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# THE EFFECT OF THE EARLY ENTRANCE TO JOB MARKET ON THE HEALTH STATUS OF THE BRAZILIANS IN 2008

***Abstract***

The early entrance to the job market has, among other consequences, a negative effect on the health status of the individual. In 2008, nearly a sixth of the Brazilian population claimed to have started working before the age of 10 and over a third reported to have started working between 10 and 15 years old. This paper aims to investigate the effect of early entrance to the job market on the current health status of the individual. The database provided by the National Survey by Household Sampling (PNAD) for 2008 was used to reach the objective of this paper. The analysis was conducted at national and regional extent using Ordered Logit method. It was evident that delaying entrance to the job market impacts positively on the current state of health. Moreover, it was found that the educational level and personal income increase the likelihood of the individual presenting a better state of health. Distinct effects of these variables on health status were also found when we took into account the regional context. The Southeast and South showed the most severe impacts of child labor on health, as well as the best results in terms of the impact of education and personal income on health status. In contrast, the North and Northeast regions showed the greatest gender disparities related to health status.

***Keywords***

Brazil, Child labor, Health status, Ordered logit

## 1. Introduction

According to the International Labor Organization (OIT, 2012), 215 million children work at present, of which about 50% act in derogatory activities. The early entrance of the child to the labor market coerced either by the family or not, prevents them from attending school or, even, from receiving some kind of care (OIT, 2012). Child labor ravages all the continents, including the European one. In Latin America, a few studies which investigate the causes of child labor as well as its consequences, mainly for Brazil, are highlighted.

In Brazil, in 2008, 13 % of the population admitted to have begun to work before the 10 years old, which makes worrying the impact of child labor upon the future of those children and consequently upon the process of the economic development of the country (IBGE, 2008). In this sense, Kassouf et al. (2001) and Nicolella et al. (2008) claim that child labor inhibits the development of the child and, afterwards, of the grown-up individual, owing to,

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among other consequences, the impossibility of attending school. For Vietnam, for instance, Beegle et al. (2009) have found evidence that child labor negatively impacts on school performance.

Although, a great part of the works does not stress the effect of the early entrance to the job market upon health, the different ages in which a child goes into the job market possess distinct impacts on the health status of the adult person. In other words, it is expected that children who began to work before the 10 years old are more harmed in relation to the ones who enter between 10 and 15 years, for example. In Brazil, in 2008, 39% of the population admitted to have gone into the job market between 10 and 15 years old (IBGE, 2008).

The regional matter is also very important in the surveying of the relationship between child labor and health status, since in regions, as the Brazilian Northeast, the percent of individuals who claimed to have entered the job market before the 10 years old is of 16% (IBGE, 2008). In the Central-Western region, about 15% of the population claimed to have begun in the job market before the 10 years, while in the Southeast region, more developed economically– mainly as far as the industry is concerned – about 10% so stated. In the other regions, North and South, that percent is intermediary, respectively, 13% and 14%. It is advisable to highlight that other factors are also unequal, such as education, income and race and gender question.

Therefore, given that context, the present work intends to investigate the relationship between the individual's age of entrance to the job market and his current health status. Strictly speaking, it aims to survey from the construction of age ranges the effect of the delay upon the age of entrance to the job market on the health status.

In addition to that piece of information, this work counts, forthwith, with the literature review which is concerned with this theme. Afterwards, both the methodology and the main results obtained are presented. At last, the final remarks are presented.

## 2. General overview of the literature about the impact of child labor on health status

The literature which is concerned with the theme, although scarce, enables us to characterize in a concrete form, the research theme. Some works stand out for the theoretical discussion and others for the empirical application.

The investigation about the health status of the grown-up individual or even of the child is not recent , though; its association with child labor is so. A few pioneering works made use of theoretical models to estimate the health demand. Grossman (1972, 1975) and Wagstaff (1986, 1993) stood out for their pioneering activity in the construction and debate of such models. In Brazil, recently, Oliveira and Gonçalves (2012) investigated, specifically, the health demand from models for countable data in which the variable to be explained was the number of consultations. Although, the theoretical model aims to survey the health status, does not embrace the effect of the early entry in the job market, central aim of the study.

