No protection: Does offering dating partners the same legal protection as married partners prevent firearm-related intimate partner homicide?

A cross-sectional analysis from 1976-2010

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Abstract

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Background: In 2010, at least 1,300 people were killed by an intimate partner in the United States. Guns are used in the majority of intimate partner homicides (IPH). Previous research has shown that state-specific laws that prohibit individuals with a domestic violence restraining order (DVRO) from owning or purchasing a gun are associated with a decrease in IPH. However, only 22 states allowed dating partners to file for domestic violence restraining orders as of 2010.

Objective: This study will focus on whether state-specific DVRO laws that protect dating partners have been associated with declines in firearm-related dating IPH.

Design: We used a negative binomial regression model and controlled for median income, background violent crime rate, percent urban, percent black, and percent under 35 years old. We conducted a sensitivity analysis controlling for four additional IPH-related gun control laws.

Main outcome measures: Four main outcome measures were used: the number of female gun-related IPH, the number of female all-cause IPH, the number of all gun-related IPH, and the number of all-cause IPH.

Results: Expanding the domestic violence restraining order law to protect dating partners was associated with a decline in dating IPH (p=.001). In 2010, we estimated 110 (76-145) deaths were averted because of protections afforded to dating partners in 22 states. If all states had implemented this law, an additional 84 (60-109) deaths could have been prevented. Cumulatively, 937 (564 -1,325) deaths have been averted from 1994-2010 because of DVRO protections for dating partners. If all states had passed the expanded law to protect dating partners in 1994, an additional 885 (453-1,317) deaths could have been averted over the same period.

Conclusions: The evidence suggests that expanding DVRO laws to protect dating partners may reduce the annual number of intimate partner homicides in the US.

Background and Significance

Burden of Intimate Partner Homicide

According to the Supplementary Homicide Reports (SHR), at least 1,300 people were killed by an intimate partner in 2010. Over half of these victims were shot to death. Forty-four percent of all women who were shot in 2010 were killed by an intimate partner. A National Violence Against Women report concludes that "intimate partner violence should be classified as a major public health and criminal justice concern in the United States." [1]

National and State Law

In 1994, the Violent Crime Control Act amended the Gun Control Act of 1968 by prohibiting individuals with a domestic violence restraining order (DVRO) from purchasing or possessing firearms. Once a DVRO is obtained against an alleged abuser, that individual is legally mandated to surrender any firearms in their possession, and is banned from purchasing firearms for the duration of the protective order. This was seen as a significant step in protecting the victims of domestic violence from potentially lethal attacks. [2]

However, an individual can only file for a domestic violence restraining order if the alleged abuser is an "intimate partner." At the federal level, an "intimate partner" is defined as "the spouse of the person, a former spouse of the person, an individual who is a parent of a child of the person, and an individual who cohabitates or has cohabited with the person."[3] Notably, this federal definition does not include dating partners that have not cohabitated nor had a child together. Thus, under federal law an individual could not get a DVRO to protect against an abusive boyfriend or girlfriend if they have not lived together

nor had any children together. As a result, the alleged abuser could still legally own and even purchase firearms.

A 2006 study in Los Angeles found that 1 in 10 women who filed for a domestic violence restraining order against a dating partner would not have qualified for the federal firearm prohibitions, because they had never lived with or had a child with the alleged abuser[1].[4] Over half of the women who filed for restraining orders in this study filed them against current or former dating partners, and over 60% of the women who mentioned firearms in their appeal were in current or former dating relationships with their alleged abusers. [4] Dating partners represent a significant percentage of the victims of domestic violence.

Twenty-two states[2] have broadened the definition of "intimate partner" to include current and former dating partners, thus extending the protections afforded to married couples to dating partners. This analysis will focus on the expanded law and assess whether the broadened definition is associated with changes in IPH.

Evaluation of Gun Control Regulation

There have been numerous studies that have attempted to quantify the impact of gun control laws on homicide rates. One 1993 review concluded that out of 29 studies considered, four showed a significant protective effect, 8 were mixed, and 17 showed that gun control laws were not effective. Some common

[1] However, at this time California included current and former dating partners in the definitions of "intimate partner" so these women were protected. It is unclear whether a similar number of women in dating relationships would have filed for DVROs if the definition of "intimate partner" did not include dating partners in California.
[2] Alaska, Arizona, California, Connecticut, Delaware, Hawaii, Illinois, Indiana, Iowa, Massachusetts, Michigan, Montana, Nevada, New Jersey, North Carolina, North Dakota, Pennsylvania, Rhode Island, Texas, Washington, West Virginia, and Wisconsin

weaknesses of these studies were that they included few if any control variables and they lumped together heterogeneous laws or only focused on a specific law with limited generalizability. [5]

More recently, Vigdor and Mercy found that laws that restrict gun purchases by individuals with a domestic violence restraining order reduce IPH by 7%. [6] The same study found that laws restricting access to guns by domestic violence misdemeanants and laws that allow law enforcement officers to confiscate guns when responding to a domestic violence call have no effect. This study used a negative binomial model, indicator variables on each law type, and state and year fixed effects. They also controlled for overall homicide rates, household prevalence of guns, other gun laws, and demographic variables, such as percent of the population between 20 and 34 years old, percent black, percent male, percent urban, poverty rate, and median income. Marriage rates were also included, as well as per capita alcohol consumption. [6] The Vigdor and Mercy study was conducted using Supplementary Homicide Reports from 1982-2002. The authors highlighted the importance of further disaggregating gun control laws to explore the associations between more specific legislation and IPH.

