



UNIVERSIDADE FEDERAL DO CEARÁ
FACULDADE DE ECONOMIA
DEPARTAMENTO DE ECONOMIA APLICADA
PROGRAMA DE PÓS-GRADUAÇÃO EM ECONOMIA

DANIEL LOPES RIBEIRO

INTIMATE PARTNER VIOLENCE AND SEPARATION: AN EMPIRICAL ANALYSIS

FORTALEZA

2019

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Dissertação apresentada ao Programa de Pós-Graduação em Economia da Universidade Federal do Ceará, como requisito parcial à obtenção do título de Mestre em Economia. Área de concentração: Teoria Econômica.

Orientador: Prof. Dr. José Raimundo de Araújo Carvalho Júnior.

Fortaleza

2019

Dados Internacionais de Catalogação na Publicação Universidade Federal do Ceará Biblioteca
Universitária Gerada automaticamente pelo módulo Catalog, mediante os dados fornecidos
pelo(a) autor(a)

R368i Ribeiro, Daniel.

INTIMATE PARTNER VIOLENCE AND SEPARATION: AN EMPIRICAL ANALYSIS

/ Daniel Ribeiro. – 2019.

32 f.

Dissertação (mestrado) – Universidade Federal do Ceará, , Fortaleza, 2019.

Orientação: Prof. Dr. José Raimundo de Araújo Carvalho Júnior.

1. Domestic Violence. 2. Separation. 3. Bivariate Probit Model. I. Título.

CDD

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Aprovada em: ___/___/_____.

BANCA EXAMINADORA

Prof. Dr. José Raimundo de Araújo Carvalho Júnior (Orientador)
Universidade Federal do Ceará (UFC)

Prof. Dr. Diego de Maria André
Universidade Federal do Rio Grande do Norte (UFRN)

Prof. Dr. Victor Hugo de Oliveira Silva
Instituto de Pesquisa e Estratégia Econômica do Ceará (IPECE)

Aos meus pais, Carmem e César.

AGRADECIMENTOS

Primeiramente a Deus por permitir minha existência.

Aos meus pais (Carmem e Cesár) e irmãos.

Ao Prof. José Raimundo, pela excelente orientação e suporte nessa caminhada.

Aos professores participantes da banca examinadora Victor Hugo e Diego Maria André pelo tempo, pelas valiosas colaborações e sugestões. Serão importantíssimas para o desenvolvimento do trabalho

Ao corpo docente do CAEN, especificamente ao professor Ivan Castelar, Sebastião Carneiro e Marcio Veras pelas recomendações dadas nessa reta final.

Ao corpo administrativo Carmem, Marcia e Jonathan que trabalham nos bastidores para que tudo permaneça nos eixos.

Aos meus companheiros de café Chico e Adriana.

À minha noiva/parceira Luana Sabino que, como sempre, foi peça fundamental para essa conquista e outras.

Aos que se tornaram minha família em Fortaleza Isabela, Karine e Mario.

Aos meus amigos Assuero e Clécio que deixaram tudo mais digerível nessa caminhada acadêmica em Fortaleza.

À CNPQ pelo apoio financeiro.

Com tudo inerte em mim, como sequela da lesão medular, o peso do coração... E do mais profundo de mim mesma, com força de promessa, nascia-me uma esperança: sobreviverei.

(Maria da Penha)

ABSTRACT

This study aims to understand the determinant factors of woman's decision of separation focusing in post-IPV cases. In addition, we are interested in measuring the direct effect of the violence on the decision of separation. To do so, we made use of an innovative micro database known as PCSVDF-Mulher for 2017, to estimate two bivariate probability models. The first one consists of a recursive bivariate probit model where IPV enter as a covariate of separation and the second one is a standard bivariate probit (seemingly unrelated equations). Our results show that 22% of the abused women had chosen to separate while only 10% of the non-victim women had separated. The econometrics estimates point out that the variables regarding to economic independence appears as significant factors for the separation. Finally, we reiterate that violence has a large and positive effect on the woman's decision of dissolution.

Keywords: IPV. Separation. Bivariate Probit Model. Domestic Violence.

RESUMO

O objetivo do presente de trabalho é o de verificar os fatores determinantes da separação, focando na separação pós-violência doméstica. Além disso, se está interessado em mensurar o impacto direto da violência na decisão de separação. Para tanto, fez se uso de uma base de microdados inovadora conhecida como PCSVDF-Mulher, ano de 2017, para estimar dois modelos de probabilidade bivariados. O primeiro consiste em um modelo recursivo e o segundo um modelo padrão onde a fonte de “possível” relação está inserida no termo de erro. Encontra-se que 22% das mulheres violentadas decidiram se separar enquanto apenas 10% das que não foram vítimas de violência tomaram tal decisão. Com respeito aos resultados econométricos, os fatores que indicam independência econômica como educação e ocupação da mulher e do parceiro se mostraram significativos para decisão de separação. Por fim, confirmou-se que a violência tem um impacto bastante acentuado na probabilidade de separação.