Some studies prioritize to identify the impact of child labor upon other variables such as personal performance. Among those works, the ones proposed by Kassouf and Santos (2010) stand out, who investigate the impact of child labor upon the future performances of the Brazilians and by Haas et al. (2011), who seeks to investigate the impact of the child's health on the performances of the same ones when they become adults (between 25 and 50 years) for the 1990's. Furthermore, Fonseca (2011) turns his attention to the theoretical aspects of the relationship between health and employment.

In the international literature, there are two works which discuss the research trouble investigated in this work for Vietnam – O'Donnell et al. (2005) and Beegle et al. (2009). The first work is intended to investigate the impact of child labor on the health status in the short and long term, controlling for other control variables as education. The authors utilized the Vietnam Living Standards Survey to perform their surveys. Among the methods used; the Two Stage Least Squares (2SLS), the Seemingly Unrelated Regression (SUR) and Bivariate Probit stand out. O'Donnell et al. (2005) measured the health from the following variables: in the short term, body mass index; and, in the long term, recurrent diseases. The authors highlighted a weak relationship, in the short term, between the child labor and health, found when utilizing the 2SLS method in differences and robust in the long term.

Beegle et al. (2009), on the other hand, making use of the same data base, found no negative evidence of child labor upon the health status. Health was measured in two manners, diseases and number of sick days and in none of them, the negative effect upon the child labor was found.

Giuffrida et al. (2005) sought to investigate the correlation between poverty and health in Brazil as well as the relationship between health and child labor. In addition, the authors surveyed the determinants of the access and utilization of the medical assistance as well of the income. The authors made use of the data base of the Brazilian Institute of Geography and Statistics (IBGE), National Household Survey (PNAD) of the year of 1998 and innovated as regards the other works for using a distinct methodology – Structural Equation Models – SEM.

In the results found by Giuffrida et al. (2005), the positive impact of education, of income, of the public availability of water and of the presence of sewerage in the home on the health status. The authors also found that there is a positive relationship between dwelling the urban area and utilization of the medical assistance. Giuffrida et al. (2005) complemented the survey in stating that this result is in accordance with the literature and agree with the expected one, for in the urban areas there is increased possibility of access, since the availability is greater. Child labor, on the other hand, negatively influenced health status, as expected.

Kassouf et al. (2001) investigated the impact of the entrance of children to the job market on the health status when adult in Brazil. The authors utilized the data of the IBGE Standard of Living Survey of 1996–1997. Among the chief results, one can highlight that the early entrance to job market is associated with poor levels of schooling and income. In addition, the percent of individuals who possess an inadequate health status is directly associated with the ones who began to work before the 15 years of age. Besides, they call the attention

to the fact that the impact of the early entrance to the job market may not be realized when the children become youngsters or young adults, but in reality, afterwards.

Nicolella et al. (2008) address that point in investigating the impact of child labor upon the health of the children in the farm sector. This work stands out in relation to the others for making use of the cohort techniques to join together these two data bases of the PNAD of IBGE - of 1998 and 2003. In short, the authors aimed to identify the children who were in the age range of 5 to15 years in 1998 and of 10 to 20 years in 2003.
The work by Nicolella et al. (2008) proposes to correct the endogeneity problem existing among the variables health status and if the child worked in the farm sector. For that purpose, the authors made use of the Probit method with instrumental variables and found that the sector in which the child works does not possess significant impact upon his health status, but, when surveyed the children of the urban area, child labor decreased the probability for them to present a very good health status by 0.128 percent point.

In short, the international literature, mainly as far as Brazil is concerned, is still incipient, with few studies with the purpose of relating child labor with health. Therefore, this work seeks to add to that literature the discussion between the early entrance to job market and the current health of the grown-up.

