Bargaining, Intra-family Violence Laws and Acts of Domestic Violence in Mexico

Trinidad Beleche*
University of California, Riverside

October 31, 2009

Abstract

In the mid-1990s Mexican states began to adopt reforms to allow domestic violence as grounds for divorce and to explicitly define domestic violence as a punishable offense in the penal code. Administrative laws were also adopted to establish assistance programs for victims of domestic violence. These reforms can potentially shift bargaining power to the victims and alter intra-household bargained outcomes. Exploiting the heterogeneity that arises in the timing of law adoption across states I estimate the impact of these reforms on acts that are closely linked to domestic violence such as homicides, suicides and bodily injuries. States that adopted reforms to establish assistance and prevention programs saw a 20 percent decline in bodily injury crimes. The homicide rate committed against married and cohabiting males was 6 percent lower in states adopting assistance programs. Evidence also suggests that having alternatives outside of a potentially abusive relationship can explain 8 to 19 percent of the decline in suicide rates of married and cohabiting individuals.

JEL Classifications: J12, K36, 054

Keywords: domestic violence, intra-household bargaining, institutional reform, public policy

*University of California, Riverside, Department of Economics, 3122 Sproul Hall, Riverside, CA 92521. Email: trinidad.beleche@email.ucr.edu. I would like to thank David Fairris, Mindy Marks and Jorge Aguero for their valuable advice. I also thank the INEGI staff for answering data questions. I alone am responsible for any errors that remain.

1 Introduction

Domestic violence is a public health issue present in both developed and developing countries, but its prevalence is more severe in developing countries. In Mexico, a survey indicated that 40 percent of married and cohabiting Mexican women over the age of 15 had been victims of domestic violence in 2006.[1,2] Studies have shown that domestic violence is negatively associated with wages and health outcomes (Aizer, forthcoming), and student performance (Carrell and Hoekstra, 2008). Thus, determining whether public policy can affect behavior within the family becomes relevant because changes in domestic violence are likely to alter these outcomes for both current and future generations (Bowlus and Seitz, 2006; Pollak, 2002).

In the last decade Mexico altered laws surrounding domestic violence and this event produces an opportunity to examine behavioral changes effected by legal institutional reform. The Mexican legal reforms provided access to divorce, police reporting and assistance programs to victims of domestic violence. These reforms redistribute bargaining power to the person who has the most to gain from exiting a relationship. In exit-threat bargaining models these legal reforms improve opportunities outside the relationship, thereby creating a credible threat to exit the abusive relationship. For example, if prior to the reforms, victims opted for costly alternatives, e.g. murder or suicide, to escape an abusive relationship, the legal reforms provide a cheaper or more attractive opportunity outside the marriage that can be used to bargain for less violence in the household.

[1] Encuesta Nacional sobre la Dinamica de las Relaciones en los Hogares, (ENDIREH, 2006).

[2] In the U.S. the National Violence Against Women Survey found that 22 percent of women had been physically assaulted by an intimate partner at some point in their lives, and 1.3 percent reported such an event in the 12 months preceding a 1995 survey. <http://www.ncjrs.gov/txtfiles1/nij/183781.txt>

Exploiting the heterogeneity in the adoption of legal reforms across states, I investigate whether these reforms explain changing trends in potentially lethal and non-lethal ends of domestic violence such as homicides, suicides and bodily injuries. I use a set of administrative data on homicides, suicides and crimes that contain detailed information which allows me to explore outcomes that reflect the group most likely affected by the treatment of the reform. For instance, I examine suicides by marital status rather than overall suicides as has been done in studies on the U.S. Moreover, the richness of the data also provides me with other measures, e.g. other violent events that include information on the age of victims, and location where the event occurred, that serve as placebo tests to probe into the robustness of the results. Lastly, I examine another outcome, injurious behavior, that is likely to reflect domestic violence behavior that does not result in a fatal outcome.

Although it has been more than a decade since the first intra-family violence (IFV) reform took place, no study has examined the impact of these reforms in Mexico, or in other Latin American countries such as Brazil, Chile, and Colombia that have adopted similar reforms at the national level. This study poses an opportunity to shed some light on the impact that this type of policy can have in developing countries where opportunities outside of the marriage may be inherently low due to cultural and legal institutions. This study also allows for a comparison with studies done on the U.S., where opportunities outside the marriage may be higher.

The findings are suggestive of changes in household-bargained outcomes. I find evidence that male- and female-committed injury-related crimes were lower in states that provided assistance programs. I also find that states that adopted the reform to provide assistance programs saw a decline of about 6 percent in homicides committed against males. The

effects on homicides represent half of the effect found on intimate partner homicides against women in the US. In the U.S., states that adopted unilateral divorce–thereby improving outside opportunities–experienced a decline in female suicides. By contrast, Mexican states that gave access to assistance programs had an 8-18 percent decline in suicide rates of both men and women. While these effects are similar in magnitude with those found in the U.S., improving outside opportunities in Mexico had an impact on a broader population.

This paper is organized as follows. Section 2 presents the institutional background and economic framework. The empirical strategy and data are discussed in Section 3, followed by the results on bodily injuries (Section 4), homicides (Section 5) and suicides (Section 6). Robustness checks and a discussion on the results are presented in Section 7. The last section concludes.

2 Institutional Background and Economic Framework

2.1 Domestic Violence in the Mexican Legislature

Mexican laws of divorce and family relations are embedded in civil and penal codes that fall under each state's sovereignty. In the mid-1990s Mexican states[3] began to reform their penal and civil codes in an effort to update statutes that had not changed since the 1920s.[4]

In 1996 Mexico City became the first state to introduce the "Law of Access, Assistance and Prevention against Intra-family Violence" (Assist Law). Assist Law defined

[3]There are 31 states and the Federal District (Mexico City or Distrito Federal). Hereafter, I will refer to Mexico City as a state.

[4] As late as 1994, a Mexican Supreme Court ruled spousal rape as 'the undue exercise of a right.' www2.scjn.gob.mx/consultas/Comunicados, accessed March 2, 2009.

intra-family violence (IFV) and established objectives and conditions under which interdisciplinary agencies (Ministry of Education, Ministry of Health and Development, Ministry of Public Security, Department of Justice and a human rights commission) work together to increase public awareness and to provide prevention and assistance programs to victims of domestic violence. Under this law, IFV is defined as any recurring act aimed to control or harm–physically, verbally or psychologically–any member of the family that is related by blood or affinity (whether married or cohabiting) living inside or outside the family residence. Some of the objectives of Assist Law include: training and educating judges, law enforcement, health and social workers on domestic violence issues, running prevention and intervention programs, establishing shelters and centers that provide counseling, legal assistance and training to victims of IFV. Assist Law fosters a conciliatory process between the victim and the aggressor. Counselors serve as mediators suggesting solutions that are drawn into a contract agreed upon by the victim and the aggressor intended to prevent further domestic violence. Failure to fulfil the terms of the agreement can lead to prison, a restraining order, loss of alimony, or a fine.

Before states began to reform the penal code to explicitly define IFV, the penal codes covered crimes that were general, and which, for the most part, were consequences of aggressive behavior such as injuries or homicides. Sanctions for injuries were based on the severity of the wound, which was measured by the time it took to heal (15 days being the minimum for the injury to merit judicial intervention). Under the penal code reform (Penal Code) domestic violence(DV)[5] is defined as "the use of physical or moral strength of one

[5]Generally, the penal codes discuss IFV while the civil codes use DV. Hereon I will use IFV and DV interchangably.

member of the family on another family member against his or her physical or psychic integrity, independently of whether it results in injuries." It further stipulates that the crime can be committed by the spouse, concubine, any blood relative or other relatives up to fourth degree, and adopted or adopting members living in the same household. The sanctions vary by state, but generally range from six months to four years in prison, loss of alimony or custody rights, a fine or counseling requirements.

While retaining the traditional grounds for divorce, states reformed their civil codes to allow "acts of domestic violence committed by the spouse against another or against the children" as grounds for divorce (Divorce Law). Although there were other causes, such as extreme cruelty or threats, that existed prior to this reform, they were seldom used,[6] they did not explicitly define domestic violence, and the abusive spouse could still retain custody rights.

Table 1 lists the month and year in which each of the states adopted Assist Law, Domestic Law and Penal Code (the legal reforms) as of January 2007. This table shows that while some states adopted the legal reforms, others did not, and within the reforming states the changes occurred at various points in time: of the 32 states, Aguascalientes, Hidalgo, Chihuahua, and Yucatan had yet to adopt Assist Law, Tlaxcala Queretaro and Campeche had not adopted the Penal Code reform while there were six states without Divorce Law.

This study exploits the heterogeneity in the timing of the legal reform adoption across states to estimate the impact of IFV law reform on acts linked to domestic violence such as homicides, suicides and bodily injuries. The adoption of these reforms has occurred quite

[6] In the period 1992-1996, before the passage of the first reform, only 2.63 percent of all divorces used threats as a cause for divorce.

rapidly and evidence points to a change in behavior surrounding reform adoption. Figure 1 plots IFV crimes as a percent of total crimes committed after reform adoption. This figure illustrates that shortly after reform adoption, the percent of reported IFV crimes rose dramatically as access to reporting was facilitated by the reform. The percent of reported crimes continued to rise for approximately five years when it reversed to a downward trend. In Section 7, I discuss possible interpretations for why it may take time for shifts in behavior to occur; the next section presents the economic framework underlying this study.

2.2 Economic Framework

The modern literature on intra-household allocations focuses on bargaining models. Bargaining models relax the single household utility function and pooled budget constraint assumption of the Beckerian (Becker, 1981) common preference approach and instead allow husband and wife to have distinct preferences in determining a bargained family outcome. In these models, the presence of threat points, which represent the highest level of utility attainable when no agreement is reached, determines intra-family distribution through Nash bargaining between the wife and the husband. Manser and Brown (1980) and McElroy and Horney (1981) present a cooperative (exit-threat) bargaining model in which the value of the threat point can be altered by changes in opportunities outside of the marriage. On the other hand, in Lundberg and Pollack's (1993) non-cooperative or separate spheres bargaining model, the threat point is determined internally within the marriage and the distribution of marital rents is maintained by a threat of reversion to a non-cooperative equilibrium. Their model predicts that changing opportunities outside the marriage will have little effect on the

equilibrium outcome within marriage.

The legal reforms can impact the incidence of domestic violence through changes in the external threat point. For instance, prior to Divorce Law, a victim wishing to dissolve the marriage could leave without the spouse's consent. But in this case, the victim gives up the right to remarry and does not retain full legal child custody or alimony rights. Under Divorce Law, the value of the exit threat point increases for the abused partner, as the rights to custody, alimony and remarriage are preserved. If the abuser stays in the marriage, the legal reforms create a credible threat that can be used to prevent abusive behavior. Changes in domestic violence behavior can occur even if the threat to divorce (available through Divorce Law), to use a shelter,[7] (made possible through Assist Law) or to report the abuser to the authorities (available under Penal Code) is never exercised.

Domestic violence behavior can be affected by dissolution of the most violent relationships as marriage decisions might respond to divorce regime changes. However, Beleche and Lew (2008) find that Divorce Law had no impact on divorce or marriage rates. Thus, changes in domestic violence propensities could not be attributed to change in divorce regimes.

