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Domestic Violence, Employment and Divorce

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Abstract

Using unique, representative data on domestic violence, we document several stylized facts on abuse: the average characteristics of abused wives and abusive husbands are markedly different than the characteristics of individuals in non-violent marriages, the vast majority of violent marriages end in divorce, and employment rates are lower for women who experience abuse. We then construct a sequential model of employment, marriage and abuse. The results indicate abuse is the primary factor in the decision to divorce and witnessing violence as a child is a strong predictor of becoming an abusive spouse. Policy experiments suggest men are more responsive to policies designed to increase the costs of abuse than women are to policies reducing the cost of leaving violent marriages and policies designed to reduce the inter-generational effects of domestic violence may be promising strategies for preventing abuse.

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1 Introduction

Domestic abuse[1] is a social issue of concern to individuals and policy makers alike. The magnitude of the problem may be surprising: estimates from the Canadian Violence Against Women Survey (VAWS) indicate that 29% of ever-married Canadian women (Statistics Canada, 1993a, p.4) and 50% of divorced women have been victims of abuse.[2] Despite the prevalence of domestic violence, the private nature of this phenomena and the resulting unavailability of data made abuse a difficult subject to study. However, surveys detailing the incidence of domestic violence have recently emerged and a series of studies concerning the economic implications of abuse has followed.

Tauchen, Witte and Long (1991) were the first to model domestic violence within an economic framework. In their model, husbands maximize utility by choosing the amount of abuse and income to tranfer to their wives, subject to the wives' reservation utility levels. This framework has been applied to several data sets to estimate the number of incidents of violence in abusive marriages (Tauchen, Witte and Long, 1991; Farmer and Tiefenthaler, 1997; Kingston-Riechers, 1997). The papers in this literature, while providing an important first step in our understanding of domestic violence, tended to rely on small, select samples of currently married and abused women or samples of women who contacted the police. These data likely exclude women who left abusive relationships after learning their spouse's behavior, and may therefore present an inaccurate portrayal of the prevalence of abuse. Others in the literature have studied the effects of abuse on employment (Lloyd 1997a, 1997b) and the relationship between abuse and divorce (Kingston-Riechers, 2001). While these studies point out important potential effects of abuse, they ignore the selection into marriage and the relationship between employment and marital status decisions. Domestic

[1]The expressions domestic abuse and domestic violence shall be used interchangeably in this paper.

[2]The VAWS defines domestic violence as including any of the following activites: threatening to hit, pushing, grabbing, shoving, slapping, kicking, hitting, biting, beating, choking, threatening to use or using a gun or knife or sexual assault.

violence is also often treated as an exogenous determinant of behavior. These issues all likely have important consequences for any inference regarding domestic violence.

In this paper we address these shortcomings and make two important contributions to the existing literature on domestic abuse. First, we document several stylized facts on domestic violence using the 1993 VAWS. The VAWS, which contains a large, random sample of women, is one of the most representative data sets currently available on domestic violence.[3] One particularly valuable feature of the data is information on the presence of violence in the family of origin for women and for current and past spouses. This background variable is not only a strong predictor of domestic abuse, but is important for modelling as it is exogenous to the individual. The data highlight three noteworthy aspects of abuse: (1) the average characteristics of abused wives and abusive husbands are markedly different from their counterparts in non-violent marriages, (2) the majority of violent marriages end in divorce, and (3) the employment rate of abused women, regardless of current marital status, is lower than that for non-abused women.

Second, we construct and estimate a model that is able to account for the empirical regularities observed in the data. Similar to Tauchen, Witte and Long (1991), domestic violence serves two roles for men within the model. Men may have preferences over abuse directly and may also use abuse as a mechanism through which to influence their wives' behavior, in particular her employment decision. To capture the relationship between domestic violence and divorce, men and women make decisions sequentially in the model. That is, women make employment decisions taking into account how their behavior influences the likelihood of experiencing abuse in the future and men decide whether to abuse taking into account the likelihood their wives will divorce them. We also incorporate het-

[3]Several studies outside the economic literature have studied these data extensively. For example, Thompson, Saltzman and Johnson (2001) and Ratner (1998) document the determinants of suffering injury from physical abuse in the VAWS and the health effects of abuse, respectively. Wilson, Johnson and Daly (1995) consider the demographic correlates of domestic violence.

erogeneity in characteristics that determine the female's tolerance for abuse and the male's predilection for violence in the model to reflect the heterogeneity evident in the samples of abusive and non-abusive relationships. To estimate the model, we use data from the VAWS on initial marriage formations, domestic violence experienced by women in current and past relationships, violence in the family backgrounds of women and their spouses and the female's current employment behavior.

The results of our analysis reveal the following findings. First, domestic violence is an important factor in divorce decisions: women who are abused are significantly more likely to divorce than women in non-violent marriages. What is more important in explaining the high divorce rates among abused women, however, is the strong correlation between the individual characteristics of women who are abused and those of women who divorce. Second, for men observing domestic violence as a child, the likelihood of abusing one's own wife increases by 348%. This highlights the importance of inter-generational effects of domestic violence. Third, the lower employment rates of abused women observed in the raw data are attributed to differences in exogenous characteristics, as we find abuse does not have a direct causal effect on the current employment decisions of married women and the employment decisions of women do not have a significant impact on the husband's decision to abuse. Finally, results from policy experiments highlight the potential of policies aimed at reducing the inter-generational effects of violence and imposing separation costs on abusive spouses to reduce domestic violence rates.

2 The Violence Against Women Survey

The VAWS was conducted between February and June of 1993 and involved telephone interviews of 12,300 women aged 18 and above in all provinces of Canada. The survey dealt with the respondents' experiences of violence since the age of 16 as well as their

perception of personal safety. The VAWS is particularly valuable in three respects. First, it contains a random sample of women. This is in contrast to most surveys involving abuse-related subject matter, where samples tend to be limited to abused women seeking services (Tauchen, Witte and Long, 1991; Farmer and Tiefenthaler, 1997) or to low income families in a restricted geographical area (Lloyd, 1997a, 1997b). In this paper, we focus our analysis on domestic violence in past and current marriages and common-law relationships.

Second, survey responses were not restricted to reported incidents alone: all activities considered an offense under the Canadian Criminal code, reported or not, were recorded. As a result, the problem of underestimating the prevalence of violence by restricting responses to reported incidents is mitigated to some extent. However, considering the highly sensitive nature of the survey questions, the data may still be subject to some degree of under-reporting. It is likely that all women do not fully disclose their experiences regarding domestic abuse to the interviewer out of fear, shame or denial (Okun, 1986; Weis, 1989; Straus and Gelles, 1992; Dutton, 1995). Furthermore, women may be more likely to report abuse in a past marriage than abuse in a current marriage. It is also possible that non-response to the survey as a whole may be correlated with abuse. We are not able to directly address this issue. However, Statistics Canada, recognizing the sensitive nature of the survey, consulted a wide range of experts while constructing the questionnaire to mitigate the degree of non-response in the survey. Interviewers were trained to recognize and respond to signals that the respondent was concerned about being overheard and telephone numbers of local support services were offered to women reporting current cases of abuse and to women in distress (Statistics Canada, 1994b). In addition, sensitive questions on the survey were prefaced with statements designed to make the respondent more comfortable answering the question. As a result of these efforts, it is likely that under-reporting of domestic violence is diminished to a large extent.[4]

[4]A total of 19,309 eligible respondents were contacted, resulting in a response rate of 63.7% (Statistics

Third, the data set contains detailed information about the frequency and severity of abuse in current as well as past marriages, and personal background information on respondents and their spouses, including violence in the family of origin.[5] In this context, violence in the family of origin refers to incidents of domestic abuse inflicted on the mother by the father. The latter information is extremely important. As noted in the introduction, domestic abuse is often treated as an exogenous determinant of outcomes, even though in the same literature it also is recognized as the outcome of a household decision problem. Information on family background aids us in studying the simultaneity of these outcomes as it provides a source of exogenous variation in determining abuse. In addition to rich information on domestic violence, the VAWS contains standard information on the personal characteristics of women, including current employment status, education and the presence of children.

