Session Number: 2B
Session Title: 'The Intergenerational Transmission of Inequality'
Paper Number: #5
Session Organizer: Miles Corak & Dean Lillard
Discussant:

Paper Prepared for the 28th General Conference of
The International Association for Research in Income and Wealth
Cork, Ireland, August 22 – 28, 2004

TITLE Intergenerational Mobility of Wages in Brazil (preliminary draft)

AUTHORS: Sergio Guimarães Ferreira & Fernando Veloso

For additional information please contact:

Author Name(s) Sergio G. Ferreira
Author Address(es): Av. Republica do Chile 100/729 – 20139-900 – Rio de Janeiro - Brazil
Author E-Mail(s) sergiogu@bndes.gov.br / sergiogu@terra.com.br
Author FAX(es)
Author Telephone(s) 55-21-2547-1567

This paper is posted on the following websites: **http://www.iariw.org**
http://www.econ.nyu.edu/iariw
http://www.cso.ie/iariw/iariwhome.html

Intergenerational Mobility of Wages in Brazil

Sergio Guimarães Ferreira*
BNDES

Fernando A. Veloso
IBMEC

Preliminary Draft

Abstract

In this paper, we present evidence on intergenerational mobility of wages in Brazil. We use data drawn from the mobility supplement of the PNAD 1996, a Brazilian household survey. The mobility supplement of the PNAD 1996 provides information on the education and occupation of the household head's father, but it does not give information on the father's earnings or wage. In order to construct a measure of father's wage we use a methodology proposed by Angrist and Krueger (1992) and Arellano and Meghir (1992) and applied by Bjorklund and Jantti (1997) to the study of intergenerational mobility in the United States and Sweden. We find that the degree of intergenerational mobility of wages in Brazil is lower than the one observed for developed countries. Moreover, mobility varies across regions and racial groups. We find evidence of significant nonlinearities in the mobility pattern in Brazil. More specifically, mobility is lower for sons of low-wage and high-wage fathers than for middle-wage fathers. We show that these nonlinearities may help explain the observed differences in mobility patterns between regions and racial groups and the behavior of mobility across cohorts.

Sergiogu@bndes.gov.br, BNDES, Av. República do Chile, 100/1227, 20139-900; Fveloso@ibmecrj.br, IBMEC-RJ, Av. Rio Branco, 108, Centro, 20040-001.

1. Introduction

In the last decade, several studies have attempted to estimate the degree of intergenerational mobility of earnings or wages in developed countries.[1] However, due to the lack of suitable data sets, only a few studies have looked at patterns of intergenerational mobility of earnings in developing countries.[2] The empirical evidence suggests that mobility is higher at developed than developing countries.

In this paper, we present evidence on intergenerational mobility of wages in Brazil. We use data drawn from the mobility supplement of the PNAD 1996, a Brazilian household survey. The PNAD is a suitable data set for our purposes mainly for two reasons. First, it allows for a study of intergenerational persistence of economic status for a large developing country. Second, the large number of observations of the PNAD allows for the estimation of nonlinearities in the pattern of intergenerational mobility.

The mobility supplement of the PNAD 1996 provides information on the education and occupation of the household head's father, but it does not give information on the father's earnings or wage. In order to construct a measure of father's wage we use a methodology proposed by Angrist and Krueger (1992) and Arellano and Meghir (1992) and applied by Bjorklund and Jantti (1997) to the study of intergenerational mobility in the United States and Sweden. Father's years of education and occupation, with interactions with the years of birth, are used to construct the instrument used in the paper. In particular, we include father's occupation among the instruments to diminish the potential upward bias in the persistence estimate, driven by the direct impact of father's education on son's wages, as studied by Solon (1992).

We find that the degree of intergenerational mobility of wages in Brazil is lower than the one observed for developed countries. Moreover, mobility varies across regions and racial groups. In particular, mobility is higher in the Southeast (a rich Brazilian

---

[1] For recent evidence on intergenerational mobility of earnings in developed countries, see Mulligan (1997) and Solon (1999) for the United States, Bjorklund and Jantti (1997) for Sweden, Dearden, Machin and Reed (1997) for Great Britain, Couch and Dunn (1997) for Germany, and Corak and Heisz (1999) for Canada. Solon (2002) presents evidence for several developed countries. Earlier studies include Behrman and Taubman (1990), Solon (1992) and Zimmerman (1992).

[2] For evidence on intergenerational mobility in earnings for developing countries, see Lillard and Kilburn (1995), for Malaysia, and Hertz (2001) for South Africa. Grawe (2001) presents evidence for several developed and developing countries.

region) than in the Northeast (a poor Brazilian region). Moreover, mobility is higher among Blacks than among Whites.

Some studies, including Solon (1992), Mulligan (1997) and Corak and Heiz (1999), have attempted to document nonlinearities in the pattern of intergenerational mobility. Besides being important for descriptive purposes, nonlinearities may provide evidence on economic theories of intergenerational mobility. For example, theories based on the existence of borrowing constraints typically predict that mobility of earnings or wages are higher for richer families, since they are less likely to be constrained.[3]

We find evidence of significant nonlinearities in the mobility pattern in Brazil. More specifically, mobility is lower for sons of low-wage and high-wage fathers than for middle-wage fathers. We show that these nonlinearities may help explain the observed differences in mobility patterns between regions and racial groups. In particular, we show that the probability that a son of a black father from the lowest quintile will remain in this quintile (45%) is considerably higher than the analogous probability for a son of a white father (25%), which suggests a higher persistence of low wages for black families.

On the other hand, persistence of high wages is stronger for white families. In particular, the probability that a son of a black father from the highest quintile will remain in this quintile is 25%, whereas the analogous probability for a son a of a white father is 53%.

A comparison between the intergenerational transmission of wages in the Northeast and the Southeast shows that the main difference in the mobility pattern in the two regions is the degree of persistence observed in the lowest quintile. In the Northeast, the probability that a son of a father in the lowest quintile will remain in this quintile is 58%, in comparison to only 24% in the Southeast. Since a substantial fraction of the Northeast sample of fathers is in the lowest quintile (25%), this result may help explain the significant difference in mobility in the two regions.

In order to analyze the dynamic pattern of intergenerational mobility in Brazil, we look at the behavior of the degree of mobility of wages for each five-year cohort in the

[3] See Grawe (2001) for a discussion of theories of intergenerational mobility based on borrowing constraints and their implications in terms of nonlinearities of the degree of intergenerational mobility.

25-64 age bracket. We find that mobility initially falls, reaching a trough at the generation born between 1947 and 1951. The cohorts born after that generation have experienced increasing mobility. Such a pattern repeats itself for all regions and for White families.

As Grawe (2002) and others have noted, the estimation of the degree of intergenerational mobility of earnings may be subject to a life cycle bias. For this reason, it is possible that the finding that mobility increases across cohorts in Brazil is capturing life cycle effects instead of true cohort effects. In order to alleviate that problem, we construct a measure of permanent wage for fathers and sons, based on instruments of occupation and education. We find that the degree of intergenerational mobility displays a similar pattern, although the increase in mobility for younger generations is slightly less pronounced. This suggests that there has been in fact an increase in mobility across cohorts in Brazil, over and above any possible life cycle effects.

We then exploit the observed nonlinearities in the mobility pattern to have a better understanding of the behavior of mobility across cohorts. The results suggest that mobility may be increasing across cohorts for three reasons. First, mobility increases significantly across cohorts for the group of sons whose fathers' wages are below the median, whereas it is relatively stable for the group above the median. Second, the fraction of fathers in the group above the median, which is characterized by higher mobility, has increased over time, which contributed to increase the overall degree of mobility. Third, the wages of the sons of poor fathers have increased relative to the wages of the sons of richer fathers.

The paper is organized as follows. Section 2 presents the empirical methodology and presents a brief discussion of the previous literature. Section 3 presents the data and describes the two-sample instrumental variable procedure used to estimate the intergenerational persistence of wages. Section 4 presents empirical results for the full sample and different regions and racial groups. Section 5 presents results on the pattern of intergenerational mobility of wages across cohorts. Section 6 extends these results for the degree of intergenerational mobility for permanent measures of wages of fathers and sons. Section 7 concludes.

2. Methodology and Previous Literature

The econometric model typically used to assess the extent of intergenerational wage mobility is given by

$$y_{s,i} = \alpha + \beta y_{f,i} + \varepsilon_i \quad (1)$$

where $y_{s,i}$ represents the son's permanent log wage, $y_{f,i}$ represents the father's permanent log wage, and ε_i is a stochastic term with

$$E(\varepsilon_i) = 0,\ E(\varepsilon_i y_{f,i}) = 0, \text{ and } E(\varepsilon_i^2) = \sigma_\varepsilon^2$$

The coefficient β is the elasticity of son's wage with respect to the father's wage, also called the degree of intergenerational persistence. The measure $1 - \beta$ is a measure of the degree of intergenerational mobility.