If murder was being used to escape a violent marriage, and the legal reforms provide cheaper alternatives, abused spouses might substitute away from committing homicides. As such, one would expect to see a decrease in homicides or other forms of domestic violence because the threat to exit, if abused, becomes credible. Similarly, to the extent that abused partners resort to suicide to flee abusive relationships, the option to divorce or to incarcerate the abused partner may deter this course of action. On the other hand, if husbands feel

[7] Farmer and Tiefenthaler (1996) find that the use of shelters and other services can be used as signal of the victim's unwillingness to tolerate domestic violence.

that Divorce Law threatens their "right" to abuse their spouse, a substitution of private for public enforcement of their marriage contract (through more violence at home) could result in an increase in domestic violence.

Stevenson and Wolfers (2006) apply the exit-threat model to examine the impact of unilateral divorce laws in the U.S., which transfer bargaining power to the abused, on domestic violence, suicides and homicides. They find that unilateral divorce laws led to a decline in: women murdered by their partners, female suicide and domestic violence for both men and women. In the Mexican context, two empirical studies indicate that changes in a wife's income–brought by Mexico's flagship conditional cash transfer program Oportunidades–contributed to a decline in husband's aggressive behavior towards his wife (Angelucci, 2008; Bobonis, Gonzales-Brenes and Castro, 2006). Based on an observation that not many women use shelters or seek legal assistance, Rivera-Rivera *et al* (2003) claim that the legal reforms may have no significant impact on reducing domestic violence. However, as discussed above, in the exit-threat bargaining model, the threat does not have to be exercised to observe changes in intra-household bargained outcomes.

3 Empirical Strategy and Data

3.1 Identification

In order to identify the causal effect of the laws on measures of DV the assumption is that the legal reforms are exogenous. Causal effects remain unidentified if the adoption of the legal reforms is correlated with time-varying unobservables that impact measures of

domestic violence. An examination of the homicide rates in 1996 (the year in which the first legal reform occurred) and the intensity of the legal reform adoption suggests there is no systematic relationship between legal reform adoption and homicide rates (Figure 3). Some of the northern states with low homicide rates had higher intensity of law adoption than states with medium to high homicide rates.

Although not a test for exogeneity, one way to explore the timing of law adoption is by regressing the lagged outcome on the contemporaneous law dummy indicator. If high levels of domestic violence lead to the adoption of the legal reforms, the coefficient should be positive and statistically significant. Table 2 suggests that Assist Law did not come first for states with historically high rates of various measures of domestic violence. However, the timing evidence is somewhat inconclusive for Divorce Law and Penal Code adoption. That is, by chance, some coefficients are expected to be statistically significant, but I am finding slightly more statistically significant effects than would be expected under the null of no effect. Yet, there is no systematic relationship between the signs of the effects and the outcomes that would pose a major threat to the identification of Penal Code and Divorce Law. The results suggest lower homicide rates occurred two years before Divorce Law adoption, but there is no effect for one year before law reform. Furthermore, the results point to a positive and statistically significant relationship between bodily injuries and male suicide rates two years before Penal Code adoption.

If evidence clearly indicated that states with higher incidence of domestic violence are adopting Penal Code reforms, the estimates on Penal Code would be upward biased. By contrast, one would be cautious about attributing any negative effects found on Divorce Law rather than to pre-existing trends. Since the results are inconclusive, I will still present

some results for Assist Law, Divorce Law and Penal Code; however, the reader is left to judge whether decreasing homicide levels pre-dated Divorce Law or whether high bodily injury rates preceded Penal Code adoption as well as the extent to which these undermine the results.

Aside from establishing exogeneity, there needs to be enough variation to precisely identify the effects. Figure 4 shows there is variation, geographically and politically, in the adoption of the reforms and that there are no discernible patterns with respect to law adoption. For example, the northern border states do not show any systematic tendencies to adopt a particular law: there are northern border states that are early adopters of Assist Law but late adopters of Divorce Law or Penal Code, and vice versa. There is also variation with respect to the adoption of Assist Law, Divorce Law and Penal Code within the southern states. Some of these states are both early and late adopters and there is no indication that adoption of any of these reforms follows any particular pattern.

3.2 Model Specification

Using a difference-in-difference approach, this research design exploits the fact that not all states adopted the legal reforms and those that adopted the legal reforms did so at different points in time. The benchmark specification is equation (1):

$$DV_{st} = \beta law_{st} + X'_{st}\theta + \gamma_s + \delta_t + \epsilon_{st} \tag{1}$$

where DV_{st} is a measure of the domestic violence outcome of interest (homicide rate, suicide rate or bodily injury crime rate) in state s at time t. law_{st} is a categorical variable equal to one

if state s had the reform for at least six months in year t. law_{st} can denote: allowing divorce as grounds for divorce (Divorce Law), defining IFV as a crime (Penal Code) or adopting an administrative law to assist victims of domestic violence (Assist Law). β is the average change in the outcome attributable to law adoption. γ_s represents state fixed effects that control for unobserved influences on measures of domestic violence that vary across states, while δ_t denotes year fixed effects that control for evolving unobserved national trends that affect measures of domestic violence.

X'_{st} is a vector of time-varying aggregate state level demographic controls for the sex ratio, population age structure, GDP per capita and percent of population enrolled in an undergraduate degree. Age structure represents the population ages 15-19, 20-29, 30-39, 40-49, 50-59, 60-64 and 65 and older for men and women and they capture changes in the age population that may impact the adoption of the law and the incidence of domestic violence. That is, if domestic violence behavior is more prevalent among a certain age group and a higher proportion of this age group in a state's population induces legal reform, then omitting it would lead to biased estimates. The sex-ratio serves as a proxy for changes in female empowerment which may affect both law adoption and changing attitudes towards domestic violence. If wealthier states or states with a higher proportion of educated people are more likely to adopt these reforms and these factors are associated with lower (higher) domestic violence propensity, then my estimates would be biased downward (upward). Finally, because the legal reforms are more likely to affect groups that are in a relationship and there could be differential attitudes or behavior surrounding the outcomes of interests, all the specifications are estimated separately for men and women, and where possible, by marital status. To address concerns of serial correlation (Bertrand, Duflo and Mullainathan,

2004) standard errors are clustered at the state level.

One of the limitations with equation (1) is that the single dummy indicator captures the full adjustment process of the policy shock and does not map out the dynamic response of the adoption of the outcome to the legal reform. It is plausible that it takes time for information about the laws to be disseminated or for spouses to understand their new bargaining power; thus, a preferred specification–similar to Stevenson and Wolfers (2006)–is presented as equation (2). In this equation, ϕ_k,for $k = 1, 2, ..., 7$,is the estimated coefficient of a dummy law indicator that captures the

$$DV_{st} = \sum_{k=1}^{7} \phi_k law_{st} + X'_{st}\pi + \eta_s + \nu_t + \varsigma_{st} \tag{2}$$

effect of the law before and after law adoption. For instance, the first and second dummy indicates, respectively, 2 and 1 years before the law is adopted, the third denotes the year that a given law was changed, and the rest of the dummies is equal to one if the law has been in effect 1-2 years, 3-4 years, 5-6 years and more than 7 year.[8] η_s and ν_t represent the state and year fixed effects, respectively.

3.3 Data

Information on the legislative changes was gathered by reviewing historical statutes of civil codes, penal codes and administrative laws for each of the 32 states available on the Mexican National Supreme Court of Justice's web site. The year of the legal reform was determined using the date in which the legal reform was published in the Official Newspaper (Diario

[8] I chose one-year intervals because I do not observe outcomes for four years prior to the law for some of the states.

Oficial). To allow for the possibility that it takes time for information to disseminate or for implementation to occur, I code the adoption of the legal reform to have occurred in the current year if it has been published for at least six months. The states of Colima and San Luis Potosi are excluded in the analysis because the publication dates for the adoption of Penal Code could not be verified.

Administrative data on homicides come from Mexico's Vital Statistics provided by the National Institute of Statistics and Geography (INEGI), and compiled from death certificates of all deceased persons in the country for 1994-2006. The individual level data used in this study contain a rich set of information that include actual acts of domestic violence for a given period; thereby allowing me to provide support for the choice on the measures used. Moreover, the data also enable me to explore suicides by marital status, which capture groups that are more likely affected by the legal reforms, but which was not possible in the U.S. study by Stevenson and Wolfers (2006).

In the case of violent deaths, such as homicides, by law, a coroner or forensic authority must certify the cause of death before burial proceedings can take place; thus, it is unlikely that under-reporting is a major concern in this database. The extent to which homicides are reported as suicides introduces measurement error in the dependent variable, which does not affect the unbiasedness of the results. Since some violent relationships end in homicides, intimate partner homicides would seem the appropriate measure to analyze. Yet, the death certificates do not contain information on the perpetrator or on the relationship of the murderer to the victim.[9] An advantage of the data, however, is that IFV murders can be

[9]Even if these data existed, problems would arise if classification of spousal relationships changed due to legal regime adoption. Stevenson and Wolfers, (2006, p. 283)

identified for 2000-2006, and these data reveal demographic characteristics about victims of IFV that are consistent with other studies. Table 3A shows that IFV murder victims are more likely to be married or cohabiting, that they are more likely to work in non-professional occupations and have low levels of educational attainment. The data also show that more than 43 and 71 percent of male and female IFV homicides, respectively, occurred in the victim's home. Thus, for the period of analysis, I will use homicides committed in the victim's home to proxy for IFV homicides. It is worth noting the data also reveal that men are the victim in 55 percent of all IFV homicides. At first, this may seem at odds with the usual assumption that men are the perpetrators of domestic violence, however it brings forth the possibility that if men are the usual culprits of domestic violence, their acts do not result in a fatal outcome while women's acts do. This story is consistent with a study that found that in many cases Mexican women kill a relative as a result of persistent and long-lasting domestic violence (Azaola, 1995). When analyzing the homicide rate of all persons, not just those who are married or cohabiting, the estimates capture the effect of the legal reforms on murders that may not be related to domestic violence. However, due to sample size restrictions on the number of female murders I am not able to run the analysis by marital status for homicides committed against women.[10]

For suicide rates I have two sources of data: death certificates for 1994-2006 from Vital Statistics and deputy officer's reports on suicides and attempted suicides for 1996-2006 (Attempted Suicides). The advantage of the latter is that I can identify the cause (e.g. love, family arguments, financial, remorse) of the suicide for about fifty percent of the acts in the

[10]The counts by marital status for women show 117 and 34 state-year cells where there were no murders for single and married/cohabiting, respectively. This is unlikely due to non-reporting as the state shows murder counts for the entire year, but not for the given marital status.

sample. In Table 3B I present descriptive statistics drawn from each database. The last two columns show that most of the events where the cause is reported was due to "love" or "family arguments," followed by illness. These data provide some evidence that suicides are plausibly associated with domestic violence. There are a couple of disadvantages in using the Attempted Suicides database: INEGI did not begin collecting it until 1995 and there are cases in which three states do not report any suicides for 2006, while there are suicides reported in Vital Statistics for these states. Table 3B shows that the demographic characteristics are similar for the two databases, and to increase the sample size, the main specifications using suicides will draw from the death certificate data.

