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MASTER THESIS

Employment and the risk of domestic violence

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Abstract

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In this master's thesis we study the effect on the risk of intimate partner violence (IPV) for women of the emplyoment status of herself, her partner and income together with a set of exogenous sociodemographic factors. In doing so we account for the possible endogeneity of the employment statuses as well as the incomne. We use the most recent data available which originates from the Violence Agains Women survey (VAW) in Spain from 2019. We apply three different estimation methods to study their differences and in order to be able to compare our results to previous studies which used the same approaches. The estimation methods are a linear univariate probability model which we use in order to examine the results without taking possible endogenity into account, a linear two-stage least squares probability model and a non-linear multivariate probability model. Where the latter two models account for endogeneity. Our main findings with respect to the employment statuses are that only the partners employment status plays a major role on reducing the risk of IPV for the woman and only when the woman is also employed and only on the non-physical IPV type. Furthermore, the lowest risk of non-physical IPV appears when both partners are employed. Additionally we find that especially the education of a woman and her partner plays a major role in reducing the risk for both types of IPV when successfully finished college.

Keywords: intimate partner violence, gender based violence, domestic violence, employment, multivariate probit, mvprobit, 2SLS, two-stage leas squares, endogeneity

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List of Abbreviations

IPV	**I**ntimate **P**artner **V**iolence
VAW	**V**iolence **A**gains **W**omen
HBS	**H**ousehold **B**udget **S**urvey
HH	**H**ouse**H**old
EAPS	**E**conomically **A**ctive **P**opulation **S**urvey
2SLS	**2** **S**tage **L**east **S**quares

Chapter 1

Introduction

Violence against women (VAW) is a product of gender based inequalities and has been associated with different factors such as e.g. employment instability (Showalter, Yoon, and Logan, 2021). Hence, VAW is not only of great political interest but also of economic interest all around the globe. Lots of studies are devoted to examine determinants which affect whether a woman experiences violence conducted by her partner or not and many studies focus on the impact of a woman's employment status on her risk of experiencing the so called intimate partner violence (IPV) (Allen et al., 2019; Goodey, 2017; Capaldi, 2012). Still the findings in the literature differ to a great extent, they are inconsistent and sometimes even contradictory. This very fact makes it desirable take the studies further, using the most recent data available for Spain, from 2019.

In this master's thesis we want to examine the effect of the woman's employment status, her partner's employment status as well as a set of sociodemographic variables on the risk of IPV. We distinguish two types of IPV, such are non-physical IPV and physical IPV. IPV refers to behaviour by an intimate partner or ex-partner that causes physical or non-physical harm - where physical harm also includes sexual abuse and non-physical harm includes controlling behaviour (World Health Organization, 2019). Furthermore we apply three different estimation procedures such are a two-stage least squares linear probability model, a non-linear multivariate probit model and a linear univariate probit model. In applying those we want to study the differences between the methods and, furthermore, we aim at establishing conclusions about the importance of taking the possible endogeneity of the employment statuses of the woman and her partner as well as the income into account.

For this purpose there are two very recent studies - beside others - which we mainly follow due to the fact that we carry out the same estimation approaches as them and compare the results between each other. The first to mention is the work from Lenze and Klasen, 2017, who carried out their research with data from Jordan and published their work in 2017. They used a two-stage least square linear probability approach in order to account for the possible endogeneity of woman's

employment. After accounting for a possible endogeneity bias, they came to the conclusion that there is no significant evidence for an effect of woman's labor force participation on domestic violence. The second paper we mainly follow is the study from Alonso-Borrego and Carrasco, 2017. This study is carried out with partly the same data as we use for this very master's thesis. They use data from the Spanish VAW survey from the years 1999, 2002 and 2006 while we use data from the same survey but from the survey year 2019. They studied the relationship between, not only, the woman's employment status, but also the partner's employment status and income on the risk of IPV. They use a multivariate probit model in order to account for the possible endogeneity of both of the employment statuses and income.

The master's thesis is organized as follows. In section 2 we report previews studies and literature regarding the examination of IPV and employment statuses. The underlying data base for our analysis, the sample creation and the corresponding descriptive statistics are described in section 3. The theoretical aspects of the different estimation models used are presented in section 4. In section 5, we discuss the results before we finally present the main conclusions in section 6.

Chapter 2

Literature Review

In this part of the master's thesis we firstly discuss the relevant research that took place before the works of Alonso-Borrego and Carrasco, 2017, and Lenze and Klasen, 2017. In the second part of this chapter we will not only look closer into the two main papers mentioned above, but also focus on the research that has come to light afterwards, until the writing of this master's thesis.

Intimate partner violence (IPV) initially has been a topic of criminology and sociology where it is known to mainly serve two purposes: Expressive purposes and instrumental purposes. Expressive here means that some men derive a direct benefit from violence while instrumental refers to the case when the partner is increasing his utility indirectly, by the control of the woman's behaviour (Alonso-Borrego and Carrasco, 2017). One of the older papers - and one of the first studies to provide negative empirical evidence on the relationship between IPV and the female employment status - is the work of Gelles, 1976. Gelles used the sociological absolute resource theory to explain why wives stay with their partners despite being abused by them. He identifies three factors which mainly influence the actions of abused wives. Firstly, the less violence is exerted and the less frequent it is, the more likely it is that the woman will stay with her husband, secondly; if a woman was struck by her parents when she was a child, it is more likely for her to stay with her abusive husband - the more abuse experienced the more likely it is. Thirdly; the more resources and the more power a wife has in her relationship to her husband, the less likely she is to stay with him. He also concludes that IPV might be a problem of poor households hence identifying households income as possibly influenced by an endogenous bias.

At about the same time and further, altruistic models claimed by Becker, 1965 and Becker, 1973 were predominant. Here we find the assumptions to be that in a marriage each person tries to do as well as possible and that the "marriage market" is in equilibrium. With the aid of several additional simplifying assumptions, a number of significant implications about behavior in this market have been derived. He found that the gain to a man and woman from marrying compared to remaining single is

shown to depend positively on their incomes, human capital, and relative difference in wage rates. Furthermore his theory implies that men differing in physical capital, education or intelligence and many other traits will tend to marry women with like values of these traits, whereas the correlation between mates for wage rates or for traits of men and women that are close substitutes in household production will tend to be negative. However, those models where challenged by rather game-theoretical approaches which state game models in a non-cooperative way where partners utilities are functions of their consumption levels (Tauchen, Witte, and Long, 1991 or Farmer and Tiefenthaler, 1997).

A later study by Macmillan and Gartner, 1999 claims to have found a relationship in the sense that an improvement in a woman's economic situation could lead to an increased risk of abuse. Pollak, 2004 on the other hand, uses an intergenerational model of domestic violence in which men and women are heterogenous, with respect to receiving violence, depending on the violence situation in the households where they have been raised, meaning whether they experienced violence in their homes or not. He claims that behavioral strategies or scripts are transmitted from parents to their children.

If we take a closer look at the studies which analyze the effect of women's economic opportunities on the occurrence of violence in particular, we find contradictory results in the literature. On the one hand, there are empirical studies which confirm a negative effect of women's economic opportunities on the occurrence of violence, such as Farmer and Tiefenthaler, 1997 as well as Tauchen, Witte, and Long, 1991. On the other hand there are other studies in which empirical evidence was found that a relative increase in female income might increase the risk of becoming a target of domestic violence. Reason for that is that *"[...]the improved economic position of the woman in the relationship challenges the so called socially prescribed male dominance and consequently triggers male backlash."*[1] (Luke and Munshi, 2011). Additionally DeMaris et al., 2003 found evidence that women who are employed experience greater violence whilst Kaukinen, 2004 found evidence that the relationship between a woman's employment and her risk of abuse depends on the employment status of her partner rather than on her own employment status - the risk of abuse being greater if her partner is not employed but she is.

