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**An Empirical Approach for Child Labor
in Brazil**



AN EMPIRICAL APPROACH FOR CHILD LABOR IN BRAZIL

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INTRODUCTION

There are a lot of reasons that can urge a child to labor market, but generally the most common is the presence of low household incomes, which forces children to work to sustain themselves or, in less serious cases, to increase the life quality of their families. According to the altruistic model suggested by Basu & Van (1998), a household will not send children to labor market if their income is sufficiently high. In other words, for every household there is a critical wage, W_i , such that the household will send its children to work if and only if, the adult wages prevailing in the market is less than W_i . This assumption is called “*Luxury Axiom*” and represents the main idea of the altruistic models.

The first objective of this essay is to verify the validity of the “*Luxury Axiom*” to Brazilian case, besides define and quantify the influence of some determinants over child labor in Brazilian families. In other words, the intention is to answer the question: What determines that a child supplies his or her labor in the labor market? A second objective is to raise safe information about the nature and the extension of child labor in Brazil, to permit the remotion and rehabilitation of these working children. The availability of trustable data is essential to define priorities, to determine which groups deserve priority attention, to draw realistic combat programs and to evaluate the progress of such initiatives. Finding out what social groups or geographical areas child workers come from, and working with families at risk can prevent new children from being recruited for exploitative work.

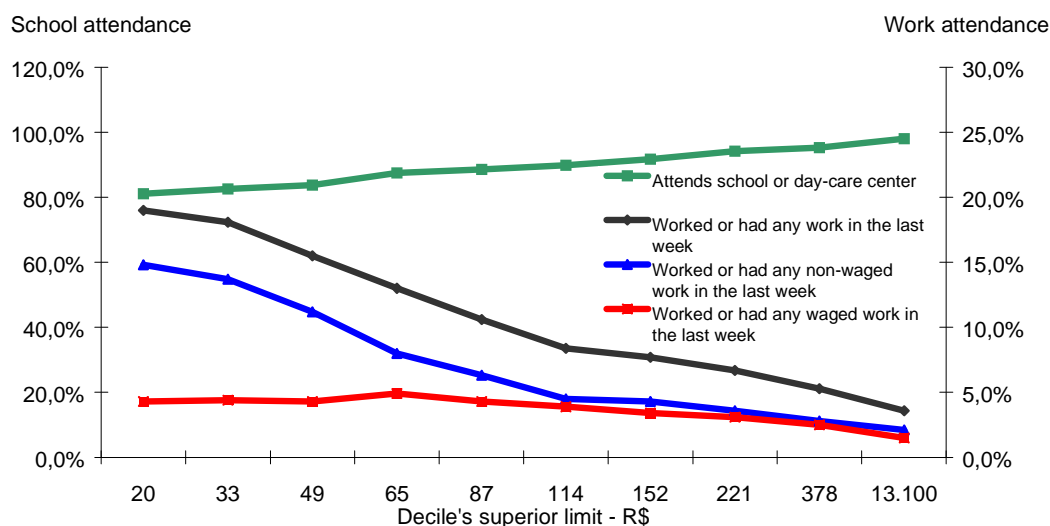
It is necessary to understand the actual situation of child labor to figure out the magnitude of the problem that we are dealing with. Therefore, the paper is organized in four sections as follows: **The first** quickly discuss the main causes of child labor in Brazil taking into account recent literature about the subject. **The second** shows the econometric methodology used to investigate the determinants of child labor, and introduces the data basis. **The third section** analyses the obtained results and checks the veracity of the “*Luxury Axiom*” to prove if household income really is the main cause of children’s entry into the labor market. Finally, **the forth section** concludes the paper.

This investigation was realized using recent cross-sectional data from PNAD (National Research by Household Sample) 1998, which besides having a good sample size, also offers a lot of information concerning the studied cases.

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1. WHY CHILDREN WORK?

The recognition of poverty as a major cause of the child labor problem is not new, but a growing body of information and experience has revealed another dimension. Child labor is also about the exploitation of poverty, social exclusion, inequality and injustice.



Graphic 1. SCHOOL ATTENDANCE AND ECONOMIC ACTIVITY OF CHILDREN WITH 5-15 YEARS OLD, BY FAMILIAR PER CAPITA INCOME DECILE

Source: Pnad 98 – IBGE

Graphic 1 clarifies the relation between income, school attendance and work. It may be observed that the propensity of study increases for higher income levels, while the proportion of working persons has an opposite behavior, especially those children that executed non-waged tasks in the last week. It is also important to say that the positive variation in school attendance is smaller than the negative deviation in work attendance. In addition, it is also relevant to observe that only in the sixtieth decile is that waged and non-waged activity rates touch themselves, what means that the total work decreases mainly due to the non-waged work. Therefore, these data also support the poverty hypothesis in that it is clear that the rates of school attendance increase and of child work decrease in moving from the lowest to the highest decile.

However, according to UNICEF (1997b), there are a lot of factors besides poverty that are connected to child labor: income distribution, fertility, education, bad nutrition, woman status, as well as the economy structure and the frame of macroeconomic policies are strongly related to the insertion of a child into the labor market.

BHALOTRA & HEADY (2000) for example, investigating the determinants of child labor in rural household from Ghana and Pakistan concluded that, in addition to the number of siblings, factors as age, mother's education, region, ethnic, religion, availability of public

transports and electricity are variables that show some importance to define the number of hours that children work.

ZYLBERSTAJN, PAGOTTO & PASTORE (1985) conducted a study in Brazil to show which are the forces that drive children, teens, and women to the labor market. The authors found that the poorest families use the work of children and teenagers to survive mainly because of three reasons: the father's handicap, age and the health of the son. When they did this study, there were "...27% of families where the head did not work due to sickness or job accident, living in total or partial handicapped conditions. In this group of families, there are 37% whose income is exclusively formed by the precarious work of minors." In this case, the option of these children was not between working or not, but between living or starving. Although this "surviving question", usually others factors are indicated as responsible for children labor: the unemployment of members in the household, the rupture of the family core, with the woman becoming head in the absence of the man, and the invalidity of the household head.

BARROS & SANTOS (1991) and RESENDE (1998) also conducted an investigation to analyze related factors, directly or not, with the insertion of minors into the Brazilian labor market. Individual, regional, intra household and labor market characteristics were analyzed in this study. The authors found that the participation rate of children in the Brazilian labor market is directly and strongly related with the household poverty level.

Despite this, in another study BARROS, MENDONÇA & VELAZCO (1994) concluded that poverty is not responsible for the entry of children into the Brazilian labor market. If poverty was the main cause of child labor, then a larger participation rate should be expected in areas and periods of bigger poverty. Notwithstanding, the evidence found by the authors does not confirm this idea.

Recently, LEME & WAJNMAN (2000) studied the link between school and work and confirmed that in the decision of just study, the most important variables are parents education and household income, followed by the number of kids in the family and the child's gender. LEME & WAJNMAN also concluded, as well as FILHO et al. (2000), that these variables have great influence, but in opposite direction, over the decision of just studying.

Finally, in a last example FREIJE e LOPEZ-CALVA (2000) used Mexican and Venezuelan data to examine the forces related to child labor, and study the association between poverty and children activities. The authors concluded the following: (1) the composition and the kind of household are important determinants of child labor and education; (2) family income level matters but labor market conditions do not so policy

measures aimed at affecting the price of child labor may be ineffective; and (3) child labor is not a transitory condition and therefore it has significant impact over the future educational upward mobility of working children.

2. METHODOLOGY

The main objective of this paper is to verify if the empirical regularities and the behavior of working children observed in others studies could be seen in Brazilian case. To do this, the ideas of BASU (1999) and FREIJE & LOPEZ-CALVA (2000) will be applied, using econometrics methods to aim which are the variables affecting the decision of children to work. To do this analysis and taking into account the Federal Law determination, this work considered as children all the persons between 5 and 15 years old. It was considered as ‘working children’ all persons, who were engaged in any economic activity in the last week, waged or not.

This research intends to identify the main determinants of child labor in Brazil, besides test the “luxury axiom” and observe the per capita income influence in the hypothesis of insertion (or not) of children in the labor market. This paper evaluates how the different factors listed below influence both child labor and schooling.

