

TITLE

"Effects of Education and School Attendance on the
Income of Working Class Brazilians in the
Core, Periphery and Agriculture."

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EFFECTS OF EDUCATION AND SCHOOL ATTENDANCE
ON THE
INCOME OF WORKING CLASS BRAZILIANS
IN THE
CORE, THE PERIPHERY AND AGRICULTURE
1986

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ABSTRACT

This paper analyzes the effect of education on income among workers in different activities in Brazil. Basically, it has been hypothesized that the labor market segmentation theory which divides the labor force between a dualistic economy - core and periphery - is more useful than human capital theory in explaining such effect. The effect of education on income in agriculture as a third sector has been analyzed too. Data from the Brazilian 1976 National Household Sample Survey have been used to test the hypotheses. The present analysis shows only trivial effects of industrial core-periphery differences on the income effects of education.

1.0 INTRODUCTION

Education of individuals has been taken as an indicator to measure socio-economic development of a region or country. Some theoretical approaches assume that education is the way to increase individual earnings and the standard of living of people. In this sense we are assuming that education increases the ability in doing better the tasks anywhere. We are not assuming this approach, but rather, we state that society recognizes education as a value itself and the higher level of

education the more efficiently things work disregarding the causal relationship that some approach could set. This is the point where education as a value itself originates. However, in a utilitarian society people are concerned with something beyond merely doing the tasks well. That is why the question arises: how much does education increase income? Several different and almost opposite approaches deal with this question.

2.0 THEORETICAL APPROACHES

The Human Capital Theory takes individual ability to explain individual position in the socio-economic order, where the more skilled attains higher positions; therefore economic success is determined by individual talent or training. This principle is clear in Becker (1964): "if two persons have the same investment in human capital, the one who earns more is demonstrating greater economic talent." Beck et al (1978) argue that this assumption comes from the functional theory of social stratification set by Davis and Moore (1945) which underlines that in society there are many positions to be occupied with different grades of difficulty. The more difficult positions require more training which will be better rewarded. In the same sense, the neoclassic economic theories assume that the worker invests in training which maximizes the economic return on investments. Therefore, according to human capital theory, economic success or failure in an occupation is tied to individual characteristics, where education is one of the basic aspects to account for. In this way, education has a causal direct relation with income in occupation?

Such a theory cannot explain the unequal competition that exists in the labor market. That is why many researchers have introduced another variable to explain income

in occupational positions; the segmentation of the labor market. Many researchers have dealt with the dual labor market segmentation to explain social stratification among individuals. The segmentation concept has received different empirical definitions for different purposes. For instance, in Pastore and Haller (1982), the labor market has been segmented into formal and informal to analyze social mobility. Later, to analyze income differences, Haller and Pastore (1983) segment the labor market into metropolitan versus hinterland and into local high socio-economic developed versus local low socio-economic developed labor market. The most traditional segmentation of the labor market is the so called "primary" versus "secondary" and "core" versus "periphery" definition. These two pairs of segments are quite similar to each other. Zucker and Rosenstein (1981) state that the correspondence between these two conceptions "is far from clear." However, we can see that both approaches deal with the same variables, differing in the emphasis of the source of income differences. As Gordon (1975) argues the primary versus secondary market as expressed by Doeringer and Piore (1971) and Piore (1968, 1970) - emphasizes individual attitudes and behavior; the core versus periphery - or dual economy - as laid down by Averitt (1968), Bluestone (1968, 1970), Beck et al (1978) - emphasizes the characteristics of industries and job structure as the basic sources of the

dichotomization of the labor market. According to Beck et al (1978), this last dichotomization "includes not only individual factors but also the organization of the economic structure." Pastore and Haller (1982) refer also to the "bourgeoisie" versus "proletariat" as another dichotomization of the labor market, represented by Bowles and Gintis; they argue that these three last segmentations "seem to have moved toward a convergence." The education variable plays an important role in this approach, not as a determinant of income like in human capital theory, but as an intervening variable.

