Violence in the Household: A Multidisciplinary and Multicultural Analysis of the Effect of Violence on Divorce Rates from 1980-2013

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This paper primarily explores the relation between violence and divorce in the United States and in the U.K. from 1980-2013. In either country, the issue of violence, whether within the family or elsewhere, is prominent both within thousands of households and within society. By analyzing these issues, and the relation between them. We determine the impact that violence and divorce play from the point of view of individuals, communities, and nations. We further explore theoretical causes of divorce through cost-benefit analysis to determine relevant policy actions that could be employed for the purpose of reducing divorce through a reduction of violence. Using panel data from FRED, the World Bank, the FBI UCS Annual Crime Reports, NISRA, CSEW, and OECD, we determine that when violence rates double, divorce rates increase by approximately 50%. The research concludes by discussing the research needs as well as future issues in the study of the relation between violence and divorce rates.

I. Introduction

While it is true that the United States and the United Kingdom have erased the stigma that once prevailed concerning divorce, its effects continue to affect millions of men, women, and children every day (Fagin & Rector, 2000). Social scientists who track the multigenerational effect of divorce are continually concluding that divorce hurts society, and devastates the lives of children and the lives of their parents. The effect of divorce in society is evident within areas including education, family life, job stability, income potential, physical and emotional health, drug use, and crime (Fagan & Rector, 2000). In some cases, divorce can also lead to heightened levels of anxiety, depression, anger, rejection, and even suicide (Strohschein, 2005).

In this paper, we consider the individual and socioeconomic effects of violence and divorce in the U.S. and in the U.K. Specifically, we focus on the interrelations that exist between violence and divorce in order to gain a clearer understanding of one of the several ways in which divorce is impacted. We do so by analyzing data from FRED, the World Bank,

FBI UCS Annual Crime Reports, NISRA, the Office for National Statistics and OECD. We analyze these data and theories to propose policies that may be enacted in order to protect women, children, and the family in general. Such policies may be used to decrease the rate of not only divorces, but the need for divorce by fostering protection and safety within the household.

One of the several upsides of this data set is that we are able to use panel data from 1980-2013 and fixed effects estimates to determine the effect that violence has on divorce. This study contrasts from previous studies in that we compare two similar regions, the U.S. and the U.K., both of which are developed countries and English-speaking countries with similar cultures. We further the analysis of this research by incorporating insights from sociology and analyzing related laws to create a more comprehensive assessment of the nature of this phenomenon.

We will also consider, as a supplement, other causes of divorce, such as alcohol usage and unemployment, among others. Hence, this scope of this paper is to shed new light to the specific causes of divorce that effect both the U.S. and the U.K., and then summarize that knowledge to produce a working framework based off of the behavioral economics-based models and explanations. The following questions will be determined using a deductive research approach using concepts the aforementioned disciplines in both a quantitative and qualitative manner:

- What are the effects of divorce in the U.S. and in the U.K.?
- What is the relation between violence and divorce?
- What policies can and should be introduced to lower the effects of violence in either country?

In attempt to answer these posed questions, we will analyze and incorporate the research performed by several well-known experts including Bowlus and Seitz (2006), Fagan and

Rector (2000), and O'Brien (1971). This analyzation will comprise Section II. In Section III, we will more fully explain the research, interpret the primary coefficients and determine their connotations. In Section IV, we will lay out the related theory, and Section V will conclude with implications and additional limitations of the study. First, however, it is crucial that we define the relevant variables by explaining the method by which the measurements were captured.

Interpretation and Assumptions of Relevant Data

The data used in this research comprises of data collected from various and legitimate sources, often from government organizations. However, in cases where the methods used to measure certain data differ, it is possible that there result slightly biased estimations. Certain other restrictions and limitations exist which will be explored in this section.

Our dependent variable, divorce, has two measures in the research for both the U.S. and the U.K. First, as per norm in journals and censuses, we use divorce per thousand in the population. This measure is used primarily in Figure 1 to allow for visible disparities between the U.S. and U.K. divorce rate. It is calculated by the following equation:

$$Divorce_{pt} = \frac{Number\ of\ Divorces\ in\ time\ t}{Population\ in\ time\ t} \times 1000 \qquad \textbf{(I)}$$

We also use a similar formula for violence rates for the same reasons. The second measure of divorce is simply the natural log of divorce at time t. This is the main measure of divorce throughout the paper and is used strictly to provide a simpler interpretation of the coefficients found within the regressions. In either case and in either nation, a prominent assumption within the data is that the couples married and divorced each other in the country where they normally live. This assumption will affect the true percentages. For example, couples who live in the U.K., but divorce abroad are not included in the divorce figures but may be included in the marriage figures, which could leave to under-estimation of the proportion of marriages ending in divorce.

