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EDUCATIONAL INDICATORS BASED ON THE PNAD DATABASE FROM 2001 AND 2011

JEL classification: I2, O21

Abstract

This study aims to introduce some aspects of home databases of the National Sample Household Surveys (PNAD), provided by the Brazilian Institute of Geography and Statistics (IBGE), analyzing their advantages and disadvantages. The PNADs are important for the study of education as they enabled the calculation of various educational indicators that can be broken down into several levels of geographic units and various demographic and socioeconomic groups, such as income level, age, sex, educational group of parents etc. and would permit the study of historical series. Secondly, we present the calculation methodology for a set of educational indicators derived from the home bases, such as illiteracy rates, average years of schooling, schooling rate and others. With these indicators built up a picture of the evolution of Brazilian education, the Northeast and the Sergipe state for the years 2001 and 2011.The results show that the Brazilian education, despite recent advances, is still very precarious, even when compared to income countries per capita equal to or similar to ours.

Key words: education, PNAD, policies

1. INTRODUCTION

The National Household Sample Survey (PNAD in Portuguese) is an extremely rich database and enables researches to build different educational indicators, which enables the apprehension of many aspects related to educational systems. Moreover, the database can be used to analyses different parts of Brazil, as macroregions and states. This paper presents an overview of some of these indicators, which can be applied to academic and applied research, using the PNADs of 2001 and 2011. The main geographical area of analysis is the state of Sergipe, which is compared to the Northeast macroregion (henceforth only the Northeast) and to Brazil. We systematically present the indicators, with a brief methodological explanation, what might be clarifying on a didactic perceptive.

2. A COMPARISON BETWEEN SERGIPE, THE NORTHEAST AND BRAZIL: EDUCATIONAL INDICATORS ELABORATED WITH THE PNAD DATABASE

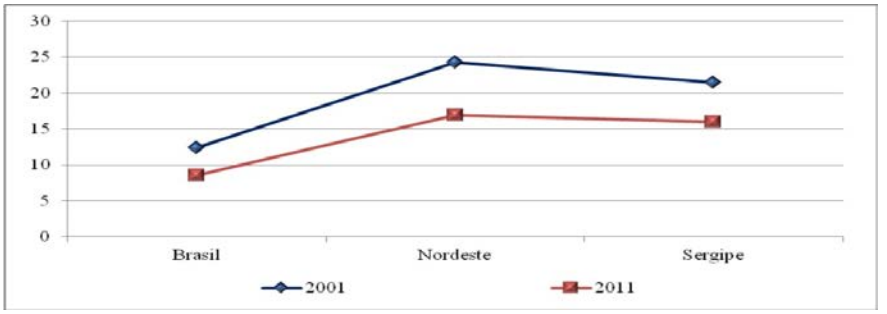
2.1 Illiteracy rate

The illiteracy rate is commonly used by international organizations as a socioeconomic indicator for the development level of countries. For instance, it is part of the Human Developed Index (HDI), implemented by the UN. It is estimated by the rate between the illiterate population and total population in the same age group, generally, individuals 10 years old and above or 15 years old and above. An illiterate person is an individual that is incapable to read or write a simple note in his/her native language (IBGE, 2012). In the PNADs there is the following question: “Do you know how to read or write?”

The following expression represents this rate:

$IR = \left(\frac{P_{illiterate}}{P_{total}} \right) * 100,$ where IR is illiteracy rate, $P_{illiterate}$ is the illiterate population in a specific age group and P_{total} is total population in the same age group

Graph 1 illustrates the evolution of the illiteracy rate in Sergipe state, the Northeast and Brazil between 2001 and 2011. The relative evolution was approximately the same in these areas, with lower levels for the country and similar rates for the other areas. In Brazil it decreased from 12.36% in 2001 to 8.59% in 2011, with a reduction of 30.5%. Similarly, in the Northeast, the rate decreased 30.46 % in the period, while in Sergipe it was a little less remarkable, with a reduction of 25.43 %.

