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How Land Title Affects Child Labor?

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Abstract

Secure property rights are considered a key determinant of economic development. However, evaluation of the causal effects of land titling is a difficult task. Since 2004, the Brazilian government, through a program called *"Papel Passado,"* has issued titles to more than 85,000 families and has the goal to reach 750,000. Another topic in public policy that is crucial for developing economies is child labor force participation. In Brazil, about 5.4 million children and teenagers between 5 and 17 years old are working full time. This paper examines the direct impact of securing a property title on child labor force participation. In order to isolate the causal role of ownership security, this study uses a comparison between two close and similar communities in the City of Osasco case (a town with 650,000 people in the São Paulo metropolitan area). The key point of this case is that some units participate in the program and others do not. One of them, *Jardim Canaã,* received land titles in 2007; the other, *Jardim DR,* given fiscal constraints, will not be part of the program until 2012, and for that reason became the control group. Estimates, generated using the difference-in-difference econometric technique suggest that titling results in a substantial decrease in child labor force participation for the families that received the title compared with the others. These findings are relevant for future policy tools for dealing with informality and how it affects economic growth.

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Introduction

The role played by private rights in the economic development of the Western world has been powerfully documented by economic historians such as North & Thomas (1973). The fragility of property rights is considered a crucial obstacle for economic development (NORTH, 1990). The main argument is that individuals underinvest if others can seize the fruits of their investment (DEMSETZ, 1967). Torstensson (1994) and Goldsmith (1995) found a significantly positive association between secure property rights and economic growth.

In such context, strengthening economic institutions is widely argued to foster investment in physical and human capital, bolster growth performance, reduce macroeconomic volatility and encourage an equitable and efficient distribution of economic opportunity (ACEMOGLU *et al.*, 2002). In the current developing world scenario, a pervasive sign of feeble property rights is the 930 million people living in urban dwellings without possessing formal titles to the plots of land they occupy (United Nations, Habitat Report, 2005). The lack of formal property rights constitutes a severe limitation for the poor. The absence of formal titles creates constraints on using land as collateral to access credit markets (BESLEY, 1995).

De Soto (2000) emphasizes that the lack of property rights limits the transformation of the wealth owned by the poor into capital. Proper titling could allow the poor to collateralize the land. Field & Torero (2002) mentioned that this credit could be invested as capital in productive projects, promptly increasing labor productivity and income. Among policy-makers as well, property titling is increasingly considered one of the most effective forms for targeting the poor and encouraging economic growth (BAHAROGLU, 2002; BINSWANGER *et al.*, 1995) as translated in the Figure 1 below.

Figure 1: Land registration
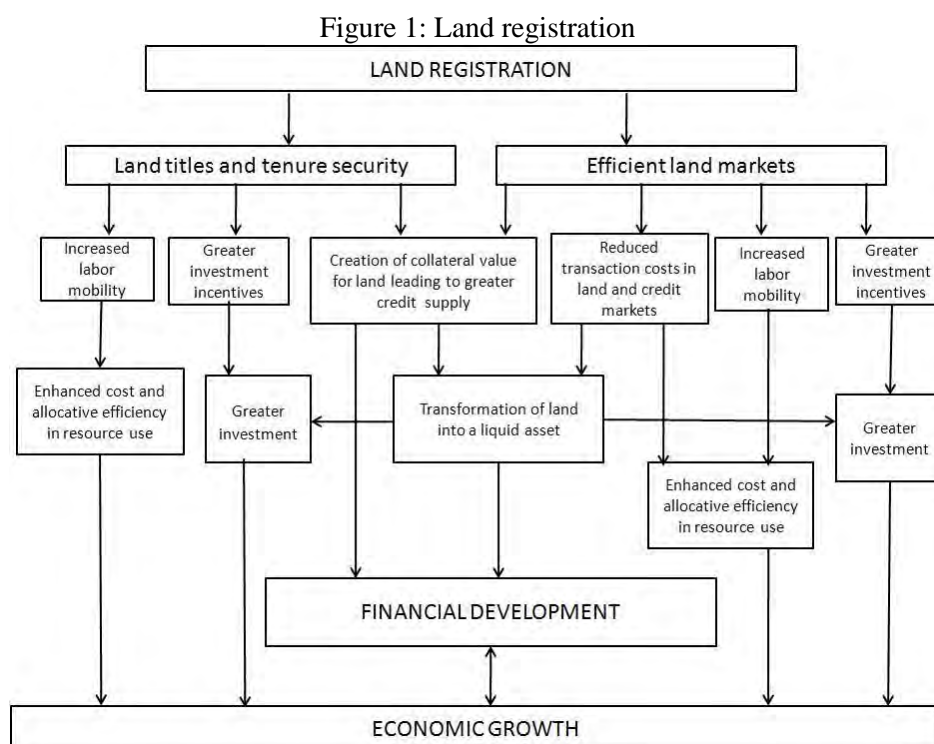
Source: World Bank, 2008

The most famous example is Peru in Latin America. The Peruvian government issued property titles to 1.2 million urban households during the 1990s. In Asia, millions of titles are being issued in Vietnam and Cambodia as shown in the *The Economist* magazine in the March 15, 2007 edition. The same edition states on the front page: "*Property Rights: China's Next Revolution*". The survey shows that China intends to put into place the most ambitious land-titling program in the world's history and includes this initiative as one of the main points of the Chinese economic development model.

In Brazil, President Luiz Inácio Lula da Silva announced during his first week in office, back in 2003, a massive plan to title 750,000 families all over the country. The Brazilian federal government created a program called "*Papel Passado*". Since launched, the program has spent US$ 15 million per year from the federal budget, providing titles to over 85,000 and reaching 49 cities in 17 different Brazilian states. The official goal of the program is "*to develop land titles in Brazil and promote an increase in the quality of life for the Brazilian population*". However, the country still faces a very difficult scenario regarding land property rights: the Brazilian government estimates that 12 million people live under illegal urban conditions (IBGE, 2007).

Furthermore, child labor is a major issue faced by the global economy. In Brazil, about 5.4 million children and teenagers between 5 and 17 years old are working (PNAD, IBGE, 2007).

This paper investigates the impact of property rights on labor markets in an emerging economy such as Brazil by analyzing household response regarding to child labor force participation to an exogenous change in formal ownership status. In particular, the paper assesses the value to a squatter household of increases in tenure security associated with obtaining a property title in terms of hours of child labor supply.

Effects of land titling have been documented by several studies. A partial listing includes Jimenez (1985), Alston *et al.* (1996) and Lanjouw & Levy (2002) on real estate values. Besley (1995), Jacoby *et al.* (2002), Brasselle *et al.* (2002) and Do & Iyer (2003) on agricultural investment. Place & Migot-Adholla (1998), Carter & Olinto (2002) and Field & Torero (2002) on credit access, housing investment and income.

In urban settings, the value of property titles has been measured far less often and empirical work has focused on real estate prices. A major contribution is from the of paper by Jimenez (1984), involving an equilibrium model of urban squatting in which it is shown that the difference in unit housing prices between the non-squatting (formal) sector of a city and its squatting (informal) sector reflects the premium associated with security. The accompanying empirical analysis of real estate markets in the Philippines finds equilibrium price differentials between formal and informal sector unit dwelling prices in the range of 58.0% and greater for lower-income groups and larger households.

For Besley (1995), the findings were ambiguous; land rights appear to have a positive effect on agricultural investment in the Ghananian region of Angola but less noticeable impact on the region of Wassa. Using a similar approach, Jacoby *et al.* (2002) find positive effects in China, whereas Brasselle *et al.* (2002) find no effects for Burkina Faso. Field & Torero (2002), in Peru, exploit timing variability in the regional implementation of the Peruvian titling program using cross-sectional data on past and future title recipients midway through the project, and also find positive effects, particularly in credit access and housing investments. In Brazil, Andrade (2006) using cross-section data from a sample of 200 families of the *Comunidade do Caju*, an urban poor community in Rio de Janeiro, has demonstrated an increase effect on the income of those that had received the land title.

A common obstacle, faced by all studies mentioned above, is how to measure the influence of tenure security considering the potential endogeneity of ownership rights as pointed by Demsetz (1967) and Alchian & Demsetz (1973). Direct evidence of this is

provided by Miceli *et al.* (2001), who analyze the extent of endogeneity of formal agricultural property rights in Kenya.

