consequence of randomization. Therefore, the estimates that will be presented below should not have significant problems with endogeneity.

Despite the randomization effected by the lottery, the decision to move to the new house is not random, and is strongly linked with the income of the individual, which in turn is due to the labor-market conditions. Table 4 makes it clear that the population that accepted the housing benefit is different from the one that was assigned to the treatment. More individuals who became beneficiaries of the program were female and had lower incomes and employment rates than the non-compliers (non-accepters) either in Rio de Janeiro or São José do Rio Preto. In Rio de Janeiro, the compliers were younger and proportionally more black or brown. In São José do Rio Preto, white people predominated, due to the past European colonization and immigration to this area. This conclusion is reinforced by a consideration of the houses and budget characteristics of the treatment and control groups (Table 5). Looking at the São José do Rio Preto data (columns (4)-(6)), the decision to move to the program's new house was not influenced by aspects of the accommodations like number of rooms, or infrastructure characteristics like running water, access to the sewer system, access to garbage collection, masonry walls, or electricity. The number of people or families living together was more critical (the more people living in the same house, the lower the likelihood of moving; but the more families living together, the higher the likelihood); also, the financial variables had a greater effect, like spending on power, water, sanitation, rent, transportation, and the total income of the household. The less-poor families tended to disregard the program's house in favor of the current one. The São José do Rio Preto data also permitted us to consider the distances from the house before the lottery to the MCMV house and to the city's central business district. In both cases, the bigger the distance, the lower the likelihood to move. Once again, the Rio de Janeiro data (restricted in the case of Table 5) confirm the data-selection problem, with non-compliers seeming to be in worse conditions than compliers. This is because compliers were enrolled in the Single Registry, but only the less-improved non-compliers were. These data suggest that the complier population (i.e., those who were assigned to treatment and complied with it) are more vulnerable than the non-compliers (which were assigned to

treatment but chose not to participate), and than the individuals in the control group.

[TABLE 4 HERE] [TABLE 5 HERE]

The MCMV houses seem to represent an improvement in the housing conditions, when considering only the beneficiaries (compliers). Table 6 indicates this apparent improvement. For the participants in both Rio de Janeiro and São José do Rio Preto, the program increased the number of rooms, decreased the number of families, improved the floor surface and wall material, and provided access to sewer, garbage collection, and electricity. In Rio de Janeiro, only 13% of the compliers had lived in slums before they moved to MCMV houses. São José do Rio Preto did not have information about the slums before the lottery. The amount of money spent by the families on rent decreased after they moved, but the amount they spent on transportation increased.

[TABLE 6 HERE]

5.2. Effects of housing offer and other baseline characteristics on compliers

Participation in the MCMV program is determined by the lottery results and other individual characteristics. Table 7 shows the relationship between the lottery and the likelihood of participating in the program. In the Rio de Janeiro case we divided the analysis by lottery. In each column, the dependent variable is a binary variable that indicates whether the individual participated in the MCMV. The result is just the compliance rate of each lottery. The first and second lotteries included MCMV houses closer to the central business district than the third one, which would explain the higher compliance rates of the first two. The table also shows how individual characteristics affect the probability of accepting a vacancy in the program. As discussed before, many reasons may explain why the people who won each lottery do not participate in the program. Our primary hypothesis is that the individuals with the strongest connections to the labor market will avoid moving to a new house that is more distant from the central business district. In the second panel of Table 7, the dependent variable is an indicator of whether the individual accepted the vacancy in MCMV after being randomly selected. The estimates differ a little bit among the three lotteries, but the qualitative results are the same. Women, lower-income individuals, and those in the service sector are more likely to accept participation in the program once they have been selected.

Furthermore, Table 7 shows that 70% of the individuals assigned to treatment in São José do Rio Preto effectively became beneficiaries of the program, which is a considerable compliance rate compared to that of Rio de Janeiro and gives more confidence in the use of the SJRP lottery as an instrumental variable. The difference in compliance rates between SJRP and RJ is likely due to how the lotteries were conducted in each city. In the former, the enrollment had several stages. In the first stage in 2012, the families who were interested in the houses signed up to participate in the program. Then the city verified the qualifications of these families to participate in the program. Only those who fit the rules could participate in the lottery, conducted in 2013. Therefore, the selection process was entirely different from Rio de Janeiro, where the list of participants came from an old housing-demand registry. The heterogeneity among the individuals in the treatment group was examined with respect to participation in the program. The dependent variable is a dummy that indicates whether the individual moved into one of the MCMV projects. The estimates show that women heads of households had a greater chance of participating in the program. Also, individuals who lived closer to the residential complex site had a

greater chance of moving to the houses of the program.

The SJRP database permits us to explore the relationships between additional variables and compliance with the MCMV program. Receiving income transfers (from *Bolsa Família*) before the lottery did not have an impact on the decision to comply with MCMV, nor did being disabled, such as having a physical handicap. On the other hand, the farther the current house was from the MCMV house, the less likely it was that the individual would comply with the program, supporting the idea that MCMV impacted the people's accessibility to a job or other usual services. Also, the bigger the rent paid for the original house was, the less likely compliance with the MCMV program was. This result reinforces the previous assertions that the MCMV houses were inferior goods, and that the program selected only the most impoverished families.

[TABLE 7 HERE]

5.3. Effects of program on employment, wages, and participation in other social programs

Table 8 shows the program's impact on the variables of interest from the post-lottery period (2012 to 2016 for Rio de Janeiro, and 2014 to 2016 for São José do Rio Preto). The table shows the ITT and TOT (instrumental variable) results, where the lottery is the instrument variable for participation in the program. The unit of observation is the individual each year. Panels A to D present the estimates for the groups of individuals who participated in Lotteries 003, 006, and 009 in Rio de Janeiro and São José do Rio Preto, respectively. The results are presented with and without control variables.[21] Fixed time effects are included, and all results have standard errors clustered at the individual level.

The participation in MCMV reduced the probability of being formally employed in the years following the lotteries. However, only in Lottery 006 is the impact significant at the level of 5%. People who were assigned to treatment and moved to MCMV houses in this lottery were 4.9% less likely to be employed in subsequent years.[22] One of the possible explanations for a significant result only in Lottery 006 is that the vacancies were for projects located farther away from public transport and had less access to public services than the projects in Lottery 003. Another explanation is that there were twice as many treatment and control units in Lottery 006 as in Lottery 003. Lottery 009, on the other hand, had a compliance rate of only 12%, and thus needed a substantial impact on its employment rate to affect the employment rate of the entire treatment group. For the São José do Rio Preto sample (Panel D) there is doubtless a negative impact on the regular employment rate. The individuals in the treatment group had their formal employment rate reduced by about 2.3%. Considering the compliance rate of 70%, this means that those who accepted the vacancy in the program and moved to the *Minha Casa Minha Vida* residential projects had their formal employment rate reduced by up to 3.3% in the

[21] The results for the control variable models include data for about 74% of the sample, in the Rio de Janeiro case, and 99% of the sample in the São José do Rio Preto case, which corresponds to those individuals who had some formal job between the years 2006 and 2014. For these restricted samples it was possible to create control variables, as presented in Table 2, and consider information about gender, schooling, age, race, and the formal job in the year prior to the lotteries, such as formal-employment rate, wages, and activity sector.

[22] The impact's magnitude is similar among the lotteries, but the significance is different. In Lottery 003 the significance is only at 10%, and in the Lottery 009 there is not significance.

three years after moving.

[TABLE 8 HERE]

It is interesting to note that the samples from both Rio de Janeiro and São José do Rio Preto had similar negative impacts on employment. However, the effect was more significant in São José do Rio Preto. This is possibly a reflection of the compliance rate, which was significantly higher there.

Figure 4 details the impact of MCMV over time by lottery. For Lottery 006 (B), the chart shows the effect becomes more negative over time, turning statistically significant at 5% three years after the lottery. A year later, the estimated reduction in employment rate is 10%. For Lottery 003 (A), the estimated effect is significant at 5% in the last year of the sample, five years after the lottery. This trend seems to indicate a medium-term impact, not just a short-term one. A short-term effect could mean a transitional phase for the new dwelling. Once the residents adapted to their new environment, the effect would tend to dissipate, as has occurred in some studies in the U.S. (Wood et al., 2008). However, this dissipation effect does not seem to occur in the Rio de Janeiro case, where the adverse effect, for all lotteries, increases over time. The effect is negative in Lottery 009 (C) also, even though it is not significant at 5%. In São José do Rio Preto (D), the impact is negative and significant as early as the first year after the lottery, which is when the individuals effectively moved to the residential complexes. Three years after the lottery, the impact is no longer significant at 5%. As the RAIS datasets for 2017 and 2018 are not yet available, it is difficult to say whether the adverse effect is a medium-term effect, as appears to be the case in Rio de Janeiro, or if it is a short-term effect, having an impact on the employment rate only in the first two years after the move.

[FIGURE 4 HERE]

The lower employment rate among beneficiaries may be the result of two different processes. On the one hand, the beneficiaries may have found it more difficult to find a job or remain in the labor market after they changed to the new house because it is more distant from the central business district. On the other hand, there may have been a shift from the formal to the informal labor market, in which case we cannot see them in the RAIS database. However, both processes represent a deterioration in the state of employment.

Estimating the effect of the program on income faces greater difficulties, given the nature of the datasets used. From RAIS, only the wages of the individuals working in the regular labor market can be obtained, thus excluding the income information of those who work in the informal labor market, who are a significant part of the sample.[23] Therefore, we only calculate the impact of the program on wages in the formal market, as shown in the second row of each panel in Table 8. That is, for those individuals who did not have formal employment in a given year, we input a zero value for salary.[24] Although imperfect, the estimate seems to indicate that there was no effect on the income for those

[23] As mentioned above, for Rio de Janeiro, 75% of the individuals in the sample had a formal job between 2006 and 2014, which means that at least a quarter of the sample had sources of income outside the formal market. This number goes higher if we assume that some individuals switched between the formal and informal labor markets during the period.

