SAVED BY THE BELL? THE EFFECT OF SCHOOLING ON CRIME AGAINST WOMEN

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Abstract
Brazil has a female homicides rate of 4.8 homicides per 100,000 female population. More than 1/3 of the female homicides occur inside their household suggesting that violent context and vulnerability at home. Lower levels of education are listed by WHO as a risk factor for women, increasing her probability of suffering violence from their partner. Increasing female schooling helps to improve women's access to paid employment and to have access to and knowledge of their rights. The higher level of education would reduce the woman's vulnerability, whether expressed in her relationship with her partner or given her role in the family structure. Nevertheless, the relationship between education and criminal activity has been investigated focusing on the criminal's point of view seeking what the effect of education has on the decision to commit a crime. Alternatively, this paper highlights the different education effects on men and women to answer the question: could education reduce the female homicides rate? To study it, we take the most desegregated level of data available on this subject to construct a panel analysis with the 645 municipalities of São Paulo state from 2003 to 2018. The impact of schooling (lag school enrolment) on female homicide rates is studied controlling for an inherited characteristic of each municipality along with following measures: the municipality economic performance, employment opportunities, level of urbanization, the percentage of youth on population, crime level and the probability to be caught (incarceration rate). Our estimative shows that an increase of one percentage point on the male enrolment tax could decrease 0.3 points the female homicide rate suggesting the importance of greater access to education.
Keywords: Crime; Female Homicide; Education
JEL: K42; O12; J16

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RESUMO

O Brasil possui uma taxa de homicídios de 4,8 homicídios femininos a cada 100.000 mulheres. Mais de 1/3 dos homicídios femininos ocorrem dentro de suas casas, sugerindo um contexto violento e vulnerabilidade em casa. Os níveis mais baixos de educação são listados pela OMS como um fator de risco para as mulheres, aumentando sua probabilidade de sofrer violência por parte do parceiro. O aumento da escolaridade da população feminina ajudaria a melhorar o acesso das mulheres ao emprego e aos de seus direitos. Já o nível superior de escolaridade reduziria a vulnerabilidade da mulher, expressa em seu relacionamento com o parceiro ou em seu papel na estrutura familiar. A maior parte dos estudos da relação entre educação e atividade criminosa foi investigada com foco no ponto de vista do criminoso, buscando qual o efeito da educação na decisão de cometer um crime. Como alternativa, este artigo destaca os diferentes efeitos da educação em homens e mulheres para responder à pergunta: a educação poderia reduzir a taxa de homicídios femininos? Para respondê-la utilizamos o nível mais desagregado de dados disponíveis sobre esse assunto para construir uma análise em painel com os 645 municípios do estado de São Paulo de 2003 a 2018. O impacto da escolaridade (matrículas defasadas) nas taxas de homicídios de mulheres é estudado controlando características herdadas de cada município, juntamente com as seguintes medidas: desempenho econômico do município, oportunidades de emprego, nível de urbanização, porcentagem de jovens em população, nível de criminalidade e probabilidade de ser detento (taxa de encarceramento). Nossas estimativas mostram que um aumento de um ponto percentual na taxa de matrícula masculina poderia diminuir 0,3 pontos na taxa de homicídios femininos, sugerindo a importância de um maior acesso à educação.

Palavras-Chave: Crime; Homicídios Femininos; Educação

JEL: K42; O12; J16

INTRODUCTION

Brazil is among the five countries with higher female homicide rates among the 83 countries studied by the World Health Organization (WHO). The country has a female homicide rate of 4.8 homicides per 100,000 female population, and about a third of them occur inside the women's household. Aggressions, deaths, and violence against women have recurred throughout history in virtually every country and some cases, even supported by structures and legislation. The murder of women motivated by adultery was considered legitimate by law in the earlier years of the Brazilian Republic. Meanwhile, the male adultery was constituted as ordinary concubinage. The legislation was changed by the Civil Code (1916), however, it took more time to social norms and customs to change (BLAY, 2003). For that reason, new laws to protect women against domestic violence were adopted: 2006 Maria da Penha Law and 2015 Feminicide Law.

According to Waiselfisz (2012), among men's homicides, only 14.3% of incidents occur in the residence or housing, while for women this proportion reaches 41%. While men are more likely to experience situations of armed conflict and criminal activity, women are more susceptible to injuries from people close to them, such as partners.

