Intergenerational mobility and inequality of opportunities among youths in Brazil

Relevant theme: Inequalities of opportunity

Ana Lúcia Kassouf[1]

Marcos de Oliveira Garcias[2]

Summary

This paper uses the School-to Work Transition Survey collected by the International Labour Organization in 2013 to measure schooling, earnings and occupational mobility. The data set has retrospective questions on parental socioeconomic characteristics, allowing the measurement of the intergenerational mobility among youths 15 to 29 years old. We found large intergenerational schooling and occupational mobility. To analyze returns to education on earnings we estimated earnings and labor force participation equations by Heckman selection model. Youths and parents´ education had great impact on earnings and labor participation.

1. Introduction

The number of poor people in a country and the average quality of life are not only related to the country's per capita income, but also depend on how equally or unequally income is distributed. High inequality adversely affects people's quality of life, inducing a higher incidence of poverty and so hampering improvement in health and education and contributing to crime.

Brazil is known by huge regional differences, mainly in social indicators such as health and education. The richer South and Southeast regions show much better indicators than the North and Northeast. However, from 2003 to 2014 the country experienced economic and social progress, with more than 26 million people being withdrawn from poverty and inequality being reduced significantly. The Gini coefficient decreased significantly in the period and in 2013 reached 0.54. While the growth in income of the total population was 3.5%, in real terms, the income of the bottom 40% of the population grew on average 6.1% between 2002 and 2012. However the fall in poverty and inequality appears to cease since 2014. GDP growth in Brazil has decreased from 4.5% in 2006-10 to 2.1% over 2011-14

---

[1] Professor at University of São Paulo -Department of Economics. Av. Pádua Dias, 11 Piracicaba, SP   13418-900 – Brazil. Phone: 55-19 98133-8649, fax: 55- 19 3434-5186 - anakassouf@usp.br

[2] Assistant Professor at Federal University of Pampa / PhD Student in Applied Economics. University of São Paulo – marcosgarcias@unipampa.edu.br

and 0.1% in 2014. Even with the triumphs in poverty reduction over the last decade, inequality still remains at relatively high levels for a middle income country [World Bank (2015)].

During the last decades the federal government instituted major policy changes and launched many social programs as a way to improve educational level and decrease child and youth labor. For example, in 1996 the federal government launched the Child Labor Eradication Program with the specific goal of eradicating child labor. In 2001, to encourage all children to complete 8 years of school, Brazil launched the Bolsa Escola conditional cash transfer program which was enlarged and renamed *Bolsa Familia* in October 2003. Currently, close to 14 million families (about 56 million people, more than one fourth of Brazil's population) received *Bolsa* payments.

After having reached universal coverage in primary education, Brazil is now struggling to improve the quality of schools, especially at the basic and secondary levels.

The School-to Work Transition Survey (SWTS) contains information on 3,288 youths from 15 to 29 years old in the five regions and in the urban and rural areas of Brazil. Separately by gender and regions, we will analyze the intergenerational mobility in education, earnings and occupational status. Knowing if the large inequality observed in the country comes from inequality of opportunities among youths due to their family background or from individual characteristics not related to family background is important to better understand the causes of high inequality and to advise policy makers. A classical analysis of social mobility in Brazil was done primarily by Pastore (1979) and more recently by Pastore & Valle Silva (2000).

According to Behrman et al. (2001), society is viewed as less fair if inequality is largely a reflection of the absence of opportunities for those with poor family backgrounds. This paper will contribute to this literature, as little is known about inequality of opportunities among youths in Brazil, mainly due to the lack of data containing information on parents in the youth´s family.

2

The SWTS survey, however, has retrospective questions on parental socioeconomic characteristics. Based on that, we will analyze the intergenerational transmissions of schooling, earnings and occupational status among youths from 15 to 29 years old. In using retrospective questions we circumvent the problem of not having panel data information.

2. Methodology

Black and Devereux (2010) presented recent developments in intergenerational mobility, arguing that the literature has placed increased emphasis on the causal mechanisms that underlie the relationship between parents and children's outcomes in addition to focusing on obtaining precise estimates of correlations and elasticities.

The most common empirical characterization of mobility is given by a model relating the socioeconomic indicator (Y) of parents to that of their children in period t:

$$\log(Y_{i,t}) = \alpha + \beta \log(Y_{i,t-1}) + \varepsilon_{i,t} \tag{1}$$

If Y is defined relative to the mean of its distribution, the parameter β is the intergenerational elasticity and $(1-\beta)$ is a measure of intergenerational mobility.

To study the transmission of schooling from parents to children, we will estimate the above equation for mother and father's schooling separately. Estimates of β close to unity suggest very narrow intergenerational mobility, while estimates of β close to zero suggest that schooling outcomes are not closely related across generations. Overall, β will be interpreted as a measure of the level to which family background affects socioeconomic outcomes, or as a measure of inequality of opportunity.

Another approach widely used in the literature to characterize intergenerational mobility is the intergenerational correlation (ρ). The correlation between the log socioeconomic indicator of parent and child equals the elasticity provided that the standard deviation of log

3

socioeconomic indicator (σ) is the same for both generations. The elasticity can then be higher in one society than in another simply because the variance of log socioeconomic indicator in the child's generation is higher in that society. The intergenerational correlation is:

$$\rho = (\sigma_{i,t} / \sigma_{i,t-1}) \beta \qquad\qquad (2)$$

An alternative strategy is to study mobility matrices and examine the quantile groups of the child's earnings, for example, conditional on the parent's earnings quantile. This approach allows the comparison of mobility rates of population subgroups across the full earnings distribution rather than just across the earnings distribution for that group [see Jantti et al (2006)].

In a similar manner, to analyze occupational mobility we will construct matrices distinguishing sectors of employment. Behrman, Gaviria and Szekely (2001) divided into white collar and blue collar occupations to compare occupational mobility among countries.

In order to measure intergenerational transmission of education we can consider educational attainment as a continuous variable and calculate the parent-child correlation or we can consider educational attainment as a discrete variable and use transition matrices, where parental education is on one axis and child education on the other. Using two different indices, Chevalier et al. (2009) measured different kinds of mobility across boundaries from one generation to the next.

In terms of estimation, education has advantages over earnings, given that measurement problems related to education are much less challenging. The reasons are that the completion of school happens earlier in life (mid-twenties), non-employment causes no difficulties, and measurement error is likely to be much less of an issue as individuals tend to know their own educational achievement.

