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PROSTITUTION LAW:  
A STUDY OF THE IMPACT OF THE SEX BUYER LAW IN NORTHERN IRELAND ON  
SEX VIOLENCE

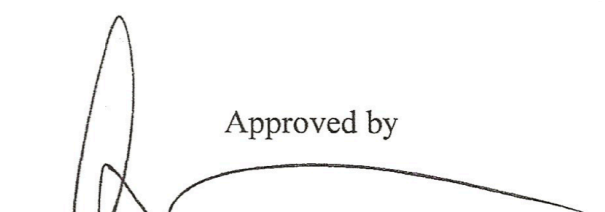
by

Kendra Ingram

A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of the requirements of the Sally McDonnell Barksdale Honors College.

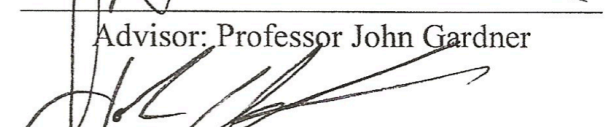
Oxford  
December 2021

Approved by



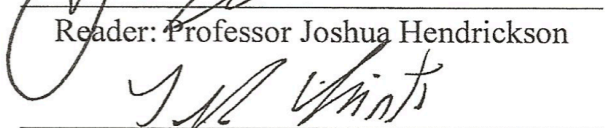
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## ABSTRACT

In this body of research, the Sex Buyer Law in Northern Ireland is critically examined. Specifically, this thesis examines the question, “Does the Sex Buyer Law have an effect on the sex violence rates in Northern Ireland?” England and Wales, Scotland, and Ireland are all used as control groups to measure the efficacy of the policy in Northern Ireland. Through analysis of a difference in differences regression, this research demonstrates that the policy had no effect on sex violence in Northern Ireland. Scotland and Ireland proved to be better control groups for Northern Ireland in terms of the identifying assumptions as England and Wales was not a strong enough control group.

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## Chapter I: Introduction

In the shadow of prostitution, organized crime, human trafficking, extremely violent crime, and corruption flourish. This study focuses on the effect of the Sex Buyer Law on sex violence and trafficking in Northern Ireland. I chose sex violence as the pinnacle area of concern as it is a crime that all countries should seek to minimize and a major violation of human dignity. According to the Universal Declaration of Human Rights, everyone has the fundamental rights to life, liberty, and security of person. (United Nations, 1948, art. 3). When prostitution becomes nonconsensual, the person who is forcing sexual actions is deliberately denying their victims' human rights. Furthermore, the victims could have physical and physiological effects after being placed in this unwanted situation that deprives them of their rights.

Sex violence, which is defined by the World Health Organization as: "any sexual act, attempt to obtain a sexual act, unwanted sexual comments or advances, or acts of traffic, or otherwise directed, against a person's sexuality using coercion, by any person, regardless of their relationship to the victim, in any setting, including but not limited to home and work." (Garcia-Moreno et al., 2021). Sex violence has been known to be perpetuated by prostitution, as there are countless stories of women who are abused in this line of work. Therefore, it is critical to investigate international approaches to prostitution to determine the most effective strategy for reducing the role of prostitution as a catalyst for sex violence.

Using difference in differences regression analysis and previous research regarding prostitution law, I investigate the effectiveness of the Sex Buyer Law in Northern Ireland that was adopted in 2015. Specifically, I investigate the effects of the policy on sex violence by utilizing England and Wales, Scotland, and Ireland as control groups. I also look at the effects of

the law on trafficking rates, and I use England and Wales as the control group for this dependent variable. For all of the difference-in-difference regressions, I use data collected from the United Nations Office on Drugs and Crime. Data are collected from national authorities through the annual United Nations Crime Trends Survey (UN-CTS). Additionally, all data are sent to UN Member States for review and validation. ("DataUNODC."). The data for this research ranges from roughly the years of 2004 to 2017, depending on the country and regressors being examined.

## Chapter II: Background and Literature Review

Money can often make a seemingly normal transaction repugnant, and this is certainly the case in terms of sex. Sex is a normal act of love making. However, a distasteful perception is created when money is attached and the act is no longer freely given. There are many characteristics that seem to play a role in the repugnance that is attached to prostitution, such as moral disapproval (Leuker et al., 2021).

Due to the varying opinions about the morality of prostitution across countries and cultures, prostitution legislation has varying degrees of enforcement across countries. Christina Leuker, Lasare Samartzidis, and Ralph Hertwig research market transactions and what makes these transactions morally repugnant. In their research, they find that among many domains of repugnant acts, prostitution was among the highest in provoking moral outrage among people, while surprisingly scoring low on the need for regulation (Leuker et al., 2021). This finding could explain why there is such a difference in countries' regulations for prostitution. Countries such as Germany consider prostitution to be legitimate sex work, while other countries, such as France, have a hardened stance that aims to eradicate prostitution as it is violent (Della Giusta, Marina, et al., 2021). The idea of whether prostitution is an acceptable trade is controversial due to the violence that can ensue.

Researchers and practitioners argue that if someone does not identify as a victim, they should not be deemed trafficked, which implies that their rights are not violated. The controversial questions are: "Can people be "victims" if they sell their bodies for sex and keep some of that money or trade it for drugs? Are they victims if a pimp provides cell phones, buys them clothes, or even cars, or places to stay?" ("Who's a Victim of Human Sex Trafficking?",



2013). These researchers are referring to prostitutes. Some call prostitution a victimless crime because it has the consent of two adults and or criminals. However, prostitution is a violation of human rights because the initial introduction to prostitution involves coercion by a perpetrator.

There is an idea that most have of an “ideal victim — someone who is physically locked in a room, chained up and who makes no money," says Catherine Longkumer, a Chicago attorney who works with victims of trafficking to help them get their lives back together (“Who's a Victim of Human Sex Trafficking?”, 2013). However, many people are forced into prostitution in a more subtle way; intimidation and drug addiction become tools for control. Sheila Johnson, a 33-year-old inmate who was a prostitute in order to feed her drug addiction, said that "Being sober, I wouldn't DARE prostitute” (“Who's a Victim of Human Sex Trafficking?”). Longkumer says that there has never been one prostitute that has said that prostitution is her goal in life. She continues by explaining that someone introduced this life to them and exploited them. (“Who's a Victim of Human Sex Trafficking?”). Khue Paige, a human trafficking case specialist I interviewed in 2018, even states, “most prostitutes that I've known started at such a young age, around 13 or younger, and had someone teach them all the ins and outs and rules of this world. In that case, there really isn't such a thing as a child prostitute. That is exploitation and trafficking of a minor” (Paige, 2018).

According to the United Nations, trafficking means “the recruitment, transportation, transfer, harboring or receipt of persons by means of the threat or use of force or other forms of coercion, of abduction, of fraud, of deception, of the abuse of power or of a position of vulnerability” (“OHCHR | Protocol to Prevent, Suppress and...”). Therefore, any form of coercion into this life of sex work is considered trafficking. There must be a minimum regulation

to safeguard these workers under the law because these women worldwide are trafficked and forced into this labor.

There is no straight-line approach to how to regulate prostitution. However, a comparative study of different approaches can give insight as to which is the most effective in deterring the harmful effects of prostitution. In the past two decades, the Nordic model has become increasingly widespread. The key components of this model are: decriminalizing all those who are prostituted, providing services to help them leave, and making prostitution purchasing a criminal offense (Nair et al., 2020). This model is important specifically for those who have been trafficked, because women who are criminalized are done so for involuntary acts, which perpetuates a cycle of crime. This model was initially introduced in Sweden under the Sex Buyer Law in 1999. This law was created in order to act as a deterrent to the purchase of commercial sex services. From a moral standpoint, this law was initiated because it “was shameful and unacceptable that, in a gender-equal society, men could obtain casual sexual relations with women in return for payment” (Sex Buyer Law 22). From an economic standpoint, this deterrent would be expected to reduce the demand for and supply of prostitution.