The biggest criticism of most of the studies is that they do not account for the potential endogeneity of women's employment status. Reason for that endogeneity is omitting unobserved factors which are mostly related to personal characteristics of the woman and her partner that might make it more likely for the woman to suffer from abuse or increase the willingness of the partner to abuse her, respectively. The

[1] particularly for patriarchal cultures where diverse is hardly an option for women

big issue is that the omitted unobserved covariates affect both, the woman's probability of abuse as well as the employment status of the woman and her partner. Consequently, due to the omission of personality traits variables and further unobserved variables which might be correlated with employment statuses and IPV induces a potential endogeneity bias in the estimation of the causal effect of employment statuses.

Several authors have chosen many different approaches to overcome this problem. Bowlus and Seitz, 2006, for example overcome this endogeneity bias by using structural models for their estimation. Other authors mentioned before, like Tauchen, Witte, and Long, 1991, use panel data techniques to control for reverse causality and biases occurring due to omitted variables. Yet other authors such as Villarreal, 2007, tackled this issue by using instrumental variables techniques, using the level of control exercised by her partner.

The statistical model from Villarreal, 2007 allows the effect of omitted covariates on women's employment and their risk of experience violence to be correlated and reverses the estimated relationship between employment status and violence. Note that within this framework a woman's employment status and her risk of violent victimization are influenced by the extent to which the partner controls her. Men who are controlling their partner are not only more likely to harm their partner physically but also are more likely to actively prevent her from working. The central realisation from this study is that employment indeed reduces women's risk of violence.

In the studies from Almlund et al., 2011 & Heckman and Kautz, 2012 for example personality traits appear as both, predictors and causes of socioeconomic outcomes like education, labour market status or health. Personality traits not only identify an individual but also the way others see this individual. Focusing on the woman, traits like lack of personal autonomy (conscientiousness), lack of empathy (agreeableness) and lack of self-control (emotional instability) might increase the partners likelihood to exert violence.

Furthermore personality traits may also influence other areas of the life of an individual, such as the mating prospects of men and woman (Kalmijn, 1994 & Schwartz, 2013). Hence it might occur that the opportunity set of partners for women with negative personality traits are dominated by men with worse personality traits (e.g. tendency to violence). Furthermore, these personality traits are important indicators of the employment prospects of the woman and her partner.

In addition to that Aizer, 2010 used aggregate data for his estimation. She estimated the causal effect of the gender wage gap at the municipality level on the risk of abuse by exploiting exogenous changes in the demand for labour in female dominated industries relative to male dominated industries. Chin, 2012 on the other

hand, uses the exogenous variation in rural women's working status driven by rainfall shows and the rice-wheat dichotomy while Bhattacharyya, Bedi, and Chhachhi, 2013 assume that children and family type affect female participation but not violence.

We find different research approaches which focus on the effect of the risk of unemployment for a woman and her partner on the the occurrence of abuse by the partner. Anderberg et al., 2015, relate the individual incidence of gender-based violence to local unemployment rates by gender and age, and find that rising unemployment rate for men has a negative impact on abuse, while the impact of an increasing unemployment rate for women increases domestic abuse. The aforementioned study by Tur-Prats, 2016, comes to identical conclusions for Spain, although it should be noted that the results do not take into account the employment status of the partners.

From 2013 onwards we also find a research approach which focuses on the use of experimental data. This approach focuses - primarily carried out in developing countries - on the effect of some implemented policies which aim at empowering women on different household outcomes including IPV. Bobonis, González-Brenes, and Castro, 2013, as well as Hidrobo, Peterman, and Heise, 2016, for example find a significant drop in the risk of physical IPV but mixed results with respect to non-physical violence. In both studies the authors use data on randomized conditional cash transfer (CCT) programs which are aimed at women in Mexico and northern Ecuador. The critics on theses studies are that the targeted population, the short-term duration and the small amount of transfers make it hard to transfer the results in a more general matter.

Other authors, such as Ramos, 2016, & Hidrobo, Peterman, and Heise, 2016, for instance, estimate structural models which allows estimated preference parameters to be used to simulate the effects of alternative policies in a more general framework. Note that both studies use the same data set. The findings are that IPV significantly affects female productivity in a negative way and that cash-transfers have a weaker effect on IPV reduction than in-kind transfers have.

One of the two main papers for us is the work of Lenze and Klasen, 2017 who use a very similar approach compared to our study. They used quantitative data from Jordan and examine whether women's labor force participation reduces domestic violence or not. In doing so they examine the effect of women's employment as measured by their participation in paid work outside their homes, on reported domestic violence. They take the possibility into account that women's employment might be endogenous and therefore might bias the relationship between domestic violence and employment. Here we have to emphasise that the results differ if endogeneity is accounted for. The results when not taking endogeneity into account, suggest

that a woman's participation in paid work enhances violence by her husband. When controlling for endogeneity though, the results are insignificant which leads to the conclusion that the employment status of a woman has no causal effect on domestic violence. Furthermore only weak evidence was found that women's employment decreases sexual violence.

The other main paper we follow is the work from Alonso-Borrego and Carrasco, 2017. They particularly examined the effect of the employment status of a woman and her partner on the risk of IPV, taking not only into account the possibly endogeneity of the two employment statuses but also the possible endogeneity of living in a low income/poor household. They use a multivariate probit approach to account for endogeneity just like we do in this very master's thesis. They used data from Spain from the VAW surveys from the years 1999, 2002 and 2006[2]. The main realizations are that the partner's employment is crucial in terms of experiencing IPV while female employment only decreases this risk when her partner is also employed. They also found that in relationships where both partners are employed, the woman faces the lowest risk of experiencing IPV.

Ruiz-Pérez et al., 2017 have done research on the prevalence of violence in couples in Spain carrying out a cross-sectional study, questioned people in primary healthcare centers, using a self-administered questionnaire. They use multivariable adjusted logistic regression models in order to identify sociodemographic criteria, which are independently associated with each IPV category. Generally they found that the prevalence of IPV physical was 24.8% and found no differences for this physical only category with respect to the employment status. They found though, that women with the highest income face less risk of IPV. On the one hand - for the category "psychological violence only" - income level did not provide any evidence of differences in the risk of experiencing this type of violence. On the other hand the findings show that as the education level decreases, the risk of psychological IPV increases and the greatest frequency for psychological IPV was observed for women who were not employed or who are enrolled in college. The highest frequency for both types of violence was found for retired women.

In 2018 another study appears in which the authors study the effect of women's employment on domestic violence. The authors use data from Cambodia, more precisely, from the Cambodia Demographic Health Survey (CDHS) in 2014 (Sen and Seenprachawong, 2018). In order to account for endogeneity the authors use the two-stage least square methodology. They reach the conclusion that the effect of women's employment on domestic violence is inconclusive.

[2]while we used the most recent data available (VAW survey year: 2019)

Interestingly the study from Węziak-Białowolska, Białowolski, and McNeely, 2020 approaches the examination of the relationship between employment and domestic violence in a different way. The authors addressed the prevalence and the impact of workplace harassment and domestic violence on outcomes related to withdrawal from work for the countries Mexico, Sri Lanka, China and Cambodia, focusing on the garment industry only. The models used are linear, logistic or Cox proportional hazard regressions. The results show that workplace harassment and domestic violence are significantly cause significant stress and affect withdrawal from work, work attitudes and work quality whilst the findings do not provide evidence that workplace harassment and domestic violence contribute to decisions to quit; nonetheless, they were found to impact intentions to leave.

Kinyondo and Joseph, 2021, study the effect of women's employment status on domestic violence in Tanzania, in the same manner as some of the previously presented studies. They estimate a 2 stage linear probability model and find that the impact of women's employment status on reducing domestic violence is much greater if they control for endogeneity.

Like Sen and Seenprachawong, 2018, also Fajardo-Gonzalez, 2021, uses data from a Demographic and Health Survey, this time in Colombia. The findings suggest a positive relationship between intimate partner violence against women and the likelihood of women's employment. These results remain when using the husband's own childhood abuse experiences as a source of plausibly exogenous variation for the appearance of domestic violence. The author uses a mediation analysis in the presence of intermediate confounders in order to explore potential mechanisms which might be underlying this relationship. In the context of this paper a woman's decision-making power is measured by active input in household and healthcare decisions. Evidence was found that a woman's decision-making power and also a measure for willingness to divorce are likely mediators. She argues it could occur that women hold jobs to increase their economic independence with respect to her partner and potentially exit abusive relationships.