Crime data come from INEGI's Judicial Statistics in Penal Matter (Arrest data) available for 1997-2006, which are gathered from incidents reported to and investigated by law enforcement agencies (Ministerio Publico or public prosecutor). Arrest data include information for up to the first six[11] of all offenses associated with an investigation such as: the alleged criminal's state of residence, age, marital status, schooling, occupation, the psychic state of the individual at the time of the act (sober, under the influence of alcohol or drugs), the intent and degree of completion of each offense. Table 3C shows that a large portion of the perpetrators of IFV (crime code 171200) are married or cohabiting, but that IFV crimes are also committed by singles. Low levels of educational attainment are also associated with IFV crimes. Alcohol consumption also appears to be related with male-committed IFV crimes. Interestingly, compared to men, there is a higher percent of women who commit IFV crimes when sober and that are sent to prison. The first two columns in Table 3C show characteris-

[11] In 2003, INEGI began collecting information for up to 99 counts. This change did not alter the composition of the counts. Before and after 2003, 99 percent of the arrests were associated with 3 counts.

tics of female- and male-committed crimes related to "injuries", (crime code 170300[12]), and "threats" (crime code 210500[13]) Note that the demographic characteristics of the alleged suspects are also similar to those who committed IFV crimes. Because prior to Penal Code adoption, IFV crimes were likely to be reported as injuries and threats, I combine injuries, threats and intra-family violence crimes to construct a measure that I call "bodily injuries" to capture acts of domestic violence. Undoubtedly, issues of under-reporting are a concern because not all crimes are reported and not all reported crimes result in arrests.[14,15] If the most abused victims or those that might be most likely to benefit from improved outside opportunities, are less prone to report then my estimates should be interpreted as a lower bound.

Finally, to construct a balanced panel of state level homicide, suicide and bodily injury crime rates, age structure and sex ratio measures, I use state level time-varying population counts available by gender and age group from the Mexican Population Council (CONAPO). GDP per capita is from INEGI's National Accounts, and educational measures are from the Ministry of Education.

[12]Injury crime is defined as an act "committed by any person who by any means infringes a harm against the health of another."

[13]Threat is committed by anybody who "announces the intention to cause a harm against another person, against their reputation, goods or rights, against someone and is linked by any bonds or ties."

[14]The Mexican criminal procedure starts with a preliminary investigation by the Public Ministry, who acts as the highest authority. In order to formally begin a criminal procedure, the Public Ministry must compile evidence of probable responsibility and present the evidence and accused to a judge. If the judge finds probable cause, the procedure begins. If the Public Ministry does not compile enough evidence, it cannot prosecute the accused and the case is archived.

[15]In 2004, there were 77,961 new preliminary investigations (for all crimes), out of which 42 percent was sent to a judge. Of the 42 percent, 58 percent resulted in an arrest. <www.pgr.gob.mx> accessed October 4, 2009.

4 Bodily Injuries

In this section I use bodily injury crimes to shed some light on injurious behavior closely related to domestic violence that did not result in a fatal outcome. The dependent variable is determined by combining the number of alleged injury, threats and IFV-related crimes committed per 100,000 persons for 1997-2006. As a first pass, I estimate the average impact of the legal reforms on bodily injury rates, and present the results in the first row of Table 4's Panel A (male-committed crimes) and Panel B (female-committed crimes). Although the coefficients are imprecisely estimated, the findings indicate that reforming states experienced lower bodily injury crimes committed by the married and cohabiting group.

Given data constraints I cannot observe pre-law adoption injuries for states that adopted the reforms on or before 1997; thus, equation (2), which estimates the evolution of the reforms, is estimated without pre-law adoption indicators. The estimates are presented from the second to the sixth row of each panel in Table 4. The effects of Divorce Law and Penal Code are not statistically significant and do not show a clear pattern on the direction of any possible effects. Notwithstanding, the results for Assist Law tell a different story. There are negative and statistically significant effects on bodily injury crime rates. In particular, the effects grow with time and affect the married and cohabiting group more than the single group. Although the effects are larger for men, the results suggest that female-committed bodily injury crimes were lower in states that adopted Assist Law. Averaging the effects, Assist Law can explain 20 and 19 percent of the decline in male- and female-committed crimes, respectively, related to bodily injury crimes.

Surprisingly, Assist Law also reduced the crimes committed by single females. This

result points to another public health concern in Mexico: violence among adolescent dating couples. A nationally representative survey revealed that 15 percent of individuals of ages 15-24 experienced at least one act of physical abuse in the current dating relationship, and reported that in 61 percent of these cases, the victims are women.[16] If this group experiences acts of violence that induce them to commit other acts of violence, Assist Law seems to have provided alternatives to such behavior. Having found no effects on Divorce Law and Penal Code, I will focus on Assist Law and discuss Divorce Law and Penal Code where effects are found.

To further probe into the results I examine the evolution of Assist Law on bodily injury crimes by age groups and graph the estimates in Figure 4. I estimate the evolution with 2-year and 1-year pre-law adoption indicators, so effects are identified off the post-1999 reforming states. The coefficients are close to zero, which provide some evidence of a causal interpretation. There is also indication of a decline in bodily injury crimes committed by both men and women 4 years after law adoption, results that are consistent with Figure 1 where an observed decrease in IFV crimes as percent of all crimes began to occur 4.5 years after law adoption. Most of the effects are driven by the 20-44 year-olds, and no effects are found for the 55 and older age group. Again, the results suggest that there was a change in behavior in the groups more likely to be involved in a relationship and therefore to domestic violence.

[16] Encuesta Nacional de Violencia en las Relaciones de Noviazgo (ENVINOV), 2007.

5 Homicides

So far the evidence indicates that states that adopted Assist Law saw a decline in bodily injury crimes. Now, I explore whether there were other observed behavioral changes on potential acts of domestic violence that ended in a fatal outcome. The dependent variable is the homicide rate (number of homicides committed in the victim's home per 100,000 population) determined separately by gender for all persons and then by marital status for men. The estimates are presented in Table 5, and for expositional purposes I include the specifications with and without controls. While the findings indicate no discernible effect on female homicide rates, the negative sign on Assist Law is consistent with the story that women's wellbeing might have improved due to better outside opportunities. For male homicides (row 1), the model without controls suggests that states which adopted Assist Law experienced lower male homicide rates, again, showing a larger effect on the married and cohabiting group. Once the controls are added, the standard errors are smaller and the coefficients remain negative but become statistically insignificant.

The coefficients of the controls (not shown) point to behavioral differences by marital status. For instance, among singles, higher proportions of 15-19 year -olds are associated with more male homicides while among women, the proportion of 30-39 year -olds is positively associated with female homicides. A higher proportion of the population obtaining an undergraduate degree is negatively associated with female murders. Individually, except for the proportion of the 20-29 year-olds in the specification of homicides of single males, and the 30-39 year-olds in the female murders, most of the controls are not statistically significant. However, I will keep the controls because an F-test shows these controls are

jointly statistically significant, and irrespective of whether these controls are correlated with law adoption, they explain criminal or violent behavior.

The estimates of equation (2) are also shown in Table 5 in rows (2) to (8) for Assist Law.[17] Consistent with estimates of equation (1), there are no discernible effects on female homicide rate, but there are negative and statistically significant effects for Assist Law on the homicide rate of the married and cohabiting group. Focusing on the married and cohabiting group a couple of things are worth noting. First, the estimates on the dummies indicating 2 years and 1 year prior to Assist Law are close to zero and statistically insignificant (individually or jointly). This points to a causal interpretation of the results. Second, the results are not sensitive to the inclusion of controls.[18] Moreover, note that the largest effects are observed after 5 years and that the estimates continue on a downward path.

Thus far, the findings suggest that if Mexican women were committing murders to escape domestic violence, access to counseling, shelters or legal assistance induced behavioral changes in the household, just as the model predicted. Averaging the estimates over the period following adoption, Assist Law explains 6 percent of the decline in the average married and cohabiting male homicide rate. The magnitude of the effect is about half of that found by Stevenson and Wolfers (2006). In addition, Stevenson and Wolfers found that improved outside opportunities available through unilateral divorce led to a decline in male murders but found no discernible effects on intimate murders committed against women. Can these differences be reconciled? U.S. data show there is a higher incidence of females being mur-

[17] This analysis was done also for Divorce Law and Penal Code and the results show no discernable effect. Results are available upon request.

[18] The results are also robust when I exclude one state at a time. For the preferred dynamic specification of the married and cohabiting group, on average, the coefficient for 5-6 years and >6 years is -0.68 and -0.72, respectively.

dered by their spouse. Since there are no Mexican data on intimate homicides I cannot make direct comparisons that would allow me to conclude whether the husband or the wife is more likely to murder his or her spouse. Notwithstanding, arrest data show that Mexican women are equally likely as men to successfully murder a family member. Moreover, a study reported that 8 percent of males incarcerated for homicide had killed a family member while the rest of the convictions involved males killing strangers in street confrontations or assaults. By contrast, the same survey showed that 76 percent of incarcerated women had been convicted for killing a relative (Azaola,1995).

6 Suicides

If women commit suicide as a device to escape an abusive relationship, suicidal behavior can capture the result of a domestic violence act. The dependent variable used is the suicide rate (number of suicides per 100,000 persons) of all persons and then it is disaggregated by marital status.[19] If marriage decisions respond to Divorce Law or Penal Code one would be concerned about endogeneity when using the suicide rates by marital status. However, previous work found that Divorce Law had no impact on divorce rates. I also regressed the Penal Code law indicator on divorce rate and a set of state-varying controls such as education, GDP per capita, migration and fertility rates and found no evidence that Penal Code had any effects on marital dissolution.

The results from estimating equation (1) are shown in row (1) of Table 6. Without controls, the coefficients on Assist Law are negative but not statistically significant, and

[19] Using linear interporlation, I estimated the suicide rates for the state of Tlaxcala that showed no suicides for the entire year in 2000. The results do not change when this state is excluded entirely from the analysis.

when controls are added, the coefficient on Assist Law switches sign for the married and cohabiting male group. Given the wide confidence intervals, the estimates of the second column could go in either direction. One possible story for finding positive effects would argue that marital dissolution can lead to more unhappy spouses and hence to higher suicidal behavior. However, since I have not found evidence that marital dissolution is being directly affected by Divorce Law and Penal Code, this story seems unlikely.

Examining the evolution of Assist Law adoption on suicide rates I find statistically significant effects which indicate that suicide rates of the married and cohabiting group began to decline 3 years after the adoption of Assist Law (see rows (6)-(7)). Table 6 also shows that inclusion of controls does not change the coefficients significantly, and that the drop in the suicide rate did not pre-date the adoption of Assist Law. Moreover, inclusion of the controls also reduces the standard errors.

As an additional check, I explore the overall suicide rates by age groups. The overall suicide rate captures the effect of the reform on suicides for those who remain in a relationship and for those who exit. If the legal reforms are directly affecting suicide propensities one might expect that they should impact prime-age individuals more than teens or the elderly. Figure 5 presents the estimates of equation (2) with dummies to indicate periods before Assist Law for both men and women. Due to small sample sizes I include the elderly in the 55 and older category and create a separate category for those whose age cannot be determined. The top panel of Figure 5 illustrates that Assist Law had no impact on males ages 14 and younger, which may reflect both a relatively small number of suicides in this age group and little relationship between the legal reforms and suicide rate. As expected, the results indicate the male age groups 25-34 and 45-54 contributed the most to the decline.

The 55 and older male age group seemed to have also contributed to the decline, although the standard errors are less precisely estimated. For women, the 35-44 age group contributed the most to the decline in female suicide, while the teens and the elderly did not.

Overall, evidence suggests that a shift in bargaining power through Assist Law created alternatives to exit the abusive relationship. Averaging the effects over the years following Assist Law reform points to a long-run decline of 11 and 19 percent in male and female suicide rates, respectively. Interestingly, Stevenson and Wolfers' (2006) study found that improvements in bargaining power via unilateral divorce laws led to a decrease in female suicide rates of about 8-10 percent, but concluded there were no effects on male suicide rates. Yet, suicide prevalence and the circumstances surrounding the decision to commit suicide differ between Mexico and the U.S. First, religiosity may explain why suicide rates are, in general, lower in developing countries. Second, in Mexico, the main reason for suicide is love or family disputes, while in the U.S. the Center for Disease Control reports that at least half of the cases where the cause was known were related to mental illness.[20] Thus, improving outside opportunities for the group more vulnerable to suicide seems to be altering such behavior for both men and women.

