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Postal Address:
Institut d'Economia de Barcelona
Facultat d'Economia i Empresa
Universitat de Barcelona
C/ John M. Keynes, 1-11
(08034) Barcelona, Spain
Tel.: + 34 93 403 46 46
ieb@ub.edu
http://www.ieb.ub.edu

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ABSTRACT: We exploit a change in the public healthcare entitlement of undocumented migrants in Spain to investigate the causal link between withdrawal of healthcare and changes in help-seeking behaviour of women experiencing intimate partner violence (IPV). We contribute to the new literature modelling domestic violence by taking a novel look at the role of human capital in decisions to seek help when in violent relationships. We use a difference-in-differences (DiD) methodology to compare the number of foreign applicants for protection orders before and after the reform using Spanish applicants as the counterfactual. The impact of the reform was immediate; foreign applicants decreased by 16% after the health policy reform was introduced and this drop amounts to 19% in areas with stronger enforcement of the reform. We perform several robustness checks including addressing potential bias from migration changes after the reform. Our findings are important for current policy discussions on granting/limiting access to public programs for the undocumented population. We provide evidence that restricted access to the healthcare system can have unintended negative consequences for the most vulnerable groups of the population with potentially important spill-over effects to the next generation.

JEL Codes: I12, I18 and H51
Keywords: Domestic violence, healthcare access, undocumented migrants

Caoimhe Rice
Bristol Trials Centre,
University of Bristol &
University of York
E-mail: Caoimhe.rice@bristol.ac.uk

Judit Vall Castelló
Centre for Research in Health and
Economics, Universitat Pompeu Fabra
Universitat de Barcelona &
Institut d'Economia de Barcelona (IEB)
E-mail: judit.vall@ub.edu

1. Introduction

Intimate Partner Violence (IPV) is a complex multi-factorial social problem with significant health consequences and economic costs. It is a major global public health concern and an underlying cause of gender inequality worldwide (Garcia-Moreno, 2013). Papageorge et al. (2016) apply human capital theory to intimate partner violence (IPV) and find that incidents of IPV were reduced when access to a healthcare innovation became available. We contribute to this burgeoning literature by providing novel evidence for the impact of *restricting* access to public healthcare for undocumented migrants on help-seeking behaviour of IPV victims in this population group.[2] To identify these effects, we exploit a reform, introduced in Spain in 2012, which imposed such restrictions in health care access for undocumented migrants. We apply a difference-in-differences (DiD) model to evaluate the change in the number of foreign women seeking protection orders in Spain compared to native Spanish women before and after the reform.

The focus on undocumented migrants is important. Increased immigration in developed countries has fostered political discussions on the extent to which undocumented migrants should get access to public programs and public benefits once they are in the host country. Europe has been exposed to an intense refugee crisis since 2015 and estimates show there are approximately 11 million undocumented migrants living in the USA, a figure that has changed little since 2009 (Passel and Cohn, 2017). In the UK, the British government introduced a "hostile environment" immigration policy in 2014 which included stricter checks on access to healthcare for undocumented migrants. Campaigners against gender violence have collected personal accounts of the negative impact of this hostile policy on the ability of victims of IPV to seek help (EVAW Coalition, 2018). Our paper informs these political discussions by providing empirical evidence for one of the many potential impacts of restricting access to the public health care system for the undocumented population.

Our results show that foreign applicants for protection orders fell by 16% after the introduction of the reform, rising to 19% in regions where the policy was most stringently adhered to. This finding supports the theory that access to healthcare is important to empower victims of IPV to seek formal help and highlights the negative consequences of preventing sub-groups of the population from using the public healthcare system.

[2] We use the term intimate partner violence and not domestic violence because our study includes non-domiciled partners.

This effect may be partially explained by the bargaining theory of IPV which suggests that women accept a level of violence in return for intra-couple transfers. Women are assumed to have a threshold above which they will not accept violence and will leave the relationship. Withdrawing access to healthcare may increase this threshold by decreasing the availability of "outside options". We propose that human capital theory better explains this change in help-seeking behaviour. We rely on two concepts from the theory of human capital. The first is that health is a form of human capital; healthcare is an input to health and thus to human capital (Grossman, 1972; Becker, 2007). The second is that changes in human capital will shift incentives for undertaking risky behaviours (Becker, 2007; Jones *et al.*, 2018). We argue that seeking-help for IPV is a potentially costly behaviour and that withdrawing access to healthcare will reduce expected future health, resulting in reduced incentives to engage in help-seeking behaviour in the present. Our results are important, not only for the affected cohort but also for the next generation which may be exposed to longer and more intense periods of violence in the household as a result of the drop in reporting behaviour.

2. The Spanish health care system and the 2012 reform

Before 2012 Spain was one of just five European Union (EU) countries providing access to more than just emergency healthcare for undocumented migrants (Biffl and Altenburg, 2012).[3] Undocumented migrants could access the healthcare system under the same conditions as the native population; the only requirement was the need to be registered in a municipality and to apply for a health care card. Registration in a municipality does not require evidence of immigration status; the procedure only requires presenting a piece of valid identification (which can be, for example, a passport) and some proof of the address in which the individual lives (such as an electricity bill). In 2012, during the ongoing economic crisis that started in 2008, the central Spanish government passed Royal Decree Law (RDL) 16/2012 to 'guarantee the sustainability' of the public healthcare system. The law came into effect in September 2012 and converted the Spanish National Health Service (Sistema Nacional de Salud, SNS) from a publicly funded universal healthcare system to a contribution-based system of social insurance. The new system resulted in the exclusion of those who were 'uninsured' from accessing healthcare; essentially, those without a residence permit to stay in the country. After the reform, health care cards of non-citizens without a residence permit were cancelled resulting in the loss of access to the public health system and subsidized treatment drugs for this group. There were

[3] EU Countries providing more than minimal emergency care include: France, Italy, Portugal, Netherlands and Spain.

three exceptions to this reform: pregnant women, emergency care for accidents, and children under the age of 18 years old. Reports from the government state that by 2013, one year after the introduction of the reform, 873,000 health care cards had been cancelled (Durana and Moreno-Fuentes, 2016).

Spain is comprised of autonomous cities and communities, hereafter referred to as regions, with a certain degree of decentralization of political power.[4] Regional Health Authorities and governments responded to the central government health reform in a multitude of ways. Six regions implemented the law with minimal modifications. In contrast, four others organised alternative healthcare programs for irregular migrants to be available from the date healthcare reform was implemented, 1st September 2012. Seven more regions arranged alternative measures but implemented them at different points in time after the introduction of RDL 16/2012. Eligibility requirements for these alternative healthcare programs varied amongst regions. Cimas et al. (2016) provide an in-depth summary of alternative regional healthcare programs and eligibility requirements. Although alternative programs were implemented in some of the regions, reports from non-governmental organizations (NGOs) working in Spain suggest that healthcare access was also restricted in many cases in those regions, for example, the report by Cimas and Gullón (2014)[5]. Thus, we cannot reliably use these regions as controls and we will use this variation only to explore the intensity of the impact of the reform across regions; we expect the effects to be stronger in regions with stricter implementation of the reform. We also expect that the differences across regions will not be substantial due to spillover effects of the reform.

3. Intimate partner violence in Spain

Foreign-born women in Spain experience a higher incidence of IPV than Spanish women and any physical violence they do suffer tends to be more severe. Estimates from the 2015 national, representative, Violence Against Women (VAW) survey in Spain show that one quarter of all women over 16 years-old have suffered physical or sexual

[4] Decentralisation of powers to the regions is diverse and depends on the region. Provision of health care services is fully decentralised to Regional Health Authorities. In contrast, the judicial system is wholly administered by the central government.

[5] In the appendix section we have copied some examples of individual cases in which access to the health care system was denied. This evidence is taken from NGO's working in Spain and documenting individual cases in order to lobby for the reinstatement of universality in the health care system.

violence at some point in their lifetime (de Miguel Luken, 2015).[6] This lifetime incidence rises to 36% amongst women who are immigrants. When asked in the VAW survey, women born abroad report twice as many incidents of IPV as Spanish women in the preceding two months (de Miguel Luken, 2015).

Whilst education level and employment status are somewhat protective against IPV, migrants with high education and high income levels still show an increased prevalence compared with Spanish women (Delegación del Gobierno para la Violencia de Género, 2012). The level of severity of the violence is also different between native and foreign women: in the last VAW survey, 31% of foreign women who report IPV reported severe physical violence compared with 17% of Spanish women (de Miguel Luken, 2015). Women born abroad are also more likely to be murdered by an intimate partner than Spanish women. In 2016, they accounted for 34% of IPV fatalities while at the same time making up just 9.4% of the female population (calculated with data from the Instituto Nacional de Estadistica (INE)). Protection orders are one option for formal reporting that is open to victims of domestic abuse. In Spain, protection orders are obtained via civil proceedings which require a lower burden of proof and impose fewer financial and time costs on petitioners than criminal proceedings (Logan *et al.*, 2006). Applications for protection orders in Spain can be submitted directly to the court of gender violence by petitioners. Although protection orders can be sought on behalf of victims, the overwhelming majority (94%) are requested by victims themselves (calculated from INE data). In this study, we use the number of applicants for protection orders as a proxy for help seeking behaviour amongst victims of IPV.

