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DISCUSSION PAPER
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Federal Government of Brazil

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SUMMARY

A NOTE ON THE TEMPORAL EVOLUTION OF THE RELATIONSHIP BETWEEN WAGES AND EDUCATION AMONG BRAZILIAN PRIME-AGE MALES: 1976 - 1989

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1. INTRODUCTION

Understanding the extent to which productivity and wages of Brazilian workers can be improved by extra years of formal schooling is important for at least two main reasons. First, this relationship is the crucial indicator of how important an educational expansion could be in fostering economic growth in Brazil [Lau **et al.** (1991)]. Secondly, education can "explain" up to 50% of the inequality in wages in Brazil and the relationship between education and wages indicates how the labor market translates inequality in education into inequality in earnings [Park **et al.** (1991)].[1] Hence, a more accurate understanding of the relationship between education, on the one hand, and wages and productivity, on the other hand, is crucial for the formulation of policies aimed at increasing growth and reducing inequality, the two major lon-term challenges for Brazilian society.

The specific goal of this note is to describe the changes in the wage-education relationship which took place in the recent past in Brazil. Our analysis will concentrate on the observed relationship between wages and education among Brazilian prime-age males from 1976 to 1989 using 13 Brazilian Annual Household Surveys available since 1976 (**i.e.**, PNADs 1976-79 and 1981-89). Three wage-education relationships for each year are estimated using flexible functional forms and an increasing number of controls: the first specification includes no controls; the second controls for age; the third includes controls for age and region of residence.

The paper is organized as follows: The next section describes the data and the construction of the variables used in the empirical analysis. Section 3 investigates the temporal evolution of the distribution of education, while Section 4 analyzes the temporal evolution of the relationship between log-wage and education and how this relationship varies across regions. Section 6 summarizes the main results.

[1]See also Langoni (1973), Reis and Barros (1991), Lam and Levison (1991**a,b**) and Ramos (1990).

2. EMPIRICAL PRELIMINARIES

Data set: This study is based on 13 Brazilian Annual Household Surveys (PNADs) covering the period from 1976 to 1989.[2] The PNAD covers all urban areas in Brazil and majority of the rural areas. The sample is based on a Three-stage sampling design. With the exception of the first stage, the sampling scheme is self-weighted. The sampling rate varies across geographic regions and over time from 1/50 to 1/400. This sampling design generates annual samples of approximately 100,000 households [IBGE (1981)].

Unit and Universe: The unit of analysis is the individual. The universe of analysis is restricted to (**a**) 25 to 50 years-old males, (**b**) living in urban areas, (**c**) who held at least one job at the time of the survey, (**d**) who worked 20 or more hours per week in all jobs,[3] and (**e**) are not currently in school.

The universe of analysis represents approximately 15 million workers in 1989; 10% of the Brazilian population and 25% of the labor force. The total sample size is around 550,000 observations. It varies from 31,000 in 1986 to 57,000 in 1985 (see Appendix 1).

Measuring Wages, Education, Age, and Region of Residence: To measure wages, **W**, we use labor earnings standardized by hours worked. Specifically, **W=R/H** where **R** is the monthly labor gross income normally received in all jobs and **H** is the usual number of hours worked per week in all jobs.[4]

We measure education by the number of years of completed schooling. Since this is not a direct question in the survey questionnaire, we use an algorithm to construct **years of completed schooling**

[2]There are fourteen years but only thirteen surveys, since in 1980 the series was interrupted to avoid overlap with the 1980 Demographic Census which, unfortunately, is difficult to compatibilize with the PNADs.

[3]We also eliminate from the final sample all observations with incomplete information on labor income, hours worked, educational attainment, age, and region of residence. Workers who reported zero labor income were also eliminated from the final sample. Close to 1% of the sample was eliminated due to these criteria (see Appendix 1).

[4]Since we are going to use log-wages in our regressions, multiplying hours worked per week by a constant like 4.5 makes no difference except to change the estimated intercept in all regressions.

from two other questions in the questionnaire. The algorithm is similar to the one used by Lam and Levison (1991**a,b**) and Barros and Lam (1991) and it is described in detail in Appendix 2.

The variable age corresponds to the individual's age at the date of the interview. In order to describe the region of residence we use a categorical variable which implies a division of Brazil into 18 geographical areas. This division coincides with the division of Brazil into States, except for a few cases where groups of States were aggregated.[5]

3. THE TEMPORAL EVOLUTION OF THE DISTRIBUTION OF EDUCATION

Figure 1 presents the distribution of workers in our universe by their number of years of schooling.[6] This frequency distribution is similar to Lam and Levison (1991**b**, Figure 5) and reveals five local peaks at zero, four, eight, eleven, and fifteen years of schooling. Each of the last four peaks corresponds to the completion of one of the basic degrees awarded by the Brazilian educacional system: Lower Primary (4 years), Upper Primary (8 years), High School (11 years), and College (15 or 16 years). The number of years of schooling of 58% of the population is equal to one of these five local peaks (0,4,8,11,15) and much of this study concentrates only on this important sub-population.

Figure 2 presents an aggregated version of Figure 1, and Figure 3 and Table 1 present the temporal evolution of this aggregated distribution. Figure 2 reveals that almost 12% of prime-age males in Brazilian urban labor markets still have no schooling. Also, less than 1/4 of this population has completed at least a year of high school. Finally, only about 10% of males aged 25-50 years in the urban labor force in Brazil have entered college.