Using *PROBIT* models, this paper proposes to estimate two regression functions. The first one will give the probability of children, between 5 and 15 years, enter in the labor market, and the second one the probability of going to school taking into account some individual and familiar characteristics. The model may be synthesized as follows:

$$Y_T = f(X_i) + \lambda, \lambda \sim N(0,1)$$

$$Y_E = f(X_i) + \xi, \xi \sim N(0,1):$$

$Y_T = 1$ if the child works or $Y_T = 0$ if the child does not work, $Y_E = 1$ if the child goes to school or $Y_E = 0$ if she doesn't go, X_i is a vector of exogenous variables (education, household per capita income provenient of all fonts, excluding the own child's income, position in the head occupation, fathers' education, color and race, and some relevant individual and household characteristics), and finally ξ and λ are the stochastic terms not correlated with the regressors.

Nevertheless, *Probit* models do not catch the existent relation between working and studying in the decisional process. They assume that school and the labor supply decision are independent, which is an untenable assumption. Approaches that are more recent try to deal with the interrelated nature of these events.

The *BIVARIATE PROBIT* model assumes that school attendance and child work decisions are separate but interrelated. This interrelation takes place through a correlated

error structure so that, after controlling for explanatory variables the two outcomes are related to each other. More formally, the bivariate model is:

$$y_{i,T} = f(X_{i,T}) + \lambda \quad \text{where: } y_T = 1 \text{ if child works, and 0 otherwise}$$

$$y_{i,E} = f(X_{i,E}) + \xi: \quad \text{where: } y_E = 1 \text{ if child attends school, and 0 otherwise}$$

$$E[\lambda] = E[\xi] = 0$$

$$\text{Var}[\lambda] = \text{Var}[\xi] = 1$$

$$\text{Cov}[\lambda, \xi] = \rho$$

After assuming the residuals normally distributed, the joint probability is then:

$$P_{i,k} = P(Y_{i,T} = y_{i,T}; Y_{i,E} = y_{i,E}) = \theta(f(X_{i,T}), f(X_{i,E}), \rho)$$

where $X_{i,j}$, $j = T, E$, are two vectors of explanatory variables and $\theta(\cdot)$ is the joint normal cumulative distribution. This model has the advantage of being flexible enough to have separate equations, and therefore different explanatory variables, for each choice. On the other hand it has the drawback of assuming the same correlation structure for all individuals (i.e., the same rho, ρ , for everybody). It is feasible to assume that the correlation between school and work, after controlling for other factors, has the same sign for almost everybody but it is less convincing to say that it also has the same magnitude.

To estimate the equations were considered persons between 5 and 15 years, what is equivalent to a sample of 78.808 cases. Based in the literature revision, and in the found descriptive statistics (in spite of a little bit of intuition), seven econometric models were specified: four using *Probit* models and three using *Bivariate Probit* specifications. More formally, Probit models may be defined as:

ESCOLA

FREQ = IDADE + IDADE2 + SEXO + COR + EDUC + EDUCAMAE + PESS7ANO + AREARU + MAECHEFI + LUZ + TOTMOR + RFPC + DUMMIES UF + DUMMIES METROPOLITANAS

TRABALHO

TRABALHA=IDADE+ IDADE2+ SEXO+ COR+ EDUC+ EDUCAMAE+ PESS7ANO+ AREARU + MAECHEFI + CPEM + TOTMOR + RFPC + DUMMIES UF + DUMMIES METROPOLITANAS

TRABALHO REMUNERADO

TRABREM= IDADE+ IDADE2+ SEXO+ COR+ EDUC + EDUCAMAE+ PESS7ANO+ AREARU + MAECHEFI + CPEM + TOTMOR + RFPC + DUMMIES UF + DUMMIES METROPOLITANAS

TRABALHO NÃO REMUNERADO

TRABFREE= IDADE + IDADE2+ SEXO+ COR+ EDUC+ EDUCAMAE+ PESS7ANO+ AREARU + MAECHEFI + CPEM + TOTMOR + RFPC + DUMMIES UF + DUMMIES METROPOLITANAS

OBS: Variable's description is in *Appendix 3*.

At this point, to permit a clear analysis later, the distinction between non-waged and household task shall be done. According to PNAD, these two kinds of work can be understood as follow:

Non-waged worker and household member – Any person that was working without remuneration, at least one hour per week, helping members from the household occupying positions as: employee in the production of commodities (including agriculture, vegetal or mineral extraction, hunting, fishing and others), self-employed or employer;

Other non-waged worker - Person that was working without remuneration, at least one hour per week, as apprentice, temporary, or helping religious and non-profit institutions, and cooperatives;

Domestic worker - Persons that were engaged in domestic works, waged in money or benefits, in one or more households;

The “rho” estimation, ρ , was done establishing the following comparisons in the Bivariate Probit model:

- School X Work;
- School X Waged work;
- School X Non-waged work;

3. ECONOMETRIC RESULTS

Probit and Bivariate Probit estimations seem to have a good fit, though predictability tests have to be carried out. The estimated parameters are in Appendix 4.

Results are in coefficients so their sign express the direction of the change in probability to a given change in the explanatory variable, and the absolute value measures the magnitude of the variable’s influence.

Personal attributes as age, gender and education had significant effects to explain child work and schooling decisions. Age demonstrated a negative relation with the probability to study and execute non-waged works, but on the other hand, it had positive effects over remunerated works. It is also possible to observe that this positive effect prevails when these two kinds of work are analyzed together. All these results point to a simple natural fact: the

older the child, the less likely to go to school and the more likely to start working, as expected.

The gender of the kid is consistently significant, where male children are more likely to work than their female counterparts. It was evidenced that girls are more likely than boys to attend school but, in counterpart, female children are less prone to work than boys, especially in non-remunerated activities. Besides, the fact of girls be more inclined to school than to work may be a tip to justify why women's education has presented better values than men's education in Brazil.

Education shown positive and significant influence over school and waged work decisions. Nevertheless, over "all works" this influence was negative, what confirms the importance of low educational levels to determine the child's participation in non-waged activities. This figure suggests the existence of a *trade off* between school and work, and in case of remunerated activities, more education is like a synonym for larger wages, what retards the child's entry in the labor market. In non-waged activities this delay does not occur because there is no salary, so more years in school does not mean larger financial returns. Hence, if the option (when an option is given) is to work without remuneration, will be worthlessness to continue in school.

The race or color of the child had less evident effects, probably because Whites, Yellows and Indians (groups with social and cultural characteristics completely different) were put together in just one omitted category. The sign of the coefficient shows that being black or mulatto reduces the probability of going to school and work. This is a pure color effect because the coefficient was estimated controlling by household income and other variables.

On the other hand, the variable EDUCAMAE reflects the fact that the higher the education of the head, the more likely is the child to go to school and the less likely to go to work. This result indicates the preference for education among educated household heads as well as their capacity to afford educational expenditures, as long as head's education is a good predictor of household income. Better-educated parents may have a stronger aversion to child labor, implying a higher disutility. Alternatively, educated parents are more likely to take jobs outside home, increasing the need for children to contribute to household production including work on the household/ enterprise.

Household composition also showed significant impact on all models. The number of members living together in the same household had negative relation to school enrollment and positive relation on all kinds of work, what confirms that a large household size is usually associated with low school enrolment of its children and a high labor force

participation rate. Moreover, bigger households tend to push children to work for generate an income for themselves. The presence of children below 7 years old also had a negative impact on child labor. In other words, the presence of youngsters does not propel children to go to the job market, but prevents them to go to school in order, perhaps, to take care of their younger siblings, and this is especially the case with older girls who often substitute for the labor of their mothers in child rearing and housework.

Households ruled by women are less likely to send their children to school, but on the other hand are more likely to send them to waged work.

Another household variable that shows strong significance in schooling decision was the presence of electrical light. The households with this kind of illumination had a probability larger than 10% of having their children attending any teaching institution. In working decision, these variable, LUZ, was substituted by head's occupational position (CPEM), which permitted to verify that the probability of children to work without remuneration is strongly influenced by the fact of the head being employer or "independent" worker, or rather children whose parents are farm or enterprise owners tend to be surely absorbed in such tasks, especially because these children can be easily exploited. Hence, intuitively it is possible to say that the variable CPEM goes against the altruistic hypothesis suggested by Basu & Van (1998), so that here parents seem to be more preoccupied in put their children to work, what the low relevance of education to work and the high learning by doing content in work. In some cases, it is argued that non-waged work is a kind of training to guarantee that the child will be apt to assume the family business, but this fact seems to be true in few cases.

The familiar per capita income gave sufficient evidence to sustain the "luxury axiom". The coefficients found confirm that larger incomes decrease the probability of working and increase the probability of attending school. It is important to emphasize that as income increases, the probability of work without remuneration becomes shorter than the probability of executes waged activities.