[24] In the Robustiness check section (section 5.4) we restricted the sample to only the observable data, and the results remained.

benefited by the program. In the estimate for Lottery 003, when control variables are considered, the effect seems to be negative, at 10% significance. Despite having a more informed database in São José do Rio Preto, the results for the formal wages are the same as in Rio de Janeiro, and we cannot affirm that the MCMV program impacted the wages of the treated individuals.

Bolsa Família is the main conditional cash-transfer program in Brazil. Currently, the program has almost 14 million beneficiary families, who live in conditions of poverty or extreme poverty.[25] Participation in *Bolsa Família* is an important indicator of the economic situation of families. The third row of each panel in Table 8 presents the impact of MCMV on participation in *Bolsa Família*. The results indicate that participation in *Bolsa Família* increased significantly in both Lotteries 003 (A) and 006 (B). In the first, this increase was from 6.5 to 7%, and in the second, 3.3 to 3.7% (Table 8, panels A and B). A negative result does not necessarily mean that the economic situation of the households got worse. To participate in MCMV, it is mandatory to register in the Single Registry database, which could facilitate the *Bolsa Família* program in finding families that already should be participating in it. The available data for Rio de Janeiro covers only the periods between 2012 and 2017, making it impossible to verify whether the treatment and control groups had similar participation rates in the *Bolsa Família* before the lottery year. However, the SJRP database permits us to investigate this impact properly. Unlike the Rio de Janeiro lotteries, the São José do Rio Preto data come from the Single Registry before the date of the lottery (about 99% of the sample from SJRP was in the Single Registry in 2013). In the SJRP case, the estimated effect is also positive, indicating that participating in the MCMV program also increased the *Bolsa Família* participation by up to 4%. Then, it is possible to conclude that the increase in the *Bolsa Família* beneficiaries is, in fact, a negative impact of MCMV, which reinforces the conclusion in the RJ case. Figure 5 makes it clear that for SJRP (D), the positive impact on participation in *Bolsa Família* appears in the second year after the lottery and remains until the last year for which the data were available, which coincides with the date of the mandatory biannual update of the Single Registry.

[FIGURE 5 HERE]

5.4. Robustness check

We estimate the impact on employment considering two alternative dependent variables. For the first one we transformed RAIS into quarterly panels, indicating whether individuals were formally employed in a given quarter between 2012 and 2016. For the second measure, we used an indicator of whether they were formally employed on the last day of each year (December 31), which was available in the RAIS database. Table 9 shows the impacts on formal employment by using these two alternative dependent variables. In the quarterly employment indicator, the estimates remain similar. Among the Rio de Janeiro lotteries, only Lottery 006 presents a significant and adverse effect at 5%. The effect is certainly not positive for any of the lotteries. In the SJRP sample, the effect remains negative and significant. Using employment on the last day of the year, the negative effect still remains; but now, it has become significant also for Lottery 003, at 5%, and Lottery 006, at 1%.

[25] Families with a monthly income of up to US$20 per person or families that have incomes between US$20 and US$45 per person and who have young children are eligible.

[TABLE 9 HERE]

In our benchmark model, we considered the wages of a regular worker found in the RAIS database, and imputed zero wages to the other individuals. However, these people could have been working in the informal market. In the robustness check, we considered a restricted sample that only included workers founded in the RAIS database. Table 10 presents the results considering this restricted sample. The conclusion is similar to that when the total sample is considered, that is, the program did not seem to affect the wages of the treated individuals that remained working, but only impacted their likelihood of employment.

[TABLE 10 HERE]

In the Rio de Janeiro regressions, we also did an exercise that excluded from the control groups individuals who had won in the other lotteries. For example, in the sample for Lottery 003, individuals who had won in Lotteries 006 and 009 were excluded from the control group, and similarly for the other two lotteries. The results are presented in Table 11. There is no change in the results. The impact on formal employment remains negative at about 4.0 to 5% and significant at 5% in both Lotteries 003 and 006. Also, the increase in participation in Bolsa Família is the same as before, varying between 3.7 and 7%.

[TABLE 11 HERE]

In Table 12 we explore robustness for some subgroups, looking at the impacts of the program on formal employment and participation in *Bolsa Família*. To simplify the presentation, we only show the treat-on-treated subsample and compare the estimated coefficient with the main-sample result, using a simple-mean test. The p-value of this test is reported in parentheses. In general, despite some differences in specific coefficients, the difference was only statistically significant in a few cases. This difference occurred only in São José do Rio Preto to people living far from the new houses (to increase their likelihood of remaining employed) or, for those who joined the cash-transfer program, to people of working age who had completed high school, were formally employed before the lottery, and lived far from the new houses before moving.

[TABLE 12 HERE]

The database of São José do Rio Preto permits us to check for biases in the Rio de Janeiro samples. The Rio de Janeiro data are based only on the RAIS information, which contains all of the formal workers in the country in a given year. The results are for about 75% of the sample, which corresponds to those individuals who had a formal job between 2006 and 2014. We add to the SJRP data a sample of individuals with only information from the RAIS database between the years 2009 and 2014. The balance between the treatment and control groups with RAIS information is about 76% of the whole dataset.[26] Table 13 presents the results for this exercise. Note that although we are excluding 25% of the SJRP sample to make it similar to the RJ restriction, the results are quite similar to the case in which all individuals are included (Table 8). The impact's magnitude is similar to those estimated for Rio de Janeiro Lotteries 003 and 006, that is, the employment rate after the lottery decreased by between 3.8 and 4.3%; wages were

[26]The balance between treatment and control groups is maintained. There are no significant differences between the two groups in those variables that we were able to construct from RAIS.

not impacted; and participation in the Bolsa Família program increased from 3.5 to 7%.

[TABLE 13 HERE]

6. Discussion and Conclusion

Housing programs affect the beneficiaries in different ways. Low-income families may be willing to live in substandard housing if this allows them to be close to employment opportunities in the central business district, as suggested by Glaeser et al. (2008) and Glaeser (2011). This means the housing program will fail its objective of improving living conditions for low-income families if the houses are built far from the center of the city. However, bad housing could effectively be a " poverty trap" due to a market failure, making it difficult for low-income families to move to another place. Therefore, the government could help these families to improve their living conditions by building better houses near the central business district.

To subsidize the acquisition of new houses, often far from the original home locations, and also far from the job center, may create other problems for the beneficiary families. Several studies have sought to analyze the impact of programs that provide individuals with housing assistance, whether in the form of vouchers or in the direct provision of housing. The performance of these individuals in the labor market is one of the most interesting impacts to be considered: it may not only reveal the indirect effects of the housing programs but also bring more information to the debate about how the government should help the most vulnerable families. The idea that housing assistance brings positive externalities to the beneficiary families is one of the main reasons for the high investment in this type of program all over the world.

In Brazil, the *Minha Casa Minha Vida* program has reached a very significant size in just eight years of existence, delivering more than 1.2 million houses just in Segment I of the program, which is aimed at the most impoverished families. It is one of the most costly government programs. In addition, it has been criticized because the houses built by the program are usually located in peripheral regions, in neighborhoods with little infrastructure, and this point imposes yet an additional cost on the beneficiaries: the cost of distance. The present work is one of the first to analyze the microdata for *Minha Casa Minha Vida*. Also, it explores a rare source of exogeneity in the literature: the randomization of the selection process for program beneficiaries.

Our results suggests that the housing program in Brazil selects participants badly, benefiting only the ones least linked to the labor market. Even if a random process like a lottery selects the families, they must decide whether it's worth it to them to accept the MCMV houses. Their decisions are based less on the current houses' condition, public infrastructure, or characteristics of the property or the neighborhood, and more on the distance from the new houses to the center of business and employment, and on the current conditions of the individuals in the labor market, as in wages. Individuals currently living in distant locations from the new houses and those holding the best jobs in the labor market are less likely to move to the new homes.

For the families that moved, the results show that MCMV has no positive effect on the formal employment rate. Not only that, the estimates allow us to affirm that MCMV hurt the regular employment rate in both cities analyzed, Rio de Janeiro and São José do Rio Preto. The effect is around 3.3% in São José do Rio Preto, and varies from 4%

to 6% in Rio de Janeiro, depending on the lottery. New studies based on data for the informal labor market will be very important in determining whether there has been a migration from the formal to the informal labor market, or whether there has indeed been a reduction in the employment rate among the beneficiaries of the program. Given the nature of the available data, the exact transmission mechanism of this negative effect cannot be isolated yet. However, the negative effect was higher for the houses located farther from the city center. Also, in São José do Rio Preto, the effect was more harmful for baseline families living more than 5 km (3 miles) from the housing complexes, suggesting that distance (accessibility) matters. Finally, in Rio de Janeiro, the negative effect on employment increased with time. In the first and second lotteries analyzed, the negative impact reached almost 10% five years after the lotteries, indicating a negative medium to long-term effect. In São José do Rio Preto, the impact was more immediate and remained negative (less significantly) with time.

Despite the negative impact on employment, the regular income of the individuals did not seem to be affected, that is, the wages of those who remained employed were not impacted by the program. Nevertheless, it is also shown that the program had a positive effect on participation in the *Bolsa Família* program, a program that is aimed at economically vulnerable families. This may indicate a worsening of the economic situation among the beneficiaries.

The results are very relevant for housing policies in Brazil. In addition, many developing countries have started housing programs with characteristics similar to those of MCMV in recent years. However, there are still few studies on these programs. This work will also contribute to this literature.