Figure 4 and Table 2 present the cumulative distribution of the population by years of schooling for 1976 and 1989. This figure reveals that the distribution for 1989 "dominates" the distribution for

[5]These cases and their respective groupings are: (**a**) Sergipe and Alagoas, (**b**) Paraíba and Rio Grande do Norte, (**c**) Maranhão and Piauí, (**d**) Pará and Amapá, (**e**) Amazonas, Roraima, Acre and Rondônia, (**f**) Mato Grosso and Mato Grosso do Sul, and (**g**) Goiás and Tocantins.

[6]This distribution is an average over the 13-year period covered by this study.

FIGURE 1
DISTRIBUTION OF THE POPULATION BY THE
N. OF COMPLETED YEARS OF SCHOOLING

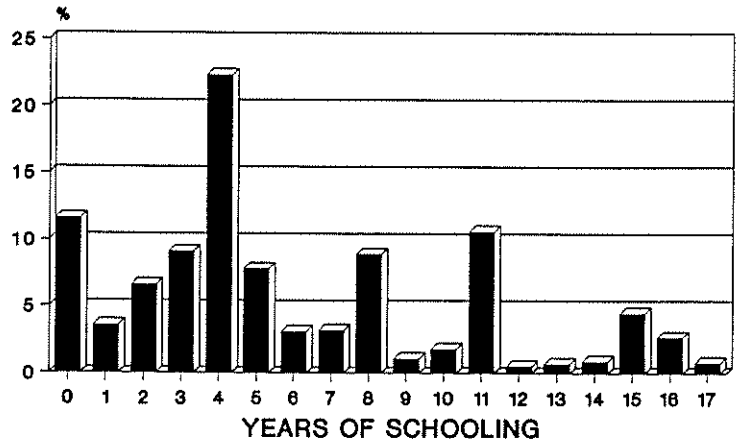


FIGURE 2
DISTRIBUTION OF THE POPULATION
BY EDUCATIONAL GROUP: 1981-1989

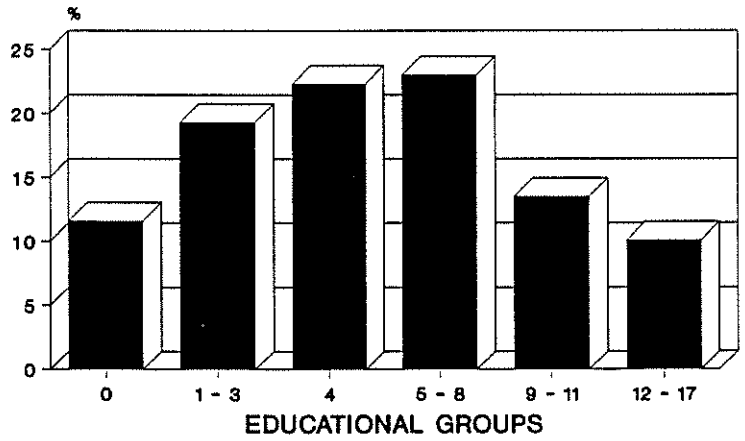


FIGURE 3
DISTRIBUTION OF THE POPULATION BY EDUCATIONAL GROUP:TEMPORAL EVOLUTION

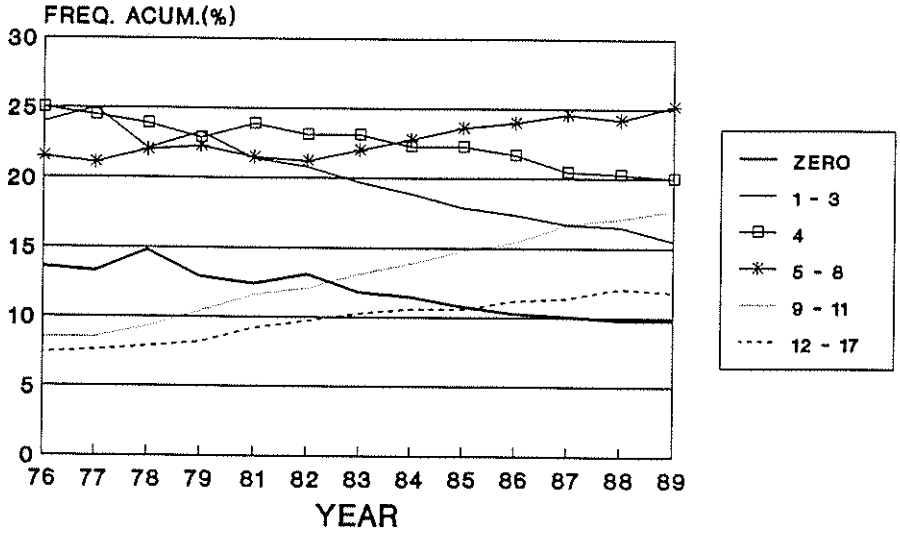


FIGURE 4
CUMULATIVE DISTRIBUTION OF COMPLETED YEARS OF SCHOOLING : 1976 AND 1989

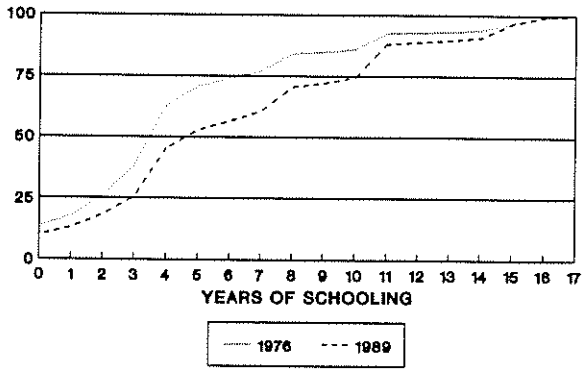
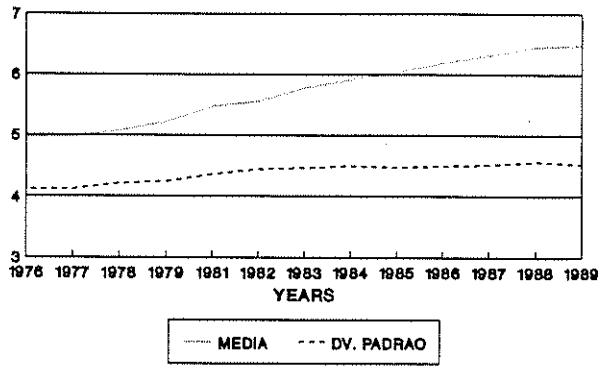


FIGURE 5
MEAN AND STANDART DEVIATION: 1976/1989 (YEARS OF SCHOOLING)



1976 using the strong concept of first-order stochastic dominance. Figure 5 presents the temporal evolution of the mean years of schooling and its standard deviation between 1976 and 1989. This figure shows a rate of growth for mean years of schooling of roughly one extra year per decade. Figure 5 also reveals a moderate increase in the standard deviation, of approximately 0,5 year of schooling, from 1977 to 1983. Figure 3 presents a more disaggregated view of this educational expansion from 1976 to 1989. The most impressive feature of this expansion is certainly the twofold increase in the fraction of the labor force with at least one completed year of high school: in 1976 only 16% of the population had completed at least one year of high school, whereas by 1989 this fraction increased to 30%. Regarding the proportion with college education, the performance was favorable, though not as impressive (it increased from 7.4% in 1976 to 11.8% in 1989). With respect to the fraction with no schooling the performance was weak, leading to a small reduction from 14% to 10%.[7]

Table 1
Distribution of the Population by Educational Group
Temporal Evolution: 1976-1989

Year	Educational Group					
	0	1-3	4	5-8	9-11	12-17
1976	13.6	24.0	25.0	21.5	8.5	7.4
1977	13.3	25.0	24.5	21.1	8.5	7.6
1978	14.8	22.1	23.9	22.0	9.3	7.9
1979	12.9	23.3	22.9	22.3	10.4	8.2
1981	12.4	21.4	23.9	21.5	11.6	9.2
1982	13.1	20.8	23.1	21.2	12.1	9.7
1983	11.8	19.7	23.1	22.0	13.1	10.3
1984	11.5	18.9	22.3	22.8	13.9	10.6
1985	10.8	17.9	22.3	23.6	14.8	10.6
1986	10.3	17.4	21.7	24.0	15.4	11.2
1987	10.1	16.7	20.5	24.6	16.7	11.4
1988	9.8	16.5	20.3	24.2	17.1	12.1
1989	9.8	15.5	20.0	25.2	17.7	11.8