While there is a field of study in the economics of crime, little attention has been given to understand the reason and determine the causes of violence against women and, more specifically, about female homicides. Despite the importance of this type of crime, empirical studies are still scarce. To our knowledge, this work fills the gap in the literature by examining the impact of male and female education on female homicides in a country that has exhibited a high female homicide rate. Moreover, Brazil is an emerging economy that has invested resources in mitigating poverty with cash transfer programs that are conditional to children's school frequency and the adoption of mandatory basic education (PIRES, 2013).

The theoretical models developed by Becker (1968) and Ehrlich (1975) prompted the emergence of new lines of empirical research whose main purposes were to investigate the socioeconomic determinants of crime, as well as their impacts on economic development. In these economics of crime models, an individual will commit a crime if the expected benefit is greater than the cost. The literature in the field has explored the impact of different socioeconomic statuses on the benefit and cost of crime to propose policies to reduce crime rates.

Ehrlich (1975) is the first author to emphasize the relationship between education and crime , and found a statistically significant and positive relationship between the average number of completed years in school by the adult population over 25 and crimes committed against property in the United States in 1960. Other contributors to the quest for understanding the relationship between crime and education are Lochner (1999), Lochner (2004), and Lochner and Moretti (2004).

Lochner (2004) promoted great advances in the theoretical literature of the relationship between education and crime and Lochner and Moretti (2004) for empirical literature. The empirical differential was the identification strategy adopted. The authors used changes over time in the education laws of each American state on the mandatory minimum age to attend classrooms as an instrumental variable for education. The justification was the problem of endogeneity and with that, they got answers causal effects of education on crime.

Lochner (2007) describe four distinct channels that education reduces expected benefit or rise expected cost from crime: (i) to raise the opportunity cost to commit crimes by increase

expected wages; (ii) may directly affect the financial or psychological returns of the crime; (iii) may change risk preference; (iv) can affect people's social networks and friendship circles. However, the effect of education on crime can be ambiguous. Lochner (2007; 2011) identifies that education has the potential to increase the productivity of the individual in committing a crime, increasing the expected benefit, and lowering the expected cost form crime.

Would education affect the risk of a woman be a victim? Education empowers women by increasing employment opportunities, and knowledge and access to women's rights. Nevertheless, education would not only be an investment in human capital but a requirement for expanding opportunities. People's *achieved functioning's* are distinct, determined by different realities that do not allow the same conditions of choice (SEN, 1980, 1992, 2000). Women's access to education reduces the deprivation of women and raises their agency in society (SEN, 2000; ROBEYNS, 2006; NUSSBAUM, 2011). With higher education, women enjoy agency, reducing their vulnerability.

Few empirical studies disaggregate the analysis by sex, despite some evidence that education impact on crime differs between men and women. The nature of many crimes differs by gender: crime tends to be more personal nature for women, for example, female homicides are often perpetrated against their husbands or partners (STEFFENSMEIER; STREIFEL, 1992; SCHWARTZ;STEFFENSMEIER, 2007; URBINA; LOCHNER, 2019). Urbina and Lochner (2019) also found that the effects of education on female crime are related to changes in marital opportunities and family formation. They found that increases in mandatory schooling laws and school quality can lead to significant reductions in female crime and the probability of incarceration, except for white-collar crimes.

The relationship between education and criminal activity has been investigated focusing on the criminal's point of view seeking what the effect of education has on the decision to commit a crime. Alternatively, this paper highlights the different education effects on men and women.

To verify the effects of male and female education on female homicides, we construct a panel analysis with the 645 municipalities of São Paulo state from 2003 to 2018. Municipalities are the most desegregated level of data available on crime. The impact of education on female homicide rates is studied controlling for the inherited characteristic of each municipality along with following measures: the municipality economic performance, employment opportunities, level of urbanization, the percentage of youth on population, crime level, and the probability to be caught (incarceration rate). By controlling for the municipality´s economic performance, we are avoiding bias on the results that may rises from the correlation of education and income (FAJNZLBER; ARAÚJO JUNIOR., 2001). Although, the positive relationship is associated with property crimes, which are more demanding in terms of criminal skills.