Attachments

[TABLE 14 HERE]

[TABLE 15 HERE]

[TABLE 16 HERE]

[TABLE 17 HERE]

Acknowledgements

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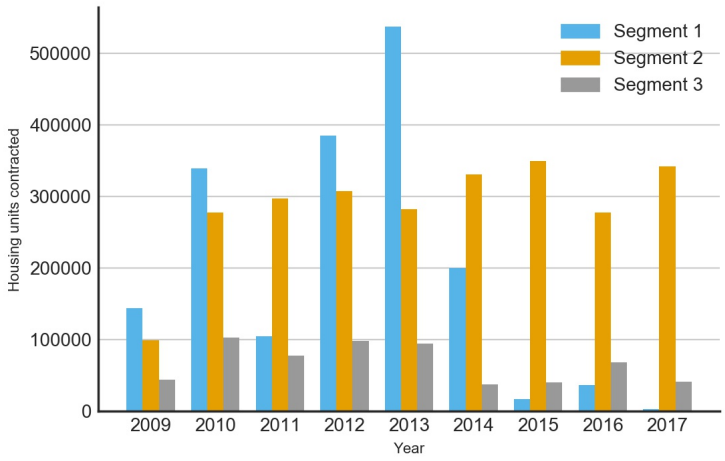

Figure 1: Housing units contracted in MCMV
Data from the Ministry of Cities. Own elaboration.

Table 1: MCMV lotteries in Rio de Janeiro city

	Lottery date	Participants	Winners	Beneficiaries	Compliance
Lottery 003/2011	11/06/2011	297,867	2,983	912	*30.6%*
Lottery 006/2011	13/08/2011	325,080	6,505	1,352	*20.8%*
Lottery 009/2011	02/11/2011	351,094	14,056	1,695	*12.1%*
Total		361,805	23,472	3,934	*16.8%*

Notes: Data from the city of Rio de Janeiro.

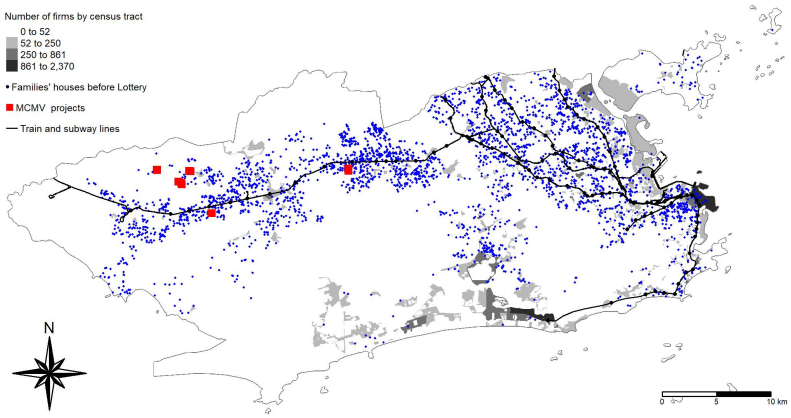

Figure 2: Distribution of formal jobs Rio de Janeiro and MCMV housing projects location. Data from RAIS and the 2010 Census. Own elaboration.

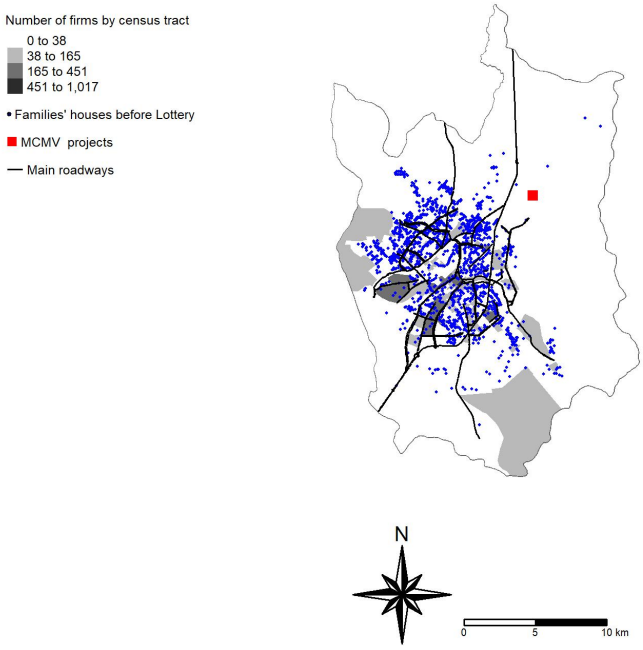

Figure 3: Location of the recipients in São José do Rio Preto
Data from Cadastro Único. Own elaboration.[27]

Table 2: Characteristics of treatment and control groups - Rio de Janeiro (all lotteries) and São José do Rio Preto

	Rio de Janeiro			São José do Rio Preto		
	(1)	(2)	(3)	(4)	(5)	(6)
	Control group	Treatment group	Difference (1) - (2)	Control group	Treatment group	Difference (4)-(5)
% with information linked in RAIS	0.746	0.746	0.000			
			(0.003)			
% linked in Single Registry				0.983	0.991	-0.008***
						(0.003)
Female	0.532	0.531	0.000	0.729	0.707	0.022**
			(0.004)			(0.010)
Age	36.921	36.965	-0.044	35.647	36.212	-0.565**
			(0.083)			(0.287)
White	0.380	0.384	-0.004	0.642	0.653	-0.010
			(0.004)			(0.011)
Yellow	0.006	0.005	0.001*	0.002	0.001	0.001
			(0.001)			(0.001)
Black	0.115	0.113	0.002	0.088	0.083	0.005
			(0.002)			(0.006)
Brown	0.342	0.340	0.002	0.264	0.258	0.006
			(0.004)			(0.010)
Indigenous	0.003	0.002	0.000	0.001	0.001	-0.001
			(0.000)			(0.001)
Color not identified	0.055	0.059	-0.004**			
			(0.002)			
Attends school				0.028	0.028	0.000
						(0.004)
Illiterate	0.001	0.001	-0.000	0.027	0.025	0.001
			(0.000)			(0.004)
Completed elementary school	0.874	0.871	0.003	0.844	0.841	0.004
			(0.003)			(0.008)
Completed High School	0.655	0.649	0.006	0.588	0.585	0.003
			(0.004)			(0.011)
Completed College	0.108	0.103	0.005**	0.055	0.060	-0.006
			(0.002)			(0.005)
Disabled				0.023	0.022	0.001
						(0.003)
Head of the family				0.947	0.947	0.000
						(0.005)
Formally employed (before Lottery)	0.575	0.572	0.003	0.382	0.385	-0.003
			(0.003)			(0.011)
Formal wage (before Lottery)	614.826	610.660	4.167	436.408	445.811	-9.403
			(5.891)			(14.992)
Worked in the services sector	0.206	0.205	0.001	0.252	0.246	0.006
			(0.003)			(0.010)
Worked in the administrative sector	0.182	0.181	0.001	0.137	0.137	-0.000
			(0.003)			(0.008)
Worked in the manufacturing sector	0.076	0.076	-0.000	0.134	0.139	-0.005
			(0.002)			(0.008)
Receives Bolsa Familia				0.169	0.156	0.013
						(0.009)
F-statistic			0.97			0.82
P-value			0.489			0.7123
Observations	338,333	23,472	361,805	9,728	2,356	12,084

Notes: This table shows the balance between the treatment and control groups in Lotteries of Rio de Janeiro and São José do Rio Preto. The unit of analysis is the individual. All information presented for Rio de Janeiro is from RAIS, and, for São José do Rio Preto, RAIS and Single Registry. Information on gender, skin color, schooling, age, and disability are from the restricted sample (74% of the total sample to Rio de Janeiro and 99% to São José do Rio Preto). Information on regular salary, formal employment, and the employment sector is from the whole sample. The columns (1) and (4) present the data on the individuals who did not win the MCMV lottery. The columns (2) and (5) present the data on the individuals who won. The columns (3) and (6) indicate the difference between the groups and the t-test for the difference between the two groups. The F-test and p-value statistics are from a regression where the dependent variable is equal to one if the individual won a Lottery and 0 otherwise.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Characteristics of the houses and budget of treatment and control groups - Rio de Janeiro city (all lotteries) and São José do Rio Preto

	Rio de Janeiro			São José do Rio Preto		
	(1)	(2)	(3)	(4)	(5)	(6)
	Control group	Treatment group	Difference (1) - (2)	Control group	Treatment group	Difference (4) - (5)
Receives Bolsa Familia	0.505	0.343	0.162***	0.169	0.155	0.013
			(0.006)			(0.09)
Number of people in household	3.231	2.673	0.557***	2.801	2.819	-0.018
			(0.021)			(0.036)
Number of families in household	1.029	1.038	-0.009	1.214	1.236	-0.022
			(0.008)			(0.014)
Number of room in the house	3.940	4.068	-0.129***	4.488	4.494	-0.006
			(0.016)			(0.029)
Has piped water	0.952	0.965	-0.013***	0.989	0.989	-0.000
			(0.002)			(0.002)
Has access to sewerage system	0.904	0.937	-0.033***	0.949	0.948	0.002
			(0.003)			(0.005)
Has access to garbage collection	0.681	0.801	-0.119***	0.997	0.998	-0.001
			(0.005)			(0.001)
Masonry walls	0.708	0.822	-0.114***	0.998	0.997	0.001
			(0.005)			(0.001)
Has electricity	0.688	0.789	-0.101***	0.998	0.997	0.001
			(0.005)			(0.001)
Has sidewalks around the house	0.809	0.865	-0.056***	0.950	0.945	0.004
			(0.005)			(0.005)
Cement floor	0.174	0.128	0.046***	0.158	0.162	-0.005
			(0.004)			(0.008)
Ceramics floor	0.418	0.589	-0.171***	0.816	0.811	0.005
			(0.005)			(0.009)
Value spent on energy (R$)	35.958	36.227	-0.270	65.615	64.653	0.963
			(6.654)			(3.921)
Value spent on water and sanitation (R$)	10.835	10.296	0.539	30.788	31.231	-0.443
			(3.107)			(0.591)
Value spent on natural gas (R$)	35.997	32.703	3.294***	21.280	20.996	0.284
			(0.508)			(0.853)
Value spent on rent (R$)	88.266	90.328	-2.062	198.953	198.686	0.267
			(1.686)			(4.502)
Value spent on transportation (R$)	7.781	11.537	-3.756***	22.075	21.678	0.397
			(0.427)			(1.147)
Household income (R$)	428.408	330.727	97.681	512.183	526.205	-14.022
			(505.385)			(8.546)
Value spent on food (R$)	200.478	215.817	-15.340***	238.094	244.483	-6.389**
			(3.266)			(2.949)
Distance between house at baseline MCMC projects				9566.464	9232.765	333.699
						(741.001)
Distance between house at baseline and city center (in meters)				5304.467	5044.604	259.863
						(746.805)
Observations	87,355	8,987	96,342	9,566	2,335	11,901