Finally, some regional variables were included to try to control and to measure the effect of social norms such as "stigma" against child labor. The weight of local customs and traditions are important factors that can push children into the workplace. Children are sometimes expected to play their social role or follow their parents' footsteps in a particular trade. Turning to encountered results was found that in general, State and metropolitan regions' dummies point to a negative probability of attends school in relation to Roraima,

which was the State with the largest incidence of children in school. Furthermore, Roraima² also has the shorter specific rate of working children, and for this reason the probability of such children work in other States is relatively larger, since that these persons do not live in metropolitan regions.

It was also observed that to live in rural areas reduces the probability of study and executes waged works. Otherwise, in rural areas the probability of perform non-waged activities is 95% superior! These are instigative results because may be insinuating that, in rural areas, children work not to generate direct income, but to help their parents in household's tasks. Alternatively, it is possible to say that, out of urban areas, the *trade off* happens between school and non-waged economic activities. In other words, this means that, for groups living in rural areas, the formal education is not considered yet so important as the education received at work (also known as *learning by doing*). Besides helping in familiar household tasks, it is possible that the absence of close schools reinforces this trend.

Summing up, the statistical test for the correlation of the errors in the bivariate probit model shows that "rho" is indeed different from zero, which implies that the decision could be made simultaneously or, in brief, the causal relation between work and school is not clear. In other words, the result of "rho" given by the specified model does not permit to say that the child is not attending school due to work, as well as does not permit to say that the child does not work because is studying. In the decision model "School x Work" for example, rho is around - 0,16, what means that the non-explained component (residual) related to the fact of a child does not attend classes, is 16% linked to the non-explained component of the working decision. However, separating activities in waged and non-waged works the effect of rho becomes clearer. In non-waged works, the residual had an influence (correlation) on school attendance equal to 3,6%, while in waged activities this influence had a weigh equivalent to 25% over the decision of not going to school. In brief, it is possible to assert that the *trade off* between work and study is much larger in waged tasks than in non-waged.

² Roraima's dummy variable was omitted due to a small number of working children. Nevertheless, this number was probably underestimated, especially because PNAD does not take into account the residents from rural areas.

4. CONCLUSION

The risen numbers show that the situation of child labor in Brazil is still critical, in spite of being slowly alleviated in the passing years. It was verified that the number of working children is diminishing and, in counterpart, the proportion of youngsters in school is increasing, probably due to the enlargement of teaching institutions and to the improve of accessibility conditions of those living in rural areas, where the incidence of child labor is higher.

In Brazil, besides Region, variables as Age, Gender, Household size, Head's position, Familiar per capita income, Studied years and Mother's education were also confirmed as significant to explain child's work and education. Moreover, the information found also adds two important aspects to the decisional process of child's allocation time. The first is that independent variables have distinct effects over waged and non-waged works, and thus the total influence depends on the prevailing effect. The second aspect sustains that non-waged activities occur more frequently among the poorest social groups, while remunerated works occur uniformly in all income deciles, such as indicate Graphic 1 and the coefficients found. Luxury Axiom seems to be true in the case of non-waged works, but it is less obvious for remunerated activities. However, it should be remembered that independently of income and of rural residence condition, parents occupying posts as employers or autonomous are more likely to avail of non-waged child labor.

According to the obtained "rho" values, in spite of non-waged works befall in larger proportions among persons between 5 and 15 years, it does not compete with school attendance, as strongly happen with waged works. Behind this idea, emerges the economic intuition that the *trade off* between work and school is more important in the case of remunerated works. Moreover, if the short-run benefits of waged activities outweigh the long-term benefits of education, the child will leave school, or else, also existing the possibility of work and study at the same time. For this reason, the notion and the understanding of opportunity cost is central for the *trade off*.

Thus, to avoid that the opportunity cost drop the child out of school, it is necessary to invest in education, transforming the school in an attractive option for the child and for their parents. In this sense, measures as teacher training/ orientation, curriculum reform and adaptation, psycho-social support to the child and to the family, free meals, and mainly financial help to the poorest households are some incentives to keep children from working and instead go to school, and furthermore are among the necessary conditions to guarantee that schools will be preferred instead of work. A growing number of programmes, combining subsidies, financial and other incentives, and education, have helped families reduce the

workload of their children and increase their participation in education. In Brazil, Bolsa Escola is a programme that provides education grants based on the monthly minimum wage and enables families to send their children to school. A formal commitment by families serves as a social contract to ensure the full engagement of their children in the learning process. Summing up, an efficient solution against child labor seems to be the provision of relevant and affordable education, followed up by financial resources to permit rehabilitation and reinsertion of these children into society. Through these kinds of measures it is possible to attenuate the inter-generational poverty transfer and, over all, reduces child exploitation. Notwithstanding, measures that support or compensate parents for the loss of income once the child is removed from work are helpful, but can be costly and difficult to sustain. They need to form part of larger development programmes, as employment and income-generation activities for the parents of child laborers, with a goal of reducing the families dependence on their children's contribution to household income.

One of the contributions provided by this paper was to show that the determinants of waged and non-waged works are different. In the case of non-waged rural work, the political solution passes through the familiar income increase (*luxury axiom*) and through the availability of close and quality schools.

Finally, it shall be remembered that if on the one hand the descriptive statistics and the econometric results were incapable of indicate direct solutions for child labor, on the other hand these numbers were efficient to signal occurrence areas, factors, individual and familiar characteristics involved in child work and/or schooling decisions. Through the study of child labor determinants it is expected to achieve an appropriate picture of the families more likely to send their children to work and thus, facilitate the combat and propitiate the synergy of efforts among agencies, institutions, movements, organizations and entities fighting against child labor.

In a last methodological point, it was concluded that *Bivariate Probit* estimations were important to evaluate the *trade off* between work and school, but on the other hand the estimated parameters in *bivariate* and *probit* models do not show huge differences, what mean that the models can be estimated in the simplest version.

“Information alone does not change attitudes or practices, but the process of raising awareness does build commitment to change and the greater the participation of communities in the research, the more authentic and effective advocacy campaigns or media strategies will be.”³

³ UNICEF. *Strategies for Eliminating Child Labor: prevention, removal and rehabilitation*, [online]. 1997. p. 7.

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APPENDIX 1

	Did you work or had any work in last week?				Labor force rate from those that were studying		Schooling rate from those that were working	
	No	Yes	TOTAL		No	Yes	No	Yes
Attends school or creche	8,9%	1,8%	10,7%	No	16,8%	10,2%	90,0%	83,5%
	80,2%	9,1%	89,3%	Yes				
	89,1%	10,9%	100,0%	TOTAL				
	Did you work or had any non-waged work in the last week?				Labor force rate from those that were studying		Schooling rate from those that were working	
	No	Yes	TOTAL	No	Yes	No	Yes	
Attends school or creche	9,8%	0,9%	10,7%	8,4%	7,1%	89,4%	87,5%	
	83,0%	6,3%	89,3%					
	92,8%	7,2%	100,0%	TOTAL				
	Did you work or had any waged work in the last week?				Labor force rate from those that were studying		Schooling rate from those that were working	
	No	Yes	TOTAL	No	Yes	No	Yes	
Attends school or creche	9,9%	0,9%	10,8%	8,3%	3,1%	89,7%	75,7%	
	86,5%	2,8%	89,3%					
	96,4%	3,7%	100,0%	TOTAL				

Number of cases: 36.057.968

	Did you work or had any work in the last week?			
	No	Yes	TOTAL	
Did you work or any non-waged work the last week?	89,2%	3,6%	92,8%	No
	0,0%	7,2%	7,2%	Yes
	89,2%	10,8%	100,0%	TOTAL
	Did you work or had any work in last week?			
	No	Yes	TOTAL	
Did you work or any waged work in last week?	89,2%	7,2%	96,4%	No
	0,0%	3,6%	3,6%	Yes
	89,2%	10,8%	100,0%	TOTAL