To conduct our analysis, the following restrictions are placed on the sample. First, to reduce the number of women currently receiving schooling and women not participating in the labor force for retirement reasons, the age range of the sample is restricted to women aged 25-55 who are not enrolled in school, eliminating 5620 women. Any married women with more than two relationships (436) and any currently single women with more than one relationship (276) are removed, for the data only contain information on the current spouse and one past spouse. Any women reporting that they are currently married but not living with their spouse (112) and widows (87) are eliminated from the sample. Finally, all respondents with missing covariate information are eliminated (383). The sample size is

Canada, 1994a). In light of the relatively low response rate, we compared the VAWS with the Canadian Survey of Consumer Finances (SCF). The average characteristics of women are the same with the exception of the proportion of women living in urban areas and in terms of educational attainments. See Appendix A for further details.

[5]For the purpose of this paper, women are recorded as married if they report being married and living with their spouse or if they report living common-law. The VAWS classifies a relationship as common-law if a woman was living with a man as husband and wife without being legally married (Statistics Canada, 1993b). Note that 8% of all currently married women are reported as living common-law.

thus reduced to 5386 women, of which 5% remain single, 73% remain in their first marriage, 9% are divorced and currently single and 13% are remarried. Below, we document several empirical regularities regarding marriage, divorce and domestic violence that are found in the data.

The average characteristics of abused women vary considerably from those of non-abused women

A number of past studies on domestic violence have considered samples of currently married and physically abused women. We present sample statistics for currently married women in Table 1, where the sample is subdivided by the severity of abuse in the current marriage. Women are recorded in the VAWS as experiencing low severity abuse if the highest level of reported abuse involves threatening to hit, pushing, grabbing, shoving or slapping; high severity abuse involves kicking, biting, beating, choking, threatening to use or using a gun or knife, or sexual assault. Key characteristics of women differ across levels of abuse severity: women who experience high levels of abuse are less likely to possess post-secondary and university education and are more likely to come from violent homes than women reporting mild or no abuse.[6] Abused women also marry earlier and are more likely to have children than women who have not experienced violence in their current marriages. Despite the differences among the samples, the labor force behavior of abused women is quite similar to that of non-abused women in terms of weeks worked and participation rates.

The average characteristics of violent husbands vary considerably from those of non-violent husbands

The characteristics of abusive and non-abusive husbands in current marriages can also be compared in Table 1. Abusive spouses are much more likely to have violent family backgrounds. This finding is consistent with other studies: Strauss, Gelles and Steinmetz

[6]Fleming (1997) also reports that one-third of abused women witnessed domestic violence against their mothers.

(1980) report that men who witnessed their fathers abuse their mothers are three times more likely to abuse their wives in a sample of American couples. Many women report they did not know whether their husbands came from violent homes. Interestingly, spouses with unknown family backgrounds are also more likely to be abusive. Abusive husbands are also more likely to have experienced unemployment in the past twelve months and are less likely to have a university education than non-abusive spouses.

Many abusive marriages end in divorce

The sample of currently married women may not be an appropriate sample of women to consider when discussing domestic abuse, for women who suffered more severe abuse may be more likely to divorce. Table 2 supports this claim, as divorce rates for women abused in first marriages are dramatically different than those for non-abused women: while the divorce rate for non-abused women is 15%, women who experienced high severity abuse in a first marriage have a divorce rate of 75%.[7] This finding is surprising in light of the psychology literature that contends abused women tend to be caught in a cycle of violence and are unable or unwilling to leave abusive spouses. For example, Dutton (1995, p.167) comments:

> *Casual discussion with police or other professionals typically generates an account of a woman who needed police intervention to save her life, who agreed to charge her husband, and who was given shelter in a transition home. After a few weeks, despite the support of transition house staff and in the absence of face-to-face contact with her husband, she decides abruptly to return to the marriage and drop the charges. The state is left without its key witness if it proceeds to trial, the police mutter knowingly about 'these women always dropping the charges,' and inexperienced transition-home workers wonder what they did wrong.*

The statistics in Table 2 likely differ from past studies because of their use of non-random samples. Many psychological studies utilize small samples of women in shelters or in counsel-

[7] Lloyd (1997b) also finds that women who experienced severe abuse are more likely to be divorced in her data on low-income families.

ing. Such samples underestimate divorce rates among abused women, as they likely exclude many women who left relationships after learning of their spouse's abusive behavior.

Table 3 presents additional evidence that abuse-related characteristics and the prevalence of abuse vary considerably across intact first marriages and those that ended in divorce. Divorced women, even those who remarry, are more likely to come from violent homes. In addition, approximately one-half of past marriages are abusive while only 15% of current marriages report abuse.

Abused women are less likely to work than non-abused women

Table 4 presents comparisons of current labor force behavior for abused and non-abused women across different marital histories. In general, abused women are less likely to participate in the labor force or to choose full-year employment than women experiencing no abuse, including women experiencing abuse in past relationships. Whether the differences reported here are due to causal effects of abuse on employment or due to differences in characteristics determining who is abused and who works is a question we address in our econometric specification. Overall, the sample statistics suggest standard economic characteristics of women and their spouses differ across the abused and non-abused samples and that domestic abuse may be an influential factor in both marital and employment choices.

3 Model

In this section, we present a model that describes the marriage, divorce, abuse and employment decisions of households and is designed to explain the empirical regularities outlined above. Building on the work of Tauchen, Witte and Long (1991), our model explicitly considers the husband's decision to abuse his wife. It also incorporates important aspects of the wife's divorce and employment decisions within a multi-state, finite horizon framework. The timing in the model is as follows. Women make decisions in every odd period and men

make decisions in every even period. Individuals receive a constant level of utility for the period in which they make decisions and for the subsequent period in which their spouses make decisions. One full period for a couple therefore consists of one odd and one even period. All agents are single in the first period. Women move first and decide whether to work (h) or not (n) and whether to be married (m) or single (s). Denote the choice set for women $I = \{sn, sh, mn, mh\}$. After observing their wife's employment choice, the husband decides whether to be abusive (a) or not (na) in the marriage.[8] Denote the choice set for husbands $J = \{a, na\}$.

Within the model, women get disutility from domestic violence and can respond to abuse through their employment and marital status decisions. Abuse in the previous period may directly influence a wife's preferences for work in the current period. In addition, a wife may respond to her husband's decision to abuse her by divorcing him in the next period. Since both partners are forward-looking, a husband must take into account his wife's preference over abuse and the possibility she will divorce him in the future when deciding whether to abuse her today. This feature of the model allows us to capture the high divorce rate for abusive marriages and any effect of past abuse on current employment decisions for women.

We allow for several additional interactions between employment and domestic violence within the model. As in Tauchen, Witte and Long (1991), the husband may receive utility from abuse directly and may use abuse as a way to influence the behavior of his wife. Thus, the wife takes into account the effect of her current employment decision on the likelihood her spouse is abusive in the next period. In particular, women abused by their partners may be more or less likely to work in the next period to avoid future abuse in the marriage. This feature of the model allows future domestic violence to play a role in the determination of the wife's current employment status and allows the employment decisions of wives to

[8]The employment decision of men is not incorporated in the model: data are only available on the current employment decision of currently married spouses, which is not sufficient to estimate the male's joint decisions to abuse and work.

influence the abuse decisions of husbands.

The model also allows men and women to assume several discrete exogenous types, $l \in L$ and $k \in K$, respectively. Each individual has type-specific preferences over his/her own behavior in the current period and over the decisions taken by their spouse in the previous period. Individuals do not have preferences over their spouse's type but know how types are related to a husband's propensity to abuse and a wife's propensity to work and divorce. Women thus use information on a potential spouse's type, observed before marriage, when deciding to match. Individual heterogeneity is introduced in the model to capture the differences in characteristics of husbands and wives across abusive and non-abusive marriages that are highlighted in Section 2. The introduction of individual heterogeneity also allows us to assess whether the low employment rates of abused women can be attributed to direct effects of abuse on employment or to different individual characteristics that jointly determine who works and who marries an abusive spouse.