There are conflicting claims about the intended and actual consequences of this policy. On the one hand, literature demonstrates that the Sex Buyer Law has a negative effect on the harmful acts that can happen from prostitution. For example, a study done by Sabarinath Vinod Nair, Shreya Sharma, and Swarnava Ghosh that investigated the Nordic model found that in Sweden, the number of rape cases increased after the adoption of the Nordic model (Nair et al., 2021). This was an especially intriguing finding because Sweden was one of the most proactive in its position of the Nordic model, and it was one of the first countries in the world to

criminalize prostitution. However, other literature demonstrates that the Nordic model has had positive effects on countries. A publication by the House of Commons that investigated the effectiveness of prostitution laws to determine an approach for England and Wales indicated these beneficial outcomes. For example, the research states, “Since the introduction of the ban on the purchase of sexual services, street prostitution in Sweden has been reduced by half, and there was nothing to indicate that the ban had diverted street prostitution to the Internet” (United Kingdom). Further study is critical to determine the exact efficacy of this strategy in light of the contradictory viewpoints and evidence.

### **Chapter III: Methodology**

In order to determine the effects of the Sex Buyer Law in Northern Ireland on prostitution, I use an event study and difference-in-difference methodologies. The difference-in-differences model is a statistical approach that is used to simulate a randomized experiment using observational data. Difference-in-difference is based on the idea that the unobserved differences between treatment and control groups remain the same throughout time in the absence of intervention. Typically, a study utilizes individual randomization, which means individuals in a study are randomly assigned to the treatment or control group that are equal in both observed and unobserved characteristics, thus ruling out selection bias. Thus, difference-in-difference is a beneficial strategy to employ when individual-level randomization is not achievable. The model elicits the causal outcome of a treatment, such as the passage of a law or enactment of a policy, by comparing the differences in outcomes between the treatment group and the control group before and after the implementation of a treatment. For the purposes of this research, I will use the term “law or policy” in place of “treatment”. The intervention group is observed prior to and following the implementation of a law. The control group, which consists of a population untreated by the observed law, is observed for the same duration as the treatment group.

In order for the difference-in-difference approach to be legitimate, the treatment and control group must have comparable trends absent the law both before and after the law. However, because it is unknown what results would look like without the law test for the treatment group in the period after the law was passed, the pre-treatment years should be looked at. The control group must have had a comparable trend to the intervention group prior to the enactment of the law. If this is true, the difference-in-differences model may be used to

determine the change in outcome that occurred as a direct result of treatment. The technique eliminates biases in post-intervention period comparisons between the intervention and control groups that may be attributable to permanent differences between those groups, as well as biases in treatment group comparisons over time that may be related to trends in other determinants of the outcome.

The general regression equation is:

$$Y_{it} = \alpha + \beta_1 Post_t + \beta_2 Treat_i + \beta_3 Post_t \times Treat_i + u_i$$

$Y_{it}$ , which is the dependent variable, denotes the outcome. The unit  $i$  is equal to a country, and the time period is  $t$ . The independent variables,  $Post_t$  and  $Treat_i$ , are the dummy variables in this equation. This implies that,  $Post_t$  takes on the value of 0 before the legal change and 1 after the legal policy is implemented.  $Treat_i$  takes on the value of 0 if it is the control group being observed and 1 if it is the treatment group being observed, regardless of if it is before or after the treatment. The independent variable,  $Post_t \times Treat_i$  measures the interaction between  $Treat_i$  and  $Post_t$ . If  $i$  is in the treatment group and period  $t$  occurs after treatment is administered, then  $Post_t \times Treat_i$  takes on the value of 1, and equals 0 if not. The coefficient  $\beta_1$  measures the average difference before and after the policy change for the control group. The coefficient  $\beta_2$  measures the average difference between treatment and control groups in the pre treatment years. The coefficient  $\beta_3$  measures the difference in after-before differences between the treatment and control groups; this is known as the difference in differences estimate. This is the main estimate of interest as it accounts for time-invariant and time-specific differences. Lastly, the variable  $u_i$  is

the regression error term, which reflect other factors besides group membership, time, and the policy that might affect  $y_{it}$ .

Using this difference in differences methodology, I use Northern Ireland as my treatment group and England and Wales as my control group. My initial model is:

$$Sexviolencerate_{it} = \alpha + \beta_1 Country_i + \beta_2 Year_t + \beta_3 pre11 + \beta_4 pre10 + \beta_5 pre9 + \beta_6 pre8 + \beta_7 pre7 + \beta_8 pre6 + \beta_9 pre5 + \beta_{10} pre4 + \beta_{11} pre3 + \beta_{12} pre2 + \beta_{13} pol15 + \beta_{14} post1 + \beta_{15} post2 + u_{it}$$

The variable  $Sexviolencerate_{it}$  is defined as police recorded offense of sexual violence per 100,000 population. The  $Country_i$  variable is equal to 1 if the country is Northern Ireland and equal to 0 if it is England and Wales.  $Year_t$  is equal to 0 if it is before the policy, and it is equal to 1 after the policy. In order to make sure that there is no violation of the identifying assumption that the countries have comparable trends prior to implementation, the pre- variables should be looked at and more importantly the coefficients on these estimates should be zero. This is especially important when graphing the estimates. The  $pre$  variables occur when the  $Sexviolencerate_{it}$  is observed within a number of years before the policy changed in Northern Ireland. For example,  $pre11$  is equal to one if the country is Northern Ireland and the year is 2004, and is zero otherwise. The  $pol$  variables are equal to one when the  $Sexviolencerate_{it}$  is observed the year the policy changed in Northern Ireland, which was in 2015. Therefore,  $pol15$  is equal to one if the country is Northern Ireland and the year is 2015, and equal to zero otherwise. Lastly,  $post$  variables are equal to when the  $Sexviolencerate_{it}$  is observed within a number of years after the policy changed in Northern Ireland and zero otherwise.

Graphing the estimates for the pre, pol, and post coefficients gives a visual representation of the comparable trends between the two countries over time. If the identifying assumption holds, then the countries will have seemingly parallel trends before the policy. If there is an effect of the policy on sex violence, then there will be a shift in the line in one direction or the other. However, if there is no effect of the policy, then one would expect the lines to continue in the same parallel trend as before the policy was enacted.

Additionally, there are potential limitations to my regression analysis, one of which is heteroscedasticity. Heteroscedasticity exists when the disturbances have different variances. When this is present, then the coefficient estimate  $b$ , which is an estimator of the population, has default standard errors that are wrong. This can affect our hypothesis testing. In order to avoid this phenomenon, I use robust standard errors for all regressions.

The same model was applied to another outcome variable, trafficking rates for women. I chose this regressor to see if the policy had an effect on the number of people being trafficked. Additionally, the same model was applied to two other countries, Scotland and Ireland, in order to find the most comparable control group for Ireland. Finding a control group with a similar trend to Northern Ireland is important as it allows me to draw better conclusions about the effect of the policy. I chose these countries due to their physical proximity to Northern Ireland.

## Chapter IV: Empirical Results

I begin by showing my results from my regression using England and Wales as the control group for the following regressors: sex violence and trafficking victims. The treatment country is Northern Ireland, and the control group for the initial regression is England and Wales. Then, I show my results from my regressions that use Scotland and Ireland as a control group for sex violence as the regressor. I also present a comparison graph and a regression graph for each regression conducted

### **a) England and Wales:**

Table 1, which is shown on the next page, demonstrates the results obtained from the regression between England and Wales and Northern Ireland, using sex violence rates as the regressor. The data obtained from the UN database on sex violence rates for these countries are from the years 2004 to 2017. It is important to note the increasing coefficients starting in 2013. The regression graph and comparison graph represented in Figures 1 and 2 give a better visual representation of the significance of the estimates below.