Palavras-chave: IPV. Separação. Probit Bivariado. Violência Doméstica.

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1 INTRODUCTION

Domestic violence is an issue with many impacts both psychological and social, whereas women are the most affected by this problem. In the Brazilian Northeast, roughly 17.27% of the women had suffered physical domestic violence at least once in their lives and 5,38% occurred between the interval of the 12 months prior to data collection (CARVALHO; OLIVEIRA, 2016). Moreover, regarding to social impacts of domestic violence, Carvalho and Oliveira (2017) found that the labor market is deeply affected by the absence of those victims, for example, in last 12 months 47% of the women victimized lost between 1 and 3 days of work, 22% have lost between 4 and 7 days, and approximately 32% have lost more than 8 days of work.

Focusing on the same issue, Lloyd (1997) using a household survey of approximately 820 women living in a specific low-income area in Chicago, where the participants were selected at random and paid a \$10 stipend for their participation on the interview, shows that 18% of the women had experienced physical aggression in 12 months prior to interview, and about 12% reported to suffer more severe types of violence. The results state that, over time domestic violence has negative effects on women's socioeconomic and occupational status attainment, but does not impact the status itself.

It is worth mentioning that the psychological consequences are alarming, being detrimental firstly to the victim and in many circumstances pervading the person itself, affecting others such as children who repeatedly witness the acts of violence. In the action plan for strengthening the health system to address violence against women 2015-2025, approved by the Pan American Health Organization (PAHO), it has demonstrated the perverse effects on mental health of women victims of domestic violence, among them the following stand out: Posttraumatic stress disorder, depression, anxiety and disorders due to alcohol and drugs use.

Having in mind all costs associated to domestic violence it is important to understand why women stay in an abusive relationship or, in another way, the factors that influence their decision to leave. To do so, we estimated two bivariate probit models where one was in a recursive approach and a second in the standard framework. Moreover, taking into account the lack of Brazilian literature addressing this problem using econometric tools our work appears as a start point of discussion. Finally and more important, we used in this study a new survey data collected in 2017 from about 10.000 woman in the nine capitals of the northeast region of Brazil

called Survey of Socioeconomic Conditions and Domestic and Family Violence against Women (PCSVDF^{Mulher}).

Beyond this short introduction there are five more sections. The section 2 briefly discusses the marriage or relationship in the economics literature jointly with the literature about Intimate Partner Violence (IPV) and dissolution. In the section 3 we shortly show how domestic violence was used to be treated by Brazilians authorities and the arising of the largely known Maria da Penha Law. In the section 4 we explain the econometric method used and we give more details regarding to the database. Lastly, in sections 5 and 6 we present the results of the econometrics estimates and a discussion about the results that have been found.

2 THE MARRIAGE/RELATIONSHIP IN ECONOMICS

In his important work that was a start point to other economic analysis about marriage and family, Becker (1973) pointed that marital patterns have major implications in society such as the population growth, inequality income, labor-force participation of women, household resources, among other things. Also, the author argues that due to some characteristics we can apply the preferences approach deeply known by economists to analyze the marriage, as we hope that people marrying expect some increasing in their utility level if compared with single status.

Moreover, the marriage can be treated as a market given men and women compete trying to find the best mates, subject to any restrictions that can be imposed. Note that for the author, marriage means that two people are sharing a same household. In addition, those two principles regarding to utility and competition can be applied to broader types of couple's relationship. Further, below we provide a brief summary of the literature regarding to dissolution of families motivated by violent episodes.

Furthermore, another work in economics to deal with aspects of marriage but in the non-cooperative sense with both endogenous and exogenous woman's income level was Farmer and Tiefenthaler (1997)¹. The authors built a game theoretical framework using a bargain model where each member is treated as a unit, has its own preference, and maximize a utility function which is, only for the man's problem, constrained by an exogenous and alternative level of satisfaction of the partner called threat point. Further, the man's utility is a function of consumption and psychological factors such as self-esteem and others that may be associated with violent relationships. Also a key assumption was the positive influence for man's utility with abusive relationship and violent environments through their impacts on the psychological factors. In addition, it is correlated with a marital capital measure that gives him satisfaction from marriage and is null when single.

On the other hand, the authors supposed that woman's utility is a function of consumption which, in its turn, is positively determined by her own income, the partner's transfers, and the financial and non-financial supports from external sources of the marriage. Other factors that impact the woman's utility are the amount of satisfaction provided by remaining in the relationship, and the man's level of utility. This latter factor aims to capture the commitment of the woman with the relation or, in other words, try to translate woman's aspects like love and

¹ Altruism is allowed in these models.

altruism who by assumption always took into account the spouse's level of satisfaction. Finally, and obviously, the level of violence negatively affects her utility.