For the US there is a recent study which examines the employment trajectories of survivors of IPV (Showalter, Yoon, and Logan, 2021). Within this study a latent growth curve model was used to investigate the impact of intimate partner violence on mothers' employment outcomes trajectories. The results show that victims of IPV were still experiencing unemployment six years after abuse occurred.

The most recent study for Spain in this field is the one from Pérez-Sánchez, Dávila-Cárdenes, and Gómez-Déniz, 2022. They analyze data provided by a survey on gender violence carried out by the Spanish Centre for Sociological Research.

The Bayesian asymmetric methodology approach is supposed to improve the specification of the model with respect to the methodology of a asymmetric link function to explain the probability of experiencing physical, sexual or psychological abuse. The paper proves that the Bayesian asymmetric model performs better and shows findings that suggest significant factors that are not revealed by the classical method, for instance, the partner's nationality for sexual abuse or the women's total number of intimate partners for psychological abuse. However, the estimations show no significance concerning to the lowest partner's level of education for physical abuse but if the intimate partner is currently studying, this reduces the probability of sexual abuse. Interestingly this study finds that the woman's level of education is not relevant to experiencing physical, sexual, or psychological abuse.

Chapter 3

Data and Descriptive Statistics

In the first part of this chapter of the master's thesis we will describe the data we worked with, the data sources and the survey from which most of our data basis originates. The second part of this chapter denotes the descriptive statistics analysis.

The main data source of this master's thesis is the cross-sectional surveys on violence against women (VAW) in Spain from 2019. This survey is not only the most relevant statistical operation carried out in Spain on this type of violence but also the only official statistic to measure the prevalence of violence against women. The survey has been carried out approximately every 4 years since 1999 and is included in the National Statistical Plan Against Domestic Violence. The Government Delegation against Gender Violence has been in charge of preparing the last three editions from 2011 to 2019. In total, the 2019 Macro-survey is the sixth to be carried out in Spain. Its main objective is to find out the percentage of women aged 16 and over residing in Spain who have suffered or currently are suffering some type of violence only because they are women (Ministry of Equality, 2020).

This survey has already served several other researchers and authors as the data basis for their work in previous years such as Alonso-Borrego and Carrasco, 2017, Brassiolo, 2016 and Tur-Prats, 2016. The survey were promoted by the First National Action Plan against Domestic Violence established in 1998, which led to subsequent legislative proposals that resulted in the first constitutional law against gender-based violence in 2004 . This law not only provided for harsher penalties for perpetrators, but also funded public assistance services and shelters for battered women, promoted training programmes for health professionals and judges, and public education and media campaigns to raise awareness of violence against women. Following the adoption of the law, the number of complaints increased, as did the number of emergency calls and the number of women contacting the special telephone service for victims of abuse (Alonso-Borrego and Carrasco, 2017). The gender violence surveys are large, nationally and regionally representative samples of women living in Spain, in this case for the year 2019. The surveys were conducted by telephone with women

aged 16 or older[1].

The second data source that feeds into this work is the household budget survey (HBS) publicly available at the website from the national institute of statistics in Spain (National Institute of Statistics, 2019). In particular we selected data from the third quarter in 2019 since this is the same time period in which the 2019 VAW-survey was carried out as well. The HBS serves our purpose to receive information on the type and purpose of consumption expenditure, as well as on a number of characteristics relating to the living conditions of households and the exact amount of total household net monthly income. For us, the net incomes are particularly interesting in order to be able to calculate the mean income for Spain in this period and then to be able to create the variable "low income/poor household", as Alosno-Borregeo et al. have also done.

Note that although we do the same as Alonso-Borrego and Carrasco, 2017, we have to take the changed intervals into account and adjust the creation of the variables accordingly to the new intervals provided by the VAW survey 2019. While Alonso-Borrego and Carrasco, 2017, defined large municipalities as those with at least 200.000 inhabitants or more, we are facing given intervals (from the changed VAW survey in 2019) in another predefined range (e.g. from 50.001 to 100.0000 inhabitants, from 100.001 to 400.00 inhabitants etc.) and therefore define a large municipality as those who have 100.000 or more inhabitants. Furthermore, note that, Alonso-Borrego et al. have considered households to be a "low income/poor household" if their income is at least one standard deviation less than the national wide average (Alonso-Borrego and Carrasco, 2017). However in our case - due to our data basis and the changed survey, the VAW statistics - we have different predefined income intervals that we use in order to create this variable, see table 3.1.

Based on the HBS data, we have calculated the national average of household income, which equals € 2,205.313, and the standard deviation, which equals € 1,386.94. This shows that, according to the definition of Alonso-Borrego et al. households with an income of € 818,373 (2,205.313-1,386.94 = 818.373) or less are classified as poor households. In our case, we set the threshold with the third interval, i.e. we classify households up to an income of 900 € as poor households because we do not have that precise information as Alonso-Borrego et al. had about the households incomes.

[1]In 2015, the Macro survey questionnaire was significantly modified in relation to previous editions (1999, 2002, 2006, 2011). With this changes, which mainly took as a reference the Guidelines for the Production of Statistics on Violence against Women prepared by the United Nations Statistics Division, the aim was to measure more rigorously the reality of violence against women in Spain. With the 2019 Macro-survey on Violence against Women, this process of improving the quality of the survey has continued (Pérez-Sánchez, Dávila-Cárdenes, and Gómez-Déniz, 2022). One example of a change would be the age of the interviewed women changed from 18 to 16.

TABLE 3.1: Household's income intervals

Interval	HH's monthly net income in €
1	none or less than 300.00
2	from 301.00 to 600.00
3	from 601.00 to 900.00
4	from 901.00 to 1,200.00
5	from 1,201.00 to 1,800.00
6	from 1,801.00 to 2,400.00
7	from 2,401.00 to 3,000.00
8	from 3,001.00 to 4,500.00
9	4,501.00 or more

Source: Spanish VAW Survey 2019

The third and final source of data for this thesis is the Economically Active Population Survey (EAPS) - also publicly available over the website form the Spanish National Institute of Statistics - from which we retrieve, after short calculations, the employment and unemployment rates for 2019 by gender, region and age-interval. Here we have to note that, again, we are facing different data than Alonso-Borrego and Carrasco, 2017 and hence we need to use different age-intervals since the unemployment and employment rates are only provided in the intervals displayed in table 3.2.

TABLE 3.2: Age intervals

Interval	interval in ages
1	from 16 to 19
2	from 20 to 24
3	from 25 to 54
4	55 or older

Source: Spanish VAW Survey 2019

We restrict our sample to woman older than 24[2]. The difference in sample sizes to the work of Alonso-Borrego and Carrasco, 2017, is mainly due to the fact that we only use data from one survey year, whereas Alonso-Borrego et al. use several survey years as a data basis. Thus our final sample consists of 1,716 observations.

[2]We cannot collapse the age intervals "from 16 to 19" and "from 20 to 24" into new or other of the given intervals because we are facing predefined intervals for the employment and unemployment rate variables which would not match these adjusted age intervals

We constructed the IPV indicator variables for comparison purposes in the same way as in previous studies (e.g. Alonso-Borrego and Carrasco, 2017, etc.). Table 3.3. displays the list of main behaviours on which the construction of these indicators is based. As can be seen, the IPV indicators take account for either physical or non-physical abuse. Whereas non-physical abuse refers to abuse not including physical violence, physical abuse refers to the opposite, including sexual violence.