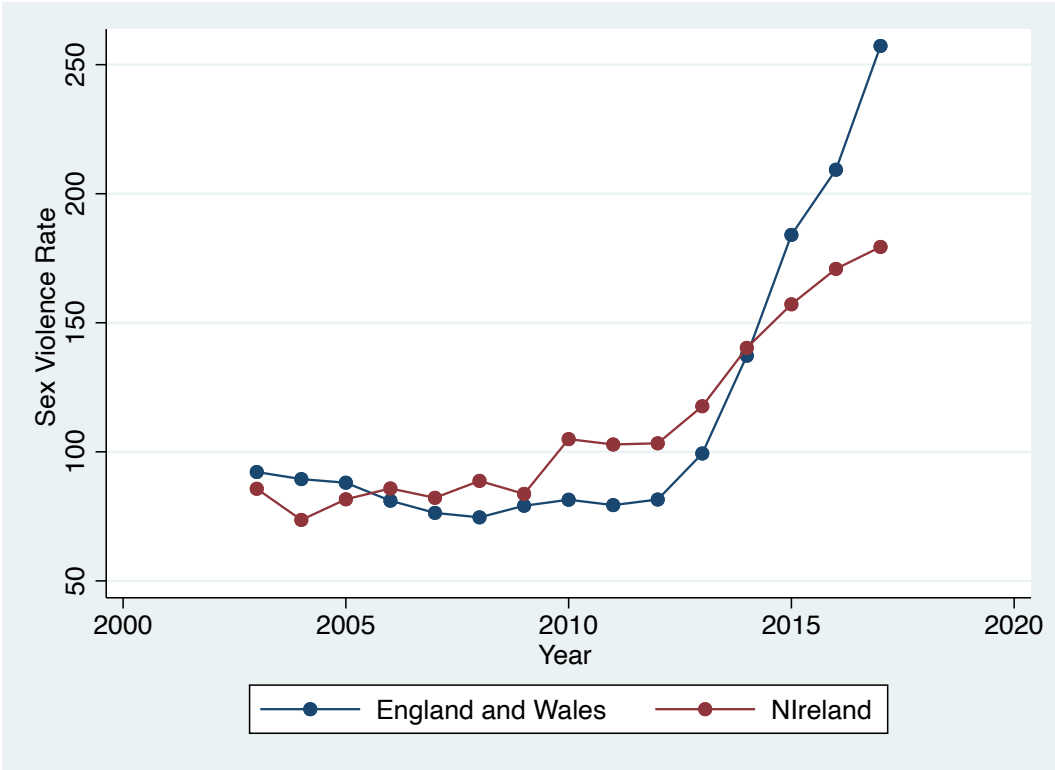
**Table 1: Sex Violence Regression Data from Northern Ireland and England and Wales**

| Linear regression |           | Number of obs    | =     | 30     |                      |
|-------------------|-----------|------------------|-------|--------|----------------------|
|                   |           | F(2, 1)          | =     | .      |                      |
|                   |           | Prob > F         | =     | .      |                      |
|                   |           | R-squared        | =     | 0.9996 |                      |
|                   |           | Root MSE         | =     | 4.7706 |                      |
| sexviolenc~e      | Coef.     | Robust Std. Err. | t     | P> t   | [95% Conf. Interval] |
| country           | -1.721424 | 13.06496         | -0.13 | 0.917  | -167.7275 164.2846   |
| year              |           |                  |       |        |                      |
| 2004              | -.3543911 | 11.31459         | -0.03 | 0.980  | -144.1199 143.4111   |
| 2005              | -1.768553 | 11.31459         | -0.16 | 0.901  | -145.534 141.9969    |
| 2006              | -8.729643 | 11.31459         | -0.77 | 0.582  | -152.4951 135.0358   |
| 2007              | -13.45666 | 11.31459         | -1.19 | 0.445  | -157.2221 130.3088   |
| 2008              | -15.17952 | 11.31459         | -1.34 | 0.408  | -158.945 128.5859    |
| 2009              | -10.6872  | 11.31459         | -0.94 | 0.518  | -154.4527 133.0783   |
| 2010              | -8.346991 | 11.31459         | -0.74 | 0.595  | -152.1125 135.4185   |
| 2011              | -10.43482 | 11.31459         | -0.92 | 0.526  | -154.2003 133.3306   |
| 2012              | -8.272764 | 11.31459         | -0.73 | 0.598  | -152.0382 135.4927   |
| 2013              | 9.555437  | 11.31459         | 0.84  | 0.554  | -134.21 153.3209     |
| 2014              | 49.8245   | 13.06496         | 3.81  | 0.163  | -116.1816 215.8306   |
| 2015              | 94.24665  | 11.31459         | 8.33  | 0.076  | -49.51881 238.0121   |
| 2016              | 119.497   | 11.31459         | 10.56 | 0.060  | -24.26842 263.2625   |
| 2017              | 167.4495  | 11.31459         | 14.80 | 0.043  | 23.68402 311.215     |
| pre11             | -14.09677 | 13.06496         | -1.08 | 0.476  | -180.1028 151.9093   |
| pre10             | -4.699909 | 13.06496         | -0.36 | 0.780  | -170.706 161.3062    |
| pre9              | 6.474812  | 13.06496         | 0.50  | 0.707  | -159.5312 172.4809   |
| pre8              | 7.572491  | 13.06496         | 0.58  | 0.666  | -158.4336 173.5786   |
| pre7              | 15.85137  | 13.06496         | 1.21  | 0.439  | -150.1547 181.8574   |
| pre6              | 6.307804  | 13.06496         | 0.48  | 0.714  | -159.6983 172.3139   |
| pre5              | 25.20916  | 13.06496         | 1.93  | 0.304  | -140.7969 191.2152   |
| pre4              | 25.20509  | 13.06496         | 1.93  | 0.304  | -140.801 191.2111    |
| pre3              | 23.50467  | 13.06496         | 1.80  | 0.323  | -142.5014 189.5107   |
| pre2              | 20.03422  | 13.06496         | 1.53  | 0.368  | -145.9718 186.0403   |
| pol2015           | -25.16536 | 13.06496         | -1.93 | 0.305  | -191.1714 140.8407   |
| post1             | -36.69641 | 13.06496         | -2.81 | 0.218  | -202.7025 129.3097   |
| post2             | -76.14254 | 13.06496         | -5.83 | 0.108  | -242.1486 89.86352   |
| _cons             | 89.79972  | 11.31459         | 7.94  | 0.080  | -53.96575 233.5652   |
| _cons             | 89.79972  | 4.131503         | 21.74 | 0.029  | 37.30399 142.2954    |

Figures 1 and 2 below graph the variables and represent the comparison and regression graphs for the regression above. Taking the information about the increase in 2013 from the data

above is important because there is a significantly sharp increase in England and Wales' trend prior to the policy enactment. This information makes it more challenging to view England and Wales as a strong control group for interpreting the effect of the policy on Northern Ireland, because the trend line for Northern Ireland is not similar prior to the enactment. Although the trends are both increasing, it is clear the rates for England and Wales are increasing at a sharper rate.

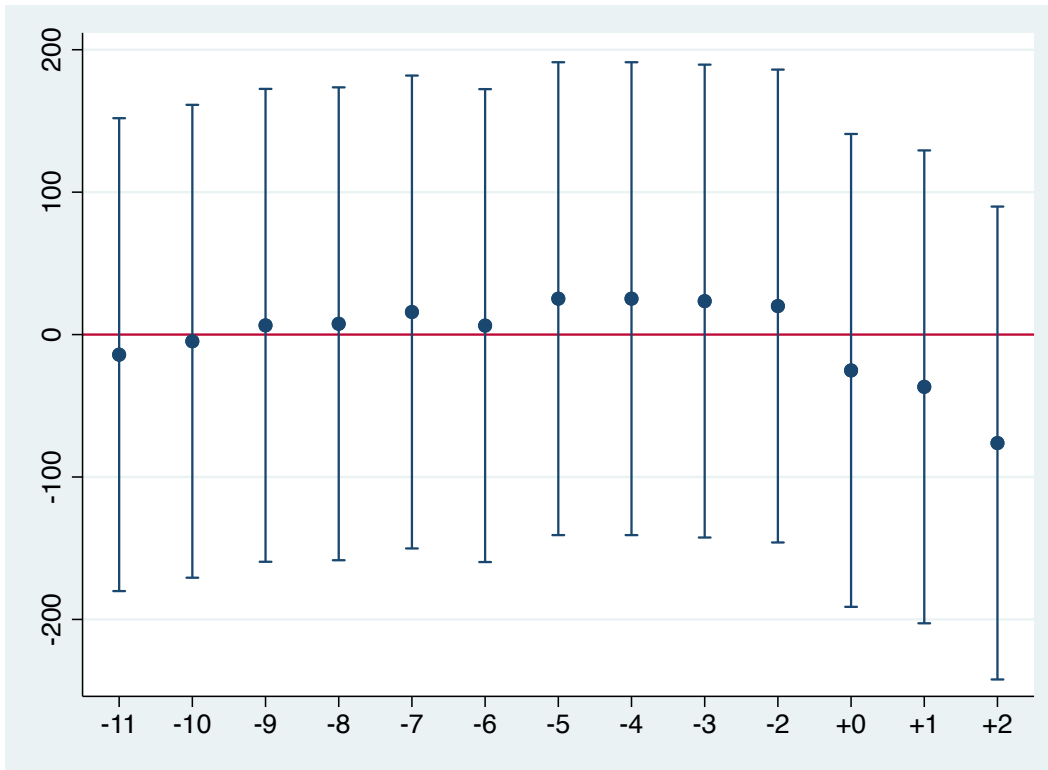
**Figure 1: Sex Violence Rate Comparison Graph for Northern Ireland and England and Wales**



In reference to Figure 2 below, the bars represent the 95% confidence interval for each year. The years are represented by the numbers in which they are before or after the policy

change. For instance, 2017 is represented by +2. It is important to note the negative trends in the coefficients that started in the year the policy was enacted.

