Is intimate partner violence harmful on children school outcomes? Evidence from Brazil

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Abstract

We investigate how intimate partner violence (IPV) affects children school outcomes: school enrollment, school delay, and drop-out. To achieve this, data from victimization survey jointly conducted with the 2009 Brazilian Household Sample Survey were used. We applied the propensity score matching method to compare the outcomes of witnesses and non-witnesses of mother's intimate partner violence. We found evidence that IPV is positively correlated with drop-out and school delay, and negatively correlated to school exposure and years of schooling. Moreover, we found that the exposure to mother's IPV is correlated to a higher likelihood of being assaulted.

Keywords: domestic violence, school outcomes

Resumo

O objetivo deste artigo é investigar o impacto da violência por parceiro íntimo (IPV) no desempenho escolar das crianças, medido por: matrícula, atraso, e abandono escolar. Usamos dados da pesquisa de vitimização realizada como suplemento especial da PNAD 2009. Aplicou-se o método de pareamento para comparar os resultados de testemunhas e não testemunhas de violência por parceiro íntimo contra a mãe. Encontramos evidência que IPV é positivamente correlacionada com abandono e atraso escolar, e negativamente correlacionada com os anos de escolaridade. Além disso, observamos que a exposição à IPV da mãe é correlacionada com o maior risco de sofrer violência.

Palavras-chave: violência doméstica, desempenho escolar

1. Introduction

The literature about violence against women points out to intimate partner violence (henceforth, IPV) as one of the most common forms of violence affecting women from different countries and socioeconomic status (Thompson et al., 1999; Garcia-Moreno et al., 2006; Friedemann-Sánchez and Lovatón, 2012). Although it is not clear why women are caught up in abusive relationships, they are mostly in poverty and other disadvantaged socioeconomic situations (Koenig et al., 2006; Dunkle et al., 2004; Naved and Persson, 2005). Consequences of domestic violence are known to be always negative not only for abused women, but also for their children and other family members (Durand et al., 2011; Heaton and Forste, 2008; Wathen and MacMillan, 2013; Kimball, 2016).

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Most of the previous studies about the effects the IPV on children were concerned with health and psychological issues. Results indicated that children who witness domestic violence are more likely to develop behavioral and cognitive problems as an indirect consequence (Edleson, 1999; Kernic et al., 2002; Gewirtz and Edleson, 2007; Durand et al., 2011; Carlson, 2000). Other studies focused on the effects of domestic violence on children's educational outcomes (Durand et al., 2011; Heaton and Forste, 2008; Wathen and MacMillan, 2013; Kimball, 2016).

Domestic violence, especially intimate partner violence, should receive more attention from development agendas worldwide, as a channel to reduce poverty and gender inequality, and improve the public health (Friedemann-Sánchez and Lovatón, 2012).

In Brazil, Federal Law nº 11,340 of August 7, 2006, popularly known as the *Maria da Penha* Act, created mechanisms to deter domestic and family violence against women. Moreover, the law seeks to eradicate discrimination against women. This law has made violence and family violence against women a serious crime. Moreover, to enforce this law a police system was created to ensure better procedures to attend victimized women.

In 2009, the Brazilian Ministry of Health introduced the *Information System on Diseases of Compulsory Declaration* (SINAN, in Brazilian acronym), where reported violence against children, adolescents, women and elderly are compulsorily recorded. Only in the first year, 107,572 cases of domestic, sexual and other types of violence were reported. About 64.5% of total victimizations were violence against women (CNJ, 2013). It should be noted that SINAN data, and any record regarding domestic violence, are underreported because most victims seek medical assistance only when the situation is unbearable, and the harms are clear for the other people.

According to CNJ (2013), violence against women occurs mostly in the victim's household. Also, there is a "generational transmission" of violence which follows the victim's age. For those under 9 years old, the father is commonly the main aggressor; for women aged 15-59, the perpetrators are mostly intimate partners and ex-partners; for those over age 60, in general, the sons are the aggressors.