They found that women's income and supports from other sources outside the marriage negatively impacts the level of IPV through changes on the woman's threat point. Regarding the husband, they found an ambiguous effect that depends on the magnitude of the fraction of income transferred to woman. Moreover, the authors used two dataset from Nebraska and North Carolina (Charlotte city) to empirically validate their findings. Both for Charlotte and Nebraska database, Tobit models were estimated, and as a result, her non-wage income had a significant and negative effect on incidence of IPV. In addition, Nebraska estimations showed that woman's employment status also impacts significantly and negatively the level of violence.

2.1 Intimate Partner Violence and Separation

As a pioneering work to empirically investigate domestic violence and the woman's action after faced physical abuse, Gelles (1976) devoted his time to provide answers to why victims of IPV stay with their partner by focusing on various aspects of the women's family and family experiences. Even though there are some limitations in the dataset, such as, non-representativeness and sample selection problem, the author provides insights about the key characteristics that could drive women's decision of stay or leave.

Regarding to the decision after they have been abused, he found that how much more severe and frequent the assaults are, higher will be the chances that wife will seek outside intervention. Besides that, the frequency of violence influences the type of intervention that woman demands. For example, almost all of those who had been victimized weekly or daily had called the police, whereas those who suffered monthly² were more likely to leave the marriage. As a possible reason for the former, Gelles (1976) argued that woman who suffered more often believes that an interruption in the relationship might produce a more violent and radical behavior from the aggressor and then she looks for an immediate intervention.

Also, the author concluded that wives who do not seek help are less likely to completed the high school and less likely to be employed. In addition, the outside resources have an important role, so fewer they would have and less are the chances to seek assistance or leave the

² At least once a month.

marriage. Finally, the lack of preparation from the authorities regarding how to behave in such cases was pointed as a factor that influence woman's decision.

Snyder and Fruchtman (1981) had as a purpose to study domestic violence by identifying heterogeneous patterns of intimate partner violence perpetrated by the husband. To do so, the authors identified groups of women with homogeneous characteristics and analyze the violence pattern within each group. In addition, a comparison between groups was made using some measures such as frequency and severity of abuse, usual precipitants, typical responses of the woman and her assailant, history of violence in the family of origin, and disposition following residence at a shelter for battered women. Snyder and Fruchtman (1981) reported that unemployment between battered women is high and correspond to 72% of the victims.

The authors reported at the stage of admission that only 13% of the abused women had intention to continue the relationship with the partner while at the time of the interview 6-10 weeks later 60% of them were living with the offender. Furthermore, the author's results suggest that how much more parental violence the woman have suffered, more tolerant to violence in her family of procreation she will be. In conclusion, after clustered the woman in five types, the principal message was that there is heterogeneity in the frequency and intensity of violence and also with respect to woman's response based on her type. Thus, policy makers should take it into account.

Strube and Barbour (1983) aims to investigate how economic dependence and psychological commitment affect woman's decision to leave the relationship. The authors used a sample of 98 abused women aged from 17 to 62 where all of them were in, or had been in, an intimate, sexual live-in relationship with their husbands or lovers (STRUBER; BARBOUR, 1983). Indeed, as expected, economic dependence was significant in all measures proposed and this proved to be a salient factor to women in their decision. Concerning to commitment, all variables related were significant and had impact on the women's decision whether stay or not³.

Aguirre (1985) asks two questions: why do so many women in shelters decide to return to their husbands? And what is the relationship between their experiences in shelters and their decisions to separate from their husbands? To answer that measures of wives' economic dependence on husbands, exposure to violence during childhood and in earlier heterosexual relationships, the number of injuries received during current reported battering and the number of

³ Another important factor was the husband promise of changing.

issues associated with the battering were used. The results of the study do not provide a test of theory as well-from which to find directions for further research.

A more recent and important economic study about violence and divorce/separation was Bowlus and Seitz (2006) where they modeled the interaction between violence and the woman's response and estimated a probability choice model using the Canadian Violence Against Women Survey (VAWS) to empirically verify its determinants. The authors showed that abused women were between 1.7 and 5.7 times more likely to separate. Further, they found that employment before be battered works as a deterrent.

3 BRAZIL AND DOMESTIC VIOLENCE

Sanctioned on August 7, 2006, the law n° 11,340 became a milestone in the movement for the fight against domestic violence (against women). This great legislative instrument in the fight against domestic violence had as a generator the case of Ms. Maria da Penha Maia Fernandes, who had her history neglected by Brazilian authorities. With the help of several NGOs, Ms. Maria da Penha denounced her situation for the Inter-American Commission on Human Rights of the OAS. Due to this, Brazil was severely criticized for its slowness, lack of adequate legislation and effectiveness in curbing domestic violence.

Further, the feminist movements increased vertiginously, generating more visibility to the situation of violence that countless women have been facing. In addition, it's worth pointing the important role played by international conventions like the Committee on the Elimination of Discrimination against Women (CEDAW) in 1979 and the Inter-American Convention on the Prevention, Punishment, and Eradication of Violence against Women known as the Convention of Belém do Pará, adopted in 1994 to the creation and implementation of the law n° 11.340/2006. In its 3rd article, the Belém do Pará Convention (1994) elucidates the right of every woman to a safe life, both within and outside her relations and Brazil became to follow the Convention by 1995.