Another important point to study is the returns to schooling. If they are high, we might expect that large differences in schooling result into large differences in earnings. The

youths' earnings equations will then be estimated using the Heckman selection model described below.

Consider the following model, called selection equation.

$$Z_i^* = \gamma'W_i + u_i$$

where

$$Z_i = 1 \quad if \quad Z_i^* > 0$$
$$Z_i = 0 \quad otherwise$$

We want to estimate the earnings equation:

$$Y_i = \beta'X_i + \varepsilon_i \tag{3}$$

However, Y_i is observed only if Z_i^* is greater than zero. Assuming that the errors ε_i and u_i are bivariate normally distributed with mean 0 and correlation ρ, we have that,

$$E(Y_i | Y_i \text{ is observed}) = E(Y_i | Z_i^* > 0) = E(Y_i | u_i > -\gamma'W_i)$$

$$= \beta'X_i + E(\varepsilon_i | u_i > -\gamma'W_i) = \beta'X_i + \rho\sigma_\varepsilon \frac{\phi(\alpha_u)}{\Phi(\alpha_u)} = \beta'X_i + \beta_\lambda \lambda_i(\alpha_u)$$

where

$$\alpha_u = \frac{-\gamma'W_i}{\sigma_u}$$

and then,

$$Y_i | Z_i^* > 0 = E(Y_i | Z_i^* > 0) + v_i = \beta'X_i + \beta_\lambda \lambda_i(\alpha_u) + v_i$$

Therefore, if we estimate equation (3) by least squares only for individuals where Y is observed, the estimated coefficients β will be biased and not consistent.

5

To obtain consistent estimates we will use the Heckman selection model that consists of estimating the selection equation for youths working or not with the earnings equation for those receiving payments by maximum likelihood.

If the youths´ decision whether to work or not is random we would not have a problem in estimating the earnings equation only for the workers by least squares. However, it is more likely that individuals do not work if they receive low wages. Usually people choose not to work when their personal reservation wage is greater than the wage offered by employers. To circumvent this problem we will use variables that strongly affect the chances for observation (the reservation wage) but not the outcome under study (the offer wage). Such a variable might be the youths´ number of children or wealth.

3. Results

Figure 01 shows the average number of years of schooling for youths from 15 to 29 years old from 2001 to 2014, based on yearly national household surveys (PNAD). We observe that the mean schooling attainment in Brazil has increased 2 years in the last decades, going from 7.54 to 9.54. If we consider individuals that have completed school (25 years old or more), the mean schooling goes from 6.02 in 2001 to 7.82 in 2014. Besides the observed improvement, Brazil still lags behind many other Latin American countries, as table 01 shows. The Human Development Report (2015) displays Brazil as having mean schooling of 7.7, while Argentina and Chile have 9.8 average years of schooling and Mexico 8.5. Developed countries such as United Kingdom, United States and Switzerland have mean years of schooling close to 13. These figures show a long way the country has to go to improve schooling of the society.

We start analyzing school mobility between parents and children separately by men and women and regions in Brazil. Afterwards, occupational mobility and returns to schooling on earnings will be calculated.
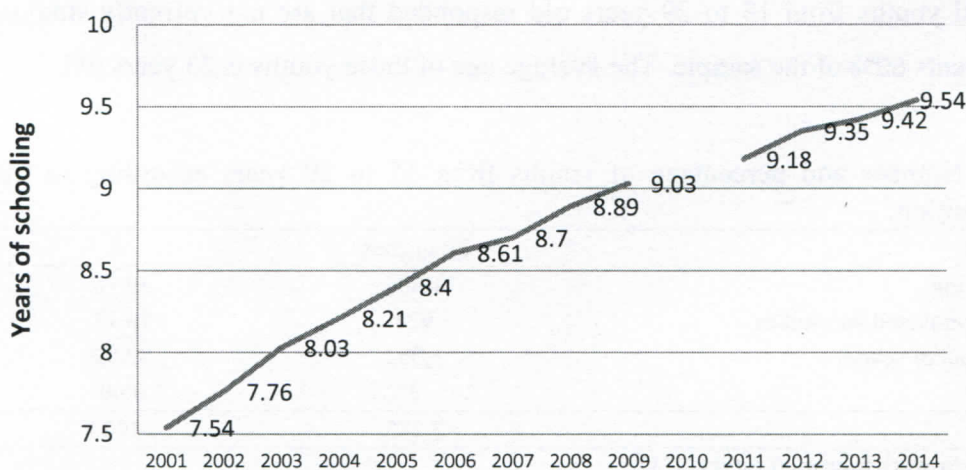
Source: PNADs. Excludes rural North for comparison reasons.

Figure 01 – Average years of schooling for youths from 15 to 29 years old.

Table 01 - Mean years of schooling for individuals 25 years old or more in Latin America countries and others in 2014.

Countries	Mean years of schooling - 2014
Brazil	7.7
Argentina	9.8
Peru	9.0
Chile	9.8
Bolivia	8.2
Paraguay	7.7
Uruguay	8.5
Ecuador	7.6
Colombia	7.3
Venezuela	8.9
Mexico	8.5
Costa Rica	8.4
United Kingdom	13.1
United States	12.9
Switzerland	12.8

Source: Human Development Report, 2015.

The following analyses are based on individuals that have completed their studies or that have dropped out of school. The goal of this restriction is to eliminate youths that have not completed their studies to avoid having a censored variable. Table 02 shows that almost

two thousand youths from 15 to 29 years old responded that are not currently studying, which represents 60% of the sample. The average age of those youths is 23 years old.

Table 02 – Number and percentage of youths from 15 to 29 years according to their schooling position.

Youth situation	Frequency	%
Currently studying	1,306	39.76
Have already completed the studies	924	28.13
Have dropped out of school	1,052	32.02
Did not answer	3	0.09
Total	3,285	100

Source: School-to-work transition survey, ILO.

3.1 Schooling Mobility.

Table 03 shows the average number of years of schooling of parents and youths in Brazil. While mothers and fathers have less than 6 years of education, their sons and daughters have mean schooling attainment equals to 10 years, representing almost double of their parents schooling. These numbers show that education has significantly increased from one generation to another. Observe that women have higher education than men in Brazil, although the difference is small.