Accordingly, 2009 National Household Sample Survey (PNAD in Brazilian acronym) dataset shows that 2.5 million Brazilians aged 10 and above were assaulted in the year before the survey. In 12.2% of these cases, the perpetrator was an intimate partner or ex-partner. Moreover, 90% of IPV victims were female (279,964 women), and 82% of the aggression took place in the household, while 9% occurred in public places and 7% in other persons' households.

In 2009, there were 34.8 million boys and girls living with their mothers within the age range of 6-17. Although less than 1% witnessed domestic violence, it represented more than 235 thousand children who were indirect victims of early psychosocial distress as a result of family violence.

Given this scenario, using Brazilian 2009 victimization and PNAD data, this paper aims to investigate how witnessing IPV affects children's school outcomes: school enrollment, school delay, and dropout. From these mentioned surveys, it is possible to know about victimization status as well as details about the aggressors and also know the local where the violence occurred.

For our empirical analysis, we used a filtered sample made up of the Brazilian population aged 6-17 living in the mother's household.[4] This procedure is based on Assaad et al. (2016). An additional exercise is performed to investigate the effect on years of schooling and school exposure for those older than 9, and we estimated the victimization risk for assault conditional to children witnessing mother's IPV. The propensity score matching method was applied to compare the outcomes of witnesses and non-witnesses of mother's intimate partner violence. This procedure was used to reduce problems of endogeneity, since no robust instrument is available in the dataset that was used. Therefore, unlike previous studies (Emery, 2011; Assaad et al., 2016; Fakir et al., 2016),

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[4] Throughout the paper, the terms "children" and "youth" will be are interchangeably used for the individuals 6-17 aged. Even though the older ones would not accept the label, it refers to a person who is dependent on adults to make decisions.

we do not establish a causal relationship between IPV and children school outcomes. Despite this limitation, our results for Brazil corroborate with the previous evidence found from other countries.

The rest of the paper is organized as follows: Section 2 provides the details about the data, filtered sample and empirical strategy; Section 3 presents the main results and robustness checks; Section 4 concludes the paper, where we recognize the limitation of our empirical findings.

2. Method

A. Data and sample

We use a cross-section dataset from the 2009 National Household Survey (PNAD, in the Portuguese acronym) and its special supplement on public safety, carried out by the Brazilian Institute for Geography and Statistics (IBGE, in the Portuguese acronym).

The PNAD is a multipurpose random household survey that investigates several socioeconomic characteristics of the population, some on a permanent basis and others with variable periodicity, such as victimization characteristics. An interesting advantage of the PNAD lies in its national coverage. In addition, given that the survey collects data on many other variables related to household structure and socioeconomic aspects of household members (income, labor, education, housing characteristics, age, etc.), it is possible to associate these variables with crime victimization. The victimization question about physical assault is translated thusly: "Were you a victim of physical assault between September 27, 2008 and September 26, 2009?"

In 2009 PNAD, 399,387 people from 153,837 households in all Brazilian states were surveyed. However, the questions on victimization were only applied to people aged 10 and above ($n = 337,510$). Regarding victimization characteristics, we clarify that: a) reference period is 365 days (from September 27, 2008, to September 26, 2009), and b) information was provided by only one person in each household, who reported cases of victimization experienced personally or by other members of the household aged 10 or over at the time of the survey

To make the dataset suitable for empirical modeling the filtered sample is centered on the nuclear family, i.e., domestic servants and their relatives were excluded. In fact, we selected family members classified as daughter or son to find observational units, family head, and spouses for mothers and fathers. Our observational units are children and youth within the age bracket of 6-17 – considered school age in Brazil, including high school level – living with their mothers.[5] After these filters, we retained 75,111 individuals in the targeted age and family status group. We then kept only those whose mother was alive and living in the same household, ending up with 73,386 observations. From this, 1.7% (or 539 individuals) witnessed intimate partner violence against their mothers. Also, we found 23,843 observations from children under age 10 who did not answer the victimization questionnaire. Missing values in explanatory variables led to a loss of observations, reducing the final filtered sample to 72,697 observations for drop-out estimates and 49,240 observations for school exposure estimates.