TABLE 3.3: Categories of serious abuse in the Spanish VAW surveys

Behavior	Physical Abuse	Non-Physical Abuse
Stopped from seeing relatives, friends and neighbors		×
Prevented from fair share of household money		×
Insulted or threatened you	×	
Prevented from deciding by yourself		×
Forced to have sexual intercourse	×	
Deprived of your necessities		×
Scared you sometimes		×
Pushed you or hit you	×	
Scorned about your capacity		×
Criticized for the things you do		×
Despised for your beliefs		×
Disregarded for your work		×
Disrespected in front of your children		×

Table 3.4 shows the frequencies and percentages of the respondents for 2019 by type of IPV. From our sample, almost half - 47.65 per cent - of the women respondents report having experienced some type of abuse. Furthermore, from those who experienced some type of abuse, almost half of them, precisely 47.06 percent report to have been victimized by non-physical violence which accounts for the largest proportion here, while physical violence accounts for 22.15 percentage points.

TABLE 3.4: IPV by Type

IPV Type	Obs.	Frequency	Percentage
Physical	1,716	264	22.15
Non-Physical	1,716	561	47.06
Any	1,716	568	47.65
No Abuse	1,716	624	52.35

Source: Own calculations from Spanish VAW Survey 2019

In Table 3.5 we report the frequencies of IPV types by region. Here we find that the IPV type "Any" ranges from 1.58 percent in the region La Rioja up to 11.62

percent in the community of Valencia, which provides evidence for statistically significant differences across regions. The same realization holds for physical IPV, ranging from 0.76 percentage points in Navarra to 12.88 percent in Cataluña. For non-physical IPV which ranges from 1.60 percent in Navarra and La Rioja to 11.41 percent in the community of Valencia. The difference between regions with respect to the variable "No Abuse", also shows a similar extent of fluctuation with a range from 0.96 percent in Melilla up to 10.10 percent in Andalucía.

TABLE 3.5: IPV type by Region

Region	Obs	No Abuse	Physical	Non-Physical	Any
Andalucía	104	10.10	8.33	7.31	7.22
Aragón	38	3.37	2.65	3.03	2.99
Asturias	48	4.33	2.65	3.74	3.70
Baleares	55	5.77	4.55	3.39	3.35
Canarias	75	6.25	6.44	6.42	6.34
Cantabria	47	4.81	3.03	3.03	2.99
Castilla-La Mancha	57	5.29	4.17	4.28	4.23
Castilla y León	48	4.49	4.17	3.57	3.52
Cataluña	98	5.93	12.88	10.87	10.74
Comunitat Valencia	112	7.37	11.74	11.41	11.62
Extremadura	59	4.65	5.30	5.35	5.28
Galicia	83	5.93	9.47	7.84	8.10
Madrid	116	9.29	8.33	10.16	10.21
Murcia	57	5.45	5.68	3.92	4.05
Navarra	29	3.04	0.76	1.60	1.76
País Vasco	79	6.89	4.17	6.42	6.34
La Rioja	24	2.40	1.14	1.60	1.58
Ceuta	43	3.69	3.41	3.57	3.52
Melilla	20	0.96	1.14	2.50	2.46

Source: Own calculations from Spanish VAW Survey 2019

The main summary statistics by IPV status are shown in Table 3.6. These statistics show that the characteristics of women, partners and households differ according to the presence of abuse, with the strongest differences for physical abuse. Most women who have been abused are found in the 25-54 age segment with huge differences to the older segment. Also the mean difference between non-physical and physical abuse is significant on the 10% level. When it comes to the education level of women, we find different results to previous studies but also have to keep in mind that we do use different, more precise, levels of education. We find that the higher the education level of a woman is, the higher the numbers of not abused women. But, we also find that women have suffered more physical as well as non-physical abuse when they only have completed secondary education in comparison to when they

have finished college or a vocational training. Here we have to be careful because finishing a vocational training might indicate that the woman is employed and the result is more likely due to the employment status than due to the finalization of the vocational training. However, we will gain further particular insight in the part of the model estimation of this very thesis. Important to point out particularly is that the woman's education level "college" shows significant mean differences even on the 1% level for physical abuse.

When it comes to the partners age and education we find similar tendencies. Most women who suffered abuse are found to be in the segment of 25 to 54 years. Interestingly we find more abused women when a woman's partner has finished secondary education in comparison to when the partner finished college. A woman's college degree also does seem to show that women in this sample were less abused. Note that the mean differences for the education level "college" are significant at the 1% for all types of abuse.

For those woman who are more educated than her partner we find the means to be very close to each other with respect to the IPV type. Furthermore we find the mean differences to be significant only for the physical IPV type.

There are very slightly differences in the household size between abused and non-abused women. The martial status differs only to a slightly larger extent when it comes to physical abused women, while the mean differences are significant at all levels for all types of IPV. When it comes to the income of an household we find that in average income households are the most reported cases of non-physical and physical violence with significant mean differences for all types of IPV at the 10% level and in particular, for physical abuse, even on the 1 % level.

In table 3.7 we display the pure prevalence of IPV depending on the employment status of the woman or her partner respectively. We find that there are no significant differences in the likelihood of being abused regardless of whether the woman is employed or not. In the work from Alonso-Borrego and Carrasco, 2017, this was a significant difference with woman who are not employed being more likely to be a victim of IPV. Furthermore only small differences appear in the likeliness of being abused when both - the woman and her partner - are employed. Compared to the previous realizations, the occurrence of IPV is the smallest when both partners are not employed (Any violence = 0.44). When we take a more detailed look at the interaction of the employment status of both, we find only small differences for the cases when the woman is not employed and the partner is employed (e.g. physical = 0.23) and when both are not employed (e.g. Physical = 0.20). The evidence for when the woman is employed and the partner is not shows that it is more likely (compared to the previous two cases) for the woman to be abused (e.g. physical = 0.33).

TABLE 3.6: Summary statistics for woman's, partners' and household characteristics by IPV status

		IPV Type		
	No Abuse	Physical	Non-Phys.	Any
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Woman age				
25-54 years	0.8 (0.40)	0.86* (0.34)	0.84* (0.37)	0.84 (0.37)
55 or more	0.19 (0.39)	0.13* (0.34)	0.15 (0.36)	0.15 (0.36)
Woman education				
Primary or less	0.08 (0.27)	0.12* (0.33)	0.1 (0.3)	0.1 (0.3)
Voc. Train.	0.24 (0.43)	0.24 (0.43)	0.24 (0.43)	0.24 (0.43)
Secondary	0.34 (0.47)	0.41* (0.49)	0.38 (0.48)	0.37 (0.48)
College	0.34 (0.47)	0.22*** (0.42)	0.29* (0.45)	0.29* (0.45)
Partner age				
25-54 years	0.74 (0.44)	0.81* (0.39)	0.8* (0.40)	0.79* (0.41)
55 or more	0.25 (0.44)	0.19* (0.39)	0.20* (0.40)	0.21* (0.40)
Partner educ.				
Primary or less	0.10 (0.30)	0.14 (0.34)	0.11 (0.32)	0.11 (0.32)
Voc. Train.	0.22 (0.42)	0.21 (0.41)	0.24 (0.43)	0.24 (0.42)
Secondary	0.37 (0.48)	0.5 (0.50)***	0.42* (0.49)	0.42* (0.49)
College	0.31 (0.46)	0.16 (0.36)***	0.23*** (0.42)	0.23*** (0.42)
Woman more educated	0.31 (0.46)	0.36 (0.48)*	0.34 (0.47)	0.34 (0.47)
Household size	3.44 (1.02)	3.48 (1.19)	3.45 (1.12)	3.45 (1.12)
Married (y/n)	0.76 (0.43)	0.54 (0.5)***	0.63 (0.48)***	0.63 (0.48)***
Household income				
Below average	0.10 (0.30)	0.13 (0.33)	0.11 (0.31)	0.11 (0.31)
Average	0.67 (0.47)	0.76 (0.43)*	0.72* (0.45)	0.72* (0.45)
Above average	0.23 (0.42)	0.12 (0.32)***	0.17* (0.37)	0.17* (0.38)
Large Municipality	0.36 (0.48)	0.33 (0.47)	0.36 (0.48)	0.36 (0.48)