Number of cases: 36.065.891

APPENDIX 2

Familiar per capita income: decil's superior limit	Attends school or creche		Worked or had a work in the last week		Worked or had a waged work in the last week		Worked or had a non-work in the last week	
	N	%	N	%	N	%	N	%
20	2.738.377	81,1%	641.865	19,0%	143.564	4,3%	498.301	14,8%
33	3.039.507	82,6%	667.285	18,1%	162.206	4,4%	505.079	13,7%
49	2.947.769	83,7%	547.813	15,5%	152.031	4,3%	395.782	11,2%
65	3.057.372	87,5%	453.443	13,0%	172.164	4,9%	281.279	8,0%
87	3.253.843	88,6%	388.584	10,6%	157.663	4,3%	230.921	6,3%
114	3.070.501	89,9%	286.336	8,4%	133.065	3,9%	153.271	4,5%
152	3.244.954	91,8%	272.419	7,7%	121.529	3,4%	150.890	4,3%
221	3.319.239	94,2%	235.463	6,7%	109.527	3,1%	125.936	3,6%
378	3.358.828	95,2%	186.116	5,3%	86.778	2,5%	99.338	2,8%
13.100	3.456.577	98,0%	126.856	3,6%	53.053	1,5%	73.803	2,1%
Total of persons between 5 and 15 years	35.274.945		35.282.868		35.282.868		35.282.868	

APPENDIX 3**VARIABLES USED IN THE PROBIT AND BIVARIATE PROBIT MODELS**

Description	Name
1 if worked, had a work, or was involved in any kind of activity turned to self-consumption in the last week	TRABALHA
1 if worked or had a waged work in the last week	TRABREM
1 if worked or had a non-waged work in the last week	TRABFREE
1 if child attends school	FREQ
1 if child is male	SEXO
Age of child	IDADE
Age Squared	IDADE2
1 if black or mulatto	COR
Child's education (years of school completed by the child)	EDUC
Mother's education	EDUCAMAE
1 if child's age is below 7 years	PESS7ANO
1 if household is in a rural area	AREARU
1 if head of household is the mother	MAECHEFI
Household size (number of members currently resident in the household)	TOTMOR
1 if household has electrical light	LUZ
1 if head is employer or "independent" worker	CPEM
Net household income (per capita)	RFPC
Regional Dummies assuming value 1 if the person resides in the considered state ⁴	DES; DRS; DMS; DMT; DRO; DAC; DAM; DPA; DAP; DTO; DMA; DPIAU_; DCE; DRN; DPARAIBA; DPE; DAL; DSE; DBA; DMG; DRJ; DSP; DSC; DGO; DPR; DDF;
Dummies assuming value 1 if the person resides in a metropolitan area	DPEMETRO; DPAMETRO; DMGMETRO; DCEMETRO; DBAMETRO; DRJMETRO; DSPMETRO; DPRMETRO; DRSMETRO

⁴ Variables DRR and DFMETRO were omitted to avoid multicollinearity.

APPENDIX 4**PROBIT MODEL - SCHOOL**

Probit estimates

Number of obs = 30877367

Wald chi2(47) = 3501419.35

Prob > chi2 = 0.0000

Pseudo R2 = 0.2595

Log likelihood = -7449773.1

FREQ	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
IDADE	1.003322	.001377	728.631	0.000	1.000623	1.006021
IDADE2	-.0527261	.0000628	-840.228	0.000	-.052849	-.0526031
SEXO	-.0510461	.0007279	-70.132	0.000	-.0524726	-.0496195
COR	-.0189151	.0008285	-22.829	0.000	-.020539	-.0172912
EDUC	.1832625	.0003408	537.719	0.000	.1825945	.1839305
EDUCAMAE	.0726652	.0001426	509.513	0.000	.0723857	.0729447
TOTMOR	-.0372839	.0001781	-209.355	0.000	-.037633	-.0369349
PESS7ANO	-.4409171	.0017486	-252.150	0.000	-.4443444	-.4374898
MAECHEFI	-.1031946	.0009877	-104.477	0.000	-.1051306	-.1012587
LUZ	.11748	.0013223	88.847	0.000	.1148884	.1200716
RFPC	.000818	5.56e-06	147.045	0.000	.0008071	.0008289
AREARU	-.1797564	.0009752	-184.329	0.000	-.1816678	-.1778451
DES	-.6607951	.0123541	-53.488	0.000	-.6850086	-.6365816
DRS	-.561848	.0122602	-45.827	0.000	-.5858775	-.5378184
DMS	-.5628233	.0124692	-45.137	0.000	-.5872624	-.5383841
DMT	-.5363748	.0124231	-43.176	0.000	-.5607236	-.512026
DRO	-.5472827	.0129614	-42.224	0.000	-.5726866	-.5218789
DAC	-.6045742	.0138994	-43.497	0.000	-.6318164	-.5773319
DPR	-.5131171	.0122485	-41.892	0.000	-.5371237	-.4891106
DAM	-.3797908	.0125093	-30.361	0.000	-.4043086	-.355273
DPA	-.2780349	.0124018	-22.419	0.000	-.302342	-.2537279
DAP	-.1687637	.0140206	-12.037	0.000	-.1962436	-.1412839
DTO	-.2035662	.0126897	-16.042	0.000	-.2284376	-.1786949
DMA	-.0572437	.0122694	-4.666	0.000	-.0812913	-.033196
DPIAU_	.0642282	.0124176	5.172	0.000	.0398901	.0885664
DCE	.1810586	.0123221	14.694	0.000	.1569077	.2052094
DRN	-.1786848	.012429	-14.376	0.000	-.2030451	-.1543245
DPARAIBA	-.0281305	.0124113	-2.267	0.023	-.0524563	-.0038048
DPE	-.3397801	.0122775	-27.675	0.000	-.3638436	-.3157166
DAL	-.4255047	.0123364	-34.492	0.000	-.4496835	-.4013258
DSE	-.0384553	.0127368	-3.019	0.003	-.063419	-.0134916
DBA	-.0821654	.0122146	-6.727	0.000	-.1061055	-.0582253
DMG	-.3325961	.012194	-27.275	0.000	-.356496	-.3086962
DRJ	-.2662546	.0124708	-21.350	0.000	-.2906969	-.2418123
DSP	-.3854496	.0121941	-31.610	0.000	-.4093496	-.3615496
DSC	-.3573763	.012329	-28.987	0.000	-.3815407	-.3332119
DGO	-.4233975	.0123002	-34.422	0.000	-.4475053	-.3992896
DDF	-.3803171	.0126961	-29.955	0.000	-.4052011	-.3554331
DPEMETRO	.1386234	.0036006	38.500	0.000	.1315663	.1456805
DPAMETRO	.0961481	.0061392	15.661	0.000	.0841156	.1081807
DMGMETRO	-.0104852	.0026845	-3.906	0.000	-.0157466	-.0052237
DCEMETRO	-.3555564	.0036234	-98.127	0.000	-.3626582	-.3484546
DBAMETRO	-.1848977	.0035119	-52.650	0.000	-.1917808	-.1780146
DRJMETRO	-.0927782	.0034897	-26.586	0.000	-.099618	-.0859384
DSPMETRO	-.0990422	.0017661	-56.080	0.000	-.1025036	-.0955807
DPRMETRO	-.1987953	.0031164	-63.789	0.000	-.2049034	-.1926872
DRSMETRO	-.1529589	.0028979	-52.782	0.000	-.1586387	-.1472791
_cons	-2.904794	.0143285	-202.728	0.000	-2.932877	-2.87671