Our results show that rises male and female education has the potential to reduce female homicides rate. We contribute to the literature on crime by providing evidence on the effect of male and female education on female homicides that corroborate the importance of education as a factor reducing crime. Previous studies about Brazil using aggregate information showed that the measures of education of the population are inversely related to crime rates (FAJNZLBER; ARAÚJO JUNIOR, 2001; SANTOS, 2009; SCOZARFAVE; SOARES, 2009; BECKER, 2012). But we could show, by separating male and female educations, that education reduction effect work from the offender and the victim side.

THE RELATIONSHIP BETWEEN EDUCATION AND CRIME

The human capital approach has been used as a reference to analyze the impact that education in an individual's life. The Theory of Human Capital (BECKER, 1993; SCHULTZ, 1988; MINCER, 1958) considers education as an investment that increases the productivity of the individual, also can make a difference in the standard of living of the population. The premise is that the capital invested in education would guarantee better opportunities in the labor market, and assuring better remuneration.

Becker's (1968) approach assumes that individuals with higher levels of formal education are less prone to criminal involvement. The idea that education is one of the determinants of crime is not new. Becker (1968), Ehrlich (1973), and Ehrlich (1975) are examples of Economic Crime Theory seminal papers in which education was already present in the modeling of criminal behavior.

Education could affect crime rates by many channels like the effect of income, available time, aversion risk, social interactions, economic and psychological returns. Impact channels can be direct or indirect (SILVA, 2014), the first acting directly on actions, modifying individual behavior, modifying preferences, and indirectly when changing individuals' opportunities. Education can also change preference rates over time, increasing patience and risk aversion (BECKER; MULLIGAN, 1997). The more patient and risk-averse individuals would find wrongdoing's punishments more costly. However, the literature recognizes the ambiguous effect that education can have on individual decision making.

Lochner (2004) central argument is that, since the human capital increases the work marginal returns more than those from the crimes, investments in human capital such as education, should reduce crime rates. According to this argument, public policies aimed at increasing the educational level of the population could minimize certain types of crimes.

So, a higher educational level would increase the opportunity cost of committing a crime, an individual with higher levels of education tend to have better returns in the labor market than on crime, therefore the opportunity cost of committing crime increases. The incarceration for this individual can be more costly because could keep the criminals out of the legal labor market for a long time.

The negative effect of education on crime is also identified in Calvó-Armengol and Zenou (2004). The authors develop a model based on the theory of crime decision games, assuming there is a peer effect on learning crime. In that case, through peer-centered analysis, they show that education generates social connections such as schooling, learning, and the labor market. The authors argue that social networks connect people. These connections discourage crime and encourage social networks without criminals.

The positive relationship is related to the cost of planning and execution of the criminal activity (BECKER; KASSOUF, 2017), whereas higher education level increases, greater will be the individual's efficiency in the planning and execution, and hence lower will be the cost. In aggregate terms, a region with higher education generally has the highest per capita income, making it potentially more attractive to the criminal action (FAJNZYLBER; ARAUJO JUNIOR, 2001). The positive relationship would be associated with crimes against property (LOCHNER, 2004; SOARES, 2007). It is noteworthy that the positive relationship between education and crime is found in empirical studies that verify the impact on thefts and robberies

or white-collar crimes. Furthermore, before any statement, the possibility of endogeneity involved in the model should be checked.

Urbina and Lochner (2017) point out that there are reasons to believe that the education has a different impact on men and women on the opportunity cost of engaging in criminal activity: (i) crime tends to be more personal nature for women; (ii) the women are more involved in domestic activities than in the labor market, with lower labor force participation rate, and so they have a lower opportunity cost of educating themselves; (iii) Women's low employment rates suggest that the return on education may be less relevant in deciding to engage in crime.

According to Robeyns (2006), education can assume a greater role than simply increasing returns in the labor market, as suggests the human capital approach. The author argues that, through education, the individual can find a job and be less vulnerable. Also, education enables the expansion of people's minds, allowing them to recognize the opportunities and providing alternatives beyond just following their parents.

VIOLENCE AGAINST WOMEN

The popular understanding of violence consists of acts of physical aggression however, violence is understood as a break from any form of the victim's integrity: physical integrity, psychic integrity, sexual integrity, and moral integrity (RICOLDI; ARTES, 2016).