Notes: The unit of analysis is the individuals' domicile who participated in the MCMV lottery. The data are from the Single Registry and represent about 74% of the sample, to Rio Janeiro, and 99% to São José do Rio Preto. The columns (1) and (4) present information on the houses of individuals who did not won in the MCMV lottery. The columns (2) and (5) present the information of the houses of individuals who won. The columns (3) and (6) indicate the difference between the groups and the result of a t-test of differences between the two groups. All monetary values are in Brazilian Reais 2012 constant prices.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Characteristics of compliers and non-compliers groups - Rio de Janeiro (all lotteries) and São José do Rio Preto

	Rio de Janeiro			São José do Rio Preto		
	(1)	(2)	(3)	(4)	(5)	(6)
	Compliers	Noncompliers	Difference (2)-(1)	Compliers	Noncompliers	Difference (5)-(4)
with information linked in RAIS	0.728	0.750	0.023***			
			(0.008)			
Receives Bolsa Familia				0.166	0.129	-0.037**
						(0.016)
Female	0.628	0.512	-0.116***	0.738	0.633	-0.105***
			(0.010)			(0.021)
Age	36.012	37.151	1.139***	36.047	36.603	0.556
			(0.219)			(0.591)
Color White	0.375	0.386	0.010	0.645	0.671	0.025
			(0.010)			(0.022)
Color Yellow	0.006	0.005	-0.001	0.001	0.001	0.000
			(0.001)			(0.002)
Color Black	0.139	0.108	-0.031***	0.087	0.075	-0.012
			(0.006)			(0.012)
Color mixed	0.382	0.332	-0.049***	0.264	0.243	-0.021
			(0.010)			(0.020)
Indigenous	0.001	0.002	0.001	0.001	0.003	0.002
			(0.001)			(0.002)
Color not identified	0.051	0.061	0.010**			
			(0.005)			
Attends school				0.029	0.026	-0.003
						(0.007)
Illiterate	0.002	0.001	-0.001	0.024	0.029	0.005
			(0.001)			(0.007)
Completed elementary school	0.860	0.873	0.014**	0.830	0.866	0.036**
			(0.007)			(0.017)
Completed High School	0.602	0.658	0.056***	0.578	0.601	0.023
			(0.010)			(0.022)
Completed College	0.063	0.110	0.047***	0.057	0.068	0.010
			(0.006)			(0.011)
Disabled				0.024	0.017	-0.007
						(0.007)
Head of the family				0.966	0.902	-0.064***
						(0.010)
Formally employed (before Lottery)	0.527	0.581	0.054***	0.367	0.425	0.058***
			(0.009)			(0.0011)
Formal wage (before Lottery)	399.812	653.114	253.302***	391.167	574.820	183.653***
			(15.255)			(14.992)
Worked in the services sector	0.241	0.198	-0.044***	0.242	0.255	0.014
			(0.007)			(0.019)
Worked in the administrative sector	0.160	0.185	0.025***	0.146	0.114	-0.032**
			(0.007)			(0.008)
Worked in the manufacturing sector	0.060	0.079	0.019***	0.127	0.168	0.041***
			(0.005)			(0.016)
Observations	3,934	19,538	23,472	1,655	701	2,356

Notes: This table shows the balance between the compliers and non-compliers to Rio de Janiero (all Lotteries) and São José do Rio Preto. The unit of analysis is the individual. All information presented to Rio de Janeiro is from RAIS, and, to São José do Rio Preto, RAIS and Single Registry. Information on gender, race, schooling, age and disability are from restricted sample (74% of the total sample to Rio de Janeiro, and 99% of total sample, to São José do Rio Preto). Information on formal salary, formal employment and the employment sector is from the whole sample. The columns (1) and (4) present data on the individuals who won the lottery and who became beneficiaries of MCMV (compliers). The columns (2) and (5) present data on those who won but did not become beneficiaries (non-compliers). The columns (3) and (6) indicate the difference between the non-compliers and compliers and the result of a t-test for the difference between the two groups.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Characteristics of the houses and budget of treatment and control groups - Rio de Janeiro (all lotteries) and São José do Rio Preto

	Rio de Janeiro			São José do Rio Preto		
	(1)	(2)	(3)	(4)	(5)	(6)
	Compliers	Noncompliers	Difference (5)-(4)	Compliers	Noncompliers	Difference (5)-(4)
Receives Bolsa Familia	0.236	0.427	0.191***	0.166	0.129	-0.037**
			(0.010)			(0.016)
Number of people in household	2.350	3.018	0.667***	2.767	2.941	0.173**
			(0.038)			(0.073)
Number of families in household	1.029	1.048	0.019	1.256	1.188	-0.068**
			(0.016)			(0.028)
Number of room in the house	4.117	4.030	-0.087***	4.468	4.554	0.086
			(0.034)			(0.065)
Has piped water	0.980	0.953	-0.026***	0.987	0.993	0.006
			(0.004)			(0.005)
Has access to sewerage system	0.972	0.910	-0.062***	0.948	0.946	-0.001
			(0.005)			(0.010)
Has access to garbage collection	0.907	0.716	-0.191***	0.999	0.997	-0.002
			(0.008)			(0.002)
Masonry walls	0.920	0.744	-0.177***	0.998	0.996	-0.002
			(0.008)			(0.002)
Has electricity	0.852	0.739	-0.113***	0.996	0.999	0.003
			(0.009)			(0.003)
Has sidewalks around the house	0.897	0.830	-0.066***	0.948	0.939	-0.009
			(0.008)			(0.010)
Cement floor	0.099	0.151	0.053***	0.171	0.142	-0.028*
			(0.007)			(0.017)
Ceramics floor	0.737	0.473	-0.264***	0.806	0.822	0.015
			(0.010)			(0.018)
Value spent on energy (R$)	36.510	35.973	-0.537	62.849	68.908	6.059*
			(1.500)			(3.390)
Value spent on water and sanitation (R$)	9.775	10.810	1.035**	30.820	32.202	1.382
			(0.481)			(1.117)
Value spent on natural gas (R$)	31.258	33.912	2.654	20.257	22.739	2.483***
			(1.677)			(0.681)
Value spent on rent (R$)	89.887	90.767	0.879	188.628	222.478	33.850***
			(3.249)			(8.983)
Value spent on transportation (R$)	13.178	9.823	-3.355***	20.102	25.410	5.307**
			(0.877)			(2.177)
Household income (R$)	451.405	236.943	-214.462***	520.427	539.839	19.412
			(6.992)			(16.703)
Value spent on food (R$)	226.024	207.457	-18.567***	234.585	267.844	33.260***
			(2.623)			(5.805)
Distance between house at baseline MCMC projects				8685.975	10,520.95	1,834.977**
						(730.082)
Distance between house at baseline and city center (in meters)				4,513.620	6,295.553	1,781.933**
						(735.140)
Observations	3,930	5,057	8,987	1,640	695	2,335

Notes: The unit of analysis is the individual's domicile who participated in the MCMV lottery. The data are from the Single Registry and represent about 74% of the sample, to Rio Janeiro, and 99% to São José do Rio Preto. The columns (1) and (4) present the information of the individual's houses who won the lottery and who became beneficiaries of MCMV (compliers). The columns (2) and (5) present the information of those who won the lottery but did not become beneficiaries (non-compliers). The columns (3) and (6) indicate the difference between the non-compliers and compliers and the result of a t-test for the difference between the two gropus. All monetary values are in Brazilian Reais 2012 constant price.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Characteristics of beneficiaries' houses (Rio de Janeiro city)

	Riol de Janeiro		São José do Rio Preto	
	Before	After	Before	After
Permanent private residence	0.97	0.99	0.995	.998
	(0.156)	(0.081)	(.070)	(.040)
Lives in slums	0.13	0.00		
	(0.342)	(0.000)		
Number of rooms	4.06	4.73	4.468	4.814
	(1.368)	(1.208)	(1.528)	(0.758)
Has piped water	0.98	0.98	0.987	0.993
	(0.144)	(0.134)	(0.113)	(0.081)
Number of families in the house	1.03	1.01	1.256	1.120
	(0.335)	(0.089)	(0.688)	(0.651)
House has dirt floor	0.13	0.01		
	(0.339)	(0.0893)		
Ceramics floor			0.806	0.931
			(0.395)	(0.254)
House has masonry walls	0.92	0.99	0.998	0.999
	(0.278)	(0.104)	(0.049)	(0.029)
House has access to sewerage system	0.97	0.98	0.948	0.982
	(0.169)	(0.149)	(0.222)	(0.133)
Has access to garbage collection	0.90	0.98	0.999	1.000
	(0.298)	(0.146)	(0.035)	(0.000)
Has electricity	0.86	0.90	0.996	0.998
	(0.343)	(0.305)	(0.065)	(0.040)
Has sidewalks around	0.89	0.95	0.948	0.985
the house	(0.313)	(0.223)	(0.222)	(0.120)
Value spent on rent (R$)			188.628	101.111
			(188.499)	(144.527)
Value spent on transportation (R$)			20.102	28.762
			(45.647)	(61.632)
Linked in Single Registry			1.000	0.748
			(0.000)	(0.435)
N	3,666	1,378	1,640	1,226

Notes: The unit of analysis is the beneficiaries' domicile. Standard deviation between parentheses. The information in column (1) is from the beneficiaries' houses before moving to the MCMV house. In column (2), the information is after the move and includes only those households that updated the Single Registry after them moved. The information was collected from the Single Registry. More information can be found in the text.