Table 03 – Mean of parental and youths (from 15 to 29 years old) schooling in years.

Education*	Frequency	Mean
Youth schooling	1,778	10.11
Male youth	873	9.99
Female youth	905	10.23
Mother schooling	1,674	5.79
Father schooling	1,439	5.57

Source: School-to-work transition survey, ILO.
*Only youths that have completed school or dropped out of school.

To obtain a characterization of mobility, we first estimate the relationship between parents and children education as in equation (1), separately for father, mother and regions in Brazil (see table 04).

Intergenerational mobility is defined as any change in the social position of family members that takes place from one generation to the next. Families of poor immigrant parents without education who have children graduating from college and grandchildren

8

becoming Professors are examples of intergenerational mobility. Therefore, when the coefficient β in equation (1) – a regression of mothers' and fathers' education on youths' education - is close to zero means that schooling outcome is not closely related across generations or that intergenerational mobility is very high $(1 - \beta)$. These are the results observed for Brazil, i.e., small β coefficient (close to 0.04) and large intergenerational mobility. Table 04 shows the values of intergenerational mobility $(1 - \beta)$ separately for male, female, regions and by father and mother education. The range goes from 0.93 for the effect of mother's education on male youth in Midwest region of Brazil to 0.97 for the effect of father's education on male youth in Southeast region of Brazil. Therefore, we observe high intergenerational mobility in general[3].

Table 04 – Measure of intergenerational schooling mobility for male and female youths by region.

Region	Intergenerational schooling mobility $(1-\beta)$					
	All youths*		Female youths		Male youths	
	Father's education	Mother's education	Father's education	Mother's education	Father's education	Mother's education
Brazil	0.9617	0.9588	0.9626	0.9609	0.9610	0.9572
North	0.9856 ns	0.9601	0.9774 ns	0.9617	0.9933 ns	0.9600
Midwest	0.9416	0.9454	0.9383	0.9574	0.9432	0.9301
Northeast	0.9638	0.9641	0.9695	0.9624	0.9608	0.9666
South	0.9513	0.9579	0.9533	0.9639	0.9484	0.9508
Southeast	0.9648	0.9619	0.9605	0.9620	0.9691	0.9619

Source: School-to-work transition survey, ILO.
*Only youths that have completed school or dropped out of school.

Figure 02 and 03 displays the values of table 04, for female and male youth, respectively for a better visualization.

---

[3] The intercepts (α) of equation (1) were all positive, statistically significant and close to 2.2.
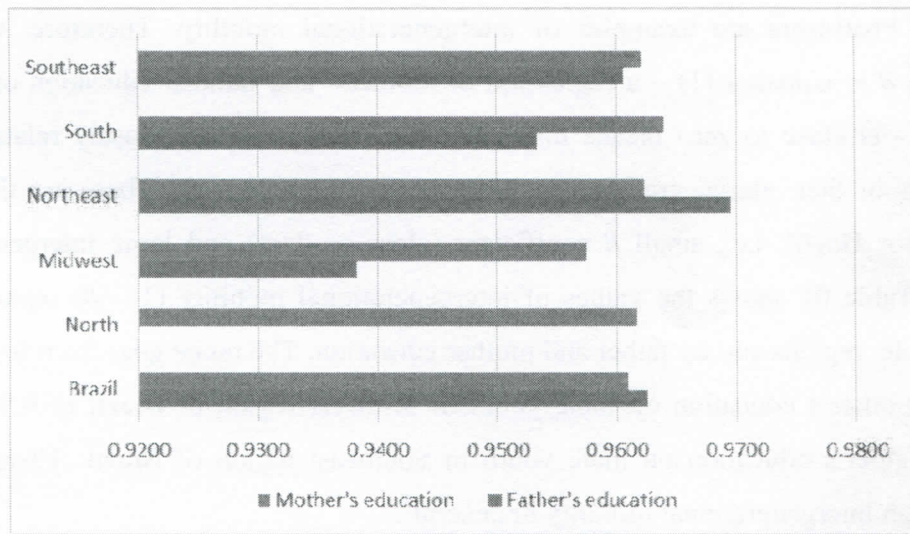
Figure 02 – Intergenerational schooling mobility between parents and female youth.
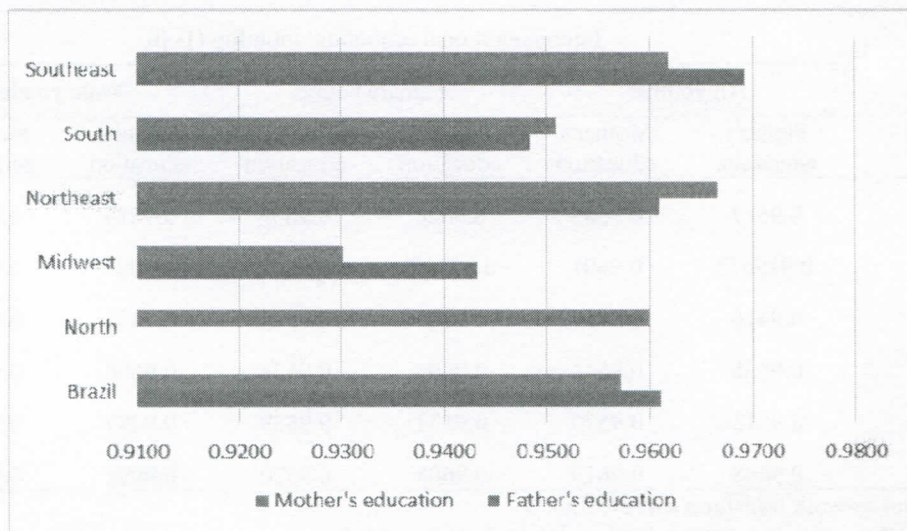

Figure 03 – Intergenerational schooling mobility between parents and male youth.

Table 05 shows intergenerational correlation (ρ) as an alternative to the elasticity. If the standard deviation of log years of schooling is the same for both generations the correlation equals the elasticity. The correlation removes the cross-sectional dispersion of log years of schooling in the two generations, while the elasticity can differ from one generation to the other simply because the variance of the log years of schooling between generations is different. The intergenerational correlation (ρ) is presented separately for male and female youths and regions by father´s and mother´s education. The range goes from 0.09 for the

10

effect of father's education on female youth in Midwest region of Brazil to 0.14 for the effect of mother's education on female youth in Southeast region of Brazil.