According Beck et al (1978), starting from the point of "the emergence during the late nineteenth and early twentieth centuries of a core industrial sector dominated by large corporate enterprises which came to constitute a oligopolistic system of production" - as pointed out by Baran and Sweezy -, the Labor Market Segmentation theory assumes that there exists a division of the industrial structure. The socio-economic structure is divided into two sectors: core and periphery. Employers and employees are in different conditions and operate according to different rules in each sector. The assumption is that each sector is "relatively internally homogeneous" as opposed to the view of homogeneity in the market as a whole. The apparent anomalies that exist

in the market are view as a consequent and normal phenomenon when seen from the view of the dualistic economy structure. Beck (1980) states that "regional or subregional disparities in wealth do not represent anomalies or market imperfections in an otherwise orderly system, but, rather, reflect an integral component of the economy of industrial capitalism." According to this theory, this segmentation of the economy plays an important role on worker opportunities. Bluestone (1968) found that wages have a tendency to be higher in capital-intensive industries than in where production is labor-intensive. He argues, that a large firm can hardly escape paying relatively higher wages. "Low wages and poor working conditions have a better chance of survival in the industries of the working poor." Bluestone also reports other characteristics which identify those industries in the core sector: unionization, large assets, high profit margins, product diversification and market concentration. The periphery sector is identified as follows: small firm size, seasonal and other variations in product supply and demand, labor intensity, weak unionization and low assets. This approach sustains that there is a rigid pattern of wages attached to the job structure and the worker wages are largely determined by the access to different job clusters. In this process, education acts "to mediate individual access to job ladders" (Gordon, 1975). In the peripheral sector, variation in the individual capacity has very little to do with variation in individual wages.

Many studies have used this approach - the segmentation of the economy into core and periphery - to explain social stratification in the United States, like Bibb and Form (1977), Beck, Horan and Tolbert (1979), Hodson (1977), Tolbert, Horan, and Beck (1980), Zucker and Rosenstein (1981), Galle, Wiswell and Burr (1985), among others. In general, they conclude that the segmentation of the economy into core and periphery is the basic factor to explain the economic stratification of the labor force in the market, even though there is no perfect agreement among them in the classification of the firms into core or periphery.

The segmentation of the market has been useful to explain social mobility in Brazil. Pastore and Haller (1982) have shown that the segmentation of the market by region, plays an important role in explaining socio-economic differences in the formal and informal labor market. They (Haller and Pastore (1983)) also found important effects of two other segmentation labour market variables - metropolitan labour market and local socio-economic development - in explaining income differences in Brazil. Although the Pastore and Haller's segmentations - which are not the same of the dualistic economy segmentation - has been used to analyze social mobility, we believe that labor market segmentation theory should also contribute to the analysis of the effects of education on income.

Therefore, the purpose of this paper is to analyze the effect of education on income (by occupational categories) in a dichotomized labor market defined as "core" and "periphery". As have been shown by Pastore and Haller, we should expect that the effects of education on income should vary according to regional socio-economic differences.

We should expect that the more dynamic sectors of the economy (core) pay higher wages, since they are more competitive, they attract the more trained human capital or have higher chances to invest in training for their workers. In these sectors of the economy, we expect a higher effect of education on earnings. We also expect that education has a higher impact on income in more developed regions.

3.0 METHODOLOGICAL DESCRIPTION

The Brazilian 1976 National Household Sample Survey (PNAD) was used for this analysis. "Education" was measured as the number of formal years of schooling completed, and "income" measured as monthly salary for workers currently employed. Years of schooling vary from 1, the first grade, through 17, the sixth year at the university (for some fields). All other informations like adult literacy program or preparation for college entrance exams (vestibular) were deleted. Table 1 shows the total amount of valid and deleted cases of the sample by region. Monthly salary does not include those workers who do not have earnings. The same table also shows the total amount of valid and deleted cases of individuals with fixed monthly salary and workers by region. Those activity were classified according to the dualistic segmented economy: core and periphery.

The activities have been restricted almost to the transformation industries available in the Brazilian industrial census. Few others have been added like civil construction, production and distribution of electrical energy, commerce of machines, chemical and pharmaceutical products, fuel and lubricants, office supplies and food and beverages. The classification of all activities into core and periphery follows the classification made by four American studies mentioned

above. Because there is no perfect agreement among them, additional criteria have also been used. Galle et al (1985) used capital intensive and level of productivity to classify the industries between core and periphery. They used the total capital expenditures over the total number of production workers as capital intensives, and the value added by manufacture over the total labour hours as level of productivity. As the total labor hours are not available in the 1975 Brazilian Industrial Census, the total number of production workers was used as a proxy to level of productivity. It reflects productivity mean by worker. Were disagreement occurs, at least two out of four, in the classifications of Beck, Horan and Tolbert, Bibb-Form, Hodson, and Tolbert, Horan and Beck (Zucker and Rosenstein, 1981) decision was made based on two variables: level of capital interveners and productivity.

