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**EPGE**

Escola de Pós-Graduação  
em Economia

Ensaio Econômico

Escola de

Pós-Graduação

em Economia

da Fundação

Getúlio Vargas

Nº 394

ISSN 0104-8910

**Microeconomic Instability and Children's Human Capital Accumulation: The Effects of Idiosyncratic Shocks to Father's Income on Child Labor, School Drop-Outs and Repetition Rates in Brazil**

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Julho de 2000

URL: <http://hdl.handle.net/10438/873>

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Microeconomic Instability and Children's Human Capital Accumulation: The Effects of Idiosyncratic Shocks to Father's Income on Child Labor, School Drop-Outs and Repetition Rates in Brazil/ Guilherme Sedlacek, Daniela Ribeiro da Costa, Alexandre Pinto de Carvalho, Emily Gustafsson-Wright, Marcelo Cortes Neri - Rio de Janeiro : FGV,EPGE, 2010  
(Ensaio Econômico; 394)

Inclui bibliografia.

CDD-330

# Microeconomic Instability and Children's Human Capital Accumulation: The Effects of Idiosyncratic Shocks to Father's Income on Child Labor, School Drop-outs and Repetition Rates in Brazil

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## Abstract:

This paper evaluates the long-run effects of economic instability. In particular, we study the impact of idiosyncratic shocks to father's income on children's human capital accumulation variables such as school drop-outs, repetition rates and domestic and non-domestic labor. Although, the problem of child labor in Brazil has declined greatly during the last decade, the number of children working is still substantial. The low levels of educational attainment in Brazil are also a main cause for concern.

The large rotating panel data set used allows for the estimation of the impacts of *changes* in occupational and income status of fathers on *changes* in his child's time allocation circumstances. The empirical analysis is restricted to families with fathers, mothers and at least one child between 10 and 15 years of age in the main Brazilian metropolitan areas during the 1982-1999 period. We perform logistic regressions controlling for child characteristics (gender, age, if he/she is behind in school for age), parents characteristics (grade attainment and income) and time and location variables.

The main variables analyzed are dynamic proxies of impulses and responses, namely: shocks to household head's income and unemployment status, on the one hand and child's probability of dropping out of school, of repeating a grade and of start working, on the other. The findings suggest that father's income has a significant positive correlation with child's dropping out of school and of repeating a grade. The findings do not suggest a significant relationship between a father's becoming unemployed and a child entering the non-domestic labor market. However, the results demonstrate a significant positive relationship between a father becoming unemployed and a child beginning to work in domestic labor. There was also a positive correlation between father becoming unemployed and a child dropping out and repeating a grade. Both gender and age were highly significant with boys and older children being more likely to work, drop-out and repeat grades.

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The authors wish to thank Peter Orazem for his useful comments and insight. Needless to say, any remaining errors are our own.

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## **I. Introduction**

### **A. Background and Rationale**

What makes a child enter the labor market? Many have attempted to answer this question as well as the possibly related question of what leads to poor educational attainment among children in developing countries. Much of the empirical evidence demonstrates that child labor and poverty are intimately linked and that child labor deters the educational attainment of working children.<sup>1</sup> Others argue that poor educational quality and low returns to schooling lead to child labor and poor educational attainment in developing countries. One perspective that has been poorly examined until now, due to lack of data, is the effect of idiosyncratic shocks to household income and unemployment on child labor and educational attainment. In considering household characteristics and changes to those characteristics over time, this paper attempts to test the existence of a positive relationship between idiosyncratic shocks to household income and child entry into the labor market as well as to poor educational outcomes.

Previous research by Duryea (1998) demonstrates a negative effect of a father becoming unemployed on a child's grade advancement when controlling for parent's education and initial earnings. Using the same data set –the *Pesquisa Mensal de Emprego* (PME), which examines the six largest metropolitan areas of Brazil, this paper contributes to the literature by disaggregating the effects on grade achievement into drop-out and repetition rates as well as examining the magnitude of the effects of shocks on the probability of a child entering the domestic and non-domestic labor markets. This type of analysis may have significant policy implications for the efforts to eliminate child labor, improve educational achievement and reduce poverty.

