Labor Inspection as Law Enforcement on Child Labor in Brazil

Abstract

The Brazilian Ministry of Labor and Employment (MTE) conducts sporadic inspections with a focus on child labor. Despite being one of the few focal measures to reduce child labor rate, empirical studies on the effect of inspection on child labor are rare. In contribution, this paper put forward the hypothesis that inspection activities reduce child labor rate in Brazilian states. To verify this hypothesis, we used aggregate data from National Household surveys (PNADs), MTE, and Ministry of Social Development (MDS) to estimate dynamic panel data model. Results show that inspection activities contributed to reducing child labor rate in Brazil.

Key words: inspection, child labor, endogeneity.
JEL classification: J8, J46, H53.

1. Introduction

Article 60 of the Brazilian statute for children and adolescents, recognized in Law n° 8069 of the 1988 Federal Constitution, prohibits any labor activity for minors under the age of 16, except in the condition of apprenticeship as from the age of 14. Still, in 2014, there were about 3,3 million child laborers between age 5 and 17 in Brazil (IBGE-PNAD, 2014). Specifically, about 2% of this total was between age 5 and 9; about 25% between age 10 and 14, and; about 73% between age 15 and 17.

One of the law enforcement measures adopted by the Brazilian government to reduce child labor rate is labor inspection with focus on child labor conducted by the Secretariat of Labor Inspection (SIT), which is part of the Ministry of Labor and Employment (MTE). This measure is designed to enforce the law and to punish exploiters of child labor in Brazil.

Inspection plans are elaborated by the Regional Superintendencies of Labor and Employment (SRTEs) based on guidelines of the SIT and reports of child labor, prioritizing the worst forms. Prior planning, inspectors undertake preventive actions and inspection activities. Preventive actions involve awareness-creation by publicizing the scale and side effects of child labor through lectures, seminars, debates, and campaigns to children, employers, and families. Months after preventive action inspection activities are executed, which involve visits to businesses or workplaces in urban and rural areas throughout the country (ILO/SIT, 2010).

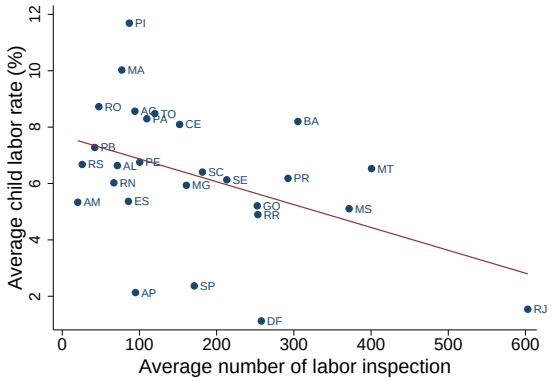
During visits, inspectors take records of irregularities concerning child labor, withdraw children from work and issue infraction reports on exploiters, which may result in fines. To avoid the return to work, children and adolescents are included

in social welfare programs. Specifically, children under the age of 14 are enrolled in cash transfer programs conditioned to school attendance and participation in social, educational and healthcare projects. Adolescents above the age of 14 are enrolled in apprenticeship programs, which offer technical training in workplaces with the intention of learning and not work.

ILO/SIT (2010) reported positive results of Labor Inspection in Brazil regarding the number of children withdrawn from work. However, it was suggested that the effectiveness of inspection activities should not be measured only by the number of children withdrawn from work but also by the awareness-creation, which is contrafactual. Basu (2006) theoretically showed that labor inspection may reduce child labor. However, for such measure to be effective, penalties (as per fines) on employers have to be significantly high. The only empirical study that investigated and confirmed the mitigating effect of inspection activities on child labor in Brazil is that of Almeida (2015).

In contribution, this study proposes to provide further empirical evidence concerning the effect of labor inspection on child labor. The hypothesis we put forward is that inspection activities reduce child labor rates since it entails awareness creation, withdrawal of children and adolescents from work, provision of social assistance, and fining of exploiters. Moreover, we observed that the average number of labor inspection has inverse association with child labor rates of states (see Fig. 1). Similarly to ILO/SIT (2010) and Almeida and Lima (2010), we acknowledge underestimation and intrinsic endogeneity of the effect of labor inspection activities.