B. Estimator and variables

Our objective is to compare educational outcomes of IPV witnesses and not witnesses. However, 2009 PNAD only provides information regarding school enrollment and grade level, but not attendance or academic performance. Therefore, we examine the following measures: 1) *school enrollment*: whether or not children are enrolled in the formal school system; 2) *drop out*: whether or not children are out of school but was enrolled before; 3) *school delay*: used to assess school

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[5] School enrollment is mandatory in Brazil for first to ninth grades (children aged 6 to 14) since 2006. High school (ages 15-17) and pre-school enrollments (ages 4-5) are mandatory since 2009. Nevertheless, the school system had until 2016 to complete the transition for pre-school and high school levels (BRASIL, 2009), and the reference period of our dataset is the third week of September 2009.

performance, indicates if the student is attending the school grade expected for his or her age;[6] 4) *years of schooling:* degree completion for children older than 9; and 5) *school exposure*: years of schooling with respect to children's age, also for those older than 9.

We also examine whether or not children themselves were violence victims in the previous year. The variable *assault* accounts for children who reported assault and whoever was the offender, such as the parents, other relatives, friends, acquaintances or unknown people. It is worthwhile to highlight that we focus on the broader aspects of violence in children's routine – e.g., naturalizing violent behavior, as pointed out by Carlson (2000) and Carpenter and Stacks (2009) – IPV parents are more likely to use physical punishment as educational strategy (Harne and Radford, 2008). Hence, this measure may reflect the family dynamics where violence is natural, more than the children's propensity to victimization afterward.

For our primary purpose, we applied the propensity score matching method (henceforth PMS), to compare the outcomes of witnesses and non-witnesses of mother's IPV. The first group (witnesses of mother's IPV) is defined as the "treatment group", and the second group (non-witnesses of mother's IPV) is defined as the "control group". The ultimate strength of PSM is that we can create treatment and control groups in its first stage based on observable variables, and then compare the groups' interest variables using means test in its second stage.

To create treatment and control groups, we estimate the probability of being treated, based on observable covariates, using logit or probit estimators. We then match observation units based on their likelihood of being treated, thus reaching treatment and control groups. Conditional on a specific set of hypothesis, the groups obtained resembles those who would arise with an experiment. It is possible to show, for example, that both groups are similar in observables, avoiding confoundedness in the estimation. We then can perform means tests to compare outcomes of treatment and control groups -- the PSM second stage -- and attribute differences to the treatment. For details about PMS see Rubin (1973), LaLonde (1986), Rosenbaum (1995), Heckman et al. (1998), and Dehejia and Wahba (2002).

In our empirical exercise, the first stage of PSM consists of the estimation of the likelihood of IPV using the logit regression, where the observation unit is the woman. The dependent variable is a dummy that assumes the value 1 if the woman was assaulted by her partner or ex-partner and 0 otherwise.

We assigned an indicator variable for IPV if the woman answered that she was assaulted in the last year, and that the aggressor was a current or former intimate partner (husband, boyfriend, dating partner etc). Therefore, we named IPV witnesses those children and youth living with a mother who said was an IPV victim in the last twelve months.

Finally, the control variables in the logit regression, based on Friedemann-Sánchez and Lovatón (2012) and Assaad et al. (2016), are: a) mother's age and schooling (years of education), b) dummy for white skin color (against non-white), c) dummy for reference person, d) dummy for labor market participation, e) dummy for welfare program beneficiary, f) dummy for living with a partner, g) dummy for being formally married, h) family size, i) dummy for have a mobile phone, j) dummy for access to the internet, k) dummies for wealth quintiles, l) dummy for urban residence, and m) dummies for geographic regions.

Table 1 provides a complete description of the variables, along with their means and stardard deviations for the entire sample, i.e., for the witnesses and non-witnesses of mother's IPV. Data analysis and econometric procedures are all unweighted – following duMouchel and Duncan, (1983), Lohr and Liu (1994) and Korn and Graubard (1995) discussion about regressions' weighting.

C. Computation details

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[6] The age-grade distortion measure was based on Ribeiro and Cacciamali (2012).

We obtain all the PSM and its variance estimates and performed the usual balance tests on covariates by using the same procedures that was used in Garrido et al., (2014). The Stata integrated code "teffects" and the user-written module "psmatch2" (Leuven and Sianesi, 2012) for Stata 14 were used.