## 3. Methodological aspects

The problem of research here suggested – effect of the entrance of children to job market upon the current health status – requires the use of methods which consider the binary or categorical dependent variable, since health status is hierarchized from very bad to very good . Therefore, the method which best fits this sort of variable, utilized in this work, Ordered Logit.

Cameron and Trivedi (2005) present that method for a model ordered with m alternatives. The same one is estimated by the Maximum Likelihood, in which the log of the function of likelihood is given by:

$$\ln L = \sum_{j=0}^{m} \sum_{y=i} \ln\left[F\left(\alpha_j - x_i'\beta\right) - F\left(\alpha_{j-1} - x_i'\beta\right)\right]$$

It is proper to stand out that though if one surveys the signs of the coefficients, the association among the variables is given by the estimative of the marginal effects which indicate the effect of a given regressor upon the regress and the calculation of the marginal effects is given by:

$$\frac{\partial \Pr(y_i = j)}{\partial x_i} = \left[F''\left(\alpha_j - x_i'\beta\right) - F'\left(\alpha_{j-1} - x_i'\beta\right)\right]\beta$$

The Ordered *Logit* seeks to estimate the probabilities related with the greatest category, in this case, the fifth, referent to the health status very good. Furthermore, it was intended to verify the statistical significance of the variables separately as well jointly.

### *3.1. Variables*

The data utilized in this work are coming from PNAD for the year of 2008. It was chosen to utilize the year of 2008 for presenting, in a direct form, in the questionnaire, a question about the individual's health status. It is worth highlighting that such a report is done by the individual interviewed, which can generate measure problems, given the subjective character of the question and/or of the answer.

The dependent variable – health status– is reported in five categories: very bad, bad, regular, good and very good. Since the method utilized is the Ordered *Logit*, the original categories were kept. The early entrance to the job market was measured from the creation of age ranges which point to the age in which the individual began to work. Two variables with distinct age ranges with the objective of captivate the unique impact upon the health status were constructed.

The first range consists in the age range between 4 and 9 years, while the second is concerned with the age range between 10 and 15 years. Although, one expects that both affect negatively the individual's health status, it is presupposed that the first age range degrades more health than the second one, since the chances for the child to study and develop professionally in the future decrease. The effect of that variable called, in most times, child labor, is confirmed by the literature as seen previously.

The variables selected for the survey of the determination of the health status were observed in papers with similar objectives. The previous section presents, in a short manner, those papers. However, it is noteworthy that Giuffrida et al. (2005) point to the relevance of surveying the association between health and age, education, race, among other factors. And, complementarily, O'Donnell et al. (2005) point to the gender as a determining factor in the resulting level of health. In addition to those variables, it was sought to capture other important effects such as the area in which the individual lives: rural or urban.

With the objective of measuring the impact of the age upon the health status, it was chosen for inserting a variable *age* into the model, corresponding to the current age of the individual. Age possesses a significant and negative impact upon health status, mainly, when the individual is at advanced age. That probably results from the possibility of occurring chronic diseases.

Nicolella et al. (2008), as already seen, discuss the health status, as a manner of accumulating human capital. The authors argue that the fact of a child not to work raises the probability that she possesses a more promising future, with higher levels of schooling and consequently of income. Starting from that presupposed, inserting more two control variables was chosen: years of study and personal income. The first one was constructed from the variable made available by the PNAD, *years of study*, and it is expected that it has a positive impact upon the health status. The second one was collected in the same source and as well as the previous one, a positive impact is expected.

In fact, the relationship of the variables years of study and *personal income* with the *health status* is founded on the same foundations. That means that both the variables are

correlated so that the greater the level of income more years of study possess the integrants of the home and vice-versa. It is expected that a higher level of income enables a more adequate feeding, greater access to medical and hospital services and a greater level of schooling. Besides, education also raises the income. So, it is expected that a higher level of income as well as of schooling has as a consequence better levels of health. It is realized, in that way, that there is a relationship of endogeneity between the level of income and schooling, but it is supposed that this relationship does not affect the estimates.