Brazil has over the years received a great deal of attention relating to child labor –the examples often being the shoe industry and orange harvesting. The problem of child labor in Brazil is however much more diverse and complicated and its determinants highly inter-linked with both poverty and education. Despite this somber perspective, according to the PME, the rate of child labor in the metropolitan areas of Brazil has declined over the last two decades (from approximately 12% to

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<sup>1</sup> See for example Graiter and Lerer (1998), Grootaert and Patrinos (1999), Jensen and Nielsen (1997), Psacharopoulos (1997) and Tzannotos (1998).

below 4% from 1982-1999), see Graph 1A<sup>2</sup>. On average over the last two decades there have been about twice as many boys measured to be working than girls.

Although the data utilized for the empirical analysis in this paper is from the PME, for the purpose of gaining a wider understanding of child labor in Brazil we may look at the PNAD household survey which examines the whole of Brazil. The PNAD differentiates between urban and rural areas and allows us to look at different age cohorts since the incidence differs substantially between different groups in the population. In 1998, 15% of all 10-14 year olds in Brazil were working -a decline of 2% since 1995. In the same year, in rural areas, 36% of children in this age group and almost 8% in urban areas were working. As mentioned, the low levels of educational attainment in Brazil, are a cause for concern and are most likely linked intimately to child labor. On a positive note, the PME does demonstrate a declining trend in the metropolitan areas over the last two decades in drop-out rates, the numbers of children who both work and attend school, and the number of kids who are behind in school for their age as demonstrated in Graphs 1A to 1E.

Nonetheless, mean levels of schooling in Brazil remain extremely low for being a middle-income country. Ninety percent of individuals from poor households have not graduated from high school and 74 percent have not completed fourth grade. In Brazil today, there are 32 million individuals (22%) living below poverty line. Almost a quarter of all Brazilian children belong to poor families. While enrollment rates are high in Brazil, educational attainment can be seen in slow progression through school due to infrequent and erratic attendance and high drop-out rates. In Brazil overall in 1998 (PNAD), the rate of repetition was 13 percent and the drop-out rate was 8.9 percent.

## **B. Framework of the Paper**

The remainder of the paper is organized as follows. Section II discusses some of the previous literature relating to child labor, educational attainment and the effects of shocks on households. Section III outlines the theoretical framework upon which this paper is based. The methodology including the data and the model are discussed in section IV. Section V presents the empirical findings and section VI concludes and discusses policy implications.

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<sup>2</sup> We must consider that the definition of child labor in Brazil changed in 1991 from 15 hours per week to at least one hour per week. This measurement includes all Brazilian children (under 18) , not differentiating by age group.

## II. Literature Review

The literature examining child labor is quite extensive including such recent studies by Jensen and Nielsen (1997), Psacharaopoulos (1997), Tzannatos (1998), and Grootaert and Patrinos (1999). Most of these studies examine household characteristics such as poverty and educational attainment of parents as determinants of child labor. The empirical evidence from this literature demonstrates convincingly that poverty and child labor are closely related and that child labor impedes the educational attainment of working children.

There is another large literature examining the determinants of children's grade attainment and achievement (or lack thereof) of which some of the more recent about Brazil include Paes de Barros and Lam (1996), Gomes-Neto and Hanushek (1994), and Lam and Schoeni (1993). Mello, Souza and Silva (1996) find that repetition rates for the first two years of schooling are negatively related to parents' income level using retrospective data for São Paulo, Brazil in 1982.

A separate pertinent vein of literature examines the effects of income shocks on households. There is a smaller literature which makes a link between transitory shocks to income and school achievement though there is virtually no empirical evidence examining the relationship between idiosyncratic shocks to household head's income and child labor.

Duryea (1998) examines the role of transitory shocks to household income in children's advancement through school in Brazil. She measures whether or not a child gains a year of schooling from one year to the next when controlling for parents education and initial earnings. Her findings suggest a 4 percent decline in the probability of grade advancement for children 10-15 whose father has experienced an unemployment shock during the school year. These results demonstrate that children's time is used to buffer rare transitory income shocks to households in ways that are consistent with education models that incorporate assumptions of imperfect credit markets.

Parker and Skoufias study the effects of job loss and change in marital status on the allocation of time within families in Mexico. They find that children are largely unaffected by economic shocks, as measured by job loss, even during periods of economic crisis. They do, however, find some negative effects of divorce which are more even extreme during economic crises.