As a whole, these figures reveal an undeniable improvement in the educational attainment of the Brazilian urban labor force over this period of 14 years. The extent to which this progress may be considered "fast enough" is, however, still very questionable. Psacharopoulos (1987:4) considers the

[7]A continuing process of migration from rural to urban areas may explain part of this weak performance.

1970s "a decade of rapid educational expansion in Brazil". Lam and Levison (1991**b**:23) also consider that in the last 40 years "dramatic improvements in the distribution of schooling" have occurred in Brazil. But Behrman (1987) estimates, based on an international cross-section, that the educational expansion which occurred in Brazil between 1960 and 1980 was far below what would be edicted by international standards.

Table 2
Cumulative Distribution of Completed
Years of Schooling
1976 and 1989

Years of Schooling	1976		1989	
	Distribution	Cumulative	Distribution	Cumulative
0	13.6	13.6	9.8	9.8
1	4.2	17.8	3.2	13.0
2	8.3	26.1	5.2	18.2
3	11.5	37.6	7.1	25.3
4	25.0	62.6	20.1	45.3
5	8.3	70.9	7.6	53.0
6	3.3	74.2	3.6	56.5
7	2.6	76.8	3.9	60.5
8	7.3	84.1	10.1	70.5
9	0.7	84.8	1.5	72.1
10	1.3	86.1	2.4	74.5
11	6.5	92.6	13.7	88.2
12	0.3	92.9	0.6	88.9
13	0.3	93.2	0.8	89.7
14	0.7	93.9	1.0	90.7
15	2.8	96.7	5.7	96.4
16	2.6	99.3	2.8	99.1
17	0.7	100.0	0.9	100.0

4. WAGE GAINS FROM EDUCATION

4.1. Methodology

We estimate wage gains from education using three models.[8] These models differ with respect to the control variables they use. The first model uses no control variables. In this model we simply estimate the average log-wage for each educational level and contrast these averages.

[8]The precise specification of the estimation procedure used in this study is described in a longer version of this paper [Barros and Ramos (1991)].

The second model includes controls for the age of the worker. In this second model, for each education level, we regress log-wage on age and its squared. In other words, we regress log-wage on age and age-squared allowing the regression coefficients to vary freely with the level of education of the worker. This model generates wage gains from education whith vary with age. However, we only report the average gains, where the average is taken over age groups using the age distribution of our population.

Finally, the third model includes controls for age and region of residence.[9] The estimates are obtained by regressing log-wage on age and age-squared for each education level and region. in other words, we regress log-wage on age and age-squared allowing the coefficients to vary freely with the level of education and region of residence of the worker. The wage gains from education estimated using this model vary with age and region of residence. As in the case of Model 2, we report only the average gains, with the average being taken over age groups and regions. Nevertheless, in Section 4.5 we briefly describe how these wage gains vary across regions.