At last, dummies variables which represent the gender, race and the fact of an individual being or not in the urban area, were inserted. The objective in that case is controlling possible problems of omission of variables. The variable of gender takes over the value equal to 1 when is of the male gender. It is expected that being of the male gender has a positive impact upon the level of health, given the positive association with higher levels of income and consequently better levels of health.

The variable race takes over the value equal to 1 when the individual is black and has as an objective to captivate indirectly the racial differentiation in the income and educational level which impact on the individual's health status. Negative association between being a black and the health status is expected, since, in a lot of works, the racial prejudice is stressed.

The variable *urban* takes over value equal to 1 for individuals situated in the urban area. The objective is captivate the different health statuses prevailing between the urban and rural areas, grounded on a number of aspects, such as the health service offer as well as the income and schooling levels.

With the purpose of captivate different bias and not only intercept, or in other words, distinct impacts of the explicative variables about the individual's health status, estimating the following function (relationship) per region as well as at the national level was opted for:

$$health\_status = f(child, age, education, sex, race, urban, income)$$

in which health status is concerned with the categorical variable (ordered logit model), child is represented by two variables – age ranges, age represents the current age of the individual, *education* represents the amount of years of study*, gender*, a *dummy* with value equal to 1 for man, race, also d*ummy* with value equal to 1 for black, *urban, dummy* with value equal to 1 for individuals who dwell in the urban area and income, represented by the napierian logarithm of personal income.

## 4. Results and discussion

The model was estimated both at the nationwide and regional level, since the number of observations is high, which characterizes a good representation of the sample. It is stressed that it was chose to consider a complex sample. The econometric[4] model presented a good

[4] It was no presented in the work, but for references, please send an e-mail: fsilva.f@hotmail.com.

adjustment[5], as can be observed in the coherence of the estimated coefficients. The tests indicated that the variable health status is liable to be subdivided into five categories. In addition, the comparison among the probabilities estimated for each category and the percents of them in the samples enables to survey the model's adjustment. In general, the difference between these was inferior to 0.02 (or 2%), indicating, therefore, a good adjustment. The results found are corroborated by the literature. The evidence stands out that the early entrance to job market affects both negatively and significantly the health status of the grown-up. Kassouf et al. (2001) also found that relationship for Brazil. Beegle et al. (2009) did not find that statistically significant relationship, while O'Donnell et al. (2005) found a negative and significant relationship between child labor and health. The other results, when surveyed by the literature, also presented similar relationships, although distinct magnitudes.

The range of the effect of the variables upon the health status is measured from the calculation of the marginal effects. Those effects, presented in Table 1, in general, were similar among the regions. It was found that the rise in one year of age decreased by 0.5 percent point (*p.p.*) the probability for the individual to present very good health status. The impact of the age upon the health status attenuates in the Southeast and South regions, pointing out that the older people present greater probability of showing a worse health status. Giuffrida et al. (2005) found, overall, a depreciation of health with age, but, indicating that the magnitude of that effect ranges with the gender, its being more perverse for the female.

The division into age ranges in which the individuals began to work presented robust results, such an impact being both significant and distinct. Such a survey enables us to infer that for all the geographical regions and for the country as a whole, the insertion in job market before the 10 years of age presents more severe effect on the health status than the entrance between the 10 and the 14 years of age. For Brazil, the entrance to job market before the 10 years of age decreases by 4.8 p.p. the chances for the individual, in 2008, to present a very good health status. But the entrance between 10 and 14 years of age decreases by 1.7 p.p. such chances.

Regionally, it is realized that the South and Southeast regions stand out for superior effects of the early entrance to job market on the health status. Specifically, for the Southeast region, the entrance to job market under 10 years of age decreases the chances for the individual to present a very good health status by 5.2 p.p., while the entrance between 10 and 14 years of age decreases by 2.2 p.p. such a probability.