Jacoby and Skoufias (1997) link incompleteness in financial markets to human capital accumulation in a study examining the response of children's school attendance to seasonal fluctuations in the income of agrarian households in rural India. By looking at household responses to aggregate and idiosyncratic, as well as anticipated and unanticipated income shocks, they also find that children's time is used as a buffer or a form of self-insurance. A paper by the same authors from 1998, tests theories of consumption behavior by looking at rainfall surprises to estimate idiosyncratic unanticipated income changes. They find that households smooth fluctuations in income.

The existing literature on topics pertaining to this study are without a doubt widespread and provide a great deal of insight into household time-allocation with respect to permanent income, idiosyncratic household income shocks, and labor market fluctuations. Some of the studies mentioned examine how certain household characteristics such as parental income and education affect child labor and educational attainment and the other studies mentioned study the effects of income shocks on children's schooling. However, a link between these two veins has not been made. A contribution to the literature is necessary and can be made in examining the link between child labor and idiosyncratic shocks to household income. In addition, a contribution can be made in better understanding about how these shocks contribute to the basis of slow progression in school -drop-out and grade repetition.

### **III. Theoretical Framework**

A simplified discussion of Ben-Porath's (1967) model of the production of human capital and the life cycle of earnings allows us to better comprehend the main effects tested in this paper. This model applies capital theory to decisions about earning capacity and demonstrates how the production function through supply conditions helps to determine the optimal path of investment, its implications for the individual's allocation of time and demonstrates how the life cycle of earnings can be affected by different properties of the production function. It is assumed that individuals invest the most in themselves at a young age. Hence, they forego their current earnings at this age and consequently have low earnings. Earnings increase with age as the investments made in the past come to fruition.<sup>3</sup>

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<sup>3</sup> Ben-Porath (1967) based his model on Friedman and Kuznets (1945), Mincer (1958, 1962) and Becker (1962, 1964).

Applying this to child labor and schooling which we are examining here, we see that a parent has the following choices for his or her child: to send them to school, send them to school and work or only send them to work. This choice depends upon the current opportunity costs of the child's time versus the present value of future earnings from increased accumulation of human capital. The choice can be restricted, for simplicity, to three periods: infancy, childhood and adulthood. In period zero, the individual has accumulated an endowment of human capital equal to  $H_0$  which would enable he or she to earn wages equal to  $W(H_0)$  in the labor market. The individual could spend a portion of period one (childhood) in school. The productivity of schooling would depend on the accumulated human capital  $H_0$  and the income of parents  $Y_0$ . The parental choice is to select attendance in period one so that:

$$(1 + 1/1+r) W(H_0) \leq (1/r) (W(H_1 (H_0, A, Y_0)) + (1-A) W(H_0)) \quad (1)$$

Where  $r$  is the rate of interest at which borrowing and lending can take place. The left-hand side of the equation represents the present value of an individual's earnings from full-time work in periods one and two (childhood and adulthood). The function  $(W(H_1 (H_0, A, Y_0)))$  is the value at the beginning of period two of the stream of earnings that the individual can obtain if he had attendance  $A$  in period one. The human capital production function is increasing in  $H_0$ ,  $A$ ,  $Y_0$  with diminishing marginal products. In period two (adulthood) the individual will work full-time. With no future periods to obtain a return on the investment, there will be no further incentive to invest in human capital.

Consequently, equation (1)<sup>4</sup> characterizes the critical decision making point at the beginning of period one when the parent decides whether to send the child to school and how regularly the child will attend. The right-hand side of the equation therefore is the present value of full-time work in period two at the higher human capital plus child earnings from part-time labor in period one if  $A < 1$ . If condition (1) is violated, the parents will set  $A=0$  and the child will spend full time at work. If the condition holds with inequality, the parent will set  $A=1$  and the child will attend school full-time. If the condition holds with equality, the child will spend time in both school and work.