Table 05 – Measure of intergenerational schooling correlation for male and female youths by region.

| Region | Intergenerational schooling correlation (ρ) | | | | | |
| | Youths* | | Female youths | | Male youths | |
	Father's education	Mother's education	Father's education	Mother's education	Father's education	Mother's education
Brazil	0.1146	0.1230	0.1121	0.1221	0.1167	0.1235
North	0.1191[ns]	0.1244	0.1115[ns]	0.1302	0.1260[ns]	0.1212
Midwest	0.1037	0.1206	0.0895	0.1008	0.1147	0.1382
Northeast	0.1131	0.1178	0.1156	0.1175	0.1113	0.1174
South	0.1239	0.1197	0.1043	0.1074	0.1480	0.1313
Southeast	0.1150	0.1362	0.1131	0.1424	0.1170	0.1308

Source: School-to-work transition survey, ILO.
*Only youths that have completed school or dropped out of school.

Intergenerational mobility might not be linear as the former analysis imposes, it might be asymmetric or stronger at the end of the distribution [Behrman et al. (2001)]. To observe these differences we created 3 educational categories: (1) primary schooling or less, including all individuals with 8 years of education or less; (2) high school completed or not, including individuals with 9 to 11 years of education and (3) higher level of education, including those in the university or in graduate school. Table 06 has the percentage of fathers, mothers and youths in each category. Most parents have only primary level school while most youths that have completed school or dropped out of school are in high school level.

Table 06 – Number and percentage of youths*, fathers and mothers of youths according to their schooling level.

| Schooling level | Father | | Mother | | Male youths | | Famale youths | |
	Freq	%	Freq	%	Freq	%	Freq	%
Primary school or less	1876	68.72	2119	67.87	356	35.58	336	34.29
High school	648	23.74	760	24.34	571	57.56	571	58.27
College or more	206	7.54	243	7.78	68	6.85	73	7.45
Total	2730	100	3122	100	992	100	980	100

Source: School-to-work transition survey, ILO.
*Only youths that have completed school or dropped out of school.

Table 07 and 08 displays the probability that a youth is in each category given his/her father and mother level of education, respectively. Close to 57% of the youths whose fathers have at most primary schooling were in high school and 5% were in college or graduate school. While 5% moved from primary education to college, 3% moved in opposite direction, i.e., they were in primary school when their fathers were in college. Besides the secular trends in schooling attainment, these results reflect some asymmetries between the years of schooling of parents and children with the proportion of upward mobile youths from the bottom of the distribution greater than the proportion of downward mobile youths from the top. On the other hand, 38% of youths with primary school or less have fathers also with primary school or less and almost 60% of youths with college have also fathers with college or graduate school. Similar results were observed when analyzing mother's education in table 08. From these analyses we conclude that there is a correlation between youths' school attainment and parents' school attainment.

Table 07 – School mobility matrices between fathers and youths*.

Father's education	Primary or less	High school	College or more
Primary school or less	38.27	57.07	4.66
High school	10.97	76.77	12.26
College or more	3.13	37.5	59.38
Total	31.56	60.11	8.33

Source: School-to-work transition survey, ILO.
*Only youths that have completed school or dropped out of school.

Table 08 – School mobility matrices between mothers and youths*.

Mother's education	Primary or less	High school	College or more
Primary school or less	40.55	56.09	3.36
High school	13.2	73.02	13.78
College or more	5.88	42.35	51.76
Total	33.93	58.58	7.5

Source: School-to-work transition survey, ILO.
*Only youths that have completed school or dropped out of school.

3.2 Occupational Mobility.

Another important generational mobility to investigate is through occupational status from parents to children. We may argue that education or income does not entirely explain the socioeconomic status of a person. To compare occupational status across generations we created five broad categories: agriculture, industry, civil construction, commerce and service and technology. We believe that the best occupations are in the category service/technology, although those categories are not ordered.

Occupational mobility matrices are presented in Tables 09 and 10, for fathers and mothers respectively. Each cell shows the percentage of sons and daughters in the occupational category for that column conditional on their father's or mother's category for that row. Observe that the largest percentage of youths work in the service/technology category, independent of their parents' occupation. As an example, 31.79% of the youths whose fathers work in agriculture, work in service and technology, while 28.9% are working in the same category as their fathers. On the other hand, only 1.96% of the youths whose fathers work in service and technology are working in agriculture and 8.6% are in civil construction, both categories considered of lower status. Similar results are observed when comparing mothers' occupation with their sons' or daughters' occupations (Table 10).

From that analysis we can conclude that sons of higher status occupation fathers are more likely to have higher status occupation themselves than the sons of lower status occupation fathers, showing some intergenerational relation in occupational status. Youths whose father has a prestigious job have 1.7 times more probability of having also a higher level occupation (53.3/31.8) compared to those whose fathers had a lower status occupation. Behrman et al (2001) using data from 1996, obtained a value of 2.6 for Brazil. However, it is also observed an improvement in the youths' occupation in general compared to their parents' occupations.

Table 09 – Intergenerational occupational mobility between fathers and youths.

Father's Occupation	Youths* occupations				
	Agriculture	Industry	Civil construction	Commerce	Service/Technology
Agriculture	28.93	11.43	12.86	15.00	31.79
Industry	6.25	27.08	12.50	21.53	32.64
Civil construction	5.83	14.56	23.30	16.99	39.32
Commerce	1.90	19.62	7.59	31.01	39.87
Service/Technology	1.96	20.00	8.63	16.08	53.33
Total	10.55	17.55	13.04	18.98	39.88

Source: School-to-work transition survey, ILO.
*Only youths that have completed school or dropped out of school.

13

Table 10 – Intergenerational occupational mobility between mothers and youths.

Mother's Occupation**	Youths* occupations				
	Agriculture	Industry	Civil construction	Commerce	Service/Technology
Agriculture	35.37	10.88	11.56	11.56	30.61
Industry	7.96	19.65	13.98	19.82	38.58
Commerce	6.84	19.66	11.11	16.24	46.15
Service/Technology	3.05	15.73	13.85	18.54	48.83
Total	9.40	17.29	13.39	18.09	41.83

Source: School-to-work transition survey, ILO.
*Only youths that have completed school or dropped out of school.
** Civil construction in the mother´s occupation was omitted due to lack of observations.