Figure1: Average child labor rate and average number of labor inspection in state, 2004-2009 and 2011-2014, Brazil.



Source: Prepared using PNAD and MTE data.

Apart from this introductory section, Section 2 presents a review on previous evidences; Section 3 presents the data, specification and econometric procedures; Section 4 provides the empirical results, and; Section 5 is conclusive.

2. Previous Evidences

In this section, we present empirical literature on the effect of labor inpection and some relevant socioeconomic factors on child labor.

Labor Inspection

In Brazil, the only empirical study found concerning the effect of labor inspection on child labor, till date[1], was that of Almeida (2015). Having that most inspection decisions are taken based on complaints filed regarding child labor, the effect of Labor Inspection on child labor is subdued to underestimation and endogeneity. Therefore, this author adopted a two-step generalized minimum least squares method using data from 2000 and 2010 census and SITI database. In the first stage model, the number of labor inspectors and the distance between inspection agencies and firms were used as instruments to estimate the number of inspections. Subsequently, this estimate was used as a regressor in the second stage model, which was for child labor. It was found that 1% increase in the number of labor inspection reduces the proportion of child laborers between age 10 and 17 in 0.22% and 0.26% for the year 2000 and 2010, respectively. In absolute terms, labor inspection activities accounted for the reduction of, approximately, 8,658 and 8,856 child laborers in the year 2000 and 2010, respectively.

Poverty and Income Inequality

Poverty has been overtly agreed, in most theoretical and empirical literature, to be the major determinant of the supply of child labor both at the micro and macro levels. From the micro-level stance, some empirical studies (Basu and Van, 1998; Kassouf, 2001; Edmonds and Turk, 2002; Kassouf, 2002; Basu, 2003; Hilowitz et al., 2004a) defend that families send children to work only if adult's income does not cover the basic needs of the family. Thus, families in situation of poverty or extreme poverty are more likely to send children to work, since rich families do not depend on children's income for subsistence. From the macro-level angle, studies such as Galli (2001), Edmonds (2005), Edmonds and Pavcnik (2005) and Kambhampati and Rajan (2006) concluded that macroeconomic progress reduces child labor. This is because richer societies can offer more free and quality education, better health services and also adopt poverty reduction measures, compared to poorer societies. Moreover, richer societies have a higher level of adult wage, which directly reduces micro-level poverty.

Inasmuch as poverty is widely accepted as a major cause of child labor, some studies (Barros et al., 1994; Ray, 2000; Rogers and Swinnerton, 2004; Kambhampati and Rajan, 2006; Dumas, 2007) have questioned this relationship. In short, these authors claim that the hypothesis of poverty as the major cause of child labor is

[1] March/2018.

doubtful. However, there is, yet, no consensus regarding the basis of such argument in literature.

Particularly, for Brazil, Kassouf (2001); Schwartzman and Schwartzman (2001); Emerson and Souza (2003); Aquino et al. (2010) and Cacciamali et al. (2010) found robust empirical evidence of a negative relationship between family income and the probability of child labor. However, the magnitude of the coefficient found for this proxy for poverty is low in all these studies. Therefore, family income has to increase expressively to reduce child labor in Brazil.

Galli (2001), Ranjan (2001), and Sarkar and Sarkar (2016) theoretically demonstrated that income inequality increases child labor. However, no empirical evidence was found in literature concerning such association.

Level of Urbanization

Urbanization rate is also an important determinant of child labor. This is not only because of the difference in the poverty levels but also due to peculiarities attached to child labor in rural and urban areas in terms of proportion, visibility, and sectoral distribution. There is a consensus in literature that the rate of child labor is higher in rural areas (Kassouf, 2007; ILO, 2013). However, in Brazil, despite higher rates are observed in rural areas, the number of children and adolescents who work is higher in the urban areas due to high population density (Inaiá, 2008; Kassouf, 2015).

Other factors that increase the labor force of children and adolescents in the urban area is migration as a result of better quality education, health services, and greater economic opportunities. It is, however, important to note that inasmuch as the living conditions of urbanized areas seem better, one has to take into account the effect of inequality and wage differences between skilled and unskilled workers. According to Barros et al. (1994) and Ferreira-Batista and Cacciamali (2012), the socioeconomic condition of poor households or unskilled workers in the urban areas is harsher compared to the same group in rural areas.