These four variables calculated from the Brazilian 1975 industrial census (Tables 2 and 3 show the list of activities and their classification. Effect of education on income is also analyzed for agriculture as a third sector.

The final sample size was reduced to 30,789 workers*, i.e., those individual who receive money or goods or

* Table 4 shows the sample size by sector and by region.

both as payment for service done to one employer. All other categories like self-employed, partner and employee, partner and employer, member of the family-not remunerated, etc., are excluded. Sample for each region are independent from one another.

The regression equations were used to measure the effect of education on income. Some empirical studies of social stratification in the United States have argued that the fact of being in school or not affects the income for workers. Considering this point, a dummy variable - being currently in school = 1 and not being currently in school = 0 -, is added as an independent variable. The natural log for income was used. Therefore, if we call income Y , numbers of years of schooling X_1 , and being currently in school or not X_2 , for each region J and for each activity,

$$\ln(Y)_j = a_j + b_{1j}X_1 + b_{2j}X_2 + e_j$$

As have been stated above, regional socio-economic differences in Brazil can affect the effect of education on income stratification. Regarding this point, the socio-economic regionalization of Brazil by Haller (1982) is taken into account. The PNAD divides Brazil into 7 regions. According to Haller's socio-economic regionalization, the South, S. Paulo and Rio de Janeiro are the most developed and, for this paper, they were classified in the same level of

development. Following these three regions come the region of Minas Gerais and Espírito Santo, and the region of Brasília, both were taken in the same level of development. According to Haller, the Northeast is divided into the third and fifth level, but we take all the Northeast as the third level since most of the states are in such a level. The same situation happens in the North. Haller divides it into the second and fourth level, but this analysis, the North is taken as fourth level because most of it is in this level, even though the PNAD take into account just urban data for this region.

Three hypotheses were tested: the effect of education on income is higher in the core than in the periphery; the more developed is a region, the higher the effect of education on income (?) The effects of education on income are lower when not controlled by the distinction between core and periphery.

A description of the occupational structure - proportional distribution of the population among different activities -, and the educational level of the activities - mean and variance -, is also presented. (In this case, all activities are considered, inspie of their allocation in the economic structure.)

4.0 RESULTS

If we take a look at the labor force in the different activities by region, the general idea is that - with a few exceptions - the labor force in the sample is very diffused among the different activities. The special exception happens in the agricultural activities in the Northeast with 51% of the labor force, in the South with 46%, and in the region of Minas Gerais and Espirito Santo with 33% of the labor force. In São Paulo the labor force in agriculture is 13%, in the North is 10%, (sample was taken in urban areas only), in Rio de Janeiro is 5%, and in Brasilia is less than 3%. Two other activities have a little concentration of the labor force in some regions. These are: civil construction and remunerated domestic services. The former occupies 13% of the labor force in Brasilia, 10% in the North, 9% in Rio de Janeiro, 7% in the region of Minas Gerais and Espirito Santo, and 5% in the South and in the Northeast (when some activity does not occupy at least 3% of the labor force, it is not mentioned here). The last one occupies 10% of the labor force in Brasilia and Rio de Janeiro, and 4% in the Northeast. Other activities which have some concentration of labor force are federal administrative service with 8% in Brasilia; transformation industries of material for transportation, food products, and metallurgy; services in highway, public instruction, and

medical with 3 or 4% each one in S. Paulo and Rio de Janeiro.

If we take a look at the level of schooling among activities, except for S. Paulo and the region of Minas Gerais and Espirito Santo, the highest level have been found in credit and investment companies with a mean up to 11,4 year of schooling in Brasilia. In the two other regions, the highest level have been found in private instruction activities, with a mean up to 10.6 years. The activity with the lower level of education is in the agriculture, for all regions, with the highest mean (4.6) in Brasilia and the lowest mean (2.8) in the Northeast.

The level of schooling among the labor force just by region does not change very much if we take into account the mean of years of schooling. Table 6 shows that the highest mean is found in Brasilia with 7.5 years and the lowest in the Northeast with 5.4. The three more developed regions - S. Paulo, Rio de Janeiro and the South - have a pretty closed mean with 6 or 6.5 years of schooling. If it is taken into account the deviation of years of schooling within the region, except the South and Brasilia, the others have almost the same deviation approximately 3.5 years. The South has the lowest standard deviation with 2.6, and Brasilia has the highest standard deviation with 4.3 years.