A 2006 evaluation of two types of gun control laws highlighted the variability in meaning and heterogeneity of seemingly similar laws. [7] This analysis demonstrated the difficulties in controlling for other gun control laws due to variation in legal language across states. This analysis will focus on one very specific change to the definition of “intimate partner,” thus limiting the variability across states in meaning and interpretation of the expanded law.

Methods

Data

Data from the Federal Bureau of Investigation's Supplementary Homicide Reports (SHR) were compiled from 1976-2010. These reports include incident level data on reported homicides, with victim and offender characteristics including their relationship, the type of weapon used, and sex, age and race data. Data on homicides committed by either a spouse, former spouse or dating partner were extracted at the agency level and aggregated to state totals. The SHR do not identify victim-offender relationships between former dating partners, so this analysis is limited to IPH among current dating partners. Same-sex relationships were not included in this analysis, although future analyses should explore patterns in IPH amongst same-sex partners. Reporting agencies that did not report to the FBI for more than 20% of the time period were excluded from the analysis. Four states were excluded that did not report to the SHR (Florida, Montana, North Dakota and Vermont).

Our main outcome was a count of intimate partner deaths by state. Females are the majority of IPH victims, so we looked at female victims separately and then at both female and male victims combined. We were interested in assessing whether there is a substitution effect from firearm-related IPH to other kinds of lethal violence. It is possible that as potential perpetrators find it more difficult to access a firearm, they may use a different weapon or form of fatal violence. To test this, we included measures of all-cause IPH in addition to measures of gun-related IPH. Thus we had four primary outcomes measures: female IPH with a gun, female IPH with all weapons, all IPH with a gun, and all IPH.

We were interested in assessing differences in levels and trends of IPH amongst married partners and dating partners. We aggregated IPH numbers by relationship status so that we had two observations for each state-year, one for married IPH counts and another for dating IPH counts.

The main variable of interest was an indicator for whether a state had expanded the definition of "intimate partner" to include current or former dating partners. Data on state-specific definitions of "intimate partner" were extracted using Lexis-Nexus and state law libraries. Additional data on a subset of gun control laws by state came from the analysis conducted by Mercy and Vigdor. [6] Data on population, demographics and marriage rates were estimated using data from the National Historical Geographic Information System. Data on total violent crime rates came from Uniform Crime Reporting Statistics.

Table 1 shows victim characteristics for intimate partner homicides in 2010. Six hundred and sixty nine victims of IPH were reported to have been killed by their spouse or former spouse, and 608 victims were killed by their current boyfriend or girlfriend. In both married and dating relationships women were more likely to be victims of IPH than men, although the risk was greater for females in married partnerships. Victims of dating partner homicide were more likely to be black and under the age of 35 than victims of married IPH. Victims of intimate partner homicide committed by a spouse or former spouse were more likely to be killed with a gun. We were unable to assess whether different kinds of people are victimized in married versus dating relationships, or whether the underlying demographic composition of people who are married is different from the underlying composition of people who are dating. However, regardless of causality, young and black women were more likely to be victimized in dating relationships.

Table 1: Demographic characteristics of victims by relationship status, 2010

	Ever Married	Dating
Total	669	608
Black Victim (%)	20.8%	39.1%
Young Victim (%)	25.9%	56.6%
Female Victim (%)	83.9%	76.3%
Gun (%)	63.8%	42.9%

Table 2 shows the years when each of the 22 states listed passed the law to include dating partners in the definition of "intimate partner." Notably, there is considerable variation in the timing of when different states adopted this law.

Table 2: Year when each state passed law to include dating partners

Year	State
1978	Massachusetts
1989	North Dakota
1990	Pennsylvania
1992	Washington
1993	Montana
1994	California, New Jersey, Rhode Island
1995	Nevada
1996	Alaska, Illinois, Michigan
1997	North Carolina
1999	Connecticut
2000	Hawaii
2001	West Virginia, Texas, Wisconsin
2002	Iowa, Indiana
2007	Delaware
2009	Arizona

Figure 1 shows the count of female-victim IPH with a gun in California, stratified by relationship status. The red line in Figure 1 corresponds to the year that California expanded the definition of "intimate partner" to include dating partners. After the law was implemented, the trend in the count of dating IPH changes and appears similar to the trend in IPH amongst married partners.

Figure 1: Trends in dating partners IPH and married partners IPH before and after the expanded law in California