In order to capture nonlinear patterns of intergenerational mobility, we will also use transition matrices, which give the probability that the son will belong to a particular wage category given the wage category of the father.

Most studies use pairs of fathers and sons' wages in order to estimate equation (1). Solon (1992) shows that measurement errors attributed to misreport or to transitory earnings effects may bias downwards the elasticity estimate. In cases where the same pair father-son may be observed more than once, averaging out wage measures may attenuate such bias. An alternative is to use instruments for father´s earnings, such as his education or occupation. However, IV estimates may bias the elasticity estimate upwards, if the choice of instrument has a direct impact on son's wage, as shown by Solon (1992) in the case of education.

Table 1 presents some estimates of the intergenerational elasticity of earnings or wages found in the literature. For the U.S., the mean estimate is 0.38. European countries generally present lower persistence estimates (larger mobility), as it is the case for Sweden and Germany. Lately, some estimates for developing countries have been found to be larger than the ones observed for developed countries (Grawe, 2001).[4]

[4] Grawe (2001) uses father's education as an instrument for father's earnings. As argued in Solon (1992), this procedure introduces an upward bias in the estimates of intergenerational persistence if father´s

Table 1: Studies of the Intergenerational Persistence of Earnings or Wages

Author	persistence estimate	Country	Method of measurement error correction of father´s income
Solon (1992)	0.41	U.S.	Averaging Measures of Earnings
Zimmerman (1992)	0.34	U.S.	Averaging Measures of Earnings
Couch and Dunn (1997)	0.13	U.S.	Averaging Measures of Earnings
Couch and Dunn (1997)	0.11	Germany	Averaging Measures of Earnings
Mulligan (1997)	0.33	U.S.	Averaging Measures of Earnings
Solon (1992)	0.53	U.S.	IV - Education
Zimmerman (1992)	0.50	U.S.	IV - Wage at other ages
Mulligan (1997)	0.50	U.S.	IV -5 instruments
Grawe (2001)	0.44	Nepal	TSIV- Education as Instrument
Grawe (2001)	0.46	Pakistan	TSIV- Education as Instrument
Bjorklund and Jantti (1997)	0.42	U.S.	TSIV- Education and Occupation as Instruments
Bjorklund and Jantti (1997)	0.28	Sweden	TSIV- Education and Occupation as Instruments
Grawe (2001)	0.60	Peru	TSIV - Education as Instrument

3. Data and Instrumental Variable Procedure:

In this paper, we use data drawn from the mobility supplement of the PNAD 1996, a Brazilian household survey. The PNAD (Pesquisa Nacional por Amostra de Domicílio) is an annual household survey conducted by the Instituto Brasileiro de Geografia e Estatística (IBGE).[5]

Most studies in the literature use data on pairs of fathers and sons in order to estimate the persistence parameter, β.[6] The PNAD 1996 has a special supplement on intergenerational mobility, which does not give information on the father's earnings or wage but provides information on the education and occupation of the household head's father.[7]

In order to construct the predicted wage variable for the fathers, we use a two-sample instrumental variable procedure (TSIV). Statistical inference for TSIV is discussed by Angrist and Krueger (1992) and Arellano and Meghir (1992), having been applied by Bjorklund and Jäntti (1997) to estimate intergenerational earnings mobility in Sweden and in the United States. Our approach can be described as follows.

In the first stage, we construct a sample of synthetic fathers containing data on wages, education and occupation. Some studies have documented significant changes in

education has a direct effect on the son´s earnings. A more complete set of instruments, as we use here, will attenuate such bias.

[5] The PNAD is close to a nationally representative sample, though it is not fully representative of rural areas, especially in the region North (more sparsely populated).

[6] See, for example, Solon (1992), Zimmerman (1992) and Mulligan (1999).

[7] We use information on the father´s occupation when the household head was 15 years old.

the schooling premium between cohorts and over time in Brazil.[8] For this reason, we used data from four waves of PNADs (1976, 1981, 1986, and 1990) to construct the sample of those synthetic fathers.[9] This sample contains data on 253,798 male individuals (from now on, referred as the sample of fathers). We then regress the log of the wage rate on educational and occupational dummies and interactions between year-of-birth cohort dummies and those variables.

In the second stage, the coefficients of the estimated wage equation are used to predict the wage of the actual fathers, that is, the fathers of the sons about whom we have information in the mobility supplement of the PNAD 1996 (the sample of sons). The sample of sons[10] who reported father's education and occupation used in the second stage contains data on 25,927 individuals aged 25-64 in 1996.[11] The last step consists in estimating the TSIV intergenerational wage elasticity, using as control variables four regional dummies, a quadratic polynomial on son's age, and a dummy for blacks and mulattos.[12]

In order to perform this TSIV procedure we had to construct the occupational and educational variables of the fathers. We use six groups of occupational categories, according to the classification proposed by Valle Silva (1974) and used by Pastore (1979, 1986) and Pastore and Valle Silva (1999) specifically to study intergenerational mobility of occupation. The occupational categories are ranked in order to capture the amount of skills required to perform each task.[13] Valle Silva (1974) classifies 927 occupations into

[8] See, for example, Lam and Levison (1992) and Ferreira (2003).

[9] The sample of fathers contains only males, aged between 25 and 65 years old, working 40 or more hours per week in all jobs, living in Brazilian urban areas. Extremely high or low hourly wage are excluded from the sample.

[10] The sample is restricted to males in order to avoid issues related to women's labor force participation. Most of the literature on intergenerational mobility of earnings includes only males in the analysis. See Chadwick and Solon (2002) for an exception.

[11] Mobility studies typically use a narrower age range for sons (in most cases, between 25 and 35 years). We use a broader range for two reasons. First, we want to be able to analyze the behavior of the persistence of wages between cohorts. Second, as we observed before, some studies have documented the existence of a life cycle bias in persistence estimates. By using a broad age bracket for sons, we intend to alleviate the life cycle bias.

[12] In the PNAD individuals report their own ethnicity. The questionnaire defines five ethnic groups: indigenous, white, asian, black and mulatto. In this paper, we consider as blacks the individuals who declared themselves as blacks or mulattos. We will present results only for blacks and whites, since the other ethnic groups correspond to only 1,1% of the sample.

[13] Examples of occupations in each category are the following: high type – engineers and large land owners; medium superior type - high school teachers and graduated bureaucrats; medium type - low graduated bureaucrats and topographer; medium-inferior type - automobile mechanic and specialized mine

six categories: high, medium superior, medium, medium inferior, low superior and low inferior. Since many other activities were added to the list of occupations available at the PNAD questionnaire, we used first the mean wage and then the mean educational level to attribute rankings to the remaining activities not classified by Valle Silva.

Education is a categorical variable for sons and fathers. We used the following dummies: no school (less than one year at school); incomplete basic, first cycle education (1^{st} to 3^{rd} degree); complete basic, first cycle education (4^{th} grade); incomplete basic, second cycle education (5^{th} to 7^{th} grade); complete basic, second cycle education (8^{th} grade). For grades higher than the 9^{th} grade, we classified as complete or incomplete high school (9^{th} to 11^{th} grade) and complete or incomplete college (greater than 11^{th} grade).

Since the PNAD 1996 does not provide information about the father's age, we assumed that the father was born 34 years earlier than the son. We construct such estimate based on information from the Brazilian Demographic Census. The average age distance between mothers and their offspring is 30 years, estimated from the Demographic Census of 1950-1970. Since such difference is stable across the Census, we assume such difference is the same for the years before 1950. In addition, from the Census data we obtain an average age difference between spouses of four years. By adding both pieces of information, we obtain an age difference of 34 years between fathers and sons.

A necessary condition for the TSIV estimate to be consistent is that the distribution of observable characteristics in the sample of fathers must be similar to the distribution of father´s characteristics reported by the sons. Table 2 compares the son's reports on the father's occupation and education (obtained from the sample of sons) with the fathers´ reports of their own characteristics (obtained from the sample of fathers). We can observe that the distributions are quite similar. In particular, the average father´s education and occupation reported by the sons are very close to the ones reported by the fathers.

---

workers; low-superior type - self employers in agriculture; low-inferior type - house cleaners and office boys.