When we move from the descriptive analysis to the findings regarding the hypotheses to be tested, we found that the labor market segmentation theory, which expects a different effect of education on income according to the segmentation of the labor market, with some exceptions, does not fit the 1976 Brazilian data very well. That is, education has practically effect on income for almost all activities in the core and in the periphery. Table 2 shows that almost all activities in the periphery have effect of years of schooling on income. However, it is visible that, usually, those effect which are statistically significant, are higher in the core than in the periphery. When all activities are grouped by sector, we can see (Table 4) that the effect of education on income is greater in the core than in the periphery for all regions except for the South, but the differences, even statistically significant, are very small.

Regarding the different effect of education on income according to the regional level of development, there is some evidence supporting the expectation, even though such evidence does not accord exactly with what has been hypothesized. Table 2 also shows that in the core, for some regions, many activities have very few representatives in some regions. That is shown specially for Minas Gerais and Espirito Santo,

Brasilia, and for the Northeast. Such a phenomenon is less frequent in the cluster of more developed regions: Rio de Janeiro, S. Paulo and South. This can suggest that those activities which are classified as core are less frequent in less developed regions. In the periphery, even the effect is different in some regions, it is not visible what is going on with the regional development and the effect of education on income. In other words, evidence in terms of the second hypothesis, which expects higher effect of education on income in the core, is even less conclusive. There are some regional differences, but it is not clear how regional development affects the effect of education on income in a dualistic economy.

The fact of being in school acts differently in the core and in the periphery. If we exclude the S. Paulo region, being in school has statistic significance just in few activities in the core for all regions. This variable has statistic significance for almost all activities in both core and periphery in S. Paulo. In the North and Northeast this variable has weaker effect on income in the periphery than in other regions. The highest effect of being in school on income* appears in the transformation industries of leather and skins

* Jencks (1977) and Haller and Pastore (1983) use $(e - 1)$ as a measure of the effect of dummy variable on the dependent variable.

in the North, with 92% less income for those workers that are currently in school. But in this case it looks an exception since, for other regions, the effect in this activity is relatively low. The other highest effect of being in school appears in the commerce of supplies, and food and beverages in the regions of S. Paulo, in the South, and in the region of Minas Gerais and Espirito Santo, where workers in school receive up to 76% less than those who are not in school. This is for the periphery. For the core, the highest effects occur in the commerce of chemical and pharmaceutical products, fuel and lubricants, in the regions of S. Paulo and in the South; in the transformation industries of beverages and alcohol products in the South, and in the pharmaceutical and veterinary products in the region of Minas Gerais and Espirito Santo, where workers in school receive up to 68% less than those who are not in school (in the case of commerce and merchandise of chemical and pharmaceutical products in the South).

There is no hypothesis regarding the effect of being in school or not on income difference. Based on other research, it was assumed that such effect is negative. In fact, the findings show that the such effect occurs most frequently in the periphery, especially for the more developed regions.

In agriculture, education has a lower effect on income than the two other sectors, for all regions. Following the rationale of the dual economy segmentation, it is possible to say that agriculture is the sector of the periphery that rewards less per year of schooling. But, for some regions like Rio de Janeiro and S. Paulo, being in school reduces income of workers in agriculture in 50% and 46%. Such effect almost does not exist in other regions like Brasilia and Northeast. It is worth to see also that the effect of being in school in Rio de Janeiro is higher in agriculture than in the two other sectors.

Regarding the third hypothesis, the findings do not fit. Table 5 shows that education has a statistically significant effect on income for all regions, despite the kind of activity they are. The same thing happens regarding the fact of being or not being in school. For all regions, those workers who are in school have lower income than those who are not. There is also no evidence that both the effects of years of schooling and the effects of being or not being in school on income are associated with regional development.

A summary chart (Chart 1) was prepared to provide a clear picture of the patterns of effects of the schooling year.

on the core, periphery on agriculture. The dependent variable, log income. The parameters are multiple to regression coefficients _____ (?)