Table 7: The effect of housing offer and other baseline characteristics on participating in MCMV

	Rio de Janeiro City			São José do Rio Preto city
	Lottery 003	Lottery 006	Lottery 009	
Dependent variable: compliance to MCMV program				
Won the lottery	0.306***	0.208***	0.121***	0.703***
	(0.000848)	(0.000719)	(0.000561)	(0.00270)
N	297,867	325,080	351,094	11,901
R^2	0.304	0.205	0.116	0.655
F	129,856.3	83,584.5	46,216.0	22,620.4
Dependent variable: compliance to MCMV program				
Female	0.103***	0.0817***	0.0313***	0.0628***
	(0.0201)	(0.0119)	(0.00656)	(0.0242)
Age	-0.00167*	-0.00239***	-0.00110***	-0.00176*
	(0.000930)	(0.000560)	(0.000312)	(0.000978)
Color black	0.0683**	0.0578***	0.0293***	0.0199
	(0.0309)	(0.0186)	(0.0103)	(0.0330)
Color brown	0.0596***	0.0134	0.0198***	0.0218
	(0.0208)	(0.0124)	(0.00693)	(0.0219)
Elementary school	0.0197	0.0345*	0.0106	-0.0956***
	(0.0322)	(0.0203)	(0.0111)	(0.0329)
High school	-0.0417*	-0.0479***	-0.0134*	-0.00334
	(0.0251)	(0.0149)	(0.00812)	(0.0240)
College	-0.0541	-0.0296	-0.0209*	-0.0171
	(0.0350)	(0.0198)	(0.0112)	(0.0414)
Formal wage	-0.0000837***	-0.0000424***	-0.0000294***	-0.000126***
	(0.0000143)	(0.00000657)	(0.00000422)	(0.0000216)
Formally employed	0.0117	-0.0268	-0.0176	-0.0381
	(0.0391)	(0.0444)	(0.0121)	(0.0443)
Services sector	0.0908***	0.0752***	0.0472***	0.0444
	(0.0343)	(0.0193)	(0.0107)	(0.0407)
Administrative sector	0.0407	0.00677	0.0167	0.121***
	(0.0337)	(0.0188)	(0.0105)	(0.0427)
Manufactury	0.0231	0.0763***	0.0000535	0.0415
	(0.0422)	(0.0242)	(0.0133)	(0.0443)
Head of the family				0.172***
				(0.0490)
Bolsa Família				0.0190
				(0.0301)
Disabled				0.0796
				(0.0629)
Attends school				-0.0221
				(0.0588)
Household income (R$)				-0.0000544
				(0.0000362)
Distance to MCMV (km)				-0.00000133**
				(0.000000649)
Rent ($)				-0.000189***
				(0.0000475)
Value spent on transportation ($)				-0.000327
				(0.000213)
Value spent on energy (R$)				-0.0000654
				(0.000131)
Value spent on water and sanitation (R$)				0.000399
				(0.000414)
Value spent on food (R$)				-0.000229***
				(0.0000808)
Number of people in household				-0.0225**
				(0.00894)
Number of families in household				0.0405**
				(0.0198)
Number of room in the house				-0.00337
				(0.00582)
Has piped water				-0.0618
				(0.0721)
Has access to sewerage system				-0.0684
				(0.0692)
Has access to garbage collection				0.0630
				(0.284)
Has electricity				-0.0986
				(0.113)
Masonry walls				0.217
				(0.220)
Has sidewalks around the house				0.0627
				(0.0648)
Cement floor				0.0782
				(0.0724)
Ceramics floor				0.0747
				(0.0692)
N	2,192	4,882	10,501	2,310
R^2	0.061	0.042	0.020	0.085
F	11.89	17.79	18.00	5.560

Notes: Each columns represents different lottery. The first three columns are from Rio de Janeiro lotteries, and the last from São José do Rio Preto. The first panel include all participants in each lottery and the dependent variable indicates compliance to MCMV program. Each row displays the results of a regression where the independent variable indicates whether the individual won the lottery in each of the lotteries. The second panel include only those individuals who won the lottery. The dependent variable also indicates compliance to MCMV program. The information is from RAIS to the period from 2006 to 2014 (RJ) and Single Registry from 2013 to 2016 (SJRP). See details about database in section 3.
All standard errors are clusterized at the individual level.
* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$

Table 8: Effects of MCMV on employment, wage and cash transfer program

	Control	ITT		biased LATE		Late IV	
	group - mean	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Lottery 003							
Formally employed	0.539	-0.013	-0.012*	-0.052***	-0.022*	-0.042	-0.040*
(yearly)		(0.008)	(0.007)	(0.014)	(0.013)	(0.027)	(0.023)
Formal wage	923.3	-33.620	-33.260*	-333.311**	-149.955**	-109.965	-112.340*
(yearly)		(21.873)	(19.027)	(21.713)	(22.614)	(71.103)	(64.060)
Receives *Bolsa Família*	0.114	0.020***	0.021***	0.110***	0.086***	0.065***	0.070***
		(0.005)	(0.005)	(0.011)	(0.012)	(0.017)	(0.018)
Number of individuals	297,867	297,867	220,411	297,867	220,411	297,867	220,411
Panel B: Lottery 006							
Formally employed	0.549	-0.008	-0.010**	-0.044***	-0.015	-0.037	-0.049**
(yearly)		(0.006)	(0.005)	(0.012)	(0.010)	(0.026)	(0.023)
Formal wage	987.2	-8.758	-9.697	-359.071**	-140.999**	-42.140	-47.771
(yearly)		(16.715)	(14.992)	(18.173)	(19.005)	(80.293)	(73.785)
Receives *Bolsa Família*	0.0996	0.007**	0.007**	0.089***	0.063***	0.033**	0.037**
		(0.003)	(0.003)	(0.009)	(0.009)	(0.015)	(0.016)
Number of individuals	325,080	325,080	242,791	325,080	242,791	325,080	242,791
Panel C: Lottery 009							
Formally employed	0.548	-0.005	-0.005	-0.036***	-0.008	-0.040	-0.040
(yearly)		(0.004)	(0.003)	(0.011)	(0.009)	(0.032)	(0.027)
Formal wage	977.5	-8.663	-6.148	-324.754**	-131.380**	-71.838	-51.980
(yearly)		(10.721)	(9.771)	(17.783)	(20.154)	(88.767)	(82.553)
Receives *Bolsa Família*	0.109	-0.003	-0.002	0.084***	0.060***	-0.022	-0.015
		(0.002)	(0.002)	(0.008)	(0.008)	(0.019)	(0.019)
Number of individuals	351,094	351,094	262,218	351,094	262,218	351,094	262,218
Panel D: São José do Rio Preto							
Formally employed	0.556	-0.025**	-0.023***	-0.051***	-0.034***	-0.036**	-0.033***
(yearly)		(0.010)	(0.008)	(0.012)	(0.009)	(0.015)	(0.011)
Formal wage	783.9	-19.069	-21.199	-109.018***	-75.582***	-27.146	-30.105
(yearly)		(18.216)	(14.046)	(19.401)	(14.992)	(25.882)	(19.901)
Receives *Bolsa Família*	0.131	0.020***	0.028***	0.043***	0.040***	0.029***	0.040***
		(0.007)	(0.005)	(0.008)	(0.006)	(0.010)	(0.007)
Number of individuals	12,084	12,084	11,843	12,084	11,843	12,084	11,843
Time fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
Control variables		No	Yes	No	Yes	No	Yes

Notes: Each panel represents a separate sample composed only of those individuals who participated in the corresponding lottery. The first column presents the mean of each dependent variable for the control group. Columns (1) and (2) indicate the intent-to-treat effects. The results come from OLS regressions of each dependent variable on a binary variable that indicates whether the individual won in that lottery. Columns (3) and (4) are the biased results for the treatment-to-treated estimator (without the correction to selection problem in the complier decision). Columns (5) and (6) are the results of a two-stage regression, where the random assignment to treatment is the instrumental-variable to participation in the program. Estimates represent the treatment-on-the-treated effects, as described in the text. Columns (1), (3), and (5) present the results for the whole sample without any control variables. Columns (2), (4), and (6) present the results with control variables for about 74% of the sample, in RJ cases (Panel A-C) or 99% of the sample, in SJRP case (Panel D). The reduction in sample corresponds to those individuals who had some formal job between the years 2006 and 2014. For these individuals, it was possible to create control variables (as presented in table 2). The formally employed variable (yearly) is a dummy that indicates whether the individual had any formal employment in a given year. The variable formal wage indicates the average salary of the individual in each year. The *Bolsa Família* participation variable is a dummy that indicates whether the individual receives *Bolsa Família* after the lottery.
All standard errors presented have clusters at the individual level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