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<sup>4</sup> Rewritten as (2)  $Z = (1/1+r) (W(H_0) - W(H_1) + A W(H_0)) \leq 0$



Negative shocks to parental income increase the probability that the child works or drops out of school. First, we can presume that  $r$  varies inversely with  $Y_0$ . As household income declines, they become less willing or able to defer current consumption, and so discount the future more heavily. In addition, numerous studies of educational production functions have found a positive relationship between household income and school achievement suggesting that  $H_1$  varies positively with  $Y_0$ . Therefore, a reduction in  $Y_0$  will raise  $r$  and lower  $H_1$ , both of which will increase the odds that (1) is violated so that  $A = 0$ . Typically,  $H_0$  is measured by parental human capital attributes and by past schooling performance by the child. The impact of  $H_0$  on schooling is ambiguous in that it both raises the opportunity cost of schooling and the marginal productivity of schooling.

The model suggest examining children who have not yet begun to work and so are still in period zero where the child is specializing in human capital accumulation. Of critical interest to us is how the length of period zero and period one depend on current parental (or household head's) income. Shocks to parental income can cut short child schooling by lowering the school productivity and by raising the discount rate on future earnings. This justifies the empirical methodology adopted which will be discussed in the following section.

## **IV. Methodology**

### **A. The Data**

#### **Pesquisa Mensal de Emprego (PME)**

The Brazilian census bureau (IBGE) began to conduct the PME in 1980, including in it the six metropolitan areas of Brazil: Belo Horizonte, Porto Alegre, Recife, Rio de Janeiro, Salvador and São Paulo. This panel survey was performed on a rotating basis by interviewing households once a month for four consecutive months, dropping them out of the sample for eight months, and then interviewing them again for the four final months. Each month between 4,500 and 7,500 households in each of the six areas which added up to approximately 35,000 households that were interviewed in all. In August of 1988, the sample size was reduced to approximately 30,000 households per month. Nevertheless, the general labor and demographic questions were the same from the period of February 1982.

The benefit of the PME for this study is that it tracks employment and income characteristics of parents while children with 10 or more years of age are treated

analogously. This structure allow us to track an individual child attendance and educational progress over a sixteen month time period. The nature of the household composition is recorded including number of children under age 10 and each child above 10 years is given a numerical code. Each of the children assigned a numerical code are interviewed and requested to report their current school status (if they are attending and grade). They are also asked to report their main activity the previous week. The children could respond that they attended school, worked, looked for work, cared for domestic affairs, were retired or other.

The sample used in this paper is from February 1982- February 1999 from the six metropolitan areas. The sample consists of approximately 2.5 million observations of children between 10 and 15 years of age. In order to have a well controlled experiment we generate longitudinal information of those individuals followed successfully during all eight interviews attempted. Furthermore, we restrict the sample to very specific families –two-parental households (one father and one mother) with at least of child between 10 to 15 years of age. The child information used refers to the oldest child

## **B. The Model**

A non-linear specification, a binomial logit model was used for the analysis. This model allows us to measure the probability of an outcome occurring based of a set of explanatory variables. Four dependent variables are estimated in two regressions each with different sets of explanatory variables. The dependent variables are (1) probability of a child beginning to work, (2) probability of a child beginning to work in domestic labor, (3) probability of a child dropping out of school, and (4) probability of a child repeating a grade. The probability examined is that of the dependent variable occurring twelve months after the observation of the explanatory variables (which are at the fourth observation). For each regression there are a set of filters used. The filter, measured at observation four, generally indicates the opposite of the dependent variable. For example, that the child was not working (when the dependent variable is child begins working). In addition, the regression is conditioned so that father's income was positive in the fourth observation.

## **The Explanatory Variables:**

### Characteristics of the child:

In estimating the determinants of child labor and educational attainment, it is common practice in empirical analysis to control for gender and age. The stylized facts from Brazil indicate that the sign on gender (dummy male) would be positive for child labor which is consistent with much of both the developing and the developed world, and positive for drop-out and repetition which is consistent with much of Latin America though diverges from other parts of the world. Children included in the sample (the oldest child in the family) are between 10 and 15 years and it is predicted that the older a child is the more likely he or she is to work, drop-out or repeat a grade given the increasing opportunity cost of education as a child gets older. Another child characteristic which is included a determinant of child labor, drop-out and repetition is if the child is already behind in school. It is predicted that the sign would be positive.