Unemployment

There are very few studies have been carried out regarding the effect of economic growth and adult unemployment on child labor in Brazil. Empirical evidence from Edmonds (2005), using Vietnamese data, points that child labor reduces with economic growth, however, highlighting that such relationship is nonlinear. In contradiction, Kambhampati and Rajan (2006) found empirical evidence, using data from India that increase in economic growth increases child labor as a result of the increase in the demand for cheaper labor by firms. These authors noted that child labor is only reduced when growth is sustained sufficiently to outweigh the increase in the demand for cheaper and unregulated labor. Abu-Ghallous (2012), using Palestinians data, concluded that increase in unemployment, which

is also indicative of economic performance, leads to increasing rate of child labor as a result of lower contribution of adults to family income.

As for Brazil, Duryea et al. (2007) used Brazil's Monthly Employment Survey (PME, in Brazilian acronym) to analyze the impact of household economic shocks, especially unemployment, on schooling and employment of youths in metropolitan Brazil. The authors estimated probit models and used data that covered about 100.000 children between age 10 and 16 from 1982 to 1999. The hypothesis tested goes in line with that theoretically posed by Basu (1999) and Galli (2001), that adult unemployment may lead to increase in child labor. The general estimation results provided evidence which does not reject this hypothesis. Specifically, unemployment shock to male household head in metropolitan Brazil increase the likelihood of children between age 14 and 16 to enter the labor market. However, in a specific model for children between age 10 and 14, these authors found an inverse relationship between adult unemployment and child labor. Although counterintuitive, such idea supports the observation made by Basu and Van (1998) concerning the possible ambiguous effect of adult unemployment on child labor.

Conditional Cash Transfer (CCT)

Most empirical studies that investigated the effect of CCT programs on child labor analyze its effect on time allocation of children and adolescents. Findings from international studies such as Ravallion and Wodon (2000) and Maluccio and Flores (2005) pointed that CCT programs have a positive effect on schooling and inverse effect on child labor. Attanasio et al. (2006) empirically supported this finding by affirming that CCT programs cause a significant increase in the time allocated to studies and also increase the school enrollment of children who are prone to enter the labor market early. However, studies such as Duryea and Morrison (2004) and Glewwe and Olinto (2004) fail to find the effect of such programs on child labor.

There is a variety of welfare programs adopted in Brazil to ease poor and extremely poor families of financial constraints. Similarly to other developing countries, one of these measures involves conditional direct cash or in-kind transfer. Among the few studies that investigated the effect of CCT programs in Brazil, most are about the *Bolsa Escola*, which preceded the *Bolsa Família*.

Cardoso and Souza (2004), using 2000 census data and propensity score method, analyzed the impact of *Bolsa Escola* program on child labor and school attendance. These authors found that the program had a significant positive effect on school attendance for both boys and girls. However, the program was found short-handed in reducing child labor. In fact, the authors observed that the value transferred were too small to persuade families to forgo income from child labor. Instead, families preferred children to combine work and school.

On a similar course, Ferro and Kassouf (2005) estimated probit models using 2001 PNAD data. These authors found that participation in the program reduces

about 3 working hours of child laborers. Alike in Cardoso and Souza (2004), the result concerning probability to work indicated that children from families who participated in the program are more likely to work due to family unobservables such as "ambition". In a posterior study, Ferro et al. (2010) used 2003 PNAD data and propensity score matching method to estimate probit models. Results showed that participation in the *Bolsa Escola* program reduces the probability of children from beneficiary families to work and increases the school enrollment of the same.

Regarding the *Bolsa Família* program (henceforth, PBF), Cacciamali et al. (2010) analyzed its impact on child labor and school attendance by using 2004 PNAD data to estimate probit models. These authors found a positive relationship between participation in the PBF and child labor, i.e, children from beneficiary families are more likely to work. This conclusion was sustained in models for urban and rural areas, and also in models for different regions in Brazil.