PROBIT MODEL - WORK

Probit estimates

Number of obs = 28134832

Wald chi2(47) = 5.146e+08

Prob > chi2 = 0.0000

Log likelihood = -6477558.6

Pseudo R2 = 0.3273

TRABALHA	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
IDADE	.1766026	.0016938	104.266	0.000	.1732829	.1799223
IDADE2	.0021239	.0000732	28.997	0.000	.0019803	.0022674
SEXO	.4960971	.0008282	599.030	0.000	.4944739	.4977203
COR	-.0399959	.0009073	-44.084	0.000	-.0417742	-.0382177
EDUC	-.0095045	.0002815	-33.766	0.000	-.0100562	-.0089528
EDUCAMAE	-.0458989	.00014	-327.841	0.000	-.0461733	-.0456245
TOTMOR	.0259354	.0001972	131.502	0.000	.0255488	.0263219
PESS7ANO	-.2246842	.0032467	-69.203	0.000	-.2310476	-.2183207
MAECHEFI	.1190693	.0012125	98.198	0.000	.1166927	.1214458
CPEM	.4919745	.0008262	595.501	0.000	.4903553	.4935938
RFPC	-.0003397	2.85e-06	-119.387	0.000	-.0003453	-.0003342
AREARU	.731449	.000929	787.342	0.000	.7296282	.7332699
DRO	5.227492	.0116386	449.151	0.000	5.204681	5.250304
DAM	5.034701	.0107997	466.191	0.000	5.013534	5.055868
DAC	5.37664	.0132598	405.483	0.000	5.350651	5.402628
DPR	5.680965	.0098221	578.387	0.000	5.661714	5.700216
DPA	5.985627	.0099956	598.828	0.000	5.966036	6.005218
DAP	5.237893	.0132372	395.695	0.000	5.211949	5.263838
DTO	5.899724	.0103541	569.797	0.000	5.87943	5.920017
DMA	5.912153	.0098265	601.653	0.000	5.892893	5.931412
DPIAU_	5.504271	.0100059	550.101	0.000	5.48466	5.523882
DCE	5.561991	.0098547	564.401	0.000	5.542676	5.581306
DRN	5.19452	.0102948	504.579	0.000	5.174343	5.214697
DPARAIBA	5.576766	.0099341	561.373	0.000	5.557295	5.596236
DPE	5.769949	.0098143	587.910	0.000	5.750713	5.789185
DAL	5.205988	.0101979	510.498	0.000	5.186001	5.225975
DSE	5.421449	.0105063	516.017	0.000	5.400857	5.442041
DBA	5.549997	.0097731	567.882	0.000	5.530842	5.569152
DMG	5.499433	.0097704	562.865	0.000	5.480283	5.518583
DES	5.678535	.0099965	568.052	0.000	5.658942	5.698128
DRJ	4.911454	.0104458	470.183	0.000	4.890981	4.931928
DSP	5.209608	.0097737	533.025	0.000	5.190452	5.228764
DSC	5.726121	.0098367	582.116	0.000	5.706842	5.745401
DRS	5.833527	.0098256	593.708	0.000	5.814269	5.852785
DMS	5.615702	.0101974	550.702	0.000	5.595716	5.635689
DMT	5.817259	.0100707	577.642	0.000	5.797521	5.836997
DGO	5.539589	.0099334	557.671	0.000	5.52012	5.559058
DDF	4.92905	.0112406	438.503	0.000	4.907019	4.951081
DMGMETRO	-.4332363	.0038594	-112.254	0.000	-.4408006	-.4256719
DPAMETRO	-.7746915	.0074462	-104.038	0.000	-.7892858	-.7600971
DCEMETRO	-.131221	.0038951	-33.689	0.000	-.1388553	-.1235867
DPEMETRO	-.3486113	.0041099	-84.822	0.000	-.3566666	-.340556
DBAMETRO	-.2507903	.0042425	-59.114	0.000	-.2591055	-.2424752
DRJMETRO	-.1007745	.0050999	-19.760	0.000	-.1107701	-.0907789
DSPMETRO	.0429666	.002222	19.336	0.000	.0386114	.0473217
DPRMETRO	-.3821472	.0044259	-86.343	0.000	-.3908219	-.3734726
DRSMETRO	-.3720245	.0037463	-99.305	0.000	-.379367	-.3646819
_cons	-9.640144	.	.	.	.	.

PROBIT MODEL - NON-WAGED WORK

Probit estimates

Number of obs = 28134832

Wald chi2(46) = 2944091.24

Prob > chi2 = 0.0000

Log likelihood = -4859650.8

Pseudo R2 = 0.3538

TRABFREE	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]
IDADE	.5008165	.001973	253.835	0.000	.4969495 .5046835
IDADE2	-.0151962	.0000853	-178.074	0.000	-.0153635 -.015029
SEXO	.4546237	.000954	476.531	0.000	.4527539 .4564936
COR	-.0313783	.0010495	-29.897	0.000	-.0334354 -.0293213
EDUC	-.0217671	.0003196	-68.107	0.000	-.0223935 -.0211407
EDUCAMAE	-.0314501	.0001646	-191.074	0.000	-.0317727 -.0311275
TOTMOR	.0127127	.0002238	56.802	0.000	.0122741 .0131514
PESS7ANO	-.0317319	.0035654	-8.900	0.000	-.03872 -.0247438
MAECHEFI	-.0734362	.0015731	-46.682	0.000	-.0765195 -.070353
CPEM	.7102378	.0009902	717.243	0.000	.708297 .7121787
RFPC	-.0003193	3.16e-06	-101.129	0.000	-.0003254 -.0003131
AREARU	.9574377	.001073	892.339	0.000	.9553348 .9595407
DRO	4.838429	.0146307	330.703	0.000	4.809753 4.867105
DAM	4.852734	.0127336	381.096	0.000	4.827776 4.877691
DAC	5.120216	.	.	.	.
DPR	5.450254	.0114231	477.126	0.000	5.427865 5.472643
DPA	5.711326	.0116254	491.282	0.000	5.688541 5.734111
DAP	5.247585	.0147612	355.498	0.000	5.218653 5.276516
DTO	5.066738	.0123158	411.400	0.000	5.0426 5.090877
DMA	5.631366	.0113669	495.416	0.000	5.609088 5.653645
DPIAU_	5.261711	.0115586	455.219	0.000	5.239057 5.284366
DCE	5.252259	.0114358	459.284	0.000	5.229845 5.274673
DRN	4.91196	.0119044	412.616	0.000	4.888628 4.935292
DPARAIBA	5.3881	.0115181	467.793	0.000	5.365524 5.410675
DPE	5.50859	.0114235	482.214	0.000	5.4862 5.530979
DAL	5.074257	.0117072	433.430	0.000	5.051311 5.097203
DSE	5.17961	.0121676	425.689	0.000	5.155762 5.203458
DBA	5.258761	.011346	463.490	0.000	5.236524 5.280999
DMG	5.181826	.0113733	455.612	0.000	5.159535 5.204118
DES	5.365888	.01163	461.383	0.000	5.343094 5.388682
DRJ	4.18503	.0133191	314.213	0.000	4.158925 4.211135
DSP	4.821361	.0114652	420.520	0.000	4.79889 4.843832
DSC	5.477672	.0114654	477.756	0.000	5.4552 5.500144
DRS	5.615976	.0114365	491.058	0.000	5.593561 5.638391
DMS	5.301913	.0118837	446.150	0.000	5.278622 5.325205
DMT	5.483243	.011699	468.693	0.000	5.460313 5.506172
DGO	5.028229	.0116444	431.817	0.000	5.005406 5.051051
DDF	4.786657	.0131704	363.440	0.000	4.760843 4.81247
DMGMETRO	-.4071457	.0053024	-76.785	0.000	-.4175382 -.3967532
DPAMETRO	-.7164806	.0093832	-76.358	0.000	-.7348714 -.6980899
DCEMETRO	.0430493	.0045413	9.480	0.000	.0341485 .0519501
DPEMETRO	-.2490227	.0047556	-52.364	0.000	-.2583436 -.2397019
DBAMETRO	-.2128112	.0055876	-38.086	0.000	-.2237627 -.2018597
DRJMETRO	.4025386	.008503	47.341	0.000	.3858729 .4192042
DSPMETRO	.1332269	.0030991	42.989	0.000	.1271528 .1393009
DPRMETRO	-.6980051	.006971	-100.130	0.000	-.711668 -.6843421
DRSMETRO	-.4743768	.004795	-98.932	0.000	-.4837747 -.4649788
_cons	-11.09257	.0157767	-703.099	0.000	-11.12349 -11.06165