7 Robustness Checks and Discussion

7.1 Pre-existing Trends

One concern is attributing changes on the outcomes of interest to Assist Law adoption rather than to pre-existing trends. To determine whether I have identified the effects of the legal

[20] http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5526a1.htm, accessed September 24, 2009.

reform separately from other confounding effects, I conduct a battery of placebo tests in which I use the same empirical strategy on a set of outcomes that are products of violent outcomes but should not be affected by the domestic violence legal reforms.

As a first check, I conduct the same exercise using homicides committed in public places,[21] and present the results in Table 7A. I present the static (row (1)) estimates for all legal reforms and the evolution (rows (2) to (8)) of Assist Law. Table 7A shows there is no relationship between homicides committed in public areas and legal reform adoption, and hence no indication that pre-existing trends are driving the results of Tables 4 to 6. The evolution of Assist Law provides further evidence of no relationship over time. Estimates of the evolution of Divorce Law and Penal Code adoption suggest that the Penal Code and Divorce Law are not associated with homicides of singles and married and cohabiting groups that were committed in public places.[22] As an additional robustness check, I use thefts, which are the most common crime in Mexico, and represent more than 30 percent of total crimes reported during the period of analysis. Table 7B reports the estimates of equation (1) where annual thefts per 100,000 population is the dependent variable. As Table 7B shows, there is no indication that legal reform adoption is associated with thefts. The findings (not shown) from the dynamic specification do not unduly change the results.

7.2 Coding of Legal Reforms and Inclusion of Large States

A couple of issues arise with respect to coding the year of legal reform adoption. First, recognizing that a reform is adopted sometime during the year raises the question of whether

[21] These include homicides committed at work, public building or recreational area.
[22] Results available upon request.

the given state should be considered a control or a treatment state. I address this by conducting the same analyses done in Tables 4-6 excluding the year in which the reform occurred. The modification (not shown) does not change the results discussed in Sections 4 to 6. For example, when either suicides or homicides is the outcome, the coefficients change slightly (for example from -0.67 to -0.511 for '5-6 years later' when homicide is the outcome) but the negative and statistically significant effects remain for the same years following law adoption. Moreover, the coefficients are not statistically significant and are close to zero in periods preceding law adoption. When bodily injuries is the outcome, excluding the year of reform results in estimates that are smaller for the married and cohabiting male group on Assist Law but the other results do not change significantly. Second, I ran all the specifications under two other cases. In the first case, the year of reform dummy is one if the reform has been in place for any period of time during the current year. In the second case, the year of reform dummy is one if the law has been in effect for 12 months in the current year. The findings suggests that the results are not sensitive to the coding of the year.

In further robustness checks, and to address the concern that certain states are driving the results, I omitted individual states one at a time for each of the outcomes and the results remain.

7.3 Discussion

In light of the results, why are effects found for Assist Law but not for Divorce Law or Penal Code? Some interpretations are plausible. The first is that Assist Law provides an immediate (through a conciliatory contract) and less costly solution to domestic distress.

Since most victims of domestic violence are women who are uneducated and who do not work, victims might believe that incarcerating or divorcing the husband will leave them without recourse. Depending on the state, an IFV offender may be incarcerated for a period that can range from 3 months to 6 years, and it is possible that this punishment may be perceived as too harsh for victims who depend financially on the aggressor. A study by Kessler and Levitt (1996) found that punishments broader in scope and less punitive may prove more effective to fight crime.

Another explanation is that reputation of law enforcement may reduce incentives for police reporting. Studies suggest that reporting is more likely if there is high probability of punishment (Ehrlich, 1996). Anecdotal evidence points to cases where the Public Ministry did not conduct a preliminary investigation required to proceed with judicial procedures even when the victim initiated legal action against the aggressor (Perez Contreras, 2000; COVAC, 1995). Since social workers provide conciliatory alternatives and do not report the aggressor to the authorities unless the victim authorizes it, there is less of an association with the judicial system–and hence to low probability of law enforcement or punishability–attached to the services provided by Assist Law.

Even though Divorce Law stipulates that child custody, alimony and child support be given to victims of domestic violence, some evidence suggests that collection of these transfer payments might prove difficult in developing countries (Goode, 1993). Furthermore, some states require evidence–a witness, medical report, and specific accounts on recurring domestic violence events–before it can be used as grounds for divorce. It is also likely that domestic violence is simply perceived as a spousal obligation rather than a crime or a reason to divorce. Thus, Assist Law–through public awareness campaigns–may be an underlying mechanism

through which social norms and intra-family behavior is changing. However, it takes time for effects to percolate through Mexican society. First, Assist Law requires coordination of multiple agencies which might slow down the time it takes for states to fully implement the law. Second, the time it takes to train law enforcement, social and health workers expands the time before behavioral changes are observed.

8 Conclusion

Examination of the evolution of the legal reforms surrounding domestic violence consistently showed that improving opportunities outside a potentially abusive relationship, such as access to shelters and counseling, changed the trends in homicides, suicides and bodily injuries of married and cohabiting individuals. Specifically, bodily injury crimes are lower by about 20 percent in states that adopted the administrative law to provide support and assistance to victims of domestic violence. I found that homicide rates against men and suicides were also lower in states that adopted such reform.

A comparison of the results in this study with those of a study done on the US reveals that there are large effects to improving outside opportunities outside the relationship in an environment where the prevalence of domestic violence is more severe and where the outside opportunities without institutional reform might be lower than developed countries. The findings suggest that Assist Law might have created a mechanism through which domestic violence could be mediated. Moreover, the extent to which government policy can affect family outcomes linked to domestic violence has greater implications on employment, health, wages and educational outcomes and inter-generational behavior.

References

Aizer, Anna. "The Gender Wage Gap and Domestic Violence" *The American Economic Review*, (forthcoming).

Angelucci, Manuela, (2008). "Love on the Rocks: Alcohol Abuse and Domestic Violence in Rural Mexico," *The B.E. Journal of Economic Analysis & Policy*, 8(1) (Contributions): Article 43.

Azaola, Elena,"El Derecho de Ser Mujer. Hombres y Mujeres Homicidas en la Ciudad de Mexico: Historias de Vida" Centro de Investigaciones y Estudios Superiores en Antropologia Social (CIESAS) and Editorial Plaza y Valdes, Mexico, October 1996.

Becker, Gary, (1981). A Treatise on the Family. Harvard University Press: Cambridge.

Beleche, Trinidad and N. Lew, (2008). "Till Laws Do Us Part? The Impact of Changing Divorce Laws on Divorce Rates in Mexico," Unpublished Manuscript.

Bertrand, Marianne, E. Duflo, and S. Mullainathan (2004). "How Much Should We Trust Differences-in-Differences Estimates?" *Quarterly Journal of Economics*, 119 (1): 249-275.

Bobonis, Gustavo, R. Castro and M. Gonzalez-Brenes, "Public Transfers and Domestic Violence: The Roles of Private Information and Spousal Control," Unpublished Manuscript, July 2009.

Bowlus, Audra, J., and S. Seitz, (2006). "Domestic Violence, Employment, and Divorce," *International Economic Review*, 47(4): 1113-1149.

Coase, Ronald H. (1960). "The Problem of Social Cost," *Journal of Law and Economics*, 3: 1-44.

Asociacion Mexicana contra la Violencia hacia las Mujeres, (COVAC) "Encuesta de Opinión Pública sobre la Incidencia de Violencia en la Familia," Mexico City, 1995.

Diaz Aranda, Enrique (2006). "Criminality and Criminal Law in Mexico," *Mexican Law Review*, 6: 163-174.

Ehrlich, Isaac, (1996). "Crime, Punishment, and the Market for Offenses," *Journal of Economic Perspectives*, 10: 43-67.

Goode, Williams J., (1993). World Changes in Divorce Patterns. New Haven and London: Yale University Press.

Kessler, D., and S.D. Levitt, (1999). "Using Sentence Enhancements to Distinguish Between Deterrence and Incapacitation," *Journal of Law and Economics*, 42: 343-363.

Lundberg, Shelly, and R. Pollak, (1993). "Separate Spheres Bargaining and the Marriage Market," *Journal of Political Economy*, 101(6): 988-1010.

Lundberg, Shelly, and R. Pollak, (1994). "Noncooperative Bargaining Models of Marriage," *AEA Papers and Proceedings*, 84(2): 132-137.

Lundberg, Shelly, and R. Pollak, (1996). "Bargaining and Distribution in Marriage," *Journal of Economic Perspectives*, 10(4): 139-158.

McElroy, Marjorie B., and M. J. Horney, (1981). "Nash-Bargained Household Decisions: Toward a Generalization of the Theory of Demand," *International Economic Review*, 22(2): 333-349.

Manser, Marilyn, and M. Brown, (1980). "Marriage and Household Decision-Making: A Bargaining Analysis" *International Economic Review*, 21(1): 31-44.

Perez Contreras, Maria de Monserrat, (2000). "La Ley de Asistencia y Prevencion de la Violencia Familiar para el Distrito Federal: Comentarios en Torno al Contenido de sus Reformas," *Boletin Mexicano de Derecho Comparado*, 38(98): 909-924.

Pollak, Robert A., (2004). "An Intergenerational Model of Domestic Violence," *Journal of Population Economics*, 17: 311-329.

Stevenson, Betsey and Justin Wolfers, (2006). "Bargaining in the Shadow of the Law: Divorce Laws and Family Distress," *Quarterly Journal of Economics*, 121(1).

Rivera-Rivera, L., E. Lazcano-Ponce, J. Salmeron-Castro, E. Salazar-Martinez, R. Castro and M. Hernandez-Avila, (2003). "Prevalance and Determinants of Male Partner Violence Against Mexican Women: A Population-based Study," *Salud Publica de Mexico*, 46(2): 113-122.

Tauchen, Helen V., D. Witte and S. K. Long, (1991). "Domestic Violence: A Nonrandom Affair," *International Economic Review*, 32(2): 491-511.

Tauchen, Helen V., and A. D. Witte, (1995). "The Dynamics of Domestic Violence," *The American Economic Review*, 85(2), Papers and Proceedings of the Hundredth and Seventh Annual Meeting of the American Economic Association Washington, DC. January 6-8, 1995: 414-418.

Garcia-Moreno, Claudia, H. E.F.M. Jansen, M. Ellsberg, L. Heise, and C. Watts, (2005) "WHO Multi-country Study on Women's Health and Domestic Violence Against Women" World Health Organization.

Table 1
Month and Year of Introduction of Legal Reforms by State

State	Assist Law	Divorce Law	Penal Code
North			
Baja California	07/2003	09/2004	06/1998
Baja California Sur	03/2005	01/2002	03/2005
Coahuila	01/1997	06/1999	05/1999
Chihuahua		09/2001	02/2001
Nuevo Leon	02/2006	01/2000	01/2000
Sinaloa	07/1998	10/1998	09/2000
Sonora	12/1999	05/2001	05/2001
Tamaulipas	06/1999	06/1999	06/1999
Central			
Distrito Federal	07/1996	12/1997	12/1997
Hidalgo			01/2002
Mexico	12/2002		03/2000
Morelos	01/1999	09/2006	06/2004
Puebla	04/2001		09/2003
Queretaro	12/1996		
Tlaxcala	05/2001	01/2006	
West-Central			
Aguascalientes		11/2001	02/2001
Colima*	02/1998	03/2000	11/2005
Durango	12/1999	05/1998	04/2004
Guanajuato	02/2000		11/2001
Jalisco	12/2003		09/2000
Michoacan	02/2002	04/2001	04/2001
Nayarit	05/2004		12/2004
San Luis Potosi*	11/2001	10/1998	03/2003
Zacatecas	02/2003	02/2003	08/2001
South-East			
Campeche	06/2002		
Chiapas	07/1998	11/2004	08/2001
Guerrero	04/1999	11/1999	04/1999
Oaxaca	09/2001	02/1998	02/1998
Quintana Roo	06/2000	07/2004	06/2006
Tabasco	04/1999	05/2003	05/2003
Veracruz	09/1998	09/1998	09/1998
Yucatan			03/2000

* Publication date for Penal Code could not be verified.
Blanks indicate that no law had been passed as of January 1, 2007.