In order to isolate the causal role of ownership security, this study uses a natural experiment, basically a comparison between two neighboring and very similar communities in the City of Osasco (a town with 650,000 people located in the São Paulo - Brazil metropolitan area). Osasco is part of the *Papel Passado*'s map and has 6,000 families living informally on urban property. One of them, *Jardim Canaã*, was fortunate to receive titles in 2007; the other, *Jardim DR*, will be part of the program schedule in 2012, and for that reason became the control group. This enables a comparison of households in a neighborhood reached by the program with households in a neighborhood not yet reached.

Furthermore, the present research, different from the previous studies, is based on panel data, based on a random sample from *Jardim Canaã* and *Jardim DR*, and produced from a two-stage survey with focus on the property rights issue. The first part of the survey was collected in March 2007, before titles had been issued to *Jardim Canaã*, and the second collected in August 2008, almost one year and half after the titles. As Ravallion *et. al* (2005) argue, the best ex-post evaluations are designed and implemented ex-ante -- often side-by-side with the program itself.

And, based on the first survey, 95.0% of the survey participants (from *Canaã* and *DR*) were not aware about receiving land titles and the meaning of it (which avoids any behavior deviation generated by the expectation of having a land title). From the second stage of the survey, most of households that received the land title felt that it improved their lives– (see Figure 2) even if they had not previously expected the land title.

Figure 2: How land title affected household's life?
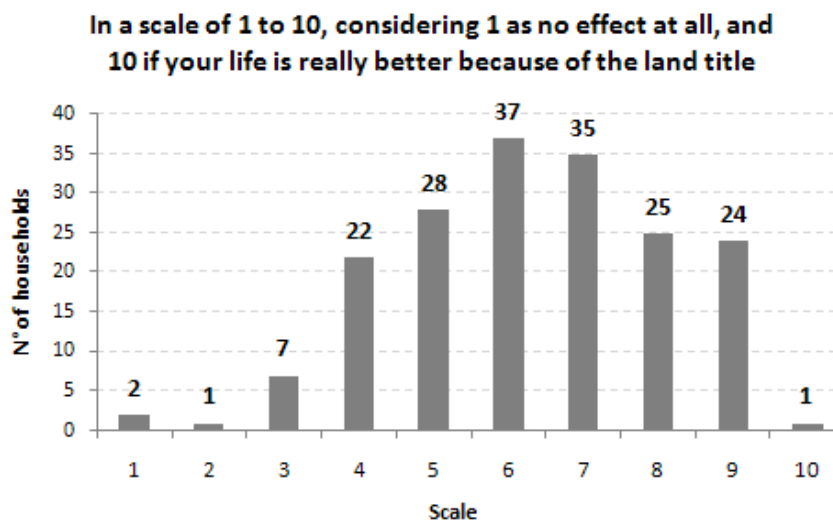
Source: Research from the Osasco Land Title Survey – 2008

Hence, an important contribution of this paper is the specific focus on non-agricultural households and the value to urban residents and their families of increased ownership security. As shown, in developing economies, large proportions of urban and rural residents alike lack tenure security. As Field & Torero (2002) demonstrated, presumably because of historic interests in agricultural investment and related politics of land reform, the majority of both academic and policy attention to property rights has centered on rural households' tenure security. Nevertheless, in most of the developing world, the population - particularly the impoverished population - is increasingly urban.

Secondly, this research provides unique panel data through a natural experiment that helps to minimize the endogeneity aspect related to most of the studies on such subject (property rights).

Third, many aspects have been applied to try to explain the reasons for child labor. The most common are income, poverty, parents' level of education, parents' previous child labor experience, credit constraints, and others. This paper intends to provide an additional aspect that can be used as part of the explanation for the causes of child labor.

Last, but not least, this paper provides an initial impact measure, in terms of applied public policy, for the "*Papel Passado*" program and gives a partial feedback for policy-makers about the effects of land titling in variation of child labor force participation. Certainly, reducing child labor force participation is one of the main goals of federal and local governments. Social programs such as PETI (*Programa de Erradicação de Trabalho Infantil*), an initiative that focuses on providing education opportunities for children engaged in labor activities and extra income for their poor families, is a great example of government's concern. Understanding the potential positive effects of land titling and property rights in such subject could be valuable to make any effort related to child labor participation stronger and more effective.

1.   Child Labor Force Participation: The Economic Context

Investing in and focusing on human capital development is a critical factor to increase economic growth, as stated by Becker and Lewis (1973), and given such a key assumption, The United Nations Millennium Development Goals include eliminating child labor as a crucial step into a better and equal world.

According to the International Labour Organization (2002), 246 million children and teenagers between 5 and 17 years old are engaged in child labor around the world. Furthermore, 75.0% of those children work for their own family activities. Asia, Africa and Latin America are the continents with the most the child labor in the world. Asia has the highest number of children in terms of volume but Africa is the leader relative to the total size of the work force.

In Brazil, data from PNAD (IBGE, 2007) has shown that from a 44.7 million population between 5 and 17 years old, 10.8% (4.8 million) are directly involved in child labor. The worst region of Brazil regarding this subject is the Northeast, with 13.4% of the 5-17 year old population working; Southeast holds the lowest average (7.9%). These statistics represent a positive evolution over the last 4 years (see Figure 3 below).

Figure 3: Occupation level among the 5-17 year-old population (Percentual of total 5-17 population)
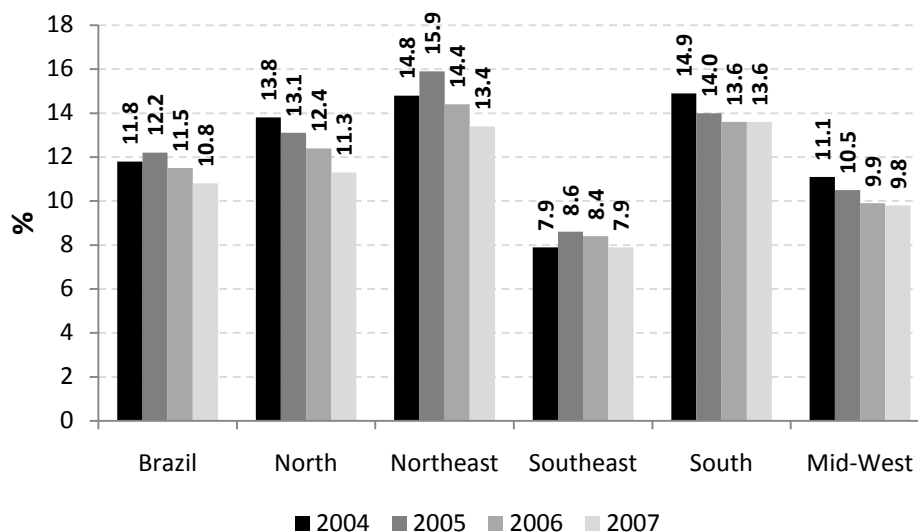
Source: IBGE, PNAD 2007

However, child labor is still a major issue for Brazilian policy makers and PNAD (IBGE, 2007) also indicates that. For example, 60.0% of the children between 5 and 13 years old are involved in non-paid activities. In the rural areas of Brazil, 40.0% of the 5-17 year old population works between 30 and 40 hours per week. In the Southeast, the richest region in the country, 30.0% work at least 40 hours per week.

Economic science has developed a range of potential theories to explain child labor. As Becker and Lewis (1973) state, child labor is an activity that generates current benefits in terms of income, but also creates future costs by reducing study and leisure. Given that, families evaluate the cost-benefits related to sending their children to school or to work. Rosenzweig (1981) has demonstrated that children's time allocation depends on the production capacity of the children and their parents and the substitution degree of the work force between both.

Basu & Van (1998) have built a model using one basic assumption: luxury. They consider that poverty is the main factor that makes parents send children to work. Hence, the children's time that is not allocated (school and leisure) to generate income is luxury, which low-income parents cannot afford. Ray (2001) has created a theory for emerging economies: child labor occurs mainly because of poverty and credit market imperfections. He has shown that if poor families had access to credit, in the presence of high returns for education, they would be willing to send their children to school instead of work. Furthermore, the same study showed the relationship between income inequality and child labor under credit constraints. The main conclusion states that a more equal income distribution would reduce child labor.

Kassouf (2002) demonstrates that an increase in the household's income reduces the probability of child labor and increases school attendance. Another element that affects the probability of child labor is the parent's education degree. Bhalotra & Heady (2003) find a negative effect given the mother's level of education and the child's labor participation in Ghana. The effect of the mother's education profile is higher compared with the father's. Kassouf (2002), in Brazil, obtains the same negative effect. Family composition is another relevant factor. Patrinos & Psacharapoulos (1994), for Paraguay, and Bhalotra & Heady (2003), for Pakistan, conclude that the more people there are in the family, the greater the chances of having child labor.