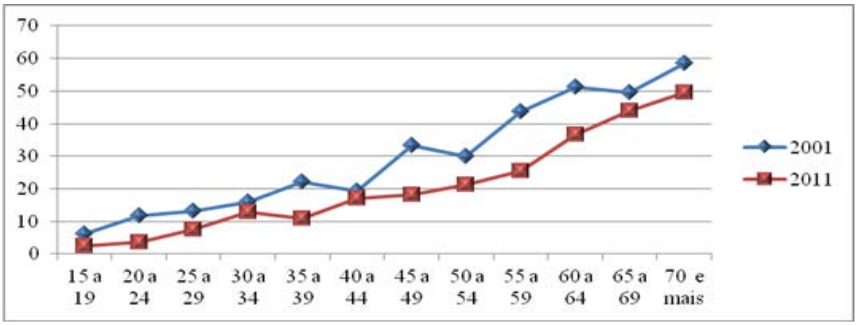


Graph 1 – Illiteracy rate for those 15 years and above in Sergipe state, the Northeast and Brazil in 2001 and 2011.

Source: IBGE , PNAD of 2001 and 2011. Data prepared by the authors.

However, illiteracy rate when estimated for the whole population above a specific age do not highlight differences between age groups. Therefore, the recent evolution of educational systems cannot be evaluated property, as age compositional effects are not illustrated. Graph 2 shows the illiteracy rate by age, what is much more insightful for this purpose, as the recent progress of educational systems cannot be appropriately observed by stock variables (RIANI and GOLGHER, 2004).

It is clear the differences between generations. Older individuals had much higher rates. For instance, between 2001 and 2011 in Sergipe, the illiteracy rate among those who were 70 years old and above was over 40%, although the rate reduced 15.34 % in the period, a similar number was observed for the rates reduction in the Northeast. For young generations, illiteracy is nearly non-existent, indicating the recent evolution of formal education in Brazil. Notice, however, that the decreased in illiteracy in older cohorts is simple due to the substitution of individuals. For example, those who aged 25 to 29 years in 2001 are the same as those who aged 35 to 39 years in 2011, and rates are rather similar. This point highlights the importance of policies of adult´s alphabetization.



Graph 2 – Illiteracy rate by age group in Sergipe in 2001 and 2011.

Source: IBGE , PNAD of 2001 and 2011. Data prepared by the authors.

Table 1 shows the illiteracy rate disaggregated by other groups of the population, by sex, the urban/rural dichotomy and income range. Concerning the differences among the sexes, rates were higher for men when compared to women. Urban residents had a much lower rate the rural ones in Sergipe, Northeast and Brazil. For instance, in Sergipe, the rates in 2001 were 16.03% in urban areas and 43.80% in rural ones. The reduction between 2001 and 2011 was also greater in the first, 37.05%, than in the last 23.56 %. Regarding income strata, as expected, the richer the households, the lower the illiteracy rate. Differences in the extremes of the income distribution were close to six fold.

Table 1

Illiteracy rate for those aged 15 years and above by sex, urban/rural place of residence and income range in Sergipe, the Northeast and Brazil in 2001 and 2011

Region	Year	Sex		Place of residence		Household income strata (in Brazilian minimum wages)			
		Male	Female	Rural	Urban	Up to one	From 1 to 3	From 3 to 5	Above 5
Brazil	2001	12.45	12.28	28.72	9.46	29.88	19.66	9.67	4.69
	2011	8.83	8.37	21.16	6.51	21.25	12.27	6.22	2.62
Northeast	2001	26.27	22.39	40.71	17.95	37.6	29.28	17.21	8.38
	2011	18.46	15.44	29.78	12.56	24.91	19.57	12.73	4.4
Sergipe	2001	23.68	19.46	43.80	16.03	39.71	24.78	14.35	7.06
	2011	17.99	14.21	33.48	10.09	27.79	18.24	12.05	4.82

Source: IBGE , PNAD of 2001 and 2011. Data prepared by the authors.