PROBIT MODEL – WAGED WORK

Probit estimates

Number of obs = 28134832

Wald chi2(47) = 1.690e+08

Prob > chi2 = 0.0000

Pseudo R2 = 0.2537

Log likelihood = -3016316

TRABREM	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]
IDADE	.0403094	.0029946	13.461	0.000	.03444 .0461787
IDADE2	.0094482	.000123	76.830	0.000	.0092072 .0096893
SEXO	.3538606	.0011513	307.345	0.000	.351604 .3561172
COR	-.0158224	.0012633	-12.525	0.000	-.0182984 -.0133464
EDUC	.0144367	.0003665	39.386	0.000	.0137183 .0151551
EDUCAMAE	-.050465	.0001933	-261.088	0.000	-.0508438 -.0500861
TOTMOR	.0325543	.0002725	119.457	0.000	.0320202 .0330884
PESS7ANO	-.3895832	.0104916	-37.133	0.000	-.4101463 -.36902
MAECHEFI	.243084	.0014553	167.029	0.000	.2402316 .2459364
CPEM	-.1114341	.0012452	-89.494	0.000	-.1138745 -.1089936
RFPC	-.0001732	3.61e-06	-47.938	0.000	-.0001802 -.0001661
AREARU	-.1765559	.0015146	-116.568	0.000	-.1795245 -.1735873
DRO	4.635246	.019564	236.927	0.000	4.596902 4.673591
DAM	4.351562	.0189649	229.454	0.000	4.314391 4.388732
DAC	4.659762	.0215114	216.618	0.000	4.6176 4.701924
DPR	4.75714	.0182527	260.627	0.000	4.721365 4.792915
DPA	5.074559	.0183469	276.590	0.000	5.0386 5.110519
DAP	4.143255	.0229611	180.447	0.000	4.098252 4.188257
DTO	5.632407	.0186422	302.133	0.000	5.595869 5.668945
DMA	4.774017	.0182008	262.298	0.000	4.738344 4.809689
DPIAU_	4.605359	.01846	249.478	0.000	4.569178 4.641539
DCE	4.869527	.0181589	268.162	0.000	4.833936 4.905118
DRN	4.693167	.0188216	249.350	0.000	4.656277 4.730056
DPARAIBA	4.554498	.0184519	246.830	0.000	4.518333 4.590664
DPE	4.839661	.0183365	263.935	0.000	4.803722 4.8756
DAL	4.381919	.0187941	233.154	0.000	4.345083 4.418754
DSE	4.706424	.0190007	247.698	0.000	4.669183 4.743664
DBA	4.813614	.0182285	264.070	0.000	4.777887 4.849341
DMG	4.832234	.0180831	267.223	0.000	4.796792 4.867677
DES	4.89781	.018421	265.882	0.000	4.861705 4.933914
DRJ	4.680742	.0185104	252.871	0.000	4.644462 4.717021
DSP	4.655618	.0180674	257.681	0.000	4.620207 4.69103
DSC	4.780842	.018096	264.194	0.000	4.745374 4.816309
DRS	4.746318	.0181124	262.048	0.000	4.710819 4.781818
DMS	4.873126	.018418	264.585	0.000	4.837027 4.909224
DMT	5.000995	.0183686	272.258	0.000	4.964993 5.036997
DGO	5.005192	.0181577	275.651	0.000	4.969603 5.04078
DDF	4.175769	.0196582	212.418	0.000	4.137239 4.214298
DMGMETRO	-.374576	.0046137	-81.188	0.000	-.3836187 -.3655333
DPAMETRO	-.565584	.00922	-61.343	0.000	-.5836549 -.547513
DCEMETRO	-.3221042	.0053215	-60.529	0.000	-.3325341 -.3116742
DPEMETRO	-.2730102	.0056844	-48.028	0.000	-.2841514 -.261869
DBAMETRO	-.2502943	.0051269	-48.820	0.000	-.2603429 -.2402458
DRJMETRO	-.5011051	.0056168	-89.216	0.000	-.5121137 -.4900964
DSPMETRO	-.1143277	.0026251	-43.551	0.000	-.1194728 -.1091826
DPRMETRO	.0252042	.0051673	4.878	0.000	.0150764 .0353319
DRSMETRO	.0203286	.004911	4.139	0.000	.0107032 .029954
_cons	-8.6088	.	.	.	.

TRABALHA						
IDADE	.1701603	.0016948	100.401	0.000	.1668385	.173482
IDADE2	.0024035	.0000733	32.792	0.000	.0022599	.0025472
SEXO	.4975421	.0008283	600.651	0.000	.4959186	.4991656
COR	-.0367435	.0009071	-40.505	0.000	-.0385215	-.0349656
EDUC	-.0092801	.00028	-33.139	0.000	-.0098289	-.0087312
EDUCAMAE	-.0460199	.00014	-328.750	0.000	-.0462943	-.0457456
TOTMOR	.0261458	.0001967	132.918	0.000	.0257602	.0265313
PESS7ANO	-.2325374	.0032645	-71.233	0.000	-.2389357	-.2261392
MAECHEFI	.1165763	.0012118	96.200	0.000	.1142012	.1189514
CPEM	.4932914	.0008254	597.663	0.000	.4916737	.4949091
RFPC	-.0003398	2.85e-06	-119.396	0.000	-.0003453	-.0003342
AREARU	.7359156	.0009286	792.537	0.000	.7340957	.7377355
DRO	-.1519996	.0112575	-13.502	0.000	-.1740638	-.1299354
DPR	.2926302	.0093694	31.233	0.000	.2742666	.3109939
DAM	-.3303765	.0103537	-31.909	0.000	-.3506694	-.3100836
DRR	-6.028854	.0100716	-598.602	0.000	-6.048594	-6.009114
DPA	.6064084	.0095471	63.517	0.000	.5876964	.6251205
DAP	-.1367143	.0129075	-10.592	0.000	-.1620125	-.1114161
DTO	.5202519	.0099336	52.373	0.000	.5007824	.5397213
DMA	.5253716	.0093254	56.337	0.000	.5070941	.5436491
DPIAU_	.1185813	.0095144	12.463	0.000	.0999334	.1372291
DCE	.1777901	.0093871	18.940	0.000	.1593916	.1961886
DRN	-.1920751	.0097595	-19.681	0.000	-.2112033	-.1729468
DPARAIBA	.1903402	.0094865	20.064	0.000	.1717469	.2089335
DPE	.3841471	.0093796	40.955	0.000	.3657633	.4025308
DAL	-.1825363	.0096676	-18.881	0.000	-.2014844	-.1635882
DSE	.0400263	.010031	3.990	0.000	.0203659	.0596866
DBA	.1690461	.0092954	18.186	0.000	.1508275	.1872647
DMG	.1132457	.0093055	12.170	0.000	.0950073	.1314841
DES	.2916238	.0095551	30.520	0.000	.2728962	.3103513
DRJ	-.4792596	.0099997	-47.927	0.000	-.4988587	-.4596605
DSP	-.1719923	.0093357	-18.423	0.000	-.1902899	-.1536947
DSC	.3388308	.0094126	35.998	0.000	.3203825	.3572791
DRS	.4553261	.0093851	48.516	0.000	.4369317	.4737205
DMS	.233337	.0097539	23.922	0.000	.2142197	.2524544
DMT	.4319535	.0096235	44.885	0.000	.4130917	.4508153
DGO	.1581313	.0094751	16.689	0.000	.1395604	.1767022
DDF	-.439217	.0107955	-40.685	0.000	-.4603759	-.4180581
DMGMETRO	-.428041	.0038611	-110.860	0.000	-.4356086	-.4204734
DPAMETRO	-.7683947	.0074001	-103.835	0.000	-.7828987	-.7538907
DCEMETRO	-.1310841	.0038861	-33.731	0.000	-.1387007	-.1234675
DPEMETRO	-.347926	.0041073	-84.710	0.000	-.3559762	-.3398759
DBAMETRO	-.2519975	.0042224	-59.681	0.000	-.2602733	-.2437217
DRJMETRO	-.0903046	.0050907	-17.739	0.000	-.1002821	-.080327
DSPMETRO	.0423257	.0022185	19.078	0.000	.0379775	.0466739
DPRMETRO	-.3713866	.0044317	-83.802	0.000	-.3800726	-.3627007
DRSMETRO	-.3707654	.0037425	-99.070	0.000	-.3781005	-.3634304
_cons	-4.227471	.0132197	-319.787	0.000	-4.253381	-4.201561