Healthcare professionals (HCPs) are some of the most common individuals to whom victims disclose IPV and evidence suggests that discussing IPV in medical settings can increase access to IPV services (McCloskey *et al.*, 2006; Ansara and Hindin, 2010; Feder *et al.*, 2011). In a European review of healthcare system responses, Spain was considered to have the most systematic and standardised approach to interventions for IPV in healthcare settings (Bacchus *et al.*, 2012). Spanish doctors are required to report any injuries (or disturbance of physical or psychological functioning) to a judge, if they suspect the injury is the result of a crime. Injuries suspected to be due to IPV are reported to the court of gender violence and these comprised, on average, 10% of all official reports of IPV during the

[6] The EU average is that 33% of women have suffered IPV at some point (European Institute for Gender Equality, 2016). For comparison, US estimates suggest 7.7% of men have suffered IPV during their lifetime, rising to 15% amongst men who have ever had an intimate relationship with another man (Tjadan and Thoennes, 2000).

study period.[7] Yet, qualitative work undertaken in Spain uncovered significant barriers for healthcare professionals to identify and report IPV in healthcare settings. Over 80% of healthcare professionals interviewed did not consider IPV to be a healthcare issue and just one quarter of nursing and medical professionals reported feeling prepared for dealing with IPV (Coll-Vinent *et al.*, 2008).

4. Human capital and theories of intimate partner violence

Economic theory of domestic violence has often been based on the paradigm that violence is perpetrated for expressive or instrumental purposes. In the former, the perpetrator gains direct utility from abuse and in the latter, indirect utility is gained from controlling the victim. There is scant economic theory or evidence looking at IPV from the victim's perspective and her incentives to seek help or leave an abusive relationship.

Economic theoreticists classically model domestic violence as sequential non-cooperative household bargaining games conducted by rational actors (Tauchen, Witte and Long, 1991; Farmer and Tiefenthaler, 1997). These models assume that one partner accepts a certain level of violence in exchange for an intra-couple transfer. A threshold is assumed to exist over which violence will not be accepted and the victim will leave. The hypothesised threshold implies that women must have options available to them outside of abusive relationships for the threat to leave to be credible. The endogeneity of key factors, such as a woman's education and employment in her choice of threshold, has only recently been investigated (Aizer, 2010; Alonso-Borrego and Carrasco, 2017).

Education, employment (and income) are key investment inputs to human capital and appear to be protective against IPV (Aizer, 2010; Anderberg *et al.*, 2015; Alonso-Borrego and Carrasco, 2017). Other theoretical work suggests that it is not just employment status or income per se that determines the risk of experiencing IPV, but the victim's economic independence. Anderberg and Rainer (2015) present an alternative model of instrumental IPV based on economic abuse. They suggest that aggressors seek to undermine the victim's economic independence by interrupting, preventing or sabotaging education and, or employment. While there is no empirical evidence directly testing this theory, Browne et al. (1999) found that low-income women with recent experience of physical IPV had 1/3 the odds of

[7] Calculated from MSSI data available from http://estadisticasviolenciagenero.msssi.gob.es/ last accessed 6th August 2018. The other reports or 'denuncias' come from victims, their families, the police, and domestic violence assistance services.

maintaining substantial employment compared to women without. It is the ability to invest sufficient time in the work place, not just employment, that facilitates "true economic independence" (Browne, Salomon and Bassuk, 1999). We consider this true economic independence to contribute to human capital.

We explore IPV from the perspective of the victim and her incentives to seek help, which few economists have addressed. Kingsnorth and Macintosh (2004) apply Rational Choice Theory to help-seeking but provide no empirical evidence. Liang et al. (2005) model the decision to leave an abusive partner from a psychological perspective. They suggest a linear process by which help-seeing progresses from informal disclosure to friends and relatives, to formally reporting and, eventually, leaving the relationship. However, this model does not address the often-cyclical nature of such decisions. Aizer and Dal Bó (2009) address this cyclicality. They demonstrate that women use commitment devices to support their decision to seek help or leave an abusive relationship, providing evidence that decisions to seek help are time inconsistent. We apply human capital theory, as set out by Grossman and developed by Becker, to help-seeking behaviour in IPV. Grossman suggested demand for health and healthcare could be modelled with health as an investment stock over the life cycle (Grossman, 1972) whereas Becker (2007) specifically addressed the role of health behaviours. He theorised that those with higher human capital and longer expected survival, were more likely to invest in costly present actions, such as exercise or refraining from smoking, because expected future gains are higher than those with lower human capital. Jones et al. (2018) recently proposed a model integrating Grossman's investment model with the Becker-Murphy theory of addiction. The authors model negative health behaviours, such as smoking, and positive investments in health capital as simultaneous choices within one optimisation problem. This suggests that a rational person considers both the impact of their behaviour and their investments in health capital when making decisions or choices.

We hypothesise that an unanticipated change in access to healthcare will reduce the value of expected future health and reduce incentives to seek-help for IPV in the present. Seeking help for IPV is a costly action; women who experience IPV commonly cite fear of worsening violence, losing their children, or losing their homes as reasons preventing them from seeking help (Fugate Leslie Landis *et al.*, 2005; Sanders, 2015). In contrast to strictly endogenous inputs to human capital, such as education, withdrawal of access to healthcare can occur exogenously and rapidly, due to a financial shock, loss of health insurance, or a change in public policy.

We build on previous empirical work including Papageorge et al. (2016) who use a DiD method to show that a medical innovation in the treatment of HIV (Highly Active Antiretroviral Therapy, HAART) led to a reduction in negative behaviours, such as drug taking, amongst women and a reduction in the incidents of domestic violence they suffered. More recently, Lee (2018) used a regression discontinuity model to show a causal link between increased access to healthcare for dependants up to 26 years old, under the Affordable Care Act, and a reduction in negative behaviours (smoking and drinking) in this group. To date, no studies have demonstrated the converse relationship i.e. that withdrawal of access to healthcare reduces incentives for positive behaviours that are costly, e.g. quitting smoking. We use a fixed-effects DiD analysis to provide causal evidence for the effect of restricting access to healthcare on help-seeking behaviour of women who experience IPV.

5. Data collection and Methodology

5.1 Data

We gather data from several administrative sources; the National Institute of Statistics (Insituto Nacional de Estadistica, INE), the Judicial Branch of the Spanish government (Poder Judicial, PJ), the Ministry for Health, Social Services and Equality (Ministerio de Sanidad, Servicos Sociales e Igualdad, MSSSI) and its inter-departmental subsidiary the National Observatory on Violence Against Women. We use the quarterly statistical reports of the number of victims with applications for protection orders for both Spanish and non-Spanish (foreign) citizens[8] from PJ to construct a panel dataset for each of the 17 regions (Autonomous Communities) in Spain from 2009 quarter 1 (2009q1) to 2016 quarter 4 (2016q4).[9] During this period, the total annual number of applications for protection orders was, on average, 27.4% of the total annual number of formal reports of IPV. This proportion remained stable over time, despite annual variation in the number of formal reports. Data from PJ shows that nationally, 95% of applicants

[8] Those with dual nationality are counted as Spanish citizens in this data. We exclude data from Ceuta and Melilla, the Spanish, North African autonomous cities.

[9] Quarterly judicial data reports available from PJ: http://www.poderjudicial.es/cgpj/en/Subjects/Domestic-and-gender-violence/Activity-of-the-Observatory/Statistic-Data/ last accessed 18th January 2018.

for protection orders in 2016 were the victims themselves, reinforcing the validity of this measure as a proxy for help-seeking behaviour[10].