Gender-violence is based on acts of physical, psychological, or verbal violence between people only because they are male or female. However, according to Khouri (2012), the expression of gender violence is almost synonymous with violence against women, since these are the biggest victims of the incidents.

Violence against women has been considered a public health problem by the World Health Organization since 1990. According to Meneghel and Hirakata (2011), the deaths of women resulting from gender conflicts are called femicides or feminicides. These crimes are usually committed by men and result from situations of home abuse, threats or intimidation, sexual violence, or situations where women have less power or resources than men (WHO, 2013). It is not, therefore, every murder of women that is characterized as feminicide. This specific crime is configured when the woman is the victim of homicide only because of her gender.

In Brazil, statistics on offenses are even scarcer than on other crimes. Despite the scarcity of data, it is possible to verify that the occurrences of female homicides, although declining, are still at alarming levels and the country lives a culture of violence as conflict resolution (WAISELFISZ, 2015).

The Maria da Penha Law, sanctioned in August 2006, established the obligation of respect and equality, creating mechanisms to curb domestic and family violence. Barreto (2016) and Garcia et al. (2013) present, however, that the Maria da Penha Law, from its force to the present day, has had little effect in reducing the numbers of violence against women and feminicide.

The numerous consequences of violence against women can be summarized, according to Bott et al. (2012): (i) a major cause of injury and disability, as well as a risk factor for

physical, mental and sexual problems; (ii) causes long-term intergenerational problems for the health, development and well-being of the children of women who have been victims; and (iii) negative social and economic consequences for society as a whole.

Education as well as being a desirable goal of economic development provides equal opportunity in work and economic resources between women and men (DUFLO, 2012). But education is a resource too and the resources have instrumental value, once they are used to exercise the agency power. In this sense, the years of schooling completed could be an indicator of functionings that increase the agency power, the ability to choose, and its effectiveness results. Moreover, exercising choice a person can change power relations. Having resources and improving active agency are related. (KABEER, 2003, p.171-174).

As pointed out by Beltrão and Alves (2009), since the 1980s women have been more educated than men, considering the number of years of schooling and are also the majority in the proportion of graduating enrollments. This increase in the educational level of women could be associated with the increase of their presence in prominent positions, inducing their appreciation outside the domestic environment. There would be a possibility, therefore, of education being configured as a channel to affect violence against women since she could find herself in situations of greater exposure and risk.

METHOD AND DATA

Methodological Procedure

The model proposed in this research seeks to understand the effect of education on female homicides, that is, to investigate whether the higher educational level can reduce female homicides, a *proxy* variable for violence against women. Few studies have investigated the causes of violence against women, especially in Brazil. We fill the gap in the literature by exploring the impact of male and female education on female homicides. By separating both levels of education we can identify the channels from males that are only the offenders from the channels from a female that can be offender and victims.

The empirical strategy was to build a data panel of the 645 municipalities in São Paulo´s state from 2003 to 2018.

The panel data model is the best strategy for studies investigating the determinants of crime, which usually present unobservable heterogeneity among individual units (SANTOS; KASSOUF, 2007). The presence of unobserved effects among municipalities affecting violence is confirmed by the Hausman test on a fixed-effects model. By controlling for fixed-effects we are taking any biased from our estimates that are due to unobserved variables that are time fixed (LOCHNER; MORETTI, 2004). We expect that culture and criminal incidence are unobserved factors that do not vary over the period of our sample (SILVA, 2014). We also control for measures of municipality economic performance.

Data

The proxy for violence against women is the rate of female homicides per 100 thousand women. This crime is considered to have more reliable records, after all, it is more reported than a crime against property and, generates a murder police report only when strong evidence is found, like a corpse (HARTUNG, 2009). However, it is noteworthy to point that in DATASUS there is no classification of deaths by feminicides so that women homicides were used to represent this variable. The explained variable come from the DATASUS Mortality Information System (SIM). Homicide codes are defined by the 10th International Classification of Disease (ICD 10), the X85 to Y09 codes marshal all types of aggressions.[4]. This variable will be constructed according to the equation below and the other variables used in the models are presented in Table 1.

$$female\ homicides = \frac{women's\ homicides\ in\ the\ municipality}{women\ in\ the\ municipality}\ x\ 100.000$$

The empirical models use some control variables to minimize the bias of the omitted variable since these variables can be correlated with the education *proxy* used.