Table 1: Definition, mean and stardard deviations for the entire sample

Variable	Definition	Mean	s.d.
PSM 1st stage			
Mother's outcome			
Mother's IPV	Dummy indicator that assumes the value 1 if the mother was assaulted in the year before the survey and the offender was an intimate partner or ex-partner, and zero otherwise	0.0073	0.0854
Mother's variables			
Age	Mother's age in years	37.4147	7.6748
White	Dummy indicator that assumes the value 1 if the mother is white and zero otherwise	0.3927	0.4884
Social benefit	Dummy indicator that assumes the value 1 if the mother has non-labor income, including governmental social benefits as *Bolsa Familia*, and zero otherwise	0.3560	0.4788
Years of education	Number of completed school grades.	7.0458	4.3477
Labor Force	Dummy indicator that assumes the value 1 if the mother is in the labor force (either working or searching for a work) and zero otherwise	0.6961	0.4599
Working	Dummy indicator that assumes the value 1 if the mother is working and zero otherwise	0.9046	0.2938
Single mom	Dummy indicator that assumes the value 1 if the mother is/was not formally married and zero otherwise	0.3059	0.4608
Internet access	Dummy indicator that assumes the value 1 if the mother has Internet access and zero otherwise	0.2872	0.4525
Mobile	Dummy indicator that assumes the value 1 if the mother has a mobile phone and zero otherwise	0.6093	0.4879
Household head	Dummy indicator that assumes the value 1 if the mother is the reference person in the household (household head) and zero otherwise	0.3290	0.4698
Geographic variables			
North	Dummy indicator that assumes the value 1 if the person lives in the North region and zero otherwise	0.1552	0.3621
Northeast	Dummy indicator that assumes the value 1 if the person lives in the Northeast region and zero otherwise	0.3309	0.4706
Mid-west	Dummy indicator that assumes the value 1 if the person lives in the Midwest region and zero otherwise	0.2627	0.4401
South	Dummy indicator that assumes the value 1 if the person lives in the South region and zero otherwise	0.1432	0.3502
Southeast	Dummy indicator that assumes the value 1 if the person lives in the Southeast region and zero otherwise	0.1080	0.3104
Urban	Dummy indicator that assumes the value 1 if the household is located in the urban area and zero otherwise	0.8133	0.3896
Family's variables			
1st quintile	Dummy indicator that assumes the value 1 if the family is in the first wealth quintile and zero otherwise	0.2035	0.4026
2nd quintile	Dummy indicator that assumes the value 1 if the family is in the second wealth quintile and zero otherwise	0.2033	0.4025
3rd quintile	Dummy indicator that assumes the value 1 if the family is in the third wealth quintile and zero otherwise	0.1981	0.3986
4th quintile	Dummy indicator that assumes the value 1 if the family is in the fourth wealth quintile and zero otherwise	0.1891	0.3916
5th quintile	Dummy indicator that assumes the value 1 if the family is in the fifth wealth quintile and zero otherwise.	0.1851	0.3884
Father cohabiting	Dummy indicator that assumes the value 1 if there is a male mother's spouse living in the household and zero otherwise. The male figure may or may not be the actual father, since it is not possible to determine the parenthood.	0.7937	0.4046
Family members	Number of family members, including the child/youth.	4.5637	1.5484
PSM 2nd stage			
Children's outcomes (6 - 17)			
School delay	Dummy indicator that assumes the value 1 if the person is enrolled in a lower school grade for his/her age and zero otherwise	0.4743	0.4993
Enrolled	Dummy indicator that assumes the value 1 if the person is enrolled in the school system and zero otherwise	0.9551	0.2070
Dropped out	Dummy indicator that assumes the value 1 if the person is not enrolled in the school system but was enrolled before and zero otherwise	0.0358	0.1858
Children's outcomes (10+)			
Schooling per year	Measures exposure to school, obtained with years of school attendance divided by the expected number of school years completed (current age minus 7 -- the school entrance age).	0.8173	0.2663
Years of school 10+	Number of completed school grades.	5.2733	2.5079
Exp. Violence	Dummy indicator that assumes the value 1 if the person was an assault victim in the year before the survey and zero otherwise	0.0179	0.1326

N = 73,386 in the PSM 1st stage; N = 73,386 for children aged 6-17 in the PSM 2st stage; N = 49,543 for children aged 10-17 in the PSM 2st stage.