Unfortunately, reports from the PJ do not distinguish between foreign women with and without Spanish residency, therefore we do not have information on what proportion of the foreign (non-citizen) women in our data are undocumented. Furthermore, determining the number of irregular migrants in a country is an exceptionally difficult task. Using data from 2005, González-Enriquez (2008) estimated that 15% of all third country (non-EU) nationals in Spain were undocumented, representing approximately 1.5% of the total population.[11] Potential 'noise' from regularised migrants in the 'foreign' group in our data could mask the effect of the health policy on irregular migrants. To evaluate the importance of this 'noise' in our analysis, we construct a second dataset that describes the proportion of women with protection orders by continent of birth, using annual data available from INE between 2011 – 2016 (Table 1).[12] On average 14% of the female population in Spain between 2011-2016 were born elsewhere. Of these, 90% were from the Americas and Caribbean, EU, or Africa.[13]

From González-Enriquez (2008) we also know that most undocumented immigrants are from Latin America (47%) with Europeans comprising 26% and Africans 20%. African women appear to be under-represented in official population statistics (first column, Table 1) compared with the estimates from Gonzalez-Enriquez, suggesting they are more likely to be undocumented than women from other continents (Table 1). In contrast, female EU citizens are over represented in official statistics as they are much less likely to be undocumented. Though the proportion of the undocumented population is estimated by González-Enriquez with a high level of uncertainty, the proportions are remarkably similar to those of women experiencing domestic violence by continent of origin presented in the second column of Table 1.

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[10] Data available from PJ: http://www.poderjudicial.es/cgpj/en/Subjects/Domestic-and-gender-violence/Activity-of-the-Observatory/Statistic-Data/La-violencia-sobre-la-mujer-en-la-estadistica-judicial--Anual-2016 spreadsheet *Violencia sobre la Mujer por Provincias – Año 2016*, last accessed 4th November 2018.

[11] Clandestino, an EU funded a research project, was set up to estimate the number of irregular migrants in 12 individual EU countries. Since its termination in 2009, estimates are updated by collaborators on an ad hoc basis. More information is available from http://irregular-migration.net/

[12] Data last access 15/09/17 and available from: http://www.ine.es/dyngs/INEbase/en/operacion.htm?c=Estadistica_C&cid=1254736176866&menu=resultados&idp=1254735573206

[13] 'The Americas' here refers to North, Central, and South America, and the Caribbean.

Furthermore, there is extensive evidence from non-governmental organisations (NGOs) suggesting that there were spill over effects of the reform between regularised and irregular immigrants. Doctors of the World (Medicos del Mundo, MDM) claim that the reform was a big shock for all migrants and that its implementation was done in a stricter way than what was intended by the law: in particular, they report a significant lack of knowledge about rights to access healthcare amongst migrants both with and without residence permits after the reform (Medicos del Mundo, 2015). In the same report, the NGO found that some immigrants in protected patient categories (e.g. pregnant women or asylum seekers) had been refused treatment though they were entitled to free treatment. Furthermore, they also describe a number of legal immigrants in Spain who were denied access to the health care system after the reform. There are three examples of these particular cases in the Appendix section (one of them on gender violence) that we have taken from two reports of an organization (REDER)[14] working in Spain to collect information on individuals affected by the healthcare reform. These reports imply a lack of knowledge of the process amongst both immigrants and healthcare administrative staff, which suggests that implementation of the reform was more intense than what was envisaged in the law.

Covariate data were retrieved from INE. The economic crisis officially began in Spain in the third quarter of 2008 (four years before the policy); we include the quarterly female unemployment rate by binary nationality (Spanish and foreign) at the regional level in order to control for local labour market conditions and its potential impact on help seeking behaviour after IPV. Similarly, population estimates at the regional level by binary nationality were included to control for population changes between regions. Table 2 provides a description of these variables for both Spanish and foreign women at the regional level. Although Spanish women account for twice as many applicants for protection orders as foreign women, when the rate of applicants per 10,000 population is calculated, proportionally more foreign women apply for protection orders than Spanish women.

5.2. Econometric Strategy

To determine a causal relationship between withdrawal of access to healthcare and reduced help-seeking behaviour we use a fixed effects differences-in-differences (DiD) model. As DiD models rely on the common trends assumption, in

[14] REDER (Red de Denuncia Y Resistencia al RDL 16/2012) is a multi-agency collective of over 300 social and professional organisations including the Spanish Association of Family and Community Medicine and Doctors of the World.

Figure 1 we plot the evolution of the log number of applicants for protection orders in Spain between the first quarter of 2009 and the fourth quarter of 2016, distinguishing between Spanish and foreign applicants. Looking at Figure 1 we can see that trends in Spanish and foreign applicants for protection orders appear to be similar pre-2012. There is a decreasing trend in applicants for protection orders, but this drop follows a parallel trend in the two groups. Once the reform is introduced there is a sharp drop in the number of foreign applicants for protection orders and, even though the trends continue to follow a similar path in the two groups after the reform, foreign applicants remain at much lower levels after the reform, relative to their pre-2012 levels and to Spanish women.

We estimate the following fixed effects DiD model:

$$\ln(\mathrm{App})_{\mathrm{fiyq}} = \gamma_{\mathrm{f}} + \theta_{\mathrm{i}} + \lambda_{y} + \pi_{\mathrm{q}} + \mathrm{Post}_{\mathrm{yq}} + \delta_{\mathrm{rDD}}\left(\gamma_{\mathrm{f}} . \mathrm{Post}_{\mathrm{yq}}\right) + \beta_1 \ln(\mathrm{Pop})_{\mathrm{fiyq}} + \beta_2 \,\mathrm{FemUR}_{\mathrm{fiyq}} + \varepsilon_{\mathrm{fiyq}} \quad (1)$$

where $\ln(\mathrm{App})_{\mathrm{fiyq}}$ is the logarithm of number of applicants for protection orders in region *i*, for year *y* and quarter *q*, and *f* denotes binary nationality. γ_{f} is the foreign dummy and acts as the treatment indicator variable. It takes the value 1 for foreign applicants and zero for Spanish. λ_{y} is the year specific dummy for all years 2009 – 2016. π_{q} is the quarter specific dummy for all q, where q = [1, 2, 3, 4] and controls for seasonal variation in intimate partner violence and help seeking behaviour due to changes in weather, holidays, and calendar events e.g. the football season.[15] θ_{i} is the region-specific dummy where *i* = [1, …, 17] for each of the regions of Spain. $\mathrm{Post}_{\mathrm{yq}}$ is a dummy marking the introduction of reform and equals 1 for post-treatment periods. The health reform law was enacted in April 2012 and implemented on 1st September 2012 so that quarter four 2012 is the first treated period. Thus, $\gamma_{\mathrm{f}} . \mathrm{Post}_{\mathrm{yq}}$ is the interaction term between the foreign and post treatment dummies. Its coefficient, δ_{DD}, is the DiD estimator for the effect of withdrawing healthcare on foreign women applying for protection orders. To control for changes in population over time, the log regional population by binary nationality ($\ln(\mathrm{Pop})_{\mathrm{fiyq}}$) is included.[16] We include the regional female unemployment rate by binary nationality ($\mathrm{FemUR}_{\mathrm{fiyq}}$) to control for the impact of local labour market conditions on help-seeking behaviour of Spanish and foreign women. Standard errors are clustered at the regional

[15] Card and Dahl (2011) showed that emotional cues such as the local team unexpectedly losing a football match can "place women at higher risk of abuse."

[16] Population numbers are published semi-annually and were applied to both quarters in a semester e.g. quarter 1 and quarter 2 both use semester 1 population data.

level by wild-bootstrap procedure to account for a small number of clusters, 17. In some specifications, we also include a region-specific linear trend to account for any linear changes over time that can influence help-seeking behaviour of women differently across regions. As some social policies are determined at the regional level, any change in these policies during our sample period in a specific region that may affect help-seeking behaviour in that region will be captured by the region-specific linear trends.

We present a second specification using a Weighted Ordinary Least Squares (WOLS) model, weighted by inverse population variance, to estimate the effect in natural units. Greater weight is given to more populous regions, improving the precision of the estimate. In the WOLS model, the dependent variable is number of applicants per 10,000 female population by binary nationality. As the population is the weighting variable, it is not therefore included as a regressor; all other regressors are the same as equation (1).

To reveal the timing and intensity of the effect of treatment we conduct an event study at the national level over 32 quarters; 16 of both lead and lag quarters. Event studies constitute an empirical test of the validity of the common trends assumption in the pre-treatment period. The number of lead and lag periods are balanced and standard errors are bootstrapped and clustered on region.

Event Study estimates are derived from a regression of the form:

$$\ln(App_{fit}) = \gamma_f + \theta_i + \rho_t + \beta_t \gamma_f . \rho_t + \ln(\text{pop})_{fit} + u_{fit} \tag{2}$$

where, $\ln(App_{fit})$ is the natural logarithm of number of applicants for protection orders. As before *f* and *i* denote binary nationality and region. *t* denotes period (i.e. year and quarter) where *t* = [1-n, …, 0, …, n] and *n* is the number of lead/lag periods. t=0 corresponds to the period the law was implemented. γ_f, θ_i, and $\ln(\text{pop})_{fit}$ are as before. ρ_t is a *period specific dummy* for 1-n lead periods, the period the law was implement (t=0), and n lag periods.[17] The remaining term $\gamma_f . \rho_t$ is the interaction term between the foreign dummy and the period specific dummies (where t = [1-n, …, 0, …, n]). The coefficients on these terms β_t describe any difference in log number of foreign applicants for

[17] The first lead period is removed to avoid multicollinearity.

protection orders relative to Spanish applicants for each period t = [1-n, …, 0, …, n] compared with period t = -n (i.e. 2009q1).