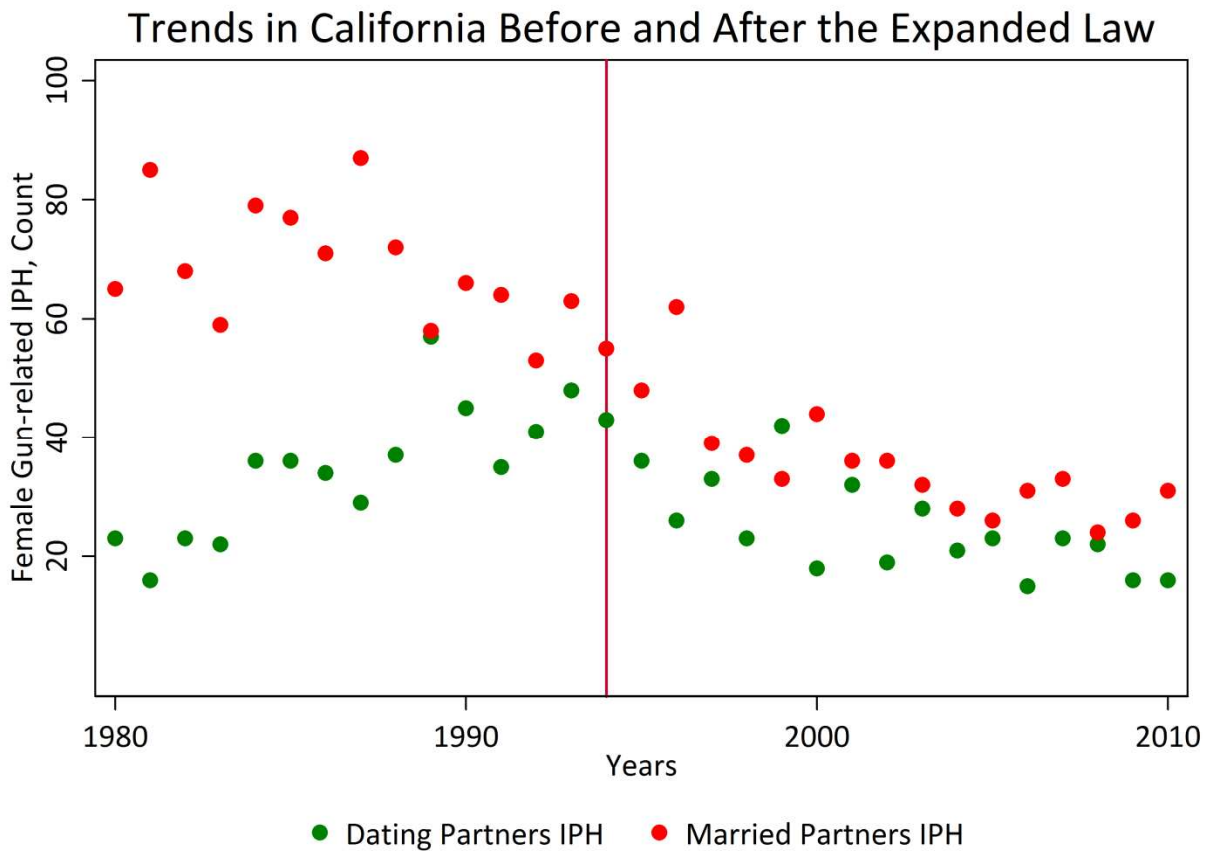


Figure 2 shows the aggregate counts of IPH across all states that implement the expanded definition during the period 1976-2010, excluding California. Since states implemented these definitions in different years, the red line in Figure 2 corresponds to when the definition was expanded, and the x-axis corresponds to relative years before and after this law. To avoid compositional bias, only years with 18 or more states are shown in Figure 2.The trend in dating IPH appears to change after the law is passed and again more closely parallels the trend observed amongst married IPH counts.

Figure 2: Trends in dating partners IPH and married partners IPH before and after the expanded law in all of the states included in this analysis, excluding California