3. Results

A. Descriptive analysis

Table 2 shows descriptive statistics for both samples of children that were exposed and not-exposed to IPV. This table provides the results from two-group mean-comparison and proportion-comparison tests performed to all covariates.

Regarding mother's variables, our data suggests a possible relationship between women facing worse living conditions and IPV. For example, when compared to no IPV mothers, mothers who experienced an IPV have lower income (R$ 421 versus R$ 652), less education (6 versus 7 years of schooling), less literacy (93% versus 90%) and despite having higher labor force participation rates (73% versus 69%) are less likely to be employed (80% versus 90%). While 54% of mothers that experienced an IPV seem to receive governmental aid – like *Bolsa Família* Program, this figure is about 35% in the group composed of mothers who did not experience an IPV.

IPV mothers are younger than no IPV mothers (35 versus 37 years old), most are non-white (69% versus 60%), more likely to be single (56 versus 30%) and – as a consequence – more likely to be the household head (75% versus 33%).

Table 2 also shows that families are made up of 4-5 members and there is a higher incidence of children living with their father (or their mother's spouse) among those not exposed to IPV. Notwithstanding, children exposed to their mother's IPV are mostly within the lower wealth quintiles[7].

The last set of variables is related to children outcomes. All differences are statistically significant at the 1% level. We can interpret these differences between groups as the unconditional effect of being exposed to mother's IPV. Thus, children and youths living with abused mothers are more likely to be assaulted in 12 percentage points (p.p.); have a higher likelihood to be delayed or to drop out from school in 8 p.p. and 2 p.p., respectively. Moreover, exposed children have a lower likelihood of being enrolled (3 p.p.), and less education measured by years of school exposure and completed years of schooling (difference is one entire school year).

School enrollment is high in both children groups that was exposed to IPV and no-exposed to IPV – about 92% and 95% of children were engaged in formal education system, respectively. The percentage of dropout is low in both groups: 5% and 3% for children who were exposed to IPV and not exposed to IPV, respectively. For these cases, the difference between IPV and no IPV groups are less than 3 percentage points.

School delay, schooling exposure per year, and years of education – the last two indicators used for children older than 9 – are used to assess school performance. About 56% of children who were exposed to IPV and 47% of children who were not exposed to IPV experience school delay. That is, half of the analyzed children are in grades they should have concluded.

Perhaps the most remarkable result: while 14% of children who were exposed to IPV have been assaulted in the last year, less than 2% of children who were not exposed to IPV have been victimized by assault. This finding is in line with Tajima (2002) in that adolescents have a higher risk of physical assault in families which experienced an IPV.

Finally, statistics from Table 2 show that IPV and no IPV groups are statistically different in their observable variables. Indeed, both groups are not comparable in the sense that covariates may affect our interest variables as well as witnessing domestic violence. Therefore, the proposed analytical method aims to create comparable treatment and control groups, with the same propensity to witness domestic violence, based on those covariates.

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[7] Data also show (statistics available upon request) that children who were exposed to mother's IPV are more engaged in the labor market (21%) and are less likely to live in a household with food security (23%) than those not exposed to mother's IPV (17 and 57%, respectively).