Our primary independent variable, violence, reflects the number of occurrences of violence that occur. Unfortunately, what constitutes violence and how it is reported differs between the U.S. and the U.K. In the United States. According to the FBI USC Annual Crime Reports (U.S.), violent crime categories include "murder and non-negligent manslaughter, legacy rape, revised rape, robbery, and aggravated assault." In the U.K., and according to CSEW and the Office for National Statistics, violent crime categories include measures involving wounding and assault, such as homicide, violence with injury, and violence without injury. Hence, a limitation of this study is that the definitions of violence slightly vary between the U.S. and the U.K. However, it is believed that the differences in measurement do not nullify the arguments made in this research, as the effects remain significant and robust, as will be revealed in Section III.

Tobacco rates and alcohol rates are among the population of ages 15 and older and are calculated by the OECD. Hence, this measure is directly comparable between the U.S. and the U.K. All other variables, including unemployment and recession rates are collected and calculated in a straightforward and definitional manner. For example, unemployment is calculated by the common formula $Unemployment\ Rate = \frac{no.\ of\ employed\ persons}{Labour\ Force}$. Further explanations of variables included within the regression may be found beneath the regression table in Figure 3. We now proceed by analyzing articles and laws which concern the relation between divorce and crime in order to determine the impacts and determinants of divorce.

II. Literature Review

Bowlus and Seitz (2006) consider the relation between domestic violence and divorce, especially for women who stand as the target and her husband as the initiator of violence. They further examine the endogeneity that exists between domestic violence, unemployment, and divorce. Using data from the 1993 Violence Against Women Survey (VAWS), they

suggest that employment before abuse occurs is a significant deterrent and that for men, witnessing violence as a child is a strong predictor of abusive behavior. They determine that abused women are 1.7-5.7 times more likely to divorce, depending in part upon the employment, age, and education of the woman. They also determine that abuse itself is linked to factors such as age, if they have a child, and the level of attained education. However, domestic violence mostly seems to come as a result of the upbringing of the males. That is, if a male is raised in a violent or otherwise unsuitable home, then it becomes more likely for that man to commit violent acts against his wife. Bowlus and Seitz (2006) further determine that women's employment decisions have a "causal effect on abuse, as working women are less likely to be abused by their spouses" (2006). This effect is especially strong for women under the age of 45.

The study by by John E. O'Brien (1971) comprised of 150 interviewed individuals who were recently involved in a divorce action. The incidence of reported intrafamily violence was fifteen percent, which violence was mainly initiated by the husbands who were "characteristically underachievers in the work/earner role and who were deficient status characteristics relative to their wives." According to O'Brien (1971), such deficiencies in the stereotypical husband role were taken as evidence that violence in the family may have arisen partially due to the husband's interpretation of the position as a form of "status inconsistency." Such violence generally included coercive force by members of a superordinate status during these times of inferiority. These findings are also congruent with the research by M.P. Johnson (2001).

Hence, two prominent reasons that lead to violence and abuse are first, the situation in which the husband was raised and second, his satisfaction or achievement with work, income, and schooling attainment. It is likely that there is a degree of causation, which would coincide with the neoclassical theory of intergenerational mobility, in which a male's upbringing

affects the amount of education and then the type of job and wage he receives. Then if there is, in fact, a direct causation between the employment status achieved by the man and the probability that he will engage in violent acts in the household, then certain policies should be enacted which strengthen the probability that the man is raised in such a home. Such policy actions will be discussed further in Section V. However, it is important to realize that abusive actions in the household may continue for several generations.

We must also consider the effect of mental illness on abuse. As stated in a report by the Consensus Project (2005), individuals with mental illness are 24 times more likely to be victims of rape, 9 times more likely to be victims of violent crimes. They are also about 7 times more likely to be victims of any crimes, compared to individuals in the general population. Hence, it is also possible that a portion of the men who abuse their wives have mental illness or are otherwise psychologically affected, which may explain a portion of the relation between violence and divorce. The degree to which this occurs, however, is beyond the scope of this research.

We now briefly analyze current laws in the U.S. and in the U.K. which may decrease the amount of violence within the household as well as the impact that certain divorce and marriage laws have had on divorce rates.

Analysis of Laws Pertaining to Domestic Violence and Divorce

Within the United States, divorce is governed by the laws of the individual states in which it occurs. While a discussion of each law within each state is beyond the scope of this paper, there are basic laws within each state that occur. For example, each state allows for a “no fault” divorce, which allows people to seek a divorce without the consent of their spouse, a contrast to previous laws which required a reason for the dissolution of the marriage by

assigning fault to one of the parties for acts such as adultery, abandonment, insanity, or imprisonment.