By using propensity score matching methods and PNAD microdata from different years, Araujo et al. (2010), Aquino et al. (2010), and Do Nascimento et al. (2016) concluded that participation in the PBF program has no significant effect on the decision of a child to work or not.

Conclusively, the studies reviewed here pointed that participation in the PBF program has no conspicuous effect on the probability of children and adolescents to work. However, most studies found its effect in reducing working hours.

Based on the empirical literature presented in this section, we create insight on the signs and challenges expected from modeling exercises. Concerning the effect of labor inspection on child labor, we expect inverse relationship after addressing endogeneity issues. As per other control variables, on one hand, we expect negative signs for poverty, urbanization, and *Bolsa Família* program. On the other hand, we expect a positive sign for adult unemployment, which is a proxy for economic performance.

3. Methodology

3.1. Data and Specification

Data concerning the number of labor inspection conducted in states was obtained from the Information System on Child Labor (SITI/MTE). These figures were only published as from the year 2006 and had missings for some states. Data for control variables were obtained by aggregating microdata from National Households Surveys (PNADs), except for *Bolsa Família* which was obtained from the Ministry of Social Development (MDS).

Our panel data covers 27 states over the period between 2004 and 2014 (without data for 2010), totaling 210 observations for control variables and 270 for labor inspection variable. Still, the overall panel data is strongly balanced.

In terms of model specification, the response variable is the rate of child labor. Specifically, a *child laborer is any individual between the age of 5 and 15 involved in any labor activity deemed formal or informal, domestic or non-domestic, temporary or permanent, paid or unpaid labor activities, except in the condition of apprenticeship*. This variable is denoted as `childlabor`.

The group of regressors is composed of: number of Labor Inspections with focus on child labor per 100,000 population (`inspect`); proportion of children and adolescents between age 5 and 15 enrolled in school (`childeduc`); average family income per capita (`famincome`); average years of mothers' schooling (`mothereduc`); average number of family members (`famsize`); total value allocated to states trough the PBF program (`PBF`)[2]; unemployment rate among economically active population (`unemp`); income inequality measured by GINI index (`gini`); urbanization rate (`urban`), and lastly; control for long-run tendency of time series effect (`trend`).

Table 1 presents the description, mean and standard deviation of variables considered for model specification. Higher values of between deviations compared to within deviations imply that there is expressive heterogeneity among states.

The rate of child labor among individuals between age 5 and 15 was about 6.29% during the period of 2004 to 2009 and 2011 to 2014. During the same period, an average Brazilian family is comprised of 4 members; the level of education of mothers was approximately 8 years, and; average per capita family income was, approximately, R$ 715. Moreover, about 92% of children between age 5 and 15 were enrolled in school; urbanization rate was about 80%; income inequality measured by the GINI index was about 0.53, and; adult unemployment rate was about 6%. The two governmental variables, PBF and Labor Inspection, indicate that the average value allocated to states through the PBF was about R$91 million (Brazilian currency) and that about 6 work inspections per 100,000 population were conducted in states during the same period.

3.2. Econometric Procedures

By using 2001–2009 PNAD data to estimate dynamic panel data models, Ramalho and Mesquita (2013) provided evidence of the existence of temporal dynamics of child labor rate in Brazil. In line with these authors, we used System Dynamic Panel Data Estimator (henceforth, GMM-SYS). Differently from these authors, we provide a more complete specification by including controls for children's education, mother's education, family size, adult unemployment, and income inequality. In addition, we treated the variables for PBF and labor inspection as endogenous variables during estimation.

Formally, our dynamic model of order 1 in `childlabor` is represented as

[2]The values of the *Bolsa Família* program are measured in constant real values of 2014 by using the IPNC price index.