Table 2
Lagged Outcomes on Law Indicator

Lag of:	Female Suspects/Victims			Male Suspects/Victims		
	Bodily Injuries	Suicides	Homicides	Bodily Injuries	Suicides	Homicides
	Assist Law			Assist Law		
[t-1]	0.004	0.014	-0.042	0.000	-0.007	0.009
	(0.006)	(0.037)	(0.056)	(0.001)	(0.013)	(0.026)
[t-2]	0.002	-0.010	-0.047	0.000	-0.001	-0.009
	(0.007)	(0.035)	(0.062)	(0.001)	(0.009)	(0.022)
	Divorce Law			Divorce Law		
[t-1]	0.004	0.038	0.02	0.002	0.014+	0.005
	(0.005)	(0.033)	(0.039)	(0.002)	(0.008)	(0.017)
[t-2]	-0.007	0.016	-0.087**	-0.001	-0.005	-0.037*
	(0.005)	(0.029)	(0.041)	(0.001)	(0.011)	(0.011)
	Penal Code			Penal Code		
[t-1]	0.009	0.036	-0.023	0.000	-0.007	-0.01
	(0.008)	(0.035)	(0.047)	(0.002)	(0.011)	(0.025)
[t-2]	0.014**	0.052+	-0.043	0.003+	-0.008	-0.028
	(0.006)	(0.027)	(0.046)	(0.001)	(0.010)	(0.017)

+ significant at 10%; ** significant at 5%; * significant at 1%

Period: 1996-2006 (n=275) for suicides and homicides, 1999-2006 (n=170) for bodily injuries. States of Colima and San
All specifications include year and state fixed effects and state level controls. Standard errors are clustered at state
Controls includes state GDP per capita, percent of population enrolled in an undergraduate degree, and male-female
The dependent variable is the respective law indicator for state s in year t.

Suicides, homicides and bodily injuries are the annual state level counts per 100,000 population.

Table 3A
Summary Statistics of Homicides by Victim's Gender

Variable	1994-2006 All Homicides Male Victims	1994-2006 All Homicides Female Victims	2000-2006 IFV Homicides Male Victims	2000-2006 IFV Homicides Female Victims
Marital Status (%)				
Single	34.61	29.8	23.57	11.22
Married/Cohab	54.31	41.91	57.89	64.16
Div/Sep/Widow	3.63	11.5	4.93	5.47
Unknown	7.45	16.79	13.6	19.15
Occupation (%)				
None	7.31	48.64	6.25	57.18
Prof/Teach/Admin	3.64	3.78	2.63	3.01
Agriculture	25.1	1.55	45.72	2.19
Manuf/Transport	21.4	2.38	17.76	2.46
Sales/Services	22.64	17.55	14.25	16.96
Unknown	19.91	26.09	13.38	18.19
Schooling (%)				
None	11.61	14.61	13.38	12.59
Primary	24.29	20.94	39.04	29.55
Secondary	38.07	30.73	27.41	29
High School	7.91	8.69	3.18	6.84
Professional	5.04	6.02	2.96	3.97
Unknown	13.08	19.01	14.04	18.06
Age (years, median)	32	30	33	29
Place of Occurrence (%)				
Home	12.44	36.59	43.31	71.00
Other	67.63	43.42	46.93	21.75
Unknown	19.93	20.00	9.76	7.25
Observations	135,533	17,484	912	731

Source: Vital Statistics, INEGI.
Excludes states of Colima and San Luis Potosi.

Table 3B
Summary Statistics of Suicides and Attempted Suicides

	1994-2006		1995-2006	
	All Suicides		Suicides and Attempted Suicides	
Variable	Male Victims	Female Victims	Male Victims	Female Victims
Marital Status (%)				
Single	42.22	45.72	40.02	44.35
Married/Cohabiting	48.75	44.03	48.61	43.17
Divorced/Separated/Widowed	5.96	7.52	5.65	5.66
Unknown	3.07	2.72	5.71	6.82
Occupation (%)				
None	17.21	71.2	19.32	60.8
Prof/Teach/Admin	4.32	4.23	2.77	2.75
Agriculture	20.5	0.76	17.61	0.80
Manuf/Transport	24.98	2.2	22.14	2.37
Sales/Services	23.75	13.37	21.53	12.92
Unknown	9.23	8.23	16.62	20
Schooling (%)				
None	8.22	7.67	14.1	11.2
Primary	26.45	21.89	26.55	20.63
Secondary	42.19	42.93	16.91	19.52
High School	9.61	13.63	6.8	8.69
Professional	6.16	8.31	4.99	5.87
Unknown	7.37	5.56	30.65	34.09
Age (years, median)	31	25	31	25
Place of Occurrence (%)				
Home	66.02	74.68	76.58	88.56
Other	20.2	12.47	22.63	10.6
Unknown	13.79	12.84	0.79	0.83
Had Children?				
Yes			36.79	32.68
No			31.31	36.58
Unknown			31.9	30.74
Reason for Suicide (%)				
Love or Family			16.93	31.38
Financial			3.87	2.45
Illness			9.8	9.73
Other			10	9.84
Unknown			58.91	46.61
Type of Act (%)				
Attempt			5.17	26.84
Suicide	100	100	94.83	73.16
Observations	37,459	7,351	28,898	7,668

Source: All Suicides from Vital Statistics, INEGI. Suicides and Attempted Suicides from Suicides and Attempted Suicides Reports (INEGI).
States of Colima and San Luis Potosi are excluded in both databases. States of Tlaxcala, Zacatecas, and Yucatan did not report any suicides for 2006 in Suicides and Attempted Suicide data.

Table 3C
Summary Statistics of Criminal Suspects, 1997-2006.

	Alledged Crime			
	Injuries & Threats		IFV	
Variable	Male	Female	Male	Female
Marital Status (%)				
Single	34.5	30.59	14.91	25.57
Married/Cohab	61.7	62.27	79.83	65.59
Div/Sep/Widow	1.88	5.3	3.24	7.22
Unknown	1.92	1.84	2.01	1.62
Occupation (%)				
None	7.64	60.75	6.11	56.6
Prof/Teach/Admin	4.86	5.7	5.92	3.24
Agriculture	19.67	0.98	12.65	1.11
Manuf/Transport	38.24	3.75	44.36	6.12
Sales/Services	28.14	27.67	29.01	31.39
Unknown	1.46	1.15	1.96	1.55
Schooling (%)				
None	7.02	8.34	7.09	11.57
Primary	37.61	35.81	39.62	43.63
Secondary	30.23	27.28	28.66	24.32
High School	13.88	14.22	12.32	10.54
Professional	8.52	10.64	9.04	6.48
Unknown/Other	2.75	3.7	3.27	3.46
Age (years, median)	32	33	36	32
Number of Counts (%)				
1	65.38	79.52	54.1	56.82
2	26.69	17.49	38.07	37.8
>2	7.93	2.99	7.83	5.38
Physical State (%)				
Sober	67.78	90.67	62.35	88.73
Drunk	24.35	3.59	28.71	4.2
Drugged	0.88	0.13	1.92	0.59
Other	0.18	0.07	0.21	0.44
Unknown	6.8	5.55	6.82	6.04
Ruling (%)				
Prison	72.24	54.16	83.79	88.87
Subject to Process	19.92	38.93	2.27	1.77
Freed, no evidence	4.77	3.90	8.60	8.03
Extinction of law	3.07	3.00	5.34	1.33
Observations	295,445	55,268	13,439	1,357
	84.24%	15.76%	90.83%	9.17%

Source: Judicial Statistics on Penal Matter, INEGI.

States of Colima and San Luis Potosi are excluded.

Table 4
Effects of Legal Reforms on Bodily Injury Crimes

	Assist Law			Divorce Law			Penal Code		
	All	Single	Married, Cohabiting	All	Single	Married, Cohabiting	All	Single	Married, Cohabiting
	Panel A. Crimes Committed by Male Suspects								
Mean Injury Crime Rate	82.83	28.38	51.01	82.83	28.38	51.01	82.83	28.38	51.01
Equation (1):	-0.315	0.659	-0.749	-1.09	-0.846	-0.477	0.702	0.754	-0.379
(1) Average effect	(4.416)	(1.541)	(2.884)	(5.269)	(1.691)	(3.615)	(3.591)	(1.170)	(2.551)
Equation (2):									
(2) Year of change	-1.742	1.057	-2.258	-0.951	-0.641	-0.613	0.079	0.759	-1.216
	(3.681)	(1.483)	(2.310)	(4.122)	(1.545)	(2.787)	(3.322)	(1.201)	(2.332)
(3) 1-2 years later	-3.531	0.103	-3.405	-0.923	-1.133	0.035	-1.168	-0.18	-1.262
	(4.569)	(1.502)	(3.069)	(6.844)	(2.266)	(4.586)	(5.677)	(1.835)	(3.925)
(4) 3-4 years later	-15.137**	-2.883	-11.650**	-1.154	-0.279	-0.99	1.696	0.431	0.767
	(6.382)	(2.074)	(4.337)	(8.021)	(2.569)	(5.481)	(8.929)	(2.780)	(6.147)
(5) 5-6 years later	-18.289+	-2.202	-15.476**	-1.939	-0.287	-2.154	-2.477	-0.677	-2.886
	(10.388)	(3.234)	(6.883)	(9.038)	(3.046)	(6.277)	(10.435)	(3.358)	(7.376)
(6) ≥ 7 years later	-20.212+	-1.554	-17.248**	0.766	-0.377	1.11	-9.497	-3.333	-6.322
	(11.021)	(3.617)	(7.485)	(13.374)	(4.632)	(9.007)	(14.683)	(5.118)	(9.918)
	Panel B. Crimes Committed by Female Suspects								
Mean Injury Crime Rate	13.32	3.97	8.34	13.32	3.97	8.34	13.32	3.97	8.34
Equation (1):									
(1) Average effect	-0.084	-0.134	-0.034	0.199	0.22	-0.073	-0.319	-0.355	-0.014
	(0.932)	(0.346)	(0.593)	(1.165)	(0.410)	(0.741)	(0.783)	(0.334)	(0.483)
Equation (2):									
(2) Year of change	-0.066	-0.172	0.028	0.046	0.049	0.064	-0.338	-0.419	0.055
	(0.772)	(0.298)	(0.558)	(0.953)	(0.400)	(0.638)	(0.678)	(0.278)	(0.483)
(3) 1-2 years later	-0.839	-0.417	-0.584	0.679	0.407	0.052	-0.341	-0.407	-0.025
	(1.067)	(0.400)	(0.681)	(1.539)	(0.553)	(0.923)	(1.438)	(0.572)	(0.827)
(4) 3-4 years later	-3.692**	-1.412**	-2.281**	0.29	0.483	-0.368	0.302	-0.061	0.301
	(1.582)	(0.583)	(0.966)	(1.998)	(0.654)	(1.252)	(2.083)	(0.792)	(1.269)
(5) 5-6 years later	-3.867	-1.556+	-2.464	0.882	0.337	0.136	0.006	-0.436	0.318
	(2.614)	(0.854)	(1.688)	(2.182)	(0.775)	(1.318)	(2.544)	(0.947)	(1.532)
(6) ≥ 7 years later	-3.92	-1.661+	-2.541	2.126	0.781	0.854	-0.597	-0.719	0.054
	(2.906)	(0.936)	(1.893)	(3.123)	(1.080)	(1.929)	(3.484)	(1.156)	(2.233)

Source: Judicial Statistics in Penal Matter, (INEGI).
Robust standard errors in parentheses, clustered at state level. + significant at 10%; ** significant at 5%; * significant at 1%
Sample 1997-2006, n=300. States of Colima and San Luis Potosi are excluded.
Dependent variable is the annual aggregate state level bodily injury crimes per 100,000 males (females). Bodily injury crimes include IFV related (171200), threats (210500) and injuries (170300)
All specifications include state and year fixed effects and controls.
All includes single, married, cohabiting, divorced, widowed, separated and unknown marital status.
Controls included are state GDP per capita, percent of population enrolled in an undergraduate degree, and male-female ratio. Age structure is the proportion of a state's population 15-19, 20-29, 30-39, 40-49, 50-59, 60-64 and 65 and older.