Source: Own calculations from Spanish VAW Survey 2019

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 3.7: Summary statistics for partners' employment and IPV status

	IPV Type			
	No Abuse Mean (SD)	Physical Mean (SD)	Non-Phys. Mean (SD)	Any Mean (SD)
Woman empl.	0.66 (0.2)	0.65 (0.3)	0.65 (0.2)	0.65 (0.2)
Partner empl.	0.82 (0.2)	0.79 (0.3)	0.82 (0.2)	0.82 (0.2)
Both empl.	0.60 (0.2)	0.55 (0.3)	0.57 (0.2)	0.57 (0.2)
Woman not empl., Partner empl.	0.5 (0.5)	0.23 (0.42)	0.5 (0.5)	0.5 (0.5)
Woman empl., Partner not empl.	0.46 (0.5)	0.33 (0.47)	0.53 (0.5)	0.54 (0.5)
Both not empl.	0.56 (0.5)	0.20 (0.40)	0.43 (0.5)	0.44 (0.5)

Source: Own calculations from Spanish VAW Survey 2019

Summarizing the descriptive statistics analysis we find that depending on the occurrence of abuse the sociodemographic attributes differ to quite a big extent. Dramatically we find that almost half of the respondents experienced some kind of physical or non-physical abuse with non-physical abuse being the bigger share. Furthermore we found huge differences on the occurrence of IPV depending on the region were the women live. In the regions of Cataluña, Valencia and Madrid most incidence have been reported and the regions of Navarra and La Rioja reported the least. The most cases of abused women are found in the age group of 24 years old up to 54 years, which applies to both the age of the woman and the age of the partners. The same tendencies apply for the level of education, for the women and also for her partner. When not finished college more abuse is found to be present. In accordance with Alonso-Borrego and Carrasco, 2017, we find that there are only small differences in the presence of abuse whether woman is working or not but less abuse depending on the employment status of her partner, finding less abuse, when the partner is employed. Also we find that when the woman is employed and her partner is not, abuse seems to be more likely to appear and the least appearance of abuse is found in relationships where both partners are employed.

Chapter 4

Methodology

In this chapter of the master's thesis, we describe the empirical model underlying the analysis that we used to estimate the risk of the occurrence of potential determinants depending on different variables, taking into account endogeneity and comparing our results with previous studies, in particular with the work of Alonso-Borrego and Carrasco, 2017 and Lenze and Klasen, 2017.

To achieve results that are as comparable as possible to those of Alonso-Borrego and Carrasco, 2017 and Lenze and Klasen, 2017, we examine the effect of employment status of females and their partners on the probability of female abuse, in a linear probability model estimating it in a two-stage least squares approach (2SLS) for the comparison with Lenze and Klasen, 2017 and a nonlinear model estimation using a simultaneous multivariate probit approach like Alonso-Borrego and Carrasco, 2017, used. The latter is a nonlinear discrete model where IPV_i^* is the latent process that steers IPV which is identified by the following behavioral model:

$$IPV_i^* = \alpha_0 + \alpha_1 f_i + \alpha_2 p_i + \alpha_3 (f_i \times p_i) + X_i' \delta + v_i \equiv W_i' \beta + v_i \qquad (1)$$

where X_i denotes a set of exogenous variables. The dummy variables for women's and her partner's employment are denoted by f_i and p_i respectively. The interaction between the female's and her partner's employment is therefore characterized by $(f_i \times p_i)$. We find ourselves observing the binary variable, IPV_i, that indicates if women i experiences IPV or not. Taking on the value 1 for the case that she does and 0 otherwise [1]. We represent this variable with an indicator function as follows:

$$\begin{aligned} \text{IPV}_i = \mathbf{1}(IPV_i^* > 0) = \\ 1(\alpha_0 + \alpha_1 f_i + \alpha_2 p_i + \alpha_3 f_i \times p_i + X_i' \delta + v_i \geq 0) \end{aligned} \qquad (2)$$

[1] Also known as dummy endogenous variable model (Amemiya et al., 1985)

This model (2) becomes a standard probit model if $v_i|X_i, f_i, p_i \sim N(0,1)$ which we also estimate for comparison reasons. The woman's and her partner's empployment status may not be exogenous and be related to the IPV status through unobserved factors. In our case we account for endogeneity by estimating a multivariate probit model. The first step is to define reduced form equations for female and male employment:

$$f_i = 1(f_i^* > 0) = 1(Z_{1i}'\lambda_1 + \varepsilon_{i1} > 0) \quad (3)$$

$$p_i = 1(p_i^* > 0) = 1(Z_{2i}'\lambda_1 + \varepsilon_{i2} > 0) \quad (4)$$

Here Z_{1i} and Z_{2i} are sets of exogenous variables, that include X_i Furthermore we assume that $v_i, \varepsilon_{i1}, \varepsilon_{i2}$ are jointly normally distributed with zero mean vector and covariance matrix.

$$\Omega = \begin{pmatrix} 1 & \rho_{v\varepsilon_1} & \rho_{v\varepsilon_2} \\ & 1 & \rho_{\varepsilon_1\varepsilon_2} \\ & & 1 \end{pmatrix} \quad (5)$$

For the case that $\rho_{v\varepsilon_1} = \rho_{v\varepsilon_2} = \rho_{\varepsilon_1\varepsilon_2} = 0$ we are not forced to estimate the equations simultaneously but can indeed obtain consistent parameters by estimating each equation separately (Alonso-Borrego and Carrasco, 2017). We use the most popular simulation method (simulation by maximum likelihood - SML) by Geweke, Hajivassiliou and Keane (GHK) to estimate our multivariate probit model, which is based on the expression of the multivariate normal distribution as the product of sequentially conditioned univariate normal distributions (Börsch-Supan and Hajivassiliou, 1993). Since we face a model in which we have an additional possible endogenous dummy variable (beeing a poor household or not) we add this variable to our reduced form model so that our multivariate probit model takes the correlation between the error terms of the four auxiliar equations (for IPV, woman's employment status, partner's employment status and poor houshold) into account.

However, since we run the multivariate probit regression first and then realize that we only find evidence for the endogeneity (see Chapter 5) of the parnter's employment status for IPV physical and only for low income/poor households for the non-physical IPV we will carry out our estimations of the auxiliar equations to create the instruments as well as the final estimation of the in stage 1 predicted values and the outcome IPV iteratively instead of simultaneously, by using a 2-Stage Least Squares (2SLS) model. The corresponding evidence can be found in Tables 5.2 & and 5.4[2]. The p-values of the correlation of the errors are only lower than 0.1 for

[2]We will take a closer look at this in chapter 5

partner's employment on IPV Physical for low income/poor household for IPV non-physical and hence only indicating significance for those two. So it seems that only two of the three possibly endogenous variables are determined simultaneously and estimating each equation separately might also lead to consistent estimations. Hence for the 2SLS approach we find our selves confronted with a linear probability model accounting for endogeneity like Lenze and Klasen, 2017, also did.:

$$IPV_i^* = \alpha_0 + \alpha_1 f_i + \alpha_2 p_i + \alpha_3 (f_i \times p_i) + \alpha_4 Y_i + X_i + \varepsilon_i \qquad (6)$$

where the remaining parameters from equation (1) are denoted by the same letters and Y_i denotes the binary variable for being a poor household or not respectively. In the first stage of the 2SLS approach we predict the values for our variables woman's employment status, partner's employment status and poor household as if they were endogenous and therefore istrumentalize them as follows.

$$Y_i = \beta_{0i} + \beta_{1i} I_1 + \beta_{2i} I_2 + v_i \qquad \forall \text{i}= 1,2,3 \qquad (7)$$

where the subscript $i = 1,2,3$ stands for the endogenous variables woman's employment status (1), partner's employment status (2) and low income/poor household (3) respectively. The values are predicted by the exogenous instruments I_1 (partner age 25-54, partner age 55+, female empoyment rate, female unemployment rate, men employment rate, men unemployment rate) and the control variables I_2 (which overlap with the variables in [6]). The error term v_i captures the remaining variance of the three variables, which is not explained by the covariates (including the instrument) in equation 7. In the second stage, the IPV type is regressed on the predicted values of the endogenous variables, woman's employment status, partner's employment status and being a poor household, from the first stage along with the set of exogenous variables. The literature shows the estimation of a linear probability model with a 2SLS approach provides good estimates of the average effect (Wooldridge, 2010). Furthermore several studies that a 2SLS approach in order to account for possible endogenous biases is convenient (Sen and Seenprachawong, 2018; Kinyondo and Joseph, 2021, etc.). In both stages robust standard errors are used.