6. Results

The results for both Log and WOLS specifications of equation (1) are presented in Table 3. The estimates of the coefficient on the interaction term between the foreign and post dummies are the DiD estimates. From the log specification (Table 3, column 2), we estimate that foreign applicants for protection orders were reduced by 15.6% after access to healthcare was restricted.[18] Alternatively, the estimated reduction in natural units is 1.6 applicants per 10,000 foreign women from the WOLS specification (Table 3, column 1).[19] Both estimates are statistically significant and are consistent with a human capital theory perspective on help-seeking behaviour in IPV. The coefficient is effectively unchanged by adding regional specific linear trends (RSLT), (Table 3, column 3).

In the log specification (Table 3, column 2) we see that the population elasticity of help-seeking, measured by number of applicants for protection orders, is 0.5 and is highly significant. This indicates that a 1% increase in population will lead to 0.5% increase in formal help-seeking behaviour and suggests that women are more likely to apply for protection orders in more populous areas. This may be due to a higher level of intimate partner violence in populated areas, better provision of specialist services in more populous areas, and/or a greater cost to seeking formal help in smaller communities, both financially and in terms of availability of outside options.

Evidence from the 2015 VAW survey suggests that all the above are true. The survey authors report that fewer women suffer physical violence in small municipalities (fewer than 2,000 inhabitants) compared with women in more populous municipalities. They find that a lower percentage of women who do experience IPV make formal reports to the police or courts in smaller municipalities and a higher proportion of these women seek help from other sources such as healthcare or social services than women in municipalities larger than 10,000 people (de Miguel Luken, 2015).

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[18] We use Kennedy's method to obtain the percentage change in y, the dependent variable, in a semi-log specification with dummy variable D where $\ln(y) = \alpha + \beta D + \varepsilon$, if D changes from 0 to 1, e.g. from Spanish to foreign, then $\%\Delta y = 100(\exp\left(\beta - \frac{1}{2}\sigma_\beta^2\right) - 1]$ (Kennedy, 1981) which has been shown to be almost unbiased by Giles (2011).

[19] An estimated reduction of 1.6 foreign applicants/10,000 foreign women is 10.6% of the pre-treatment mean of 15.98 (CI: 4.966– 26.99) foreign applicants/10,000 foreign women. This falls just outside the 95% confidence interval of estimate from the log transformation specification (CI: -19.7% - -11.3%).

Although the coefficient for female unemployment rate is positive (which is not in keeping with human capital theory or the bargaining model), it is significant only in some of the specifications and must be interpreted with caution as, in our regressions, it is used as a control for general business cycle conditions at the regional level. Furthermore, the empirical evidence shows a somewhat complex relationship between female employment and IPV and recent research suggests that relative wage within a couple and not just employment status influences the incidence of IPV (Aizer, 2010; Alonso-Borrego and Carrasco, 2017).

We then exploit differences across regions in Spain according to the intensity with which the law was implemented. As mentioned before, regions in Spain have a certain degree of autonomy with respect to some policies. Cimas et al. (2016) have reviewed regional implementation of the restrictions in health care access for undocumented migrants; in their paper, the authors rate each of the 17 regions in Spain according to these restrictions.[20] We ranked regions by the date on which an alternative healthcare provision was implemented (if any) and an intensity of treatment score, derived from Cimas et al.'s (2016) access to health score (Table 4), and perform a sub-group analysis by intensity of treatment at the regional level. The four regions with a comprehensive alternative program implemented simultaneously with the healthcare reform are considered to have low treatment intensity. The six regions with minimal or no changes to the national law are considered to have high treatment intensity. The remaining seven regions introduced alternative programs after the law was implemented, creating still more heterogeneity and so are not analysed because it is difficult to assess the degree of implementation of the national law in those regions.

As explained above and shown in the appendix section, there is anecdotal evidence collected by several NGOs and other organizations in Spain reporting the existence of restrictions in access to the health care system even in regions that implemented an alternative program to provide health coverage for undocumented migrants. The reform changed the nature of the public health care system and its implementation was experienced throughout the entire country, according to the reports issued by NGOs working in the field. Therefore, we use only the most extreme regions with respect to treatment intensity.

[20] Cimas et al. (2016) devised their score using 8 criteria: Formal definition of alternative procedures for access to healthcare, Administration requirements i.e. how many documents are required to acquire a health card (low vs high), groups of patients covered by healthcare, medical care services included in any new arrangement, coverage of out-of-pocket payments, medical history included in general patient database to facilitate ongoing care, diseases of public health relevance included, chronic disease, major mental disorder.

We see in columns 4 and 5 of Table 3 that, indeed, the effect of the policy increases with treatment intensity. For the highest treatment intensity regions, the policy caused a 19.3% reduction in foreign applicants for protection orders relative to Spanish (Table 3, column 4). The effect magnitude was smaller and statistically insignificant for the lowest treatment intensity regions where there was an estimated 7.5% reduction (Table 3, column 5).

We perform a second analysis in Table 5 where we use the treatment intensity score as a continuous variable so that regions with the most intense treatment score 100 and the least intense regions score 0 (Table 4 describes scores for each region). In the first column of Table 5 we estimate the same model as equation 1 using intensity score (a continuous variable) as a treatment variable, instead of the foreign dummy. We can see that the coefficient of the interaction of the continuous treatment variable with the post reform indicator is negative and significant, indicating stronger decreases in applicants for protection orders in regions more intensively treated by the health care restrictions. In the second and third columns of Table 5 we perform the same exercise with log and WOLS specifications using foreign women only, comparing the IPV reports of foreign women in more and less intensively treated regions. In the log specification (Table 5, column 2) we can see there is a significant reduction in foreign applicants for protection orders for a unitary increase in treatment intensity score after the policy was introduced. Using the WOLS model to derive a natural unit estimation of effect, we find there are 0.05 fewer foreign applicants for protection orders per 10,000 female population for each unit increase in treatment score (Table 5, column 3). This equates to 5 fewer foreign applicants per 10,000 population in regions with the most restrictive health policy, for example, Castilla-La-Mancha, compared with foreigners in regions which officially have full healthcare access, such as Navarra. This result supports the causal link between intensity of treatment and the reduction in help-seeking behaviour suggested in the main results.

One of the main threats to our identification strategy is the potential incentive to leave the country as a result of the reform. Exclusion from accessing the public health care system may affect the migration decision of those undocumented migrants living in Spain. Thus, there could be changes in the underlying population of undocumented migrants staying in the country that could be driving our results. In our main specifications in Table 3 we already control for the underlying population at risk of suffering IPV and the results of the reform are significant even after including population as a control. However, there could still be selection in migration patterns that could jeopardize our findings if those women suffering from IPV become more likely to migrate after the reform, which could be partly

driving to the drop in IPV reports observed in our data. In order to address this concern, we classify regions by pattern of migration and identify regions with stable trends in population between Spanish and foreign women. We perform sub group analyses using these regions to isolate the effect of the policy from that of migration. We used event study models to identify regions where the difference in migration of foreign and Spanish women was relatively stable over time. Three regions were found to have a stable population for the entire duration of the period analysed. A further nine regions had stable foreign female populations up to the third quarter after the policy reform was introduced (Table 6).

To confirm the migration trends explained above for women in these regions, we perform a DiD analysis similar to equation (1) using population as the dependant variable instead. For the group where population declines in the third quarter after the policy, we restrict the analysis to 7 periods around the policy implementation (2011q4-2013q2), three periods before the law is passed and three periods after. The results in Table 7 show there is no statistically significant change in foreign female population in the 'stable population' group for the duration of the analysis period; nor is there a significant change in foreign female population during the first 3 periods after the policy is introduced in the group where population declines in lag quarter 3. This confirms the common trend in migration for these regions.

Thus, we now repeat the main DiD analysis for change in protection order applicants by sub groups defined by migration patterns. In the nine regions where foreign female population declines in the third quarter after the reform, we estimate that the health policy causes a 15.4% decrease in foreign applicants for protection orders. This estimate is almost identical to the main result of a 15.6% decrease. The magnitude of the fall is much larger in the stable population group where the health reform is estimated to cause a 24% decrease in help-seeking behaviour amongst foreign women.