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Wahba (2002), using data from Egypt, shows a phenomenon called "dynastic poverty traps," which means that the probability of children being sent to work increases 10% when their parents had worked during their childhood. Emerson & Souza (2003) reach the same conclusion and explain such event as "social norms", parents that worked during their childhood years face child labor more naturally. As mentioned earlier, this paper aims to provide an additional element for that discussion and test the relation between land titling and child labor force participation using the case of the City of Osasco.

2.   Microeconomic Framework – The Basics

Cockburn (1998) points out that one of the principal gains of strong property institutions is to shift the burden of property protection and enforcement away from individual households and informal communities to the state.

There is little microeconomic evidence documenting the cost of informality to individual households. Carter & Zegarra (2000), World Bank (2000) and Field (2007) note that, in many settings, informal institutions arise to compensate for the absence of formal property protection. In such context, there is one important mechanism by which it is assumed that tenure security removes individuals from the labor force and incremental income. Untitled households are constrained by the need to provide informal policing, both to deter prospective invaders from invading private properties and to actively participate in community enforcement efforts to protect neighborhood boundaries.

Hence, an important outcome of titling efforts that effectively increase household tenure security should allow households and communities to reallocate time, resources and human talent away from this role.

The acquisition of a property title has a direct value in terms of freeing up hours of work (and income generation) previously devoted to maintaining tenure security through informal means.

$$I \text{ (Income)} = f(w; H^m)$$

w = market wage
H^m = work in the outside market

Assumptions:

a) There is no outside labor market for provision of home/tenure security. Assuming a missing labor market for the provision of home security is reasonably justified by incomplete contracts (there some risk involved in employing non-members to guard property - especially in those poor communities in Brazil).

b) Leisure and home production hours are assumed to be perfect substitutes for the hours individual spend on property protection.

c) All households face a common wage w_i.

d) The household is assumed to maximize per capita leisure (l_i) and not the leisure of individual members.

e) Household talent (Φ) and endowment (E) are assumed to be fixed.

Assuming, Z = time spent at home = $H^h + L$

H^h = work at home and L = leisure

And $L = \sum_{i=1}^{N} = l_i, H^h = \sum_{i=1}^{N} = H^h, H^m = \sum_{i=1}^{N} = H^m, X = \sum_{i=1}^{N} = X$

N is the number of household members, l_i is leisure, x_i consumption, H^{hi} work hours in home production, and H^m outside market work hours of household member i, and $x_i = X/N$, $l_i = L/N$.

The value of work at home is given by production function $q(H^h)$ and w is the value of work outside or the market wage.

Household utility is an increasing function of *per capita* leisure (l_i); *per capita* consumption (x_i), and home security tenure (S) (S = home tenure security function) and also concave.

The tenure security function implies that the production of home security is only determined by exogenous variable Ω (Ω = exogenous parameter, household formal property rights) and the amount of time spent in the home.

Given the set of talent Φ and endowment E:

$$U(x_i, l_i, S: \Phi, E) \text{ where } S = S(Z,\Omega)$$

Maximizing the utility function: $U(x_i, l_i, S: \Phi, E)$ where $S = S(Z,\Omega)$, where the endogenous variables are H^h, H^m, x_i, l_i, and S.

Budget (pX) and time (T) constraints to the maximization problem:

$$S = S(H^h+L,\Omega)$$
$$pX = \omega H^m + q(H^h)$$
$$T = L + H^h + H^m = Z + H^m$$

Assumption: $L, H^h, H^m, x_i \geq 0$

Where $q(.)$ satisfies the decreasing marginal productivity ($q' > 0$, $q'' < 0$). Then, normalizing prices to one, the household's optimization problem is:

$$\text{Max}_{(H^h,H^m)} U\left(\frac{1}{N}(\omega * H^m + q(H^h)), \frac{1}{N}(T - H^m - H^h), S(T-H^m,\Omega)\right)$$

This equation requires the following first-order conditions for an interior solution ($H^m > 0$; $H^h > 0$; $H^m + H^h < T$):

$$\frac{\omega}{N} \times Uxi = \frac{1}{N} \times U_{li} + U_s * sH^m \tag{1}$$

$$qH^h \times U_{xi} = U_{li} \tag{2}$$

Equation 1 establishes that, at the optimum, households equate the marginal value of an additional hour of outside labor with the marginal utility of leisure. Equation 2 states that they also equate the marginal utility of leisure with the marginal value of an additional hour of work at home.

Given such context, the demand functions of work hours in the outside market and in home production which depends on Ω and ω are:

$$H^h = H^h(\Omega,\omega), H^m = H^m(\Omega,\omega)$$

Assume that $U_{xsi} \geq 0$, $U_{XiLi} \geq 0$, $U_{lis} \leq 0$

In that case, households' ability to increase security by staying close to home implies that optimal allocation of work hours across home and market will depend on the formal tenure rights. In particular, maximizing the above utility function subject to the basic budget and time constraints mentioned above generates the following inequalities:

$$\frac{\partial H^h}{\partial \Omega} < 0 \text{ and } \frac{\partial H^m}{\partial \Omega} > 0$$

For households involved in both types of labor, an increase in formal tenure security decreases work hours at home and increases work hours in the outside market.

The conditions imply that, in aggregate, strengthening formal property rights decreases work hours inside the house and increases time spent outside, reflecting the fact that an exogenous increase in formal property protection, lowering the opportunity cost of outside labor and making stronger the probability to increase the current income of those households as represented by $I(Income) = f(w;H^m)$.

In the empirical analysis, data limitations prevent the separation of employment hours inside and outside the home. Given that, and with respect to the net effect of a property title on total labor hours, the model predicts that households with zero home production hours *ex-ante* ($H^h=0$) will increase total household work hours by some positive amount in response to a land title and property rights.

3.   Microeconomic Framwork – Labor Supply of Children

An extension of the model, and a significant part of the present study approach, incorporates differences in the household supply of adult and child labor when only adults contribute to home security provision. This extension formalizes the intuitive idea that, if adults have comparative advantage in the provision of home security, in the absence of property rights, children will substitute for adults in the labor market. In this case, while total household labor hours rise with an increase in formal rights – as demonstrated above, child labor hours will actually fall. Here, N_a and N_c are the number of adult and child household members, respectively, l_a and l_c are per capita adult and child leisure, L_a and L_c are total adult and child leisure and T_a and T_c are total adult and child time endowments. In this setting, the household maximization problem is:

$$max_{la,lc,x} U (x,la,lc,s (La, \Omega)) \text{ such that } Wa * (Ta\text{-}La) + Wc * (Tc\text{-}Lc) = X$$

The first-order conditions corresponding to each employed adult member *i* and child *j* are:

$$U_{lai} = (\frac{-Wa}{N}) * Ux + (\frac{1}{Na}) * U_{la} + Us * s_{la} = 0 \text{ adult}$$

$$U_{lci} = (\frac{-Wc}{N}) + Ux + \frac{1}{Nc} * U_{lc} = 0 \text{ child}$$

From these conditions it can be shown that, for all interior optima, $\frac{\partial lc}{\partial \Omega} > 0$, and $\frac{\partial la}{\partial \Omega} < 0$.

In households in which children are labor force participants, child labor hours will fall and adult labor hours will rise with an increase in tenure security. For all other households, adult labor hours will rise and child labor hours will remain at zero. Thus, given a positive amount of ex-ante child labor, the aggregate number of child labor hours will unambiguously fall, while the number of adult hours rises with an increase in property rights.

Although this model focuses on optimal labor allocation, the income effect that follows from relaxing the household time constraint provides a plausible alternative explanation for a decrease in child labor with an increase in formal rights, and one that has been proposed by other authors. In particular, a decrease in child labor would follow from the luxury and axioms of the Basu & Van (1998) model of labor supply, in which children can substitute for adults in the labor market and the family will send children to the labor market only if the family's income from non-child labor sources falls below some threshold amount.

4.   The Data

The empirical analysis of household labor supply and income responses to changes in formal property rights relies on a data survey developed especially and exclusively for this paper, in the City of Osasco, an important town in the São Paulo metropolitan area with a population of 654,000 people.

The federal government has chosen Osasco, as one of the participants of the "*Papel Passado*" - a program that intends, as mentioned earlier in the paper, to provide land titles to families living under illegal conditions - given its relevant economic and social role.