Table 5
Effects of Assist Law on Home Homicide Rates
Place of Occurrence is Victim's Home

	Male Victims						Female Victims	
	All		Single		Married, Cohabiting		All	
Mean Homicide Rate	20		7		11		2	
Equation (1):	-0.331+	-0.163	-0.123+	-0.076	-0.203+	-0.133	-0.063	-0.037
(1) Average effect	(0.183)	(0.163)	(0.072)	(0.071)	(0.118)	(0.098)	(0.059)	(0.063)
Equation (2):								
(2) 1 year before	-0.18	-0.039	-0.043	-0.022	-0.072	-0.006	0.038	0.078
	(0.204)	(0.183)	(0.074)	(0.072)	(0.133)	(0.121)	(0.118)	(0.109)
(3) 2 years before	0.057	0.229	0.075	0.104	-0.016	0.059	0.064	0.113
	(0.267)	(0.263)	(0.098)	(0.099)	(0.164)	(0.168)	(0.116)	(0.106)
(4) Year of change	-0.238	-0.047	-0.026	0.02	-0.145	-0.086	-0.015	0.031
	(0.295)	(0.299)	(0.115)	(0.113)	(0.200)	(0.194)	(0.107)	(0.096)
(5) 1-2 years later	-0.492	-0.214	-0.190+	-0.121	-0.299	-0.206	-0.013	0.057
	(0.306)	(0.279)	(0.099)	(0.098)	(0.186)	(0.163)	(0.114)	(0.096)
(6) 3-4 years later	-0.581	-0.206	-0.159	-0.037	-0.428	-0.329	-0.048	0.028
	(0.418)	(0.360)	(0.140)	(0.123)	(0.257)	(0.214)	(0.156)	(0.129)
(7) 5-6 years later	-1.047+	-0.706+	-0.303+	-0.169	-0.733**	-0.691**	-0.103	-0.037
	(0.525)	(0.409)	(0.159)	(0.129)	(0.342)	(0.267)	(0.162)	(0.162)
(8) ≥ 7 years later	-1.087	-0.677	-0.366	-0.177	-0.723+	-0.723**	0.093	0.178
	(0.646)	(0.541)	(0.219)	(0.186)	(0.387)	(0.335)	(0.208)	(0.193)
Controls		√		√		√		√
F-test		p=0.0488		p=0.0405		p=0.0019		p=0.0005

Source: Vital Statistics, (INEGI).

Robust standard errors in parentheses, clustered at state level. + significant at 10%; ** significant at 5%; * significant at 1%.

Sample 1994-2006, n=390. States of Colima and San Luis Potosi are excluded.

All specifications include state and year fixed effects.

Dependent variable is the annual aggregate state level homicides committed at home per 100,000 males (females).

The F-test of joint significance is for the set of controls.

All includes single, married, cohabiting, divorced, widowed, separated and unknown marital status.

Controls includes state GDP per capita, percent of population enrolled in an undergraduate degree, and male-female ratio. Age structure is the proportion of a state's population 15-19, 20-29, 30-39, 40-49, 50-59, 60-64 and 65 and older.

Table 6
Effects of Assist Law on Suicide Rates

	All		Single		Married, Cohabiting	
	Panel A. Male Victims					
Mean Suicide Rate	7.04		2.85		2.61	
Equation (1):	-0.417	-0.052	-0.158	-0.01	-0.013	0.113
(1) Average effect	(0.358)	(0.227)	(0.186)	(0.129)	(0.154)	(0.120)
Equation (2):						
(2) 1 year before	-0.353	-0.01	-0.113	0.059	-0.056	0.059
	(0.365)	(0.280)	(0.170)	(0.137)	(0.162)	(0.143)
(3) 2 years before	-0.428	0.011	0.111	0.329	-0.259	-0.113
	(0.420)	(0.285)	(0.254)	(0.212)	(0.211)	(0.197)
(4) Year of change	-0.248	0.227	0.084	0.342+	0.049	0.174
	(0.447)	(0.237)	(0.274)	(0.200)	(0.207)	(0.172)
(5) 1-2 years later	-0.925	-0.291	-0.294	0.023	-0.247	-0.079
	(0.598)	(0.438)	(0.319)	(0.241)	(0.235)	(0.201)
(6) 3-4 years later	-1.411+	-0.784	-0.429	-0.066	-0.493	-0.446+
	(0.783)	(0.623)	(0.424)	(0.341)	(0.310)	(0.248)
(7) 5-6 years later	-1.395	-0.876	-0.325	0.081	-0.562	-0.668**
	(0.954)	(0.706)	(0.509)	(0.395)	(0.386)	(0.283)
(8) ≥ 7 years later	-1.919	-1.168	-0.631	0.025	-0.978+	-1.136*
	(1.238)	(0.825)	(0.708)	(0.451)	(0.520)	(0.382)
F-test		p=0.003		p=0.0019		p=0.000
	Panel B. Female Victims					
Mean Suicide Rate	1.26		0.52		0.40	
Equation (1):	-0.161	-0.138	-0.036	-0.037	-0.052	-0.039
Average effect	(0.103)	(0.096)	(0.045)	(0.050)	(0.064)	(0.050)
Equation (2):						
(2) 1 year before	-0.022	-0.004	0.059	0.059	-0.088	-0.082
	(0.099)	(0.099)	(0.065)	(0.060)	(0.067)	(0.067)
(3) 2 years before	0.105	0.129	0.155+	0.157+	-0.068	-0.062
	(0.137)	(0.123)	(0.085)	(0.086)	(0.070)	(0.064)
(4) Year of change	-0.114	-0.098	0.086	0.088	-0.115	-0.119+
	(0.108)	(0.094)	(0.068)	(0.064)	(0.073)	(0.064)
(5) 1-2 years later	-0.151	-0.112	0.012	0.024	-0.095	-0.097
	(0.138)	(0.124)	(0.058)	(0.063)	(0.093)	(0.087)
(6) 3-4 years later	-0.248	-0.192	-0.001	0.037	-0.203+	-0.226+
	(0.183)	(0.171)	(0.079)	(0.079)	(0.112)	(0.111)
(7) 5-6 years later	-0.28	-0.214	0.105	0.164	-0.324**	-0.361**
	(0.222)	(0.235)	(0.083)	(0.098)	(0.158)	(0.160)
(8) ≥ 7 years later	-0.488	-0.412	-0.025	0.052	-0.324+	-0.382+
	(0.311)	(0.342)	(0.135)	(0.149)	(0.180)	(0.210)
F-test		p=0.001		p=0.0028		p=0.0002
Controls		√		√		√

Source: Vital Statistics, (INEGI).
Robust standard errors in parentheses, clustered at state level. + significant at 10%; ** significant at 5%; * significant at 1%.
Sample 1994-2006, n=390. States of Colima and San Luis Potosi are excluded.
All specifications include state and year fixed effects.
Dependent variable is the annual aggregate state level Suicide rate per 100,000 males (females).
All includes single, married, cohabiting, divorced, widowed, separated and unknown marital status.
The F-test of joint significance is for the set of controls.
Other Controls includes state GDP per capita, percent of population enrolled in an undergraduate degree, and male-female ratio. Age structure is the proportion of a state's population 15-19, 20-29, 30-39, 40-49, 50-59, 60-64 and 65 and older.

Table 7A
Effects of Assist Law on Homicides Committed in Public Areas

Victim's Gender:	Male			Female
	All	Single	Married, Cohabiting	All
Equation (1):				
Assist Law	-0.845	-0.269	-0.464	-0.037
	(0.716)	(0.220)	(0.455)	(0.072)
Divorce Law	-1.097	-0.426	-0.695	-0.03
	(0.936)	(0.289)	(0.551)	(0.092)
Penal Code	-0.24	-0.179	-0.045	-0.013
	(0.896)	(0.276)	(0.543)	(0.096)
	Evolution of Assist Law			
Equation (2):				
1 year before	-0.525	-0.023	-0.351	-0.067
	(0.618)	(0.211)	(0.365)	(0.057)
2 years before	-0.626	-0.094	-0.334	-0.053
	(0.749)	(0.268)	(0.439)	(0.076)
Year of change	-1.093	-0.294	-0.615	-0.06
	(0.874)	(0.293)	(0.539)	(0.080)
1-2 years later	-1.289	-0.288	-0.729	-0.083
	(1.093)	(0.314)	(0.706)	(0.105)
3-4 years later	-1.319	-0.186	-0.832	-0.09
	(1.271)	(0.361)	(0.858)	(0.134)
5-6 years later	-0.961	-0.038	-0.606	-0.124
	(1.432)	(0.399)	(1.011)	(0.148)
≥ 7 years later	-0.778	0.06	-0.596	-0.008
	(1.845)	(0.519)	(1.295)	(0.180)

Source: Vital Statistics, (INEGI).

+ significant at 10%; ** significant at 5%; * significant at 1%.
Robust standard errors in parentheses, clustered at state level.
Sample 1994-2006, n=390. States of Colima and San Luis Potosi are excluded.
Dependent variable is the annual aggregate state level homicides committed in public areas
All specifications include state and year fixed effects.
All includes single, married, cohabiting, divorced, widowed, separated and unknown marital stat
Controls included are state GDP per capita, percent of population enrolled in an undergraduate degree, and male-female ratio. Age structure is the proportion of a state's population 15-19, 20-29, 30-39, 40-49, 50-59, 60-64 and 65 and older.

Table 7B
Placebo Test: Effect of Laws on Annual Thefts per 100,000 Population

	All	Single	Married, Cohabiting
	Panel A. Thefts Committed by Males		
Assist Law	4.619	3.179	1.861
	(6.586)	(4.316)	(2.508)
Divorce Law	-0.862	-0.874	-0.498
	(5.975)	(3.294)	(2.739)
Penal Code	0.191	0.869	-0.863
	(5.622)	(3.663)	(2.196)
Number of Laws	1.106	0.899	0.152
	(4.041)	(2.694)	(1.382)
	Panel B. Thefts Committed by Females		
Assist Law	0.395	0.25	0.158
	(0.440)	(0.219)	(0.201)
Divorce Law	0.717	0.428	0.293
	(0.630)	(0.317)	(0.313)
Penal Code	-0.18	-0.2	-0.003
	(0.429)	(0.213)	(0.221)
Number of Laws	0.225	0.113	0.111
	(0.249)	(0.107)	(0.126)

Robust standard errors in parentheses, clustered at state level.