The stronger effect in the stable population group of regions cannot be explained by these regions being more intensively treated: all three regions are in the middle of the intensive index distribution and the nine regions in which population declines in the third quarter after the reform are a mix between high and low intensity regions. Therefore, our results indicate a stronger effect of restrictions in access to health care in regions where foreign women are less likely to migrate and are, thus, exposed to the full effects of the reform.

In Table 8 we evaluate the effect of the reform on migration in both low and high treatment intensity regions. We can see that the decline in foreign population relative to Spanish is significant and of similar magnitude in the two types of regions even though, as shown in Table 3, there is a larger decrease in IPV reports in high intensity regions as a result of the reform. This suggests that migration is not the cause of differential help-seeking behaviour in high and low treatment intensity regions, reinforcing our hypothesis that the differential results are explained by differing intensity in the application of the policy amongst regions.

Finally, in order to explore the dynamics of the policy effects as well as to investigate the existence of parallel trends in IPV reporting between Spanish and foreign women before the introduction of the policy, we estimate an event study model as shown in equation (2). We present the results in (figure 2), which shows that the effects of the health reform were immediate and strongly persistent. The estimate for the first quarter after the reform suggests there is a highly significant 24.5% reduction in foreign applicants when compared with 2009 quarter one. The effect of the policy persists for 4 years after its introduction in 2012. Lead estimates are, on the whole, not significantly different from zero. The explanatory power of the lead estimates is jointly zero (F (13, 1025] = 1.38), supporting the assumption of parallel trends in IPV reporting between Spanish and foreign females before the introduction of the policy.

7. Robustness checks

7.1. Controlling for male unemployment rates as a proxy indicator for IPV incidence

In this paper, we focus on the impact of restricted access to healthcare on formal help-seeking behaviour of undocumented migrant women who experience IPV. However, we cannot disentangle the extent to which the reduction in applicants for protection orders is driven by a change in the incidence of IPV itself. We assume that the underlying incidence of IPV is not affected by the reform and, thus, the observed reduction is only a result of altered personal weighting of the risks of seeking a protection order and the expected future health/human capital among affected women. Due to its hidden nature, the actual incidence of IPV is extremely difficult to measure, therefore, we sought an alternative indicator of the underlying rate of abuse within couples to test this assumption,

Two Spanish studies show a strong correlation between male unemployment and the likelihood that a woman experiences IPV. Sanz-Barbero et al. (2015) demonstrate a link between long-term male unemployment and the risk of suffering IPV. Alonso-Borrego and Carrasco (2017) provide empirical evidence from large, representative, Spanish VAW surveys which shows that male employment significantly reduces the risk of physical violence within a couple. In contrast, female employment only affects the risk of violence when her partner is also employed. Therefore, following the findings of these studies, we assume that incidents of IPV increase with male unemployment and use the regional male unemployment rate as a proxy variable to control for the underlying rate of IPV. Table 9 presents additional results in which we introduce controls for several measures of male unemployment rate while also controlling for female unemployment rate. As can be seen in columns 2, 3 and 4 of Table 9, our baseline results are unchanged with the inclusion of controls for the general male unemployment rate, the unemployment rate of foreign males, or the unemployment rate of Spanish males, all of them at the regional level. We include all three rates as IPV reports from foreign women could potentially be affected by changes in unemployment rates of both Spanish and foreign men (as couples do not necessarily sort by nationality). None of the proxies of underlying IPV trends affect the magnitude or significance levels of our baseline estimates, suggesting that the underlying rate of IPV is not influenced by the healthcare reform.

7.2. Controlling for physician behaviour in response to the reform

Healthcare professionals can provide an important link to specialist domestic violence services. One plausible explanation for our results is that applications for protection orders are affected by a change in healthcare activity, specifically, a reduction in physician referrals to specialist IPV services. As fewer migrant women have access to healthcare after the reform, we assume there will be fewer disclosures of IPV to healthcare professionals and fewer referrals to specialist IPV services resulting in a reduction in applicants for protection orders. There are no publicly available data detailing referrals from healthcare professionals to specialist IPV services. However, there is a legal requirement for doctors to report injuries, physical or

psychological, suspected to result from IPV to the court of gender violence. These reports constitute approximately 10% of all reports to the court, and are distinct from applications for protection orders, our dependant variable.[21] We include the number of quarterly regional injury reports from healthcare professionals in our regression to understand whether the effects are being driven by changes in the behaviour of medical practitioners or of affected women.[22] In column 5 of Table 9 we can see that controlling for the log number of injury reports does not change the size or significance level of our baseline results. This implies that the healthcare reform did not alter physician behaviour with regards to reporting IPV and is therefore unlikely to have affected referrals to specialist IPV services.

Thus, we conclude that the observed drop in protection order applications is mostly driven by a change in decisions about seeking help among migrant victims of IPV rather than by underlying changes in the incidence of IPV events (perpetrator behaviour) or changes in the behaviour of physicians. Therefore, even if overall IPV events do not change (as proxied by male unemployment rates), the reporting behaviour of foreign women does change as a result of the reform.

7.3. Changing the geographical level of observations: Provincial level results

To investigate whether our results are robust to the level of geographical aggregation, we present the results of both the DiD regression (1) and event study (2) models using data aggregated at the provincial level instead of regional level (autonomous community). There are 52 provinces in Spain divided amongst 17 regions. In the provincial level analysis, standard errors are clustered at the province level. Regrettably, information on female unemployment rates is not available separately for foreign and Spanish women at the province level and so we control for total female unemployment rate. In the first column of Table 10 we can

[21] Injury reports are not a perfect measure of physician activity in response to the reform as they include reports from emergency and obstetric physicians and emergency services were ostensibly unaffected by the restriction in access to healthcare. However, we know from NGOs that restriction of access spilled-over into these clinical areas in some instances.

[22] Injury reports are not available by nationality, therefore, we include the total number of quarterly injury reports in each region without distinguishing by foreign and Spanish nationals.

see that the results are extremely similar to the regressions at the regional level: province level results show a drop in IPV reports by 17% as a result of the policy while baseline results at the regional level show a drop by 15.6%. Though the similarity in these two estimates provides evidence of the robustness of our findings, we believe that regional level results are the most robust. Aggregating to the regional level is logical given the policy is applied at this level and allows us to control for regional trends in other policies or regional variables. It also allows us to better control for the impact of female unemployment given that differential female unemployment rates by binary nationality are only available for regions.

7.4. Placebo regression

For our final robustness check, we present a placebo regression to support the validity of the difference in difference method and test the common trend assumption in the pre-treatment period (Jones and Rice, 2011). If the common trend assumption holds, at least for the pre-treatment period, the DiD estimator should not be significant for a "placebo law". The placebo regression (Table 10, column 2) shows a statistically insignificant change in the number of foreign applicants before and after a placebo policy in 2010q3.[23]

8. Discussion and Conclusions

In this paper we exploit a policy reform introduced in Spain in 2012, which restricted access to the health care system for undocumented immigrants, to provide empirical evidence for a causal relationship between access to healthcare and help-seeking behaviour amongst women who experience domestic violence. Applying human capital theory, we argue that reduced access to healthcare leads to a reduction in the expected value of future health and human capital and thus decreases incentives for victims of IPV to seek help in the present.

[23] We chose the placebo policy to take place in 2010q3 because it allows for a balanced number of lead and lag periods. However, most lead periods show an insignificant reduction in log number of foreign applicants relative to 2009q1.

We construct a rich panel of IPV reports from the judiciary system for foreign and Spanish women at the regional and quarterly level. The panel includes 16 periods before and after the implementation of the reform which allows us to estimate differences-in-differences models. We show that foreign applicants for protection orders fell by almost 16%, compared with Spanish, after access to healthcare was withdrawn for undocumented immigrants due to the 2012 law. Event study models reveal that the effect of the policy is large, immediate and persistent. We demonstrate that the observed effect increases with intensity of treatment and persists after accounting for several factors such as population migration patterns, the underlying incidence of IPV, and physician behaviour in identifying and reporting cases of IPV.

Our work is especially relevant to inform current discussions on the impacts of immigration policies. In many countries there has been a surge in the inflow of undocumented migrants (as shown by the refugee crisis in Europe and the increasing numbers of undocumented individuals in the USA) and fear about the potentially negative consequences of immigration has spread over the resident population. In turn, this has prompted many policy makers to consider the introduction of policies that limit the access to several public programs and public benefits for the immigrant population. Our paper provides evidence on the negative public health consequences of some of these limitations. Apart from the population directly affected by the reform, policy makers should also consider the intergenerational effects of such policies and the potential for crossover effects on native and regularised populations. Pollak (2004) suggests that the intergenerational transmission of abusive behaviour (and victimisation) in a “cycle of violence” compounds the impact of any policy that affects IPV.