A detailed examination of the chart shows (1) that on the _____ where is the the core-periphery variable has only trivial effects on the impact of education on income; (2) that being in school has depresses income quote substantially in all areas and in each sector of the economy; (3) that outside the developed South, being in school depresses income each more among these is pheripheral than in core jobs. Unfortunately, at this time we lack an adequate explanation for this finding. Clearly this should be

5.0 CONCLUSION

Generally describing, it is possible to say that there is a great differentiation of years of schooling among occupations. The greater division is between the agricultural activities and the others. Regarding the effect of education on income differentiation, there hypotheses have been stated in an attempt to refute the human capital theory. Rather, the labor market segmentation theory, with a segmentation of the labor force between a dualistic economy - core and periphery - was expected to be more useful in explaining that difference among workers. The findings, show very little evidence in support of the core-periphery hypothesis higher effect on income in the core than in the periphery. Trivially, more important is the effect of education on income despite the allocation of the labor force in the market.

Therefore, the Brazilian 1976 PNAD data suggest that human capital theory has something to do in explaining income among workers in Brazil, at least at that time. Moreover, the data suggest that the labor market segmentation theory does not work very well. The small differences between core and periphery suggest that the classification of the activities

should be reviewed and, maybe, the same classification cannot be applied exactly for different countries, even at the same economic system.

It is not just an academic speculation, but it is very important to educational policy to continue in search of what those two theories - human capital and labor market segmentation - have to do in explaining income in Brazil. It is a real challenge to see what goes on in different capitalistic societies with a theory which has been proven to be useful in explaining some aspects of social stratification. It is also politically important to know what education has to do in increasing the income level for a great amount of people in Brazil.

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Table 1. Number of valid and deleted cases ^{of individuals} for years of schooling and salary fixed ^{by region,} and total and proportion of workers

Region	Total	Years of schooling		Salary Fixed		Workers
		Valid	Deleted	Valid	Deleted	
Rio de Janeiro	46944	32641	14303	15151	31793	13959(30%)
S. Paulo	58415	41061	17354	18426	39989	18734(32%)
South	53830	34881	18949	10415	43415	10985(20%)
Minas Gerais and						
Esp. Santo	59305	34850	24455	12972	46333	12380(21%)
Northeast	96977	36129	60848	16519	80458	14760(15%)
Brasilia	38954	26281	12673	11950	27004	11718(30%)
North	39446	24161	15285	8720	30726	8726(22%)

Table 2. Resression Coefficients for ln(income) on Years of Schooling by Region and by Activity, with the sample size of workers for each activity in parenthesis- PNAD/1976.

Activities	Rio	S.Paulo	South	M.Gerais and Esp.Sto.	Brasilia	North	North east
CORE							
1. EXTRACTIVE INDUSTRIES							
Metallic mineral extraction	-----	-----	-----	.148* (79)	-----	-----	-----
Non-metallic mineral extraction	.151* (27)	.141** (42)	.034 (38)	.048 (41)	-----	-----	.166 (54)
Mineral fuel extraction	-----	-----	.007 (32)	-----	-----	-----	.184 (31)
2. TRANSFORMATION INDUSTRIES							
Metallurgy	.141* (373)	.125* (802)	.136* (234)	.146* (404)	.146* (91)	.099* (40)	.046 (112)
Non-metallic mineral products	.182* (124)	.149* (323)	.078* (152)	.099* (171)	.157* (50)	.117* (94)	.152* (123)
Rubber	-----	.145* (77)	-----	-----	-----	-----	-----
Chemistry	.154* (197)	.150* (253)	.131* (49)	.061 (25)	-----	.147* (21)	.111 (114)
Plastic products	.171* (63)	.132* (129)	.203* (50)	-----	-----	-----	-----
Electrical material and communications	.174* (119)	.147* (436)	.106* (80)	.122** (35)	.126* (21)	.146* (43)	.082* (26)
Material for transportation	.162* (219)	.126* (622)	.089* (41)	.198* (50)	-----	.111 (31)	-----
Pharmaceutic and veterinary products	.176* (81)	.135* (83)	-----	-----	-----	-----	-----
Beverages and alcohol products	.130* (78)	.164* (89)	.130* (55)	.139* (43)	.168* (40)	.145* (44)	.241* (45)
Tobacco	.211* (28)	-----	-----	-----	-----	-----	-----
Civil construction	.144* (1041)	.131* (948)	.094* (632)	.131* (948)	.119* (1216)	.113* (681)	.123* (758)
3. PUBLIC UTILITIES							
Production and distribution of electrical energy	.141* (130)	.144* (129)	.103* (74)	.123* (84)	.188* (96)	.125* (84)	.087* (127)
4. COMMERCE AND MERCHANDISE							
MACHINES	.138* (170)	.103* (172)	.165* (126)	.084* (101)	.143* (170)	.135* (172)	.089* (170)