Table1: Summary statistics

Variable	Description		Mean	Std. Dev.
childlabor	Percentage rate of child labor	overall	6.29	3.20
		between		2.48
		within		2.07
childeduc	Percentage of children and adolescents between age 5 and 15 enrolled in school	overall	92.24	3.26
		between		2.39
		within		2.25
famincome	Average family income per capita	overall	714.87	294.80
		between		273.90
		within		119.98
mothereduc	Average years of mothers' schooling	overall	7.68	1.15
		between		0.97
		within		0.64
famsize	Number of family members	overall	3.88	0.35
		between		0.32
		within		0.17
inspect	Number of Labor Inspections with focus on child labor (per 100,000 population)	overall	6.32	15.63
		between		10.22
		within		11.87
unemp	Unemployment rate among economically active population	overall	5.89	2.36
		between		2.20
		within		0.99
gini	Income inequality measured by the GINI index	overall	0.5322	0.0407
		between		0.0324
		within		0.0254
urban	Urbanization rate in percentage	overall	80.23	9.32
		between		9.087
		within		2.63
PBF	Total value allocated to states by the PBF (in thousands of Brazilian currency - R$)	overall	91,934.16	90,037.31
		between		84,982.47
		within		33,560.79

Source: Prepared using data from PNAD, SITI/MTE, and MDS.
Note: Number of observations is 270, except for the inspect variable which has 207 observations.

$$\texttt{childlabor}_{it} = \gamma \texttt{childlabor}_{i,t-1} + \mathrm{x}'_{it}\beta + \alpha_i + \varepsilon_{it}$$

where $t = 1, ..., T$ and $|\gamma| < 1$; childlabor is the column of response variable; x is a matrix of $N \times K$ regressors that vary over time, t, and across states, i; α_i is contains time invariant factors which varies among states; γ and β are parameters, and; ε is the error term.

Compared to standard panel data models, dynamic panel model estimated by the Arellano and Bover (1995) and Blundell and Bond (1998) system-GMM method addresses endogeneity. This is done by instrumenting endogenous variables using their lagged values and the lagged difference of the dependent variable. In this study, we use all possible lags of the response variable and endogenous variables as instruments.

The variables considered exogenous are famsize, mothereduc, unemp, gini, and urban. The reason for this is that the decision of a child to work does not determine any of these variables at state level. The variables which we consider endogenous

are famincome, childeduc, PBF and inspect.

The famincome variable is suspected to be endogenous based on the observation made by Psacharopoulos (1997) and Basu (1999) that children tend to be sole contributors to households income in extremely poor families. In this sense, the endogeneity of average per capita family income tends to be high if child's income has significant weight in the family income. The simultaneous relationship between child labor and child education is in consensus in literature (Basu, 1999; Dessy and Pallage, 2001; Ranjan, 2001; Das and Deb, 2006). Therefore, the proportion of enrolled children is potentially endogenous. However, such endogeneity is reduced if most children conciliate schooling and work as observed by Kassouf (2002) and Kassouf (2015).

The government variables inspect and PBF are naturally endogenous. Specifically, the number of Labor Inspections conducted in a specific region depends on the number of complaints reported concerning child labor in the region. Similarly, the resources allocated to states through the PBF depends on the level of poverty of the same which, in turn, determines child labor rate.

Prior estimations, we verify serial correlation in the first-differenced errors using the ArellanoBond test. To confirm the validity of moment conditions we expect to reject the zero autocorrelation hypothesis not at first order but at subsequent orders. In addition, we perform the Sargan test of overidentifying restrictions to verify if instruments are valid. Note that Arellano and Bond (1991) instructed that Sargan test over rejects in the presence of heteroskedasticity.

All variables were logarithmized, i.e, models are in log-log function and, thus, coefficients represent elasticity.

4. Analysis of Empirical Results

The result obtained from model estimation is presented in Table 2. We present series of alternative specifications (I-IV) to emphasize stability of results. These specifications are classified in two groups – one with control for time trend and the other without. Within each group, there are three specifications: first, a simple model of lagged child labor rate, i.e., without control variables; second, a model with lagged value child labor rate and labor inspection, and lastly; a model with lagged value child labor, labor inspection, and other relevant controls. The result analysis of this study is centered on model VI.