We contribute to the new literature of economic theory of domestic violence by investigating factors that impact women’s decisions to seek help for IPV. Education, income and employment of a woman who experiences IPV have traditionally been considered exogenous to her ‘threshold’ for leaving in Bargaining Theory of IPV. We use a natural experiment to show that access to healthcare is an important factor in the decision to seek-help for IPV. A better understanding of victims’ motivation to seek help and barriers to help

seeking will aid both policy makers interested in incentivising help-seeking and those designing specialist IPV services.

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Tables and Figures

Table 1. Foreign women in Spain as a proportion of the foreign population and foreign victims of IPV

Origin by Continent	Proportion of female foreign population	Proportion of female foreign IPV victims	Proportion of undocumented migrant population (male and female)
Americas and Caribbean	0.432 [0.003] 0.428 - 0.435	0.422 [0.025] 0.396 - 0.449	0.47
Europe non-EU	0.337 [0.008] 0.328 - 0.345	0.295 [0.012] 0.282 - 0.307	0.26 (EU and non-EU)
Africa	0.128 [0.002] 0.125 - 0.130	0.208 [0.019] 0.188 - 0.228	0.20
Rest of the world	0.104 [0.006] 0.098 - 0.110	0.075 [0.012] 0.063 - 0.088	0.07

Note: Foreign women by continent of origin presented as a proportion of: the female foreign population, female foreign victims of IPV and the undocumented migrant population 2011- 2016. Reported as mean annual proportion [SE] 95% Confidence Intervals. Columns 1 &2 are calculated using annual, national data from INE for both the female population and proportion of female victims with protection orders or 'precautionary measures'. Column three contains data from the Clandestino project.[24]

[24] Data available from Clandestino website http://irregular-migration.net/typo3_upload/groups/31/3.Database_on_IrregMig/3.2.Stock_Tables/Spain_Estimates_IrregularMigration_Nov09_2.pdf last accessed 18th April 2018.

Table 2. Description of variables by nationality: Spanish and foreign, at the regional level.

VARIABLES	**Mean**	**SD**	**Min**	**Max**
Spanish				
Applicants	355.1	(355.5)	14	1731
Applicants/ 10,000 women	3.348	(1.342)	1.166	8.450
Ln(applicants)	5.373	(1.050)	2.639	7.456
Female population	1,008,493	(876,305)	114,040	3,114,135
Ln(female population)	13.45	(0.890)	11.64	14.95
Female unemployment rate	20.15	(7.071)	8.010	38.98
Observations	544			
Foreign				
Applicants	165.3	(181.3)	5	887
Applicants/ 10,000 women	15.98	(5.619)	2.167	34.58
Ln(applicants)	4.554	(1.071)	1.609	6.788
Female population	113,771	(122,849)	12,354	421,265
Ln(female population)	11.06	(1.109)	9.422	12.95
Female unemployment rate	32.05	(8.508)	5.430	68.15
Observations	544			

Note: Descriptive statistics for dependent (number applicants for protection orders by, its log, and number of applicants/10,0000 women by binary nationality) and independent variables (female population by binary nationality, its log, and female unemployment rate) used in the main analysis by binary nationality (Spanish and foreign) at the regional (autonomous community) level. Note: dual citizens are considered to be Spanish for the purpose of this analysis.

Table 3. Difference-in-differences estimates

	(1) WOLS	(2) Log	(3) Log with RSLT	(4) Higher intensity	(5) Lower intensity	(6) Stable population	(7) Pop falls lag q3
Variables	Applicants/ 10,000 pop.			Ln(Applicants)			
Foreign dummy	10.95***	0.428	0.446	0.190	0.742	-1.111***	-1.122***
	(0.000)	(0.370)	(0.368)	(0.538)	(0.649)	(0.354)	(0.354)
Post-treatment dummy	-0.0567	0.0361	0.0366	0.0726	0.00314	0.0680	-0.0893**
	(0.168)	(0.0347)	(0.0333)	(0.0792)	(0.0101)	(0.0867)	(0.0390)
Foreign*post interaction	**-1.653****	**-0.168*****	**-0.166*****	**-0.212*****	**-0.0742**	**-0.271*****	**-0.166*****
	(0.671)	**(0.0541)**	**(0.0536)**	**(0.0682)**	**(0.0809)**	**(0.0865)**	**(0.0524)**
ln(female population)		0.550***	0.551***	0.276	0.589***		
		(0.200)	(0.191)	(0.343)	(0.000)		
Female UR	0.0834	0.0134**	0.0120*	-0.000513	0.000955	0.0102	0.0253
	(0.0801)	(0.00646)	(0.00648)	(0.00434)	(0.00258)	(0.0148)	(0.0154)
Estimated % change†		**-15.6%*** **	**-15.4%*** **	**-19.3%*** **	**-7.5%**	**-24.0%*** **	**-15.4%*** **
Observations	1,088	1,088	1,088	384	256	192	126
Adjusted r2	0.867	0.949	0.953	0.948	0.968	0.851	0.971
Region Specific Linear Trend	No	No	Yes	No	No	No	No
Regression timespan	2009q1 - 2016q4	2009q1 - 2016q4	2009q1 - 2016q4	2009q1 - 2016q4	2009q1 - 2016q4	2009q1 - 2016q4	**2011q4-2013q2**
Number of Regions	17	17	17	6	4	3	9

Note: DiD regression results describing the effect of the law on help-seeking behaviour of victims of IPV, as measured by number of applicants for protection orders. Specifications: Column 1 shows weighted ordinary least squares (WOLS) model; Column 2 shows the log specification; Column 3 presents the log specification with region specific linear trends (RSLT); Column 4 shows the DiD regression for the 6 highest treatment intensity regions (Madrid, Balearic Islands, Murica, Rioja, Castilla and Leon, and Castilla La Mancha); Column 5 shows the same for the 4 lowest treatment intensity regions (Asturias, Catalonia, Galicia, and The Basque Country); Column 6, shows results using only the 3 regions (Aragon, Extremadura, and The Canary Islands) where the population of foreign women was shown to be stable for the period 2009-2016. Finally, in column 7, we report the results of the analysis using only the 6 regions (The Balearic Islands, Valencia, Madrid, Murcia, Navarra, Andalusia) where the population of foreign women is stable until the third quarter after the policy was introduced. Results here are reported for a seven-period window around the introduction of the reform 2011q4-2013q2. The difference in differences estimator is the co-efficient on the interaction between the foreign and post reform dummies. † The estimated change in effect is calculated using Kennedy's correction for estimating effect size using dummy variables in semi-logarithmic models. Wild bootstrapped standard errors (SEs) clustered on region are in parentheses. Statistical significance is denoted by * p<0.1, ** p<0.05, *** p<0.01.

Table 4. Ranking of regions by duration and intensity of treatment

	Rank	Region	Date alternative program implemented	Intensity of treatment score
Least intensely treated regions	1	Asturias	01/09/2012	22.5
	2	Catalonia	01/09/2012	30.5
	3	Galicia	31/08/2012	31.5
	4	Basque Country	01/07/2012	35.5
	5	Navarra	25/02/2013	0
	6	Aragon	19/03/2013	32.5
	7	Andalucia	06/06/2013	19.5
	8	Extremadura	15/07/2013	33.5
	9	Valencia	31/07/2013	29.5
	10	Canary Islands	16/08/2013	31.5
	11	Cantabria	25/11/2013	31.5
Most intensely treated regions	12	Madrid	-	60
	13	Balearic Islands	-	71
	14	Murcia	-	90
	15	Rioja	-	100
	16	Castilla y Leon	-	100
	17	Castilla La Mancha	-	100

Note: Regions ranked by the date alternative provision of healthcare for undocumented migrants was made available and intensity of treatment score, derived from Cimas at al. (2016). If alternative provision was provided after the law was introduced, regions are ranked first by date of alternative program introduction, then treatment intensity score.
Notes: 1=least intensely treatment region, 17=most intensely treated region at time reform implemented. Cimas at al. (2016) score regions out of a total of 100 based on their access to healthcare for undocumented migrants and any additional requirements such as documentation. We take the inverse, 100 – (access to care score) = intensity of treatment score. The most intensely treated regions implemented the central government law with the most fidelity, although some of the regions introduced some exceptions in case of public health risks, mental health or chronic diseases.