	(105)	(120)	(84)	(70)	(109)	(91)	(69)
Chemical and pharmaceutical products	.089* (65)	.107* (70)	.096* (80)	.111* (71)	.109* (41)	.087* (63)	.117* (64)
Fuels and lubricants	.204* (75)	.121* (104)	.198* (99)	.153* (106)	.112* (61)	.145* (91)	.052* (53)

PERIPHERY

1. TRANSFORMATION INDUSTRIES

Mechanics	.160* (132)	.127* (438)	.102* (113)	.078* (55)	-----	.079* (22)	.202* (27)
Wood	.098* (63)	.035 (58)	.076* (305)	.053 (92)	-----	.023 (165)	.094* (69)
Furniture	.036 (150)	.090* (206)	.139* (132)	.086* (91)	.089* (71)	.009 (48)	.080* (67)
Paper and cardboard	.088* (40)	.115* (114)	.139* (116)	.224* (31)	-----	-----	-----
Leather and skins	.046 (23)	.131* (26)	.198* (29)	-----	-----	-----	-----
Textiles	.115* (230)	.125* (529)	.094* (194)	.078* (157)	-----	.158* (72)	.120 (220)
Clothing, shoes and fabrics	.098* (248)	.119* (469)	.067* (321)	.081* (103)	-----	.114* (35)	.019 (79)
Food products	.096* (324)	.136* (541)	.117* (326)	.069* (307)	.084* (111)	.127* (203)	.143* (366)
Editorial and graphic	.099* (208)	.096* (239)	.084 (62)	.168* (61)	.120* (134)	.166* (66)	.148* (61)
Diverse	.133* (119)	.147* (213)	.188* (37)	.117* (34)	-----	.231* (20)	.127* (25)

2. COMMERCE OF MERCHANDISE

Office supplies	.065 (56)	.159* (46)	.077 (21)	.097** (25)	.238* (42)	.131 (26)	.059 (23)
Food and beverages	.091* (288)	.065* (320)	.084* (261)	.089* (369)	.087* (186)	.062* (258)	.098* (286)

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* t-test, level significance .01
 ** t-test, level significance .05
 ---- Less than 20 observations.

Table 3. Resression Coefficients for ln(income) on beins in school=1
by Resion and Activity - PNAD/1976.

Activities	Rio	S.Paulo	South	M.Gerais and Esp.Sto.	Brasilia	North	North east
CORE							
1. EXTRACTIVE INDUSTRIES							
Metallic mineral extraction	-----	-----	-----	-.439	-----	-----	-----
Non-metallic mineral extraction	-.373	-.196	-.629	-.069	-----	-----	-.485
Mineral fuel extraction	-----	-----	+.379	-----	-----	-----	-.627
2. TRANSFORMATION INDUSTRIES							
Metallurgy	-.425*	-.778*	-.612*	-.582*	-.899*	-.573**	-.539*
Non-metallic mineral products	-.563*	-.725*	-.066	-.434**	-.428	-.507*	-.622*
Rubber	-----	-.722*	-----	-----	-----	-----	-----
Chemistry	-.111	-.709*	-.187	-.663	-----	.929**	-.299
Plastic products	-.396	-.621*	-.720	-----	-----	-----	-----
Electrical material and communications	-.221	-.528*	-.134	-1.04	-.268	-.252	-.518
Material for transportation	-.670	-.826*	-.336	-.933*	-----	-.628**	-----
Pharmaceutic and veterinary products	-.282	-.429**	-----	-----	-----	-----	-----
Beverages and alcohol products	-.634**	-.801*	-1.00**	-.195	-.091	-.303	-.806*
Tobacco	-.190	-----	-----	-----	-----	-----	-----
Civil construction	-.550*	-.579*	-.442*	-.625*	-.535*	-.563*	-.333*
3. PUBLIC UTILITIES							
Production and distribution of electrical energy	-.516*	-.508*	-.447	-.116	-.426**	-.162	-.363**
4. COMMERCE AND MERCHANDISE							
Machines	-.309	-.393**	-.893*	-.704*	-.779*	-.521*	-.453*
Chemical and pharmaceutical products	-.567*	-1.14*	-.956*	-.645**	-.804*	-.627**	-.264
Fuels and lubricants	-.895*	-.780*	-1.01*	-.525*	+0.034	-.731*	-.467*
PERIPHERY							
1. TRANSFORMATION INDUSTRIES							
Mechanics	-.576*	-.649*	-.408**	-.255	-----	-.783	-.500
Wood	-.782*	-.668*	-.583*	-.513**	-----	-.608*	-.906*
Furniture	-.751*	-.491*	-.813*	-.729*	-.527*	-.517**	-.820**
Paper and cardboard	-.206	-.525**	-.636*	-.843**	-----	-----	-----
Leather and skins	-.315	-.745**	-.251	-----	-----	-----	-----
Textiles	-.380*	-.612*	+.235	-.454*	-----	-.311	-.202