### Characteristics of the parents and household:

The education of the mother and father are characteristics which have been shown empirically to affect the probability of a child beginning to work and his or her educational attainment. It is predicted that the sign on child and domestic labor variables would be negative as the more education a parent has the less likely it would be that they would encourage their children to work given that they are rational decision makers. The sign on drop-out and repetition is predicted to be negative as well following a similar argument. The income of the father is considered as another determinant. Because this sample is considered on rotating basis with the first four observations taken in the first four months and the last four observations (5-8) in the last four months, the father's income is considered in the fourth and the eighth observations. The variables are therefore father's income in the fourth observation and father's income being zero in the 8<sup>th</sup> observation. Father's income being zero acts as a proxy for being unemployed and measures the effect of idiosyncratic shocks to the household. Theoretically, it could mean that the father is employed in the informal labor market, however. The second specification of each regression (dependent variable) includes the father's income quintile in addition.

### Geographic and time characteristics:

The sample taken includes observations from the six metropolitan areas of Brazil: Porto Alegre, Rio de Janeiro, Belo Horizonte, Recife, Salvador and São Paulo. The sign predicted on each of these metropolitan areas would correspond to evidence of child labor, drop-out rates and repetition rates for each area. What may also be captured by including these areas are aggregate shocks to the economy which would differ from idiosyncratic household shocks. In the second specification of each regression, the year intervals are included beginning with 1982-83 and ending with 1998-99 to capture the trends over time in each of these dependent variables.

In the end of the paper, we find a series of simple tabulations (bivariate) and logistic regression analysis of the five endogenous dynamic variables with respect to a wide range of variables one at the time. We also present in the end of the paper similar evidence for the static counterparts of the variables pointed above. For example, the static version of the probability that a child leaves school is the probability that a child attends school. The empirical analysis here will be restricted to the dynamic analysis.

## **V. Empirical Evidence**

The appendix presents evidence on both static and dynamic variables using univariate, bivariate and logistic regressions related to child time allocation as posed below:

### Static Variables: (no filters)

- i) The probability of child labor
- ii) The probability of a child performing domestic labor
- iii) The probability of a child not attending schools
- iv) The probability of a child being behind years of schooling-age schedule
- v) The probability of a child being behind years of schooling-age schedule while attending school

### Dynamic Variables (same filters in both univariate and logits):

- i) The probability of a child beginning to work
- ii) The probability of a child beginning to work in domestic labor
- iii) The probability of a child dropping out of school
- iv) The probability of a child repeating a grade
- v) The probability of a child not obtaining school advancement

Due to lack of space, we will confine the empirical part of the paper to the analysis logistic regressions of dynamic variables:

## **Key Findings:**

### The probability of a child beginning to work (Table 6A):

- A child's age and gender are important determinants of child labor as evaluated by the conditional odds ratio in the last column of table 6A<sup>5</sup>. Boys are almost 2.38 times more likely to work than girls. Older children are more likely to work than younger children. For example, the conditional odds of a 10 year old child to leave school is 0.04 of a child of 15 years of age (i.e., the omitted variable). If a child is behind in school, he or she is more likely to begin to work (the conditional odds ratio is 1.09).
- The education of the child's father and mother are both important determinants of child labor. A child whose either parent has zero years of education is approximately 1.35 times more likely to work than a child whose parents have 4-7 years of schooling.
- The income of the child's father is a significant determinant of the probability of a child beginning to work. The odds of child beginning to work whose father is in the lowest income quintile is 1.7 times the odds of a child whose father is in the highest.
- However, there is no evidence that a father going from having income to having no income increases the probability of a child beginning to work at that time.

### The probability of a child beginning to work in domestic labor (Table 6B):

- Contrary to paid child labor seen in the previous item, boys are less likely than girls to begin working in domestic labor. The odds of a boy working in domestic labor are 0.13 the odds of a girl working in domestic labor. Age is also an important determinant as older children are more likely to begin working in domestic labor but the conditional odds-age profile is less steep than in the conventional labor market. For example, the odds of 10 year old child with respect to a 15 year child to perform domestic labor is 0.22 against 0.04 in the case of non-domestic labor. On the other hand, a child who is behind in school is 3.6 times more likely to begin working in domestic labor than a child who is not

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<sup>5</sup> This statistic simulates the effects of a change in a particular variable on the odds ratio keeping the other variables included in the regression constant. For example, in the case of gender we take the odds of a male child that has 15 years of age, their parents have between 4 to 7 years of schooling, that

behind in school. The same statistic related to the probability of a child performing non domestic labor is 1.09.