3.1 Women

Let $V_{i_t}^w(k|j_{t-1}, l)$ denote the value function for a woman of type k taking decision i in period t, married to a husband of type l who made decision j in period $t-1$. The utility single women receive each period depends on her type, the abuse decision of the ex-husband if married in the previous period, and an idiosyncratic component of utility. A woman does not experience abusive behavior before marriage. However, she does observe her spouse's exogenous type and takes into account the relationship between his type and his expected future response to her actions when she is deciding whether to marry and work today. All single women meet a potential spouse in every period. Women who do not have a current spouse receive a spouse type valued zero, and women who do not have a previous spouse receive j_{t-1} equal to zero. Denote γ_l the probability a single woman meets a potential spouse of type l. After observing the potential spouse's type, women decide whether to

marry and to work in the future. The value function for a single woman of type k is:

$$V_{i_t}^w(k|j_{t-1},0) = u_{i_t}^w(k,j_{t-1}) + \varepsilon_{it}^w + \beta \sum_{l' \in L} \gamma_{l'} E_{\varepsilon_{t+2}^w} \max_{i_{t+2} \in I} \left\{ V_{i_{t+2}}^w(k|0,l') \right\}, \quad (1)$$

$i_t \in \{sn, sh\}$, where $\sum_{l' \in L} \gamma_{l'} = 1$ and β is the discount factor.

After the marriage is formed, men decide whether to abuse their wives. Past abuse directly influences the utility women receive in the current period. The value function for married women, $i \in \{mn, mh\}$, is:

$$V_{i_t}^w(k|j_{t-1},l) = u_{i_t}^w(k,j_{t-1}) + \varepsilon_{it}^w + \beta \sum_{j_{t+1} \in \{a,na\}} \Upsilon_{j_{t+1}}^h(l|i_t,k) E_{\varepsilon_{t+2}^w} \max_{i_{t+2} \in I} \left\{ V_{i_{t+2}}^w(k|j_{t+1},l) \right\}. \quad (2)$$

The expected value of future utility also depends on the realization of ε_{it+2}^w and her husband's expected choices conditional on her actions today ($\Upsilon_{j_{t+1}}^h(l|i_t,k)$).

3.2 Husbands

Let $V_{j_t}^h(l|i_{t-1},k)$ denote the value function for a husband of type l taking decision j in t, married to a wife of type k that made decision i in $t-1$. The value function for married men is:

$$V_{j_t}^h(l|i_{t-1},k) = u_{j_t}^h(l,i_{t-1}) + \varepsilon_t^{jh} + \beta \sum_{i_{t+1} \in \{mn,mh\}} \Upsilon_{i_{t+1}}^w(k|j_t,l) E_{\varepsilon_{t+2}^h} \max_{j_{t+2} \in J} V_{j_{t+2}}^h(l|i_{t+1},k) + \beta \sum_{i_{t+1} \in \{sn,sh\}} \Upsilon_{i_{t+1}}^w(k|j_t,l) E_{\varepsilon_{t+2}^h} V_{d_{t+2}}^h(l), \quad (3)$$

$j \in \{na, a\}$. The expected value of future utility for the husband depends on the realization of ε_{jt+2}^h and the expected response of their wives in the next period, $\Upsilon_{i_{t+1}}^w(k|j_t,l)$, including the probability wives choose to divorce. The female's tolerance of abuse and the ease with which she can leave the marriage thus becomes a key issue in determining whether men

decide to abuse their wives. Once divorced, it is assumed for simplicity that husbands can't re-enter the marriage market. The value function for divorced men is:

$$V_{d_t}^h(l) = u_d^h(l) + \varepsilon_{dt}^h + \beta E_{\varepsilon_{t+2}^h} V_{d_{t+2}}^h(l). \tag{4}$$

Assuming ε_{it}^w and ε_{jt}^h are distributed $i.i.d$ extreme value, the expected response of husbands to their wives' current decisions can now be described by

$$\Upsilon_{j_{t+1}}^h(l|i_t,k) = \frac{exp\{V_{j_{t+1}}^h(l|i_t,k) - \varepsilon_{jt+1}^h\}}{\sum_{r\in J} exp\{V_{r_{t+1}}^h(l|i_t,k) - \varepsilon_{rt+1}^h\}}, \tag{5}$$

and the expected response of women to their husbands' current decisions by

$$\Upsilon_{i_{t+1}}^w(k|j_t,l) = \frac{exp\{V_{i_{t+1}}^w(k|j_t,l) - \varepsilon_{it+1}^w\}}{\sum_{r\in I} exp\{V_{r_{t+1}}^w(k|j_t,l) - \varepsilon_{rt+1}^w\}}. \tag{6}$$

3.3 Terminal Conditions

In period T, men no longer make decisions and receive no utility in the future. Since men make decisions after their wives, the terminal value functions for husbands are

$$V_{j_T}^h(l|i_{T-1},k) = u_{j_T}^h(l,i_{T-1}) + \varepsilon_{jT}^h, \tag{7}$$

if $i_{T-1} \in \{mn, mh\}$ and

$$V_{d_T}^h(l) = u_d^h(l) + \varepsilon_{jT}^h, \tag{8}$$

if $i_{T-1} \in \{sn, sh\}$. The terminal value functions for women are

$$V_{i_{T-1}}^w(k|j_{T-2},l) = u_{i_{T-1}}^w(k,j_{T-2}) + \varepsilon_{iT-1}^w + \beta u_{i_{T-1}}^w(k,j_T) \tag{9}$$

$i_{T-1} \in \{mn, mh\}$ and

$$V_{i_{T-1}}^w(k|j_{T-2},0) = u_{i_{T-1}}^w(k,j_{T-2}) + \varepsilon_{iT-1}^w + \beta u_{i_{T-1}}^w(k,0) \tag{10}$$

if $i_{T-1} \in \{sn, sh\}$.

3.4 Optimal Policies

The solution to the model is based on a set of reservation values. The sequence of reservation values that form the solution to the problems faced by husbands and wives can be expressed in terms of the stochastic component of utility. For wives, define ε_{it}^{w*} such that women prefer to be married and not working for values of $\varepsilon_{mnt}^{w} - \varepsilon_{it}^{w}$ above ε_{it}^{w*} and would like to choose state i for values of $\varepsilon_{mnt}^{w} - \varepsilon_{it}^{w}$ below ε_{it}^{w*} for every state $i, i \in \{sn, sh, mh\}$; ε_{it}^{w*} is the value such that

$$V_{i_t}^{w}(k|j_{t-1}, l) + \varepsilon_{mnt}^{w} - \varepsilon_{it}^{w} = V_{mn_t}^{w}(k|j_{t-1}, l) + \varepsilon_{it}^{w*} \tag{11}$$

for $i_t \in \{sn, sh, mh\}$. Consider two possible states $i, i' \in I_t$ where I_t is the choice set available in period t. Women will choose state i in t if the value of choosing i exceeds the value of choosing state i'. The state yielding the highest level of utility therefore satisfies

$$\varepsilon_{it}^{w} - \varepsilon_{i't}^{w} \geq \varepsilon_{i't}^{w*} - \varepsilon_{it}^{w*}. \tag{12}$$

The optimal policy for any $i \in I_t$ is therefore:

$$i_t = \begin{cases} 1 & \text{iff } \varepsilon_{it}^{w} - \varepsilon_{i't}^{w} \geq \varepsilon_{i't}^{w*} - \varepsilon_{it}^{w*},\ \forall i \in I \\ 0 & \text{otherwise.} \end{cases} \tag{13}$$