Table 2: Descriptive Statistics for Brazilian Samples of Fathers and Sons – PNAD 1996 and PNAD 1976/1981/1986/1990

	Father's Own Report	Son's Report
Mean Schooling*	3.1	2.9
Educational Categories	%	%
0	35.9	34.9
1-3	26.2	29.4
4	17.7	21.7
5-7	7.8	2.4
8	4.0	3.7
9-11	4.2	4.6
more than 11	4.2	3.3
Occupational Ranking	%	%
Mean**	4.3	4.5
High	4.8	3.3
Medium Superior	8.8	6.0
Medium	9.6	7.1
Medium Inferior	24.3	29.4
Low Superior	36.0	31.5
Low Inferior	16.5	22.7

OBS: * The mean schooling is calculated based on the midpoint of each educational category. For example, we assume two years of schooling for all individuals who completed between one and three years of education.

** We assume the value of one, for high rank occupations; 2 for medium superior; 3 for medium; 4 for medium inferior; 5 for low superior; 6 for low inferior.

Table 3 describes summary statistics for the sample of fathers.[14] The sample contains 253,798 individuals. The average number of years in school varies from 2 for individuals at the very bottom of the occupational rank to 13.1 for individuals classified in the most skilled occupational group. The hourly wage rate varies even more, from 1 *Real* per hour to 15.3 *Reais* per hour, respectively for the lowest and the highest occupational rank.

Table 3: Father´s Characteristics (Sample of Fathers)

[14] The results reported throughout this paper use sample weights provided by IBGE to produce a representative sample of individuals for the Brazilian population. Sample sizes reported refer to the unweighted number of observations. All regressions and summary statistics are calculated using the sample weights.

occupational ranking	education	real wage*	N	frequence
High	13.11	15.3	10121	4%
Medium Superior	9.74	9.58	21359	8%
Medium	8.59	5.22	37025	15%
Medium Inferior	4.9	2.73	96051	38%
Low Superior	3.2	1.63	61377	24%
Low Inferior	2.06	1.07	27865	11%

Source: PNADs 1976, 1981, 1986, 1990; * Average real wage in 1996 Reais.

Table 4 shows information on the parent's occupation and education attainment in the sample of sons. It also presents summary statistics for their predicted wages. Some points in Table 4 are worth emphasizing. With respect to education, 35% of sons have fathers with less than one year in school, and 86% of sons reported having fathers with at most 4 years of schooling.

Table 4: Father´s Characteristics (Sample of Sons)

Father's	Unweighted	Weighted	Mean	Occupational Ranking (%)					
Schooling	N	Percentage	Wage*	High	M-S	M	M-I	L-S	L-I
0	8872	34.22	1.11	0.62	2.82	1.69	15.63	41.29	37.95
1-3	7535	29.06	1.73	1.23	4.25	4.05	31.9	35.49	23.08
4	5436	20.97	2.62	1.92	6.85	9.82	45.39	25.34	10.68
5-7	718	2.77	2.85	3.39	7.88	12.55	52.35	17.59	6.24
8	1072	4.13	4.19	3.6	11.24	23.28	47.25	11.29	3.34
9-10	206	0.79	5.65	5.58	19.04	24.77	35.16	10.13	5.32
11	1116	4.30	6.27	11.17	21.27	31.12	30.19	4.98	1.27
12-15	84	0.32	10.85	12.36	33.19	27.34	21.61	4.94	0.56
16	888	3.43	13.42	49.86	21.18	19.34	7.75	1.19	0.68
Total	25927	100.00%	2.49	3.27	6.04	7.13	29.37	31.48	22.72

OBS: (1) Mean Wage refers to the actual father´s predicted wage. (2) The education categories are: No schooling (0); Incomplete Basic, first cycle education (1-3); Complete basic, first cycle (4); Incomplete Basic, Second Cycle (5-7); Complete Basic, Second Cycle (8); Incomplete Secondary (9-10); Complete Secondary (11); Incomplete College (12-15); Complete College (16).

With respect to the father's occupation, as expected, the father's occupational rank captures cognitive skills not necessarily transmitted through formal learning. For example, 11% of fathers with completed high school education are classified as working in high-skill activities. However, a strong positive correlation between occupational ranking and school attainment indicates formal learning is required to be eligible for higher-skill occupations. Finally, father's predicted wage is positively correlated to the number of years in school with some indication of convexity in schooling premium, since

completing college education more than doubles the real hourly wage with respect to having a complete high school degree.

Table 5 presents some descriptive statistics on intergenerational mobility, based on the sample of sons. We can observe that the son's occupational rank is highly correlated to father's education. The probability that the individual performs a high-skill demanding task is 40.5% for those whose father has completed college and just 1.4% for those whose fathers do not have any formal schooling. Reported wage rates are strongly correlated with father's education as well.

Table 5: Son´s Characteristics, by Father´s Schooling (Sample of Sons)

Father's	Mean	Mean	Occupational Ranks (%)					
Schooling	Schooling	Wage	High	M-S	M	M-I	L-S	L-I
0	3.9	2.7	1.4	5.2	6.5	50.0	24.8	12.1
1-3	6.3	4.1	4.0	8.7	10.9	53.2	17.8	5.4
4	8.9	6.3	8.4	15.2	17.8	44.9	11.5	2.3
5-7	9.6	5.8	9.4	13.3	18.8	46.1	9.8	2.6
8	11.0	8.9	15.9	19.7	21.2	36.2	6.3	0.7
9-10	12.0	9.8	21.2	19.8	25.8	25.4	7.1	0.7
11	12.4	11.3	18.9	24.6	24.3	26.6	5.1	0.5
12-15	12.7	15.0	25.3	20.5	31.6	17.1	4.1	1.5
16	14.1	15.3	40.5	25.8	17.3	13.2	2.7	0.5

4. Intergenerational Mobility of Wages

In this section, we first present results for intergenerational mobility of wages for the full sample. Then we analyze differences in the mobility pattern for specific subpopulations.

4.1. Mobility in the Full Sample

We first estimate (1) by ordinary least squares for the full sample. We use as control variables four regional dummies, a quadratic polynomial on son´s age, and a dummy for blacks (including mulattos). As shown in Table 6, the degree of persistence (β coefficient) in Brazil is 0.58, which means that, if the father's wage is 100% above the mean, the son's wage is expected to be 58% above the mean.

Table 6 also presents persistence estimates for different combinations of control variables. The coefficients are always significant at the 1% level.[15] The estimation of (1) for the United States typically includes the age of the father and the son (and the respective age variables squared) as controls (see, for example, Solon, 1992). The PNAD, however, does not have information on the age of the father. Using only the age and age squared of the son as controls, we obtain a value of β equal to 0.66.

Table 6: Intergenerational Persistence of Wages in Brazil – PNAD 1996

Dependent Variable: Son's log wage.					
	(a)	(b)	(c)	(d)	(e)
father's log wage	0.58*	0.66*	0.59*	0.55*	0.59*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Adjusted R squared	0.29	0.22	0.27	0.25	0.24

OBS: Standard errors in parenthesis.
Control variables are:
(a) son's age (linear and squared variables), dummies for region, dummy for blacks.
(b) son's age (linear and squared variables).
(c) son's age (linear and squared variables), dummy for blacks.
(d) dummy for blacks.
(d) dummies for regions.
* significant at the 1% confidence level.

The degree of persistence of wages that we found for Brazil is very high in comparison with other countries, especially if we consider the estimate obtained from the specification that is closest to the ones commonly used in the literature. As we discussed in section 2, the mean estimate of persistence of earnings (and wages) in the U.S. presented in Table 1 is 0.38, and the estimates for other developed countries are even smaller.

Dunn (2003) estimates the degree of intergenerational persistence of earnings in Brasil, using a similar TSIV methodology. Besides using earnings instead of wages, an important difference between his study and ours is that he uses only father´s education as

[15] Every regression has the standard error obtained through the use of bootstrap procedure. First, we draw a bootstrap sample of fathers containing 150,000 observations, from which we estimate the parameters used to generate a son's predicted father's wage. Then, we randomly draw a bootstrap sample of sons with 5,000 observations, for whom we generate a predicted father's wage. After repeating these steps 500 times, we use the standard deviation of the bootstrap estimates to calculate the asymptotic standard error of the persistence estimate.

an instrument. Since we expect father´s education to have a direct effect on the son´s wage, this procedure tends to produce an upward bias in the persistence estimate.

In order to assess the robustness of our persistence estimates, Table 7 presents estimated persistence coefficients obtained with the use of different instruments for the father´s wage.