and fabrics	-.428*	-.649*	-.476*	-.414*	----	-.017	-.105
Food products	-.333*	-.659*	-.498*	-.446*	-.744*	-.759*	-.539*
Editorial and graphic	-.464*	-.709*	-.850*	-.800*	-.726*	-.737*	-.711*
Diverse	-.477*	-.776*	-.959*	-1.16*	-.082	-.619**	-.739
2. COMMERCE OF MERCHANDISE							
Office supplies	-.568**	-1.42*	-1.15*	-.834*	-.649**	-.038	-.902
Food and beverages	-.597*	-.900*	-.784*	-.926*	-.834*	-1.08*	-.581*

.sk2

* t-test, level significance .01

** t-test, level significance .05

---- Less than 20 observations(see table 2).

Table 4. Regression coefficients of years of schooling (b1) and being in school (b2) on income and the sample size of workers for the core periphery, and agriculture by region, grouping all activities, with standard error in parenthesis.

Region	Core			Periphery			Agriculture		
	b1	b2	n	b1	b2	n	b1	b2	n
Rio de Janeiro	.150 (.004)	-.453 (.044)	2643	.113 (.006)	-.471 (.049)	1881	.086 (.023)	-.699 (.168)	2
S. Paulo	.136 (.003)	-.709 (.033)	3950	.129 (.004)	-.747 (.038)	3199	.072 (.011)	-.617 (.071)	10
South	.123 (.005)	-.630 (.055)	1602	.127 (.006)	-.655 (.049)	1917	.089 (.015)	-.283 (.132)	7
Minas Gerais and Esp. Santo	.138 (.005)	-.650 (.053)	1999	.095 (.008)	-.674 (.055)	1340	.078 (.011)	-.435 (.077)	11
Northeast	.133 (.005)	-.451 (.051)	1531	.114 (.008)	-.531 (.064)	1251	.066 (.011)	-.213 (.066)	14
Brasilia	.133 (.004)	-.590 (.044)	1712	.101 (.009)	-.752 (.071)	603	.153 (.041)	-.156 (.677)	
North	.113 (.006)	-.553 (.047)	1237	.111 (.009)	-.730 (.059)	925	.063 (.023)	-.331 (.125)	3

Table 5. Resression Coefficients for $\ln(\text{income})$ on years of schooling⁽⁶¹⁾ and being currently in school⁽⁶²⁾, and the mean and standard deviation (in parenthesis) of years of schooling by region - PNAD/1976.

REGION	b1	b2	Mean of years of schooling
Rio de Janeiro	.141*	-.489*	6.6 (3.5)
S. Paulo	.135*	-.695*	6.1 (3.7)
South	.135*	-.619*	6.1 (2.6)
Minas Gerais and			
Esp. Santo	.123*	-.637*	5.5 (3.6)
Brasilia	.147*	-.497*	7.5 (4.3)
Northeast	.145*	-.499*	5.4 (3.8)
North	.137*	-.652*	5.9 (3.6)

Table 6. Percentage of workers that are currently in school or not and the total valid cases of workers by region - PNAD/1976.

Region	Not currently in school	Currently in school	Total valid cases
Rio de Janeiro	71.1	28.9	16616
S. Paulo	74.1	25.9	18734
South	77.1	22.9	22709
Minas Gereis and			
Espirito Santo	73.0	27.0	20673
Brasilia	62.4	37.6	13670
Northeast	79.6	21.4	34278
North	69.2	30.8	8726

E: Years of formal schooling

A: In school = 1
Else = 0

CHARIT

CORE

PEN.

AG.

TOTL

R.J

SP

SO

MG-ES

NE

BSB

NORTH