Prior to the law n° 11.340/2006 known as Maria da Penha law, the law n° 9.099/95 which regulates the Special Criminal Courts was applied to cases of domestic violence where were considered crime of lesser offensive potential. The Maria da Penha Law became more severe in order to eradicate the thought that such simplistic attitudes could solve the violence and all traumas experienced by women victims of violence.

In the face of this break with the prior legal dispositive, women began to hold a more satisfactory legal apparatus. Also, one of the major advances of Law was the creation of Domestic and Family Violence Courts against women with civil and criminal jurisdiction. Thus, currently there always should have such specialized courts, having in mind their potential competence and efficiency to denunciate and prosecute crimes of domestic violence.

The law writes in its article n° 7 the ways of domestic and familiar violence against women, having as an option give examples of the many different types of violence. Based on that, domestic violence constitutes the physical, psychological, sexual, and patrimonial, among others harmful conducts by intimate partner (BRASIL, 2006).

4 EMPIRICAL STRATEGY

Dissolution of a relationship is clearly a multidimensional problem which involves aspects of self-concept, family setup, and many other characteristics related to the woman's environment. Gelles (1976) states that the decision to either stay in an abusive relationship or to seek outside help or leave the marriage is not determined merely by the occurrence and characteristics of the physical attack perpetrated by her husband. The change of the woman's behavior has an important role in the process. Then, the aim of this work is try to understand the woman's decision of separation jointly with the incidence of domestic violence (by any type) from the partner, identifying its determinants. To do so, we used two econometric models: a recursive as well as a standard simultaneous equation model with two binary choice variables that will be explained below.

4.1 Recursive and Standard Bivariate Probit Models

In our setup, the first equation has the purpose to model the incidence of Domestic Violence, or the man's choice to be violent considering a set of covariates related to the profile of the woman and her partner. Following that, the second equation is concerned to model woman's decision to dissolve the relationship, including domestic violence as an explanatory variable in the recursive approach. Greene (1998) proposed a bivariate probit regression to handle such kind of problem. In addition, this econometric method allows the random errors to follow a bivariate normal distribution and take into account possible simultaneity. Finally, the method can be based on two unobserved latent variables S^* and IPV^* defined as below

$$IPV^* = z'\gamma + \varepsilon_{ipv}, \quad IPV = I\{IPV^* > 0\} \quad (1)$$

$$S^* = x'\delta + IPV'\theta + \varepsilon_{s1}, \quad S = I\{S^* > 0\} \quad (2)$$

In the present, $IPV=1$ indicates that woman was victim of domestic violence, and $IPV=0$ otherwise. Similarly, $S=1$ means that she/they have chosen to separate and 0 if she remains in the relationship. Also, x and z are column vectors of exogenous variables, and (γ, θ, δ) are three column vectors of parameters to be estimated. As said earlier, it is supposed that ε_s e ε_{ipv} are

jointly normally distributed with conditional mean zero, conditional variance one, and correlation ρ . The four probability cells are given as presented originally in Greene (1998)⁴

$$\text{Prob}[\text{IPV} = 1, S = 1] = \Phi_2(z'\gamma, x'\delta + \theta, \rho) \quad (3)$$

$$\text{Prob}[\text{IPV} = 1, S = 0] = \Phi_2(-z'\gamma, x'\delta, -\rho) \quad (4)$$

$$\text{Prob}[\text{IPV} = 0, S = 1] = \Phi_2(z'\gamma, -x'\delta - \theta, -\rho) \quad (5)$$

$$\text{Prob}[\text{IPV} = 0, S = 0] = \Phi_2(-z'\gamma, -x'\delta, -\rho) \quad (6)$$

Φ_2 is the cumulative distribution function of the bivariate normal distribution with correlation ρ . The conditional expectation of separation, given the values of x and z , can be written as

$$E(x, z) = \text{Prob}[\text{IPV} = 1] \times E[S|\text{IPV} = 1, x, z] + \text{Prob}[\text{IPV} = 0] \times E[S|\text{IPV} = 0, x, z] \quad (7)$$

Writing in terms of the joint distribution function we have

$$E(x, z) = \Phi_2(z'\gamma, x'\delta + \theta, \rho) + \Phi_2(-z'\gamma, x'\delta, -\rho) \quad (8)$$

Now, to compute the marginal effects of a continuous exogenous variable w_i , which can belong either x or z , on the conditional expected value for separation define $H(w_i)$ as⁵

$$H(w_i) = \frac{\partial}{\partial w_i} E(x, z) = H_1(w_i) + H_2(w_i) \quad (9)$$