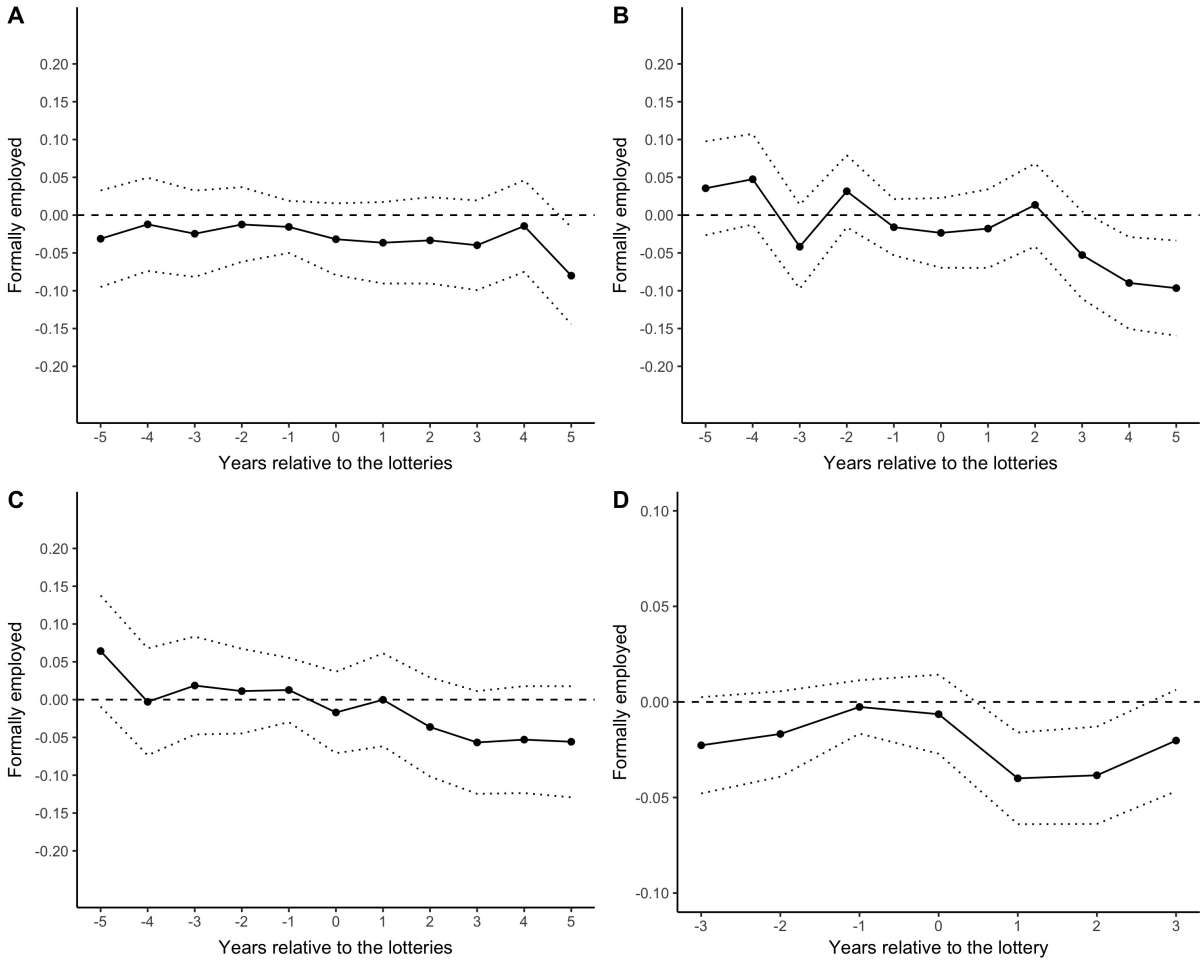

Figure 4: Effects of the program on employment rates over time by lottery

Notes: Figures A, B, C and D correspond to Lotteries 003, 006 and 009 in Rio de Janeiro and the lottery in São José do Rio Preto, respectively. Each solid line represents instrumental-variable estimation for the sample with control variables in each year. Dotted lines represent the 95% confidence interval around the estimates. Year zero is the year the lotteries were held. Data comes from RAIS of 2006 to 2016.

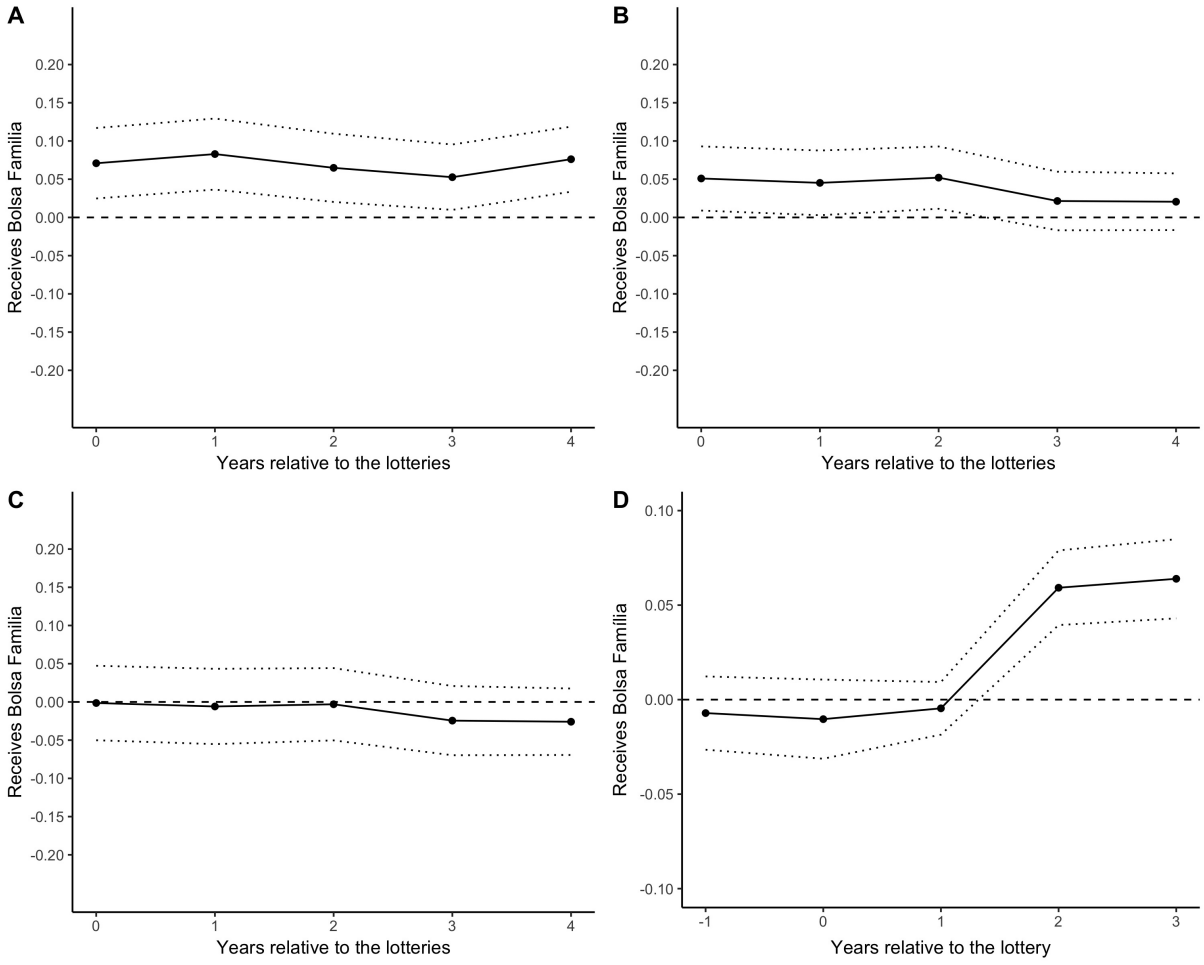

Figure 5: Effects of the program on *Bolsa Familia* participation rates over time by lottery

Notes: Figures A, B, C and D correspond to Lotteries 003, 006 and 009 in Rio de Janeiro and the lottery in São José do Rio Preto, respectively. Each solid line represents instrumental-variable estimation for the sample with control variables in each year. Dotted lines represent the 95% confidence interval around the estimates. Year zero is the year the lotteries were held. Data comes from Single Registry from 2012 to 2016.

Table 9: Effects of MCMV on alternative employment variables

	Control group mean	ITT		LATE IV	
		(1)	(2)	(3)	(4)
Panel A: Lottery 003					
Formally employed (quarterly)	0.479	-0.013	-0.012*	-0.041	-0.040*
		(0.008)	(0.007)	(0.025)	(0.023)
Formally employed on 12/31	0.441	-0.014*	-0.014*	-0.046*	-0.048*
		(0.008)	(0.007)	(0.025)	(0.025)
Number of individuals	297,867	297,867	220,411	297,867	220,411
Panel B: Lottery 006					
Formally employed (quarterly)	0.490	-0.010*	-0.012**	-0.048*	-0.059**
		(0.005)	(0.005)	(0.025)	(0.023)
Formally employed on 12/31	0.452	-0.011**	-0.014**	-0.054**	-0.067**
		(0.005)	(0.005)	(0.025)	(0.024)
Number of individuals	325,080	325,080	242,791	325,080	242,791
Panel C: Lottery 009					
Formally employed (quarterly)	0.489	-0.004	-0.004	-0.034	-0.033
		(0.004)	(0.003)	(0.030)	(0.027)
Formally employed on 12/31	0.451	-0.002	-0.002	-0.020	-0.014
		(0.004)	(0.003)	(0.030)	(0.029)
Number of individuals	351,094	351,094	262,218	351,094	262,218
Panel D: São José do Rio Preto					
Formally employed (quarterly)	0.473	-0.025**	-0.024***	-0.035***	-0.034***
		(0.010)	(0.007)	(0.014)	(0.010)
Formally employed on 31/12	0.419	-0.021**	-0.021***	-0.030**	-0.030***
		(0.010)	(0.008)	(0.014)	(0.011)
Number of individuals	1,2084	12,084	11,843	12,084	11,843
Time fixed effects		Yes	Yes	Yes	Yes
Control variables		No	Yes	No	Yes

Notes: Each panel represents a separate sample composed only of those individuals who participated in the corresponding lottery. The first column presents the mean of each dependent variable for the control group. Columns (1) and (2) indicate the intent-to-treat effects. The results come from OLS regressions of each dependent variable on a binary variable that indicates whether the individual won in that lottery. Columns (3) and (4) are the results of a two-stage regression, where the random assignment to treatment is the instrumental-variable to participation in the program. Estimates represent the treatment-on-the-treated effects, as described in the text. Columns (1), and (3) present the results for the whole sample without any control variables. Columns (2), and (4) present the results with control variables for about 74% of the sample, in RJ cases (Panel A-C) or 99% of the sample, in SJRP case (Panel D). The reduction in sample corresponds to those individuals who had some formal job between the years 2006 and 2014. For these individuals, it was possible to create control variables (as presented in table 2). The formally employed variable (quarterly) is a dummy variable to individuals employed in each quarter. The variable formally employed on 12/31 is a dummy variable to individuals employed on 12/31.
All standard errors presented have clusters at the individual level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Effects of MCMV on wage - restricted sample