Chart 1 - Variables used in estimations.

Variable	Description	Source	Expected signal
Violence	Women´s homicides	DATASUS	-
Education	The ratio of enrollment and school-age population with ten years lag.	INEP²	Negative
GDPpc	GDP per capita	SEADE¹	Negative
Urban Pop.	Percentage of population living in urban areas	SEADE	Positive

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[4] X85 - Aggression Through Drugs, Medicines and Biological Substances; X86 - Aggression Through Corrosive Substances; X87 - Pesticide Aggression; X88 - Aggression Through Gases and Vapors; X89 - Aggression Through Other Specified Chemicals and Harmful Substances; X90 - Aggression Through Unspecified Chemicals and Harmful Substances; X91 - Aggression Through Hanging, Strangulation and Suffocation; X92 - Aggression Through Drowning and Submersion; X93 - Aggression Through Hand Firearm Shooting; X94 - Assault by Shotgun, Carbine or Firearm of Larger Caliber; X95 - Assault by Shooting Another Firearm or Unspecified Weapon; X96 - Aggression Through Explosive Material; X97 - Aggression Through Smoke, Fire and Flames; X98 - Aggression Through Water Vapor, Gases or Hot Objects; X99 - Aggression by means of a sharp or penetrating object; Y00 - Aggression by means of a blunt object; Y01 - Aggression Through Projection from an Elevated Place; Y02 - Aggression Through Projection or Placing the Victim in Front of a Moving Object; Y03 - Motor Vehicle Impact Aggression; Y04 - Aggression Through Body Strength; Y05 - Sexual assault by physical force; Y06 - Neglect and Abandonment; Y07 - Other Maltreatment Syndromes; Y08 - Aggression by other specified means; Y09 - Aggression By Unspecified Means.

Young Pop.	Men 15 to 24 years old	SEADE	Positive
Apprehensions	Theft apprehensions	SSP[3]	Positive
Detention Rate	Relationship between number of homicide prisoners	SSP	Negative
Workforce	Percentage of employed women in working age	RAIS[4]	Ambiguous

[1] State Data Analysis System Foundation; [2] National Institute of Educational Studies and Research Anísio Teixeira; [3]Secretariat of Public Security of the State of São Paulo; [4]Annual List of Social Information.

The *proxy* used for the education of municipalities is presented according to the equation below:

$$education\ rate = \frac{N.\ of\ schoolage\ enrolled}{N.\ of\ schoolage\ enrolled\ residents}\ x\ 100.000$$

We use the enrollments from the first year of schooling until high school, so we shape the rate with the nine years of fundamental school and the three years of high school. The text will refer to the twelve years of schooling as fundamental schooling. The number of school-age enrollments was taken from the Educational Census collected and disseminated by the Anísio Teixeira National Institute for Educational Research (INEP). The enrollment data has ten years lag for each year of homicide information. With this strategy, the education rate expresses de average access to education of the adult population in each analyzed year with registered homicides. The age population data were obtained from the Brazilian Institute of Geography and Statistics (IBGE) in population counts, with estimates of age ranges from the 2000 and 2010 Population Census.

The municipal educational level represents the social and economic development degree and may be associated with demographic, economic, and social factors. The control variables can be separated into three groups: socioeconomic, demographic, and criminal justice determinants.

The GDP per capita of the State Data Analysis System (SEADE) is one of the socioeconomic determinants. Municipal GDP per capita is used as a proxy to capture the effects of income changes on crimes against individuals. We can analyze this variable from two perspectives: according to Becker's (1968) model of rational utility theory, agents condition its utility to factors that would increase the opportunity cost of committing a crime. However, as local income increases, the benefits associated with crime increase, generating potential gains for the criminal. Thus, the effect of income on crime is ambiguous. The values of the municipal GDP *per capita* were deflated by the implicit deflator of GDP for the year 2015. This variable was used by Kume (2004), Hartung (2009) and Silva (2014).