Similarly, for the abusive state, $j = a$, define ε_{nat}^{h*} such that husbands prefer to be non-abusive for values of $\varepsilon_{nat}^{h} - \varepsilon_{at}^{h}$ above ε_{nat}^{h*} and would like to be abusive for values of $\varepsilon_{nat}^{h} - \varepsilon_{at}^{h}$ below ε_{nat}^{h*}; ε_{nat}^{h*} is the value such that

$$V_{a_t}^{h}(l|i_{t-1}, k) + \varepsilon_{nat}^{h} - \varepsilon_{at}^{h} = V_{na_t}^{h}(l|i_{t-1}, k) + \varepsilon_{nat}^{h*} \tag{14}$$

for $i_{t-1} \in \{mn, mh\}$. Men will choose to abuse their wives in t if the value of an abusive marriage exceeds the value of a non-abusive marriage. The state yielding the highest level of utility therefore satisfies

$$\varepsilon_{at}^{h} - \varepsilon_{nat}^{h} \geq \varepsilon_{nat}^{h*}, \tag{15}$$

and the optimal policy for abuse is therefore:

$$a_t = \begin{cases} 1 & \text{iff } \varepsilon^h_{at} - \varepsilon^h_{nat} \geq \varepsilon^{h*}_{nat} \\ 0 & \text{otherwise.} \end{cases} \tag{16}$$

The model presented above has the potential to account for several important relationships between abuse, marital status and employment. First, the determinants of domestic abuse are an integral component of the model and include the possibility that employment decisions of women may influence the abuse propensity within marriage. If a husband has preferences over the employment behavior of his wife, he may use abuse as a tool to influence her choice in the next period. Second, the wife's tolerance for abuse serves to influence the abusive behavior of her husband: women who are less tolerant of abuse may be more likely to divorce in response to domestic violence. Men take this into account when deciding to abuse.

Although several important relationships are incorporated in the model, two caveats should be raised before proceeding to estimation. First, the data contain only limited information about the composition of the current household and it is not possible to determine the timing of births. Due to the limitations imposed by the data and the complexity inherent in modeling the timing and number of children, fertility decisions are not incorporated in this paper. However, as in many other studies, the presence of children in the household is allowed to affect the marriage and employment decisions of women. Second, the dynamics of labor supply decisions have been found to be important in previous work (e.g., Eckstein and Wolpin, 1989; van der Klaauw, 1996), as well as the relationship between current employment and future divorce (Johnson and Skinner, 1986). These relationships are not addressed here as no information is available in the data on employment histories and labor market experience. Both issues are worthy of further attention. However, given the limitations of the data, they are beyond the scope of the current paper.

4 Econometric Specification

The model outlined in Section 3 captures the sequential nature of marital status choices. Information in the VAWS is available on the current employment status of women, abuse in past and current marriages and whether the first marriage ended in divorce. Therefore, we estimate a four period version of the model outlined above. All women are initially single and decide whether to marry and work in the first period. After observing their spouses' abuse decisions in the second period, women decide whether to work and whether to divorce in the third period. Men decide whether to abuse in the second and fourth periods, conditional on the female's employment status decisions. We, therefore, estimate the transitions to marriage and divorce, the female's employment status decision in the third period and the husband's decision to abuse his wife in the second and fourth periods. The model is solved by backwards recursion, as discussed in the previous section, and the solution to the model is used to construct the likelihood function.

Retrospective data on the transition to marriage and on the presence of abuse prior to the past twelve months is used to estimate the female's decision in period 1 and the husband's decision to abuse in period 2, respectively. Retrospective data on the transition from marriage to divorce and the woman's decision to work in the past twelve months is used to estimate her decision in period 3. Data on the decisions of men to abuse in the past twelve months is used to estimate the husband's decision in period 4. The first two periods therefore capture all the decisions made prior to the last twelve months, with the exception of the decision to divorce. The last two periods capture the divorce decision and all decisions made within the last twelve months. Information on the presence of abuse in the family of origin for men and women provides important exogenous variation that is used to identify the husbands's propensity to abuse and the wife's marriage and employment decisions.

4.1 Specification for Husbands

As mentioned above, husbands decide whether to abuse in the second and fourth periods. Data on the severity and frequency of abuse in current and previous marriages are available in the VAWS. For the purposes of our analysis, abuse is defined as an indicator equal to one if the husband inflicted high severity abuse on his wife. This definition of abuse is adopted for two reasons. First, the data on abuse severity are richer than that on abuse frequency. Abuse severity is split into categories based on specific activities, while the frequency data are categorical in nature and top-coded at 11, limiting their accuracy and usefulness in estimation. Second, in constrast to high severity abuse, a preliminary analysis of the raw data indicated that frequent, low-severity abuse was not highly correlated with divorce and employment. Information is also available on whether any of the abuse experienced in the current marriage occurred within the past twelve months. Unfortunately, this information does not distinguish between high severity and low severity abuse. We, therefore, define current period abuse as an indicator equal to one for women reporting high severity abuse in the current marriage and abuse within the last twelve months, zero otherwise.

A limited set of characteristics is available on husbands in first marriages in the data. In particular, for women who are currently divorced, the data only contain information on the presence of abuse and information regarding the presence of domestic violence in her spouse's family of origin, a strong predictor of abuse in previous studies. Some women reported that they did not possess information on their spouse's family background.[9] Instead of excluding these couples, we allow men to come in two exogenous types, non-violent family background and violent family background, and infer the true type for men with unknown family backgrounds. In particular for women who report family background is unknown, we assume they observe other characteristics of their spouses, such as whether the family

[9] 383 women reported they did not know whether their first spouse witnessed violence in his family of origin.

of origin is dysfunctional in other respects, that are perfectly correlated with their spouses family background and influence their husbands' propensity to be abusive in the same manner as the family background measure in the data. For the purposes of estimation, this assumption implies that the woman observes her spouse's type, while the econometrician does not in the absence of information on family background.

Preferences for men taking decision j of type l, married to women taking decision i in $t-1$, are therefore specified as:

$$\alpha_j^h l + \theta_j^h i_{t-1} + \varepsilon_{jt}^h \tag{17}$$

for $j \in \{na, a\}$ and $t \in \{2, 4\}$. The utility from divorce and no abuse are normalized to zero for identification purposes.

4.2 Specification for Wives

A richer set of information is available for female respondents in the data set and is included in estimation. Current employment information is available where working is defined by an indicator equal to one if women reported working 52 weeks in the past year and zero otherwise. Information on the age, education, province of residence, the presence of children in the household and the family background of women are also available. This information is used to define the exogenous types of women in the marriage market. While most of these characteristics are time invariant, some are likely to change over time. Unfortunately, due to the cross-sectional nature of the data, we do not observe time variation in the data used to construct types. Implicitly, we are therefore assuming that a woman carries her observed type at the time of the survey throughout the decision process of the model, i.e. both forward and backward in time.

Preferences for marriage and employment vary with each of the aforementioned characteristics for women. The utility women receive from abuse also varies depending on her

marital status but, with the exception of family background, does not vary with exogenous characteristics. Since we don't have information on age at divorce, we allow divorced women to have different preferences than single women to capture age effects. Denote the divorced, not working and divorced, working states as dn and dh, respectively. Preferences for wives of type k taking decision i, married to a spouse taking decision j in the previous period, are therefore specified as:

$$\alpha_i^w k + \theta_i^w j_{t-1} + \varepsilon_{it}^w \tag{18}$$

for $i \in \{sn, sh, mh, dn, dh\}$ and $t \in \{1, 3\}$ where j_{t-1} is zero if women were single in the previous period. The utility from the married, not working state is normalized to zero.