Before exploring results, we present the post-estimation tests performed on our model. We tested for collinearity, heteroskedasticity, and normality of residuals on a pooled version of our model estimated using OLS. On the dynamic panel data model we tested for autocorrelation and over-identifying restrictions as suggested by Arellano and Bover (1995) and Blundell and Bond (1998). The test for collinearity showed that the degree of association between regressors is not alarming. However,

Table2: Main results from log-log models for child labor rate

Response variable: childlabor

	I	II	III	IV	V	VI
$\texttt{childlabor}_{t-1}$	0.727^{***}	0.491^{***}	0.223^{***}	0.492^{***}	0.470^{***}	0.184^{*}
	(0.079)	(0.087)	(0.085)	(0.134)	(0.125)	(0.097)
inspect		-0.0703^{***}	-0.0546^{***}		-0.0607^{*}	$\mathbf{-0.0457}^{**}$
		(0.021)	(0.018)		(0.032)	(0.019)
famincome			-0.154			-0.192
			(0.495)			(0.494)
mothereduc			-2.598^{***}			-2.241^{***}
			(0.749)			(0.690)
childeduc			-0.478			-0.850
			(0.984)			(1.027)
famsize			-1.539^{*}			-1.760^{**}
			(0.900)			(0.800)
unemp			-0.324^{**}			-0.326^{**}
			(0.158)			(0.159)
gini			-0.106			-0.294
			(0.566)			(0.564)
urban			-1.589^{***}			-2.039^{**}
			(0.600)			(0.808)
PBF			-0.194^{***}			-0.184^{***}
			(0.056)			(0.050)
trend	No	No	No	Yes	Yes	Yes

Tests	Value
Heteroskedasticity: Breush-Pagan	$\chi^2 = 6.09$; p-value$= 0.0136$
Colinearity: Variance Inflation factor	mean VIF$= 3.85$
Normality: Shapiro-wilk	$w = 0.9835$; p-value$= 0.0158$
Autocorrelation: Arellano-bond	
order 1	$z = -3.71$; p-value$= 0.0002$
order 2	$z = -0.91$; p-value$= 0.3652$
Over-Identification: Sargan	$\chi^2 = 203.13$; p-value$= 0.1043$

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

we observed that famincome and mothereduc are the most correlated. The test value for heteroskedasticity indicated that residuals have constant variance at 5% level of significance. Nevertheless, for rigor, we calculated robust standard errors. The test for normality showed that residuals are normal at the level of significance of 1% but not at 5%. The test values for autocorrelation indicated that residuals are not correlated and the test for identification shows that over-identifying restrictions are valid at common levels of significance.

Similarly to most socioeconomic issues, child labor rate is dynamic in time. In this sense, the rate from a specific year is affected by that from previous years. Such dynamic of child labor rate in Brazil was confirmed by Ramalho and Mesquita (2013) and corroborated by the coefficient of the lagged dependent variable of our model, $\texttt{childlabor}_{i,t-1}$.

The proxy for poverty, famincome, was not statistically significant. However, we

suspect that it is due to the correlation with mother's education[3], which was significant at a level of 1%. Both variables show a negative relationship with child labor rate. We observe that the coefficient for `mothereduc` has the highest value, i.e., child labor rate is most elastic to changes in mother's education compared to other variables. Such observation supports the observation of Basu (1999) that a huge governmental effort to educate a generation may reduce child labor in subsequent generations.

Still on family variables, Emerson and Souza (2008) showed that family size is a determinant of child labor in the sense that the probability of a child to work depends on its order of birth in the family. Specifically, the last born of a family is less likely to work compared to the firstborn because the latter tends to work for the former to study. Apart from upholding this hypothesis, the coefficient for `famsize` also showed to have high elasticity effect on child labor rate.

The estimate found for `unemp` indicates a negative relationship between the rate of child labor and adult unemployment. This relationship is contradictory compared to that theoretically pointed by Galli (2001). However, Basu and Van (1998) cautioned that the relationship between adult employment and child labor may be ambiguous in a competitive labor market. Our result goes in line with the evidence from Duryea et al. (2007) for children between the age 10 and 14. A reasonable explanation for this is that the `unemp` variable captured the effect of economic performance. Therefore, in line with Kambhampati and Rajan (2006), one can interpret that the reduction of economic progress led to both adult and child unemployment. Nevertheless, we suggest further investigation of the effect of adult unemployment on child labor.