2.2. Mean schooling attainment

The mean schooling **attainment** is one of the most used among the educational indicators. It is influenced by approval and dropout rates, as well as rates of attendance (SOARES and LIMA, 2002). Therefore, high levels of attendance and approval, and low dropout rates tend to increase the mean schooling **attainment** of a particular population.

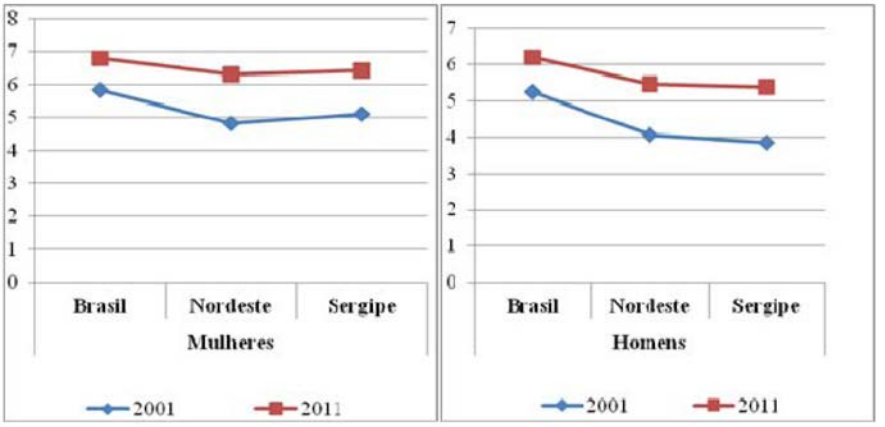
This indicator is built in the PNADs with information among students of the year and grade the individuals we e currently attending, and among those who were not attending any formal educational institution, the last year attended being approved.

The following expression shows how the indicator is estimated:

$$MSA = \left(\frac{\sum_{i=0}^{17} iP_i}{P_{total}} \right),$$

where MSA is mean schooling **attainment,** I is the numbers of years of formal education , P_i is the population with as specific number of years of formal education and P_{total} is total population.

Graph 3 shows the evolution of this indicator for the population aged 7 to 25 years[1] by sex in Sergipe, Northeast and Brazil in 2001 and 2011. The values increased clearly in the period, however, women had higher values than men and differences increased between 2001 and 2011. According to Ramos (2007), differences in the labor market dynamics, as men are supposed to work at an earlier age than women, promote greater dropout and failure rates among males, partially explaining these results. Tendencies in the three areas are very similar, although the gaps in the Northeast and in Sergipe were greater. Values increased respectively 1,53 e 1,42 in Sergipe and in the Northeast, and a little less, 0.94 in Brazil.



Graph 3 – Mean schooling attainment for the population aged 7 to 25 years by sex in Sergipe, Northeast and Brazil in 2001 and 2011

Source: IBGE , PNAD of 2001 and 2011. Data prepared by the authors.

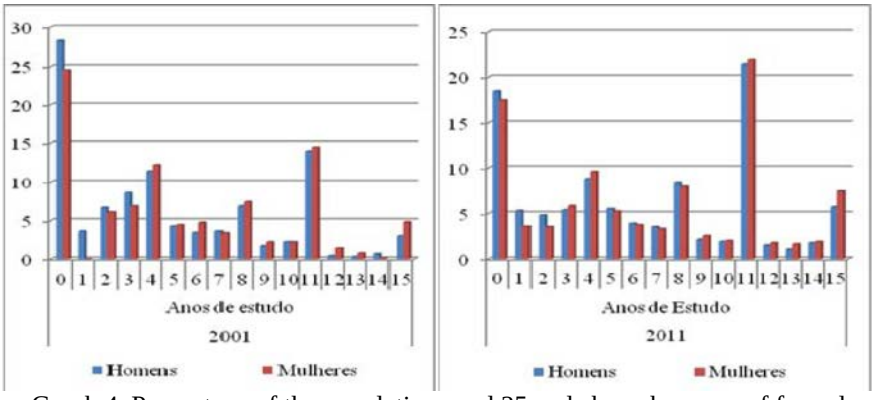
[1] This age group is the same used in Riani and Golgher (2004), nonetheless, it is more usual to use the ages groups 15, 20 or 25 years old and above.