- Both mother's and father's education are significant determinants of a child beginning to work in domestic service and each matters about the same. The basic difference with respect to non-domestic labor is that here the coefficients found for both mothers and fathers with a university degree is not statistically significant, due to a small cell size.
- The probability of a child starting to perform domestic labor of a child living in the metropolitan areas of Porto Alegre is higher than in the other areas. There is a negative partial correlation between living in Salvador and working in domestic labor.
- The probability of a child working in domestic labor depends highly on the father's income. A child whose father is in the lowest income quintile is 2.3 times more likely to work in domestic labor than a child whose father is in the highest income quintile.
- There is weak evidence that a child whose father's income goes from positive to zero (becomes unemployed or exits the labor market) will begin to work in domestic labor as a result. The conditional odds here with respect to a father that did not experienced an adverse shock is 1.21. In sum, our main variable of interest indicates that adverse shocks to fathers occupational status impacts positively domestic labor but not non-domestic labor.

We will look now at the two possible components of a child not accumulating an additional completed year of schooling<sup>6</sup>, namely: drop-outs rates and repetition rates.

#### The probability of a child dropping out of school (Table 6C)

- Age and gender both are significant determinants of drop-out. Boys are more likely to drop out of school than girls (odds ratio of 1.18). As children get older they are more likely to drop-out of school. For instance, the odds of 10 year old child with respect to a 15 year child to drop-out of school is 0.09. There is a strong relationship between a child being behind in school and he or she dropping out is 2.92.

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leaves in São Paulo, her father is located in the fifth income quintile and was observed in the 1998-99 period with another identical child except for its female gender.

- The more educated the parents, the less likely to children drop out of school. Children whose either parents have no formal education have are at least 1.5 greater odds of dropping out of school than children whose parents have more than 4 years of education.
- Porto Alegre and Rio de Janeiro are the metropolitan areas with the largest probability of children dropping out of school. Recife and Salvador demonstrate a smaller controlled school drop-outs rates than less poor regions. This result is noteworthy.
- Father's income has a negative effect on a child dropping out of school even after controlling for fathers education. This may be seen as a first proxy of the impacts of transitory shocks to children time allocation, in the sense of comparing current income brackets with the best single variable approximation to permanent income brackets. Although, this approximation may not be viewed as truly satisfactorily in a dynamic sense.
- There is strong evidence that children whose father's income becomes zero will likely drop out of school by an odds of 1.23.

The probability of a child repeating a grade (Table 6 E):

- Boys are much 1.33 times more likely to repeat a grade than girls are. The odds of repeating a grade rises with age, 10 year old children odds are 0.71 of those found for 15 year old ones. Children who are already behind in school have 1.39 the odds of repeating a grade than children who are not delayed.
- The education of both the mother and father are once again both significant determinants of a child repeating a grade.
- Children who live in Salvador are 1.59 more likely to repeat a grade than those living in São Paulo and it presents higher chances than any other metropolitan area.
- The higher, the father's income, the less likely the chances are of a child repeating a grade. For example, the chances of those in the first quintile is 1.37 times of those in the upper quintile.
- If a fathers income becomes zero, there is 1.08 higher chance that his child will repeat a grade than the ones with no occupational shock.

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<sup>6</sup> The analysis of this particular variable is found in in Duryea (1998) and in the appendix.

## **VI. Main Conclusions, Policy Considerations and Future Extensions**

This paper evaluates the effects of economic instability on human capital accumulation. We studied the effects of shocks measured at individual and family levels on child time allocation in Brazil. In particular, the main question proposed is the following: do adverse shocks to father's occupational status measure through income losses lead to child work, low enrollment rates and slim grade advancement outcomes observed in Brazil? The large rotating panel data set used allows to estimate the impacts of *changes* in occupational and income circumstances of adults on *changes* in child work and education related decisions. Along the paper we assess other possible determinants of child time allocation such as child characteristics (gender, age, if he/she is behind in school for age), parents characteristics (grade attainment and income) and time and location variables.