According to Kassouf (2002), Hilowitz et al. (2004b), Inaiá (2008), Kassouf and Justus (2010), and ILO (2013), among many others, the level of urbanization plays a very important role on child labor rate. Specifically, these authors found that most child laborers are found in rural areas, especially in the agricultural sector. This may be due to lower reach of inspections, high incidence of family agriculture and a higher level of poverty compared to urban areas. In our model, the coefficient for `urban` corroborated that child labor is elastic to urbanization rates.

In Brazil, the PBF conditional cash transfer is one of the major countermeasure centered on reducing poverty, which is considered in literature as the major cause of child labor. Still, evidence concerning the effect of this program on child labor is rare. Apart from Cacciamali et al. (2010) who found positive relationship between child labor and participation in the PBF, Araujo et al. (2010), Aquino et al. (2010) and Do Nascimento et al. (2016) found no evidence of relationship between both.

[3] In a parallel exercise, we noted that exclusion of mother's education makes family income variable significant but the magnitude of the coefficient of both variables was barely altered. Given the value of mean VIF, we opted to control both variables.

However, the latter authors found evidence that the value transferred to families through the PBF has a mitigating effect on the probability of child labor. Similarly, in this study, we found evidence indicating that the value allocated to states through the PBF reduces child labor rate. We believe that the contradictory sign and lack of significance in previous studies may be due to the correlation of participation in the PBF with poverty since only poor population are eligible to participate in the program.

Concerning the main objective of this study, results permit not to reject the hypothesis that inspection activities in states contribute to reducing child labor rates. Specifically, we found that for every 1% increase in inspection activities per 100,000 population, child labor rate is reduced by approximately 0.05%. This finding corroborates that from Almeida (2015), which is the only empirical evidence of the effect of inspection on child labor in Brazil.

The coefficient for `inspect` insinuates that inspection has little effect on child labor rate. However, one has to consider the following: a) inspection with focus on child labor is a relatively modest countermeasure in terms of resources and scale compared to, for example, the PBF; b) inspections highly depend on collaboration of society to report child labor, and; c) the reach of inspection is limited due to lack of access to hidden forms of child labor, especially in rural areas and family environments. Moreover, we agree with ILO/SIT (2010) in that the effect of labor inspection should not be reduced to the number of children withdrawn from work since the effect of awareness-creation carried out in the process is unobservable.

5. Concluding Remarks

Labor inspection with focus on child labor is a law enforcement measure adopted by the Brazilian government to specifically reduce child labor and to punish exploiters of the same. Being one of few with such focal target, it is surprising that empirical studies regarding its effect on child labor are rare. The contribution of this study is to provide more evidence regarding this effect.

Our empiric result permits not to reject the hypothesis that inspection activities contributed to reducing child labor rate in Brazil. Specifically, we found that increase in 1% in inspection activities per 100,000 population reduces child labor by about 0.05%. This finding is influential in that it highlights the importance of labor inspection, which has been going through budget cuts due to the ongoing economic crisis.

Among all variables controlled in the model, that for mother's education showed highest elasticity effect on child labor rate. This implies that education is a means to reduce child labor rate in the long run. This may be achieved through a major governmental effort to increase access to higher education in a certain generation, especially in less developed regions. Such generation is likely to earn a better in-

come and, consequently, does not need children and adolescents to work to support family income. Still, such generation tends to recognize the negative effects of early labor and, thus, condemn and report it when witnessed.

We also observed that regional policies that promote urbanization may significantly reduce child labor rate. Such policies sprout positive externalities such as access to better health, education and infrastructural facilities, which in turn bolster economic performance. However, it is important that urbanization policies take into account the possible adverse effects such as an increase in crime, inequality, uncontrolled migration, poor living conditions, etc. Such conditions may end up diverting child labor to invisible and worst forms such as prostitution, drug trafficking, street trading, etc..

Our result also shows that the *Bolsa Família* conditional cash transfer program contributes to reducing child labor rates through the values allocated to states. Apart from poverty relief, such effect may be attributed to the condition imposed on poor families to withdraw children from work and enroll in school in order to participate in the program.

Lastly, we found empirical evidence which corroborates previous literature concerning the intertemporal dependence of child labor rate in Brazil. Therefore, the effect of governmental countermeasures against child labor in a period may be disseminated to subsequent periods.

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