As far as the early entrance in the job market is concerned, in general, the results confirmed those found by Nicolella et al. (2008) and Kassouf et al. (2001). More severe impacts in the South and Southeast with relation to the North and Northeast and Northeast were highlighted. Partially, such an effect is due to the percent of persons who declared to have at least good health. For the first two regions, that percent is superior to 77% of the sample, while for the two latter regions, such a percent is inferior. It is worth pointing out that, methodologically, the marginal effects are calculated having as a reference the greatest

[5] One sought to consider the problem of endogeneity by estimating a *Probit* with instrumental variables, but, the results were very similar, except some signs for some regions.

category of the dependent variable, or in other words, considering the very good health status.

| | BR | NO | NE | SE | SU | CO |
|---|---|---|---|---|---|---|
| ***Age*** | -0.005*** (0.000) | -0.004*** (0.000) | -0.004*** (0.000) | -0.005*** (0.000) | -0.005*** (0.000) | -0.004*** (0.000) |
| ***Age 1 (4-9 years)*** | -0.048*** (0.002) | -0.034*** (0.005) | -0.034*** (0.004) | -0.052*** (0.006) | -0.061*** (0.006) | -0.045*** (0.005) |
| ***Age 2 (10-14 years)*** | -0.017*** (0.002) | -0.014*** (0.004) | -0.010** (0.003) | -0.022*** (0.003) | -0.027*** (0.004) | -0.018*** (0.004) |
| ***Years of study*** | 0.014*** (0.000) | 0.009*** (0.000) | 0.007*** (0.000) | 0.016*** (0.000) | 0.017*** (0.000) | 0.016*** (0.000) |
| ***Personal Income*** | 0.010*** (0.000) | 0.005*** (0.000) | 0.006*** (0.000) | 0.012*** (0.000) | 0.009*** (0.000) | 0.008*** (0.001) |
| ***Gender*** | 0.045*** (0.001) | 0.041*** (0.004) | 0.047*** (0.002) | 0.042*** (0.002) | 0.036*** (0.004) | 0.053*** (0.004) |
| ***Black*** | -0.007** (0.003) | 0.004 (0.007) | -0.004 (0.004) | -0.010* (0.005) | 0.007 (0.01) | -0.014* (0.007) |
| ***Urban*** | 0.002 (0.004) | -0.012 (0.010) | -0.022*** (0.006) | 0.013 (0.009) | 0.018* (0.01) | -0.004 (0.011) |

*, ** and *** denote significance at 10%, 5% and 1% respectively.

***Table 1:*** *Marginal Effects for the Health equation for the year of 2008 (Results of research)*

With relation to the educational level, it was found, as expected and pointed by the literature, a positive association with the health status. Therefore, a higher schooling level increases the chances for the individual to present a very good health status. For the country as a whole, the increase of one year of study increases raises by 1.4 p.p. such chances. From among the regional discrepancies, the one which takes places between the Northeast and South region stands out, in which, in the former region, the increase is of the magnitude of 0.7 p.p., while in the latter is of 1.7 p.p..

Personal income impacted positively on the health status, indicating that, for the country as a whole, for instance, the increase of a unit in the income brings about a rise by 1 p.p. in the probability for the individual to present a very good health status. In that sense, the increase by R$ 100 (local currency) in the personal income, and everything else constant, increases by about 4.6 p.p the chances for the individual to have a health status considered very good.

The effect of the personal income upon the health status possesses distinct impacts on the regions of the country. The North and Northeast regions proved less sensitive than the other regions, pointing out that the income increase by R$ 100,00 (local currency) for the North, for example, increases by 2.3 p.p. the chances for the individual to have the health status considered very good, while in the Southeast is of only 5.5 p.p. the increase of that probability.

Gender showed itself as a significant factor in determining the chances for one to have a health status considered very good, which possibly, can be explained by its correlation with

the income level. Giuffrida et al. (2005) point to the distinction in health status coming from gender, but, as previously stressed, estimated the models separately, which is not done in this paper. Nicolella et al. (2008) also corroborate such result – males present increased probability of having a better health status.