Table 2: Means and proportions comparison before matching for no IPV and IPV groups

Variable Name	Treatment		Control		Difference
	Mean	S.D.	Mean	S.D.	
PSM 1st stage					
Mother's outcome					
Mother's IPV	0.007	0.085			
Mother's variables					
Age	37.433	7.679	34.889	6.661	2.545***
White	0.393	0.489	0.312	0.464	0.082***
Social benefit	0.355	0.478	0.540	0.499	−0.185***
Years of education	7.055	4.352	5.865	3.614	1.190***
Labor Force	0.696	0.460	0.737	0.441	−0.041*
Single mom	0.304	0.460	0.557	0.497	−0.253***
Internet access	0.288	0.453	0.184	0.388	0.104***
Mobile	0.609	0.488	0.610	0.488	−0.001
Household head	0.326	0.469	0.757	0.429	−0.431***
Geographic variables					
North	0.155	0.362	0.161	0.368	−0.006
Northeast	0.331	0.470	0.380	0.486	−0.050*
Mid-west	0.108	0.310	0.102	0.303	0.006
South	0.143	0.350	0.122	0.328	0.021
Southeast	0.263	0.440	0.234	0.424	
Urban	0.813	0.001	0.857	0.015	−0.044*
Family's variables					
1st quintile	0.375	0.485	0.202	0.402	0.172***
2nd quintile	0.286	0.452	0.203	0.402	0.083***
3rd quintile	0.180	0.385	0.198	0.399	−0.018
4th quintile	0.100	0.301	0.190	0.392	−0.090***
5th quintile	0.050	0.218	0.186	0.389	−0.136***
Father cohabiting	0.797	0.403	0.419	0.494	0.377***
Family members	4.564	1.548	4.544	1.611	0.020
PSM 2nd stage					
Children's outcomes (6 - 17)					
School delay	0.474	0.002	0.558	0.021	−0.085***
Enrolled	0.955	0.001	0.926	0.011	0.030***
Dropped out	0.036	0.001	0.058	0.010	−0.023**
Children's outcomes (10+)					
Schooling per year	0.818	0.001	0.728	0.015	0.090***
Years of school 10+	5.280	0.011	4.274	0.129	1.007***
Exp. Violence	0.017	0.001	0.140	0.019	−0.122***

N = 73,386 observations in the PSM 1st stage
N = 73,386 observations for children ages 6-17 in the PSM 2nd stage
N = 72,697 observations for "dropped out" variable of children ages 6-17 in the PSM 2nd stage
N = 49,543 observations for children ages 10-17 in the PSM 2nd stage
* $p<0.05$;** $p<0.01$; *** $p<0.001$

B. Propensity score estimates

The first step to perform PSM is to estimate the propensity of treatment, based on observable variables. We then regress the IPV indicator conditional on the covariates presented in Section 2B to obtain the estimated probability of IPV for all mothers in our sample. Based on the estimated propensity to suffer domestic violence, we are able to match observations from both IPV and no IPV groups, thus creating comparable groups. We perform the matching procedure using Stata 14 "teffects" code. Using covariate's balance check, we are able to verify if groups are comparable after matching. Table 3 shows that the differences in covariates vanished after PSM.

Table 4 shows that covariates are all balanced after matching procedure. IPV and no IPV groups are similar regarding observed characteristics after matching. Therefore, both are comparable groups and results from Table 3 are reliable.

After propensity score procedures, we can compare the outcomes of children exposed to mothers' IPV to those of not exposed children. Table 4 shows that the difference in school

enrollment between groups is not statistically significant; children that was exposed to IPV are more likely to have school delay and to drop out (8 p.p. and 2 p.p., respectively) than children unexposed to IPV. For children above age 9, those exposed to IPV have 0.5 and 0.3 lesser year of school exposure per year and years of schooling, respectively, compared to no-exposed IPV children. These results are similar to those from Assaad et al. (2016).

The proportion of IPV children that experienced any violence in the last year is 8 p.p. higher than that for no-exposed IPV children. We are aware of endogeneity problems with this outcome. While Tajima (2002) establishes a link between wife abuse and child abuse, Markowitz (2001) argues that the hypothesis in which differences in demographic groups – such as race, age and socioeconomic status – would yield different attitudes towards physical punishment against children does not hold. Nevertheless, here we are not considering a causal relationship between that result and mother's IPV.

At this point, we should remember that our analysis is about a specific category of domestic violence victims: 6 to 17 years old sons and daughters living with their mothers, who experienced an IPV. Defining IPV witnessing based on mother's response may deepen the lack of children's voice about their own experiences (Kimball, 2016). Moreover, the definition of IPV includes the physical, emotional/psychological, financial and sexual abuse, which may occur in both heterosexual and same-sex couples (Daire et al., 2014; Tomsich et al., 2017; Ellsberg et al., 2001). However, due to data set limitation, we restricted our analysis to physical violence that women experienced from their intimate partners (which may be a current or past relationship) in the last year.