The city of Osasco has 30,000 people (about 6,000 families) living under informal conditions, which represents almost 4.5% of its total population. The program timetable for Osasco establishes that all the communities living in illegal conditions will be part of the "*Papel Passado*" during the period between 2007 and 2014 (the main reason that all communities are not receiving the land title at the same time is becuase fiscal resources are limited). Officially, as released by the Osasco City Hall, the priority follows random criteria. Unofficial sources from local communities in Osasco express the feelings that a "political" agenda is present in the decision.

The first community to receive the land title was *Jardim Canaã*, in 2007, which has 500 families. The closest neighbor of *Jardim Canaã* is a community called *DR*, with 450 families. The *DR*'s households will be part of the "*Papel Passado*" program schedule in 2011. Hence, the data of this particular paper consist of 326 households distributed across *Jardim Canaã* and *DR* (185 from *Jardim Canaã* and 141 from *DR*).

4.1   Minimizing Endogeneity Bias Concerns

Given the nature of the research conducted in the city of Osasco, some steps were taken to minimize the bias related to the data collected.

First of all, a technique from Bolfarine & Bussab (2005) was used to choose randomly 326 sample households. The approach was basically to choose the first 150 households (from the *Canaã* and *DR*) that have the closest birth dates (day and month) in comparison with the three field researchers that conducted the survey interviews (important to mention that the field researchers are not from Osasco). Each researcher got 50 names initially as first base. Additionally, after reaching each of those households, they could go and pick the third and the fifth neighbor on the right hand side.

Secondly, Heckman & Hotz (1989) states that constructing counterfactuals is the central problem in the literature evaluating social programs given the impossibility of observing the same person in both states at the same time. The goal of any program evaluation is to compare only comparable people. An important step to minimize such issue in this study was to use a comparison between those two neighbors (*Jardim Canaã* and *DR*) with very similar characteristics. *Canaã* and *DR* are not only official neighbors but there is no physical "borderline" among them, both are geographically united (if someone walks there, it is hard to identify the boundaries -- even for the local households).

One of them, *Jardim Canaã*, fortunate to receive the titles in 2007, is qualified, for the paper proposal, as the main sample. The other, *DR*, only part of the program schedule in 2011, became the control group. This approach enables a comparison of households in a neighborhood reached by the program with households in a neighborhood not yet reached and makes it possible to produce a panel of data.

Another aspect to be mentioned about the data collected is that it produced a unique match within the same geographic area, which helped to ensure that comparison units come from the same economic environment. Rubin & Thomas (2000) indicate that impact estimates

based on full (unmatched) samples are generally more biased, and less robust to miss-specification of the regression function, than those based on matched samples.

Given such conditions, the data were produced from a two-stage survey focused on the property right issue. However, to minimize bias, the way that survey was prepared and conducted by the researchers does not provide any direct information for the households on what exactly the research is about. Officially for the people interviewed, the study was about general living conditions in the City of Osasco.

The survey was based on a 39-question questionnaire applied to the 326 families randomly sampled as described above. The survey instrument, in many of its questions and methodologies, closely mirrors the IBGE Living Standards Measurement Survey (PNAD - *Pesquisa Nacional de Amostra de Domicílios do Instituto Brasileiro de Geografia e Estatística*) in content, and therefore contains a variety of information on household and individual characteristics. In addition, there are six questions designed to provide information on a range of economic, social and personal benefits associated with property formalization. (See Appendix A for the complete stage I and stage II questionnaires.)

The first stage of the survey was conducted in March 2007, before titles had been issued to *Jardim Canaã*, and the second collected in August 2008, almost a year and a half after the first titles had been issued (with exactly the same households and with 98.0% recall -- or 2.0% missing, which means that almost all the households interviewed in the first survey were found and interviewed during the second stage). The reason for the time gap was to give the an opportunity to all the households interviewed during the first survey stage to have at least 1 year with the land title. The exactly dates that each household interviewed received the title were provided by the 2nd *Cartório de Osasco* (2nd Osasco's Office of Registration) along with the formal authorization from the Osasco's City Hall to conduct the research.

Heckman & Hotz (1989) add that is not necessary to sample the same persons in different periods -- just persons from the same population. This particular survey instrument design has clearly the advantage that the same households were tracked over time to form a panel data set. Ravallion *et al.* (1995) argue that making a panel data with such characteristics should be able to satisfactorily address the problem of miss-matching errors from incomplete data, a very common issue regarding public policy evaluation.

Furthermore, it is also important to emphasize again another aspect that helps minimize the selection bias. Based on the first survey, 95.0% of the survey participants (from *Canaã* and *DR*) did not expect to receive any land title, i.e., they were not aware of "*Papel Passado*" and the meaning of it. Such lack of information about the subject provides the study a non-bias aspect regarding the importance of property rights because it avoids a potential behavior deviation from households included in the program.

Finally, the study also tracks the households that moved outside both communities to check if the land title effect stands. From the original sample only 8.0% of the households that received the land title have moved away from *Canaã* (one of the main concerns from local authorities in Osasco was that most citizens would receive the land title, sell the property right away and return to an informal living conditions and that not has been materialized). From the control group, only 1 household (out of 140) has moved during the same period.

5.   Basic Findings – Child Labor Force

This study has used basically four questions to address the issue of child labor using the survey. The first question was: *"Do you have any children?"* (Please refer to Appendix A for the complete stage I and stage II questionnaires.) Of the combined sample and control group, about 75.0% of the households said they have children (about 73.0% of the sample and 76.0% of the control group).

After the initial question mentioned above, the survey included the following: a) *"Are there any children helping in the family's income? How many? (under 18 years old)"*, b) *"How many hours do they work daily?"* and c) *"How many days per week do minors work?"* On top of that, from those households that have children, 25.5% responded that they have minors helping the family's income (sample 35.4% and control group 64.8%).

Additionally, the diagram below summarizes the household's answers (2007 and 2008) about weekly hours of child labor. The main issue that arises is related to the fact that for the sample, children are working lower hours (and even households that have children working in 2007 changed path in the survey's second round) and for the control group the scenario gets worst over time.

Figure 4: Child Labor Force Hours Worked Weekly x Number of Households
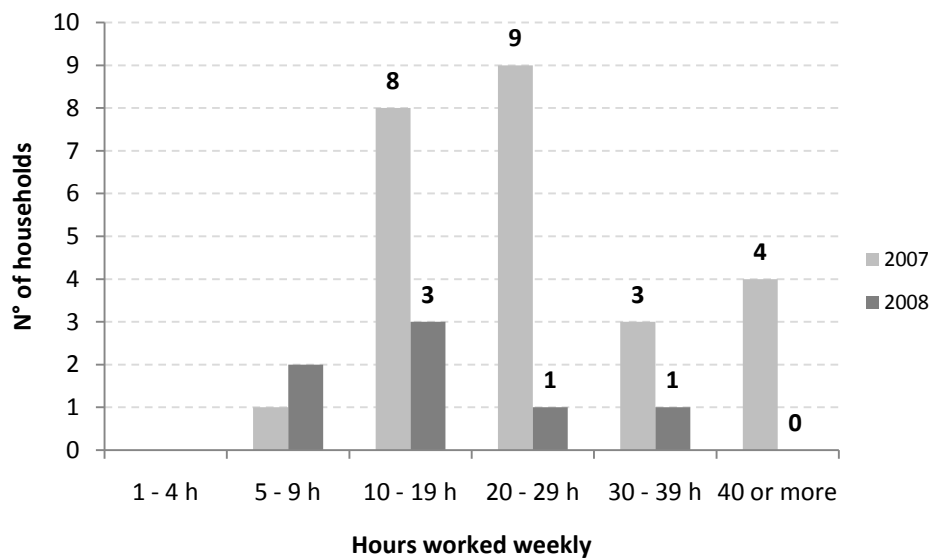
Source: Research from the Osasco Land Title Survey – 2008

6. Econometric Model: Difference-in-Difference Estimates

6.1 Difference-in-Difference Estimates: Estimator – General Framework

The econometric method used was Difference-in-Difference Estimatation, known as DIFF-in-DIFF (DD), given the data characteristics described above. As Bertrand *et al.* (2004) define, Differences-in-Differences consists of identifying a specific intervention or treatment (often a passage of a law). One then compares the difference in outcome after and before the intervention for groups affected by the intervention to the same for unaffected groups.