Table 7: Intergenerational Persistence of Wages in Brazil, Different Instruments– PNAD 1996

Dependent Variable: Son's log wage.				
	Ocuppation + Education	Education	Occupation	Instrument for son's log wage (a)
father's log wage	0.58*	0.60*	0.52*	0.49*
	(0.01)	(0.01)	(0.01)	(0.01)

(a) Son's log wage is instrumented by son's occupation and education.
*1% significant
Each estimation contains a full set of control variables: a quadratic age polynomial, race and regional dummies.

Table 7 shows that the degree of wage persistence is significantly smaller when only occupation is used as an instrument (0.52) for father´s wage than when than only education is used as instrument (0.60). This may indicate that the use of father's education as an instrument may produce an upward bias in the persistence estimates, which justifies our choice for a broader set of instruments. We will still keep father´s education as an instrument since nearly all studies in the literature that adopt either a IV or a TSIV procedure use this variable as an instrument. Table 7 also presents results for the persistence of wages when we instrument for the son´s wage (in addition to the father´s wage) using his education and occupation as instruments. In this case, the degree of persistence is 0.49.

The degree of persistence, β, is a summary measure of immobility. In order to analyze in detail the mobility pattern of wages in Brazil, we use different procedures to describe persistence for different levels of the father´s wage.

Figure 1 plots the mean of the son's log wage as a function of the father's log wage. It suggests that mobility varies with the father's log wage in a complicated pattern. Persistence is stronger at the extremes of the father's wage distribution. In particular, the

degree of persistence is smaller for families of middle-wage fathers than for children of low-wage parents. At the upper end of the father's wage, persistence rises again.

Figure 1: Conditional Mean of Son´s Log Wage

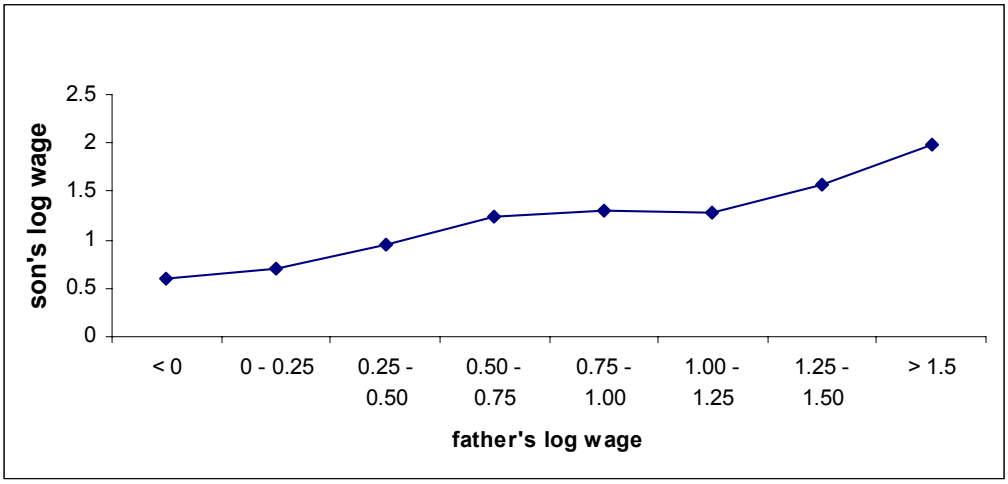


Figure 1 shows a relatively strong convexity for fathers whose log wage is higher than 0.75. Such steeper profile may be a result of convex returns to schooling, especially at the college level. A small difference in the schooling level may lead to large differences in wages among the relatively more educated individuals. Small differences in the schooling level may lead to small differences in wages among the relatively less educated individuals.[16]

The figure suggests that mobility varies with the wage of the father. Table 8 presents some additional evidence of nonlinearities in the mobility pattern. The table shows that mobility is higher for families with higher wages. In particular, the degree of persistence is 0.67 for sons of fathers whose wages are below the median, whereas for sons of fathers with wages above the median the persistence estimate is 0.53.

We also regress the log of the son's wage on the log of the father's wage and its square. We find that the coefficient on the linear term is positive and the coefficient on the quadratic term is negative and significantly different from zero at the 5% level. This result also suggests that persistence falls with the father's wage on average. Overall, this

[16] For evidence that the schooling premium is higher for college education in Brazil, see Ferreira (2003).

evidence is consistent with standard theories of intergenerational mobility based on borrowing constraints, which predict that mobility is higher for richer families to the extent that they are less likely to be constrained.[17]

Table 8: Evidence of Nonlinearities in the Persistence of Wages

Dependent Variable: Son's Wage			
	(1)	(2)	(3)
father's log wage	0.67*	0.53*	0.633*
	(.032)	(.013)	(.017)
father's log wage squared	------	------	-0.025**
			(.008)

OBS: Each estimation contains a full set of control variables:
son's age (linear and squared variables); dummies for region and race.
(1) Sample of sons with father's wage below the median.
(2) Sample of sons with father's wage above the median.
(3) Full sample.
*significant at the 1% confidence level
**significant at the 5% confidence level

As shown in the Appendix, the evidence of concavity in the son-father log wage profile is also observed when we use only occupation as an instrument. When we use only education as an instrument, however, the evidence suggests a convex pattern, even though the positive coefficient on the squared log wage of the father is not statistically different from zero. This suggests that the convex segment observed at higher wages of the father in Figure 1 may be in fact associated with high schooling premiums at that level[18].

In order to analyze in greater detail the pattern of intergenerational mobility in wages, we present the transition matrix for wages in Table 9. As mentioned in section 2, this matrix gives the fraction of sons in each wage category for each category of father's wages.

[17] Grawe (2001) argues, however, that the implication that persistence declines with father´s wages is not robust to variations in the specification of the wage function, in particular with respect to the way in which ability affects wages. In fact, borrowing constraints may be also consistent with convex mobility patterns. Moreover, concave patterns do not necessarily indicate the presence of borrowing constraints. Grawe suggests the use of quantile regressions as a further test of the presence of borrowing constraints. This procedure is implemented for the PNAD data in Andrade et al. (2004).
[18] This results are available upon request.

Table 9: Transition Matrix of Wages (by Wage Quintile)– Brazil, PNAD 96

father/son	1st	2nd	3rd	4th	5th
1st	35	26	19	13	7
2nd	29	25	21	15	10
3rd	17	21	23	21	18
4th	11	17	23	24	25
5th	7	11	15	24	43

OBS: Values are expressed in %.
The shaded area corresponds to the conditional median.

Table 9 displays a few interesting patterns. First, there is strong persistence at the extremes of the conditional distribution of the son's wage. The fraction of sons of fathers in the poorest quintile (first quintile) that remained in this quintile is 35%, whereas the fraction of sons of fathers in the richest quintile (fifth quintile) that remained in this quintile is 43%. This suggests that high intergenerational persistence is driven not only by a "poverty trap" (defined as a extreme high probability of staying at the same status as the father, if the father has extremely low wage) but by a "richness trap" as well.

Second, Table 9 also shows that the probability that an individual will move from the lowest to the highest wage category (65%) is higher than the probability of falling from the highest to the lowest wage category (57%).[19]

Third, the table confirms the evidence of strong persistence of wages in Brazil. For example, the probability that a son of a father in the lowest wage quintile will be in the highest quintile is only 7%, whereas the analogous probability for a son of a father in the highest quintile is 43%.

Figure 2 shows the cumulative distribution function of sons' wages for selected quintiles of father's wages. The probability density function of sons of fathers in the third quintile is close to a uniform distribution, which lead to an almost linear cumulative distribution. This is another way to look at the large differences in the probability of being rich or poor depending on the family background.

Figure 2: Cumulative Distribution of Son´s Wage, Conditional on Father´s Wage

[19] This result is consistent with the pattern observed in the United States (Zimmerman, 1992) and Great Britain (Dearden, Machin e Reed, 1997).

4.2. Mobility Patterns for Different Subpopulations.

The degree of persistence is considerably higher in the Northeast (0.73), a poor Brazilian region, than in the Southeast (0.54), a rich Brazilian region, and for white families (0.60) in comparison with blacks (0.53). Table 10 presents the main results.[20]

Table 10: Intergenerational Persistence of Wages in Brazil, Different Subpopulations– PNAD 1996

Dependent Variable: Son's log wage						
	Northeast	Southeast	South	Midwest	Blacks	Whites
father's log wage	0.73*	0.54*	0.62*	0.55*	0.53*	0.60*
	(0.02)	(0.01)	(0.02)	(0.03)	(0.01)	(0.01)
Adjusted R squared	0.28	0.25	0.23	0.20	0.18	0.24
Number of Obs.	5913	9804	5551	2968	10199	15726

OBS: Standard errors in parenthesis.
Each estimation contains a full set of control variables: son's age (linear and squared variables); dummies for region and race.
* Significant at the 1% confidence level.