**Figure 2: Sex Violence Rate Regression Graph for Northern Ireland and England and Wales**



Additionally, I conducted a different regression in which there was just one post variable for the years after the policy was enacted. Therefore, the *post* variables occurs when the  $Sexviolencerate_{it}$  is observed every year after the policy changed in Northern Ireland. This means that *post* is equal to one if the country is Northern Ireland and the year is 2016 or 2017, and equal to zero otherwise. This is conducted to represent the average effect of all post-

treatment years. The results for this using sex violence as the regressor and England and Wales as the control group is shown below in Table 2.

**Table 2: Sex Violence Regression Data from Northern Ireland and England and Wales using Average Post variable**

| Linear regression |           | Number of obs    | =     | 30     |                      |           |
|-------------------|-----------|------------------|-------|--------|----------------------|-----------|
|                   |           | F(16, 13)        | =     | 224.44 |                      |           |
|                   |           | Prob > F         | =     | 0.0000 |                      |           |
|                   |           | R-squared        | =     | 0.9704 |                      |           |
|                   |           | Root MSE         | =     | 11.963 |                      |           |
| -----             |           |                  |       |        |                      |           |
| sexviolenc~e      | Coef.     | Robust Std. Err. | t     | P> t   | [95% Conf. Interval] |           |
| country           | 4.909159  | 4.482586         | 1.10  | 0.293  | -4.774879            | 14.5932   |
| year              |           |                  |       |        |                      |           |
| 2004              | -7.402775 | 12.70536         | -0.58 | 0.570  | -34.85105            | 20.0455   |
| 2005              | -4.118507 | 8.633034         | -0.48 | 0.641  | -22.76904            | 14.53203  |
| 2006              | -5.492237 | 6.124015         | -0.90 | 0.386  | -18.72237            | 7.737894  |
| 2007              | -9.67041  | 6.144305         | -1.57 | 0.140  | -22.94437            | 3.603554  |
| 2008              | -7.253834 | 7.87543          | -0.92 | 0.374  | -24.26767            | 9.759998  |
| 2009              | -7.533298 | 6.125897         | -1.23 | 0.241  | -20.7675             | 5.700898  |
| 2010              | 4.257587  | 11.70739         | 0.36  | 0.722  | -21.03469            | 29.54986  |
| 2011              | 2.167725  | 11.70553         | 0.19  | 0.856  | -23.12053            | 27.45598  |
| 2012              | 3.479572  | 10.93762         | 0.32  | 0.755  | -20.14973            | 27.10887  |
| 2013              | 19.57255  | 9.450971         | 2.07  | 0.059  | -.8450334            | 39.99013  |
| 2014              | 49.8245   | 6.20439          | 8.03  | 0.000  | 36.42073             | 63.22827  |
| 2015              | 81.66397  | 18.14183         | 4.50  | 0.001  | 42.47094             | 120.857   |
| 2016              | 132.6739  | 14.52023         | 9.14  | 0.000  | 101.3048             | 164.0429  |
| 2017              | 160.9032  | 14.52023         | 11.08 | 0.000  | 129.5342             | 192.2723  |
| post              | -63.05006 | 15.63702         | -4.03 | 0.001  | -96.83178            | -29.26834 |
| _cons             | 86.48443  | 6.520733         | 13.26 | 0.000  | 72.39724             | 100.5716  |

The next table shows the results obtained regarding the effect of the policy on trafficking victim rates. The control for this regression is England and Wales. The data are collected from the years 2010 to 2016. These data, which will be better represented in graph for

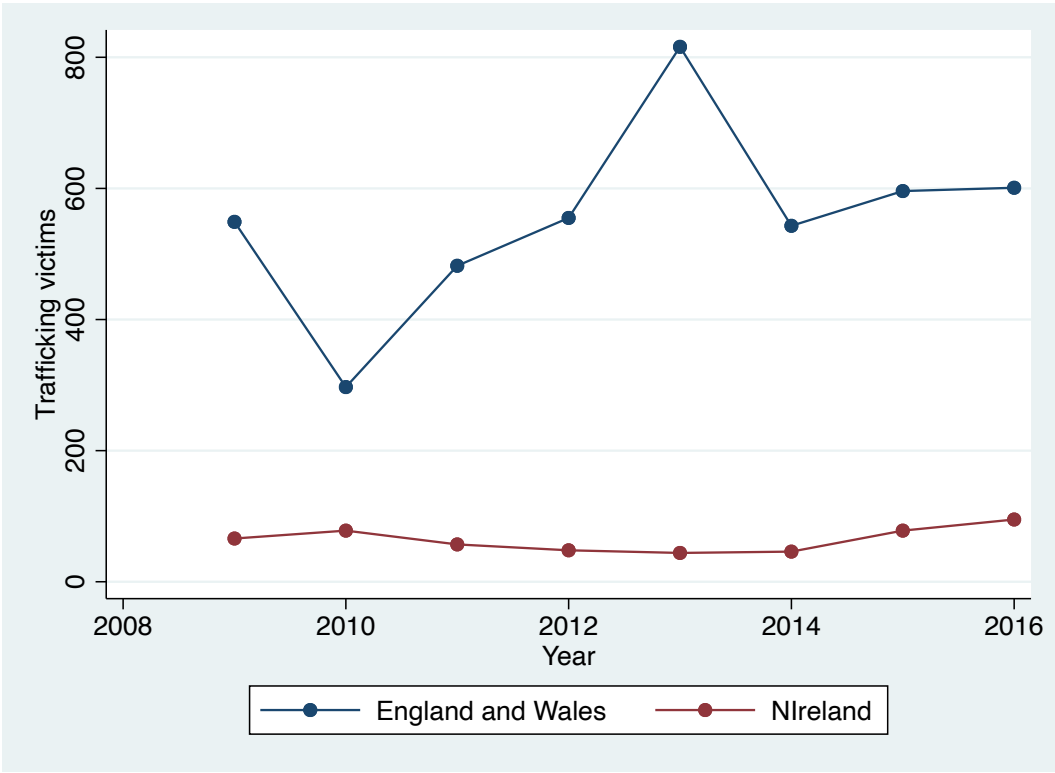
below, suggest that England and Wales are not a valid control group for Northern Ireland with regards to trafficking rates.