4.2. Temporal Evolution: Model 1

Based on the model with no controls, Table 3 and Figure 6 depict estimates of the temporal evolution of the wage gains associated to the completion of the major steps of the education ladder in Brazil:[10],[11] 4 years of schooling (Lower Primary), 3 years of schooling (Upper Primary), 11 years of schooling (High School), and 15 or 16 years of schooling (4-year and 5-year College).

The inspection of the results of Model 1 presented in Table 3 and Figure 6 reveals four important features. First that, in Brazil, except from lower to upper primary, wage gains associated to extra years of schooling are very large, ranging from 0.12 to more

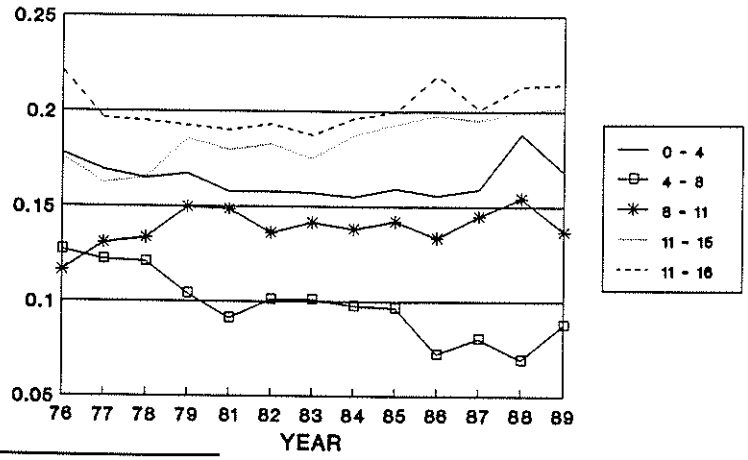
[9]For this purpose, Brazil is divided in 18 regions as it was described above in Section 2.
[10]Notice that around 60% of the population are included in these groups (Table 2).
[11]The estimates in Table 3, Figure 6 and in all tables in this section are reported in per schooling year basis, **i.e.**, the wage differentials between two education levels are divided by the number of years of schooling between them. So, for instance, the reported wage gain from 0 to 4 years of schooling is equal to the wage differential between these two categories divided by 4.

than 0.20. These wage gains are very large in the sense that, as shown by Psacharopoulos (1985), in most countries they tend to be close to 0.10. Such large wage gains from education are a distinguishing characteristic of Brazilian labor markets which have been found repeatedly by a number of authors.[12]

Table 3
Wage Gains From Education
(No Controls)

Year	Years of Schooling				
	0 to 4	4 to 8	8 to 11	11 to 15	11 to 16
1976	0.178	0.127	0.116	0.180	0.221
1977	0.169	0.122	0.131	0.162	0.196
1978	0.165	0.121	0.133	0.165	0.195
1979	0.167	0.104	0.150	0.186	0.193
1981	0.158	0.091	0.149	0.180	0.190
1982	0.158	0.101	0.136	0.183	0.193
1983	0.157	0.101	0.142	0.175	0.188
1984	0.155	0.098	0.138	0.188	0.196
1985	0.160	0.098	0.142	0.193	0.200
1986	0.156	0.072	0.134	0.198	0.219
1987	0.159	0.080	0.145	0.195	0.201
1988	0.188	0.069	0.154	0.200	0.213
1989	0.168	0.088	0.137	0.202	0.214
1981-85	0.158	0.098	0.142	0.184	0.194

FIGURE 6
WAGE GAINS FROM EDUCATION
NO CONTROL



[12]See Langoni (1973), Branco (1979), Velloso (1975), Senna (1976), Medeiros (1982), Reis and Barros (1991), Lam and Levison (1991a, b), Ramos (1990), Strauss and Thomas (1991), Dabos and Psacharopoulos (1991), Dougherty and Jimenez (1991) and Tannen (1991).

A second distinguished feature revealed by Table 3 is a relationship between log-wage and education which begins concave and then becomes strongly convex after 8 years of schooling. In fact, as Table 3 shows, the wage gains from education decrease up to the upper primary level to increase sharply from that point upwards.

Thirdly, Table 3 and Figure 6 reveal that the wage gains at different levels of education display distinct tendencies over this period of time. At the secondary and tertiary levels, wage gains tende to increase over time, whereas at the lower levels wage gains seem to be either stable (lower primary) or even decreasing (upper primary) over the period. For instance, if we use the years of 1977 and 1989 as reference,[13] the wage gain associated to the completion of a four-year college increased from 0.16 to 0.20 and those related to the completion of high school went up from 0.13 to 0.14. At the same time, te wage gain associated to the completion of the upper primary level shrunk from 0.12 to 0.08. These numbers indicate a large increase in the convexity of the relationship between log-wage and education over time. Since the growth pattern of the wage gains varies by education level, whether the average gain (the average being taken over education levels) actually increased or decreased over this period, will depend very much on how the gains at different education levels are going to be weighted.

Finally, Table 3 and Figure 6 point to a clear diference in the evolution of the wage gains when we look at subperiods. For all levels of schooling, the period that goes from 1981 to 1985 is remarkably stable, whereas the periods from 1977 to 1981 and after 1986 display a tendency to a widening of the wage gains, **i.e.**, during these periods the relationship between log-wage and education becomes increasingly convex.