One contribution of the paper was to disentangle the effects of shocks on grade advancement measures into drop-out rates and repetition rates. Similarly, we analyzed in separate the effects exerted on child labor into domestic and non-domestic labor.

The paper was divided in two parts: the first part does a literature review and sets a standard theoretical framework, following Ben-Porath's contribution. The second and main part of the paper assesses empirically the impact of aggregate and idiosyncratic shocks on child work/education outcomes.

### **Main Results**

The main variables analyzed are dynamic proxies of impulses and responses, namely: shocks to household head's income and unemployment status, on the one hand and child's probability of dropping out of school, of repeating a grade and of start working, on the other. The findings suggest that father's income has a significant positive correlation with child's dropping out of school and of repeating a grade. The findings do not suggest a significant relationship between a father's becoming unemployed and a child entering the non-domestic labor market. However, the results demonstrate a significant positive relationship between a father job loss and his child beginning to work in domestic labor. There was also a positive correlation between father becoming unemployed and a child dropping out and repeating a grade. Both gender and age were highly significant with boys and older children being more likely to work, drop-out and repeat grades.



### **Policy Considerations:**

The paper intends to serve two main purposes. First, to inform the Government and other policy-makers about long run costs of the pronounced micro-economic instability behind the macro fluctuations observed in Brazil during the recent decades. Second, it will contribute with specific information that can be used to improving the design of safety nets (e.g., Bolsa escola, frentes de trabalho de emergência etc.).

i) Idiosyncratic shocks do seem to lead higher entry rates into domestic labor, they induce drop-out and repetition within one year period. Intervention at the household level in order to counteract the shocks could lead to lower levels of domestic labor (primarily a problem in poor households), drop-out rates and repetition rates. The challenge here would be to design adequate safety nets to counteract these shocks. Unemployment insurance schemes are already in place in Brazil but they do not cover individuals who are displaced from informal activities. More than half of individuals belong to families headed by informal workers or self-employed<sup>7</sup>.

ii) We also see that boys and older children have a larger tendency to begin working and to drop out or repeat grades. Policies which target these groups would be most appropriate. However, girls are overly represented in domestic labor –this is a crucial problem that also demands action. This could be done though restricting access to minimum income maintenance programs conditioned not only on school attendance of all school age children within the household but also on their performance. This type of access criteria are present in Bolsa-escola program implemented in Brasilia and Belo Horizonte.

### **Future extensions:**

In this sense we are trying to capture the. Since occupational changes are frequent but typically presents low duration in Brazil, our results may be read as preliminary indications of the long-run consequences of temporary shocks. However, there are more direct ways to address the effects of the degree of persistence and a series of characteristics of idiosyncratic shocks such as:

i) Are there asymmetries between the impacts of good and bad shocks?

The effects of good and bad shocks on child labor/study outcomes can differ in absolute magnitude due to irreversibility. For example, the decision to take children out of school may be taken at any moment while the reverse is not true.

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<sup>7</sup> See, for example. Ferreira et al. (2000).

ii) Who in the household suffers the shock matters?

The status of the agent that receives the shock may also affect the outcome of the shock. For example, the dropout rate of children higher may be higher when the mother gets unemployed than when the father gets unemployed. This type of result may indicate the convenience of electing the mother as the direct beneficiary of programs such as Bolsa-Escola.

iii) Other microeconomic characteristics of the shocks observed are differences between income versus occupational shocks (including informality), differences between voluntary versus involuntary movements out of occupation and last but perhaps more interesting differences between workers that moved out of occupation that had versus those that did not have access to workers fund (FGTS), as proxies for liquidity constraints.

iv) Another desirable extension is to describe using monthly aggregate data (described in Graphs 1) and standard time-series techniques, the correlation patterns between macro shocks, on the one hand, and child work and education related transitions, on the other.

v) A perhaps more interesting extension is to combine the methodology used in this paper with proxies for aggregate shocks measured from the episodic analysis of booms and recessions performed in Neri and Thomas (2000). Finally, we should also attempt to disaggregate the effects of macro shocks from regional shocks using a multivariate regression including regional unemployment rates.

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