Finally we estimate the marginal effects of the variables evaluated at certain values of the explanatory variables, in our case the mean. Since our model includes the interactin between employment indicators this values should hence depend on the other's employment status. For example, for the sample mean values of the covariates $\bar{X}$, the estimated effect of female employment on the probability of IPV when the male partner is employed is obtained by examining the following difference:

$$\widehat{Pr}(IPV = 1|f = 1, p = 1, \bar{X}) - \widehat{Pr}(IPV = 1|f = 0, p = 1, \bar{X}) =$$
$$\Phi(\hat{\alpha} + \hat{\alpha_1} + \hat{\alpha_2} + \alpha_3 \hat{+} \hat{\alpha_4} + \bar{X}'\hat{\delta}) - \Phi(\hat{\alpha_0} + \hat{\alpha_2} + \bar{X}'\hat{\delta})$$

where $\hat{\alpha_0}, \hat{\alpha_1}, \hat{\alpha_2}, \hat{\alpha_3}, \hat{\alpha_4} and \hat{\delta}$ are the iterative model estimates by the 2SLS approach and Φ denotes the cumulative distribution function of the univariate standard normal distributions. Equally, the effect of female employment when the male partner is not employed is given by the equation:

$$\Phi(\hat{\theta_0} + \hat{\theta_1} + \bar{X}'\hat{\delta}) - \Phi(\hat{\theta_0} + \bar{X}'\hat{\delta})$$

Chapter 5

Results

In this part of this master's thesis we discuss the estimation results with respect to the different empirical approaches carried out (univariate probit analysis, 2SLS analysis & multivariate probit analysis).

We examine the effect on the probabilities of experiencing physical and non-physical IPV for women of the employment status of her and her partner, household income and other characteristics like the education level of the woman and her partner. We included the variables logarithm of the GDP per capita by region and the population density by region in order to account for geographical differences which may lead to differences in the incidence of IPV. We are not only considering the binary indicators for the woman's and her partner's employment status but also take the interaction between those status into account. The binary indicator for being a poor household takes on the value 1 if the income is significantly below average and 0 otherwise (see chapter 3). The set of dummy variables for households and sociodemographic characteristics consists of binary indicators for both, women and her partners such as the age of the woman and her partner (see Chapter 3) , the different levels of education (finished secondary studies and / or college successfully) and also a binary indicator which takes on the value 1 if the woman is more educated than her partner and 0 otherwise. Furthermore we have a binary indicator for the case if an individual lives in a large municipality (100.000 or more inhabitants) and a variable for the number of household members in the household. In order to account for possible unobserved regional differences and in order to be able to compare our results to those from Alonso-Borrego and Carrasco, 2017, we also included a binary indicator variable which takes on the value 1 if the individual lives in one of the northern or mediterranean regions (Galicia, Asturias, Cantabria, Euskadi, Navarra, La Rioja, Aragon, Cataluña, Baleares, Valencia and Murcia) and takes on the value 0 if the individual lives in one of the more central or southern regions (Castilla y Leon, Castilla-La Mancha, Madrid, Extremadura, Andalucia, Ceuta, Melilla and Canarias).

In tables 5.1 and 5.3 we report estimates of physical IPV and non-physical IPV

respectively based on the different types of regression analysis according to the models described in chapter 4. We interpret the results in terms of the sign and statistical significance. The first column of each of the tables displays the variables, while the second column shows the univariate probit estimates, which do not take any possible endogeneity into account. In the third column we find the estimates from the two-stage least square estimation and the fourth column denotes the obtained estimates from the multivariate probit regression. Furthermore we report the cross-correlation coefficients to asses the possible endogeneity of the variables woman's employment status, partner's employment status and low income/poor household on the outcome physical and non-physical IPV in tables 5.2 and 5.4 respectively. Additionally we report the marginal effects - for the sake of simplicity on basis of the in the 2SLS approach obtained estimated coefficients - in tables 5.5 (for the employment statuses and their interaction) and table 5.6 for the set of covariates.

Looking at table 5.1 we find that the estimations from the univariate probit estimation for physical IPV show two significant coefficients which are both negative: women who finished college as well as having a partner who have finished college seem to lower the risk of experiencing physical IPV[1]. Right next to it we find the 2SLS estimates which take the possible endogeneity of woman's and partner's employment status and being a poor household into account through an instrumentalized prediction in the first stage. Interestingly we find those results to be partly consistent with the results from the univariate probit estimation. In addition to the two significantly negative coefficients of woman's and partner's education "college" in this model we find that being a low income household seem to increase the risk of experiencing physical IPV since the estimated coefficient is positive[2]. This finding matches previous findings e.g. from Gelles, 1976. Taking a look at the estimation results from the multivariate probit regression, which also does take the possible endogeneity of the employment statuses and being a poor household into account, we find the exact same tendencies as in the univariate probit regression. Woman who finished college and having a partner who has finished college both seem to lower the risk of experiencing physical IPV on a 10 % significance level[3]. In table 5.2 we find that the estimated cross-equation correlation for IPV physical with respect to the

[1] We also run a univariate probit regression taking the interaction of the two education variables "woman college" and "partner college" into account, but when including this interaction, the estimates turn out not to be significant. The table with this results can be found in the appendix

[2] When running the same regression including the interaction of the education level college for the woman and her partner, only the poor household turns out to be significant. The table with this results can be found in the appendix

[3] When including the interaction of the woman's and partner's education "college" into account, non of the estimates are significant. The table with this results can be found in the appendix

three possible endogenous variables woman's employment status, partner's employment status and poor household only indicate endogeneity for the variable partner's employment.

In table 5.3 we display the estimated coefficients for non-physical IPV. The univariate probit analysis results show significant negative coefficients for the interaction of woman's and partner's employment indicating a decreasing risk of non-physical IPV only when both partners in a relationship are employed. Additionally we also find that women who finished college seem to face a significant lower risk of experiencing non-physical IPV. The population density of the region seem to be significantly positive correlated with non-physical IPV which indicates that the higher the population density there is, the higher risk of experiencing non-physical IPV occurs[4]. The 2SLS estimates in the third column show significant positive coefficients for woman who are employed and for woman who have a partner who is employed. When it comes to the interaction of the employment statuses though, we find the same results as from the univariate probit analysis, indicating a woman only decreases the risk of experiencing non-physical IPV when both parties in the relationship are employed. Also women who finished college seem to face lower risk of experiencing non-physical IPV just like the results from the univariate probit analysis. In addition to that, the 2SLS approach also delivers a negatively significant variables for women who themselves finished college, for women who have a partner who finished secondary education and for woman who have a partner with a college degree[5]. For the multivariate probit estimates we find 3 negatively significant coefficients: women who finished college, women who have a partner who finished college and poor households. This matches with the results for IPV physical with the exeption of the poor household variable. Here it seems that being a low income/poor household decreases the risk of experiencing non-physical IPV. A positive significant coefficient is found for the population density of the province just like the univariate probit analysis also showed[6]. Taking a look at table 5.4 which shows the estimated cross-equation correlation for the non-physical IPV-type we find that only the low income/poor household variable seems to be endogenous.