4.3. The Effect of Controls for Age and Region - Models 2 and 3

The results obtained using age as a control variable (Model 2) are presented in Table 4 and Figure 7. The results produced by Model 3, which controls for age and region of residence, are presented in Table 5 and Figure 8.

[13]Notice that 1977 and 1978 are quite similar, and 1976 is very different from all other years in the 70s. This is the reason why we are choosing 1977 as a reference for comparison, rather than 1976.

The major effect of the introduction of controls is a slight increase in the wage gains at the primary and secondary levels and a sharp decrease in the gains at the tertiary level. Overall the log wage-education relationship becomes flatter and much less convex, as it can be seen from the average wage gains for the period from 1981 to 1985, displayed at the bottom of Tables 3 to 5. Results which are qualitatively similar but quantitatively much stronger have been obtained by Birdsall and Behrman (1984). Using the 1970 Brazilian Census, they show that controls for region of origin and region of residence can reduce their estimate for the wage gain from education in almost 0.08.

Table 4
Wage Gains from Education
(Control: Age)

Year	Years of Schooling				
	0 to 4	4 to 8	8 to 11	11 to 15	11 to 16
1976	0.180	0.130	0.128	0.166	0.212
1977	0.171	0.128	0.134	0.155	0.191
1978	0.169	0.127	0.138	0.157	0.186
1979	0.170	0.113	0.157	0.172	0.180
1981	0.161	0.101	0.158	0.161	0.173
1982	0.162	0.110	0.145	0.164	0.176
1983	0.161	0.111	0.152	0.158	0.168
1984	0.160	0.111	0.143	0.169	0.179
1985	0.161	0.111	0.149	0.171	0.178
1986	0.157	0.091	0.138	0.171	0.194
1987	0.157	0.095	0.154	0.172	0.181
1988	0.185	0.087	0.159	0.178	0.193
1989	0.166	0.108	0.143	0.178	0.194
1981-85	0.161	0.109	0.149	0.165	0.175

Moreover, the introduction of age and region of residence as control variables contributes to diminish the temporal variation. For instance, if we compare the amplitude of the observed oscillations in the gains to lower primary, we see that it declines from 0.033 in Model 1.

FIGURE 7

WAGE GAINS FROM EDUCATION

CONTROL - AGE

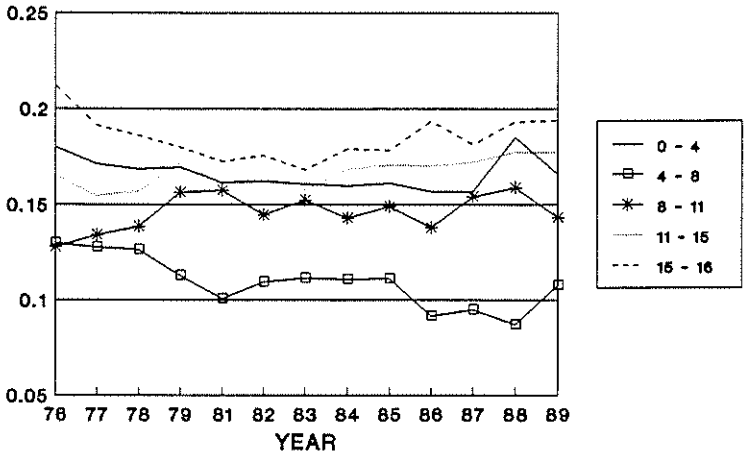


FIGURE 8

WAGE GAINS FROM EDUCATION

CONTROLS - AGE AND REGION

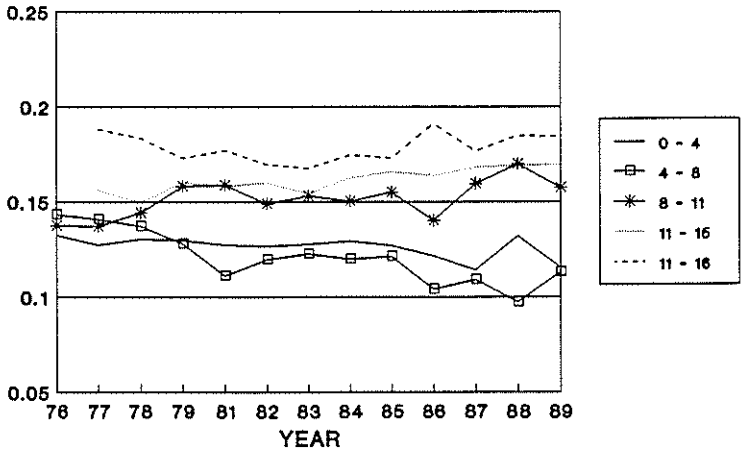


Table 5
Wage Gains from Education
(Controls: Age and Region)

Year	Years of Schooling				
	0 to 4	4 to 8	8 to 11	11 to 15	11 to 16
1976	0.133	0.143	0.138	0.165	0.153
1977	0.128	0.141	0.137	0.157	0.188
1978	0.131	0.137	0.144	0.150	0.184
1979	0.180	0.128	0.158	0.160	0.173
1981	0.127	0.111	0.159	0.158	0.177
1982	0.127	0.120	0.149	0.160	0.170
1983	0.128	0.123	0.153	0.155	0.168
1984	0.129	0.120	0.150	0.163	0.175
1985	0.127	0.121	0.155	0.166	0.173
1986	0.122	0.104	0.140	0.164	0.191
1987	0.114	0.109	0.159	0.168	0.177
1988	0.132	0.097	0.170	0.169	0.185
1989	0.115	0.113	0.157	0.170	0.184
1981-85	0.127	0.119	0.151	0.160	0.173

to 0.028 in Model 2 and to 0.018 in Model 3 (apart from 1976). Similar behavior is observed at the other extreme. For instance, the amplitude of the oscillations in the gains to five-year college declines from 0.031 in Model 1 to 0.026 in Model 2 and to 0.023 in Model 3.