4.3 Estimation of the Choice Probabilities

The choice probabilities are estimated according to the optimal policies described by (13) and (16). Assume the idiosyncratic component of preferences is distributed *i.i.d.* extreme value. The probability that a man of type l chooses alternative j in the fourth period is:

$$\Pr(j_4 = 1|l, i_3, k) = \frac{exp\{\alpha_j^h l + \theta_j^h i_3\}}{\sum_{r\in J} exp\{\alpha_r^h l + \theta_r^h i_3\}}. \tag{19}$$

The probability that a man of type l chooses alternative j in the second period is:

$$\Pr(j_2 = 1|l, i_1, k) = \frac{exp\{\alpha_j^h l + \theta_j^h i_1 + \beta E \max V_{j_4}^h(l|i_3, k)\}}{\sum_{r\in J} exp\{\alpha_r^h l + \theta_r^h i_1 + \beta E \max V_{r_4}^h(l|i_3, k)\}}, \tag{20}$$

where

$$E \max V_{r_4}^h(l|i_3, k) = \sum_{i_3\in\{mn,mh\}} \Upsilon_{i_3}^w(k|j_2, l) E_{\varepsilon_{r4}^h} \max_{r_4\in J} V_{r_4}^h(l|i_3, k) + \sum_{i_3\in\{dn,dh\}} \Upsilon_{i_3}^w(k|j_2, l) E_{\varepsilon_{d4}^h} V_{d_4}^h. \tag{21}$$

The probability that a wife of type k chooses alternative i in period 1 is

$$\Pr(i_1 = 1|k) = \frac{exp\{\alpha_i^w k + \beta E \max V_{i_3}^w(k|j_2, l)\}}{\sum_{r\in I} exp\{\alpha_r^w k + \beta E \max V_{r_3}^w(k|j_2, l)\}}, \tag{22}$$

and the probability that a wife of type k chooses alternative i in period 3 is

$$\Pr(i_3 = 1|k, j_2, l) = \frac{exp\{\alpha_i^w k + \theta_i^w j_2 + \beta u_{i_3}^w(k|j_4, l)\}}{\sum_{r\in I} exp\{\alpha_r^w k + \theta_r^w j_2 + \beta u_{r_3}^w(k|j_4, l)\}}. \tag{23}$$

We must account for four features of the data when constructing the likelihood function. First, the data do not contain information on the past employment decisions of women. We, therefore, integrate over the female's first employment decision when estimating the probability of experiencing abuse in the second period. Define d_m as an indicator equal to one if a woman in the sample reports a relationship, zero otherwise. The probability men abuse their wives in period 2 is:

$$\Pr(j_2|k, l, \Theta) = \Big[\sum_{i\in\{mn,mh\}} \Pr(j_2|i_1, k, l, \Theta)\Pr(i_1|k, l, \Theta)\Big]^{d_m}, \tag{24}$$

where Θ is the vector of preference parameters from the model. Second, we do not observe the proportion of potential spouses that come from violent homes in the population. We assume that men are equally likely to come from a violent home as women. The proportion of all women in the sample from violent homes is 17.48%. The probability that women decide to marry and work in the first period is therefore:

$$\Pr(i_1|k, \Theta) = 0.8252 \cdot \Pr(i_1|j_1, k, 0, \Theta) + 0.1748 \cdot \Pr(i_1|j_1, k, 1, \Theta). \tag{25}$$

Third, as mentioned above, we assume that the wife, but not the econometrician, observes spousal type for families when the wife reports she does not know whether her spouse has a violent family background. We, therefore, estimate the probability spouses with unknown family backgrounds are from violent homes (γ_b). Married women report the background of their spouses with probability p_k and don't report with probability p_u, where $p_k + p_u = 1$. Define l_u as an indicator equal to one if women report they don't know their spouse's family background. Define l_b to be an indicator equal to one if the husband comes from a violent family, zero otherwise. The likelihood contribution for women in the third period is

therefore:

$$\Pr(i_3|j_2,i_1,k,\Theta) = \Big[p_u\gamma_b \Pr(i_3|j_2,i_1,k,1,\Theta) + p_u(1-\gamma_b)\Pr(i_3|j_2,i_1,k,0,\Theta)\Big]^{l_u} \cdot \Big[p_k \Pr(i_3|j_2,i_1,k,1,\Theta)\Big]^{(1-l_u)l_b}\Big[p_k \Pr(i_3|j_2,i_1,k,0,\Theta)\Big]^{(1-l_u)(1-l_b)} \quad (26)$$

We set $p_u = 0.08215$, the fraction of women who report the family background of their spouse as unknown. We estimate different spousal type probabilities for women who remain married, women who divorce and remain single and women who divorce and eventually remarry. Finally, for women that have been married less than twelve months, the likelihood contribution is limited to the first and second periods of marriage.

The likelihood function for the N women and men in the sample is therefore

$$\pounds = \prod_{n=1}^{N} \Pr(j_4^n|i_3^n,j_2^n,k,l,\Theta)\Pr(i_3^n|j_2^n,i_1^n,k,\Theta)\Pr(j_2^n|k,l,\Theta)\Pr(i_1^n|k,\Theta). \quad (27)$$

5 Results

5.1 Parameter Estimates

Estimates of the preference parameters for the model are presented in Tables 5 and 6 for women and men, respectively. In this instance, the model is estimated with the discount factor fixed at 0.95.[10] First, we examine the relationship between domestic abuse and divorce. As expected, the estimated effect of abuse on preferences for marriage is negative and significant. As can be seen in the first row of Columns 4 and 5, domestic violence is among the strongest determining factors of divorce decisions: women with abusive spouses are significantly more likely to divorce than to remain married. From the parameter estimates, we can compute the difference between divorce probabilities when women are in non-violent versus violent marriages and find that women who are abused are 76% more

[10] As reported by others, for example van der Klaauw (1996), difficulties were encountered when attempting to estimate the discount factor. A myopic version of the model, with the discount factor fixed at zero, was also estimated. Results are available from the authors upon request.

likely to divorce than women in non-abusive marriages. This result suggests that women are responsive to the presence of domestic violence, a finding contrary to the common perception that abused women have great difficulty leaving bad relationships. Interestingly, domestic violence does not appear to have a direct effect on preferences over work, as the results indicate domestic violence does not have a significant impact on a married woman's decision to work. These results suggest that women's tolerance of abuse appears to only tell part of the story, as the preference parameters alone cannot explain the majority of the difference in divorce rates and employment rates across abused and non-abused women in the data. In particular, the stylized facts presented in Section 2 indicate that the divorce rate for women experiencing high severity abuse is over four times higher than that for women in non-abusive marriages. Differences in exogenous individual characteristics thus play an important role in determining who is abused and who is likely to work and to divorce. We discuss this issue in detail below.

The presence of violence in a woman's family of origin does not appear to significantly influence the initial decision to marry nor the employment decision of married women. However, a violent family background does have implications for divorce decisions that differ depending on whether the woman's own marriage was abusive. In particular, women from violent homes are more likely to divorce but are also more likely to tolerate abuse. It therefore appears that the correlation between family backgrounds of women and their spouses observed in the data is due to the fact that once married, men may be more likely to abuse because their wife is less likely to leave if she is from a violent home. The estimated probabilities presented at the bottom of Table 5 indicate that most married women reporting they don't know their spouse's family background behave as if he had a non-violent background and most divorced, including those who eventually remarry, women behave as if their former spouse had a violent background.[11]

[11] We note that this result implies that the initial distribution of violent backgrounds for men is such that

The preference parameters for husbands are presented in Table 6. We allow the abuse intercepts to differ across the second and fourth periods to allow the accumulation of marital-specific capital to influence the husband's preferences over abuse. The intercepts for both periods suggest that men get disutility from abusing their wives overall. However, observing violence as a child significantly increases the likelihood of abusing one's wife, as illustrated in Row 4 of Table 6. Computing the difference between abuse propensities for men from abusive homes and for those from non-abusive homes, we find that men with violent family backgrounds are 348% more likely to abuse their wives. This result suggests that witnessing violence as a child may reduce the disutility of domestic violence substantially and confirms the importance of the inter-generational impacts of domestic violence. Previous abuse in the second period is also a good predictor of violence in the current period, as men who abused their wives in the past and are still married are significantly more likely to abuse their wives in the current period than men who were not abusive in the past. The results also suggest that marriage to a working wife reduces the likelihood of abuse, although the effects are not significant. The differences in employment rates of abused women that are present in the raw data can therefore not be attributed to a direct causal effect of domestic violence on employment.