Now we take a closer look at the marginal effects. In table 5.5 the marginal

[4]When including the interaction of the college education of the woman and her partner, "Woman: College" turns out not to be significant anymore. The table with this results can be found in the appendix

[5]When including the interaction of the college degree variable, woman's employment status, partner's employment status, the interaction of both, the indicator of the woman's partner finished secondary education and low income/poor household turn out to be significant. The table with this results can be found in the appendix

[6]When including the interaction of the college degrees of the woman and her partner, only the poor household variable and the population density delivers significant estimated coefficients. The table with this results can be found in the appendix

effects for the different values and interactions of woman's and partner's employment statuses are reported on the basis of the onbtained estimates via the 2SLS approach. Interestingly we find that only for the IPV-type non-physical the employment statuses are significant. The effect of female employment in a relationship with a partner who is not employed or a partner who is employed respectively delivers the same tendency of marginal effect, indicating that it does not matter if the partner is employed or not when the woman is employed on the risk of experiencing non-physical IPV. On the other hand the table shows that when the woman's partner is employed and the woman is employed too, we find a decreasing risk for experiencing non-physical IPV which is consistent with the results of Alonso-Borrego and Carrasco, 2017.

Table 5.6 reports the marginal effects for the remaining variables in our regressions based on the estimates obtained by the 2SLS method. It can be seen that, in addition to the marginal effects for physical violence reported in Table 5.5, the fact that a woman has a college degree and that a woman's partner has a college degree significantly reduces her risk of being a victim of physical IPV. Living in a low income/poor household on the other hand increases this risk. For non-physical violence we find the same marginal effects and interpretations but with the exception of the low income/poor household were for non-physical IPV the marginal effect is not significant.

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TABLE 5.1: Estimates for risk of Physical IPV

	Probit	2SLS	mvprobit
	IPV	IPV	IPV
VARIABLES	Physical	Physical	Physical
Woman employed	0.24	0.61	0.09
	(0.17)	(0.5)	(0.26)
Partner employed	-0.15	0.06	0.13
	(0.14)	(0.22)	(0.20)
Women empl. × Partner empl.	-0.30	-0.23	-0.251
	(0.19)	(0.38)	(0.19)
Household size	0.005	0.01	-0.0044
	(0.04)	(0.01)	(0.04)
Woman Age 25-54	0.13	-0.11	0.13
	(0.29)	(0.16)	(0.29)
Woman Age 55+	-0.19	-0.05	-0.08
	(0.3)	(0.12)	(0.31)
Woman: Secondary	0.01	-0.01	0.01
	(0.08)	(0.03)	(0.08)
Woman: College	-0.23*	-0.08*	-0.23*
	(0.1)	(0.04)	(0.1)
Partner: Secondary	0.06	0.004	0.06
	(0.08)	(0.03)	(0.08)
Partner: College	-0.23*	-0.06*	-0.26*
	(0.11)	(0.03)	(0.11)
ln(province GDP per capita)	0.03	-0.01	-0.05
	(0.19)	(0.08)	(0.2)
Prov. population density	-0.00003	-0.00001	-0.00003
	(0.00004)	(0.00001)	(0.00003)
Woman more educated	0.07	0.02	0.071
	(0.09)	(0.03)	(0.09)
Low income household	0.04	0.55*	-0.26
	(0.14)	(0.32)	(0.26)
Large Municipality	-0.02	-0.01	-0.02
	(0.07)	(0.02)	(0.07)
RNorMed	0.05	0.004	0.04
	(0.08)	(0.03)	(0.08)
Observations	1,716	1,716	1,716

Source: Own calculations from Spanish VAW Survey 2019

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 5.2: Cross-equation correlations coefficients for IPV Physical (from mvprobit estimation)

VARIABLES	Woman empl.	Partner empl	Low income
IPV Physical	0.05	-0.19*	0.18
	(0.11)	(0.10)	(0.12)

Source: Own calculations from Spanish VAW Survey 2019

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 5.3: Estimates for risk of Non-Physical IPV

	Probit	2SLS	mvprobit
	IPV	IPV	IPV
VARIABLES	Non-Physical	Non-Physical	Non-Physical
Woman employed	0.24	1.25*	0.02
	(0.16)	(0.57)	(0.27)
Partner employed	0.04	0.58*	0.26
	(0.12)	(0.27)	(0.2)
Women empl. × Partner empl.	-0.33*	-1.09*	-0.28
	(0.17)	(0.45)	(0.17)
Household size	-0.01	0.002	-0.02
	(0.03)	(0.01)	(0.03)
Woman Age 25-54	0.01	-0.16	0.01
	(0.25)	(0.18)	(0.26)
Woman Age 55+	-0.18	-0.03	-0.11
	(0.27)	(0.14)	(0.27)
Woman: Secondary	0.06	0.02	0.067
	(0.08)	(0.03)	(0.08)
Woman: College	-0.18*	-0.09*	-0.18*
	(0.09)	(0.04)	(0.09)
Partner: Secondary	-0.1	-0.06*	-0.1
	(0.07)	(0.03)	(0.08)
Partner: College	-0.14	-0.08*	-0.17*
	(0.1)	(0.04)	(0.1)
ln(province GDP per capita)	0.23	0.03	0.12
	(0.17)	(0.11)	(0.18)
Prov. population density	0.00006*	0.00002	0.00006*
	(0.00003)	(0.00001)	(0.00003)
Woman more educated	0.1	0.04	0.09
	(0.08)	(0.03)	(0.08)
Low income household	0.08	0.16	-0.58*
	(0.12)	(0.38)	(0.26)
Large Municipality	0.05	0.02	0.05
	(0.07)	(0.03)	(0.07)
RNorMed	0.03	-0.0039	0.02
	(0.07)	(0.03)	(0.07)
Observations	1,716	1,716	1,716

Source: Own calculations from Spanish VAW Survey 2019

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 5.4: Cross-equation correlations coefficients for IPV Non-Physical (from mvprobit estimation)

VARIABLES	Woman empl.	Partner empl	Low income
IPV Non-Physical	0.11	-0.17	0.36*
	(0.12)	(0.11)	(0.14)

Source: Own calculations from Spanish VAW Survey 2019

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 5.5: Estimated marginal effects of woman and partner employment on IPV on the basis of the 2SLS regression

Effect of woman employment	IPV Physical	IPV Non-Physical
Partner not employed	0.51	0.42*
	(0.39)	(0.64)
Partner employed	0.4	0.54*
	(0.71)	(0.84)
Effect of partner employment		
Woman not employed	0.11	0.31*
	(0.33)	(0.27)
Woman employed	-0.64	-0.27*
	(0.47)	(0.72)

Source: Own calculations from Spanish VAW Survey 2019

Marginal effects evaluated for 2019, using the sample mean values at that year.

Standard errors in parentheses (using Delta method)

*** p<0.01, ** p<0.05, * p<0.1

TABLE 5.6: Estimated marginal effects of household characteristics on IPV on basis of the 2SLS regression

Variable	IPV Physical	IPV Non-Physical
Household size	0.00	0.001
	(0.00)	(0.01)
Woman Age 25-54	-0.05	-0.1
	(0.08)	(0.08)
Woman Age 55+	-0.02	-0.002
	(0.06)	(0.05)
Woman: Secondary	-0.01	0.01
	(0.01)	(0.01)
Woman: College	-0.04*	-0.03*
	(0.002)	(0.04)
Partner: Secondary	0.01	-0.03*
	(0.02)	(0.01)
Partner College	-0.02*	-0.04*
	(0.01)	(0.002)
ln(province GDP per capita)	-0.001	0.001
	(0.007)	(0.01)
Prov. population density	-0.00	0.00
	(0.00)	(0.00)
Woman more educated	0.04	0.02
	(0.01)	(0.02)
Low income household	0.08*	0.06
	(0.03)	(0.04)
Large Municipality	-0.04	0.01
	(0.02)	(0.01)
RNorMed	0.0002	-0.004
	(0.001)	(0.002)

Source: Own calculations from Spanish VAW Survey 2019

Marginal effects evaluated for 2019, using the sample mean values at that year.