3.3 Returns to education on earnings.

The youths´ earnings equations are initially estimated taking into account sample selectivity bias, which may occur due to the fact that earnings are observed only for those participating in the labor market. From 1489 men, 902 work and from 1535 women, 547 work. Based on that, approximately 61% of male youths and 36% of female youths in the sample are employed. Some individuals work but do not receive payments. From the number of individuals working, 72% of males (647 out of 902) and 66% of females (362 out of 547) receive earnings.

Trying to account for sample selectivity bias, the earnings equations were estimated using the Heckman selection model. This procedure consists of estimating the earnings equation and the labor force participation equation (probit model) by maximum likelihood. The dependent variable of the probit model, which is the selection equation, takes values 1 or 0 whether the individual participates or not in the job market. The dependent variable of the earnings equation is the logarithm of hourly earnings only for those receiving earnings. The data are weighted by the sample expansion factor. The social class, marital status as well as the number of children variables were included in the labor force participation equations and excluded from the earnings equations to identify the model. Table 11 has the description of the variables and the means of the variables used in the analyses.

Table 11 – Description of the variables used in the Heckman analyses.

Variable	Description	Mean	
		Female youth*	Male youth*
Ln_earnings/hour	Log of earnings per hour	1.70	1.85
educ_youth	Youths number of years of schooling	10.23	9.99
educ_mother	Mothers number of years of schooling	5.65	5.93
educ_father	Fathers number of years of schooling	5.51	5.63
Age	Youths´ age in years	23.62	23.5
Race	1 if white or Asian, 0 otherwise	0.35	0.33
Urban	1 if urban, 0 otherwise	0.85	0.84
North	1 if residing in North region of Brazil, 0 otherwise	0.098	0.095
Midwest	1 if residing in Midwest region of Brazil, 0 otherwise	0.059	0.058
Northeast	1 if residing in Northeast region of Brazil, 0 otherwise	0.311	0.304
South	1 if residing in South region of Brazil, 0 otherwise	0.141	0.139
Southeast	1 if residing in Southeast region of Brazil, 0 otherwise	0.390	0.403
Married	1 if married, 0 otherwise	0.585	0.374
Number of children	Youths´ number of children	1.10	0.523
Social income class	6 levels of social income class (from very poor to rich)	3.07	3.11

Source: School-to-work transition survey, ILO.
*Only youths that have completed school or dropped out of school.

Table 12 shows the results of the log hourly earnings for the whole sample and for those who are out of school and have a defined number of years of education for all male and female youths (15 to 29 years old).[4] The exogenous variables are: mother and father's number of years of education assuming that, in early ages, parents would have a great effect on youths' work life. Moreover, we included youths´ age as a measure of experience, youth´s number of years of education, urban/rural area of residence, regions of residence (North, Northeast, South, Southeast and Midwest of Brazil) and race. The region variables (Southeast is omitted) control for differences around the country and the race variables control for ethnical and cultural divergences. In the race category, the white variable includes the Asians besides the Whites, and the omitted race includes all the other colors: black, mulatto and Indigenous.

---

[4] There is also a two step Heckman procedure. This procedure consists of first estimating the labor force participation equation (probit model) by maximum likelihood, where the dependent variable takes values 1 or 0 whether the individual participates or not in the job market. Second, the inverse of Mill's ratio (lambda) is obtained based on the estimated coefficients from the probit model and then used as an exogenous variable in the logarithm of hourly earnings equations only for those receiving earnings. Although consistent, this estimator is not fully efficient according to Greene (1995) and therefore a maximum likelihood Heckman procedure was chosen.

The first four columns show the coefficients for the whole sample, i.e., individuals currently studying or out of school. The last four columns display the coefficients for the youths that are out of school, or because they completed school or because they dropped out of school. The coefficients of the log earnings equations showed that the youths' human capital variables, education and age, have positive effect on earnings. The larger the youths education and experience, the higher is his or her earnings. The returns vary from 1.7% for male youth to 12.5% for female youths, including mother's and father's years of schooling. Mother's education had a positive effect only on the male youth's earnings and father's education had a positive effect also for males but only for the whole sample (column 1). Living in urban areas has a positive effect on earnings compared to rural areas. The coefficients of the regions variables indicated that lower earnings are received in the relatively poorer areas (North and Northeast) and in the Midwest of the country with respect to the Southeast (omitted variable) and South of Brazil.

It is interesting to observe that when we include youths that are still in school as in column 1 to 4, the results are similar to those using a sample with youths that had completed their education or had dropped out of school (columns 5 to 8). The child's education is obviously an endogenous variable if the youth is still in school, however the results are very similar if we compare columns 1 to 4 with 5 to 8, which shows robustness of the results. We also included or excluded mother's and father's education to see how much of the parent's education effect goes to the youths education when those variables are omitted. It is possible to observe an increase in the youths' education coefficients when parents' education variables are omitted.

Lam and Schoeni (1993) investigated whether omitted family background variables were responsible for high returns to schooling in Brazil and concluded that the bias was modest.

Table 12 – Coefficients of the earnings equations (log earnings/hour) estimated using the Heckman selection model by maximum likelihood for male and female youths from 15 to 29 years old for the whole sample and only for those that were out of school.