In Wolfer's 2006 analysis of unilateral and no-fault divorce law, he employs an interrupted time series model to determine the effects of unilateral divorce rates on divorce rates. His findings suggest that these laws did increase the divorce rates. However, controlling for pre-existing trends, the law itself only affected divorce rates for about ten years following the introduction of the law in the 1970's. It may, however, been a catalyst for other laws to be invoked or for certain social norms to either change or continue to change.

As far as the distribution of assets after divorce, there exist two basic schemes in the U.S. which are employed. In the community property scheme, the husband and wife equally own all money earned by either one of them from the beginning of the marriage to the divorce. In the equitable distribution scheme, the accumulated assets and earnings are divided fairly, but not necessarily equally.

Perhaps a more relevant class of law pertaining to divorce in this research would those which involve children, states have a significant public interest in insuring that the children are adequately provided for. If children are, in fact, well provided for and in good custody after the divorce (assuming it was a fault-type divorce), and if this divorce occurs very early on in the child's development, then it seems reasonable to suggest that the child would have a decreased probability of participating in domestic violence compared to a similar child who continued to live in the abusive household.

Divorce in England and Wales is permissible on the ground that marriage has irretrievably broken down. According to the Matrimonial Causes Act of 1973, marriage may be found to have irretrievably broken down if one of the following is established: adultery, unreasonable behavior, desertion for a period of two years, and separation with agreed divorce (two years)

or contested divorce (five years). Further, a divorce in England or Wales is only possible for marriages of more than one year. It may be subject to debate, but from an objective standpoint, it seems that the laws in England and Wales are more closely related to the at-fault divorce laws that occurred before the 1970s in that there must be a specific reason for the divorce.

Regardless, in both the U.S. and the U.K., there are continuous changes in social norms. As society and cultural norms changes ever so rapidly, certain laws have come into existence both within the U.S. and the U.K. which may increase the divorce rates, such as did the no-fault and unilateral divorce laws explored earlier. Similar laws have made divorces more accessible, cheaper, and give men and women equal rights in filing. Further, the changes in society and norms themselves, including the changing role of women, rising expectations of women, growing secularization, social attitudes, reduced functions of the family, and increased life expectancy, may also be a factor of increasing rates of divorce in both countries.

In several circumstances, raising the divorce rate may actually prove beneficial to society and the affected families. For instance, they allow for couples who find themselves in difficult or abusive relationships to not only allow the wife to escape from her husband, but also provide another chance for the children to grow and receive proper education and jobs which would allow them to live a more fulfilling life. However, it is also debated that many laws which allow for a reduced cost (both socially and monetarily) in divorce might induce marriage without much consideration of the situation into which the husband and wife are entering.

According to the World Bank, although unilateral divorce leads to a larger number of divorces in the short term, it is likely to lead to better-quality marriages in the long term.

Further, the legalization of divorce leads to increases in the labor force participation among married women. However, the law requires splitting marital assets equally between spouses, such as is the case with the community property scheme, allowing unilateral divorce may lead to worse long-term child outcomes, such as a lower level of educational attainment and adult income. Unilateral divorce may also increase the incidence of criminal behaviors among children born slightly before and therefore are affected by the change in divorce law. Unilateral divorce is further associated with lower rates of domestic violence and female suicide. However, unilateral divorce also leads to lower fertility and other marriage-specific investments (Gonzalez, 2014).

While there is undoubtedly more debate to be had regarding the advantages, disadvantages, and intricacies pertaining to divorce laws in the U.S. and the U.K., it is clear that law does play a part in determining the effect that violence, and especially domestic violence has on divorce; that is, laws may make it easier or more difficult for a couple to escape or enter an abusive relationship. Therefore, laws and social norms, in addition to the raising and education and wages of the husband, may account for the disparities between the divorce rates in the U.S. and the U.K.

III. Model and Estimation

In this section, we present a simple model that describes the choices that women make when determining the choice to make regarding divorce in various circumstances. It is assumed in this framework, for purposes of simplification, that the woman has already entered into marriage, and that it has become an abusive marriage with the husband as the abuser and the wife as the target. While men may be the initiators of divorce and women the abusers, our mode will be based on scenario in which men are the abusers and women are the targets and initiators of divorce. This model will analyze the probability of the women

deciding to divorce via functions of past and present frequencies of abuse and other related factors.