Standard errors in parentheses (using Delta method)

*** p<0.01, ** p<0.05, * p<0.1

Chapter 6

Conclusions

In this master's thesis we used data from different sources but mainly from the violence against women (VAW) survey in Spain from 2019 (more details can be found in chapter 3) in order to examine the effect of woman's and her partner's employment status on the risk of experiencing IPV. For this purpose we distinguished between two IPV types, physical and non-physical. We took account of the separate effects of the two different employment statuses (for the woman and her partner) as well as of the interaction between both of them. Additionally we conditioned our analysis on income and a set of covariates. We used three different estimation approaches, such as an univariate probit regression, a two-stage least square linear probability regression and a multivariate probit regression. While the univariate probit regression does not take the potential endogeneity of the variables woman's employment status, partner's employment status and poor/low income households into account, the other two regression strategies do.

In the case of physical IPV the results of the different analysis approaches taking account of endogeneity and the approach which is not taking account of it (the univariate probit analysis) are quite similar. As you can see later, two of the significant variables which lower the risk of experiencing IPV physical can also be found to lower the risk of experiencing non-physical IPV. Those variables are having a college degree and having a partner who finished college. The 2SLS approach provides further evidence such is, that living in a low income/poor household increases the risk of physical IPV. Furthermore the results in this master's thesis underline the importance of taking account of endogeneity when it comes to non-physical IPV. While in both of the approaches which take account of endogeneity the results show that for IPV non-physical, finishing college and having a partner who finished college significantly decreases the risk, the univarate probit approach provides no evidence that having a partner who finished college reduces the risk of experiencing non-physical IPV. Also taking the results of the marginal effects into account, we find that finishing college and having a partner who finished college underlining the findings from the estimation results and, furthermore, that the employment status of the partner plays

a major role only if the woman is employed too and in this case lowering the risk of non-physical IPV. For physical IPV we did not find any evidence with respect to the employment statuses.

The main realization therefore are that only the partners employment status plays a major role in reducing the risk of IPV and only when the woman is also employed and only on the non-physical IPV type. This realization differs from those from Alonso-Borrego and Carrasco, 2017 realizations in the way that they found the same influence but also influencing the physical IPV. This results matches with the realizations of Kaukinen, 2004 who found that the risk of abuse rather depends on the employment status of the partner than on the employment status of the woman herself. Our results match the results from Alonso-Borrego and Carrasco, 2017 in the point that the lowest risk of non-physical IPV appears when both partners in a relationship are employed. Our results do not match with the results from Lenze and Klasen, 2017 since we found significant evidence for the partner's employment status, if the woman also is employed and they did not find any significant evidence after accounting for endogeneity. Furthermore we found that especially the education of a woman and her partner plays a major role in reducing the risk for both types of IPV when successfully finished college. Intriguingly, when comparing these results with the results from Pérez-Sánchez, Dávila-Cárdenes, and Gómez-Déniz, 2022, (see Chapter 2 for more details) we realize that they found a decreasing effect for sexual IPV only when the partner is currently studying and furthermore that the education level of the woman is not relevant to any type of IPV.

Reflecting on our work we have to note that our sample is relatively small when comparing the sample size of 1,716 from our work to the sample size of e.g. Alonso-Borrego and Carrasco, 2017, with more than 30.000 observations and we only considered data from one year. Hence, in order to get even more precise results it would be desirable to extent the underlying data set with data from previous years. With special respect to the 2SLS approach one could might obtain better results when finding better instruments.

Appendix A

Appendix

TABLE A.1: Estimates for risk of Physical IPV - including interaction of woman's and partner's education level: college

	Probit	2SLS	mvprobit
	IPV	IPV	IPV
VARIABLES	Physical	Physical	Physical
Woman employed	0.24	0.62	0.08
	(0.17)	(0.5)	(0.26)
Partner employed	-0.15	0.05	0.13
	(0.14)	(0.22)	(0.20)
Women empl. × Partner empl.	-0.3	-0.23	-0.25
	(0.19)	(0.38)	(0.19)
Household size	0.01	0.01	-0.003
	(0.04)	(0.014)	(0.04)
Woman Age 25-54	0.13	-0.11	0.13
	(0.29)	(0.16)	(0.29)
Woman Age 55+	-0.19	-0.05	-0.08
	(0.3)	(0.12)	(0.31)
Woman: Secondary	-0.002	-0.01	0.0004
	(0.08)	(0.03)	(0.08)
Woman: College	-0.15	-0.06	-0.15
	(0.12)	(0.05)	(0.12)
Observations	1,716	1,716	1,716

Source: Own calculations from Spanish VAW Survey 2019

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE A.2: Continuing: Estimates for risk of Physical IPV - including interaction of woman's and partner's education level: college

	Probit	2SLS	mvprobit
	IPV	IPV	IPV
VARIABLES	Physical	Physical	Physical
Partner: Secondary	0.07	0.01	0.07
	(0.08)	(0.03)	(0.08)
Partner: College	-0.15	-0.05	-0.18
	(0.13)	(0.04)	(0.13)
Women college × Partner college	-0.22	-0.05	-0.20
	(0.19)	(0.05)	(0.19)
ln(province GDP per capita)	0.02	-0.01	-0.06
	(0.19)	(0.08)	(0.2)
Prov. population density	-0.00003	-0.00001	-0.00003
	(0.00003)	(0.00001)	(0.00003)
Woman more educated	0.03	0.01	0.04
	(0.1)	(0.03)	(0.1)
Low income household	0.05	0.58*	-0.25
	(0.14)	(0.32)	(0.27)
Large Municipality	-0.018	-0.01	-0.02
	(0.07)	(0.02)	(0.07)
RNorMed	0.05	0.003	0.04
	(0.08)	(0.03)	(0.08)
Observations	1,716	1,716	1,716

Source: Own calculations from Spanish VAW Survey 2019

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE A.3: Estimates for risk of Non-Physical IPV - including interaction of woman's and partner's education level: college

	Probit	2SLS	mvprobit
	IPV	IPV	IPV
VARIABLES	Non-Physical	Non-Physical	Non-Physical
Woman employed	0.24	1.27*	0.01
	(0.16)	(0.57)	(0.27)
Partner employed	0.04	0.57*	0.25
	(0.12)	(0.27)	(0.2)
Women empl. × Partner empl.	-0.33*	-1.09*	-0.28
	(0.17)	(0.46)	(0.17)
Household size	-0.01	0.003	-0.02
	(0.03)	(0.01)	(0.03)
Woman Age 25-54	0.01	-0.16	0.01
	(0.25)	(0.18)	(0.26)
Woman Age 55+	-0.18	-0.03	-0.11
	(0.27)	(0.14)	(0.27)
Woman: Secondary	0.05	0.01	0.05
	(0.08)	(0.03)	(0.08)
Woman: College	-0.08	-0.06	-0.09
	(0.11)	(0.05)	(0.11)
Observations	1,716	1,716	1,716

Source: Own calculations from Spanish VAW Survey 2019

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE A.4: Continuing: Estimates for risk of Non-Physical IPV - including interaction of woman's and partner's education level: college

	Probit	2SLS	mvprobit
	IPV	IPV	IPV
VARIABLES	Non-Physical	Non-Physical	Non-Physical
Partner: Secondary	-0.09	-0.05*	-0.08
	(.08)	(0.03)	(0.08)
Partner: College	-0.05	-0.04	-0.08
	(0.12)	(0.05)	(0.12)
Women college × Partner college	-0.23	-0.08	-0.22
	(0.17)	(0.07)	(0.17)
ln(province GDP per capita)	0.22	0.03	0.11
	(0.17)	(0.11)	(0.18)
Prov. population density	0.0001*	0.00002	0.00005*
	(0.00003)	(0.00001)	(0.00003)
Woman more educated	0.05	0.02	0.05
	(0.09)	(0.04)	(0.09)
Low income household	0.08	0.22	-0.57*
	(0.12)	(0.38)	(0.26)
Large Municipality	0.06	0.02	0.05
	(0.07)	(0.03)	(0.07)
RNorMed	0.03	-0.004	0.02
	(0.07)	(0.03)	(0.07)
Observations	1,716	1,716	1,716

Source: Own calculations from Spanish VAW Survey 2019

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

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