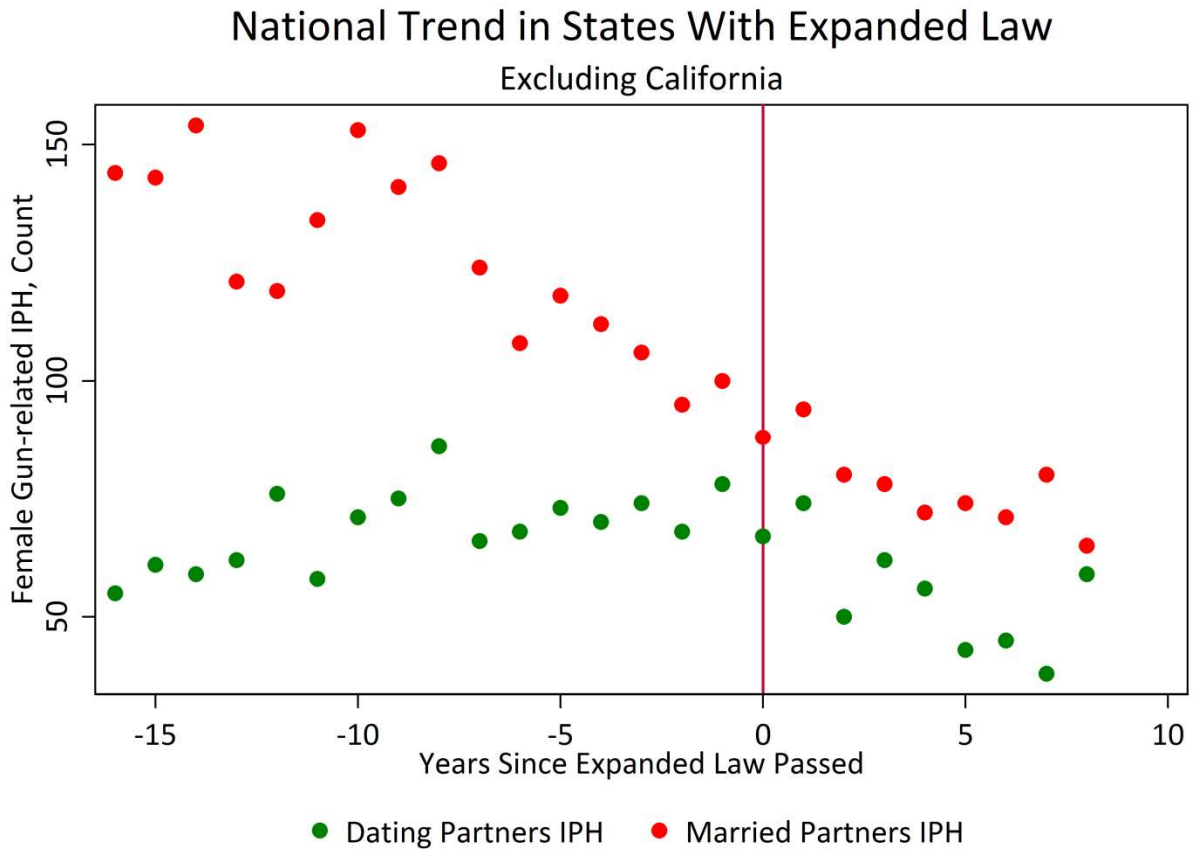
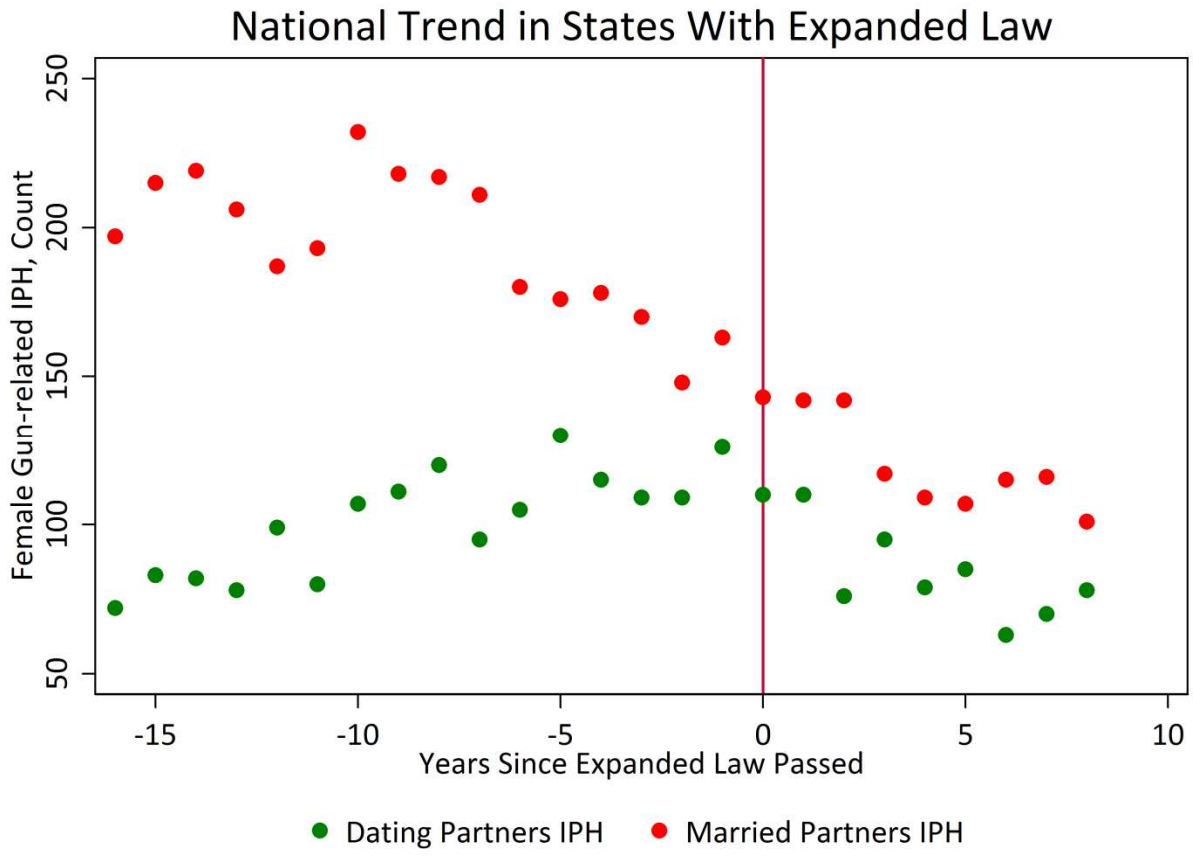


Figure 3 shows the same measures for all states combined, including California.

Figure 3: Trends in dating partners IPH and married partners IPH before and after the expanded law in all of the states included in this analysis



It is striking that the trend is similar across all three figures. Although California exhibits a dramatic shift after passage of the expanded law, other states experience similar shifts giving us more confidence in the observed trends.

Statistical Methods

Our outcome measures were counts of IPH, so we used a negative binomial regression model to account for the distribution of the data. This modeling strategy allowed us to further explore the trends seen in Figures 1-3, while controlling for potential confounders. Modeling also allowed us to more accurately estimate the policy impact of the expanded law and assess several counterfactual scenarios.