	Control	ITT		LATE IV	
	group - mean	(1)	(2)	(3)	(4)
Panel A: Lottery 003					
Formal wage conditional	1711.737	-20.674	-19.106	-73.024	-67.623
on working		(30.904)	(19.374)	(108.541)	(68.334)
Number of individuals			195,622		
Panel B: Lottery 006					
Formal wage conditional	1799.671	12.205	2.873	62.943	14.815
on working		(23.830)	(17.374)	(123.297)	(89.607)
Number of individuals			215,749		
Panel C: Lottery 009					
Formal wage conditional	1783.558	0.714	7.033	6.280	61.966
on working		(14.522)	(9.675)	(127.760)	(85.375)
Number of individuals			233,330		
Panel D: São José do Rio Preto					
Formal wage conditional	1411.22	-19.069	-21.199	-27.146	-30.105
on working		(18.216)	(14.046)	(25.882)	(19.901)
Number of individuals			7,881		
Time fixed effects		Yes	Yes	Yes	Yes
Control variables		No	Yes	No	Yes

Notes: Each panel represents a separate sample composed only of those individuals who participated in the corresponding lottery. The first column presents the mean of each dependent variable for the control group. Columns (1) and (2) indicate the intent-to-treat effects. The results come from OLS regressions of each dependent variable on a binary variable that indicates whether the individual won in that lottery. Columns (3) and (4) are the results of a two-stage regression, where the random assignment to treatment is the instrumental-variable to participation in the program. Estimates represent the treatment-on-the-treated effects, as described in the text. Columns (1), and (3) present the results for the whole sample without any control variables. Columns (2), and (4) present the results with control variables for about 74% of the sample, in RJ cases (Panel A-C) or 99% of the sample, in SJRP case (Panel D). The reduction in sample corresponds to those individuals who had some formal job between the years 2006 and 2014. For these individuals, it was possible to create control variables (as presented in table 2). The variable formal wage indicates the average salary of the individual in each year.
All standard errors presented have clusters at the individual level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Effects of the program on individuals in Rio de Janeiro - Excluding other lottery winners

	ITT		LATE IV	
	(1)	(2)	(3)	(4)
Panel A: Lottery 003				
Formally employed	-0.015*	-0.013*	-0.050*	-0.046*
(yearly)	(0.008)	(0.007)	(0.027)	(0.024)
Receives *Bolsa Família*	0.019***	0.021***	0.064***	0.070***
	(0.005)	(0.005)	(0.017)	(0.018)
Number of individuals	280,913	207,822	280,913	207,822
Panel B: Lottery 006				
Formally employed	-0.008	-0.010**	-0.038	-0.050**
(yearly)	(0.006)	(0.005)	(0.027)	(0.023)
Receives *Bolsa Família*	0.007**	0.007**	0.032**	0.037**
	(0.003)	(0.003)	(0.016)	(0.017)
Number of individuals	309,809	231,347	309,809	231,347
Panel C: Lottery 009				
Formally employed	-0.005	-0.005	-0.041	-0.040
(yearly)	(0.004)	(0.003)	(0.032)	(0.027)
Receives *Bolsa Família*	-0.003	-0.002	-0.023	-0.015
	(0.002)	(0.002)	(0.019)	(0.019)
Number of individuals	350,452	261,740	350,452	261,740
Year fixed effects	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes

Notes: Each panel represents a separate sample composed only of those individuals who participated in the corresponding lottery. The first column presents the mean of each dependent variable for the control group. Columns (1) and (2) indicate the intent-to-treat effects. The results come from OLS regressions of each dependent variable on a binary variable that indicates whether the individual won in that lottery. Columns (3) and (4) are the results of a two-stage regression, where the random assignment to treatment is the instrumental-variable to participation in the program. Estimates represent the treatment-on-the-treated effects, as described in the text. Columns (1) and (3) present the results for the whole sample without any control variables. Columns (2) and (4) present the results with control variables for about 74% of the sample. The reduction in sample corresponds to those individuals who had some formal job between the years 2006 and 2014. For these individuals, it was possible to create control variables (as presented in table 2). The formally employed variable (yearly) is a dummy that indicates whether the individual had any formal employment in a given year. The *Bolsa Família* participation variable is a dummy that indicates whether the individual receives *Bolsa Família* after the lottery.
All standard errors presented have clusters at the individual level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Effects of the program by subgroup - Rio de Janeiro (all Lotteris) and São José do Rio Preto

	TOT - IV							
	Formally employed				Receives *Bolsa Família*			
	Lottery 003	Lottery 006	Lottery 009	SJRP	Lottery 003	Lottery 006	Lottery 009	SJRP
Main sample (Table 8)	-0.040	-0.049	-0.040	-0.033	0.070	0.037	-0.015	0.040
Female	-0.026	-0.049	-0.057	-0.038	0.061	0.014	-0.039	0.027
	(0.687)	(0.999)	(0.695)	(0.769)	(0.770)	(0.412)	(0.478)	(0.159)
Working age	-0.036	-0.050	-0.046	-0.035	0.069	0.040	-0.012	0.023**
	(0.904)	(0.975)	(0.877)	(0.898)	(0.970)	(0.898)	(0.913)	(0.048)
Color black or brown	-0.066	-0.047	-0.005	-0.041	0.088	0.049	-0.043	0.033
	(0.501)	(0.959)	(0.437)	(0.705)	(0.569)	(0.686)	(0.408)	(0.539)
Completed elementary school	-0.021	-0.055	-0.056	-0.039	0.075	0.045	-0.003	0.024*
	(0.584)	(0.860)	(0.686)	(0.712)	(0.853)	(0.740)	(0.672)	(0.083)
Completed high school	-0.022	-0.063	-0.086	-0.046	0.058	0.061	0.013	0.019**
	(0.641)	(0.711)	(0.289)	(0.485)	(0.673)	(0.363)	(0.360)	(0.034)
Formally employed before Lottery	-0.044	-0.062	-0.059	-0.028	0.070	0.042	-0.011	0.019**
	(0.908)	(0.714)	(0.650)	(0.779)	(0.999)	(0.836)	(0.888)	(0.023)
Worked in the administrative sector	-0.093	-0.121	-0.069	-0.036	0.074	0.092	-0.053	0.021
	(0.311)	(0.220)	(0.641)	(0.913)	(0.913)	(0.153)	(0.340)	(0.145)
Worked in the services sector	-0.010	-0.025	-0.093	-0.059	0.074	0.026	0.014	0.022
	(0.483)	(0.574)	(0.297)	(0.325)	(0.911)	(0.733)	(0.436)	(0.167)
Earns less than a Minimun Wage				-0.052				0.033
				(0.368)				(0.539)
Lived more than 5km from MCMV project				-0.081**				0.022**
				(0.035)				(0.036)

Notes: Each column presents treatment-on-the-treated effects of the MCMV program on the variables of formal employment (yearly) and participation in *Bolsa Família* by lottery. Each row is from a different regression with sample restricted by subgroup. The result of each row is the coefficient of a dummy variable indicating whether the individual won in that lottery. All results are for samples with control variables, which corresponds to about 75% of the total sample in each lottery, to the Rio de Janeiro city, and 99% to São Jose do Rio Preto city.
In parenthesis, the p-value of a test comparing the estimated coefficient with the main sample result.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13: Effects of the program on individuals - RAIS sample

	ITT		TOT IV	
	(1)	(2)	(3)	(4)
Formally employed	-0.025**	-0.029***	-0.036**	-0.042***
(yearly)	(0.010)	(0.009)	(0.015)	(0.014)
Formally employed	-0.025**	-0.029***	-0.035***	-0.043***
(quarterly)	(0.010)	(0.009)	(0.014)	(0.013)
Formally employed	-0.021**	-0.026**	-0.030**	-0.038***
on 31/12	(0.010)	(0.010)	(0.014)	(0.015)
Formal wage	-19.069	-17.729	-27.146	-25.920
(yearly)	(18.216)	(20.681)	(25.882)	(30.170)
Receives *Bolsa Família*	0.020***	0.024***	0.029***	0.035***
	(0.007)	(0.007)	(0.010)	(0.011)
Time fixed effects	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes
Number of individuals	12084	9228	12084	9228

Notes: Columns (1) and (2) indicate the intent-to-treat effects of MCMV on the dependent variables on each of the lines. The results come from OLS regressions of each dependent variable on a binary variable that indicates whether the individual won in that lottery. Columns (3) and (4) are the results of a two-stage regression, where the random assignment to treatment is the instrumental-variable to participation in the program. Estimates represent the treatment-on-the-treated effects, as described in the text. Columns (1) and (3) present the results for the whole sample without any control variables. Columns (2) and (4) present the results with control variables to about 76%of all individuals, corresponding to those with RAIS information between the years 2009 and 2014, similar for the case of Rio de Janeiro. The control variables are those presented in Table 2. The formally employed (yearly) variable is a dummy that indicates whether the individual had any formal employment in a given year. The formally employed (quarterly) variable is also a dummy indicating individuals employed in each quarter. The variable formally employed on 12/31 is a dummy variable indicating individuals employed on 12/31 of each year. The variable formal wage measures the average salary of the individual in each year. The *Bolsa Família* participation variable is a dummy indicating individuals receiving cash transfer each years. All these regressions are for the years 2014 to 2016, after the lottery..
All standard errors presented have clusters at the individual level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14: Housing projects of MCMV by lottery - Rio de Janeiro

Housing project	Lottery 003	Lottery 006	Lottery 009	**Total**
Cascais	4	354	56	413
Destri	411	11	2	411
Estoril	73	100	230	400
Évora	17	18	411	446
Park Imperial	46	72	161	278
Park Royal	59	85	134	277
Res. Rio Bonito	148	8	3	157
Sevilha	4	236	15	254
Taroni	10	198	2	209
Toledo	72	228	135	434
Vidal	59	20	142	220
Zaragosa	9	22	404	435
Total	912	1,352	1,695	3,934

Notes: The table presents the 12 housing projects for which the selection of beneficiaries happened in the three lotteries held in 2011, in Rio de Janeiro. Columns indicate in which of the lotteries the beneficiaries were selected.