Another way to characterize the differences in mobility between racial groups is through the analysis of transition matrices.[21] Tables 11 and 12 present transition matrices for black and white families.

[20] We did not present the results for the North Region because the PNAD data is not representative of this region. In particular, the PNAD does not have data for rural areas in the North Region.

Table 11: Transition Matrix of Wages (by Wage Quintile)– Blacks, PNAD 96

father/son	1st	2nd	3rd	4th	5th
1st	47	25	16	9	3
2nd	39	28	17	11	5
3rd	27	24	23	16	10
4th	21	24	23	20	12
5th	14	18	20	25	23

OBS: Values are expressed in %.
The shaded area corresponds to the median.

Table 12: Transition Matrix of Wages (by Wage Quintile)– Whites, PNAD 96

father/son	1st	2nd	3rd	4th	5th
1st	25	26	22	16	11
2nd	20	23	25	19	13
3rd	12	20	23	24	21
4th	7	15	22	26	30
5th	4	9	14	23	50

OBS: Values are expressed in %.
The shaded area corresponds to the median.

The shape of the transition matrices is very different for these two sub-populations. The conditional median of son's wage is positively correlated with father's wage for the white population. For blacks, the conditional median wage is at the 2nd quintile of the overall son's wage distribution for the sons of fathers at the 1st, 2nd and 3rd quintile of the overall father's wage distribution, and at the 3rd quintile for sons of fathers at the 4th and 5th quintile of the distribution. This reveals a large mobility among black families, and a small mobility among white families, and this happens because most of the blacks do not get to the highest quintiles regardless the value of their father's wage. This partly explains a persistence coefficient for blacks that is substantially lower than the one estimated for whites.

Another reason, not perceived by just looking at the transition matrix, is that the proportion of fathers in the highest quintiles is only 12%, compared to 23% for the white

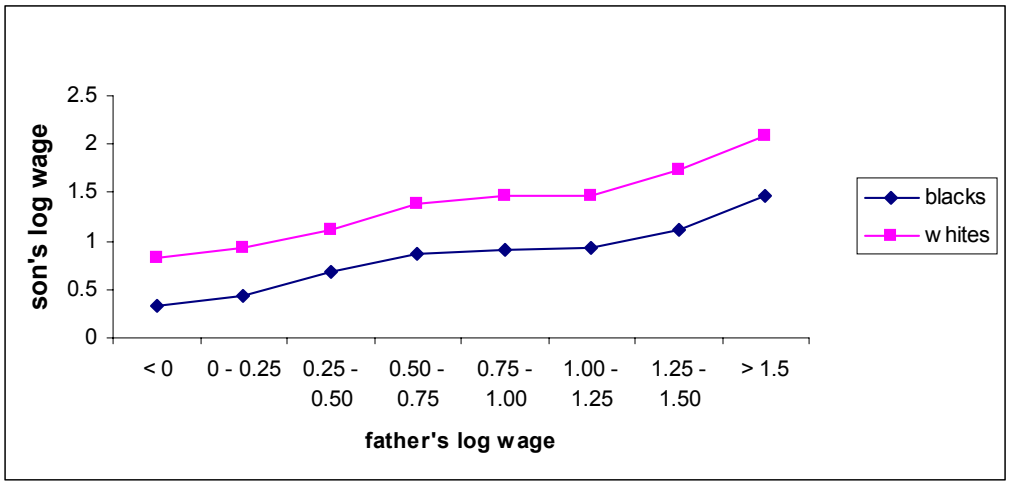
[21] The quintiles mentioned in all transition matrices are the quintiles of the overall distribution of wages, respectively for fathers and sons. For example, the fathers belonging to the fifth quintile of the wage distribution represent only 13% of black sons´ fathers (less than 20%), while fathers belonging to the 1st and 2nd quintiles represent 51% of that black sons´ fathers (more than 40%). For whites, the proportion is respectively 24% (more than 20%) and 33% (less than 40%).

sub-population. As discussed above, the highest quintile is exactly where the largest intergenerational persistence is observed.

Tables 11 and 12 show that the probability that a son of a black parent from the lowest quintile will remain in this quintile (47%) is considerably higher than the analogous probability for members of white families (25%), which suggests a higher persistence of low wages for black families. On the other hand, persistence of high wages is stronger for whites. In particular, the probability that a son of a black father from the highest quintile will remain in this quintile is 23%, whereas the analogous probability for whites is 50%.

Figure 3 plots the mean log wage of sons as a function of log wage of the fathers, for both blacks and whites. The conditional mean wage functions are almost parallel to each other, which reinforces the hypothesis that the difference in persistence between these two subpopulations is due to different compositions.

Figure 3: Conditional Mean of Son´s Log Wage – Blacks and Whites



It is important to observe, however, that the race variable may be capturing the persistence of other non-observable determinants of economic status rather than intrinsically racial effects (such as discrimination). It is possible that, to the extent that blacks represent a larger fraction of poor families than whites, the smaller persistence for

the former may result from smaller rates of return to schooling or from the fact that black individuals suffer negative externalities from living on poor neighboorhoods.[22]

As shown in Table 10, the degree of persistence of wages in the Northeast (0.73) is larger than in the Southeast (0.54). Tables 13 and 14 present transition matrices for the Northeast and the Southeast.

Table 13: Transition Matrix of Wages (by Wage Quintile)– Northeast, PNAD 96

father/son	1st	2nd	3rd	4th	5th
1st	58	22	10	6	3
2nd	53	23	12	7	5
3rd	37	25	16	13	9
4th	27	21	19	17	16
5th	14	13	14	22	36

OBS: Values are expressed in %.
The shaded area corresponds to the median.

Table 14: Transition Matrix of Wages (by Wage Quintile)– Southeast, PNAD 96

father/son	1st	2nd	3rd	4th	5th
1st	24	27	24	16	9
2nd	16	25	26	21	12
3rd	10	18	25	25	22
4th	8	16	23	26	27
5th	4	10	15	24	47

OBS: Values are expressed in %.
The shaded area corresponds to the median.

A comparison between the intergenerational transmission of wages in the Northeast and the Southeast shows that the main difference between the two regions is the persistence in the lowest quintile. In the Northeast, the probability that a son of a father in the lowest quintile will remain in this quintile is 58%, in comparison to only

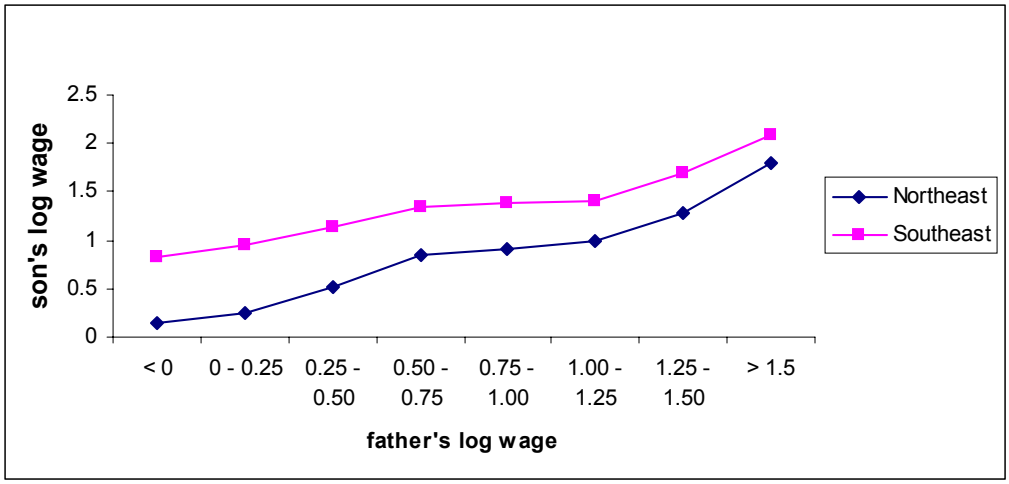
[22] Borjas (1992) shows that neighborhood effects have a significant impact on the degree of intergenerational mobility in the United States.

24% in the Southeast.[23] Since a substantial fraction of the Northeast sample of fathers is in the lowest quintile (25%), this result may help explain the significant difference in the persistence coefficients presented in Table 10.[24]

The conditional median is strongly related to the father's status in the Northeast, except for the first two quintiles. In the Southeast, the son's median wage conditional on father's wage is the same for individuals whose fathers are in the second and third quintiles, and again for fathers in the fourth and fifth quintile, which leads to smaller persistence estimates in the Southeast.