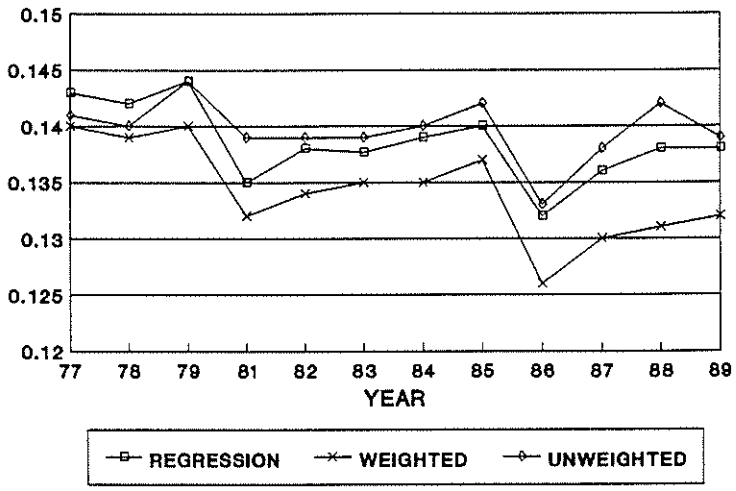
4.4. The Average Wage Gains From Education

To focus further on the temporal evolution of the wage gains from education we computed, for each year, the average of the first four wage gains in Table 5. We computed both unweighted and weighted averages. In the weighted average, the weights are the proportion of the overall population with no education (12%), with 4 years of schooling (22%), with 8 years of schooling (9%) and with 11 years of education (10%). These averages are reported in Table 6 and Figure 9. An alternative to this procedure, which is actually more commonly used, is to estimate the average gain using Linear Regression. The average gain estimated using this procedure is reported in the last column of Table 6. These three results differ only to the extent that they use different weights. As it is shown in Barros and Ramos (1991), the weights in the regression procedure are larger for educational levels close to the mean and smaller at the extremes. The three weighting schemes are presented in Figure 10.

Table 6
Average Gains from Education

Year	Unwgt.	Wgt.	Regr.
1976	-	-	0.147
1977	0.141	0.140	0.143
1978	0.140	0.139	0.142
1979	0.144	0.140	0.144
1981	0.139	0.132	0.135
1982	0.139	0.134	0.138
1983	0.139	0.135	0.138
1984	0.140	0.135	0.139
1985	0.142	0.137	0.140
1986	0.133	0.126	0.132
1987	0.138	0.130	0.136
1988	0.142	0.131	0.138
1989	0.139	0.132	0.138

FIGURE 9
AVERAGE WAGE GAINS FROM EDUCATION



The temporal evolution of these three averages are slightly different. The unweighted average is very stable over time. The weighted average and the one obtained by linear regression reveal some decline over time. The decline is slightly stronger when we use the weighted average than when we use the results from linear regression.

4.5. Regional Variations

Model 3 allows us not only to estimate the relationship between log-wage and education controlling for region,

but also to investigate how this relationship varies across regions. These regional variations are investigated in this section.

Table 7 and Figure 10 to 13 present the average over time of the wage gains from education for six regions: the State of Rio de Janeiro, the State of São Paulo, the South,[14] the East,[15] the Northeast,[16] and the Frontier.[17]

The inspection of Table 7 reveals some important regional disparities. The Northeast (NE) presents the largest gains from education at the secondary and tertiary levels, but the smallest gains at the primary level. A similar but smoother behavior is found for Rio de Janeiro (RJ). The opposite takes place for the East (E), the South (SO) and São Paulo (SP): these regions have the smallest gains at the secondary and tertiary level, but are the ones with the largest gains at the primary level. As a consequence, the commonly referred finding that the relationship between log-wage and education is steeper in the Northeast than elsewhere in Brazil must be properly qualified, since this fact is only correct at the secondary and tertiary levels.

Table 7
Wage Gains from Education
(by Region)

Region	Years of Schooling				
	0 to 4	4 to 8	8 to 11	11 to 15	11 to 16
RJ	0.099	0.121	0.161	0.185	0.201
SP	0.134	0.114	0.120	0.143	0.160
SO	0.133	0.132	0.167	0.136	0.158
E	0.147	0.136	0.163	0.150	0.159
NE	0.124	0.111	0.188	0.203	0.200
FR	0.118	0.104	0.152	0.155	0.162

[14]The South is formed by the States of Paraná, Santa Catarina, and Rio Grande do Sul.
[15]The East Region is formed by the States of Espírito Santo, Minas Gerais and the Federal District.
[16]The Northeast Region is formed by the States of Piauí, Maranhão, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe, and Bahia.
[17]The Frontier is formed by all the States of Goiás, Tocantins, Mato Grosso do Sul, Mato Grosso, Rondônia, Acre, Amazonas, Roraima, Pará, and Amapá.