Such approach involves basically two regimes: "0" and "1" given an observed outcome Y, which means $Y_1 = dY_1 + (1-d)Y_0$. Given $d=1$, we observe Y_1 and with $d=0$, Y_0 is observed.

As Heckman & Hotz (1989) state, the parameter most commonly invoked in the program evaluation literature, although not the one actually estimated in social experiments, is the effect of randomly picking a person with characteristics X and moving from "0" to "1":

$$E(Y_1 - Y_0/X) = E(\Delta/X)$$

In practice, most non-experimental and experimental studies do not estimate $E(\Delta/X)$. Instead, studies usually estimate the effect of treatment on the treated.

$$E(\Delta/X), d=1$$

Given the data characteristics, this particular study aims, as previously mentioned, to provide a comparison between "treated" and "untreated" to estimate the impact of treatment on the treated with a counterfactual.

Again as Heckman & Hotz (1989) point out, it is impossible to form change in outcomes between "treated" and "untreated" states for anyone. However, it is possible to form one or the other terms for everyone with the counterfactual mechanism.

Under such scenario, the current study also has the "before-after" estimator which incorporates time t in the model.

Let's assume that the program/treatment occurs only at the time period k and $t > k > t'$.

Furthermore, yi_t is the "treated" group at period t, if $i=1$ and "untreated" if $i=0$. Additionally, consider $d=1$ is the "treated" group and $d=0$ the "untreated" group.

Hence, the main focus is to estimate the following:

$$E(y_1t - y_0t/d = 1) = E(y_1t - y_0t)_1$$

and given that it is possible to decouple the equation above between "treated" and "untreated" given two different periods, or $t > t'$. The Difference-in-Difference estimator is:

$$E(y_it - y_0t)_1 = E(y_it - y_0t')_1 - E(y_0t - y_0t')_1 + E(y_0t - y_0t')_0 - E(y_0t - y_0t')_0$$

And, the assumption is:

$$E(y_0t - y_0t')_1 = E(y_0t - y_0t')_0$$

This basically means that between periods t and t', the variation of the "treated" and "untreated" averages are the same. Hence:

$$E(y_1t - y_0t)_1 = E(y_1t - y_0t')1 - E(y_0t - y_0t')_0$$

Given the fact that there is no treatment at t', the "treated" differentiates from the "untreated" as $(y_0t'|d=1)=y^1t'$ and $(y_0t|d=0)=y^0_{t'}$. Following the equation above:

$$E(y_1t\text{-}y_0t)_1 = E[(y^1t\text{-}y^1t') \text{ - } (y^0_t\text{-}y^0_{t'})] = E(\Delta y_1\text{-}y_0)$$

Finally, the estimator can expressed as follows:

$$\Delta y = d\Delta y_1 + (1\text{-}d)\Delta y_0 = \Delta y_0 + d(\Delta y_1\text{-}y_0)$$

Given the case the $\Delta y_i = \Delta X\beta_i + u_i$, the regression is:

$$\Delta y = \Delta X\beta_0 + d(\Delta X\beta_1\text{-}\Delta X\beta_0) + u_0 + d(u_1\text{-}u_0)$$

Assuming that $\beta_1\text{-}\beta_0=0$, except for the constant, follows:

$$\Delta y = \Delta X\beta_0 + d\alpha + u_0 + d(u_1\text{-}u_0)$$

and α is the focus parameter.

6.2   Difference-in-Difference Estimates: The Regression Model

Difference-in-Difference estimates and their standard error, according to Greene (2002), most often derive from using Ordinary Least Squares (OLS) in repeated cross sections (or a panel) data on individuals in treatment and control groups (no treatment) for a period before and after a specific intervention. As Meyer (1995) argues, the great appeal of DD estimation comes from its simplicity as well its potential to circumvent many of the endogeneity problems that typically arise when making comparisons between individuals.

The standard DD estimates the following regression:

$$Yist = As + Bt + cXist + \beta Ist + \varepsilon ist$$

where *As* and *Bt* are fixed effects for states and years respectively, *Xist* are relevant individual controls and εist is a error term. The estimated impact of the intervention is the OLS estimate *β*. Standard errors used to form confidence interval for *β* are usually OLS standard errors sometimes corrected to account for correlation of shocks within each year. Considering the data characteristics mentioned earlier, this study will assume that the estimated coefficient of intervention is variable (given *Xist*) but does not help to determine program participation (land titles were given randomly and households were mostly unaware about receiving the title).

Hence, this specification is a common generalization of the most basic DD, and it will be the foundation for this particular study's econometric technique. The basic assumption is that changes in the outcome variable over time would have been exactly the same in both the treatment and the control group in the absence of the intervention.

6.3   Difference-in-Difference Estimates: Land Title Specification

In this paper, formally, the dependent variable is hours weekly hours of work of child labor force *Yist* (the outcome of interest for household *i* in group *s* by time *t*). The dependent variable would be posted as the difference among weekly hours of child labor in 2008 and 2007.

Also, *δ* indicates whether the household lives in a neighborhood that has been reached by the program -- being the dummy for whether the land title has affected the group *s* at time *t*; with fixed effects and *Xi* is a vector of characteristic controls.

Hence, the coefficient *δ* is the estimated program effect, which provides a measure of conditional average difference in time worked by children in households in the program area versus the non-program area.

In addition, *Xi* includes the following controls: sex (dummy), marital status (dummy, example: single) and ethnicity (dummy, example: African Brazilian).

Another set of variables included, to extend to include fixed effects, and convergent with Becker & Lewis's (1973) suggestion, level of income -- measured in terms of minimum wage (please refer to question number P-38 at Appendix A for details). Furthermore, weekly hours of adult work is an essential variable to understand child labor according to Rosenzweig (1981).

Patrinos & Psacharapoulos (1994) for Paraguay, Grootaert (1998) for Ghana, and Heady (2003) for Pakistan conclude that the more people there are in the family, the higher are the chances of having child labor. Given such a framework, the number of household members is also included. The same applies for the years of education of the family head. For income,

weekly hours, number of household members and years of education, also the difference between the survey collection results in 2008 and 2007 is applied (example: the independent variable of income is = Income 2008 - Income 2007 and so on with the other variables mentioned).

As a robustness check, this study also estimates a regression including the households that moved from *Canaã* (households that got the title, sold the property and moved right away). The goal is to check if the land title still has a positive effect even considering those that are not living in the original community.

Given all the conditions mentioned above, the basic econometric structure is the following:

$$Y_i = \alpha + \delta(Land\ title) + \beta(Hours\ worked\ weekly\text{-}adult) + \beta(Income) + \beta(Households\ number) + \beta(Years\ of\ education) + \alpha'X_i + e_i$$

Furthermore, the main hypothesis to be tested is the following:
$H_0 = \delta < 0$
$H_1 = \delta \geq 0$

7.   Results

The summary of basic statistical results is presented in Table 1 (Sample Means). Consistent with the study's basic findings, one main aspect demands special attention. The average weekly hours of child labor has decreased in the program households and increased in the non-program households. Additionally, for land title owners, weekly hours worked of adults increase more. This could provide a potential signal that child labor is being substituted by adult work.

Table 1: Sample means - with all households that have children

	Pre-Program (N = 251)			Post-Program (N = 240)		
	Ia (program)	Ib (non-program)	IC |tΔ|	IIa (program)	IIb (non-program)	IIC |tΔ|
Mean age	42.0	45.0	-3.0	42.8	45.9	-3.1
Time in residency (# months)	146.2	158.4	-12.1	157.8	175.0	-17.1
Household number (# members)	3.8	4.0	-0.2	3.9	4.1	-0.2
Number of rooms	3.3	3.7	-0.7	3.3	3.7	-0.4
Income (number of MW)	2.0	3.0	-1.0	2.0	3.0	-1.0
Years of Education	9.0	5.0	4.0	9.0	5.0	4.0
Hours Worked Weekly	9.8	9.2	0.5	19.5	10.0	9.5
Child Labor Hours Weekly	3.5	9.1	-5.6	0.5	11.9	-11.4

Source: Author's Estimates

Table 2: Child Labor and Land Title

Independent Variables	Dependent Variable Income	
		Robustness check
Constant	5.66 (1.92)	5.62 (1.86)
Sex	0.39 (0.90)	-0.11 (0.97)
Single	-3.38 (1.56)	-4.23 (1.77)
African Brazilian	-3.20 (1.90)	-3.22 (1.92)
Years of Education	0.69 (0.11)	0.12 (0.12)
Households number (# members)	-0.51 (0.31)	-0.50 (0.30)
Income (number of MW)	-0.0001 (0.0005)	0.00001 (0.0003)
Hours worked weekly	-0.004 (0.05)	0.002 (0.05)
Land Title	-6.28 (1.16)	-7.26 (1.22)
R^2	0.20	0.20
RootMSE	7.07	7.34
N	240	251

Source: Author's Estimates
(*) significant at 5%
( ) standard deviation

Econometric results appear in Table 2. This study default estimates include the entire set of regressors consistent with the current theory regarding child labor and land titles and the data collected during the survey. In such specification, the estimate of the land title δ coefficient is -6.82, with a robust standard error of 1.16.