In fact, for the country as a whole, being of the male gender increases by 4.5 p.p. the probability for the individual to present a very good health status. It is noteworthy to highlight, in that sense, the regional discrepancies verified. For instance, for the Central-West region, being a male increases by 5.3 p.p such a probability while in the South region, that increase is of 3.6 p.p.. Such a fact, likely, is recurrent from the greatest insertion of the female into the job market as well as from the greater acceptance of the society of her role.

In the Central-West region, from among the individuals employed in 2008, 41% corresponded to females, while in the South of the country, that percent was of 43%. The situation becomes worse when surveying in which income ranges are situated the female workers of each region. In the Central-West region, for example, 46% of the females employed stated to receive up to one minimum wage (in 2008), while in the South, 38% did so.

The ethnic issue, discussed from the variable *Black*, indicated that being of the black color decreases the probability for the individual to present a very good health status. Nicolella et al. (2008) presented a similar result – being a white increases the probability of having a good health status due to the closeness to hospitals, since they dwell in neighborhoods with more access to health. In general, the marginal effects were not statistically significant, except for the country as a whole and for the Southeast and Central-West regions, though weakly significant. For Brazil, the fact of being a black decreases by 0.7 p.p. the changes for having health status considered very good and, respectively, for the former and latter region, such a decrease is of the order of 1.0 and 1.4 p.p.

Living in urban or rural as a determinant of the health status only was significant for the Northeast and South regions. It is noteworthy to stand out that for the South region, the parameter was weakly significant at 10%. The results pointed out distinct impacts. For the first region, the fact for the individual to be situated in the urban area decreases by 2.2 p.p. the chances of presenting very good health status, while in the south region, there is an increase of 1.8 p.p. Nicolella et al. (2008) also did not find any significance in the distinction in the dichotomy urban/rural when the models with those dummies variables were estimated. On the other hand, Giuffrida et al. (2009) argued that living in the urban area increases the access to medical care and, therefore, they expected and found a positive relationship with health status. Therefore, for the South region, that variable is only weakly significant, its result is in agreement with that of Giuffrida et al. (2009).

The interpretation of the results discussed up to now and of the already existing literature points out that the implementation of a public policy, which delays the children's entrance to job market would be interesting. An initial strategy for minimization of the problem could occur via intensification in the inspection of the Family Allowance Program. So, an increase would occur in the probability for the individual to present a better health status coming from the delay in the entrance to job market as well as an increase in schooling level.

Besides, the Child Labor Eradication Program (PETI), also implemented by the federal government, which involves the state and local spheres and which seeks to decrease the participation of the children in job market from the income transfer, would also act as a mitigation mechanisms of child labor.

## 5. Conclusion

The objective of the work was that of surveying the negative impact of child labor upon the health status of the grown-up. The descriptive survey of the data founded in a successful manner on the interpretation of the results from the use of the econometric models.

In general, it follows that child labor decreases the probability for the individual to present a good health status when grown up, but that the age in which the child is inserted into job market is also important in the determining of health status. So, though one cannot fight in a definitive way child labor, for matters which goes beyond the scope of this paper, a policy of delay of the entrance of the child to job market would be important.

Furthermore, the results pointed out that the greatest educational level as well as of *per capita income*, affect positively the probability of having a better health status. The regional results pointed out that homogeneous policies will not obtain homogeneous results. This took place because the early entrance to job market as well as other variables affect, in a distinct way, the health status of the individual.

The utilization of the year 2008 only, instead of recurring to the cohort technique, stands out itself as a limitation of the paper. In addition, the endogeneity problem was not taken into account in the models estimated. The subjective character of the variable which measures the health status of the individual can also be dealt as another limitation of paper. For future research, the joint carrying out of that study with the estimate of the earnings equation relating the current health status with earnings level is suggested.

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