+ significant at 10%; ** significant at 5%; * significant at 1%

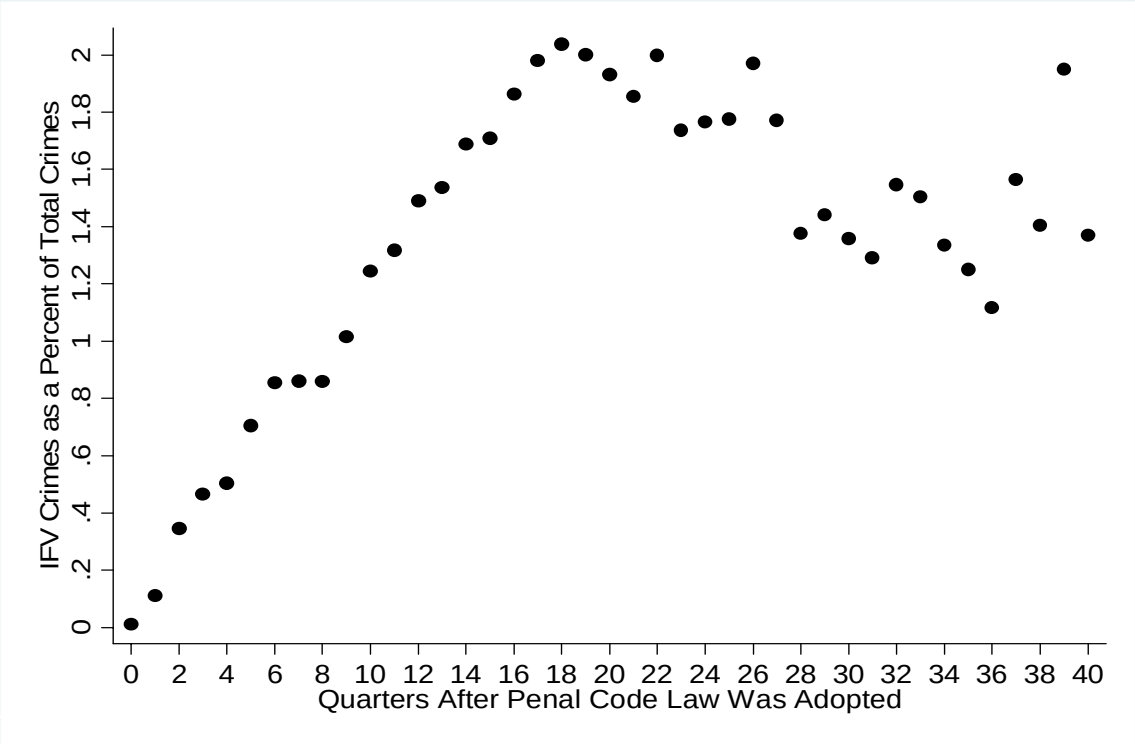
Sample 1997-2006, n=300. Excludes San Luis Potosi and Colima.

Dependent variable is the annual aggregate state level thefts (crime code 200100) per 100,000 males or females.

All includes single, married, cohabiting, divorced, widowed, separated and unknown marital

All specifications include state and year fixed effects. Controls included are state GDP per capita, percent of population enrolled in an undergraduate degree, and male-female ratio. Age structure is the proportion of a state's population 15-19, 20-29, 30-39, 40-49, 50-59, 60-64 and 65 and older. Number of Laws represents the total number of reforms effective each year in a

Figure 1.
IFV Crimes Reported as a Percent of All Crimes, 1997-2006.



Note: San Luis Potosi and Colima are excluded because the year of reform could not be verified.
Source: Judicial Statistics in Penal Matter, (INEGI) 1997-2006.

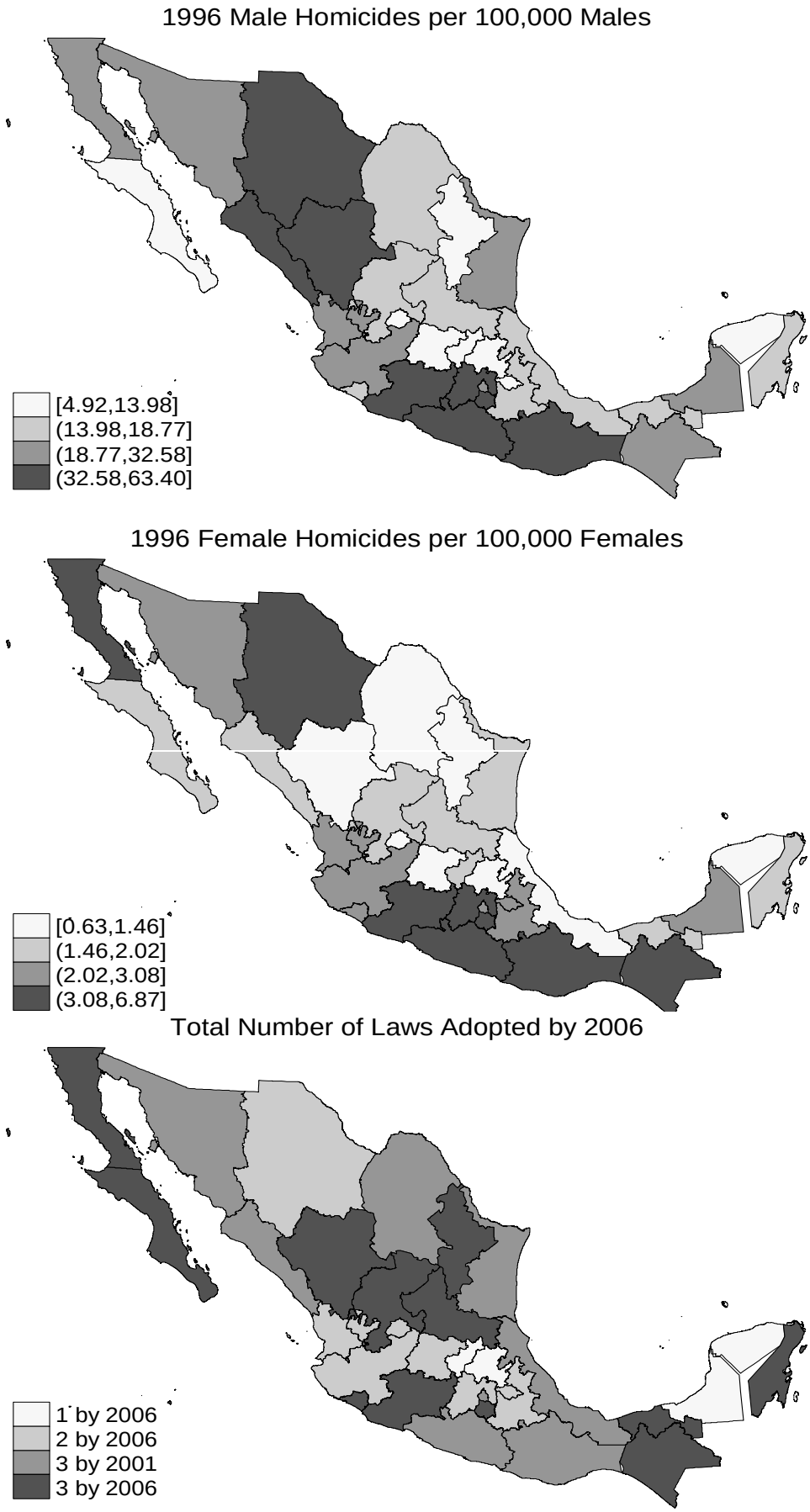
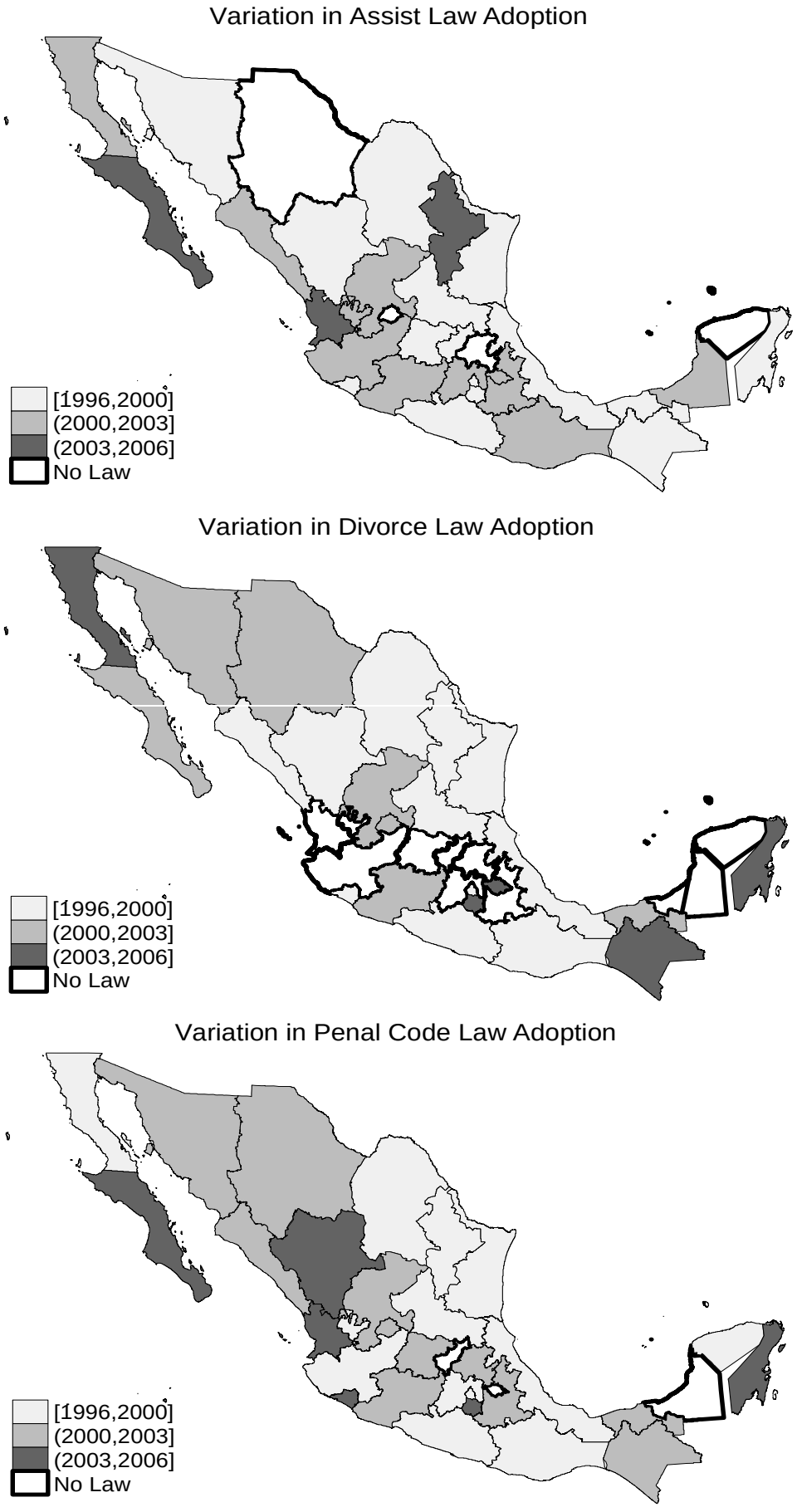