Variable	ln earnings/hour							
	Male youths		Female youths		Male youths		Female youths	
Educ_youth	0.0206**	0.0594*	0.1182*	0.1176*	0.0171	0.058*	0.1181*	0.1221*
	(0.01)	(0.0105)	(0.0139)	(0.0124)	(0.0119)	(0.0116)	(0.0179)	(0.0159)
Educ_mother	0.0171***	-	0.009	-	0.0247*	-	0.0106	-
	(0.0101)		(0.0106)		(0.0096)		(0.0126)	
Educ_father	0.0165***	-	-0.0113	-	0.0082	-	-0.0045	-
	(0.0087)		(0.0104)		(0.0093)		(0.013)	
Age	0.0555*	0.0968*	0.0576*	0.0583*	0.0447*	0.0442*	0.0326**	0.0324**
	(0.0088)	(0.0117)	(0.0109)	(0.011)	(0.0111)	(0.0117)	(0.0142)	(0.0142)
Race (white)	-0.0231	-0.0664	-0.0229	-0.0259	0.0724	0.0225	-0.1123	-0.1092
	(0.0679)	(0.0785)	(0.0876)	(0.0858)	(0.0766)	(0.0827)	(0.1013)	(0.1011)
Urban	0.1731***	0.3307*	0.4056*	0.387*	0.0811	0.2266***	0.4161*	0.4157*
	(0.0943)	(0.1224)	(0.1451)	(0.1454)	(0.103)	(0.1305)	(0.1571)	(0.1539)
North	-0.2306***	-0.3629*	-0.1792	-0.1747	-0.0561	-0.1252	-0.2487	-0.2408
	(0.1259)	(0.1381)	(0.1636)	(0.1653)	(0.1538)	(0.1615)	(0.1967)	(0.1944)
Midwest	0.0208	-0.1942	-0.5411*	-0.5274*	0.0705	-0.0314	-0.4004**	-0.3912**
	(0.1086)	(0.1551)	(0.1719)	(0.1653)	(0.1338)	(0.1739)	(0.1926)	(0.1819)
Northeast	-0.193**	-0.5681*	-0.4585*	-0.4531*	-0.1446	-0.4527*	-0.3708*	-0.3727*
	(0.0942)	(0.1229)	(0.1055)	(0.1045)	(0.0997)	(0.1331)	(0.1143)	(0.1139)
South	0.0949	0.1668***	0.0964	0.091	0.0964	0.1922**	0.2206***	0.211***
	(0.0764)	(0.0935)	(0.101)	(0.1001)	(0.0841)	(0.0945)	(0.1131)	(0.114)
Constant	0.0841	-1.7876*	-2.1718*	-2.1726*	0.36	-0.3505	-1.4827*	-1.4809*
	(0.2425)	(0.3835)	(0.4102)	(0.4182)	(0.2992)	(0.347)	(0.5026)	(0.5045)
All out of school	No	No	No	No	Yes	Yes	Yes	Yes
Number Obs.	524	524	311	311	386	386	209	209
Wald test	119.91*	112.37*	116.17*	121.94*	61.30*	64.76*	93.21*	87.62*

Standard deviations are in parentheses.
* Denotes significance at the 1% level.
** Denotes significance at the 5% level.
*** Denotes significance at the10% level.

Table 13 presents the earnings equations for male and female youths by parental education. The idea is to measure the youths´ return to education on earnings if mothers and fathers have only primary education or if parents have high school or higher education. For female youths the returns to education on hourly earnings when mother and father had only primary education is 14.6%, meaning that a one year increase in the youths schooling would increase his or her hourly earnings by 14.6%. The same analysis when parents have higher level of education shows a return to education close to 6.5%, which is less than half

of the return obtained for lower educated parents. Similarly, for male youths, the returns are 7.4% when parents have lower level of education and 4.1% when they have higher level of education. It is possible that, when parents are low educated and probably in lower level of income, their children need to study harder to find good jobs and years of schooling are very important to obtain higher wages. On the other hand, when parents are well educated and consequently have higher economic status and better occupations they may help their children in finding good jobs even if they do not have a higher level of education.

Table 13 - Coefficients of the earnings equations (log earnings/hour) estimated using the Heckman selection model by maximum likelihood for male and female youths from 15 to 29 years old that have completed school when parents have lower or higher level of education.

Variable	ln earnigs/hour			
	Female youths		Male youths	
	Parents with lower education	Parents with higher education	Parents with lower education	Parents with higher education
Education youth	0.1365*	0.0629*	0.0715*	0.041***
	(0.0253)	(0.0217)	(0.0143)	(0.0244)
Age	0.0302	0.0431***	0.0359*	0.0744*
	(0.0205)	(0.0224)	(0.0129)	(0.0223)
White/Asian	-0.174	-0.0314	0.0381	0.1074
	(0.1464)	(0.1638)	(0.0933)	(0.1781)
Urban	0.5574*	0.378	0.3371**	0.0127
	(0.2021)	(0.4371)	(0.1522)	(0.3393)
North	-0.1265	-1.0683*	-0.271	0.5069
	(0.265)	(0.253)	(0.1776)	(0.4462)
Midwest	-0.4707***	0.238	0.0768	-0.2544
	(0.2652)	(0.3906)	(0.2149)	(0.2384)
Northeast	-0.4065**	-0.7982*	-0.4691*	-0.2983
	(0.1688)	(0.2267)	(0.1342)	(0.2229)
South	0.281***	0.0805	0.2383**	-0.3077***
	(0.1587)	(0.1941)	(0.1064)	(0.1667)
Constant	-1.7957*	-0.6511	-0.3912	0.0194
	(0.6857)	(0.5572)	(0.4108)	(0.7505)
Number Observations	128	51	261	87
Wald test	43.66*	60.65*	58.49*	24.78*

Standard deviations are in parentheses.
* Denotes significance at the 1% level.
** Denotes significance at the 5% level.
*** Denotes significance at the10% level.

Figures 04 and 05 displays the estimated values of female earnings from table 13 as a function of female years of schooling for the two different levels of parents´ education. There is a much higher dispersion when parents have higher level of education compared to a lower level of education.
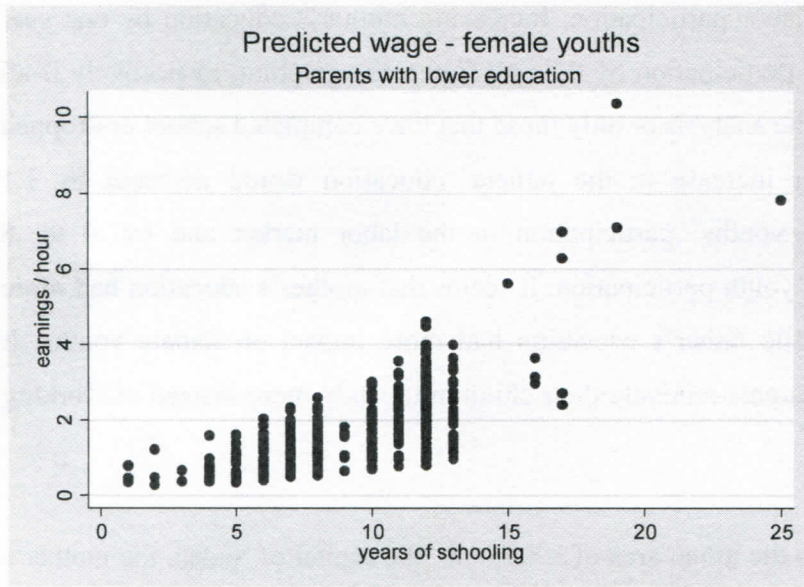