In Model 1 we assessed whether the dating law was associated with a change in the trend of intimate partner homicides committed by dating partners. Our outcomes of interest were counts of IPH committed by a dating partner for female IPH with a gun, female IPH with all weapons, all IPH with a gun, and all IPH. We included an indicator on whether a state expanded the definition of "intimate partner" to include dating partners in a given year (*Expanded Law*). Year was included as a continuous variable since the data have generally linear trends in IPH over time. An interaction between this expanded law indicator and year was included to capture any change in trend over time associated with implementation of the law (*Expanded Law*Year*).

Control variables included the percent of the population between ages 15 and 35, percent black, percent urban and median usable income (in $1,000s). Background violent crime rates were also included to account for changes over time in propensity for violence across states. These variables are represented in the vector *C*. To account for differences in exposure, the log of the population multiplied by the percent unmarried was included and constrained to have a coefficient of one (*ln(Pop)*). The model included state fixed effects (*State*) to capture time-indeterminate state-specific factors that may affect the level of IPH. If substitution from gun-related IPH to other forms of fatal IPH occurred, we would expect to see an insignificant or positive coefficient on the interaction between the expanded law and year (β_3).

Generally, we fit a negative binomial model of the form:

$$IPH_{i,t} \sim NB(\mu_{i,t}, \alpha)$$
$$\mu_{i,t} = \exp(x_{i,t}\beta)$$

For Model 1, the following specification corresponds to $\mu_{i,t}$:

Model 1:

$$\mu_{i,t} = \exp\left(\beta_1 Expanded\ Law_{i,t} + \beta_2 Year_t + \beta_3 Expanded\ \ Law_{i,t} * Year_t + \gamma_4 C_{i,t} + \ln\left(Pop\right)_{i,t} + State_i\right)$$

In Model 2 we continued to assess the relationship between the expanded law and dating IPH while controlling for levels and trends of IPH committed by current or former spouses. Our outcomes of interest were counts of IPH committed by either a dating partner or a current or former spouse (indexed by *j*). We built on Model 1 by adding an indicator for whether IPHs were committed by a dating partner or current/former spouse (*Dating Partners*). Additional interactions were included between this indicator, *Expanded Law* and *Year*. The three-way interaction *Expanded Law*Dating Partners*Year* captures any difference in trend in IPH between dating partners after the law is passed. The *ln(POP)* variable is indexed by state, year, and relationship status. When *Dating Partners* equals 0, ln(POP) corresponds to the log of the population multiplied by the percent married.

Model 2:

$$IPH_{i,t,j} \sim NB(\mu_{i,t,j}, \alpha)$$
$$\mu_{i,t,j} = \exp\left(x_{i,t,j}\beta\right)$$

$$\mu_{i,t,j} = \exp\left(\beta_1 Expanded\ Law_{i,t} + \beta_2 Year_t + \beta_3 Expanded\ Law_{i,t} * Year_t + \beta_4 Dating\ Partners_j + \beta_5 Dating\ Partners_j * Year_t + \beta_6 Expanded\ Law_{i,t} * Dating\ Partners_j * Year_t + \gamma_4 C_{i,t} + \ln\left(Pop\right)_{i,t,j} + State_i\right)$$

Based on results from Model 2, a counterfactual analysis was conducted to assess the estimated number of IPHs that would have occurred if there were no protections for dating partners during the period 1994-2010. A second counterfactual analysis was conducted to estimate the number of IPHs if all states had protected dating partners from 1994 onwards. Estimated deaths averted due to the expanded law were calculated per year as the difference between the first counterfactual analysis and

the observed counts of IPH. A cumulative total was also calculated. Estimated deaths that could have been prevented if all states implemented the expanded law in 1994 were calculated as the difference between observed counts of IPH and the second counterfactual scenario. Cumulative estimates were calculated as well.

To test model sensitivity, the same analyses were conducted using only a subset of years, 1982-2002, for which additional data were available on four other gun control laws based on the analysis by Vigdor and Mercy. [6] *DVRO* is an indicator for whether a state had a specific state-level law prohibiting gun possession or purchase by individuals with a domestic violence restraining order. *Confiscate* is an indicator of whether a state had a law allowing or enabling police officers to seize guns when responding to a domestic violence incident. *Misdemeanor* is an indicator of whether a state had a specific law restricting gun possession or purchase by individuals with a misdemeanor for domestic violence. *Temp* is an indicator for whether a state extended the firearm ban to individuals with a temporary domestic violence restraining order.

Model 3:

$$\mu_{i,t} = \exp\left(\beta_1 Expanded\ Law_{i,t} + \beta_2 Year_t + \beta_3 Expanded\ \ Law_{i,t} * Year_t + \beta_4 DVRO_{i,t} + \beta_5 Confiscate_{i,t} + \beta_6 Misdemeanor_{i,t} + \beta_7 Temp_{i,t} + \gamma_4 C_{i,t} + \ln(Pop)_{i,t} + State_i\right)$$

Model 4:

$$\mu_{i,t,j} = \exp\left(\beta_1 Expanded\ Law_{i,t} + \beta_2 Year_t + \beta_3 Expanded\ Law_{i,t} * Year_t + \beta_4 Dating\ Partners_j + \beta_5 Dating\ Partners_j * Year_t + \beta_6 Expanded\ Law_{i,t} * Dating\ Partners_j * Year_t + \beta_7 DVRO_{i,t} + \beta_8 Confiscate_{i,t} + \beta_9 Misdemeanor_{i,t} + \beta_{10} Temp_{i,t} + \gamma_4 C_{i,t} + \ln(Pop)_{i,t,j} + State_i\right)$$

All analysis was conducted in Stata 11.2, with the exception of the counterfactual analysis which was conducted in R 2.12.