As an illustration of the importance of differences in exogenous characteristics across abusive and non-abusive couples, we consider the predicted behavior of four hypothetical couples in Table 7. All couples are from Ontario with a wife that is 38 years of age. In couple A, both partners come from non-violent homes, the wife has at least a post-secondary education, and the couple has no children. In this instance, the predicted marriage rate is relatively low, in part due to the high value of the female's time in the labor market. The overall abuse rate in first marriages is low, and those marriages that do become violent

14.43% of men came from violent homes, which is close to the corresponding 17.46% for women in the initial family background distribution. Calculations are available from the authors upon request.

are very likely to end in divorce, as women have favorable outside options in the event the marriage dissolves. For couple B, we assume both partners come from violent homes, but hold all other characteristics the same as for couple A. Changing the family background characteristics in this manner results in a large rise in marriage rates, associated with a rise in divorce rates. This shift in behavior is likely due to the fact that women from violent homes are more tolerant of abuse (hence more willing to face the prospect of entering an abusive marriage) but also more likely to divorce. As expected, we observe a dramatic increase in abuse rates for couples with violent family backgrounds. One striking result for couple B, as compared to couple A, is that women in abusive marriages are less likely to work in the current period.

We next consider changing the wife's education level from post-secondary in couple B to less than high school to generate the predictions in Column C. The results suggest that women with lower levels of education are less likely to divorce. This finding is likely due to the limited outside labor market opportunities faced by uneducated women, and is confirmed in part by the low employment rates in Rows 5-9. As women find it more difficult to leave abusive marriages, husbands are more likely to abuse their wives, especially women who were not working in the previous period. Education therefore seems to play an important role in determining which women are abused and which women are able to leave abusive relationships. Column D presents predictions for couples with children that are the same in all other respects to the couples in Column C. As is consistent with the literature, the couples with children have much lower divorce rates than childless couples and women with children have lower employment rates. Interestingly, couples with children are also more likely to be abusive. Women with children prefer to remain married than to divorce; men therefore face a lower chance of separation following abuse and are more likely to abuse as a result.

The predictions in Table 7 help to provide a picture of how differences in exogenous characteristics relate to the differences highlighted in the raw data. In summary, it appears that the high divorce rates and the low employment rates of abused married women are driven by differences in characteristics that help determine a woman's opportunities outside the marriage. In particular, well-educated women and women without children are more likely to work and are more likely to divorce, suggesting that the characteristics driving the employment decision are also important in determining who stays with an abusive spouse. Men do face a deterrent effect, as men are less likely to abuse wives that have better outside opportunities. Both results are consistent with the burgeoning literature that examines the positive link between current employment and future divorce decisions (Johnson and Skinner, 1986; van der Klaauw, 1996). However, the presence of a violent family background is by far the most important determinant of abuse.

Table 8 provides evidence on the predictive performance of the model. Considering the limitations of the data, the model is able to match the dynamics of marital status decisions well. In particular, the econometric specification matches the high divorce rates for abusive marriages and relatively low divorce rates for non-violent relationships. The model does over-predict the number of marriages formed in the data. This is not surprising given the fact that we must integrate out both the female's initial employment decision and the initial distribution of family background information of husbands. The predicted employment rates are slightly higher than those in the data; however we are able to match the employment rates in the data reasonably well overall. In general, the model is also able to match the statistics on the prevalence of domestic violence, including abuse rates in past marriages and the low current abuse rates in intact marriages. These results are quite encouraging, considering the fact that the model was estimated with limited spousal information.

5.2 Policy Experiments

A major advantage of constructing and estimating a behavioral model of domestic violence, employment and divorce is that we can consider a variety of policy experiments aimed at reducing domestic violence. Several policy initiatives already exist in many countries that are designed to help women leave abusive marriages. Shelters, counseling services and abuse telephone hot-lines, for example, are offered extensively as a means of lowering the costs to women of leaving abusive relationships. Other strategies, such as tougher laws prohibiting domestic violence and mandatory programs designed to re-socialize abusive spouses have been adopted to increase the costs of domestic violence to abusers. There has also been much discussion of the inter-generational effects of domestic violence and how policy might address this issue. In this section, we describe how one can translate such policies into the parameters of our framework, and then assess the behavioral implications of four policy experiments that address the aforementioned issues.

The first two experiments consider policies adopted widely in practice. As mentioned above, several policies, such as providing shelters and counseling and legal services to abused women, have been aimed at reducing the costs of leaving violent marriages. This type of policy is examined in our model by increasing the female's preference for divorce if abused by 50%. The results of this experiment are reported in Table 9. They suggest that such a policy would increase the number of divorces but would not reduce the prevalence of domestic violence in first marriage. Reducing the tolerance for abuse results in a 23% increase in divorce rates in abusive marriages. While the prevalence of violence in first marriages does not decline, the fraction of currently abused women does fall by 60%. In other words, the overall abuse rate remains the same but the number of incidents of abuse suffered falls. Women who remain in abusive marriages after the policy change have lower employment rates. This is likely a compositional effect of the policy change: those women

who remain married are those who are less likely to work, as confirmed by the results in Table 7.

The second experiment we consider is one designed to directly increase the costs of violence to abusive spouses. Such policies could include longer prison sentences for domestic violence or mandatory counseling programs for abusive men, and are most likely to influence men whose wives have left the marriage and have filed formal charges against them. We therefore conduct this policy within the model by implementing a 1 util divorce cost for abusive men in Table 10, which is approximately one-half the size of the second period intercept for husbands. While the fraction of women that initially marry does not change, this policy change serves as a substantial deterrent to abuse: the overall abuse rate in first marriages falls by 35%. Current abuse rates also fall after the policy change. As consistent with the first experiment, increasing the cost of abuse has virtually no impact on the employment rates of currently married women. This finding is not surprising given the findings that the negative correlation in the data between female employment and domestic violence is largely compositional in nature.

The final two experiments we consider are those designed to reduce the intergenerational effects of domestic violence. Such policies might be implemented in practice, for example, by re-socializing children from abusive homes through counseling or mentoring programs. We implement the policy in the model by setting the family background preference parameters to zero. Results of these experiments are presented in Tables 11 and 12 for women and men, respectively. Eliminating the effect of a violent family background on women's marriage, divorce and employment choices has virtually no impact on behavior. Women are equally likely to marry, divorce, and work as in the baseline scenario. Preventing future domestic violence by re-socializing women does not appear to be an effective strategy for combating domestic violence. In contrast, as illustrated in Table 12, men are quite responsive to the

policy change. After re-socializing men from violent homes so that their preferences over abuse are the same as those for men from non-violent homes, abuse rates in first marriages fall by 37% and abuse rates in current marriages fall by 85% as men from violent homes are no more likely to abuse than men with violent backgrounds. The policy change has virtually no impact on marriage rates, which is not surprising considering the high marriage rates in the baseline specification and the age range of the women in the sample. Although the aggregate divorce rate falls due to the fall in the number of abusive spouses, the divorce rate in abusive marriages also rises due to the fact that women are less tolerant of any abuse that does occur.

6 Conclusion

The relationship between domestic abuse, employment and divorce is estimated in this paper. The dominant effect of abuse on women's behavior is through divorce. The evidence presented on the importance of abuse in the divorce decision highlights the fact that many women observed in representative data respond to domestic violence by leaving the relationship. This finding is in stark contrast to the common portrayal of abused women as unable or unwilling to leave violent relationships. The results also confirm the strong inter-generational effects of domestic violence, as observing domestic violence as a child dramatically increases the likelihood of abusing one's wife. As highlighted by the stylized facts and the estimation results, much of the difference in employment, marital and abusive behavior is driven by the fact that abusive couples tend to have characteristics, such as violent family backgrounds and lower levels of education, that differ substantially from those in non-violent marriages. Together, the findings suggest that policies aimed at addressing domestic violence should not ignore the important links between abuse, marriage and employment. If the costs of program implementation across men and women are the same,

our policy experiments suggest targeting the behavior of men is a more effective means of reducing or preventing domestic violence; abused women are less responsive to reductions in the cost of leaving abusive marriages and to eliminating the effect of violent family backgrounds on preferences. In contrast, increasing the costs of domestic abuse to husbands and reducing the inter-generational effects of violence for men appear to be promising strategies for preventing abuse.