Where $H_1(w_i)$ and $H_2(w_i)$ are specified like Greene (1998) and Kassouf and Hoffmann (2006), and can be found below⁶

$$H_1(w_i) = \phi(z'\gamma) \Phi\left(x'\delta + \theta - \rho \frac{z'\gamma}{\sqrt{1-\rho^2}}\right) \gamma_w + \phi(x'\delta + \theta) \Phi\left(z'\gamma - \rho \frac{x'\delta + \theta}{\sqrt{1-\rho^2}}\right) \delta_w \quad (10)$$

And

$$H_2(x_i) = -\phi(z'\gamma) \Phi\left(x'\delta - \rho \frac{z'\gamma}{\sqrt{1-\rho^2}}\right) \gamma_w + \phi(x'\delta) \Phi\left(-z'\gamma + \rho \frac{x'\delta}{\sqrt{1-\rho^2}}\right) \delta_w \quad (11)$$

For a binary variable, the method is similar, but does not involve derivatives. Suppose a variable w_i that take values 0 or 1, then the marginal effect is given by $H(w_i) = E(x_1, z_1) - E(x_0, z_0) = H_1(w_i) + H_2(w_i)$ where $H_j(w_i)$ with $j = 1, 2$ are given in the following

⁴Kassouf and Hoffmann (2006) provide a nice summarized explanation of the recursive model in their section 4.

⁵ The subscript "i" is regarding to the variable "i" and does not refers to the observation i.

⁶ $\Phi(\cdot)$ and $\phi(\cdot)$ are the c.d.f and the p.d.f of the standard normal distribution, respectively.

$$H_1(w_i) = \Phi_2(z_1' \gamma, x_1' \delta + \theta, \rho) - \Phi_2(z_0' \gamma, x_0' \delta + \theta, \rho) \quad (12)$$

$$H_2(w_i) = \Phi_2(-z_1' \gamma, x_1' \delta, -\rho) - \Phi_2(-z_0' \gamma, x_0' \delta, -\rho) \quad (13)$$

With z_1 and x_1 being the vectors of covariates when $w_i = 1$ and z_0 and x_0 the vectors of covariates when $w_i = 0$. To more details, see Greene (1998). Finally, the Standard Bivariate Probit model will be estimated also using equations (1) and (2), but excluding IPV as an explanatory variable.

4.2 Data

We exploited an interdisciplinary and longitudinal household dataset called Survey of Socioeconomic Conditions and Domestic and Family Violence against Women - PCSVDF^{Mulher} applied to more than 10,000 households located in the nine capitals of the northeast region of Brazil. The PCSVDF^{Mulher} aims to enable interdisciplinary studies regarding to domestic violence, women and children's health, child development, bargaining power, among others subjects. In addition, the survey is a quantitative, probabilistic and representative sample of women living in the nine states' capitals of the Brazilian Northeast region aged between 15 and 60 years old (CARVALHO; OLIVEIRA, 2016).

The data was collected in two waves, being the first wave collected in 2016 and the second one in 2017. Beyond that, it is worth saying that the sampling plan was designed by stratifying the population in three stages. First of all, the authors randomly selected the census tracts and then a stratification of the census tracts into three strata based on the mean income distribution was made. Finally, after the second step a woman aged between 15 and 60 years old per household was randomly selected to respond the survey questions. Also, the interviewers were composed only for trained women who speak the local language.

Our sample was created using only the second wave and some filters were employed to make the data more informative based on the investigation scope. All dependent variables such as incidence of IPV (also desegregated by type: Physical, Emotional, and Sexual) and the decision to dissolve the relationship are binary in order we can implement the econometric strategies proposed in the previous section. It's worth mentioning how our variable regarding to separation was created. Firstly, we have considered only women who already had a partner once in their lives. Following that, the sample was divided into two groups where the first one was composed by women in a relationship and the second by those that were single. We have considered for the

sample of separated women only such women who have decided to dissolve the matching by their own or by the couple in a mutual decision. The descriptions of all variables used are given below.

Table 1: Description of the variables.

VARIABLES	DESCRIPTION
IPV	Assumes 1 if the woman had suffered violence perpetrated by the partner at least once (emotional or physical or sexual).
Separation	Sep=1 if the woman is separated and 0 otherwise
Education	Indicates the education level of the woman. 1 = No schooling; 2 = Incomplete elementary school; 3=Completed elementary school; 4 = Incomplete High School; 5 = Completed High School; 6 = Certificate program; 7 = Incomplete undergraduate; 8 = Complete undergraduate; 9 = Graduate.
Work	Indicates the job status of the woman. If she work, then work = 1 and if does not then work = 0
Age	Woman's age.
Mother	Indicates if she is mother. Assumes 1 if she is mother and 0 otherwise.
Black	Indicates the color. Assumes 1 if she is black and 0 otherwise.
P. Education	Education indicates the education level of the partner. The variable is defined as to the women.
P. Work	Indicates the job status of the woman of the partner. Assumes 1 if is holding a job and 0 otherwise.
Religion	Assumes 1 when she is Evangelic or Jehovah Witnesses and 0 otherwise.
Class	This set of dummy variables indicates the social class of the woman's parents.
Number of Children	Number of children.