This outcome is highly consistent with our hypothesis, that property rights (Land Title) decrease child labor by 6.82 hours worked per week. With a t-statistic of over 5, the coefficient is different from zero at any reasonable level of statistical significance.

The robustness part of the table provides our robustness check, adding (as mentioned previously) to the regression analysis, households that moved. The robustness outcome not only remains but also makes it even more significant (-7.26). This result should help to reinforce the conclusion that land titling has a positive effect on individuals, and not only on property. Households that moved had the same attitude toward child labor.

Hence, the effect of land titling, given the conditions and variables applied, is clearly positive, and helps to minimize the number of weekly hours worked by children.

Conclusion

This paper has presented new evidence on the value of formal property rights in urban squatter communities in a developing country. By studying the relationship between the exogenous acquisition of a land title and child labor force participation, the study has provided additional empirical support for the evidence that property titling appears to reduce household demand for child labor in the majority of households.

Although existing studies indicate significant effects on access to credit, income, home investment and fertility (Field 2007; Andrade 2006), this particular study aims at helping to fill an important gap in the literature on property rights and child labor force participation. Furthermore, the results indicate that, unlike employment responses to most welfare programs, which tend to involve an income effect that potentially removes adult households from the labor force, government property titling programs appear to have a different effect -- removing child labor from the labor force.

Regarding further research, it will certainly be interesting to apply the same survey in different locations and compare outcome results. Ravallion *et al*. (2005) argue that the same program works well in one village but fails in another. An example is Bangladesh's *Food for Education Program*. The program worked well in reaching the poor in some villages but not in others, even in relatively close proximity. Furthermore, it will also add value in keeping tracking of the same households with other surveys to check the consistency and robustness of the results over time.

It is clear that understanding the multiple channels through which land titles influence economic outcome is particularly important given that governments across the world are considering titling programs to address urban informality. In addition, the results have potential implications for understanding labor market frictions in developing countries (Goldsmith, 1995). In places characterized by high levels of residential informality, such as most developing and poor countries, informal property protection may constitute an important obstacle to labor market adjustment. Hence, land titling could be applied as an asset to improve public policy actions that directly impact economic growth.

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APPENDIX A: Complete stage I and stage II questionnaires

Stage I
Good morning/Good afternoon. My name is_____. We are doing a research to develop an academic study about the local living conditions. I would like to count on your cooperation to understand what is your level of satisfaction regarding such matter.

NAME			
HOME PHONE	COML	MOBILE PHONE	**SAMPLE** **1 2 3**
FAMILY'S HEAD NAME			**LIST CODE**
ADDRESS			

PF1 – **GENDER**   1 Male   2 Female

COMPLEXION   1 White-Caucasian   2 African-Brazilian   3 Asian   4 African-Indian   5 Indian

PF2 – How old are you?
(TAKE NOTE ON THE BOX AND FILL THE AGE GROUP)

1. 18 to 24   2. 25 to 34   3. 35 to 44   4. 45 to 59   5. 60 – more

P1. Currently, do you work? **(IF YES)**
1 YES → **CONTINUE**   2 NO → **GO TO P.8**

P2. What is your main activity? **(THROUGH OF THE OCCUPATION, IDENTIFY THE BETTER SITUATION).**

      PEA (Active Economic Population)

1 Wage Employee - Registered

2 Wage Employee - Unregistered

3 Public Servant

4 Regular Self-Professional (Pays Social Security ex: maid)

5 Self Professional (with college degree ex: lawyer)

6 Entrepreneur

7 Free-lancer

8 Internship (with salary)

9 Others **(TAKE NOTE)**_____

P3. What's your main activity?

P4. Where do you work?   **(READ UNTIL THE QUESTION MARK) (STIMULATED AND UNIQUE)**

    1 at Home   2 Own Neighborhood   3 Another neighborhood   4 Another town

P5. How many hours do you work each day?

	TAKE NOTE THE TOTAL NUMBER OF HOURS

P6. How many days per week? **(STIMULATED AND ONLY) (THE HIGHEST AVERAGE FREQUENCY)**
1 day   2 days   3 days   4 days   5 days   6 days   7 days (everyday)

P7. Do you just study / Are you a retired / Are you a housewife / Are you unemployed? **(IF UNEMPLOYED)** Are you looking for a job or not?

NO PEA (Non-Active Economic Population)
NO PEA

11 Only housewife   12 Only retired
13 Only student   14 Other forms of income
15 Other **(TAKE NOTE)**   16 Unemployed (Don't seeking for a job) – NO PEA
17 Unemployed (Seeking for a job) – PEA

P8. Do you have any children? **(STIMULATED AND ONLY)**
                    1 Yes   2 No

P9. How many people, including yourself, live in your place? **(TAKE NOTE)**

TAKE NOTE

P10. Are there any children/teenager helping in the familiar income? How many? (= UNDER 18 years old)

TAKE NOTE

99 There are no children working **GO TO P.13**

P11. How many hours they work daily ? IF THERE ARE MORE THAN ONE WORKING, PLEASE CHECK THE AVERAGE OF WORKED HOURS BETWEEN THEY ALL (PER DAY) - DON'T PROVIDE THE SUM

TAKE NOTE - QUANTITY OF WORKED HOURS

P12. How many days per week do minors work? (SPONTANEOUS AND UNIQUE) (THE HIGHEST AVERAGE FREQUENCY)

1 day   2 days   3 days   4 days   5 days   6 days   7 days (everyday)

P13. Do you have some other source of income? .... **(READ UNTIL THE QUESTION MARK)**
1) Alimony   2) Pension   3) Retirement   4) Unemployment Insurance
5) Any rent   6) Donations   7) Occasional jobs   8) Social programs   **OR**
98 Other? Which?_____   **99 – NO ONE**

P14. Are you (or someone in your home) benefited by any Government social program?
          1) Yes   2) No →**go to P18**

P15. Which social program benefits you (or someone in your home)? **READ THE ALTERNATIVES**

1 Bolsa família   2 Bolsa escola   3 Student pass   4 Unemployment pass
5 LOAS/BPC   6 Basket good   7 Housing Program   8 Medicines
9 Donations   10 PRONAF   11 PROGER   98 Other. Which?_____

P16. What's your marital status? **(SPONTANEOUS AND UNIQUE)**
              1. Single   2. Married   3. Widowed   4. Divorced

P17. About the house where you live, you think you are… **(READ UNTIL THE QUESTION MARK)**
(STIMULATED AND ONLY)

1. Housewife / Head of family / mother / wife **(ONLY FOR WOMEN)**
2. Head of family / husband / father **(ONLY FOR MEN)**
3. Son / Daughter (older than 18 years old) **OR**
4. Other adults (18 or older)

P18. "Taken all together, how would you say things are these days - would you say that you are … **READ UNTIL THE QUESTION MARK:**

  1 Not too happy   2 Pretty Happy   OR   3 Very happy ?

P19. On the whole, about the life that you lead, are you... **READ UNTIL THE QUESTION MARK:**

   1 Not at all satisfied   2 Fairly Satisfied   **OR**   3 Very satisfied?

LET'S TALK ABOUT YOUR HOME

P20. How long do you and your family live here? **(TAKE NOTE)**

Year	Months

P21. Which the size of your property?

1 Until 20m^2 2 More than 20 m^2 - 40m^2 3 More than 40m^2 - 60m^2 4 More than 60m^2 5 Don't know

P22. How many rooms have your place? **(TAKE NOTE)**

1 One   2 Two   3 Three   4 Four   5 Five   6 Six   7 Seven   8 Eight   9 Nine   10 Ten   98 Other TAKE NOTE
_____

P23. Do you use your place only as home?