2.3. Percentage of the population of a particular age within a range of educational attainment

The indicator percentage of the population of a particular age within a range of educational attainment is directly linked to the indicator above[2]. The expression below shows how to estimate the indicator:

$PPEA = \left(\frac{P_{ic}}{P_i} \right) * 100,$ where *PPEA* is percentage of the population of a particular age within a range of educational attainment**;** P_{ic} is the population in the specific range of educational attainment among those of a particular age group; and P_i is the total population in the age group.

Graph 4 shows the indicator for the population aged 25 year and above for the number of years of educational attainment in Sergipe by sex. The temporal evolution and the higher levels of formal education of women are clearly noticed. Moreover, two other facts should be emphasized: the large proportion of individuals of both sexes with no education [3] and the peaks at 4, 8 and 11 years of formal education. These peaks represent the end of cycles: 4 years for the elementary level; 8 for the fundamental level; and 11 for high school diploma. There was an increase in the proportion of individuals with 11 years of formal education between 2001 and 2011, those who potentially could enter tertiary education, but given the lack of opportunities or will do not make the transition between the secondary level and the university.



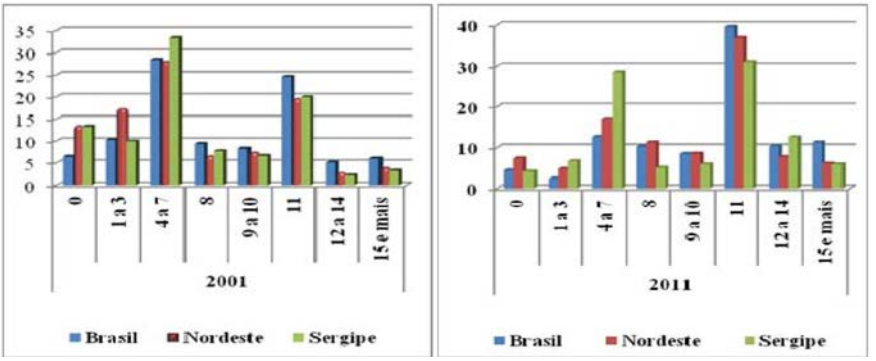
Graph 4 Percentage of the population aged 25 and above by years of formal education by sex in Sergipe in 2001 and 2011.

Source: IBGE , PNAD of 2001 and 2011. Data prepared by the authors.

[2] The ranges of educational achievement most commonly used in Brazil by the central government are: no education (zero years of formal education); incomplete fundamental studies (1 to 7); complete fundamental studies or incomplete secondary level (8 to 10); complete secondary level and incomplete tertiary (11 to 14) and complete tertiary level (15 year and above). Researches commonly use the ranges 0 to 3, 4 to 7, 8 t o10, 11 and 12 and above.

[3] Not necessary illiterate.

Graph 5 shows the results for the indicators for 8 ranges of educational attainment: zero years of formal education (no education), 1 to 3 years of forma education (less than elementary); 4 to 7 (less than fundamental); 8 (fundamental level); 9 to 10 (less than high school); 11 (high school diploma); 12 to 14 (some university); 15 and above (university degree). The results clearly show the positive evolution of schooling attainment in the three analyzed areas. For instance, in Sergipe, the decline of individuals with no education between 2001 and 2011 was 9.14%, while in the Northeast and in Brazil the numbers were respectively 6.1% and 2.0%. On the other hand, there was an increase in the percentages of those who held higher levels of education.