In addition, the son's conditional mean wage relates differently to father's wage in the two regions. The profile is much steeper in the Northeast. Figure 4 plots the mean log wage of sons as a function of log wage of the fathers, for both the Northeast and the Southeast Region. Sons of individuals in the poorest segment earn 97% more in the Southeast compared to their peers in the Northeast, while sons of individuals in the richest segment earn just 26% more in the Southeast, compared to their peers in the Northeast.

Figure 4: Conditional Mean of Son´s Log Wage – Northeast and Southeast



[23] Selection bias caused by migration of the most skilled sons from Northeast to Southeast may bias upward the persistence in the Northeast, especially for those families with poor background (for which migration is substantial).

[24] Persistence for higher wages is considerable larger in Southeast, since the probability of staying at the highest quintile is 47%, compared to 36% in Northeast, but these fathers represent only 20% and 15% of the Southeast and Northeast populations, respectively.

The intergenerational transmission of education explains part of the steeper profile observed in the Northeast. In particular, Ferreira and Veloso (2003) find that the Northeast has a substantially larger educational persistence than Southeast. In addition, the returns on high skill are larger in Northeast than in Southeast. This is true for both high education and skill-intensive occupations.[25] Hence, one can think that the combination of educational persistence and larger premium will explain the larger wage persistence in Northeast.

5. Mobility over Time: Cohort Analysis

In order to analyze the dynamic pattern of intergenerational mobility in wages in Brazil, we look at the behavior of the degree of persistence of wages for each five-year cohort in the 25-64 age bracket. Figures 5-7 show the behavior of the degree of persistence across cohorts for the country as a whole, regions and racial groups.

Figure 5: Intergenerational Persistence of Wages, by Cohort

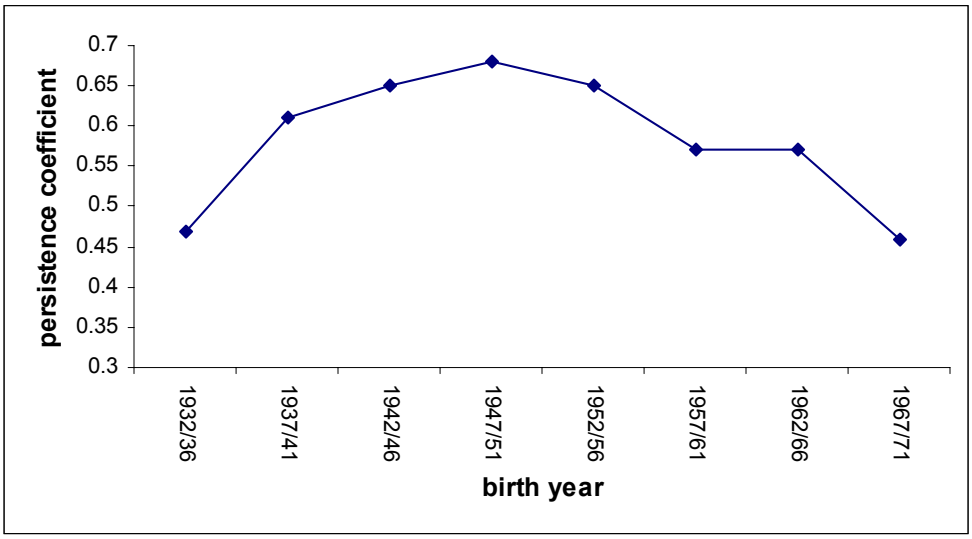


Figure 6: Intergenerational Persistence of Wages, by Cohort and Region

[25] The differences in school premium for high education and in occupation premium can be provided by the authors upon request.

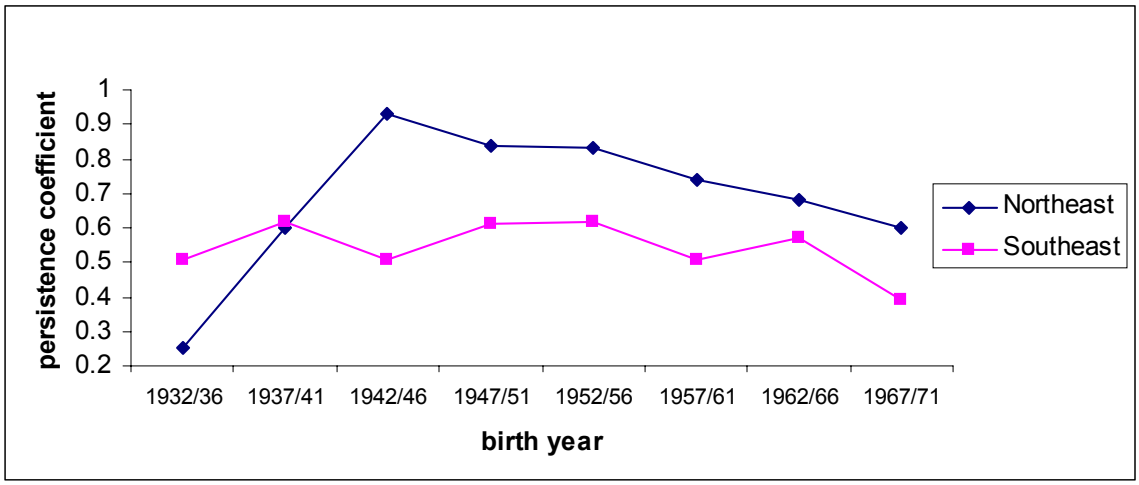
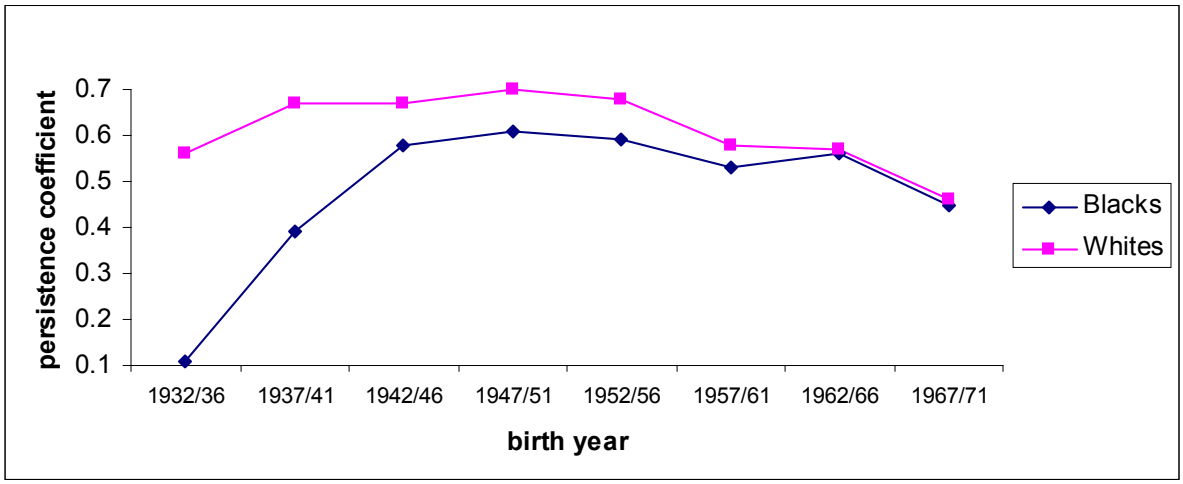


Figure 7: Intergenerational Persistence of Wages, by Cohort and Race



The figures show that, for the country as a whole, persistence rises for five-year cohorts born between 1932 and 1951, and falls continually for younger cohorts. In particular, the estimated degree of persistence falls from 0.68 for the cohorts born between 1947 and 1951 to 0.46 for the cohort born between 1967 and 1971, as shown in Table 15 below.

The degree of intergenerational persistence in wages varies substantially across geographic regions and over time. Particularly, it shows a negative trend for every region since the cohort born in 1942/1946, especially in the Northeast. The Northeast has larger persistence for all cohorts born after 1941.