Source: Elaborated by the authors. PCSVDF-Mulher.

5 RESULTS

5.1 Descriptive Analysis

The summary of the variables can be accessed in table 1. The average education level of the women in the data is roughly 5 which mean they have completed, on average, the high school degree. An interesting fact is that partners, on average, have lowers level of education. A similar result about women's schooling was presented by Carvalho et al. (2019) where they compared the information from PCSVDF with data from a well-known Brazilian micro database called PNAD Continua-IBGE⁷. Regarding to the occupational status, we have found that approximately

⁷ They used the first quarter of 2016.

44% of the interviewed women were working and 80% of the partners had a job in the period that interviews were implemented. Also, 71% of the sample is composed by mothers and 22% were characterized as black. The average age is about 34 years old, and close to 22% of the women has received “Bolsa Família” which consists of a public policy of income transference originally aiming help families to maintain their children in the school.

Table 2: Descriptive Information

	Mean	Standard- Deviation	Min	Max
Separated	0.139	0.3494	0	1
Education	4.794	1.8793	1	9
Work	0.437	0.4955	0	1
Bolsa Familia	0.218	0.4162	0	1
Age	33.59	9.3522	15	52
Mother	0.713	0.4504	0	1
Black	0.217	0.4137	0	1
P. Education	4.347	1.6314	1	8
P. Work	0.800	0.4001	0	1
Religion	0.300	0.4594	0	1
Lower Class	0.293	0.4625	0	1
Lower Middle Class	0.305	0.461	0	1
Upper Middle Class	0.343	0.475	0	1
Middle Class	0.049	0.215	0	1
High Class	0.010	0.0986	0	1
Number of Children	1.471	1.444	0	33
IPV	0.3403	0.4738	0	1
V. Physical*	0.1683	0.3741	0	1
V. Sexual*	0.0705	0.2560	0	1
V. Emotional*	0.2902	0.4539	0	1
N. Obs.	4,478			

Source: By the authors.* N=4355.

Also, by table 1 we have that 34.03% of women reported that have suffered intimate partner violence once in their lives. Beyond that, 29% have reported that were victims of emotional abuse, 17% of physical abuse, and 7% reported to have been sexually abused by their partners. Remember that the types of violence are not mutually exclusive and the victim might suffer more than one kind of violence.

Table 3: Number of women by cells

	Not Abused Woman	Abused Woman	
Not Separated	2,665 (59.5)	1,192 (26.6)	3,857 (86.13)
Separated	289 (6.45)	332 (7.4)	621 (13.87)
	2,954 (66.0)	1,524 (34.0)	4,478

Source: By the authors. Percentage in parentheses.

In addition to all the information provided above, it is possible to verify in table 2 the percentage of those abused ones that have chosen to leave the violent relationship. Approximately 22% of abused wives leaved the relationship while only 10% who were not victimized had decided to separate.

5.2 Equation of Separation

In this section can be found the results of the bivariate probit models proposed earlier with robust standard errors. Specifically, in the table 3 are the conditional marginal effects for the model of separation for the standard bivariate probit model. The model estimates has a very little p-value lesser than 0.01, in other words, jointly statistically significant in a level of 1%. Also, the estimated correlation coefficient is significant and positive, telling that the error terms are indeed correlated.

Table 4: Standard BPM Results. Conditional Marginal Effects

	Prob(Separation =1 IPV=1)	Prob(Separation =1 IPV=0)
Education	0.0164*** (0.0048)	0.00912*** (0.00268)
Work	0.0410*** (0.0149)	0.0228*** (0.00830)
Bolsa Familia	0.0250 (0.0189)	0.0150 (0.0106)
Age	-0.0207*** (0.00617)	-0.0115*** (0.00343)
Age-squared	0.000349*** (0.0000+)	0.000193*** (0.0000+)
Mother	-0.0560*** (0.0203)	-0.0309*** (0.0113)
Black	0.0177 (0.0170)	0.0105 (0.00948)

P. Education	0.00440 (0.00543)	0.00221 (0.00302)
P. Work	-0.0398** (0.0174)	-0.0222** (0.00969)
Religion	-0.0190 (0.0156)	-0.00999 (0.00867)
Number Children	0.00298 (0.00622)	0.00197 (0.00348)
Lower Middle Class	0.00910 (0.0185)	0.00500 (0.0102)
Middle Class	0.0147 (0.0183)	0.00815 (0.0101)
Upper Middle Class	0.0604* (0.0364)	0.0348 (0.0218)
High Class	0.0103 (0.0698)	0.00568 (0.0388)
Wald Statistic		179.27***
rho		0.3314***
Athrho		0.3443*** (0.0311)
N	4,478	

Source: Elaborated by the authors. Standard-Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

With respect to the impact of education on the probability of dissolving the relationship, we found that education is quite statistically significant with a positive relation with separation as expected in both cases we have reported in table⁸. Conditional to have suffered violence, the contribution of education on the probability is about 0.0165 while conditional to have not suffered is slightly lesser than 0.01.