Graph 5 Percentage of individuals aged 25 and above by educational attainment range in Brazil, the Northeast and Sergipe in 2001 and 2011.

Source: IBGE , PNAD of 2001 and 2011. Data prepared by the authors.

2.4. Gross enrollment ratio and net enrollment ratio

The indicators gross enrollment ratio and net enrollment ratio complement each other in some features and both are described in this section. The gross enrollment ratio is estimated by the ratio between enrollments in a specific level and the population that ideally should be attending the level. It enables to evaluate the volume of students vis-à-vis those who potentially would demand the specific level.

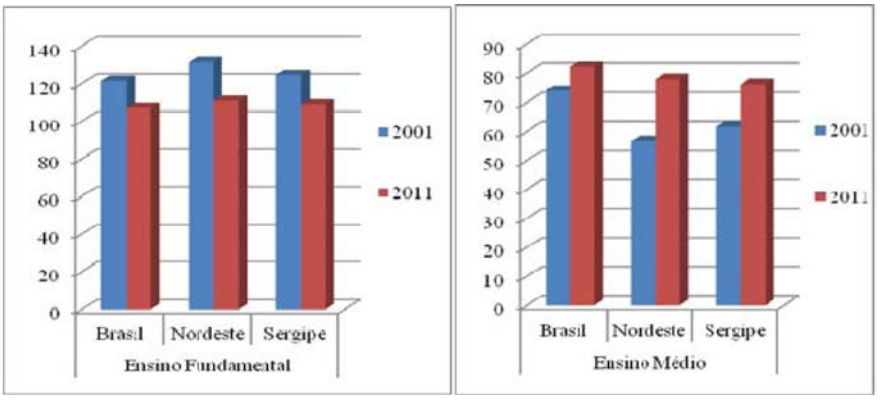
The following expression shows how to obtain the indicator:

$$GER = \left(\frac{Enr_j}{P_i} \right) * 100,$$ where *GER* is gross enrollment ratio; Enr_j is the population enrolled in the specific educational level irrespective of the age; and P_i is the total population in the age group that ideally should attend the level.

However, this indicator has some limitations, as a region might have a higher value than other mostly due to a high age-grade distortion, when older individuals are still attending lower levels than they should (FELÍCIO and FERNANDES, 2005). Large proportions of older individuals than the ideally expected are caused by a later entrance in the educational system, temporary dropout or due to failure. Between 2001 and 2011, there was an increase in enrollment ratios in ages considered ideal for the fundamental level (7 to 14 year old) and for the secondary level (those aged 15 to 17). In part, this was the consequence of policies associated with school meals, the *bolsa-familia* policy, and greater availability of school.

Graph 6 shows the results for the indicator for the fundamental level and for the secondary one in the three analyzed areas in 2001 and 2011. For the fundamental level, the values are over 100% in all areas and years, as there were more people enrollment in this level than individuals aged 7 to 14 in the population. These results show the low levels of efficiency of educational systems in Brazil, with high values of age-grade distortion. Therefore, the ambiguities of the indicator, as mentioned above, are quite clear. On the positive side, more students are in school and did not dropout. On the other, many older students did not conclude with success the fundamental level. Notice that the values decreased between 2011 and 2011.

This same indicator does not show such great ambiguities for the secondary level. The positive side of the indicator tends to be much greater than the negative one. Regions with better values for the indicator for the age group of 15 to 17 tend to be more developed educationally. Notice that the values increased in the period in the three regions.



Graph 6- Gross enrollment ratio in the fundamental level and secondary level in Brazil, the Northeast and Sergipe in 2001 and 2011

Source: IBGE , PNAD of 2001 and 2011. Data prepared by the authors.