**Table 3: Trafficking Victim Rates Regression Data from Northern Ireland and England and Wales**

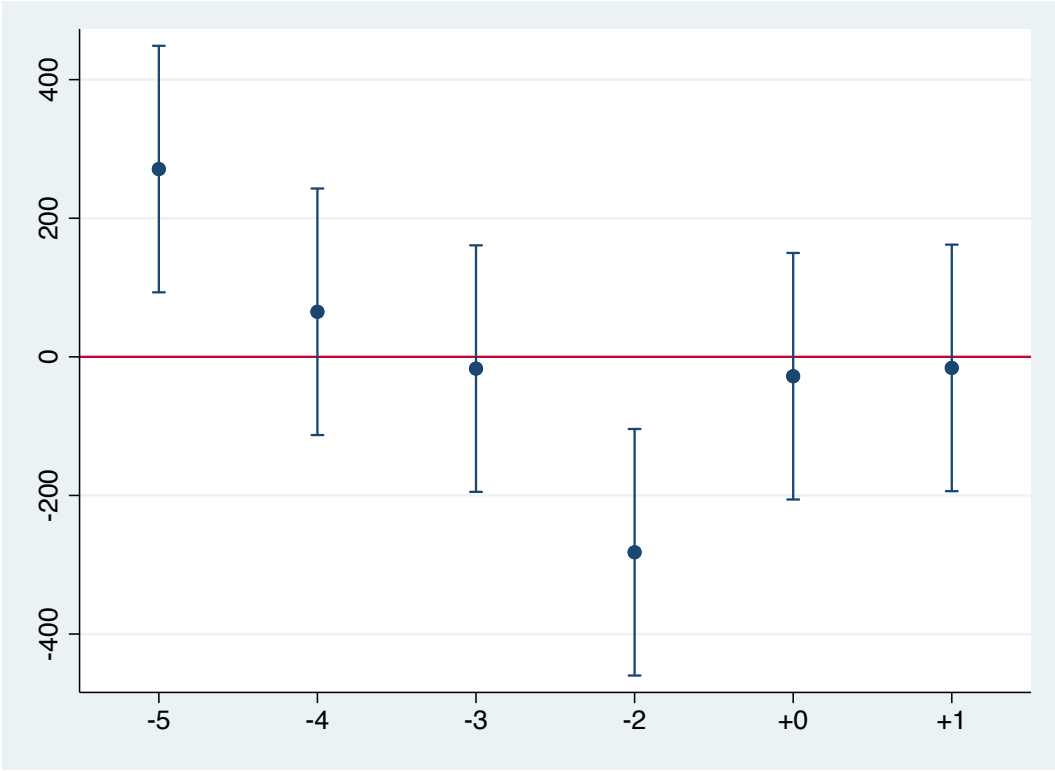
| Linear regression |        | Number of obs    | =      | 16     |                      |
|-------------------|--------|------------------|--------|--------|----------------------|
|                   |        | F(2, 1)          | =      | .      |                      |
|                   |        | Prob > F         | =      | .      |                      |
|                   |        | R-squared        | =      | 1.0000 |                      |
|                   |        | Root MSE         | =      | 7      |                      |
| trafficking       | Coef.  | Robust Std. Err. | t      | P> t   | [95% Conf. Interval] |
| country           | -490   | 14               | -35.00 | 0.018  | -667.8869 -312.1131  |
| year              |        |                  |        |        |                      |
| 2010              | -255.5 | 12.12436         | -21.07 | 0.030  | -409.5545 -101.4455  |
| 2011              | -70.5  | 12.12436         | -5.81  | 0.108  | -224.5545 83.55455   |
| 2012              | 2.5    | 12.12436         | 0.21   | 0.871  | -151.5545 156.5545   |
| 2013              | 263.5  | 12.12436         | 21.73  | 0.029  | 109.4455 417.5545    |
| 2014              | -13    | 14               | -0.93  | 0.524  | -190.8869 164.8869   |
| 2015              | 43.5   | 12.12436         | 3.59   | 0.173  | -110.5545 197.5545   |
| 2016              | 48.5   | 12.12436         | 4.00   | 0.156  | -105.5545 202.5545   |
| pre5              | 271    | 14               | 19.36  | 0.033  | 93.11313 448.8869    |
| pre4              | 65     | 14               | 4.64   | 0.135  | -112.8869 242.8869   |
| pre3              | -17    | 14               | -1.21  | 0.439  | -194.8869 160.8869   |
| pre2              | -282   | 14               | -20.14 | 0.032  | -459.8869 -104.1131  |
| pol2015           | -28    | 14               | -2.00  | 0.295  | -205.8869 149.8869   |
| post1             | -16    | 14               | -1.14  | 0.458  | -193.8869 161.8869   |
| _cons             | 552.5  | 12.12436         | 45.57  | 0.014  | 398.4455 706.5545    |

Figures 3 and 4 below represent the comparison graph and the regression graph, respectively. One can see that, in Figure 3, England and Wales' trend line is drastically different from Northern Ireland's. Northern Ireland's line stays stagnant, while England and Wales' line goes through sharp and unexplained changes, such as the drastic decrease from 2013 to 2014.

**Figure 3: Trafficking Victim Rates Comparison Graph for Northern Ireland and England and Wales**



**Figure 4: Trafficking Victim Rates Regression Graph for Northern Ireland and England and Wales**



In Figure 4, it is important to note the two confidence intervals that do not contain zero. This indicates that England and Wales may not be a valid control group for Northern Ireland, which means that the difference-in-difference estimates may be biased for the effect of the law on outcomes. This would be different if it were after the policy change, which would demonstrate there is an effect of the policy change. However, this indicates that England and Wales is not a strong control group to compare with Northern Ireland.

### **b) Scotland**

Table 4 demonstrates the results obtained from the regression using Scotland as a control group for Northern Ireland, and using sex violence rates as the dependent variable. The data obtained from the UN database on sex violence rates for this country are from the years 2005 to 2017. It is important to note the lack of statistical significance in the coefficients in both the years preceding the policy enactment as well as after. The lack of statistical significance in the differences between the outcomes during the years before the policy change demonstrates that Scotland had a comparable trend to Northern Ireland. Additionally, because the coefficients on the post-policy variables are statistically insignificant, it can be concluded that the policy had no effect on the sex violence rates in Northern Ireland. The regression graph and comparison graph represented in Figures 5 and 6 give a better visual representation of the significance of the data below.