/athrho	-.1595781	.0007266	-219.615	0.000	-.1610023	-.158154

rho	-.1582372	.0007084			-.1596254	-.1568484

Wald test of rho=0:			chi2(1) =	48230.5	Pr > chi2 =	0.0000

BIVARIATE PROBIT MODEL – SCHOOL x WAGED WORK

(1) [athrho]_cons = 0.0

chi2(1) =76295.46
 Prob > chi2 = 0.0000

Seemingly unrelated bivariate probit

Number of obs = 28104860

Wald chi2(94) = 5379947.88

Log likelihood = -9584465.6

Prob > chi2 = 0.0000

	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
FREQ						
IDADE	1.042972	.0014663	711.278	0.000	1.040098	1.045846
IDADE2	-.0546235	.000067	-814.713	0.000	-.0547549	-.0544921
SEXO	-.0518443	.0007719	-67.169	0.000	-.0533571	-.0503315
COR	-.0212138	.0008795	-24.121	0.000	-.0229376	-.0194901
EDUC	.1859317	.0003671	506.532	0.000	.1852122	.1866511
EDUCAMAE	.0740456	.000152	487.144	0.000	.0737477	.0743435
TOTMOR	-.0407804	.0001943	-209.858	0.000	-.0411613	-.0403995
PESS7ANO	-.4188144	.0018453	-226.959	0.000	-.4224312	-.4151977
MAECHEFI	-.0979148	.0011595	-84.446	0.000	-.1001873	-.0956422
LUZ	.1260296	.0013901	90.664	0.000	.1233051	.128754
RFPC	.0007846	5.63e-06	139.297	0.000	.0007736	.0007957
AREARU	-.1906201	.0010267	-185.663	0.000	-.1926324	-.1886078
DRO	-.4869884	.0132098	-36.866	0.000	-.5128791	-.4610977
DAM	-.3358826	.0127666	-26.309	0.000	-.3609047	-.3108606
DAC	-.6529882	.0140939	-46.331	0.000	-.6806117	-.6253647
DPR	-.4362555	.0124613	-35.009	0.000	-.4606792	-.4118318
DPA	-.205405	.0126233	-16.272	0.000	-.2301462	-.1806638
DAP	.0309363	.0145521	2.126	0.034	.0024147	.0594579
DTO	-.1918212	.0129293	-14.836	0.000	-.2171621	-.1664802
DMA	.0195868	.0124857	1.569	0.117	-.0048847	.0440583
DPIAU_	.1134864	.0126511	8.970	0.000	.0886906	.1382821
DCE	.234768	.0125364	18.727	0.000	.2101972	.2593389
DRN	-.1257127	.0126788	-9.915	0.000	-.1505627	-.1008627
DPARAIBA	.0530179	.0126477	4.192	0.000	.0282289	.077807
DPE	-.2375234	.0125006	-19.001	0.000	-.2620241	-.2130226
DAL	-.3778731	.01256	-30.086	0.000	-.4024902	-.353256
DSE	.0704938	.0130166	5.416	0.000	.0449818	.0960058
DBA	-.02422	.0124253	-1.949	0.051	-.0485731	.0001331
DMG	-.2559564	.0124037	-20.635	0.000	-.2802673	-.2316455
DES	-.6074985	.0125698	-48.330	0.000	-.6321349	-.5828621
DRJ	-.1379877	.0127432	-10.828	0.000	-.1629639	-.1130115
DSP	-.3260527	.012402	-26.290	0.000	-.3503601	-.3017453
DSC	-.3044696	.0125439	-24.272	0.000	-.3290553	-.279884
DRS	-.5094324	.0124714	-40.848	0.000	-.5338759	-.4849889
DMS	-.4874532	.012687	-38.422	0.000	-.5123192	-.4625872
DMT	-.4761813	.0126484	-37.648	0.000	-.5009717	-.4513909
DGO	-.376707	.0125193	-30.090	0.000	-.4012444	-.3521695
DDF	-.3219791	.0129624	-24.839	0.000	-.3473849	-.2965732
DMGMETRO	-.0245601	.0028852	-8.512	0.000	-.030215	-.0189051
DPAMETRO	.0526149	.0066552	7.906	0.000	.0395708	.0656589
DCEMETRO	-.282309	.0039367	-71.711	0.000	-.2900248	-.2745931
DPEMETRO	.1013026	.0039311	25.770	0.000	.0935979	.1090073
DBAMETRO	-.1198062	.0038442	-31.166	0.000	-.1273407	-.1122718
DRJMETRO	-.1115673	.0038387	-29.064	0.000	-.1190909	-.1040436
DSPMETRO	-.1078996	.0018683	-57.752	0.000	-.1115614	-.1042378
DPRMETRO	-.2251047	.003261	-69.030	0.000	-.2314961	-.2187133
DRSMETRO	-.1463405	.0030743	-47.601	0.000	-.1523661	-.140315
_cons	-3.142437	.014776	-212.672	0.000	-3.171398	-3.113477

TRABREM						
IDADE	.012088	.0029818	4.054	0.000	.0062438	.0179322
IDADE2	.0106265	.0001226	86.694	0.000	.0103862	.0108667
SEXO	.3557844	.0011494	309.547	0.000	.3535317	.3580371
COR	-.0101855	.0012625	-8.067	0.000	-.0126601	-.007711
EDUC	.0151979	.0003613	42.063	0.000	.0144898	.0159061
EDUCAMAE	-.0512143	.0001929	-265.505	0.000	-.0515924	-.0508362
TOTMOR	.0327038	.0002704	120.932	0.000	.0321737	.0332338
PESS7ANO	-.4098141	.0105828	-38.724	0.000	-.430556	-.3890721
MAECHEFI	.237009	.0014519	163.245	0.000	.2341634	.2398546
CPFM	-.1097734	.0012399	-88.538	0.000	-.1122035	-.1073434
RFPC	-.0001734	3.63e-06	-47.802	0.000	-.0001805	-.0001663
AREARU	-.1712201	.001501	-114.071	0.000	-.174162	-.1682782
DRO	-.0546931	.0140414	-3.895	0.000	-.0822138	-.0271725
DPR	.0490864	.011992	4.093	0.000	.0255825	.0725903
DAM	-.3137013	.0130221	-24.090	0.000	-.3392241	-.2881785
DRR	-5.892447	.0127499	-462.155	0.000	-5.917436	-5.867458
DPA	.3857014	.0121534	31.736	0.000	.3618812	.4095216
DAP	-.527279	.0184042	-28.650	0.000	-.5633507	-.4912074
DTO	.9512086	.0124178	76.600	0.000	.9268701	.9755471
DMA	.0883253	.0120203	7.348	0.000	.064766	.1118846
DPIAU_	-.0843974	.0123913	-6.811	0.000	-.1086839	-.0601109
DCE	.179996	.012028	14.965	0.000	.1564214	.2035705
DRN	-.0146102	.0123933	-1.179	0.238	-.0389006	.0096803
DPARAIBA	-.142153	.0123988	-11.465	0.000	-.1664543	-.1178517
DPE	.1362332	.0120657	11.291	0.000	.1125848	.1598816
DAL	-.3141912	.0126194	-24.897	0.000	-.3389249	-.2894575
DSE	.0207028	.0129857	1.594	0.111	-.0047488	.0461543
DBA	.1242755	.0118593	10.479	0.000	.1010317	.1475193
DMG	.1234539	.0118328	10.433	0.000	.100262	.1466458
DES	.1934754	.0121962	15.864	0.000	.1695712	.2173795
DRJ	-.0311708	.0123961	-2.515	0.012	-.0554667	-.0068748
DSP	-.0349493	.0118292	-2.954	0.003	-.0581342	-.0117644
DSC	.069848	.0120781	5.783	0.000	.0461754	.0935205
DRS	.0447619	.0120661	3.710	0.000	.0211128	.068411
DMS	.1517859	.0124415	12.200	0.000	.127401	.1761707
DMT	.2901488	.0123102	23.570	0.000	.2660213	.3142763
DGO	.3129042	.011981	26.117	0.000	.2894218	.3363865
DDF	-.5059286	.014025	-36.073	0.000	-.5334172	-.47844
DMGMETRO	-.35852	.0046078	-77.808	0.000	-.3675511	-.3494889
DPAMETRO	-.5495587	.009132	-60.180	0.000	-.567457	-.5316603
DCEMETRO	-.3282535	.0052763	-62.212	0.000	-.3385949	-.317912
DPEMETRO	-.2616301	.0056668	-46.169	0.000	-.2727369	-.2505234
DBAMETRO	-.2493245	.0050741	-49.137	0.000	-.2592695	-.2393795
DRJMETRO	-.4808492	.005607	-85.758	0.000	-.4918388	-.4698596
DSPMETRO	-.1162068	.002621	-44.336	0.000	-.1213439	-.1110697
DPRMETRO	.0495897	.0051654	9.600	0.000	.0394657	.0597137
DRSMETRO	.0401619	.0049144	8.172	0.000	.0305298	.0497939
_cons	-3.756268	.0212268	-176.959	0.000	-3.797871	-3.714664