Figure 04 – Predicted values of earnings by youths´ education when parents have lower level of education.
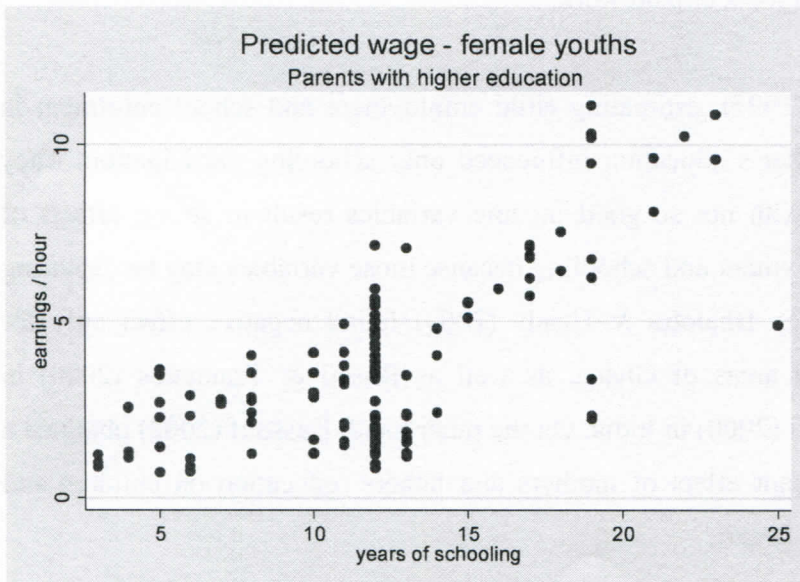

Figure 05 – Predicted values of earnings by youths´ education when parents have higher level of education.

Results of the probit equations in table 14 show a positive effect of the youth´s education, indicating that more years of schooling increase the probability to participate in the job market. A one year increase in the youths´ education would increase their participation in the labor market by 2 to 3 percentage point. On the other hand, parents´ education has a negative effect on youths´ labor participation. Increasing mother´s education by one year would decrease male youth participation by 0.7 or 1.1 percentage point, respectively if all individuals are included in the analysis or only those that have completed school or dropped out of school. A one year increase in the fathers´ education would decrease by 1.1 percentage point the male youths´ participation in the labor market and by .6 to .8 percentage point the female youth participation. It seems that mother´s education had more impact on male youths, while father´s education had more impact on female youths. It seems that more educated parents motivate their children to study more instead of working at early ages.

Peek (1978) observed that in the urban area of Khartoum, the capital of Sudan, the mother's education variable had one of the highest influences in the girls' activities. He concluded that in families where the mother is relatively well educated the daughter is more likely to attend school instead of doing housework or paid work.

Canagarajah & Coulombe (1997), estimating child employment and school enrolment in Ghana, concluded that mother's education influenced only schooling participation. They claimed that other studies with not so good income variables result in strong effects of parents' education on employment and schooling because those variables may be capturing the permanent income effect. Bhalotra & Heady (2003) found negative effect only for mother´s education in rural areas of Ghana, as well as Rosati & Tzannatos (2000) in Vietnam and Cigno & Rosati (2000) in India. On the other hand, Kassouf (2002) obtained a highly negative and significant effect of mothers and fathers´ education on children and youth probability to work in Brazil.

Table 14 – Marginal effects of the labor participation equations (probit model) for male and female youths from 15 to 29 years old for the whole sample and only for those that were out of school.

Variable	Marginal effect – Probit model			
	Men		Women	
Educ_youth	0.0247*	0.0346*	0.0222*	0.0226*
	(0.0052)	(0.0068)	(0.0047)	(0.0064)
Educ_mother	-0.0066***	-0.0106***	0.000	0.0041
	(0.0041)	(0.0055)	(0.0037)	(0.0053)
Educ_father	-0.0109**	-0.0081	-0.006***	-0.0085***
	(0.0043)	(0.0059)	(0.0036)	(0.0052)
Age	0.0264*	0.0025	0.0253*	0.0138**
	(0.0043)	(0.006)	(0.004)	(0.0057)
Race (white)	-0.0336	-0.0469	0.0051	-0.0189
	(0.0339)	(0.0449)	(0.0291)	(0.0397)
Urban	0.0685	0.0833	0.0485	0.088***
	(0.0467)	(0.0591)	(0.0366)	(0.0486)
North	-0.073	-0.0333	-0.0206	-0.0322
	(0.0528)	(0.0745)	(0.0451)	(0.0644)
Midwest	-0.1701**	-0.1433	-0.1581*	-0.1398***
	(0.0639)	(0.0945)	(0.036)	(0.0609)
Northeast	-0.2381*	-0.2608*	-0.103*	-0.1112**
	(0.0364)	(0.0494)	(0.0298)	(0.042)
South	0.0178	0.0689	0.016	0.0646
	(0.0496)	(0.0623)	(0.0397)	(0.0566)
Married	0.1852*	0.1243**	-0.0706**	-0.1093*
	(0.047)	(0.0488)	(0.0318)	(0.0401)
Number of children	-0.0647**	-0.046	-0.0575*	-0.0584*
	(0.0271)	(0.0289)	(0.0181)	(0.0216)
Social class	0.0322	0.0612**	-0.0026	0.0262
	(0.0209)	(0.0267)	(0.017)	(0.0236)
All out of school	No	Yes	No	Yes
Number Obs	1182	678	1235	703
Wald	177.46*	87.72*	131.69*	78.56*
Pseudo R^2	0.1213	0.104	0.1051	0.0958

Standard deviations are in parentheses.
* Denotes significance at the 1% level.
** Denotes significance at the 5% level.
*** Denotes significance at the 10% level.

The marginal effect of age is positive, reflecting the fact that as a person gets older more experience is acquired improving job opportunities. Increasing one year in age rises labor participation by 2%. Child's age reflect experience and maturity and, as expected, has a positive effect on the youth's entrance to the labor market.