1 Yes → **GO TO PP.26**   2 No → **CONTINUE**

P24. What kind of trade/service there is in your home?	**P25. How long are you doing that in your home?**
1. Bar	1. Less than 1 year
2. Mini-market	2. 1 to 3 years
3. Beauty and Cosmetics	3. More than 3 to 5 years
4. Homemade food and candies	4. More than 5 to 10 years
5. Mechanics and Auto-service	5. More than 10 to 15years
6. Deposit of recycle material	6. More than 15 years
7. Church	7. Don't know
8. Other. Which one ?...	

P26. How did you acquire this residence? **(SHOW THE CARD AND READ IT)**

1. Bought the property from the Householders Association

2. Bought the property from other household and built the house

3. Bought an already built house

4. Occupied the property and built the house

5. The property was conceded **definitely** by the former owner
6. The property was inherited by a relative that passed away
7. Rent the house
8. The property was **temporarily** borrowed by the current owner
   9. Was officially transferred by the local government/ Has received the land title from the local officials
9. Other. Which one TAKE NOTE

96. Don't know / Don't remember

R$

P276. **(TO P26 = 1,2,3)** Could you tell me how much did you pay for this property? **(TAKE NOTE)**

P26b. (TOP27# 7 and 8 Have you ever have rented this property to another household? **(TAKE NOTE)**

1 Yes   How much? R$_____   2 No

R$

P26c. Do you know what is the market value of this property today? **(TAKE NOTE)**

P27. Could you tell me if during the last year have you purchased something by credit? **(SPONTANEOUS AND ONLY)**

      1 Yes   2 No **(GO TO P30)**

P28. What was the payment method chosen to make this purchase? (**READ THE ALTERNATIVES**) **(STIMULATED AND MULTIPLE)**

1) Credit card	2) Debit card	3) Postdated check	4) Payroll credit
5) Installment payment slip	6) Store collection statement	7) Financing	8) Other **(TAKE NOTE)**

P29. Last year did you take any personal loan? **(SPONTANEOUS AND ONLY)**

1 Yes ⇨ **1** Bank/financing company/insurance   **2** Family/Friends   **3** Credit card   **4 Other** _____   **96 No**

P30. Have you delayed any payment of personal loan or purchase on credit? **(TO P.28=1 or P30 =1)**

      1) Yes   2) No **(GO TO P 33)**

P31. (TO P.27=1 or P29 =1) (For those who delayed payments last year) How past due was/is the delay? **(READ THE ALTERNATIVES) (STIMULATED AND MULTIPLE)**

  1) Less than 30 days   2) Between 31 to 60 days   3) Between 61 to 90 days 4) More than 90 days 5) More than 180 days

P32. Thinking about the payment methods which you use regularly, I would like to know which of them you use more frequently**: READ EACH ITEM_____**

P33. FOR EACH PAYMENT METHOD THAT YOU REGULARLY USE, I would like to know the level/degree that you use between 1 and 5, 1 is the lowest and 5 the highest (STIMULATED)

		Lowest use				Highest use
A) Check	1 Yes 2 No	1	2	3	4	5
B) Postdated check	1 Yes 2 No	1	2	3	4	5
C) Debit card	1 Yes 2 No	1	2	3	4	5
D) Credit card	1 Yes 2 No	1	2	3	4	5
E) Store card	1 Yes 2 No	1	2	3	4	5
F) Installment payment slip	1 Yes 2 No	1	2	3	4	5
G) Cash	1 Yes 2 No	1	2	3	4	5
I) Others ? **(TAKE NOTE)**		1	2	3	4	5

P34 Now, I will ask some questions about your home. Such information is required only for socioeconomic classification.
Do you have in your house _____ *(Ask to each item below)*? How many?

Items	There's no	THERE IS	(QUANTITY)		
		1	**2**	3	
Color TV	0	1	2	3	
Videocassette/ DVD	0	2	2	2	
Radios	0	1	2	3	
Baths	0	4	5	6	
Vehicles	0	4	7	9	
Maid	0	3	4	4	
Washing machines	0	2	2	2	
Refrigerator	0	4	4	4	
Freezer (*)	0	2	2	2	

(*) independent or 2 doors on refrigerator

P35. Which level of education have the head of the family reached?

English	Points Fill	Portuguese
Illiterate/ Elementary school incomplete	0	Analfabeto/ até 3ª Série Fundamental
Elementary school completed/ middle school incomplete	1	4ª Série Fundamental
Middle school completed/ High school incomplete	2	Fundamental completo
High school completed/ College incomplete	4	Médio completo
College complete	8	Superior completo

P36 (SHOW THE "INCOME CARD")

Now, I will read some income groups and I would like you tell me what group is your monthly familiar income included. I mean, the sum of income of all people living in your home, including you. Your monthly familiar income (last month) was? **(READ THE INCOME GROUPS) (STIMULATED AND ONLY)**

(SM = Minimum wage)

1	Until R$ 380,00	Until 1 SM
2	R$ 381,00 to R$ 760,00	More than 1 to 2 SM
3	R$ 761,00 to R$ 1140,00	More than 2 to 3 SM
4	R$ 1141,00 to R$ 1.520,00	More than 3 to 4 SM
5	R$ 1.521,00 to R$ 2.660,00	More than 4 to 7 SM
6	R$ 2.660,00 to R$ 4.560,00	More than 7 to 12 SM
7	R$ 4.560,00 to R$ 8.740,00	More than 12 to 23SM
8	More than R$ 8.741,00	More than 23 SM

P37) Do you expect to receive any land title from the local officials or the Household Association during the next year?

1 Yes   2 No

Thank you for the cooperation.

Stage II

Good morning/Good afternoon. My name is_____. We are doing a research to develop an academic study about the local living conditions. I would like to count on your cooperation to understand what is your level of satisfaction regarding such matter.

NAME			
HOME PHONE	COML	MOBILE PHONE	**SAMPLE** 1 2 3
FAMILY'S HEAD NAME			**LIST CODE**
ADDRESS			

PF1 – **GENDER**   1 Male   2 Female

COMPLEXION   1 White-Caucasian   2 African-Brazilian   3 Asian   4 African-Indian   5 Indian

PF2 – How old are you?
(TAKE NOTE ON THE BOX AND FILL THE AGE GROUP)

1. 18 to 24   2. 25 to 34   3. 35 to 44   4. 45 to 59   5. 60 – more

P1. Currently, do you work? **(IF YES)**
1 YES → **CONTINUE**   2 NO → **GO TO P.8**

P2. What is your main activity? **(THROUGH OF THE OCCUPATION, IDENTIFY THE BETTER SITUATION).**

PEA (Active Economic Population)

1 Wage Employee - Registered

2 Wage Employee - Unregistered

3 Public Servant

4 Regular Self-Professional (Pays Social Security ex: maid)

5 Self Professional (with college degree ex: lawyer)

6 Entrepreneur

7 Free-lancer

8 Internship (with salary)

9 Others **(TAKE NOTE)**_____

P3. What's your main activity?

P4. Where do you work?   **(READ UNTIL THE QUESTION MARK) (STIMULATED AND UNIQUE)**

1 At home   2 Own Neighborhood   3 Another neighborhood   4 Another town

P5. How many hours do you work each day?

	TAKE NOTE THE TOTAL NUMBER OF HOURS

P6. How many days per week? **(STIMULATED AND ONLY) (THE HIGHEST AVERAGE FREQUENCY)**
1 day   2 days   3 days   4 days   5 days   6 days   7 days (everyday)

P7. These hours are greater, equal to or lower compared to one year ago? **(STIMULATED AND ONLY)**
1 Greater   2 Equal to   3 Lower

P8. Do you just study / Are you a retired / Are you a housewife / Are you unemployed? **(IF UNEMPLOYED)** Are you looking for a job or not?