When a woman faces a situation in which she is abused by her husband, two primary options exist: either the woman can continue with the marriage, or she can appeal for divorce. The utility obtained from either option is partially a function of the direct consequences of divorce as viewed by the econometrician. Such factors may include custody of the children, the amount of money or property rights received from the divorce, the time involved with filing the divorce and healing from the relationship, the seriousness of violence involved, and perhaps the number of previous spouses the woman had.

However, there exist additional personal costs which are not easily viewed by the econometrician, including emotional attachment or risk in leaving and the uncertainty regarding future events after the divorce. She may also be subject to the status-quo bias in that she is biased towards the current state of affairs, which would intensify the cost associated with divorce (Kahneman et al. 1991). It may also be possible that the wife is subject to the sunk cost fallacy, in which she will also consider the time, energy, and resources it took to create the life she has now. Hence, the individual will need to consider a cost-benefit analysis in order to determine whether or not divorce would be the correct option given the circumstances. In these situations, the analysis is straightforward.

However, in areas in which there are no laws which permit for unilateral divorce, it becomes more challenging to determine the correct solution, or in some circumstances, to make a decision based solely on the preferences of one partner. Such a circumstance may arise if the abuser receives a positive utility from engaging in violent behaviors. In these situations, it is common for the target to claim an at-fault divorce. However, this poses an additional cost to the target. Such a cost may include attempts to prove the acts committed by

the initiator or simply the time required to complete such a process. Depending on the law and the level of severity of abuse, this may alter the decision of the wife to continue with the divorce, and hence, law may pose an indirect effect on the short-term utility achieved by the wife, and may, in such circumstances, induce violence to remain in the household. Hence, a basic cost-benefit analysis could occur as follows:

From the perspective of the abuser, there are two choices which are available: he may choose to abuse or not to abuse his spouse. Such decisions are, in part, a function of the situation the husband was raised, the personal values and intrinsic qualities of the husband, the employment decisions of him and his wife, the household income and proportion of the household income received by the male, divorce laws, and all other measurable and immeasurable variables which may affect the husband's decision to engage in domestic violence.

In this framework, it is evident that the primary decisions made by the husband and wife are inherently different. In this scenario, while the husband can clearly choose whether or not to divorce the woman, his decision in this model is whether or not to abuse his wife. On the other hand, his wife's main decision is to determine whether or not to divorce. In the unilateral case, which is a more relevant and simplistic framework, we have that the woman's decision to divorce, which becomes a function of not only the severity of abuse she receives, but also a function of the probability that her husband will abuse her.

Our first model is used to estimate the probability of the divorce given several key variables. We begin the estimation process by determining the average number of times the wife was abused from the time of marriage, t_m, to the time of the wife's consideration of divorce, t_d. In this model, we assume that the husband is the only abuser of the wife that causes consideration of divorce. Hence, $abuses_w$ is equal to the number of times that the

husband abused the wife during their marriage. We model the average number of incidents by the following equation: $\frac{1}{t_d - t_m} \times \sum_{t_m}^{t_d} abuses_w$.

We now attempt to analyze the probability that the wife is abused. We first consider the gender wage gap, which has been found in previous studies to affect the probability of domestic violence (Azier, 2010; O'Brien,, 1971). We measure this difference by dividing the wage the wife receives in the household at time of consideration, denoted as $wage_{wd}$, by the wage the man receives in the household at that time, $wage_{dt}$. We measure this gap, then, by use of the following formula: $\frac{wage_{wd}}{wage_{md}}$, which is calculated as a decimal.

Studies show that the level of abuse evident in the household while the male is in adolescence is strongly and positively correlated with the probability that the male will abuse his wife (Bowlus and Seitz, 2006). Hence, we multiply the difference in wages between the partners by the average number of times the husband was abused from the time of his birth, t_0, to the time he left the house, t_h.

After considering wage differentials and the average number of times per year the husband was abused in his childhood, we are able to consider the value of g_m, which estimates the effect that these factors have on a particular man's action to abuse his wife. Hence, as the value of g increases, so does the probability that the man will abuse the woman at any point during marriage. We add the term α_h to indicate additional effects that would cause the man to be in a similar state. We also add the error term ε_i to account for other factors which affect the probability of divorce, and therefore the divorce rate, and the time of consideration. In this model, the wife will choose to divorce the man only if the values sum to more than 50%, or 0.5. Such factors are described in further detail in Equation III.