**Table 4: Sex Violence Regression Data from Northern Ireland and Scotland**

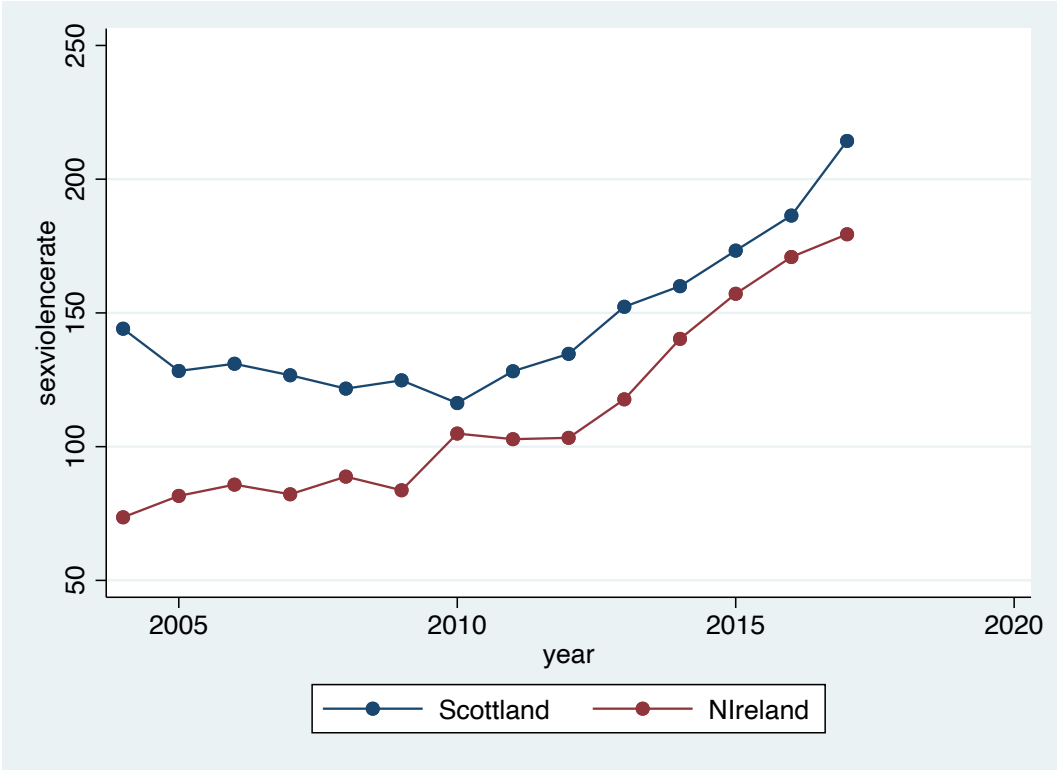
| Linear regression |           | Number of obs    | =     | 28     |                      |          |
|-------------------|-----------|------------------|-------|--------|----------------------|----------|
|                   |           | F(2, 1)          | =     | .      |                      |          |
|                   |           | Prob > F         | =     | .      |                      |          |
|                   |           | R-squared        | =     | 0.9815 |                      |          |
|                   |           | Root MSE         | =     | 25.4   |                      |          |
| -----             |           |                  |       |        |                      |          |
| sexviolenc~e      | Coef.     | Robust Std. Err. | t     | P> t   | [95% Conf. Interval] |          |
| -----             |           |                  |       |        |                      |          |
| country           | -45.1     | 67.2021          | -0.67 | 0.624  | -898.9836            | 808.7836 |
| year              |           |                  |       |        |                      |          |
| 2005              | -3.1      | 58.19872         | -0.05 | 0.966  | -742.5849            | 736.3849 |
| 2006              | -.4000034 | 58.19872         | -0.01 | 0.996  | -739.8849            | 739.0849 |
| 2007              | -4.700006 | 58.19872         | -0.08 | 0.949  | -744.1849            | 734.7849 |
| 2008              | -9.700006 | 58.19872         | -0.17 | 0.895  | -749.1849            | 729.7849 |
| 2009              | -6.6      | 58.19872         | -0.11 | 0.928  | -746.0849            | 732.8849 |
| 2010              | -15.1     | 58.19872         | -0.26 | 0.838  | -754.5849            | 724.3849 |
| 2011              | -3.200006 | 58.19872         | -0.05 | 0.965  | -742.6849            | 736.2849 |
| 2012              | 3.299994  | 58.19872         | 0.06  | 0.964  | -736.1849            | 742.7849 |
| 2013              | 20.9      | 58.19872         | 0.36  | 0.781  | -718.5849            | 760.3849 |
| 2014              | 41.3      | 67.2021          | 0.61  | 0.649  | -812.5836            | 895.1836 |
| 2015              | 41.9      | 58.19872         | 0.72  | 0.603  | -697.5849            | 781.3849 |
| 2016              | 54.99999  | 58.19872         | 0.95  | 0.518  | -684.4849            | 794.4849 |
| 2017              | 82.9      | 58.19872         | 1.42  | 0.390  | -656.5849            | 822.3849 |
| pre10             | -1.600002 | 67.2021          | -0.02 | 0.985  | -855.4836            | 852.2836 |
| pre9              | -.0999947 | 67.2021          | -0.00 | 0.999  | -853.9836            | 853.7836 |
| pre8              | .6000023  | 67.2021          | 0.01  | 0.994  | -853.2836            | 854.4836 |
| pre7              | 12.20001  | 67.2021          | 0.18  | 0.886  | -841.6836            | 866.0836 |
| pre6              | 3.999996  | 67.2021          | 0.06  | 0.962  | -849.8836            | 857.8836 |
| pre5              | 33.7      | 67.2021          | 0.50  | 0.704  | -820.1836            | 887.5836 |
| pre4              | 19.70001  | 67.2021          | 0.29  | 0.818  | -834.1836            | 873.5836 |
| pre3              | 13.70001  | 67.2021          | 0.20  | 0.872  | -840.1836            | 867.5836 |
| pre2              | 10.5      | 67.2021          | 0.16  | 0.901  | -843.3836            | 864.3836 |
| pol2015           | 28.96     | 67.2021          | 0.43  | 0.741  | -824.9236            | 882.8436 |
| post1             | 29.6      | 67.2021          | 0.44  | 0.736  | -824.2836            | 883.4836 |
| post2             | 10.19999  | 67.2021          | 0.15  | 0.904  | -843.6836            | 864.0836 |
| _cons             | 131.4     | 58.19872         | 2.26  | 0.265  | -608.0849            | 870.8849 |
| -----             |           |                  |       |        |                      |          |

Both Figures 5 and 6 represent the comparison graph and regression graph. One can see the comparable trend lines of the sex violence rates in both Scotland and Northern Ireland prior



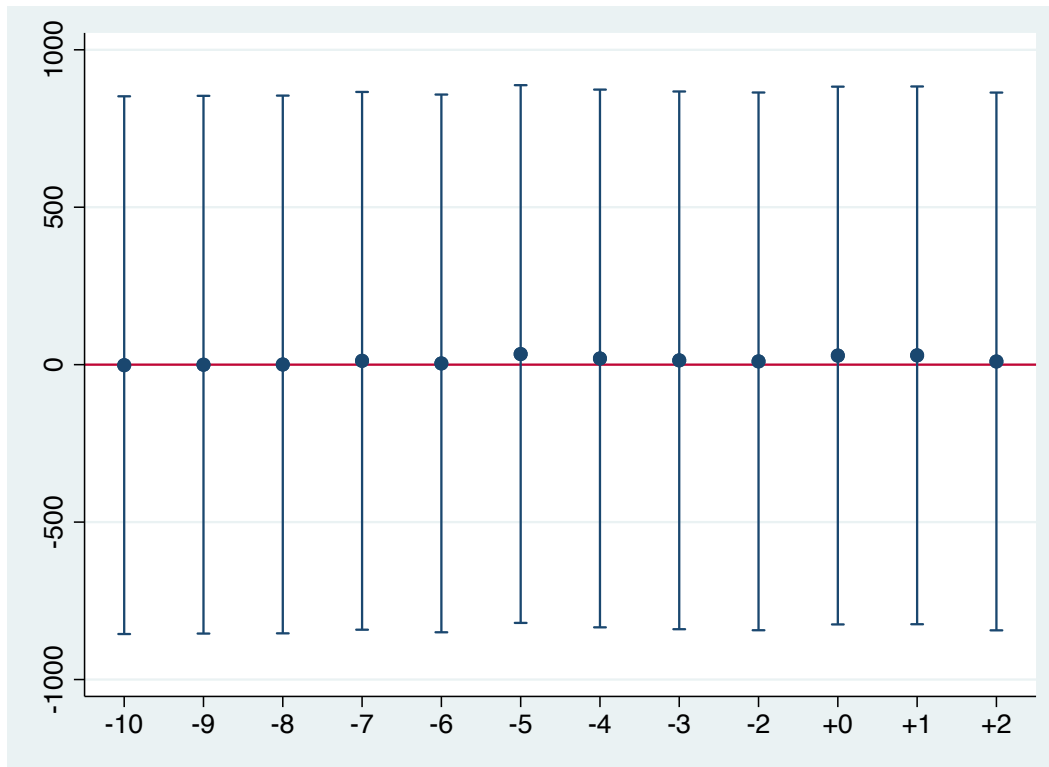
to the enactment of the policy in 2015. Specifically, starting in 2011, one can see the comparable trend of the countries that continues after the policy enactment as well.

**Figure 5: Sex Violence Rate Comparison Graph for Northern Ireland and Scotland**



Additionally, in Figure 6 below, the statistical significance of the coefficients from each year are represented visually. There is little deviation in the estimators from their confidence intervals, either prior to policy enactment or after.

**Figure 6: Sex Violence Rate Regression Graph for Northern Ireland and Scotland**



Similar to what was done for England and Wales, I conducted a different regression in which there was just one post variable for the years after the policy was enacted. I conducted this to represent the average effect of all post-treatment years. The data for this using sex violence as the regressor and Scotland as the control group is shown below in Table 5. The coefficient estimates from this regression are statistically insignificant as well.