/athrho	-.2611419	.0009454	-276.216	0.000	-.2629949	-.2592889

rho	-.2553633	.0008838			-.2570946	-.2536303

Wald test of rho=0:

chi2(1) = 76295.5

Pr > chi2 = 0.0000

BIVARIATE PROBIT MODEL – SCHOOL x NON-WAGED WORK

(1) [athrho]_cons = 0.0

chi2(1) = 1788.53
 Prob > chi2 = 0.0000

Seemingly unrelated bivariate probit

Number of obs = 28104860

Wald chi2(94) = 7096354.73

Log likelihood = -11463409

Prob > chi2 = 0.0000

	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
FREQ						
IDADE	1.043749	.0014678	711.085	0.000	1.040872	1.046626
IDADE2	-.054653	.0000671	-814.552	0.000	-.0547845	-.0545215
SEXO	-.0514985	.0007727	-66.649	0.000	-.053013	-.0499841
COR	-.0213994	.0008798	-24.322	0.000	-.0231238	-.0196749
EDUC	.1856668	.0003682	504.233	0.000	.1849451	.1863885
EDUCAMAE	.0739928	.0001523	485.917	0.000	.0736944	.0742913
TOTMOR	-.0404864	.0001943	-208.348	0.000	-.0408672	-.0401055
PESS7ANO	-.4184753	.0018459	-226.699	0.000	-.4220932	-.4148573
MAECHEFI	-.0974084	.0011608	-83.915	0.000	-.0996835	-.0951333
LUZ	.1155197	.0013942	82.856	0.000	.112787	.1182523
RFPC	.000791	5.65e-06	139.950	0.000	.00078	.0008021
AREARU	-.1926511	.001028	-187.406	0.000	-.1946659	-.1906363
DRO	-.4927282	.0132186	-37.275	0.000	-.5186362	-.4668202
DAM	-.3355978	.0127682	-26.284	0.000	-.360623	-.3105726
DAC	-.6510735	.0141076	-46.150	0.000	-.678724	-.6234231
DPR	-.4364423	.0124625	-35.020	0.000	-.4608684	-.4120162
DPA	-.2057043	.0126244	-16.294	0.000	-.2304476	-.1809609
DAP	.0298074	.0145345	2.051	0.040	.0013202	.0582945
DTO	-.1871801	.012938	-14.467	0.000	-.2125382	-.161822
DMA	.0211582	.0124873	1.694	0.090	-.0033164	.0456328
DPIAU_	.1096762	.0126525	8.668	0.000	.0848779	.1344746
DCE	.2333467	.0125378	18.611	0.000	.208773	.2579203
DRN	-.1327898	.0126762	-10.476	0.000	-.1576347	-.1079449
DPARAIBA	.0558735	.0126499	4.417	0.000	.0310802	.0806668
DPE	-.2379139	.012502	-19.030	0.000	-.2624174	-.2134105
DAL	-.3800741	.01256	-30.261	0.000	-.4046912	-.355457
DSE	.0709482	.0130145	5.451	0.000	.0454401	.0964562
DBA	-.025526	.0124265	-2.054	0.040	-.0498815	-.0011706
DMG	-.2581885	.0124044	-20.814	0.000	-.2825007	-.2338763
DES	-.6090905	.0125693	-48.458	0.000	-.633726	-.5844551
DRJ	-.1413763	.0127407	-11.096	0.000	-.1663475	-.116405
DSP	-.3230294	.0124028	-26.045	0.000	-.3473384	-.2987203
DSC	-.3025556	.0125452	-24.117	0.000	-.3271437	-.2779675
DRS	-.508986	.0124727	-40.808	0.000	-.533432	-.4845401
DMS	-.4909523	.0126888	-38.692	0.000	-.5158218	-.4660827
DMT	-.4793925	.0126521	-37.890	0.000	-.5041902	-.4545947
DGO	-.3732392	.0125204	-29.810	0.000	-.3977787	-.3486996
DDF	-.3255717	.0129653	-25.111	0.000	-.3509832	-.3001602
DMGMETRO	-.0225726	.0028831	-7.829	0.000	-.0282234	-.0169219
DPAMETRO	.050012	.0066625	7.507	0.000	.0369538	.0630701
DCEMETRO	-.2824386	.0039379	-71.724	0.000	-.2901567	-.2747205
DPEMETRO	.1036646	.0039386	26.320	0.000	.0959451	.1113841
DBAMETRO	-.1185234	.0038525	-30.765	0.000	-.1260742	-.1109727
DRJMETRO	-.1088263	.0038275	-28.433	0.000	-.1163281	-.1013245
DSPMETRO	-.1103691	.0018711	-58.986	0.000	-.1140364	-.1067018
DPRMETRO	-.2235875	.0032647	-68.486	0.000	-.2299863	-.2171888
DRSMETRO	-.1453015	.0030797	-47.180	0.000	-.1513377	-.1392653
_cons	-3.138159	.0147824	-212.290	0.000	-3.167132	-3.109186

TRABFREE						
IDADE	.5012877	.0019748	253.848	0.000	.4974173	.5051582
IDADE2	-.0152079	.0000854	-178.038	0.000	-.0153753	-.0150405
SEXO	.4546501	.0009544	476.377	0.000	.4527795	.4565206
COR	-.0298308	.0010504	-28.400	0.000	-.0318895	-.0277722
EDUC	-.0220011	.0003194	-68.876	0.000	-.0226271	-.021375
EDUCAMAE	-.0312528	.0001646	-189.859	0.000	-.0315754	-.0309301
TOTMOR	.0128457	.0002238	57.400	0.000	.0124071	.0132843
PESS7ANO	-.0319009	.0035697	-8.937	0.000	-.0388973	-.0249044
MAECHEFI	-.0739385	.0015744	-46.963	0.000	-.0770243	-.0708527
CPEM	.7098281	.0009908	716.452	0.000	.7078863	.711177
RFPC	-.00032	3.16e-06	-101.348	0.000	-.0003261	-.0003138
AREARU	.9598114	.0010739	893.761	0.000	.9577066	.9619162
DRO	-.2791005	.014631	-19.076	0.000	-.3077768	-.2504242
DPR	.3264138	.0114289	28.560	0.000	.3040136	.348814
DAM	-.259144	.0127417	-20.338	0.000	-.2841172	-.2341707
DRR	-5.432909	.012368	-439.270	0.000	-5.45715	-5.408668
DPA	.5937162	.0116303	51.049	0.000	.5709212	.6165111
DAP	.1283941	.0147612	8.698	0.000	.0994627	.1573254
DTO	-.0534549	.0123205	-4.339	0.000	-.0776027	-.0293072
DMA	.5095921	.011372	44.811	0.000	.4873034	.5318808
DPIAU_	.1405087	.0115635	12.151	0.000	.1178448	.1631727
DCE	.1311528	.0114406	11.464	0.000	.1087297	.153576
DRN	-.2093817	.0119103	-17.580	0.000	-.2327255	-.1860379
DPARAIBA	.2663493	.0115232	23.114	0.000	.2437643	.2889343
DPE	.3875062	.0114283	33.907	0.000	.365107	.4099053
DAL	-.0469616	.0117114	-4.010	0.000	-.0699156	-.0240077
DSE	.059055	.0121715	4.852	0.000	.0351993	.0829106
DBA	.1397862	.0113513	12.315	0.000	.1175381	.1620342
DMG	.0608909	.0113786	5.351	0.000	.0385892	.0831925
DES	.2441545	.0116354	20.984	0.000	.2213495	.2669594
DRJ	-.9357831	.013324	-70.233	0.000	-.9618976	-.9096686
DSP	-.2989153	.0114702	-26.060	0.000	-.3213966	-.2764341
DSC	.3560628	.0114708	31.041	0.000	.3335806	.3785451
DRS	.5000018	.0114414	43.701	0.000	.4775771	.5224264
DMS	.1940746	.0118865	16.327	0.000	.1707774	.2173718
DMT	.3646024	.0117049	31.150	0.000	.3416612	.3875437
DGO	-.0938761	.0116525	-8.056	0.000	-.1167145	-.0710377
DDF	-.3216114	.013163	-24.433	0.000	-.3474103	-.2958124
DMGMETRO	-.4059026	.005304	-76.528	0.000	-.4162982	-.395507
DPAMETRO	-.7168598	.0093731	-76.480	0.000	-.7352308	-.6984889
DCEMETRO	.0438701	.0045403	9.662	0.000	.0349713	.0527689
DPEMETRO	-.2492341	.0047558	-52.406	0.000	-.2585554	-.2399128
DBAMETRO	-.2144763	.0055841	-38.409	0.000	-.2254209	-.2035318
DRJMETRO	.4045911	.0085018	47.589	0.000	.3879279	.4212544
DSPMETRO	.1338727	.0030978	43.216	0.000	.1278012	.1399442
DPRMETRO	-.6930608	.006975	-99.363	0.000	-.7067316	-.67939
DRSMETRO	-.4770479	.0047933	-99.524	0.000	-.4864426	-.4676532
_cons	-5.978213	.0157846	-378.736	0.000	-6.009151	-5.947276

/athrho	-.0362785	.0008578	-42.291	0.000	-.0379599	-.0345972

rho	-.0362626	.0008567			-.0379416	-.0345834

Wald test of rho=0:			chi2(1) = 1788.53		Pr > chi2 = 0.0000	