Table 1: Sample Statistics for Currently Married Sample, by Abuse Severity

Variable	No Abuse	Low Severity Abuse	High Severity Abuse
Participation rate	0.7992	0.8147	0.8450
	(0.4006)	(0.3890)	(0.3632)
Worked 52 weeks	0.5688	0.5942	0.6154
	(0.4953)	(0.4916)	(0.4882)
Age	38.4684	38.1635	38.8003
	(8.2627)	(8.0711)	(8.0476)
Age at first	22.5514	21.8855	21.2738
marriage	(4.0292)	(3.5998)	(3.8753)
Child	0.7459	0.8339	0.8150
	(0.4354)	(0.3726)	(0.3897)
High school	0.3172	0.3405	0.3442
	(0.4654)	(0.4744)	(0.4769)
Post-secondary or	0.4914	0.4913	0.3480
university	(0.5000)	(0.5005)	(0.4781)
Violence in family	0.1397	0.2454	0.3376
background	(0.3467)	(0.4308)	(0.4747)
Violence in current	0.0778	0.2060	0.3735
spouse's family	(0.2679)	(0.4049)	(0.4855)
Don't know current spouse's	0.0576	0.0764	0.1057
family background	(0.2330)	(0.2659)	(0.3087)
Spouse was unemployed	0.1238	0.1481	0.2422
	(0.3294)	(0.3556)	(0.4300)
Spouse worked 52 weeks	0.7645	0.7522	0.6663
	(0.4243)	(0.4323)	(0.4733)
Spouse has high school	0.2659	0.3077	0.3022
	(0.4419)	(0.4621)	(0.4609)
Spouse has post-secondary	0.2631	0.2763	0.2847
	(0.4404)	(0.4470)	(0.4529)
Spouse has university	0.2072	0.1641	0.0778
	(0.4053)	(0.3708)	(0.2689)
Observations	3326	427	136

Note: Standard deviations are in parentheses.

Table 2: Divorce Rates by Abuse in First Marriage

No Abuse	Low Severity Abuse	High Severity Abuse
0.1437	0.2963	0.7397
(0.3509)	(0.4570)	(0.4392)

Note: Standard deviations are in parentheses.

Table 3: Abuse-Related Characteristics by Marital History

Variable	Single	Married	Divorced and Single	Remarried
Violence in family background	0.1288 (0.3356)	0.1588 (0.3655)	0.2472 (0.4318)	0.2225 (0.4162)
Violence in current spouse's family		0.1030 (0.3041)		0.0976 (0.2970)
Don't know current spouse's family background		0.0615 (0.2403)		0.0661 (0.2486)
Violence in past spouse's family background			0.1775 (0.3825)	0.1982 (0.3989)
Don't know past spouse's family background			0.1137 (0.3178)	0.1106 (0.3138)
Low severity abuse in current marriage		0.1109 (0.3140)		0.1193 (0.3244)
High severity abuse in current marriage		0.0374 (0.1897)		0.0505 (0.2188)
Low severity abuse in past marriage			0.1649 (0.3715)	0.1532 (0.3604)
High severity abuse in past marriage			0.3391 (0.4739)	0.3716 (0.4835)
Observations	290	3889	467	740

Note: Standard deviations are in parentheses.

Table 4: Within History Comparisons of Labor Market Indicators by Abuse Severity

Marital State	Participation Rate	Worked 52 Weeks
Married		
No abuse	0.7992	0.5688
	(0.4007)	(0.4953)
Low severity	0.8147	0.5942
	(0.3890)	(0.4916)
High severity	0.8450	0.6154
	(0.3632)	(0.4883)
Divorced		
No abuse	0.8002	0.5892
	(0.4007)	(0.4930)
Low severity	0.9053	0.6596
	(0.2950)	(0.4773)
High severity	0.8500	0.5949
	(0.3581)	(0.4924)
Remarried		
Current marriage		
No abuse	0.8449	0.6240
	(0.3623)	(0.4848)
Low severity	0.8182	0.6223
	(0.3879)	(0.4876)
High severity	0.9342	0.7129
	(0.2516)	(0.4590)
Previous marriage		
No abuse	0.8789	0.6891
	(0.3267)	(0.4635)
Low severity	0.8172	0.6053
	(0.3882)	(0.4909)
High severity	0.8164	0.5601
	(0.3879)	(0.4973)

Note: Standard deviations are in parentheses.

Table 5: Preference Parameters for Wives

	Single Not Working	Single Working	Married Working	Divorced Not Working	Divorced Working
Abusive spouse			0.2346	3.0010	3.2550
			(0.1518)	(0.1755)	(0.1826)
Abusive spouse, wife			-0.2991	-0.6527	-0.7195
has violent background			(0.1810)	(0.1821)	(0.1666)
Wife has violent	0.04388	-0.0496	-0.0376	0.1030	0.2443
background	(0.0725)	(0.0666)	(0.0697)	(0.0848)	(0.0654)
Child	-1.0750	-1.7770	-0.3039	-0.8100	-1.1900
	(0.1480)	(0.1212)	(0.0772)	(0.0852)	(0.0784)
High school	0.2456	0.5746	0.6926	0.1090	0.7596
	(0.0757)	(0.0938)	(0.0730)	(0.0832)	(0.1121)
Post secondary	0.4827	0.8642	0.9241	-0.0760	1.1360
	(0.0730)	(0.0918)	(0.0813)	(0.0971)	(0.1091)
Age/10	0.6204	1.9150	0.7772	1.1230	2.9800
	(0.2228)	(0.2698)	(0.3463)	(0.4199)	(0.3268)
Age2/100	-0.1055	-0.2800	-0.1019	-0.1749	-0.4010
	(0.0295)	(0.0344)	(0.0437)	(0.0531)	(0.0416)
Maritime	-0.3718	-0.2420	-0.2749	-0.0835	-0.6728
	(0.1016)	(0.0950)	(0.1083)	(0.1148)	(0.1120)
Quebec	-0.2780	-0.1617	-0.1540	0.0890	-0.1840
	(0.0863)	(0.0909)	(0.0969)	(0.1022)	(0.0973)
Ontario	-0.0836	0.1481	0.2806	0.0556	-0.1390
	(0.1013)	(0.0813)	(0.0932)	(0.1008)	(0.0956)
Prairie	-0.2264	0.0741	0.2415	-0.0115	-0.1486
	(0.0984)	(0.0866)	(0.0998)	(0.1098)	(0.1050)
Intercept	-1.0110	-3.0510	-1.5750	-1.1880	-4.9880
	(0.4005)	(0.5081)	(0.6530)	(0.7723)	(0.6274)
Probability Unknown Spousal Type is Non-Violent Family Background					
Married					0.9995
Divorced					0.0032
Remarried					0.0072
Log-likelihood value					-11744.3676

Note: Standard errors are in parentheses. Married, not working is the base category.

Table 6: Preference Parameters for Husbands

2^{nd} period intercept	-2.2630
	(0.1612)
4^{th} period intercept	-13.7500
	(0.2437)
Abusive in second period	10.7400
	(0.2879)
Husband has violent	2.0870
background	(0.2029)
Wife working	-0.5018
	(0.3306)
Wife working, husband	-0.3656
has violent background	(0.4061)
Log-likelihood value	-11744.3676

Note: Standard errors are in parentheses. Not abusive is the base category.