Table 15: Characteristics of treatment and control groups - Lottery 003

	(1) Control group	(2) Treatment group	(3) Difference (1) - (2)	(4) Compliers	(5) Noncompliers	(6) Difference (5)-(4)
% with information linked in RAIS	0.747	0.747	-0.000	0.733	0.749	0.016
			(0.004)			(0.011)
Female	0.532	0.532	-0.000	0.616	0.521	-0.095***
			(0.005)			(0.015)
Indigenous	0.003	0.003	-0.000	0.001	0.003	0.002
			(0.001)			(0.002)
Color White	0.380	0.387	-0.006	0.382	0.387	0.006
			(0.005)			(0.015)
Color Black	0.115	0.113	0.002	0.136	0.110	-0.026***
			(0.003)			(0.010)
Color Yellow	0.006	0.004	0.002**	0.005	0.004	-0.000
			(0.001)			(0.002)
Color mixed	0.342	0.334	0.008*	0.378	0.329	-0.050***
			(0.005)			(0.014)
Color not identified	0.055	0.060	-0.005**	0.047	0.062	0.015**
			(0.002)			(0.007)
Illiterate	0.001	0.001	0.000	0.001	0.001	-0.000
			(0.000)			(0.001)
Completed elementary school	0.874	0.873	0.001	0.868	0.874	0.006
			(0.003)			(0.010)
Completed High School	0.655	0.646	0.008*	0.610	0.651	0.041***
			(0.005)			(0.014)
Completed College	0.107	0.103	0.004	0.064	0.108	0.045***
			(0.003)			(0.009)
Age	36.913	36.950	-0.036	35.865	37.095	1.231***
			(0.106)			(0.322)
Formal wage in 2010	614.399	612.536	1.862	406.398	640.803	234.405***
			(7.492)			(22.112)
Formally employed in 2010	0.575	0.574	0.001	0.526	0.580	0.054***
			(0.004)			(0.013)
Worked in the services sector	0.206	0.205	0.001	0.244	0.200	-0.044***
			(0.003)			(0.010)
Worked in the administrative sector	0.182	0.179	0.003	0.164	0.181	0.017*
			(0.003)			(0.010)
Worked in the Industrial sector	0.076	0.077	-0.001	0.051	0.081	0.030***
			(0.002)			(0.007)
F-statistic			0.91			
P-value			0.575			
N	294884	2983	297867	912	2071	

Notes: This table shows the balance between the treatment and control groups of Lottery 003, the first lottery held in 2011 in Rio de Janeiro. The unit of analysis is the individual. The sample includes all individuals enrolled in Lottery 003. All information presented is from RAIS from 2006 to 2014. Information of gender, skin color, schooling, age, and disability are from 76% of the total sample, whose information was present at the RAIS. Information on regular salary, formal employment, and the employment sector is from the whole sample. The columns (1) and (2) present the data on the individuals who did not and who win the MCMV lottery, respectively. The columns (3) indicate the difference and the t-test (in parenthesis) for the difference between the two groups. The columns (4) and (5) present the data on the individuals whom compliers and non-compliers with the program, respectively. The columns (6) indicate the difference and the t-test (in parenthesis) for the difference between the two groups. The F-test and p-value statistics are from a regression where the dependent variable is equal to one if the individual won a Lottery and 0 otherwise.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 16: Characteristics of treatment and control groups - Lottery 006

	(1) Control group	(2) Treatment group	(3) Difference (1) - (2)	(4) Compliers	(5) Noncompliers	(6) Difference (5)-(4)
% with information linked in RAIS	0.747	0.750	-0.004	0.733	0.755	0.022*
			(0.005)			(0.013)
Female	0.525	0.528	-0.003	0.633	0.501	-0.132***
			(0.007)			(0.018)
Indigenous	0.003	0.002	0.001	0.001	0.002	0.001
			(0.001)			(0.001)
Color White	0.383	0.382	0.000	0.385	0.382	-0.004
			(0.007)			(0.017)
Color Black	0.114	0.112	0.002	0.141	0.105	-0.037***
			(0.005)			(0.011)
Color Yellow	0.006	0.006	0.000	0.006	0.006	-0.000
			(0.001)			(0.003)
Color mixed	0.342	0.345	-0.003	0.366	0.340	-0.027
			(0.007)			(0.017)
Color not identified	0.055	0.061	-0.006*	0.059	0.062	0.003
			(0.003)			(0.009)
Illiterate	0.001	0.002	-0.001**	0.004	0.001	-0.003*
			(0.000)			(0.002)
Completed elementary school	0.877	0.876	0.001	0.866	0.878	0.012
			(0.005)			(0.012)
Completed High School	0.660	0.662	-0.002	0.605	0.676	0.070***
			(0.007)			(0.017)
Completed College	0.110	0.105	0.005	0.069	0.114	0.045***
			(0.005)			(0.011)
Age	36.994	37.009	-0.015	35.976	37.272	1.296***
			(0.153)			(0.380)
Formal wage in 2010	623.110	624.114	-1.004	400.710	682.729	282.020***
			(11.016)			(28.869)
Formally employed in 2010	0.579	0.575	0.004	0.533	0.586	0.052***
			(0.006)			(0.015)
Worked in the services sector	0.205	0.201	0.003	0.237	0.192	-0.045***
			(0.005)			(0.012)
Worked in the administrative sector	0.185	0.186	-0.001	0.153	0.195	0.042***
			(0.005)			(0.012)
Worked in the Industrial sector	0.077	0.074	0.002	0.073	0.074	0.001
			(0.003)			(0.008)
F-statistic			0.87			
P-value			0.616			
N	318575	6505	325080	1352	5153	6505

Notes: This table shows the balance between the treatment and control groups of Lottery 006, the second lottery held in 2011 in Rio de Janeiro. The unit of analysis is the individual. The sample includes all individuals enrolled in Lottery 006. All information presented is from RAIS from 2006 to 2014. Information of gender, skin color, schooling, age, and disability are from 76% of the total sample, whose information was present at the RAIS. Information on regular salary, formal employment, and the employment sector is from the whole sample. The columns (1) and (2) present the data on the individuals who did not and who win the MCMV lottery, respectively. The columns (3) indicate the difference and the t-test (in parenthesis) for the difference between the two groups. The columns (4) and (5) present the data on the individuals whom compliers and non-compliers with the program, respectively. The columns (6) indicate the difference and the t-test (in parenthesis) for the difference between the two groups. The F-test and p-value statistics are from a regression where the dependent variable is equal to one if the individual won a Lottery and 0 otherwise.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 17: Characteristics of treatment and control groups - Lottery 009

	(1) Control group	(2) Treatment group	(3) Difference (1) - (2)	(4) Compliers	(5) Noncompliers	(6) Difference (5)-(4)
% with information linked in RAIS	0.747	0.747	-0.000	0.733	0.749	0.016
			(0.004)			(0.011)
Female	0.532	0.532	-0.000	0.616	0.521	-0.095***
			(0.005)			(0.015)
Indigenous	0.003	0.003	-0.000	0.001	0.003	0.002
			(0.001)			(0.002)
Color White	0.380	0.387	-0.006	0.382	0.387	0.006
			(0.005)			(0.015)
Color Black	0.115	0.113	0.002	0.136	0.110	-0.026***
			(0.003)			(0.010)
Color Yellow	0.006	0.004	0.002**	0.005	0.004	-0.000
			(0.001)			(0.002)
Color mixed	0.342	0.334	0.008*	0.378	0.329	-0.050***
			(0.005)			(0.014)
Color not identified	0.055	0.060	-0.005**	0.047	0.062	0.015**
			(0.002)			(0.007)
Illiterate	0.001	0.001	0.000	0.001	0.001	-0.000
			(0.000)			(0.001)
Completed elementary school	0.874	0.873	0.001	0.868	0.874	0.006
			(0.003)			(0.010)
Completed High School	0.655	0.646	0.008*	0.610	0.651	0.041***
			(0.005)			(0.014)
Completed College	0.107	0.103	0.004	0.064	0.108	0.045***
			(0.003)			(0.009)
Age	36.913	36.950	-0.036	35.865	37.095	1.231***
			(0.106)			(0.322)
Formal wage in 2010	614.399	612.536	1.862	406.398	640.803	234.405***
			(7.492)			(22.112)
Formally employed in 2010	0.575	0.574	0.001	0.526	0.580	0.054***
			(0.004)			(0.013)
Worked in the services sector	0.206	0.205	0.001	0.244	0.200	-0.044***
			(0.003)			(0.010)
Worked in the administrative sector	0.182	0.179	0.003	0.164	0.181	0.017*
			(0.003)			(0.010)
Worked in the Industrial sector	0.076	0.077	-0.001	0.051	0.081	0.030***
			(0.002)			(0.007)
F-statistic			1.27			
P-value			0.192			
N	337038	14056	351094	1695	12361	14056

Notes: This table shows the balance between the treatment and control groups of Lottery 009, the third lottery held in 2011 in Rio de Janeiro. The unit of analysis is the individual. The sample includes all individuals enrolled in Lottery 009. All information presented is from RAIS from 2006 to 2014. Information of gender, skin color, schooling, age, and disability are from 76% of the total sample, whose information was present at the RAIS. Information on regular salary, formal employment, and the employment sector is from the whole sample. The columns (1) and (2) present the data on the individuals who did not and who win the MCMV lottery, respectively. The columns (3) indicate the difference and the t-test (in parenthesis) for the difference between the two groups. The columns (4) and (5) present the data on the individuals whom compliers and non-compliers with the program, respectively. The columns (6) indicate the difference and the t-test (in parenthesis) for the difference between the two groups. The F-test and p-value statistics are from a regression where the dependent variable is equal to one if the individual won a Lottery and 0 otherwise.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$