FIGURE 10
WEIGHTS USED TO COMPUTE THE AVERAGE WAGE GAINS FROM EDUCATION

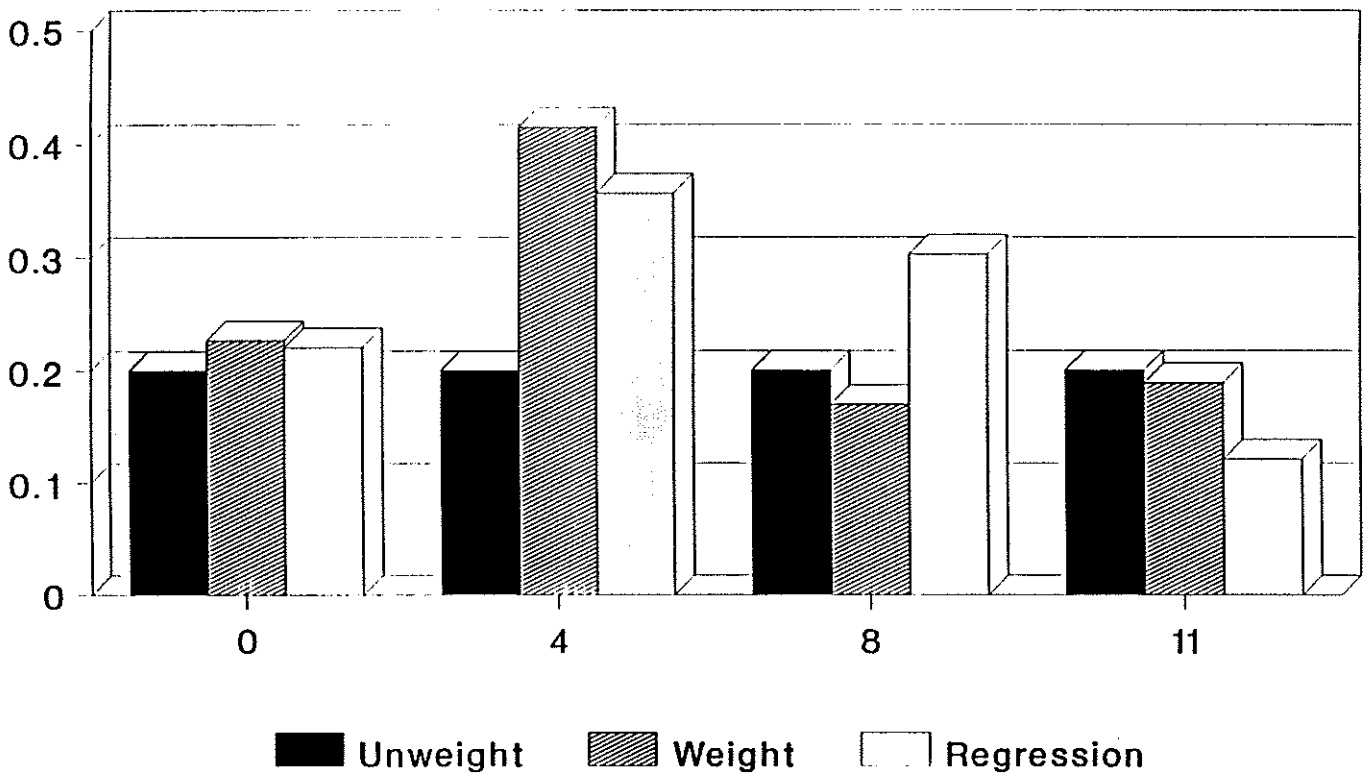


FIGURE 11
WAGE GAINS FROM EDUCATION
0 TO 4 YEARS OF SCHOOLING

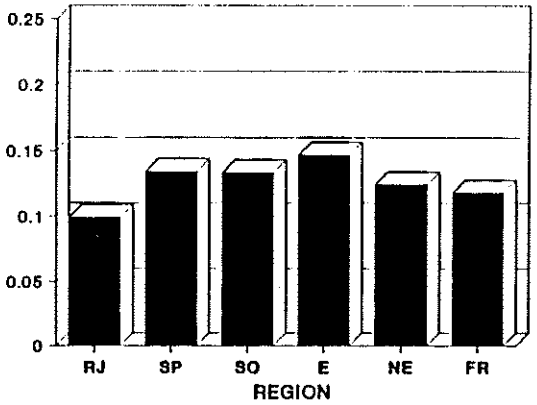


FIGURE 12
WAGE GAINS FROM EDUCATION
4 TO 8 YEARS OF SCHOOLING

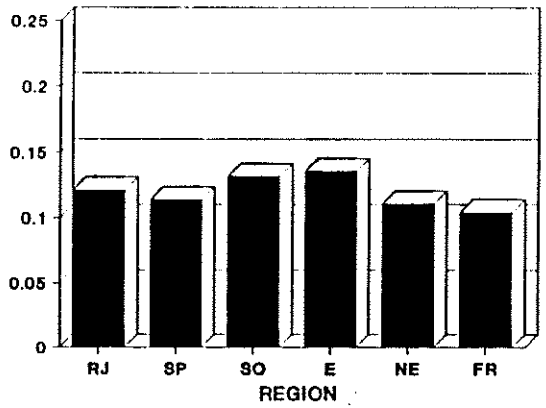


FIGURE 13
WAGE GAINS FROM EDUCATION
8 TO 11 YEARS OF SCHOOLING

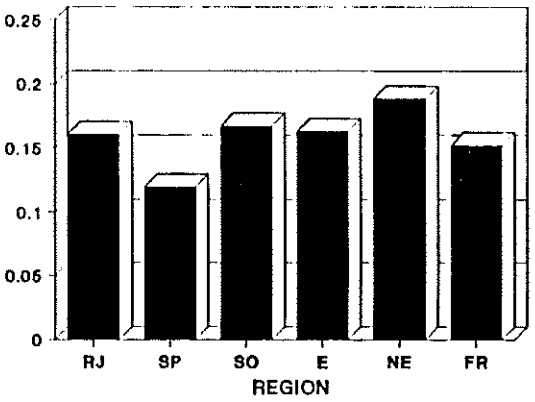
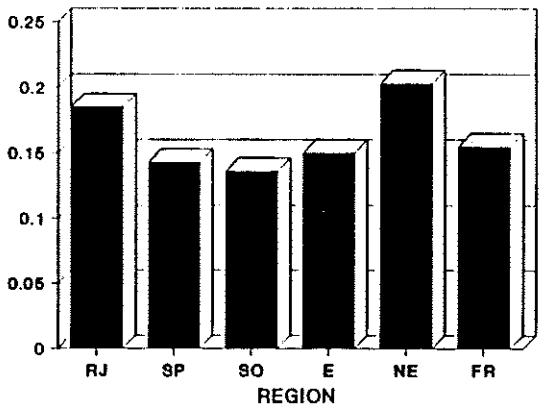


FIGURE 14
WAGE GAINS FROM EDUCATION
11 TO 15 YEARS OF SCHOOLING



5. SUMMARY

In this study we investigate the temporal evolution of the wage-education relationship among Brazilian prime-age males covering the period from 1976 to 1989. For each year three wage-education relationships were estimated using flexible functional forms and an increasing number of control variables. Model 1 uses no controls; Model 2 controls for the age of the worker; and Model 3 controls for age and region of residence.

The estimated relationships reveal that in Brazil the log wage-education profile is much steeper than in other countries and convex at the secondary and tertiary levels. As a consequence, the wage gains from college are much larger than those from primary education.

Whether the wage gains from education are increasing or decreasing over time depends on which educational level is considered. For instance, the gains from primary education are clearly decreasing over time, while the gains from college education are increasing. As a consequence, over the decade, there is a clear increase in convexity which occurs mainly during the period from 1986 to 1989.

The inclusion of controls by age and region of residence tends to decrease the gains from education, their variation over time, and the degree of convexity of the log wage education relationship.

The regional analysis indicates that the Northeast region has the largest gains from education at the secondary and tertiary levels but one of the smallest at the lower levels. The opposite takes place for São Paulo, implying a much more convex log wage-education relationship for the Northeast. The assertion that gains from education are larger in the Northeast than