**Table 5: Sex Violence Regression Data from Northern Ireland and Scotland using Average Post variable**

```
reg sexviolencerate country i.year post, vce(robust)
```

Linear regression

|               |   |        |
|---------------|---|--------|
| Number of obs | = | 28     |
| F(15, 12)     | = | 81.40  |
| Prob > F      | = | 0.0000 |
| R-squared     | = | 0.9559 |
| Root MSE      | = | 11.316 |

---

| sexviolenc~e | Coef.     | Robust Std. Err. | t     | P> t  | [95% Conf. Interval] |           |
|--------------|-----------|------------------|-------|-------|----------------------|-----------|
| country      | -34.96167 | 4.834703         | -7.23 | 0.000 | -45.49558            | -24.42775 |
| year         |           |                  |       |       |                      |           |
| 2005         | -3.900002 | 20.21276         | -0.19 | 0.850 | -47.93982            | 40.13982  |
| 2006         | -.4500008 | 19.9735          | -0.02 | 0.982 | -43.96852            | 43.06852  |
| 2007         | -4.400005 | 19.87217         | -0.22 | 0.828 | -47.69774            | 38.89773  |
| 2008         | -3.600002 | 19.22517         | -0.19 | 0.855 | -45.48804            | 38.28804  |
| 2009         | -4.600002 | 19.47709         | -0.24 | 0.817 | -47.03694            | 37.83693  |
| 2010         | 1.75      | 23.02795         | 0.08  | 0.941 | -48.4236             | 51.9236   |
| 2011         | 6.649998  | 19.87544         | 0.33  | 0.744 | -36.65487            | 49.95486  |
| 2012         | 10.15     | 19.28905         | 0.53  | 0.608 | -31.87722            | 52.17722  |
| 2013         | 26.15     | 19.19389         | 1.36  | 0.198 | -15.6699             | 67.96989  |
| 2014         | 41.3      | 20.88784         | 1.98  | 0.071 | -4.210697            | 86.8107   |
| 2015         | 56.38     | 21.71847         | 2.60  | 0.023 | 9.05953              | 103.7005  |
| 2016         | 64.91916  | 20.38076         | 3.19  | 0.008 | 20.5133              | 109.325   |
| 2017         | 83.11917  | 20.38076         | 4.08  | 0.002 | 38.71331             | 127.525   |
| post         | 9.761662  | 8.846482         | 1.10  | 0.291 | -9.513165            | 29.03649  |
| _cons        | 126.3308  | 19.34453         | 6.53  | 0.000 | 84.18272             | 168.4789  |

**c) Ireland:**

Table 6 demonstrates the results obtained from the regression for Ireland and Northern Ireland, using sex violence rates as the regressor. The data obtained from the UN database on sex violence rates for these countries are from the years 2005 to 2017. It is important to note the lack of statistical significance in the coefficients in both the years preceding the policy enactment as well as after. The lack of statistical significance in the years prior demonstrate that Ireland has a comparable trend to Northern Ireland. Additionally, because there is no statistical significance of the differences in outcomes after the policy enactment, the results suggest that the policy had no

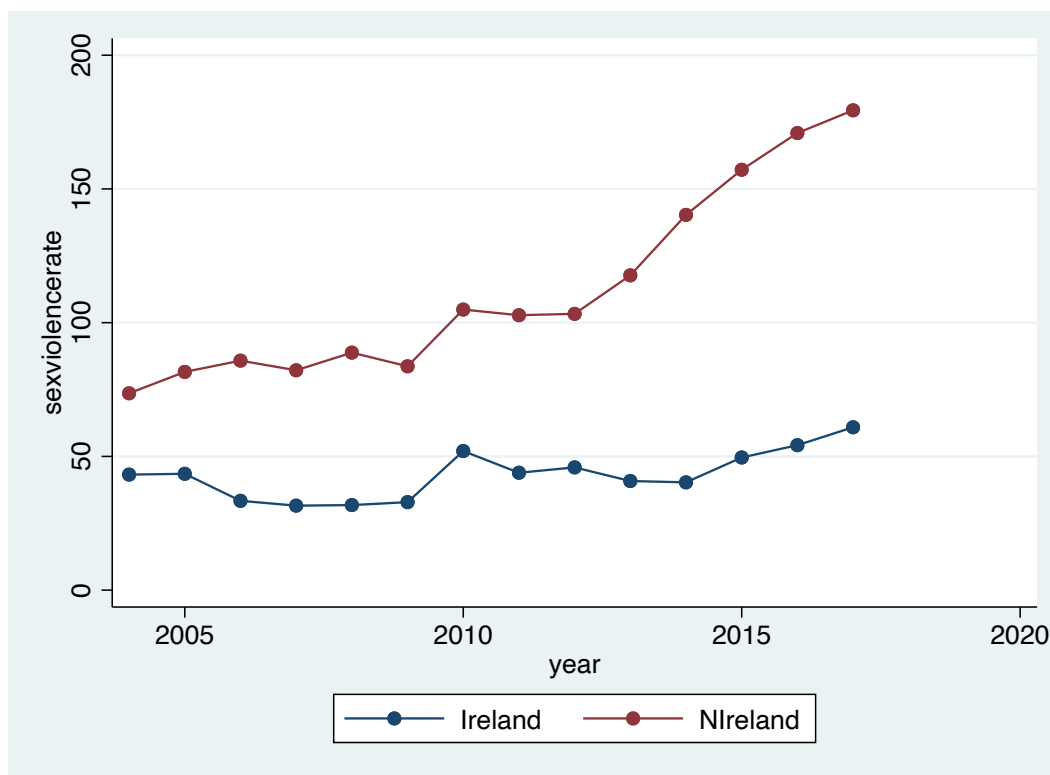
effect on the sex violence rates in Northern Ireland. The regression graph and comparison graph represented in Figures 7 and 8 give a better visual representation of the significance of the data below.

**Table 6: Sex Violence Regression Data from Northern Ireland and Ireland**

| Linear regression |           | Number of obs    | =     | 28     |                      |          |
|-------------------|-----------|------------------|-------|--------|----------------------|----------|
|                   |           | F(2, 1)          | =     | .      |                      |          |
|                   |           | Prob > F         | =     | .      |                      |          |
|                   |           | R-squared        | =     | 0.9762 |                      |          |
|                   |           | Root MSE         | =     | 34.8   |                      |          |
| sexviolenc~e      | Coef.     | Robust Std. Err. | t     | P> t   | [95% Conf. Interval] |          |
| country           | 65.2      | 92.07215         | 0.71  | 0.608  | -1104.688            | 1235.088 |
| year              |           |                  |       |        |                      |          |
| 2005              | 17.7      | 79.73682         | 0.22  | 0.861  | -995.4524            | 1030.852 |
| 2006              | 7.600002  | 79.73682         | 0.10  | 0.940  | -1005.552            | 1020.752 |
| 2007              | 5.800001  | 79.73682         | 0.07  | 0.954  | -1007.352            | 1018.952 |
| 2008              | 6         | 79.73682         | 0.08  | 0.952  | -1007.152            | 1019.152 |
| 2009              | 7.100002  | 79.73682         | 0.09  | 0.943  | -1006.052            | 1020.252 |
| 2010              | 26.2      | 79.73682         | 0.33  | 0.798  | -986.9524            | 1039.352 |
| 2011              | 18.1      | 79.73682         | 0.23  | 0.858  | -995.0524            | 1031.252 |
| 2012              | 20.1      | 79.73682         | 0.25  | 0.843  | -993.0524            | 1033.252 |
| 2013              | 15        | 79.73682         | 0.19  | 0.882  | -998.1524            | 1028.152 |
| 2014              | 31.9      | 92.07215         | 0.35  | 0.788  | -1137.988            | 1201.788 |
| 2015              | 23.8      | 79.73682         | 0.30  | 0.815  | -989.3524            | 1036.952 |
| 2016              | 28.4      | 79.73682         | 0.36  | 0.782  | -984.7524            | 1041.552 |
| 2017              | 35.1      | 79.73682         | 0.44  | 0.736  | -978.0524            | 1048.252 |
| pre10             | -27.1     | 92.07215         | -0.29 | 0.818  | -1196.988            | 1142.788 |
| pre9              | -12.8     | 92.07215         | -0.14 | 0.912  | -1182.688            | 1157.088 |
| pre8              | -14.6     | 92.07215         | -0.16 | 0.900  | -1184.488            | 1155.288 |
| pre7              | -8.199997 | 92.07215         | -0.09 | 0.943  | -1178.088            | 1161.688 |
| pre6              | -14.40001 | 92.07215         | -0.16 | 0.901  | -1184.288            | 1155.488 |
| pre5              | -12.3     | 92.07215         | -0.13 | 0.915  | -1182.188            | 1157.588 |
| pre4              | -6.299999 | 92.07215         | -0.07 | 0.957  | -1176.188            | 1163.588 |
| pre3              | -7.799999 | 92.07215         | -0.08 | 0.946  | -1177.688            | 1162.088 |
| pre2              | 11.7      | 92.07215         | 0.13  | 0.920  | -1158.188            | 1181.588 |
| pol2015           | 42.36     | 92.07215         | 0.46  | 0.725  | -1127.528            | 1212.248 |
| post1             | 51.49999  | 92.07215         | 0.56  | 0.675  | -1118.388            | 1221.388 |
| post2             | 53.29999  | 92.07215         | 0.58  | 0.666  | -1116.588            | 1223.188 |
| _cons             | 25.8      | 79.73682         | 0.32  | 0.801  | -987.3524            | 1038.952 |