Table 5. Difference-in-differences estimates using intensity of treatment score

	(1)	(2)	(3)
	Spanish and foreign	**Foreign only**	**Foreign only**
	Log with intensity score	Log with intensity score	WOLS with intensity score
	Ln(Applicants)		Applicants/ 10,000 population
Post-treatment dummy	0.0637	0.131	1.965***
	(0.0539)	(0.105)	(0.000)
ln(female population)	0.417***	0.198	-8.382
	(0.000)	(0.462)	(10.80)
Female UR	0.0133***	-0.00219	-0.0118
	(0.00463)	(0.00262)	(0.0329)
Treatment intensity score	0.00688***	-0.00403	0.0759
	(0.000)	(0.00288)	(0.115)
Post*Intensity score interaction	-0.00231***	-0.00363***	-0.0529***
	(0.000894)	(0.00117)	(0.0170)
Observations	1,088	544	544
Adjusted r2	0.947	0.953	0.713

Note: DiD regression results describing the effect of treatment intensity on help-seeking behaviour as measured by number of applicants for protection orders. The DiD estimator is the co-efficient of the interaction of the post reform dummy and continuous treatment intensity score listed in Table 4. Column 1 shows the specification with log number of female applicants for protection orders by binary nationality (Spanish and foreign) as the dependent variable. Column 2 presents the same model using only data for foreign women. The weighted ordinary least squares (WOLS) model with foreign female applicants for protection orders per 10,000 foreign women as the dependent variable. Wild bootstrapped standard errors (SEs) clustered on region are in parenthesis, Statistical significance is denoted by * p<0.1, ** p<0.05, *** p<0.01

Table 6. Regions grouped by migration pattern.

Migration Pattern	Regions
Foreign female population declines before the policy	Asturias, Cantabria, Castilla Y Leon, Castilla La Mancha, Catalonia, Galicia, Basque Country, Rioja
Foreign female population declines after the policy	Balearic Islands, Valencia, Madrid, Murcia, Navarra, Andalucia
Stable foreign female population	Aragon, Extremadura, Las Canarias

Note: Regions are categorised by migration of female foreigners, relative to Spanish women, based on event studies looking at changes in female population over time. The foreign female population is considered to be stable if there is no evidence of differential migration patterns between foreign and Spanish women over the study period. In 8 regions, the foreign female population declines, relative to the Spanish population, before the reform is introduced and in the remaining 6 regions, a decline in the foreign female population is seen after 2013q3, the third quarter after the reform was introduced. Note: these categories contain different groups of regions from the high and low treatment intensity regions described in Table 4.

Table 7. Difference-in-differences estimates for changes in migration.

	(1) Weighted population	(2) Log population	(3) RSLT population	(4) Stable population	(5) Pop falls lag q3
	Population	Ln(Population)			
Foreign dummy	-1.773e+06***	-2.227***	-2.220***	-2.312***	-2.673***
	(572,413)	(0.719)	(0.717)	(0.737)	(0.844)
Post-treatment dummy	-33,238	0.0531***	0.0533***	-0.0485	-0.0137
	(55,587)	(0.0193)	(0.0194)	(0.0695)	(0.0317)
Foreign*post interaction	**-45,619**	**-0.0889*** **	**-0.0883*** **	**0.00278**	**-0.0110**
	(37,819)	**(0.0287)**	**(0.0285)**	**(0.00742)**	**(0.00817)**
Female UR	20,811	-0.0100	-0.0107	-0.0151***	0.00470
	(27,661)	(0.00672)	(0.00737)	(0.00482)	(0.0128)
Estimated % change†		-8.5%***	-8.5%***	0.3%	-1.1%
Observations	1,088	1,088	1,088	192	126
Adjusted r2	0.945	0.965	0.965	0.941	0.982
Region Specific Linear Trend	No	No	Yes	No	No
Regression timespan	2009q1 - 2016q4	2009q1 - 2016q4	2009q1 - 2016q4	2009q1 - 2016q4	2011q4-2013q2
Number of Regions	17	17	17	3	9

Note: DiD regression results describing the effect of the health reform on female migration. The DiD estimator is the co-efficient of the interaction of the foreign and post reform dummies. Column 1 shows the change in foreign female population, relative to Spanish, weighted by inverse population weights for all regions for the entire study period. Column 2 presents the same using log population as the dependent variable. In column 3, regional specific linear trends are added to the log specification of column 2. In column 4, the regression is restricted to regions with stable population and finally in column 5, the regression is restricted to a seven-period window around the time the policy was implemented those regions where the female foreign population declines in the third quarter after the reform. Bootstrapped standard errors clustered on region are in parentheses. Region specific dummies, year dummies and quarter dummies are included for each regression. Statistical significance is denoted by * p<0.1, ** p<0.05, *** p<0.01. †Calculated using Kennedy's correction for estimating effect size using dummy variables in semi-logarithmic models.

Table 8. Population changes by treatment intensity

	(1) Higher intensity pop	(2) Lower intensity pop
	Ln(population)	
Foreign dummy	-1.788*** (0.574)	-2.853*** (0.913)
Post-treatment dummy	0.0808*** (0)	0.0489 (0.0401)
Foreign*post interaction	**-0.150***** **(0.0482)**	**-0.130***** **(0.0417)**
Female UR	-0.0170 (0.0159)	0.00615 (0.00711)
Estimated % change†	-14.0%***	-12.3%***
Observations	384	256
Adjusted r2	0.975	0.973
Region Specific Linear Trend	No	No
Regression timespan	2009q1 - 2016q4	2009q1 - 2016q4
Number of Regions	6	4

Note: DiD regression results describing the effect of the reform on female migration in regions with higher treatment intensity (column 1) and lower treatment intensity (column 2). The DiD estimator is the co-efficient of the interaction of the foreign and post reform dummies. Bootstrapped standard errors clustered on region are in parentheses. Region specific dummies, year dummies and quarter dummies are included for each regression. Statistical significance is denoted by * p<0.1, ** p<0.05, *** p<0.01. †Calculated using Kennedy's correction for estimating effect size using dummy variables in semi-logarithmic models.

Table 9. Controlling for male unemployment rate and doctors' IPV related injury reports.

	(1) Baseline Results	(2) Controlling for Male UR	(3) Controlling for Foreign Male UR	(4) Controlling for Spanish Male UR	(5) Controlling for Ln(Injury reports)
			Ln(applicants)		
Foreign	0.428	0.427	0.434	0.421	0.427
	(0.370)	(0.371)	(0.374)	(0.368)	(0.371)
Post-treatment	0.0361	0.0372	0.0298	0.0526	0.0382
	(0.0347)	(0.0333)	(0.0327)	(0.0321)	(0.0360)
Foreign*Post	**-0.168*** **	**-0.168*** **	**-0.167*** **	**-0.169*** **	**-0.168*** **
	(0.0541)	**(0.0541)**	**(0.0538)**	**(0.0544)**	**(0.0541)**
Ln(Female Pop.)	0.550***	0.551***	0.549***	0.554***	0.550***
	(0.200)	(0.200)	(0.199)	(0.201)	(0.200)
Male UR		-0.000946	0.00374	-0.0157*	-0.000937
		(0.00500)	(0.00269)	(0.00917)	(0.00489)
Female UR	0.0134**	0.0135*	0.0125*	0.0147**	0.0135*
	(0.00646)	(0.00707)	(0.00666)	(0.00702)	(0.00718)
Ln(Injury reports)					0.00759
					(0.0367)
Estimated % change†	-15.6%***	-15.6%***	-15.5%***	-15.7%***	-15.6%***
Observations	1,088	1,088	1,088	1,088	1,088
Adjusted r2	0.949	0.949	0.950	0.950	0.949
Number of Regions	17	17	17	17	17