Hence, the decision to divorce can be modeled as follows:

$$Divorce = \begin{cases} 1 & \text{if } f_w\left(\frac{1}{t_h - t_0} \times \sum_{t_m}^{t_d} abuses_w\right) \times [1 + pr(abuses_w)] + h(\varepsilon_{id}) > 0.5 \\ & \text{where } pr(abuses_w) \approx g_m\left(\frac{wage_{wd}}{wage_{md}}, \frac{1}{t_h - t_0} \times \sum_{t_0}^{t_h} abuses_m, \alpha_h\right) \\ 0 & \text{otherwise} \end{cases}$$

where a value of 1 suggests that the woman will seek divorce and 0 suggesting she will not.

Two numerical examples of this model is as follows. First, assume that no abuse has arisen in the household. In this case, the probability of divorce is proportional only to the value of ε_i. Note that this is the case regardless of the level of abuse in the man's household while in the presence of his parents in childhood. Now assume that the husband and wife have been married 3 years during which time the wife has been abused an average of 15 times per year. Assume also that the wage of the wife at the time of consideration of divorce was 5 percent higher than that of the man's. Assume also that the male was abused an average of five times per year during his adolescence, and that all additional factors of divorce make up 20% of the reason for consideration of divorce by the wife. Assume that for this particular wife, that the function f is approximated by the following monotonic equation:

$$f_w\left(\frac{1}{t_h - t_0} \times \sum_{t_m}^{t_d} abuses_w\right) = 0.05 \times e^{\frac{\sum_{t_m}^{t_d} abuses_w}{10(t_h - t_0)}} = 0.05 \times e^{\frac{15}{10}} \cong 0.224.$$

We now consider the probability that the man will act violently toward his wife by focusing on the wage differential and his history of violence as an adolescent. Assume, similarly to the first case, that the woman receives wage that are 5% higher than those of her counterpart. Assume that the man was abused an average of 10 times per year as a child and that all other determinants of violence affected the man at a level of 0.3. Let the function g_m for this particular man be determined as follows with the respective weights of each variable:

$$g_m\left(\frac{wage_{wd}}{wage_{md}}, \frac{1}{t_h - t_0} \times \sum_{t_0}^{t_h} abuses_m, \alpha_h\right)$$

$$= 0.1 \times \frac{wage_{wd}}{wage_{md}} + 0.2 \times \frac{1}{t_h - t_0} \times \sum_{t_0}^{t_h} abuses_m + 0.15 \times \alpha_h$$

$$= 0.1 \times 1.05 + 0.02 \times 10 + 0.15 \times 0.3 = 0.35$$

Assume that $h(\varepsilon_{id})$ = 0.1. Then

$f_w\left(\frac{1}{t_h - t_0} \times \sum_{t_m}^{t_d} abuses_w\right) \times [1 + pr(abuses_w)] + h(\varepsilon_{id}) = 0.224 \times (1 + .35) + 0.1 \cong$ 0.40.

Therefore the woman will not choose to divorce the man in this situation.

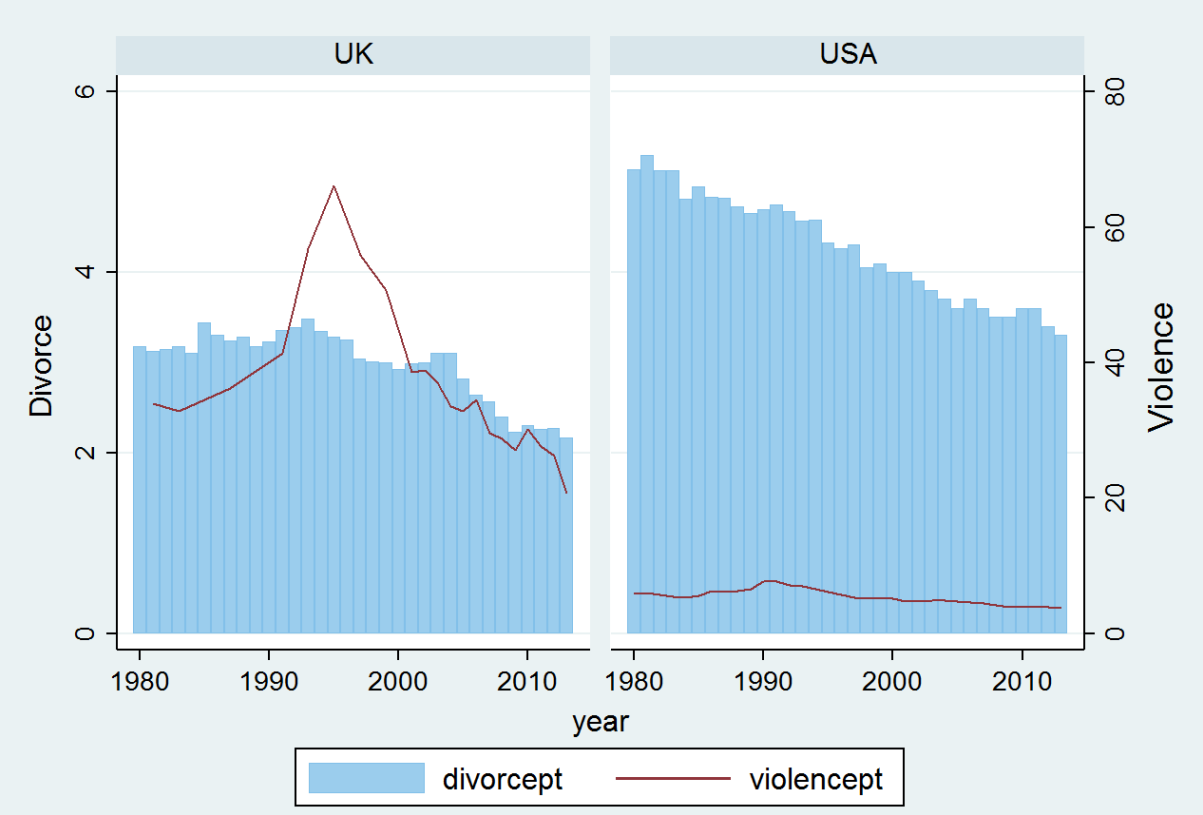
Thus, by considering the various factors related to the benefits and costs, the woman may decide whether to initiate the divorce or to continue with the average frequency of abuse that she has encountered from the time of marriage, t_m, until the time of consideration of divorce, d_t. This decision considers as well the probability and effect of the abuse conditioned upon the average frequency of abuse in the man's household from birth, t_0, to the time the man moved from home but was not yet married, $t_{m\text{-}x}$.