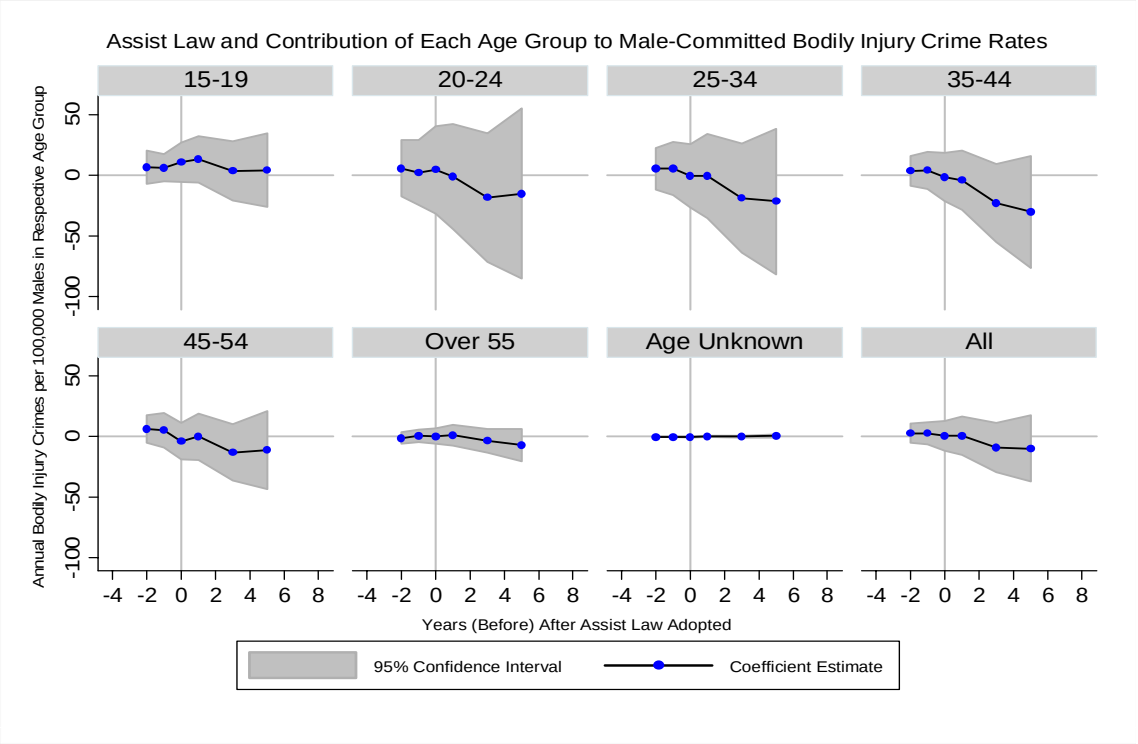
Figure 2. Male and Female Homicide Rates in 1996 and Adoption of Legal Reforms

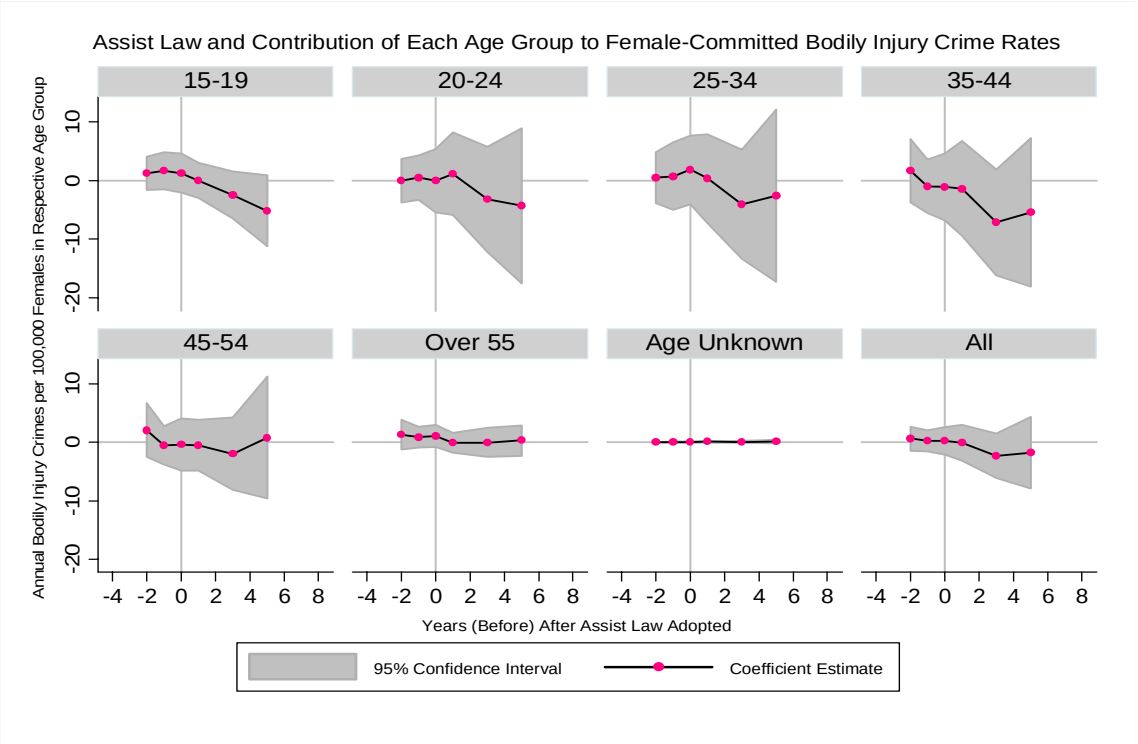
Figure 3. Heterogeneity in Timing of Legal Reform, 1996-2006.



Source: Vital Statistics, (INEGI).

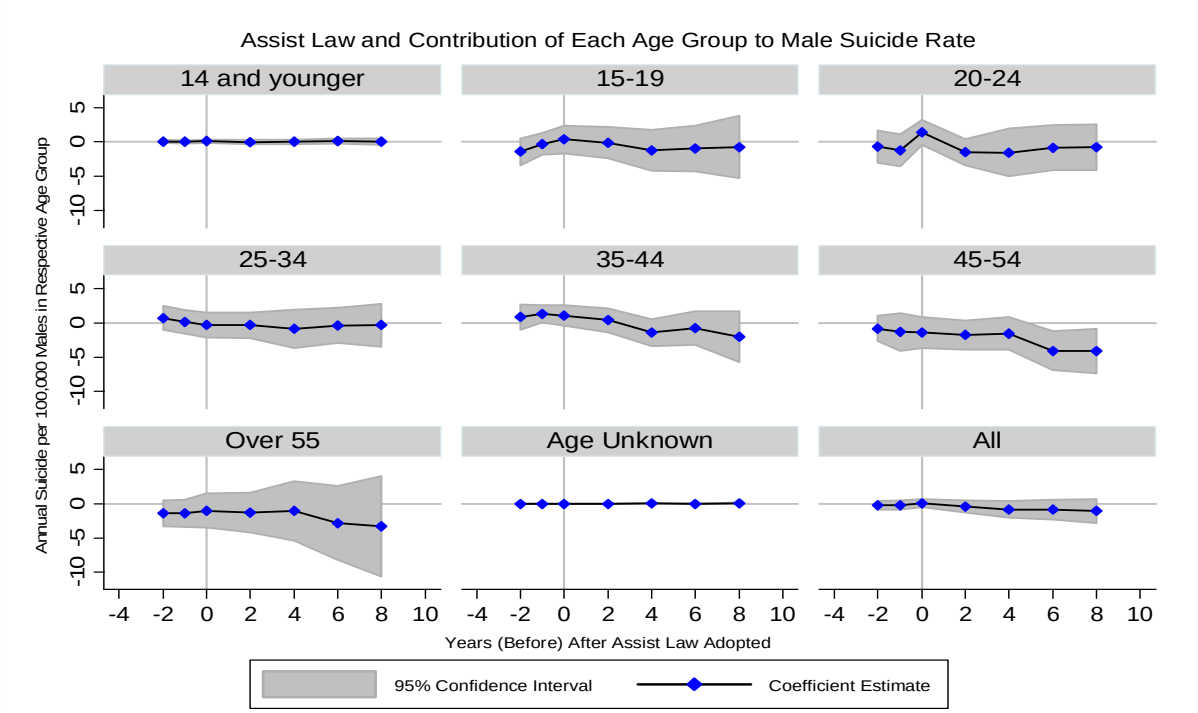
Figure 4. Effect of Assist Law and Contribution of Each Age Group to Bodily Injury Crimes

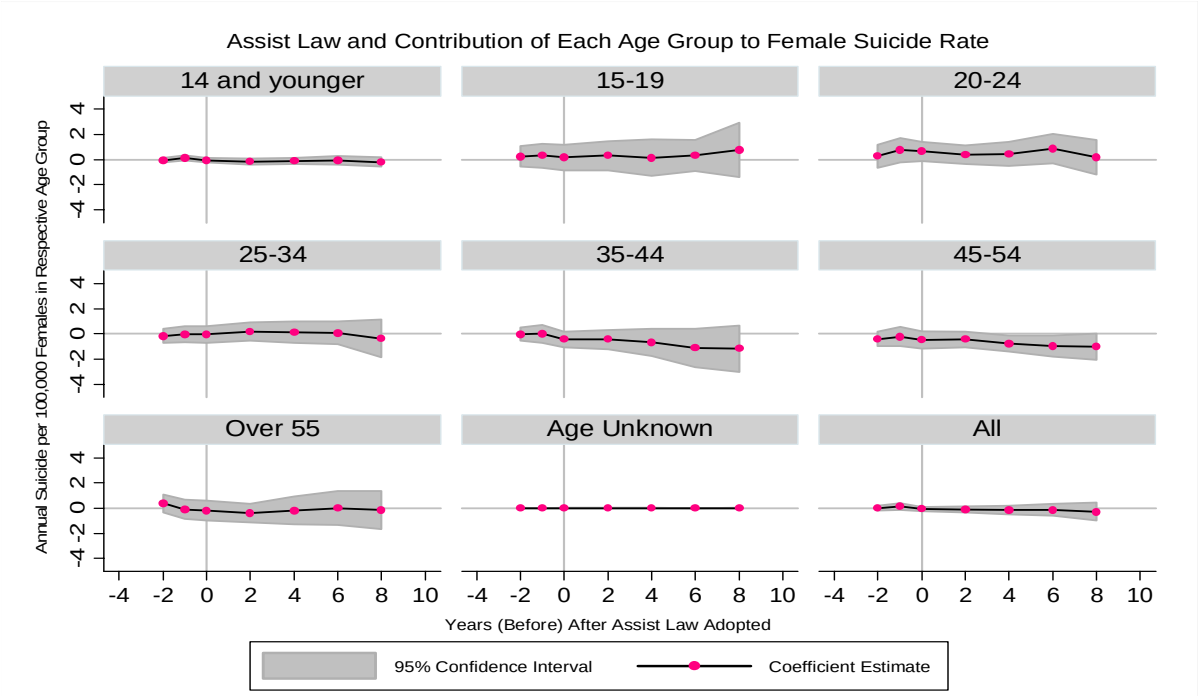




Note: Each panel represents estimate coefficients from a separate regression. Each regression includes state and year fixed effects and all controls in Table 4. Standard errors are clustered at the state level.

Figure 5. Effect of Assist Law and Contribution of Each Age Group to Suicide Rate





Note: Each panel represents estimate coefficients from a separate regression. Each regression includes state and year fixed effects and all controls in Table 4. Standard errors are clustered at the state level.