Results

The results from Model 1 are shown in Table 3. The interaction between year and the expanded law is significant and negative across all four outcome specifications. This indicates that the trend over time in dating IPH decreases after the definition of intimate partners is expanded. The coefficient on year is negative and significant across all outcomes, suggesting a slight downward trend overall. The log of the violent crime rate is positively associated with IPH counts, and median income is positively associated with IPH counts for all outcomes except for all IPH committed with a gun. Standard errors are reported in parentheses.

Table 3: Regression results for Model 1, 1976-2010

	Female, Gun	Female, All	Both, Gun	Both, All
Expanded Law	39.3**	25.5**	40**	20.7**
	(14.35)	(10.31)	(13.19)	(9.42)
Year* Expanded Law	-.0197**	-.0129**	-.0201**	-.0105**
	(0.01)	(0.01)	(0.01)	(0.00)
Year	-.00883**	-.00814**	-.00834**	-.00755**
	(0.00)	(0.00)	(0.00)	(0.00)
Urban (%)	-.304	-.0233	-.238	-.402
	(0.75)	(0.59)	(0.65)	(0.53)
Young Adults (%)	1.71	2.19	2.49	2.71*
	(1.81)	(1.37)	(1.54)	(1.19)
Black (%)	-1.84	-2.69	.515	-1.87
	(2.39)	(1.81)	(2.13)	(1.64)
Log Crime Rate	.745**	.569**	.587**	.482**
	(0.09)	(0.07)	(0.08)	(0.06)
Income (in $1,000s)	.00714**	.0119**	-.00576**	.00427*
	(0.00)	(0.00)	(0.00)	(0.00)

Significance: * 0.1 ** 0.05

Table 4 shows the results from Model 2. The interaction between year, the expanded law and dating partners is significant and negative across all four outcomes. The magnitude of the coefficient is largest for the two outcomes that measure IPH committed with a gun. Year is again significant and negative suggesting an overall downward trend. Percent urban is negative across all outcomes and significant for

all except all IPH committed with a gun. Percent under 35 years old is significant and positive across all outcomes. The log of the crime rate is positive and significant across all four models, and median income is negative and significant across all models.

Table 4: Regression results for Model 2, 1976-2010

	Female, Gun-related IPH	Female, Any method IPH	All, Gun-related IPH	All, Any method IPH
Dating Partners	-64.8**	-60.5**	-66.2**	-67.2**
	(4.72)	(3.92)	(4.40)	(3.82)
Expanded Law	-35.9**	-28.7**	-38.7**	-37.8**
	(12.78)	(10.20)	(12.56)	(10.26)
Dating Partners * Expanded Law	99.7**	69.1**	100**	70.7**
	(17.70)	(13.63)	(17.09)	(13.42)
Year* Dating Partners * Expanded Law	-.0498**	-.0345**	-.0502**	-.0353**
	(0.01)	(0.01)	(0.01)	(0.01)
Year* Dating Partners	.0324**	.0303**	.0331**	.0337**
	(0.00)	(0.00)	(0.00)	(0.00)
Year* Expanded Law	.0179**	.0143**	.0193**	.0188**
	(0.01)	(0.01)	(0.01)	(0.01)
Year	-.00666**	-.00636**	-.00619**	-.00592**
	(0.00)	(0.00)	(0.00)	(0.00)
Urban (%)	-1.04**	-.733*	-.697	-.892**
	(0.47)	(0.41)	(0.45)	(0.40)
Young Adults (%)	1.86*	1.83**	2.73**	2.9**
	(1.08)	(0.91)	(1.00)	(0.87)
Black (%)	-.679	-1.66	.505	-.847
	(1.53)	(1.29)	(1.49)	(1.31)
Log Crime Rate	.373**	.317**	.259**	.254**
	(0.06)	(0.05)	(0.05)	(0.05)
Income (in $1,000s)	-.0205**	-.0149**	-.034**	-.0247**
	(0.00)	(0.00)	(0.00)	(0.00)

Significance: * 0.1 ** 0.05

The interaction coefficients can be difficult to interpret. Figures 4A and 4B show the expected count of all gun-related IPH under two counterfactual scenarios, based on the results from Table 2. The purple line corresponds to the predicted count of all gun-related IPH that we have observed. The green line corresponds to the model prediction if there were no protections for dating partners in any state. The

orange line corresponds to the model prediction if all states protected dating partners from 1994 onwards. The shaded regions and dashed lines correspond to the 95% confidence intervals.