We therefore find that divorce rate is a function of violence, and that the violence rate is a function of the situations into which the husband was raised, wages, and other factors. In the OLS model shown in the next section, we include additional variables which serve as controls and fixed effects which help achieve precision to the relation between violence and divorce.

IV. Description and Analyzation of Data

As mentioned in Section I, this comprises of data from several governmental sources from the U.S. and the U.K., including FRED, the World Bank, the FBI UCS Annual Crime Reports, NISRA, CSEW, and OECD, unlike the cross sectional data from the research composed by Bowlus and Seitz as mentioned in Section II. We now provide a summary statistic of the divorce rate per thousand (divorcept) and the violence rate per thousand (violencept), shown by Figure 1, according to the definitions provided in Section I. We find that the U.S. has a typically higher rate of divorce but lower rate of violence per thousand in the population.

FIGURE 1: Divorce Rate and Violence Rate per Thousand, by Country



By use of panel data, we are able to include information such as the national averages of divorce and abuse, and more thoroughly examine the average relation between violence and divorce as well as the differences in effect between similar countries. We begin by including a correlation matrix, which comprises of the correlations between divorce, violence, alcohol, tobacco, unemployment rate, and recession. This matrix is provided below as Figure 2. A further analysis of the implications of this correlation and related robustness checks are available in the following subsection.

FIGURE 2: Correlation Matrix for U.K. and U.S. Data, by Country

Correlation Matrix for U.K.

Variables	ln(divorce)	ln(violence)	Unemployment	ln(tobacco)	ln(alcohol)	Recession
ln(divorce)	—					
ln(violence)	0.7299* (0.0002)	—				
Unemployment	0.2830 (1.049)	0.0617 (0.7904)	—			
ln(tobacco)	0.7566* (0.0000)	0.8397* (0.0003)	0.4056* (0.0492)	—		
ln(alcohol)	-0.2150 (0.2219)	-0.0951 (0.6819)	-0.8732* (0.0000)	-0.4413* (0.0309)	—	
Recession	-0.2235 (0.2038)	-0.2854 (0.2099)	-0.0930 (0.6007)	0.0997 (0.6430)	-0.0604 (0.7344)	—

*$p<0.05$

Correlation Matrix for U.S.