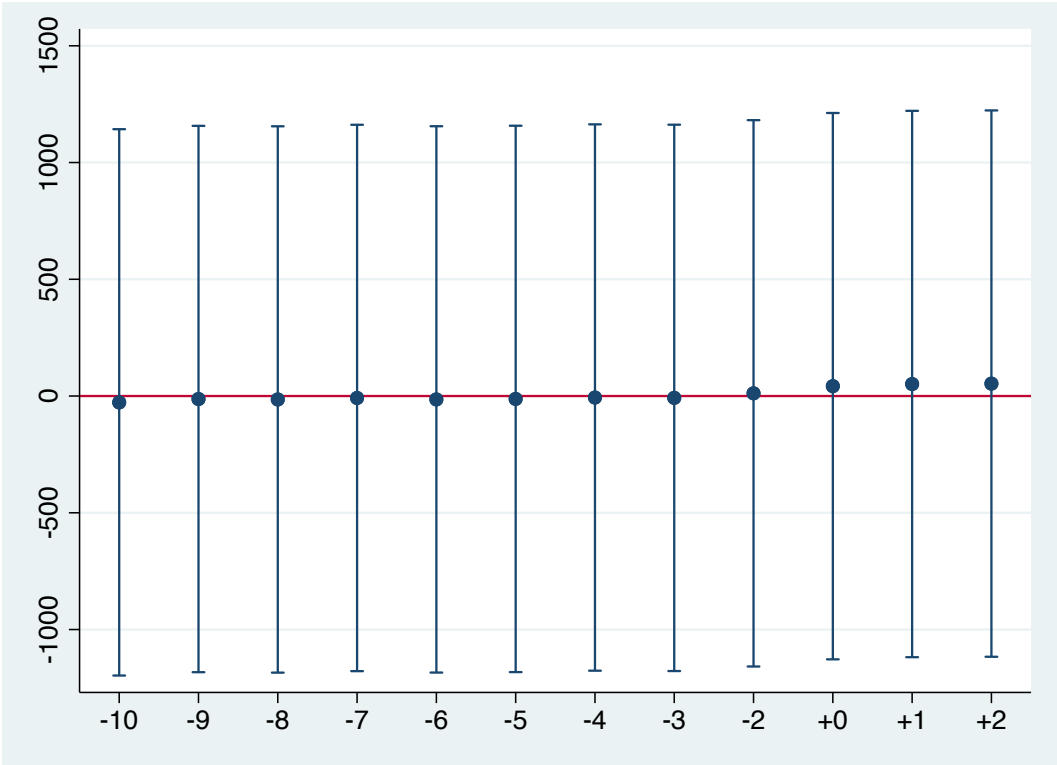
Both Figures 7 and 8 below represent the comparison graph and the regression graph. One can see the comparable trend lines for sex violence rates in both Ireland and Northern Ireland prior to the enactment of the policy in 2015. Unlike Scotland, Northern Ireland seems to be having a bit more of an increase in its sex violence rates than Ireland is.

**Figure 7: Sex Violence Rate Comparison Graph for Northern Ireland and Ireland**



However, as figure 8 shows, the differences between the two countries are not statistically significant. Therefore, it is indicated that Ireland is a strong control group. Additionally, there is no evidence of a statistically significant difference after the policy, which indicates no effect.

Figure 8: Sex Violence Rate Regression Graph for Northern Ireland and Ireland



## Chapter V: Discussion of Results

The results for the regressions are particularly interesting, as I had an expectation that there was going to be a decrease in sexual violence in Northern Ireland. However, the evidence demonstrates first that there was no statistical significance in the results, and second that there was no change in Northern Ireland's sex violence rates after the enactment of the policy. This can be seen mainly through the regression results for using Scotland and Ireland as the control groups, as they had a more comparable trend to Northern Ireland prior to the policy change.

The regression I conducted for England and Wales was the first I conducted. When I initially viewed the results, I saw that there was a sharp increase in the sex violence rates for England and Wales. The data could have been taken in the direction that the policy helped deter Northern Ireland from having such a sharp increase in sex violence rates as England and Wales. However, because the increase started before the policy for England and Wales and not at such a rate for Northern Ireland, it is difficult to make that claim.

The regression using England and Wales as the control for the dependent variable, trafficking rates, also did not show convincing results, as the statistics for the two counties were not comparable. The trend lines for the two groups were drastically different in the years before the policy was enacted. Therefore, because there was a statistical significance in the difference in outcomes pre-policy, the control group could not be used as an accurate comparison for Northern Ireland.

Taking both regressions for England and Wales into consideration, I came to the conclusion that it was not a good control group for Northern Ireland. Because of this, I sought a better control group for Northern Ireland in order to make a more convincing claim regarding the

true effect of the policy. Keeping proximity in mind, in order to find a strong comparison for Northern Ireland, I chose to use Scotland and Ireland.

As such, Scotland was the strongest comparison group for Northern Ireland as their pre-policy trends were similar. The lack of statistical significance in the differences between the outcomes in these countries, both before and after the policy change, is convincing in making the claim that the policy did not have an effect on the sex violence rates. The lack of statistical significance described in Chapter IV for both the pre and post periods demonstrates two important facts. First, the outcomes demonstrate that Scotland is a strong control group for Northern Ireland and second that the policy had no effect on the sex violence rates in Northern Ireland.

Ireland was similar to Scotland in having a trend that was closely comparable to Northern Ireland. It is important to note that Northern Ireland had more of an increasing rate of sex violence than Ireland did. This is highlighted in Figure 7. However, this was much less pronounced than the increase seen in the regression using England and Wales as the control group. As can be seen in Figure 8, the outcomes for Ireland are not statistically significantly different from those of Northern Ireland. The lack of statistical significance in the years prior to the policy change is important in classifying Ireland as a strong control group similar to that of Scotland. The estimates added extra confirmation to the claim that the policy had no effect on the sex violence rates.

In conclusion, using all of the results I obtained from the multiple difference in differences regression, I have found statistical evidence that the policy had seemingly little to no effect on sex violence rates in Northern Ireland. This claim can be made because of the lack of



statistical significance in the regressions using Scotland and Ireland as a control group for Northern Ireland. There is a chance that this policy had an impact on other factors; however, this study shows that the policy had no effect on reducing sex violence in Northern Ireland.

One key implication of this study is that sex violence is still an unresolved issue in the prostitution industry. From an economic standpoint, this law is meant to diminish the demand for and supply of prostitutes. I anticipated these interactions to be minimized because prostitution is a precursor to sex violence. However, people continue to be involved in these unwanted sexual interactions. This poses a challenge for regulators as it indicates that this regulation is ineffective at reducing sex violence rates. As a result, regulators in Northern Ireland should investigate an alternate kind of regulation to lower sex violence rates.

It is imperative to note that further studies may be conducted to determine the efficacy of the Nordic model. Further regressions may be conducted to assess the impact of the policy on other outcomes, such as rape, sexually transmitted diseases, and online sex services. The influence on alternative outcomes might imply that this regulation has a favorable impact on protecting these workers from the negative impacts of prostitution. As a result, this study might be advantageous. It would also be interesting to look at alternative countries that have adopted the Nordic model to determine if their sex violence rates have altered. If the results were comparable to those found in this body of research, it would provide more evidence that this model had no influence on sex violence rates. Lastly, other prostitution regulations could be researched to find out which approach regulators should adopt in order to minimize the sexual violence that occurs in their country. Further research directions as described might be extremely

valuable in determining the optimal strategy for prostitution legislation in order to appropriately safeguard people participating in the frequently violent profession.

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