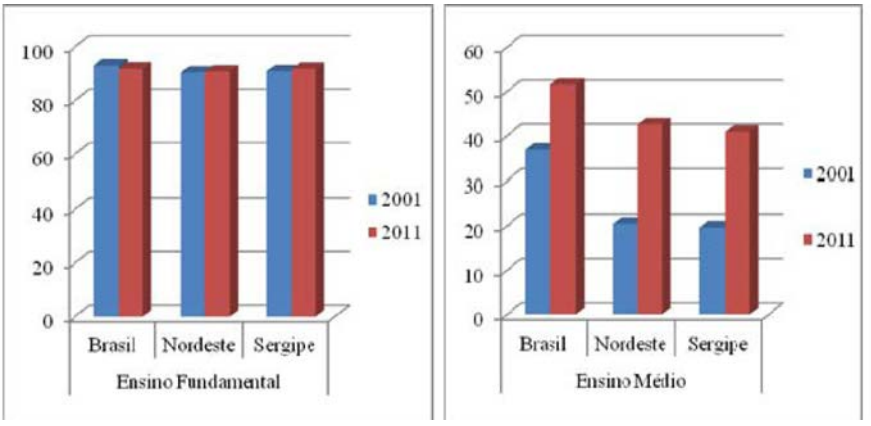
The ambiguities of the GER do not exist in the net enrollment ratio, which is estimated by the ratio between the enrollment of those who ideally should be in the level divided by the total population of the age group. The following expression shows how to estimate the indicator:

$$NER = \left(\frac{Enr_{ij}}{P_i} \right) * 100,$$

where *NER* is net enrollment ratio; Enr_{ij} is the population enrolled in the specific educational level among the age group that ideally should attend the level; and P_i is the total population in the age group that ideally should attend the level.

This indicator does not include individuals in older age groups than those who ideally should attend the specific level, is basically influenced by positive phenomena, and hence is adequate to evaluate the efficiency of the educational system. However, notice, for instance, that 10 year old students that are still in the first year of the fundamental level do show age-grade distortion, as they should be in the third or fourth years, by they are considered in the ideal age group to attend the fundamental level.

Graph 7 shows the results for the fundamental and for the secondary levels. All values are below 100%, and a clear positive evolution is observed between 2001 and 2011. Notice that the results for the fundamental level, which are close to 100%, show that this level is nearly universalized in Brazil. However, for the secondary level, values are much lower, although the evolution in the period was remarkable.



Graph 7 – Net enrollment ratio in the fundamental and secondary levels in Brazil, Northeast and Sergipe in 2001 and 2011.

Source: IBGE , PNAD of 2001 and 2011. Data prepared by the authors.

3. FINAL COMMENTARIES

This paper presented some educational indicators estimated with the PNAD database of 2001 and 2011. It compared the Sergipe state, the Northeast regions and Brazil for a myriad of indicators, which enable the apprehension of an encompassing perspective of the recent evolution of education systems in these areas in aspects related to sex and other demographic variables, as well as income and other economic variables.

It was observed a remarkable evolution of Sergipe, especially regarding illiteracy rate and mean schooling attainment, both with more notable progress than Brazil. Notably, gross schooling rates were high for the fundamental level, although the relative evolution of secondary level education systems were more strikingly, indicating the still incipient development of this last level in Sergipe and in Brazil.

It is well acknowledged that formal education in Sergipe and in Brazil, although the recent remarkable progress, still have a long way to go to be considered of a reasonable quality, even when compared to countries of similar per capita income. This social perspective highlights the need to effectively propose public polices designed to overcome the many deficiencies and difficulties presented by the educational system in Brazil. Aspects associated with social integration, poverty, economic competiveness, social inequality, income growth, all linked to formal education, will be necessary considered by the public agenda in the near future. Therefore, studies as this one that presented an evolution of encompassing educational indicators in different geographical areas, surely can be used by political actors to found a more developed and equal society.

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