NO PEA (Non-Active Economic Population)
NO PEA

26

11 Only housewife
13 Only student
15 Other **(TAKE NOTE)**
17 Unemployed (Seeking for a job) – PEA

12 Only retired
14 Other forms of income
16 Unemployed (Don't seeking for a job) – NO PEA

P9. Do you have any children? **(STIMULATED AND ONLY)**
                 1 Yes   2 No

P10. How many people, including yourself, live in your place? **(TAKE NOTE)**

	TAKE NOTE

P11. Are there any children/teenager helping in the familiar income? How many? (= UNDER 18 years old)

	TAKE NOTE	99 There are no children working **GO TO P.15**

P12. How many hours they work daily ? IF THERE ARE MORE THAN ONE WORKING, PLEASE CHECK THE AVERAGE OF WORKED HOURS BETWEEN THEY ALL (PER DAY) - DON'T PROVIDE THE SUM

	TAKE NOTE - QUANTITY OF WORKED HOURS

P13. How many days per week do minors work? (SPONTANEOUS AND UNIQUE) (THE HIGHEST AVERAGE FREQUENCY)
1 day   2 days   3 days   4 days   5 days   6 days   7 days (everyday)

P14. The number of hours is greater, equal to or less than one year ago? (STIMULATED AND ONLY)
1 Greater   2 Equal to   3 Lower

P15. Do you have some other source of income? …. **(READ UNTIL THE QUESTION MARK)**
1) Alimony 2) Pension   3) Retirement   4) Unemployment Insurance   5) Any rent
6) Donations   7) Occasional jobs   8) Social programs   98) Other? Which?_____   **99 – NO ONE**

P16. Are you (or someone in your home) benefited by any Government social program?
         1) Yes   2) No →**go to P18**

P17. Which social program benefits you (or someone in your home)? **READ THE ALTERNATIVES**
1 Bolsa família   2 Bolsa escola   3 Student pass   4 Unemployment pass
5 LOAS/BPC   6 Basket good   7 Housing Program   8 Medicines
9 Donations   10 PRONAF   11 PROGER   98 Other. Which?_____

P18. What's your marital status? **(SPONTANEOUS AND ONLY)**
         1. Single   2. Married   3. Widowed   4. Divorced

P19. About the house where you live, you think you are… **(READ UNTIL THE QUESTION MARK)**
(STIMULATED AND ONLY)
5. Housewife / Head of family / mother / wife **(ONLY FOR WOMEN)**
6. Head of family / husband / father **(ONLY FOR MEN)**
7. Son / Daughter (older than 18 years old) **OR**
8. Other adults (18 or older)

P20. "Taken all together, how would you say things are these days - would you say that you are … **READ UNTIL THE QUESTION MARK:**

	1 Not too happy	2 Pretty Happy	OR	3 Very happy ?

LET'S TALK ABOUT YOUR HOME

P21. How long do you and your family live here? (**TAKE NOTE**)

Year	Months	

P22. Which the size of your property?
1 Until 20m^2 2 More than 20 m^2 - 40m^2 3 More than 40m^2 - 60m^2 4 More than 60m^2 5 Don't know

P23. How many rooms have your place? (**TAKE NOTE**)
1 One   2 Two   3 Three   4 Four   5 Five   6 Six   7 Seven   8 Eight   9 Nine   10 Ten   98 Others TAKE NOTE
_____

P24. Do you use your place only as home?
1 Yes → **GO TO PP.27**   2 No → **CONTINUE**

P25. What kind of trade/service there is in your home?	**P26. How long are you doing that in your home?**
1. Bar	1. Less than 1 year
2. Mini-market	2. 1 to 3 years
3. Beauty and Cosmetics	3. More than 3 to 5 years
4. Homemade food and candies	4. More than 5 to 10 years
5. Mechanics and Auto-service	5. More than 10 to 15years
6. Deposit of recycle material	6. More than 15 years
7. Church	7. Don't know
8. Other. Which one ?..	

P27. How did you acquire this residence? (**SHOW THE CARD AND READ IT**)

1. Bought the property from the Householders Association

2. Bought the property from other household and built the house

3. Bought an already built house

4. Occupied the property and built the house

5. The property was conceded **definitely** by the former owner

6. The property was inherited by a relative that passed away

7. Rent the house

8. The property was **temporarily** borrowed by the current owner

9. Was officially transferred by the local government/ Has received the land title from the local officials

9. Other. Which one TAKE NOTE

96. Don't know / Don't remember

R$

P27a. (**TO P27 = 1,2,3**) Could you tell me how much did you pay for this property? (**TAKE NOTE**)

P27b. (TOP27# DE 7 and 8 Have you ever have rented this property to another household? (**TAKE NOTE**)

1 Yes How much? R$_____

2 No

R$

P27c. Do you know what is the market value of this property today? (**TAKE NOTE**)

P28. Could you tell me if during the last year have you purchased something by credit? **(SPONTANEOUS AND ONLY)**
      1 Yes   2 No **(GO TO P30)**

P29. What was the payment method chosen to make this purchase? (**READ THE ALTERNATIVES**) **(STIMULATED AND MULTIPLE)**
    1) Credit card   2) Debit card   3) Postdated check   4) Payroll credit
    5) Installment payment slip   6) Store collection statement   7) Financing   8) Other **(TAKE NOTE)**

P30. Last year did you take any personal loan? **(SPONTANEOUS AND ONLY)**
1 Yes ⇨ **1** Bank/financing company/insurance   **2** Family/Friends   **3** Credit card   **4 Other** _____   **96 No**

P31. Have you delayed any payment of personal loan or purchase on credit? **(TO P.28=1 or P30 =1)**
      1) Yes   2) No **(GO TO P 33)**

P32. (TO P.28=1 or P30 =1) (For those who delayed payments last year) How past due was/is the delay? **(READ THE ALTERNATIVES) (STIMULATED AND MULTIPLE)**

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P33. Thinking about the payment methods which you use regularly, I would like to know which of them you use more frequently**:**
READ EACH ITEM_____

P34. FOR EACH PAYMENT METHOD THAT YOU REGULARLY USE, I would like to know the level/degree that you use between 1 and 5, 1 is the lowest and 5 the highest (STIMULATED)

		Lowest use				**Highest use**
A) Check	1 Yes 2 No	1	2	3	4	5
B) Postdated check	1 Yes 2 No	1	2	3	4	5
C) Debit card	1 Yes 2 No	1	2	3	4	5
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F) Installment payment slip	1 Yes 2 No	1	2	3	4	5
G) Cash	1 Yes 2 No	1	2	3	4	5
I) Others ? **(TAKE NOTE)**		1	2	3	4	5

P35. On the whole, about the life that you lead, are you... **READ UNTIL THE QUESTION MARK:**
  1 Not at all satisfied   2 Fairly Satisfied   **OR**   3 Very satisfied?

P36 Now, I will ask some questions about your home. Such information is required only for socioeconomic classification.

Do you have in your house _____ *(Ask to each item below)*? How many?

Items	Ther e's no	THERE IS	(QUANTITY)		
		1	**2**	3	
Color TV	0	1	2	3	
Videocassette/ DVD	0	2	2	2	
Radios	0	1	2	3	
Baths	0	4	5	6	
Vehicles	0	4	7	9	
Maid	0	3	4	4	
Washing machines	0	2	2	2	
Refrigerator	0	4	4	4	
Freezer (*)	0	2	2	2	

(*) independent or 2 doors on refrigerator

P37. Which level of education have the head of the family reached?

English	Points Fill	Portuguese
Illiterate/ Elementary school incomplete	0	Analfabeto/ até 3ª Série Fundamental
Elementary school completed/ Middle school incomplete	1	4ª Série Fundamental
Middle school completed/ High school incomplete	2	Fundamental completo
High school completed/ College incomplete	4	Médio completo
College complete	8	Superior completo

P38 **(SHOW THE "INCOME CARD")**

Now, I will read some income groups and I would like you tell me what group is your monthly familiar income included. I mean, the sum of income of all people living in your home, including you. Your monthly familiar income (last month) was? **(READ THE INCOME GROUPS) (STIMULATED AND ONLY)**

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8	More than R$ 8.741,00	More than 23 SM

ONLY IF P27 = 9 - TO FINISH, you told me you got, **last year, the land title from the local officials**. I would like you tell me how such event has changed your life. In a scale of 1 to 10, considering 1 as no effect at all, and 10 if your life is really better because of the land title
1   2   3   4   5   6   7   8   9   10   96 Don't know

Thank you for the cooperation.

APPENDIX B

Table 3: Sample means with all households

	Pre-Program (N = 326)			Post-Program (N = 310)		
	Ia (program)	**Ib (non-program)**	**IC |tΔ|**	**IIa (program)**	**IIb (non-program)**	**IIC |tΔ|**
Mean age	39.0	42.4	-3.4	40.0	43.4	-3.4
Time in residency (# months)	143.4	154.4	-11.0	155.8	170.2	-14.4
Household number (# members)	3.8	4.0	-0.2	3.9	4.0	-0.2
Number of rooms	3.3	3.6	-0.3	3.3	3.6	-0.3
Income (number of MW)	2.0	3.0	-1.0	2.2	3.0	-0.8
Years of Education	9.0	5.0	4.0	9.0	5.0	4.0
Hours Worked Weekly	10.6	10.1	0.5	20.4	11.2	9.2

Source: Author's Estimates