The proxies to the demographic determinant are the percentage of young men and the urban population of each municipality, both obtained from the SEADE. The percentage of young people refers to the number of people in the municipality's male population aged 15 to 24 years to the total population of the municipality. According to Kume (2004), urban areas

would be responsible for the rising crime rate because the most crowded environments tend to make it difficult to identify the criminal and facilitate his escape.

The detention rate is the likelihood of apprehension, and it is the proxy for criminal justice. Insofar as there is a larger likelihood associated with detention, greater is the cost of choosing an illegal activity. The detention rate is similar to that used by Gaulez (2018). It is the ratio between the number of prisoners and the number of homicides lagged in a period. If the proportion of arrested individuals increases, it is expected that others refrain from committing crimes in light of the probability of being punished. The number of vehicle thefts apprehensions is a variable to control the city's crime. This information was extracted from the São Paulo Public Security Bureau.

Descriptive statistics of the variables are presented in Tables 1 and 2. Table 1 shows statistics following the panel data pattern, while Table 2 presents a descriptive analysis of the variables in all periods.

Table 1 - Descriptive statistics for the municipalities of São Paulo. 2003 to 2018.

Variable		Average	DP	Min	Max	Obs.
Violence	*overall*	1.85	6.62	0.00	139.59	N = 10320
	between		3.92	0.00	53.03	n = 645
	within		2.33	- 51.18	88.41	T = 16
Women Educ.	*overall*	0.76	0.12	0.00	1.00	N = 5805
	between		0.08	0.42	1.00	n = 645
	within		0.08	0.24	1.18	T = 9
Men educ.	*overall*	0.77	0.12	0.00	1.00	N = 5805
	between		0.08	0.41	1.00	n = 645
	within		0.08	0.27	1.23	T = 9
Urban Pop.	*overall*	0.84	0.14	0.22	1.00	N = 10320
	between		0.13	0.25	1.00	n = 645
	within		0.03	0.32	1.35	T = 16
Young Pop.	*overall*	0.08	0.01	0.05	0.25	N = 10320
	between		0.01	0.06	0.22	n = 645
	within		0.01	- 0.00	0.12	T = 16
Detention rate	*overall*	0.26	0.36	0.00	1.00	N = 9675
	between		0.17	0.00	0.71	n = 645
	within		0.01	- 0.43	1.19	T = 15
Workforce	*overall*	0.21	0.13	0.00	1.00	N = 10320
	between		0.11	0.01	0.95	n = 645
	within		0.07	-0.72	1.04	T = 16

All variables have non-null *within* standard error and all, but the holding rate has a standard error *between* greater than *within*, suggesting that the heterogeneity between municipalities is large.

Table 2 - Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Violence	10320	1.85	6.618	0	139.60
Men´s Educ	5805	0.77	0.12	0.00	1.00
Women´s Educ	5805	0.76	0.18	0.00	1.00
Urban Pop.	10320	0.84	0.14	0.22	1.00
Young Pop.	10320	0.09	.012	0.05	0.25
Detention Rate	9675	0.26	0.36	0.00	1.00
Workforce	10320	0.21	0.13	0.00	1.00
GDPpc	9675	20595.14	20509.03	2606.15	401303.95

RESULTS AND DISCUSSION

The results presented raise relevant information to understand the determinants of crime on a rational choice and women empowerment approaches, especially considering the role of education in women's homicides. In short, it is expected to understand how these variables relate to each other.

The results of the fixed effects panel model estimates are shown in Table 3. Estimates were based on information of 645 municipalities of São Paulo from 2003 to 2018. The panel data model is used to control the unobservable heterogeneity of each observation unit, since characteristics cultural, social, political, considered stable over time, can influence violence against women in municipalities.

Some tests were performed to verify the best behavior of the data and the functional form: first, the Breusch-Pagan test toevaluate if the errors were homoscedastic. The null hypothesis was rejected indicating the presence of heteroscedasticity so robust errors were adopted; second, the Hausman tests were applied to evaluate which panel data method should be used. The test indicated the use of the Fixed Effects method, corroborating the Brazilian literature that does not disprove the unobserved fixed effects hypothesis, and the multiple linear restriction F tests performed for each regression rejected the null hypothesis indicating that variables were statistically significant together, the value-p was 0.00.