Variables	ln(divorce)	ln(violence)	Unemployment	ln(tobacco)	ln(alcohol)	Recession
ln(divorce)	—					
ln(violence)	0.5862* (0.0003)	—				
Unemployment	0.0930 (0.6008)	-0.3555* (0.0391)	—			
ln(tobacco)	0.7223* (0.0000)	0.3095 (0.1090)	0.0213 (0.9145)	—		
ln(alcohol)	-0.3673* (0.0326)	-0.1768 (0.3172)	-0.5361* (0.0011)	0.7039 (0.0000)	—	
Recession	-0.0028 (0.9873)	-0.0727 (0.6830)	0.1627 (0.3580	0.1940 (0.3225)	0.3322 (0.0549)	—

*$p<0.05$

In the model chosen, we used country fixed effects to account for the differences within each country. Such differences include unemployment or recession gaps which did not occur simultaneously in either country, as well as differences in social norms and laws. We also include decade fixed effects to control for any particular social norm, custom, or economy the differed between the decades, and do the same for recession as explained in the footnotes of Figure 3. We include variables which consider both macroeconomic effects as well as controls for alcohol and tobacco, which are additional possible indicators which may possibly affect violence or divorce. This fixed effects model, which additionally includes robust standard errors, is shown below in the following equation:

$$Divrate_{ct} = \beta_0 + \beta_1 \cdot Violrate_{ct} + \beta_2 \cdot Country + \beta_3 \cdot Decade + \beta_4 \cdot Unemployment_{ct} + \beta_5 \cdot Alcohol_{ct} + \beta_6 \cdot Tobacco_{ct} + \beta_7 \cdot Recession_t + \beta_8 \cdot Unemployment \times Violence + \varepsilon_i \quad \textbf{(III)}$$

The identifying assumption in this model is that controlling for the inherent differences of the U.S. and the U.K., as well as additional factors such as unemployment rates, alcohol, and so forth, that the divorce rates would be the same in either of the countries. We further analyze the relation of these controls and country fixed effects by regressing each variable on the natural log of the divorce rate from 1980-2013 in seven separate models. This allows us to identify the confounding effect, if any, that several of the variables holds which would mediate the relation between violence and divorce. We determine that violence holds a significant and likely causal relation on violence. That is, the relation between violence and divorce cannot be mediated by unemployment, alcohol, or recessions, though these variables do affect divorce rate in their own right. These findings are significant throughout the U.S. and the U.K. and are shown below in Figure 3, following which we continue by interpreting and analyzing the main results**.**

FIGURE 3: Model Estimation and Robustness Check

Independent Variables	Dependent Variable: Natural Log of Divorce					
	(1)	(2)	(3)	(4)	(5)	(6)
ln(violence)	0.280***	0.288***	0.232***	0.185***	0.113**	0.531***
	(0.0411)	(0.0416)	(0.0609)	(0.0516)	(0.0545)	(0.141)
Unemployment (U)		0.00811*	0.00716	-0.00343	-0.00763	1.004***
		(0.00423)	(0.00475)	(0.00503)	(0.00458)	(0.215)
1990-1999			-0.0351	0.0923*	0.159*	0.139***
			(0.0239)	(0.0498)	(0.0806)	(0.0454)
2000-2009			-0.0412**	0.128**	0.160**	0.127***
			(0.0189)	(0.0568)	(0.0733)	(0.0426)
2010-2013			-0.103***	0.150*	0.194*	0.118**
			(0.0243)	(0.0814)	(0.103)	(0.0565)
ln(tobacco)				0.511***	0.443***	0.380***
				(0.160)	(0.156)	(0.0992)
ln(alcohol)					0.478**	0.333**
					(0.192)	(0.137)
Recession						-0.0647***
						(0.0212)
U × Violence						-7.090***
						(1.520)
U × Recession						
USA	2.206***	2.216***	2.182***	1.436***	1.611***	1.662***
	(0.0275)	(0.0283)	(0.0331)	(0.236)	(0.203)	(0.143)
Constant	7.776***	7.598***	8.468***	-1.658	-0.331	-4.586**
	(0.604)	(0.615)	(0.876)	(3.495)	(3.487)	(2.103)
Observations	55	55	55	41	41	41

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Author's analysis based on data from FRED, World Bank, FBI UCS Annual Crime Reports, NISRA, and OECD. Data covers years from 1980-2013, with the exception of models 4-7, in which data for tobacco and alcohol usage were unavailable for certain years (for more information, see data set). Decade control variables (e.g. 1990-1999) account for peculiarities within each decade, with the omitted decade being the 1980's. Regression does not capture all years between 1980 and 2013 due to availability of data; however, each regression captures at least 20 years between those dates for the U.S. and the U.K. The variable "Recession" is binary with a value of 1 if, during that year, both the U.S. and the U.K. were experiencing a recession, and 0 otherwise. The variable "USA" is binary with a value of 1 if the country is the United States, and a value of 0 if the country of interest is the United Kingdom.

Interpretation and Analyzation of Key Variables and Relations

From Model 1, we find there is a significant and positive correlation between violence and divorce when accounting for the country. The significance and sign of this relation remain constant throughout each model, suggesting a direct relation between violence and divorce. Further, form Model 5 to Model 6, the value of the coefficient for violence increases by more than three times over. This further suggests that the relation between violence and divorce is not mediated by factors such as unemployment or alcohol or tobacco usage, and is significant across countries and years. These findings coincide with the results from O'Brien as well as from Bowlus and Seitz in the articles evaluated earlier.