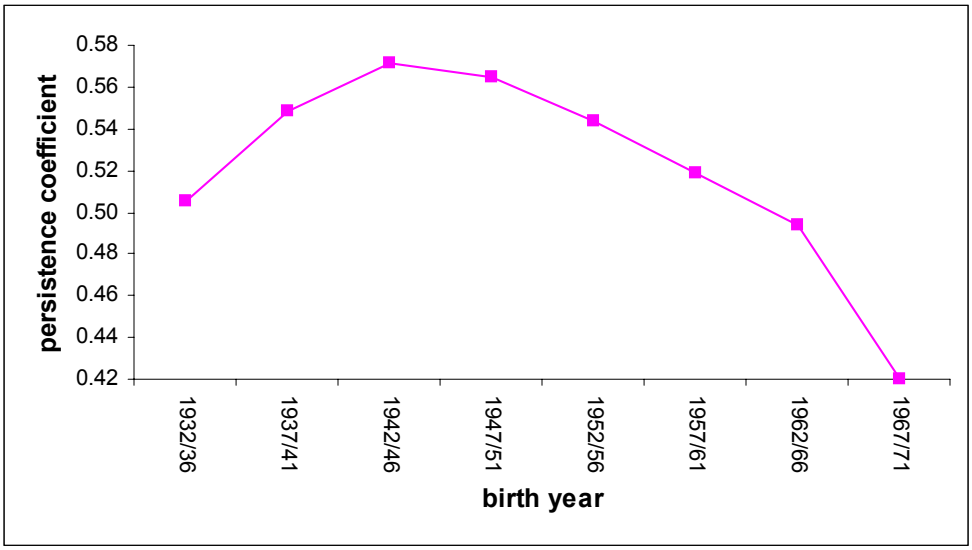
Intergenerational wage persistence is smaller for blacks for all cohorts. It increases for the cohorts born between 1932 and 1951 and declines thereafter, whereas persistence is relatively stable for Whites.

One should keep in mind, however, the impossibility of identifying cohort and age effects from a cross-section of just one year. Persistence may be falling for younger cohorts only because the son's wage in younger ages is less related to father's permanent wage, compared to the son's wage at older ages.[26] Such bias could lead to an increase in the intergenerational mobility as such the one observed above.

6. Mobility over Time: Cohort Analysis with Permanent Wages

In order to check if such a potential bias is actually driving the results, we replaced the fathers and sons wages by measures of permanent wages. We construct these permanent wage measures using data on education and occupation and by assuming that the father (son) is 40 years old. Figure 8 displays the evolution of the intergenerational persistence of permanent wages across cohorts.

Figure 8: Intergenerational Persistence of Permanent Wages, by Cohort



[26] See Grawe (2001) for details.

The mobility pattern of permanent wages across cohorts is similar to the observed for actual son´s wages in Figure 5. Table 15 compares the persistence coefficients obtained from using current and permanent wage concepts. One difference is that in the latter case the persistence coefficient reaches its peak for the cohort born in 1947/1951, while the one associated with permanent wages peaks for the cohort born in 1942/1946. Moreover, the patterns are not only qualitatively similar, but quantitatively as well. Specifically, for the cohort born in 1932/1936, the persistence estimate is 0.47 for current son´s wages and 0.51 for permanent wages. For the cohort born in 1967/1971, the persistence estimates are equal to 0.46 and 0.42, respectively. This suggests that most of the increase in mobility across cohorts is not an artifact of a life-cycle bias.

Table 15: Intergenerational Persistence of Wages, Different Measures of Wage

	Current Wage*	Permanent Wage**
1932/36	0.47	0.51
1937/41	0.61	0.55
1942/46	0.65	0.57
1947/51	0.68	0.57
1952/56	0.65	0.55
1957/61	0.57	0.52
1962/66	0.57	0.50
1967/71	0.46	0.42

OBS: * Current Wage takes into account interactions between education and cohort dummies. It uses the predicted father´s wage as independent variable and the reported son´s wage as dependent variable..
** Permanent Wage assumes that both father and son have the same age (40). It uses the predicted son´s wage and the predicted father´s wage as variables of interest, however predicting both at age 40.

Given that persistence is falling across cohorts, we would like to have a better understanding of the mechanism that is generating this outcome. In order to analyze in detail the evolution of intergenerational mobility of wages across cohorts, we use two different approaches: sample partition and the conditional mean function.

First, we divide the sample into two groups, consisting of the families with father's wages below and above the overall sample median, respectively. Then we estimate (1) for each group and each cohort. Table 15 presents the results.

Table 16: Intergenerational Persistence of Permanent Wages, by Cohort and Subsamples

Son's Birth Year	1932/36	1937/41	1942/46	1947/51	1952/56	1957/61	1962/66	1967/71
father's wage below the median	,55*	0,69*	0,68*	0,74*	0,67*	0,66*	0,69*	0,55*
	(0.07)	(0.06)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)
father's wage above the median	0,40**	0,37*	0,55*	0,48*	0,49*	0,48*	0,49*	0,43*
	(0.07)	(0.06)	(0.04)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)
Proportion of fathers above median* (%)	27,1	28,5	30,5	36,5	41,3	45.8	49,9	48.1
Mean Persistence	0,51	0,55	0,57	0,57	0,55	0,52	0,50	0,42

OBS: (1) Standard errors in parenthesis; (2) We take as reference the median of the overall sample.
* significant at 1%

We can observe that persistence is always higher for sons of fathers with wages below the overall median. Table 15 suggests that the wage persistence may have declined for two reasons. First, the fraction of fathers with wages above the overall sample median increases from 27% for the sons born in 1932/1936 to 50% for the cohort born in 1962/1966.[27] This fact contributed for a reduction in persistence, since persistence is smaller for the group with wages above the median.

Second, we observe a significant decline in persistence for the cohorts born after 1951 for the group of fathers with wages below the median, and a relative stability of persistence for the group above the median.[28]

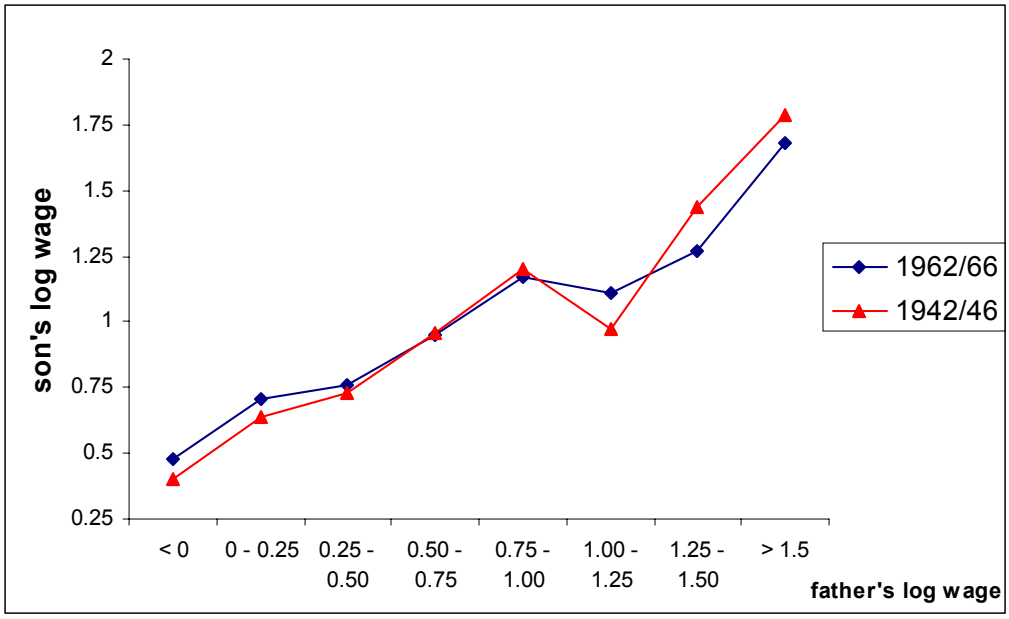
Figure 9 plots the mean of the son's log wage as a function of the father's log wage for two selected cohorts. We can observe that the increase in mobility for the youngest cohorts results, at least partially, from the flatter conditional wage profile for the younger cohort. In particular, the permanent wage of the sons of poor fathers increased between cohorts 1942/1946 and 1962/1966. One important reason behind this improvement is an increase in schooling. While for the cohort born in 1942/1946 average education for sons of fathers with no schooling was 2.5 years, the corresponding average for the cohort 1962/1966 was 4.1 years.

[27] Table 15 shows that the fraction of fathers with wages above the median falls slightly for the cohort born in 1967/1971. One possible reason is that we exclude from the sample sons who still live with their parents, which correspond to 38% of sons born in 1967/1971. For this cohort, sons who still live with their parents have, on average, higher schooling than sons who are household heads. In particular, the average schooling of the latter is 6.6, whereas it corresponds to 7 years for the first. If the parents excluded from the sample also have higher average schooling, this may contribute to reduce the fraction of fathers above the median for the cohort 1967/1971. For the other cohorts, this exclusion is not significant. For the cohort born in 1962/1966 only 19% of the sons live with their parents, and this fraction is insignificant for the other cohorts.