Table 3: Covariates' balance after matching

| | Mean | | | *t*-test | |
Variable	Treated	Control	% bias	t	p-value
Mother's variables					
Age	36.359	37.109	−11.2	−1.52	0.13
White	0.328	0.316	2.5	0.33	0.74
Social benefit	0.538	0.532	1.2	0.16	0.88
Years of education	5.927	5.760	4.1	0.56	0.58
Labor Force	0.754	0.739	3.4	0.45	0.66
Single mom	0.526	0.514	2.6	0.31	0.76
Internet access	0.201	0.176	5.7	0.80	0.43
Mobile	0.626	0.617	1.9	0.24	0.81
Household head	0.769	0.793	−5.4	−0.75	0.45
Geographic variables					
North	0.143	0.134	2.6	0.34	0.74
Northeast	0.374	0.392	−3.8	−0.48	0.63
Mid-west	0.106	0.088	5.9	0.79	0.43
South	0.152	0.122	8.5	1.13	0.26
Urban	0.869	0.878	−2.5	−0.04	0.73
Family's variables					
1st quintile	0.350	0.356	−1.4	−0.16	0.87
2nd quintile	0.283	0.240	10	1.24	0.22
3rd quintile	0.192	0.207	−3.8	−0.49	0.63
4th quintile	0.125	0.143	−5	−0.69	0.49
Father cohabiting	0.407	0.371	8.1	0.96	0.34
Family members	4.505	4.423	5.2	0.65	0.52

Table 4: Propensity score estimates

Variable	Difference	S.E.	N
Exp. violence	0.0846*	0.0266	49,543
Enrolled	−0.0183	0.0105	73,386
School delay	0.0853*	0.0402	73,386
Dropped out	0.0200*	0.0104	72,697
Schooling per year	−0.5344*	0.0222	49,240
Years of school 10+	−0.3499*	0.2587	49,240

* $p<0.05$

4. Concluding remarks

In this paper, using Brazilian data, we investigate how intimate partner violence affects children school outcomes: school enrollment, school delay, and drop-out.

Our findings corroborated the previous studies: there is no difference in school enrollment among witnesses and non-witnesses; but, children from violent households are more likely to drop-out of school, to have fewer years of school exposure for their age and to attend classes from grades under the expected. Witnesses are also more likely to be assaulted than non-witnesses. However, the relationship between violence towards mothers and sons/daughters is not straightforward.

The findings of this study reflect a statistical association between intimate partner violence and education. However, any inferences of causality are only suggestive and tentative. Although we attempted to control for endogeneity by using a propensity matching score design, we were not able to establish a causal relationship between intimate partner violence witnessing and school outcomes for children. Data set limitations were crucial, and we should stress some of them.

First, household surveys may shed light on this research field but are not screening substitutes. Second, the lack of information about perpetrators avoids the precise estimation of intimate partner violence determinants. Third, underreporting may be worse in a general survey context – direct questions about sensitive topics, poor interviewer training, fear of perpetrator's retaliation, shame and other aspects may avoid women to respond honestly. Last, we estimate effects of intimate partner violence on children without hearing children's voices – even though in a quantitative research context, the fact that someone else provides their information may be a way to hide unwelcome outcomes. Fourth, it is possible that a child we are assigning as an intimate partner violence witness did not actually witness his or her mother being assaulted. Furthermore, there is a wide range of personal involvement with the aggression. A child may listen to his or her parents discussing, or be present at the moment of the physical aggression – some of them would even try to help their mothers; fifth, we repeat parents' variables for children from the same family; sixth, we do not take into account more than one family cohabiting – although the family head can be more likely to make decisions about a family member than a household head, and; last but not least, we exclude from data set – and from all analysis – other relatives or employees and their children.

Despite these several limitations, our findings are unprecedented evidence about the damage that domestic violence has on human capital formation in Brazil.

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