Another implication from Model 1 which is also robust and significant is the fact that the U.S. has more divorces. However, this is no surprise given the differences in population between the U.S. and the U.K. However, as we have already determined the differences in both violence and divorce between Figure I and II, we move to interpret the findings of the subsequent models.

In Models 4 and 5, we discover the positive and significant relation between tobacco and divorce as well as the similarly significant relation that exists between alcohol and divorce. This relation is further examined in several articles (Doherty et. al., 1998; Caces, 1999). Though these articles primarily focus on the relation in the U.S., it is likely, based on the results provided in this research, that similar effects occur in the U.K.

We also determine, based on the findings of Model 6, that recessions are negatively correlated with divorce rates. That is, during recessions, it becomes costlier for couples to divorce and are therefore less likely to do so. These findings are likely to be causal (Cohen, 2014). Further, it appears that at times of greater unemployment, violence is correlated with a decreased level of divorce. Further, unemployment is positively correlated with divorce rates

when there is no recession. However, when there is a recession, unemployment is positively correlated with divorce.

The Wald test was implemented in Model 6 to discover the probability of each decade after the 1980s providing the same effect on divorce. The test, which implementation can be found in the .do file under supplemental materials, was shown to produce an F-stat of approximately 0.62, and hence we cannot reject the null hypothesis that each decade past the 1980s effected the divorce rate in a similar way; that is, compared to the 1980s, with each decade, the divorce rate (not accounting for population), increased by a similar rate. Hence, caution must be considered when viewing Figure II since the figure does account for population. Therefore, we know that in either country, the population grows faster than the rate of divorce.

V. Policy Recommendations and Limitations

Based on our results, we now have several implications to consider concerning public policy. Several of the policies will be based on the neoclassical theory and its relation to violence in the household and the results from the fully-informative model in the regression. That is, we consider past influences that may have led to violence being introduced into a household, and we do so primarily from the perspective of the husband. In this section, we further consider the various limitations to this study and further accompanying research that may provide useful to solve these issues in future research.

A great advantage of constructing a model and analyzing panel data related to violence, employment, and divorce is that we can consider a variety of policies aimed at reducing domestic violence. Several policy initiatives in the U.S., U.K., and elsewhere currently exist to help women leave abusive marriages, thus lowering the cost of divorce. Such policies and programs include shelters, hotlines, and counselling services. Further, there have been several

laws and policies aimed at reducing the level of abuse that occurs within the household. We have also discussed the intergenerational effects that lead to an increased probability of husbands abusing their wives as well as the effect that a distorted view of social responsibility in the perspective of the husband has on the probability of abuse.

Our primary policy recommendation, then, is geared towards altering the perception of the husbands who were primarily raised in an abusive home, whether the abuse caused was physical, emotional, or mental. It is clear that it is not sufficient for the women alone to be the ones who participate in counselling. While this counselling has been proven to decrease the tolerance for abuse by anywhere between 10% to 47% based on age (see Bowlus and Seitz), social planners and counsellors should additionally focus on advertising and providing counselling to those men who grew up in a difficult situation. Social norms within the U.S. and the U.K. publicize that men over a certain age should no more have need to engage in such practices as counselling. However, a change of this perception by way of introducing subsidies to adult males who receive counselling. Such a change will be sure to decrease the intergenerational effect of husband abuse, and therefore increase the quality of these marriages.

Certain limitations exist, however, regarding the research. Unfortunately, data was unavailable during various and random years between 1980 and 2013. However, at all times, at least 20 years of observations were recorded at all times between the U.S. and the U.K. separately. Data segregated by gender was not included into the findings. However, such data may be found in the same article by Bowlus and Seitz, where gender and age were both provided by the cross-sectional data in the VAWS. Other limitations are explored in Section I, under the subsection entitled *Interpretation and Assumptions of Relevant Data*. Further research should be able to predict the effect that such policies would have on the rate of successful marriages and the effect of divorce rates.

Notwithstanding these limitations, however, we have surely reasoned that there is a positive and significant effect from violence to divorce. While currently, the measure of the level of divorce is a neutral indicator as it may signify either an increase in unhappy marriages or a decrease in the tolerance of women, or both, it is the hope of this research that by decreasing the level of domestic violence as well of violence outside of the home, that there will be an increase in the frequency and percentage of marriages which are non-abusive, cooperative, and long-lasting.

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