Figures 4A & 4B: Counterfactual scenarios based on Model 2 for all gun-related IPH, across the 46 states included in the analysis

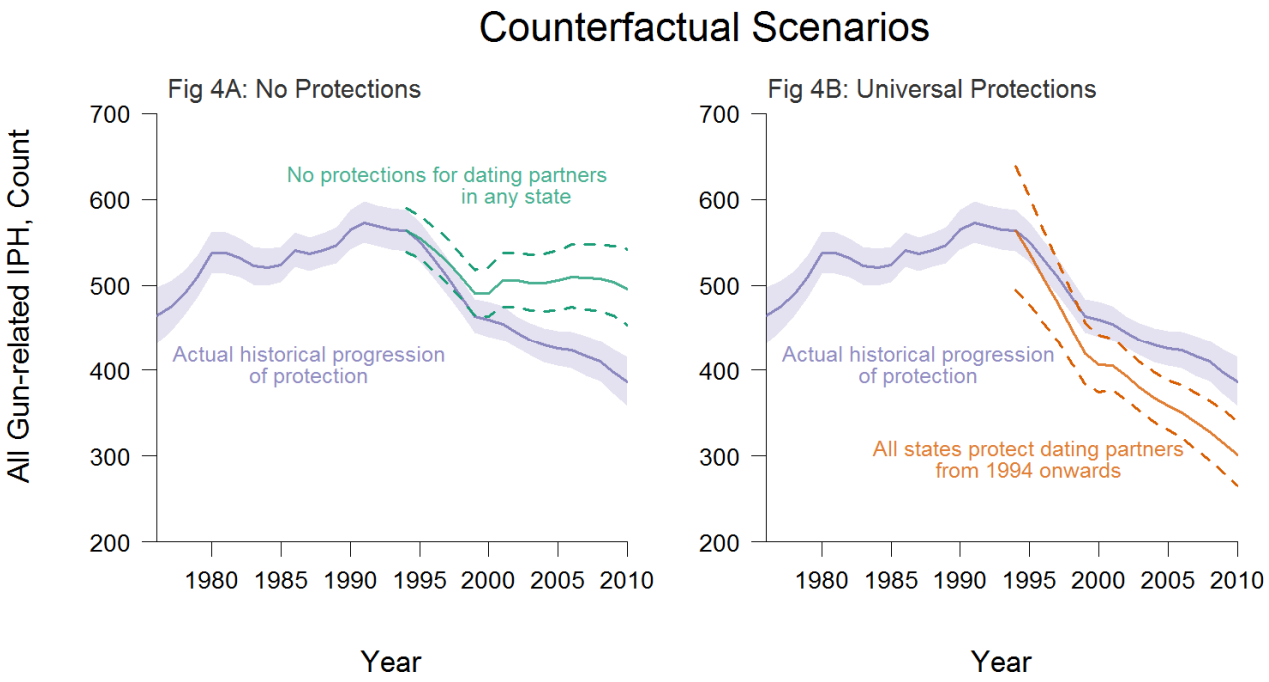


Table 5 shows the annual and cumulative deaths that were averted or could have been averted under these two counterfactual scenarios. In 2010, there were 110 (76-145) fewer deaths than there would have been if the law hadn't been implemented at all. If all states had expanded DVRO laws to protect dating partners from 1994 onward, we would have expected to see 84 (60-109) fewer deaths than actually occurred in 2010. Cumulatively, 937 (564 -1,325) deaths were averted based on the actual progression of protection. However, since 1994 if all states had expanded the definition of "intimate partner", 885 (453-1,317) additional deaths could have been averted.

Table 5: Counterfactual estimates of deaths that have been averted and deaths that could have been prevented from 1994 onwards, based on Model 2 for all gun-related IPH

Year	Estimated deaths that were averted due to expanded law	Confidence Interval	Estimated deaths that could have been prevented	Confidence Interval
1994	0	(-17 to 17)	0	(-64 to 59)
1995	4	(-13 to 21)	13	(-43 to 65)
1996	11	(-10 to 33)	22	(-21 to 63)
1997	18	(-4 to 40)	30	(-7 to 65)
1998	22	(3 to 43)	38	(5 to 70)
1999	27	(9 to 46)	44	(15 to 73)
2000	32	(14 to 50)	53	(24 to 80)
2001	51	(27 to 76)	49	(27 to 71)
2002	61	(35 to 88)	51	(31 to 71)
2003	67	(41 to 94)	56	(36 to 77)
2004	73	(47 to 101)	62	(41 to 83)
2005	80	(52 to 108)	67	(46 to 89)
2006	86	(58 to 116)	73	(51 to 96)
2007	92	(63 to 123)	78	(55 to 101)
2008	97	(67 to 129)	82	(59 to 106)
2009	106	(73 to 140)	82	(58 to 105)
2010	110	(76 to 145)	84	(60 to 109)
Cumulative 1994-2010	937	(564 to 1,325)	885	(453 to 1,317)

Tables 6 and 7 present the results from Models 3 and 4, based on the restricted period and including additional gun control laws. The results from Table 6 suggest that there is a significant negative relationship between states with state-specific domestic violence restraining order laws across all outcomes. However, states with confiscation or misdemeanor laws are associated with significant positive effects. These findings are consistent with Vigdor &Mercy. [6] After controlling for these gun control laws and restricting the sample to the years 1982-2002, the interaction between year and the expanded law is no longer significant in any of the models.