Estimates were made to verify the impact of education on women's homicides. The first column estimates the impact of women's access to education on their homicides; the second column aims to verify the impact of men's education and the third column presents the impact of men's and women´s education. In all specifications, education has been lagged for 10 years to identify the impact of access to education on life as young adults. The results of these estimates are presented in Table 3.

Table 3 - Women's Homicides and Education - EF Estimates.

VARIABLES	(1)	(2)	(3)
Women Education	-0.214*		-0.213*
	(0.115)		(0.115)
Men Education		-0.339**	-0.277**
		(0.113)	(0.113)
Apprehensions	-0.000241***	-0.000250***	-0.000242***
	(7.36e-05)	(7.35e-05)	(7.36e-05)
Urban Pop	-0.109	-0.0756	-0.105
	(0.806)	(0.806)	(0.806)
Young Pop	-1.440	-1.002	-1.524
	(2.704)	(2.713)	(2.727)
Detention Rate	0.0350	0.0349	0.0349
	(0.0309)	(0.0309)	(0.0309)
Female Work Force	-0.196	-0.236	-0.194
	(0.336)	(0.336)	(0.337)
GDP per capita	-9.96e-07	-1.10e-06	-9.89e-07
	(8.95e-07)	(8.93e-07)	(8.95e-07)
Constant	0.512	0.596	0.495
	(0.755)	(0.757)	(0.759)
Observations	5,805	5,805	5,805
R-squared	0.004	0.003	0.004
Number of code	645	645	645

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results show a negative relationship between homicides and education, suggesting that greater access to education would decrease the homicide rates of women in the municipalities. One percentage point in women's education rate reduces 0.2 points the female homicide when we consider only the women's education or when we consider the men's too (Model 1 and 3). In the same way, an increase of one percentage point on the male education rate could decrease 0.3 points the female homicide rate.

Our results are accordingly with other scholars that find a negative relationship between crime and education (BECKER; KASSOUF, 2017; KUME, 2004; SANTOS, 2009). Mostly of studies on the economics of crime use education to explain the costs and benefits of criminality, not as an explanatory variable itself to the homicide (HARTUNG, 2006; CERQUEIRA; LOBÃO, 2003; ERVILHA; LIMA, 2019) . Our distinctive point is insofar including the ten years lag enrollment rate to shape the education variable we highlight the importance of the fundamental school. Additionally, our results show a decrease in the homicide rate as a result of education, not as a result of an individual choice changed by education. Through the results obtained presented in Table 3, some of the control variables are not statistically significant, although they remain with the same sign and similar magnitudes regardless of the specification.

FINAL REMARKS

This paper analyzes the effect of education on female homicides in the municipalities of São Paulo from 2003 to 2018. We investigated through the literature the channels that education can impact on crime. The papers done has mostly focused on the influence of education on the decision to be involved or not in the criminal action, through the opportunity cost. The literature also recognizes the positive effect that education could have on decreasing the probability of apprehensions and on crimes that require more skills. There are, however, few papers that disaggregated the determinants of crime for men and women. Even more rare are the papers that verify the effect of education on crimes committed against women.

Using a panel data model for all municipalities in the state of São Paulo, we estimate the effect of education of men and women on female homicides, a proxy for violence against women. The objective of using ten years lag enrollment as a proxy for education was to verify the effect of access to school as young people on violence as adults. Furthermore, it clarifies a little more the important role of the fundamental education.

The results achieved in this study corroborate the literature and are consistent, indicating that higher schooling decreases crime. In addition, according to the literature higher education allows women to make better choices. Our results show that access to education could improve women's choices as indicated by literature. But the men's access to fundamental education seems to be more influential to avoid female homicides than women's education.

The increase of one percentage point in the enrollment rate of men reduces the rate of female homicides by 0.3 points and the increase of one percentage point in the enrollment rate of women reduces by 0.2 percentage points. The difference between the coefficients is statistically significant, suggesting that men's education has a greater impact on reducing women's violence.

The education process consists of several faces, which occur both in the school environment and abroad, but which are mediated by them. One hypothesis is that in the educational process there is a content of coexistence and citizenship, which does not have a direct monetary value but lead to protection against violence.

Regardless of the channel that education interferes in reducing violence, the results found to leads to the conclusion that educational policies are extremely necessary and should do their utmost importance to keep children in schools.

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