in more developed areas of Brazil [Lam and Levison (1991**b**)] is valid only for secondary and tertiary education. It is worth noticing, however, that some studies [Psacharopoulos (1987)] found evidence that the wage-education relationship does not vary across regions, while others [Birdsall and Behrman (1984)] found larger wage gains from education in the Southeast than in the Northeast.

APPENDIX 1

SAMPLE SCREENING AND SAMPLE SIZE BY YEAR

Table A.1
Sample Screening
1976-1989

Screening	Sample Reduction
Males	51.6
Urban Areas	25.4
Known Age	0.0
Age ≥ 25	43.7
Age ≤ 50	26.4
Occupied	7.6
Known Income	0.4
Positive Income*	0.2
Known Hours Worked	0.2
Hours Worked ≥ 20	0.5
Known Education	0.1
Not in School	4.2

*Includes eight cases where income equals 1.

Table A.2
Sample Size by Year
1976-1989

Year	Sample Size
1976	35,332
1977	45,286
1978	49,877
1979	41,191
1981	49,067
1982	52,748
1983	53,996
1984	54,249
1985	56,978
1986	31,154
1987	32,720
1988	32,238
1989	33,459
Total	543,207

APPENDIX 2

CONSTRUCTION OF THE VARIABLE "YEARS OF SCHOOLING"

Years of Schooling	Grade	Degree	Fraction (%)
None	....	None	11.7 (All)
One	....	Alfab. Adultos	0.1 (79.81)
	First	Elementar	2.5 (79-89)
	First	1º grau	1.0 (All)
Two	Second	Elementar	4.6 (79-89)
	Second	1º grau	2.0 (All)
Three	Third	Elementar	6.3 (79-89)
	Third	1º grau	2.8 (All)
Four	Fourth	Elementar	14.4 (79-89)
	Fourth	1º grau	5.9 (All)
Five	First	Médio 1º ciclo	1.7 (All)
	Fifth	Elementar	4.5 (79-89)
	Fifth	1º grau	2.7 (All)
Six	Second	Médio 1º ciclo	2.2 (All)
	Sixth	1º grau	1.0 (All)
Seven	Third	Médio 1º ciclo	2.0 (All)
	Seventh	1º grau	1.2 (All)
Eight	Fourth	Médio 1º ciclo	6.1 (All)
	Eight	1º grau	2.8 (All)
Nine	First	Médio 2º ciclo	0.5 (All)
	First	2º grau	0.7 (All)
Ten	Second	Médio 2º ciclo	0.9 (All)
	Second	2º grau	1.0 (All)
Eleven	Third	Médio 2º ciclo	5.1 (All)
	Third	2º grau	5.8 (All)
	Fourth	Médio 2º ciclo	0.0 (89)
	Fourth	2º grau	0.1 (All)
Twelve	First	Superior	0.5 (All)
Thirteen	Second	Superior	0.6 (All)
Fourteen	Third	Superior	0.9 (All)
Fifteen	Fourth	Superior	4.6 (All)
Sixteen	Fifth	Superior	2.9 (All)
Seventeen	Sixth	Superior	0.8 (All)
	....	Dout./Mestrado	0.1 (79-89)

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