[28] The degree of persistence falls from the cohort born in 1962/1966 to the one born in 1967/1971, especially for the group below the median. This can result, however, from the fact that the younger cohort may not have completed their education.

Moreover, the permanent wage of the sons of middle-income fathers did not increase and it even decreased for rich fathers.[29] The stability of wages of sons of middle-income fathers across cohorts may result from barriers to access to college education in Brazil, as documented in Ferreira and Veloso (2003).

Figure 9: Conditional Mean of Son´s Log Wage – Selected Cohorts



One may ask what is driving the fall in wage persistence for younger cohorts, especially among poor families. Ferreira and Veloso (2003) find that the intergenerational persistence of education follows a similar pattern. Hence, part of the story behind these figures may be due to policies that reduce education persistence. Examples of such policies may be the increase in supply of public schools at the basic level and policies that relax the parental budget constraints, such as transfers target to the poor.

In addition, some authors have observed a persistent fall in schooling premium over time.[30] This may be contributing to reinforce the fall in intergenerational mobility. If an illiterate father may have a child with a 4th degree and a 4th degree father may have a 8th degree son, a substantial fall in the wage differentials between these two sons will weaken the intergenerational link on wages.

[29] This may result, however, from incomplete schooling of the sons of rich fathers.

7. Conclusion

In this paper, we presented evidence on intergenerational mobility of hourly wages in Brazil. We used data drawn from the mobility supplement of the PNAD 1996, a Brazilian household survey. The mobility supplement provides information on the education and occupation of the household head's father, but it does not give information on the father's income or wage. In order to construct a measure of father's wage we used a methodology proposed by Angrist and Krueger (1992) and Arellano and Meghir (1992) and applied by Bjorklund and Jantti (1997) to the study of intergenerational mobility in the United States and Sweden.

We found that the degree of intergenerational mobility of wages in Brazil is lower than the one observed for developed countries. Moreover, mobility varies across regions and racial groups. In particular, mobility is higher in the Southeast (a rich Brazilian region) than in the Northeast (a poor Brazilian region). Moreover, mobility is higher among blacks than among white families.

We found evidence of significant nonlinearities in the mobility pattern. In particular, mobility is lower for sons of low-wage and high-wage fathers than for middle-wage fathers. We showed that these nonlinearities may help explain the observed differences in mobility patterns between regions and racial groups.

In particular, the mobility pattern for blacks and the Northeast are characterized by high persistence at the lowest quintile of fathers' wages and low persistence at high wages, in comparison with the patterns observed for white fathers and the Southeast, respectively.

In order to describe the dynamic pattern of intergenerational mobility in Brazil, we analyzed the behavior of the degree of mobility of wages for each five-year cohort in the 25-64 age bracket. We found that mobility decreases and then increases substantially across cohorts. This patterns is similar across regions and racial groups.

[30] Menezes-Filho et al. (2003) and Ferreira (2003) find a substantial decrease in the log wage difference

In order to alleviate a possible life-cycle bias, we construct measures of permanent wages for fathers and sons and estimate the degree of persistence of permanent wages across cohorts. The results are qualitatively and quantitatively similar, which suggests that the increase in mobility is not an artifact of life-cycle biases.

The results suggest that mobility increased across cohorts for two main reasons. First, there has been a significant increase in the wage of sons of poor fathers. This fact resulted in a fall in persistence among poor families and increased the fraction of fathers above the group above the median wage, which is characterized by smaller persistence.

Second, the permanent wage of sons of middle-income and rich families has been stable across cohorts. This may be related to barriers to access to college education in Brazil.

In a deeper level, educational policies directed to the poor and an associated fall in the schooling premium over time may have contributed to the increase in mobility between cohorts in Brazil.

References

Andrade, E., Ferreira, S. G., Madalozzo, R. and F. Veloso (2004) – "Do Borrowing Constraints Decrease Intergenerational Mobility? Evidence from Brazil" – Mimeo.

Angrist, Joshua and Alan Krueger (1992). "The Effect of Age at School Entry on Educational Attainment: An Application of Instrumental Variables with Moments from Two Samples". *Journal of American Statistical Association*, 87 (418), p. 328-36.

Arellano, Manuel and Costas Meghir (1992). "Female Labour Supply and On-the-job Search: An Empirical Model Estimated Using Complementary Data Sets". *Review of Economic Studies*, 59 (3), p. 537-59.

Behrman, J. and P. Taubman (1990). "The Intergenerational Correlation between Children's Adult Earnings and their Parents' Income: Results from the Michigan Panel Survey of Income Dynamics". *Review of Income and Wealth* 36, p. 115-127.

Björklund, A. and M. Jäntti (1997). "Intergenerational Income Mobility in Sweden Compared to the US". *American Economic Review*, 87 (5), p. 1009-1018.

---

between workers with complete 8th degree and workers with complete 4th degree.

Borjas, G. (1992). “Ethnic Capital and Intergenerational Mobility”. *Quarterly Journal of Economics*, v. 107, n. 1, p. 123-50.

Chadwick, L. and G. Solon (2002). “Intergenerational Income Mobility among Daughters”. *American Economic Review*, v. 92, n. 1, p. 335-44.

Corak, M. and A. Heisz (1999). “The Intergenerational Income Mobility of Canadian Men: Evidence from Longitudinal Income Tax Data.” *Journal of Human Resources* 34, p. 504-33.

Couch, K. A. and T. A. Dunn (1997). “Intergenerational Correlations in Labor Market Status: A Comparison of the United States and Germany”. *Journal of Human Resources*, 32, p. 210-32.

Dearden, L., S. Machin and H. Reed (1997). “Intergenerational Mobility in Britain”. *Economic Journal*, v. 107, n. 440, p. 47-66.

Dunn, C. (2003). “Intergenerational Earnings Mobility in Brazil”. University of Michigan, mimeo.

Ferreira, S. (2003). *Skinning the cat: Education Distribution, Changes in the School Premium and Earnings Inequality*. Proceedings of the Brazilian Economic Association (ANPEC).

Ferreira, S. and F. Veloso (2003). “Mobilidade Intergeracional de Educação no Brasil”.. *Pesquisa e Planejamento Econômico* 33 (3): 481-513.

Grawe, N. (2001). *Intergenerational Mobility in the US and Abroad: Quantile and Mean Regression Measures*. Ph.D. Dissertation, Department of Economics, University of Chicago.

Grawe, N. (2002) – *Life Cycle Bias in the Estimation of Intergeneration Earnings Persistence.* Working Paper N. 207, Analytical Studies Branch, Statistics, Canada.

Hertz, T. (2001). *Education, Inequality and Economic Mobility in South Africa*. PhD Dissertation, University of Massachusetts, 2001.

Lam, D. and D. Levison (1992) – “Declining Inequality in Scholling in Brazil and its Effects on Inequality in Earnings”. *Journal of Development Economics* 37: 199-225.

Lillard, D. and M. Kilburn (1995). “Intergenerational Earnings Links: Sons and Daughters”. Mimeo.

Menezes-Filho, N., R. Fernandes & P. Picchetti (2003) – “Rising Human Capital but Constant Inequality: the education composition effect in Brazil”- Mimeo – University of Sao Paulo.

Mulligan, C. (1997). *Parental Priorities and Economic Inequality*. Chicago: University of Chicago Press.

Pastore, J. (1979). *Desigualdade e Mobilidade Social no Brasil*. São Paulo: Editora da Universidade de São Paulo.

Pastore, J. (1986). "Desigualdade e Mobilidade Social: Dez Anos Depois". In: Bacha, E. e Klein, H., eds. A Transição Incompleta: Brasil desde 1945. Rio de Janeiro: Editora Paz e Terra.

Pastore, J. and N. Valle Silva (1999). *Mobilidade Social no Brasil*. Makron Books.

Solon, G. (1992). "Intergenerational Income Mobility in the United States". *American Economic Review,* v. 82, p. 393-408.

Solon, G. (1999). "Intergenerational Mobility in the Labor Market". In *Handbook of Labor Economics*, Volume 3A. O. C. Ashenfelter & D. Card, eds. Amsterdam: North-Holland, p. 1761-800.

Solon, G. (2002). "Cross-country Differences in Intergenerational Earnings Mobility". *Journal of Economic Perspectives*, v. 16, n. 3, p. 59-66.

Valle Silva, N. (1974). *Posição Social nas Ocupações*. Mimeo, IBGE, Rio de Janeiro.

Zimmerman, D. J. (1992). "Regression toward Mediocrity in Economic Stature". *American Economic Review*, v. 82, p. 409-429.