According to Jensen and Nielsen (1997) since age is associated with more experience and more human capital, older children should have a potentially higher wage than younger ones, increasing their participation in the job market. Barros & Mendonça (1991) analyzed job participation of youths in three metropolitan areas of Brazil, using data from 1987. Only income, region, gender and age variables were included in the model. They also observed a very strong effect of age in increasing employment.

The race coefficient was not statistically significant at 10% level or less. Most of the marginal effects of race showed negative signs, indicating that the probability of blacks and mullatos youths to work is higher than the probability of whites and Asians to work. The survey shows that 33.5% of black, mulattos and Indigenous youths are working, while close to 37% of white and Asians work.

The probability of working is also higher for youths living in urban areas as compared to rural areas and in wealthier regions (South and Southeast) as compared to poorer regions, such as North and Northeast of Brazil. The analyzed survey shows that 36% of youths living in urban areas work, while only 26% of youths living in rural areas work. Table 15 has the percentage of working youths by regions in Brazil. The southern and southeastern regions have the largest percentage of youths working, while Northeast and Midwest parts of the country have the smallest percentage of youths working.

Table 15 – Percentage of youths from 15 to 29 years old working by regions in Brazil.

Regions	Youths working
Midwest	25.2
Northeast	25.2
North	35.1
South	39.3
Southeast	41.7

Source: School-to-work transition survey, ILO.

Barros & Mendonça (1991) observing a smaller rate of youths' job participation in poorer areas compared to others, concluded that their decision to work and not study are also affected by the labor market conditions and not only by their economic situation.

There is a negative effect between the youths' number of children and their labor force participation, mainly for female youths. This negative effect of children is related to a higher reservation wage and therefore a lower participation in the job market.

The results also show that the higher is the social income class of the household, the lower is the youth's participation in the labor market. Higher income families invest in their children's education. Moreover, the presence of the spouse reduces the mother's job participation but increases that of the father.

4. Conclusions.

Society is viewed as less fair if inequality is largely a reflection of the absence of opportunities for those with poor family backgrounds. This paper contributes to this literature, as little is known about inequality of opportunities among youths in Brazil, mainly due to the lack of data containing information on parents in the youth's family.

The School-to Work Transition Survey has retrospective questions on parental socioeconomic characteristics, allowing the measurement of the intergenerational transmissions of schooling, earnings and occupational status among youths 15 to 29 years old. In using retrospective questions we circumvent the problem of not having panel data information. Knowing if the large inequality observed in the country comes from inequality of opportunities among youths due to their family background or from individual characteristics not related to family background is important to better understand the causes of high inequality and to advise policy makers.

We found large intergenerational schooling mobility. Close to 57% of the youths whose fathers have at most primary schooling were in high school and 5% were in college or

23

graduate school. There is also a high occupational mobility. Close to 32% of the youths whose fathers work in agriculture, work in service and technology, while 29% are working in the same category as their fathers.

Earnings and labor force participation equations were estimated by maximum likelihood using Heckman selection model. The larger the youths education and experience, the higher is his or her hourly earnings. The returns vary from 1.7% for male youth to 12.5% for female youths, including mother´s and father´s years of schooling in the model. Moreover, a one year increase in the youths´ education would increase their participation in the labor market by 2 to 3% percentage point, while parents´ education had a negative effect on youths´ labor participation.

References

Barros, R. and R. Mendonça. 1991. "Infância e Adolescência no Brasil: As Consequências da Pobreza Diferenciadas por Gênero, Faixa Etária e Região de Residência." *Pesquisa e Planejamento Econômico*. 21:2, 355-376 p.

Behrman, Jere R., Gaviria, Alejandro, Székely, Miguel. Intergenerational mobility in Latin America. Inter-American Development Bank Working Paper No. 452, Washington, D.C, June 2001.

Black, Sandra E., Devereux, Paul J. Recent Developments in Intergenerational Mobility. NBER Working Paper No. 15889, April 2010.

Bhalotra, S. e C. Heady. 2003. "Child Farm Labor: The Wealth Paradox" *The World Bank Economic Review*, vol. 17, n.2.

Canagarajah, S. and H. Coulombe. 1997. "Child Labor and Schooling in Ghana." Policy Research Working Paper No. 1844, World Bank, Washington, DC, pp. 37.

Chevalier, Arnaud, Kevin Denny, and Dorren McMahon. A Multi-country study of inter-generational educational mobility. in: Peter Dolton, Rita Asplundh and Erling Barth, eds., *Education and inequality Across Europe*, Edward Elgar, London, 2009.

Cigno, A. & F. Rosati. *The Economics of Child Labour*. Oxford Univ. Press.

Dahan, M., A. Gaviria. Sibling Correlations and Intergenerational Mobility in Latin America. Forthcoming in *Economic Development and Cultural Change*, 2001.

Jäntti, Markus, Bernt Bratsberg, Knut Røed, Oddbjørn Raaum, Robin Naylor, Österbacka, Eva, Björklund Anders and Tor Eriksson. American exceptionalism in a new Light: A comparison of intergenerational earnings mobility in the Nordic countries, the United Kingdom and the United States. Institute for the Study of Labor (IZA) Discussion paper No. 1938, Bonn, 2006.

Kassouf, Ana L. 2002. *Aspectos Sócio-econômicos do Trabalho Infantil no Br*asil. Ministério da Justiça, Secretaria de Estado dos Direitos Humanos. Brasília. 123 pág.

Lam, David, and Robert F. Schoeni. Effects of Family Background on Earnings and Returns to Schooling: Evidence from Brazil. *Journal of Political Economy*, 101(4): 710-40.

Pastore, J. 1979. *Desigualdade e Mobilidade Social no Brasil*, São Paulo: T.A Queiróz Editor.

Pastore, J. e N. V. Silva. 2000. *Mobilidade Social no Brasil*, com Prefácio de Fernando Henrique Cardoso, São Paulo: Makron Books, 2000.

25

Peek, P. 1978. "The Education and Employment of Children: A Comparative Study of San Salvador and Khartoum" in *Labour Force Participation in Low-Income Countries*. Ed. Guy Standing and Glen Sheehan. ILO, Geneva. 177-190 p.

Rosati, F. e T. Tzannatos. 2000. "Child Labor in Vietnam. The World Bank, mimeo.

World Bank, *Statistics by country – Brazil*. Access in September, 2015. <http://www.worldbank.org/en/country/brazil/overview>