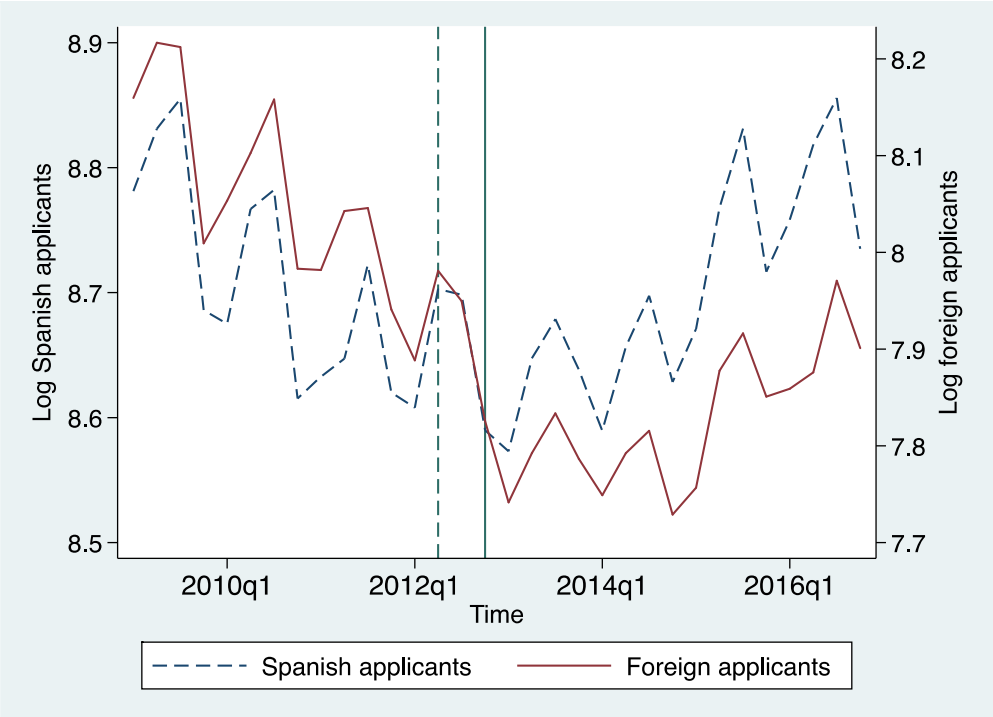
Note: DiD regression results describing the effect of the reform on help-seeking behaviour of victims of IPV when male unemployment rate is included as a proxy for the incidence of IPV as a means of interrogating the robustness of our results to changes in underlying rates of IPV (column 1). In columns 2 and 3, we use foreign and Spanish male unemployment rates respectively to determine whether there is a difference in nationality of the perpetrator, given that couples do not sort on nationality. Column 5 presents the DiD results when the number of doctor's injury reports to the court of gender violence are included as a measure of the activity of medical professionals in identifying and reporting cases of IPV. In all cases, the DiD estimator is the co-efficient of the interaction of the foreign and post reform dummies. Bootstrapped standard errors clustered on region are in parentheses. Region specific dummies, year dummies and quarter dummies are included for each regression. Statistical significance is denoted by * p<0.1, ** p<0.05, *** p<0.01. †Calculated using Kennedy's correction for estimating effect size using dummy variables in semi-logarithmic models.

Table 10. Difference-in-differences estimates for provincial level analysis & placebo regression.

	(1)	(2)
	Provincial level	**Placebo regression Regional level**
VARIABLES	Ln(Applicants)	
Foreign dummy	0.648***	0.424
	(0.207)	(0.382)
Post-treatment dummy	0.578***	0.534***
	(0.0776)	(0.184)
Foreign*post interaction	**-0.185*** **	**-0.0639**
	(0.0296)	**(0.0531)**
ln(Total Female UR)	-0.000344	
	(0.000990)	
Ln(Female UR by binary nationality)		0.0148*
		(0.00878)
ln(female population)	0.0218	0.0585
	(0.0473)	(0.0688)
Estimated % change†	**-16.9%*** **	**-6.3%**
Observations	3,198	408
Adjusted r2	0.898	0.954
Region Specific Linear Trend	Yes	No
Regression timespan	2009q1 - 2016q4	2009q1 - 2012q1
Number of regions	17	17

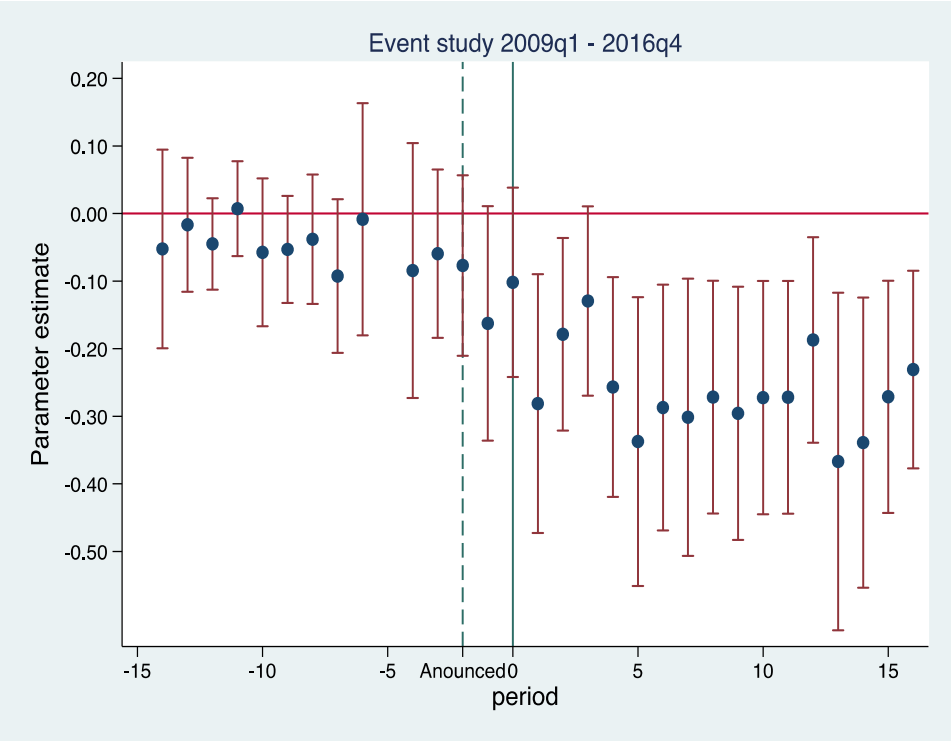
Note: Column 1 shows the DiD regression results describing the effect of the reform on help-seeking behaviour of victims of IPV at a provincial level to test whether the level of data aggregation affects the results. In this case, female unemployment rate in is total provincial female unemployment rate, *not* by binary nationality. In column 2, we present the DiD results for a placebo regression. We select 2010q3 as the date of the placebo reform, allowing for a balance of 6 lead and lag periods. Bootstrapped standard errors, in parentheses, are clustered on province in Column 1 and region in column 2. Region specific dummies, year dummies and quarter dummies are included for each regression. Statistical significance is denoted by * p<0.1, ** p<0.05, *** p<0.01. †Calculated using Kennedy's correction for estimating effect size using dummy variables in semi-logarithmic models.

Figure 1. Trends in log number of applicants 2009q1-2016q4.



Note: A comparison of trends in log number of applicants for protection orders for Spanish women (left axis) and foreign women (right axis) during the study period 2009 – 2016. The dashed line at 2012q2 represents enactment of RDL 16/2012. The solid line corresponds to 2012q4, the first fully treated quarter after implementation of the law.

Figure 2. Change in foreign female applicants relative to Spanish over time.



Note: Event study derived from equation (2) for n=16 periods where t = (1-n, …, 0, …, n]. Parameter estimates are the estimates of coefficients on the interaction term between the foreign dummy, which takes 1 for foreign population, and lead and lag period specific dummies. Positive estimates signify an increase in foreign applicants relative to Spanish applicants, negative estimates indicate a decrease. Bars represent 95% confidence intervals calculated using wild bootstrapped standard errors clustered on region. 2009q1 is omitted due to multicollinearity. The dashed line at period -2 represents enactment of RDL 16/2012, the solid line at period 0 represents 2012q4, the first fully treated quarter after implementation of the law.

APPENDIX

Rosa *is a 71-year-old Uruguayan woman who has been living in Spain for many years with her daughter and her granddaughters, who are her only family. She registered more than three years ago and she used to have a healthcare card. She suffers from a chronic cardiovascular disease. She has had to go to the emergency ward on several occasions, because this is the only way for her to access the healthcare system. She has already received several invoices but she does not have the financial means to pay them.*

She was referred to a specialist hospital with persistent respiratory insufficiency - she needed urgent surgery to replace an aortic valve. When she was discharged she received a medical report referring her for follow-up care with her general practitioner. But, to complete the vicious circle, she cannot receive this follow-up care because she does not have a healthcare card.

Source: REDER report, "Anatomy of the healthcare reform", 2015.

M. L. *is a Bolivian woman who has been a victim of trafficking for sexual purposes. Despite the fact that this situation had been confirmed by the sub-office of the Regional Government in Lugo, when M. went to the casualty department as a consequence of the injuries caused by gender violence she was billed for being attended. As if this were not enough, as M. is pregnant she attended hospital once more to give birth for which she was again billed.*

As a consequence of this situation M. has accumulated a debt of over 30,000 euros with the tax authorities; this prevents her from receiving subsidies for the three years that it takes to resolve her claim.

Unfortunately M.'s story is not an isolated case as our organisations have recorded similar incidents at the same hospital.

Source: REDER report, "Five myths for five years of health exclusion", 2017.

J. G. *is a Venezuelan women aged 56. In 2014 she arrived in the Canary Islands owing to a family regrouping process. J. suffers from diabetes and needs insulin. However, although she is legally resident in Spain the National Social Security Institute (Instituto Nacional de Seguridad Social, INSS) refuses to issue her a health card. As a consequence of this refusal, J. is unable to obtain not only the medical follow-up she needs but also the insulin she must have as it is only available on prescription.*

Source: REDER report, “Five myths for five years of health exclusion”, 2017.

2013

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