Moreover, related to woman's outside resources, we also have statistically significant results for job status and socioeconomics condition of her family of orientation, although the latter was significant only in the IPV=1 condition. The fact of woman is working increases the probability to break the matching, conditional to have been victim of IPV, in 0.041 if compared with those without a job. On the other hand, conditional on the absence of violence, the occupation status increases the probability of leaving the partner, but only in 0.023. Regarding to

⁸ The significance level adopted in this work was 10%.

the family of orientation, the status of upper middle class increases the probability to leave an abusive relationship in 0.06 compared with woman belonging to the lower class.

The results confirms the expected that women who have more information and outside resources accept less to stay in a dangerous relationship as found in Strube and Barbour (1983). Another study by the same authors Strube and Barbour (1984) used a sample of 251 abused wives and concluded that woman who had left the relationship was more likely to be employed. In contrast, Gelles (1976) found that holding a job has no impact on the chances of breaking the relationship, but influence woman's action of seeking others types of outside help.

In this work, the age variable was significant and with a non-linear impact starting negative in both conditions, but influencing positively by certain level like a "U". In addition, we have found statistically significant and negative impact of having a child in both equations. To this variable, the signal of the result meets the expected; given the fact that dissolve a relation in such situation has higher associated costs for mothers. The results show that be mother decreases the conditional probability of separation in 0.0560 when IPV=1 and in 0.0309 when IPV=0. Given we controlled the maternal status; we found that the number of children had not any statistically significant impact on the probability of separation as in Gelles (1976).

Furthermore, for certain keys characteristics of the partner such as level of education and occupational status only job status had a statistically significant effect. When the partner has a job, the probability of separation falls in 0.0398 in the case of has suffered violence while in the situation of woman had not been victim, this probability decreases in just 0.0222.

Trying to measure or at least to indicate the significance/signal of the direct effect of IPV on separation, we provide in table 4 the results for the recursive model where IPV appears explicitly as an explanatory variable. The marginal effects were calculated at IPV=0, IPV=mean, and IPV=1 with all other variables at their mean values. The variables were jointly statistically significant. Also, the p-value of the correlation coefficient of the error terms was about 0.06, indicating significant correlation. However, we had a reversion in the signal of the coefficient where in the standard model it was positive, here the coefficient passed to be negative.

Table 5: Recursive BPM Results. Marginal Effects

	Separation (IPV=0)	Separation(IPV=0.34)	Separation (IPV=1)
Education	0.00489** (0.0019)	0.0114*** (0.0042)	0.0144** (0.0071)

Work	0.0114** (0.0057)	0.0264** (0.0124)	0.0335* (0.0194)
Bolsa Familia	-0.00720 (0.0089)	-0.0167 (0.0214)	-0.0212 (0.0242)
Age	-0.00657** (0.0024)	-0.0153*** (0.005)	-0.0193** (0.0086)
Age-squared	0.000108** (0.000+)	0.00025*** (0.000+)	0.00032** (0.00014)
Mother	-0.0172** (0.0078)	-0.0400** (0.0171)	-0.0506* (0.0267)
Black	-0.00262 (0.0068)	-0.0061 (0.016)	-0.00772 (0.0195)
P. Education	0.00377** (0.0018)	0.00876** (0.0044)	0.0111* (0.00528)
P. Work	-0.00974 (0.007)	-0.0226 (0.0156)	-0.0287 (0.0228)
Religion	-0.0109** (0.005)	-0.0253** (0.0117)	-0.0320** (0.0153)
IPV	0.245*** (0.0315)	0.57*** (0.109)	0.7231*** (0.0115)
Number of Children	-0.00310 (0.0026)	-0.0072 (0.0062)	-0.00913 (0.0071)
Lower Middle Class	0.00143 (0.0049)	0.0034 (0.0116)	0.0043 (0.0153)
Middle Class	0.00473 (0.0048)	0.011 (0.0112)	0.0140 (0.0148)
Upper Middle Class	0.0180 (0.0113)	0.0404* (0.0234)	0.0481 (0.0308)
High Class	-0.00285 (0.017)	-0.0068 (0.0409)	-0.00905 (0.0550)
Wald Statistic		1092.61***	
rho		-0.9239 *	
Athrho		-1.6151* (0.8836)	
N	4,478		

Source: Elaborated by the authors. Standard-Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The marginal effect from education was significant in all the three level of IPV, having a large increase from IPV=0 to IPV=0.34. The probability is marginally affected with a larger

impact when woman found herself in a more violent environment. In conclusion, we have found an absolutely decreasing marginal effect.