Table 7: Comparison of Couples with Differing Characteristics

	A	B	C	D
Marriage Rate				
Overall	0.8119	0.9250	0.9395	0.9985
Divorce Rates				
Overall	0.4171	0.5932	0.5335	0.3210
Abusive marriages	0.9225	0.8877	0.8303	0.6140
Non-abusive marriages	0.3812	0.4683	0.3848	0.1670
Employment Rates				
Currently married women in abusive marriages	0.7860	0.6740	0.4532	0.3900
Currently married women in non-abusive marriages	0.7526	0.7456	0.5377	0.4618
Divorced women from abusive marriages	0.9025	0.9194	0.5176	0.3385
Divorced women from non-abusive marriages	0.8778	0.9044	0.4709	0.2980
Never-married women	0.8691	0.8470	0.7245	0.4012
Abuse Rates				
Abuse rate in first marriages	0.0663	0.2978	0.3338	0.3446
Current period abuse overall	0.0003	0.0155	0.0266	0.0447
Current period abuse, employed wife	0.0003	0.0107	0.0149	0.0243
Current period abuse, non-employed wife	0.0004	0.0291	0.0398	0.0613

Table 8: Comparison of Actual and Predicted Choices

	Actual	Predicted
Marriage Rate		
Overall	0.9298	0.9594
Divorce Rates		
Overall	0.2434	0.2440
Abusive marriages	0.7595	0.7352
Non-abusive marriages	0.1847	0.1927
Employment Rates		
Currently married women in abusive marriages	0.5486	0.5708
Currently married women in non-abusive marriages	0.5832	0.5858
Divorced women from abusive marriages	0.5991	0.6300
Divorced women from non-abusive marriages	0.6166	0.6207
Never-married women	0.7877	0.7914
Abuse Rates		
Abuse rate in first marriages	0.1046	0.1137
Current period abuse overall	0.0060	0.0052
Current period abuse, employed wife	0.0057	0.0034
Current period abuse, non-employed wife	0.0065	0.0076

Table 9: Experiment 1: Reduce Wife's Tolerance for Abuse by 50%

	Baseline	Post Policy Predictions
Marriage Rate		
Overall	0.9594	0.9645
Divorce Rates		
Overall	0.2440	0.2668
Abusive marriages	0.7352	0.9060
Non-abusive marriages	0.1927	0.1968
Employment Rates		
Currently married women in abusive marriages	0.5708	0.5516
Currently married women in non-abusive marriages	0.5858	0.5859
Divorced women from abusive marriages	0.6300	0.6554
Divorced women from non-abusive marriages	0.6207	0.6327
Never-married women	0.7914	0.7915
Abuse Rates		
Abuse rate in first marriages	0.1137	0.1125
Current period abuse overall	0.0052	0.0021
Current period abuse, employed wife	0.0034	0.0013
Current period abuse, non-employed wife	0.0076	0.0032

Table 10: Experiment 2: Introduce a 1 Util Divorce Cost for Abusive Men

	Baseline	Post Policy Predictions
Marriage Rate		
Overall	0.9594	0.9565
Divorce Rates		
Overall	0.2440	0.2218
Abusive marriages	0.7352	0.7303
Non-abusive marriages	0.1927	0.1922
Employment Rates		
Currently married women in abusive marriages	0.5708	0.5663
Currently married women in non-abusive marriages	0.5858	0.5855
Divorced women from abusive marriages	0.6300	0.6282
Divorced women from non-abusive marriages	0.6207	0.6198
Never-married women	0.7914	0.7914
Abuse Rates		
Abuse rate in first marriages	0.1137	0.0737
Current period abuse overall	0.0052	0.0035
Current period abuse, employed wife	0.0034	0.0023
Current period abuse, non-employed wife	0.0076	0.0052

Table 11: Experiment 3: Eliminate the Effect of Family Background on Wife's Preferences over Marriage and Employment

	Baseline	Post Policy Predictions
Marriage Rate		
Overall	0.9594	0.9573
Divorce Rates		
Overall	0.2440	0.2364
Abusive marriages	0.7352	0.7398
Non-abusive marriages	0.1927	0.1838
Employment Rates		
Currently married women in abusive marriages	0.5708	0.5849
Currently married women in non-abusive marriages	0.5858	0.5873
Divorced women from abusive marriages	0.6300	0.6219
Divorced women from non-abusive marriages	0.6207	0.6092
Never-married women	0.7914	0.7959
Abuse Rates		
Abuse rate in first marriages	0.1137	0.1135
Current period abuse overall	0.0052	0.0050
Current period abuse, employed wife	0.0034	0.0034
Current period abuse, non-employed wife	0.0076	0.0073

Table 12: Experiment 4: Eliminate the Effect of Family Background on Husband's Predilection for Abuse

	Baseline	Post Policy Predictions
Marriage Rate		
Overall	0.9594	0.9566
Divorce Rates		
Overall	0.2440	0.2230
Abusive marriages	0.7352	0.7647
Non-abusive marriages	0.1927	0.1923
Employment Rates		
Currently married women in abusive marriages	0.5708	0.6028
Currently married women in non-abusive marriages	0.5858	0.5854
Divorced women from abusive marriages	0.6300	0.6271
Divorced women from non-abusive marriages	0.6207	0.6198
Never-married women	0.7914	0.7913
Abuse Rates		
Abuse rate in first marriages	0.1137	0.07125
Current period abuse overall	0.0052	0.0008
Current period abuse, employed wife	0.0034	0.0006
Current period abuse, non-employed wife	0.0076	0.0010

A Comparison of Average Characteristics for the Violence Against Women and 1993 Survey of Consumer Finances Samples

Table A1 compares similar samples from the VAWS and the 1993 SCF, a supplement of the Canadian Labor Force Survey similar to the March Current Population Survey in the U.S., to assess the representativeness of the former data set. Both samples are limited to women between the ages of 25 and 55 who are not attending school. The average characteristics of women in the VAWS and SCF data are similar, with three exceptions. First, total spousal income is higher in the SCF. It is likely that the measure of spousal income reported from the VAWS is inaccurate, as spousal income was constructed as the difference between the categorical variables"Total Personal Income" and "Total Household Income". Second, the proportion of women residing in an urban area is higher in the SCF. It should be noted that P.E.I. was not assigned a "Rural/Urban" indicator in the VAWS, and was thus coded as "Rural". Finally, the proportion of women with some post-secondary education is higher in the SCF and the proportions of women with high school and university degrees is lower. This latter difference could stem from coding or non-response pattern differences across the data sets. However, given the many similarities between the VAWS and the SCF especially in terms of employment patterns,[12] it does not appear the high non-response rate for the VAWS resulted in an unrepresentative sample.

[12]In the VAW, full-time employment applies to respondents reporting full-time work in the past year; in the SCF full-time employment applies to those reporting 'mostly' working full-time in the reference year.

Table A1 Comparison of Average Characteristics for the Violence Against Women and Survey of Consumer Finances (1993) Samples

Variable	SCF93 (1992 Income)	VAW (1993)
Total personal income	20,448.48	21,933.72
	(130.0261)	(214.0748)
Total spousal income	39,439.08	30,404.59
	(286.5227)	(257.1105)
Age of respondent	38.6668	38.9941
	(0.0582)	(0.1038)
Respondent resides in Nfld., N.S.,	0.0819	0.0859
N.B. or P.E.I.	(0.0019)	(0.0034)
Respondent resides in Quebec	0.2555	0.2694
	(0.0030)	(0.0054)
Respondent resides in Ontario	0.3793	0.3624
	(0.0034)	(0.0059)
Respondent resides in AB., SK.,	0.1575	0.1657
or MN.	(0.0025)	(0.0045)
Respondent resides in B.C.	0.1191	0.1165
	(0.0022)	(0.0039)
Respondent resides in an urban area[3]	0.8260	0.7456
	(0.0026)	(0.0053)
Highest level of education is less	0.2311	0.2071
than high school	(0.0029)	(0.0050)
Highest level of education is	0.2632	0.3197
high school	(0.0030)	(0.0057)
Highest level of education includes	0.3571	0.2964
some post-secondary education	(0.0033)	(0.0056)
Highest level of education is a	0.1486	0.1767
university degree	(0.0025)	(0.0047)
Respondent worked in the reference year	0.7882	0.7685
	(0.0028)	(0.0052)
Respondent worked or looked for work	0.8129	0.8165
in the reference year	(0.0027)	(0.0047)
Number of weeks worked for respondents	0.8767	0.8906
who reported working	(0.0020)	(0.0033)
Respondent worked full-time[4]	0.7652	0.7365
	(0.0036)	(0.0061)
Respondent worked part-time	0.2212	0.2635
	(0.0035)	(0.0061)

Note: standard errors in parentheses.

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