In addition, differently of the standard model, religion and the education level of the partner were significant. The religion variable, which assumes value 1 if the woman is Protestant or Jehovah Witnesses, had a negative impact on the probability of separation as expected differently from the conditional marginal effect that had no effect. The possible explanation for the religion's result is that more rigorous the religions are more they tend to treat separation as a deviant behavior.

5.3 Intimate Partner Violence

Until now we have investigated the impact of IPV on the probability of leaving the "marriage". However, it is worth asking how the marginal effects appears when we are looking at the probability of suffering violence given had separated. To do so we reported in table 5 the marginal effects on the probability of being victim of IPV conditional separation variable be equal one. The results were obtained from the standard model estimated using the equations (1) and (3).

Table 6: Standard BPM Results. Conditional Marginal Effects

	Prob(IPV=1 Separation =1)
Education	-0.00782 (0.0055)
Work	-0.0162 (0.017)
Bolsa Familia	0.0662*** (0.021)
Age	0.0125* (0.007)
Age-squared	-0.0002** (0.0001)
Mother	0.0391 (0.0249)
Black	0.0370* (0.0194)
P. Education	-0.0176***

	(0.0061)
P. Work	0.0110
	(0.0204)
Religion	0.0456***
	(0.0174)
Number of Children	0.0199**
	(0.0085)
<hr/>	
N	4,478

Source: Elaborated by the authors. Standard-Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The variables of education and work were insignificant (with p-value higher than 0.1), but the variable that indicates whether a woman receives Bolsa Familia or not was significant and positively correlated with the probability of suffering violence by the partner. The result can be explained by a possible attrition from a marginal increasing in the woman's income and goes against Bobonis et al. (2013) who showed that beneficiary women from a Mexican public policy are less likely to be victim of abuse, specifically considering the physical ones.

Notwithstanding, recent studies have found that the women's income level has ambiguous impacts on violence (BERTRAND et al., 2015). In a first time, increases in the power of bargaining can contribute with the aggressive and violent partner's behavior and consequently enhance the domestic violence cases by directly facing the man's self-esteem, among others aspects. Tauchen and Witte (1995) argued that an improvement in women's income will generate an increase in the incidence of IPV only when the wife's income level comes to be higher than the husband's income level.

As opposed to the separation equation, age was positively related to incidence of IPV and has a non-linear impact, drawing an inverted "U". Moreover, how much more educated the partner is, less will be the probability of IPV given she have leaved the relationship. A controversial result was found to religion, stating that be protestant or JW increases the conditional probability of abuse. Maybe it is due to the characteristic of those religions with favoritism for men, assigning to the women the role of helpmate. Such particularity can contribute to the sensation of owning by men and a separation dispartate a series of emotional abuse to the "ex-wife". Lastly, the number of children had a positive effect on the probability and this could occur due to the husband's perception of higher associated costs of dissolving the

relationship. If the partner believes that the number of children decreases the woman's chances of breaking the marriage, then the result makes all sense⁹.

⁹ Even though we have not found statistically significant results for the number of children in the separation equation.

6 CONCLUSION

This study aimed to shed light on the relation between intimate partner violence and the decision of separation. We asked ourselves what are the determinants of leaving a marriage for abused wives and how it differs from not abused ones. The episode of breaking a relationship can clearly be considered a multifaceted issue involving aspects of self-concept, family setup, and many other characteristics related to the woman and the partner. Snyder and Fruchtman (1981) points out that at the stage of admission only 13% of the abused women had the intention to continue the relationship with the partner while at the time of the interview 6-10 weeks later, 60% of them were living with the offender.

Considering the lack of Brazilian economics literature trying to empirically understand this problem using econometric tools our work appears as a start point of discussion. In the present study, we used an interdisciplinary and innovative dataset called Survey of Socioeconomic Conditions and Domestic and Family Violence against Women - PCSVDF^{Mulher} applied to more than 10,000 households located in the nine capitals of the northeast region of Brazil, which was conducted by DataInfo containing two data collection waves: the wave 1 which was collected in 2016 (March-June) and the wave 2 collected in 2017 (March-June). This database was built by the joint efforts of international researchers from the Universidade Federal do Ceará, Brazil (UFC), Institute for Advanced Study in Toulouse, France (IAST), University of Oxford, the World Bank and a non-governmental organization (NGO) named Instituto Maria da Penha, Brazil (IMP).

Our study confirms that domestic violence perpetrated by the partner has a huge and positive effect on the decision of dissolution. Also, we found that education and job status, and partner's status job are important factors to the decision after suffered violence. The conclusion is that economic independence is one of the more important drivers to leave abusive relationships.

Finally, we propose to future versions of this work to estimate a simultaneous equation system where the IPV enter as explanatory variable to separation and separation enter as an explanatory variable to IPV. For this, we will use the longitudinal feature of the PCSVDF-Mulher. Together, we will consider the strategic relation of IPV and separation using strategic probability choice models that can be found in Kenkel and Signorino (2014).

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