Table 6: Model 1 Sensitivity Analysis, 1982-2002

	Female, Gun	Female, All	Both, Gun	Both, All
Temporary DVRO	-.0246	-.0183	-.0614	-.071
	(0.09)	(0.07)	(0.08)	(0.06)
Confiscate	.157*	.152**	.136*	.0737
	(0.08)	(0.06)	(0.07)	(0.06)
Misdemeanor	.237**	.166**	.213**	.118*
	(0.09)	(0.07)	(0.08)	(0.06)
DVRO	-.33**	-.29**	-.267**	-.248**
	(0.08)	(0.07)	(0.08)	(0.06)
Expanded Law	40.9	-6.26	43.2	-13.4
	(33.04)	(23.98)	(30.55)	(22.20)
Year* Expanded Law	-.0206	.00304	-.0217	.00663
	(0.02)	(0.01)	(0.02)	(0.01)
Year	-.00956**	-.00839**	-.00983**	-.00808**
	(0.00)	(0.00)	(0.00)	(0.00)
Urban (%)	3.26**	2.61**	2.71**	1.07
	(1.36)	(1.06)	(1.20)	(0.95)
Young Adults (%)	-2.73	-.599	1.47	.00187
	(3.31)	(2.48)	(2.94)	(2.21)
Black (%)	-1.18	-5.41	5.03	.143
	(4.88)	(3.71)	(4.39)	(3.41)
Log Crime Rate	.86**	.681**	.69**	.577**
	(0.13)	(0.10)	(0.11)	(0.09)
Income (in $1,000s)	-.00361	.00328	-.00981	-.00235
	(0.01)	(0.01)	(0.01)	(0.01)

Significance: * 0.1 ** 0.05

Table 7 presents the results from Model 4, which controls for trends in IPH amongst married couples. In this model, the interaction between year, the expanded law, and dating partners is negative and significant.

Table 7: Model 2 Sensitivity Analysis, 1982-2002

	Female, Gun	Female, All	Both, Gun	Both, All
Dating Partners	-77.4**	-64.1**	-78.8**	-73.7**
	(9.26)	(7.85)	(8.54)	(7.61)
Expanded Law	-27.9	-39.9*	-20.8	-41.2*
	(29.13)	(22.96)	(28.14)	(22.78)
Dating Partners * Expanded Law	102**	54.9*	106**	51.3*
	(38.20)	(29.34)	(36.12)	(28.56)
Year* Dating Partners * Expanded Law	-.0512**	-.0275*	-.0532**	-.0257*
	(0.02)	(0.01)	(0.02)	(0.01)
Year* Dating Partners	.0387**	.0322**	.0394**	.037**
	(0.00)	(0.00)	(0.00)	(0.00)
Year* Expanded Law	.0139	.0199*	.0103	.0205*
	(0.01)	(0.01)	(0.01)	(0.01)
Year	-.00713**	-.00674**	-.00713**	-.00644**
	(0.00)	(0.00)	(0.00)	(0.00)
Temporary DVRO	-.112*	-.0716	-.0697	-.0466
	(0.06)	(0.05)	(0.06)	(0.05)
Confiscate	.0829	.0752	.0668	.0206
	(0.06)	(0.05)	(0.05)	(0.05)
Misdemeanor	.172**	.122**	.189**	.115**
	(0.06)	(0.05)	(0.06)	(0.05)
DVRO	-.13**	-.137**	-.105*	-.133**
	(0.06)	(0.05)	(0.06)	(0.05)
Urban (%)	.378	.302	.755	-.285
	(0.89)	(0.77)	(0.82)	(0.75)
Young Adults (%)	2.6	3.38*	5.53**	4.46**
	(2.12)	(1.76)	(1.97)	(1.70)
Black (%)	-1.65	-4.07	.483	-1.44
	(3.18)	(2.72)	(3.03)	(2.74)
Log Crime Rate	.387**	.357**	.308**	.312**
	(0.08)	(0.07)	(0.08)	(0.07)
Income (in $1,000s)	-.0171**	-.0091**	-.0286**	-.02**
	(0.01)	(0.00)	(0.00)	(0.00)

Significance: * 0.1 ** 0.05

Discussion

Interpretation

There were at least 1,300 intimate partner homicides in 2010. While this number has been nearly halved in the last 35 years, intimate partner homicides still represent 12% of all homicides in the US. From 1976 to 2010, 22 states passed laws that extended the definition of "intimate partner" to include current and former dating partners. The results in Tables 3 and 4 suggest that the amended law was associated with a downward trend in the number of dating intimate partner homicides after controlling for a number of demographic characteristics, background violent crime rates, and the number of married intimate partner homicides. The results from these more complex models support the trends observed in Figures 1-3.

The magnitude of the effect was larger when we restricted the outcome to IPHs committed with firearms. This lends strength to the theory that the expanded definition of intimate partner homicide in these states allowed dating partners to seek the protection of a restraining order, which directly limits a perpetrator's ability to access a gun. This also suggests that there does not seem to be a substitution effect, since the expanded law is associated with decreases in the trend for non-gun related IPH as well, indicating that potential perpetrators are not simply shifting to a different weapon when they are prohibited from purchasing guns.

However, this analysis is limited since we only have data on intimate partner homicides, and not on other non-fatal forms of intimate partner violence (IPV). It is possible that there is a substitution effect from lethal to non-lethal intimate partner violence following the passage of the dating law. It is also possible that the law was associated with decreases in non-lethal forms of intimate partner violence, in which case this analysis underestimates the total effect of the expanded law.

The sensitivity analyses reported in Table 6 are the only set of models that do not show a significant decrease in the trend of dating IPH after the amendment of the definition of "intimate partner." However, the subsequent sensitivity analyses reported in Table 7 are consistent with the other models and suggest that even after controlling for four gun control laws, when we compare dating IPH to married IPH the expanded law is associated with a downward trend in dating IPH. Again, these sensitivity analyses suggest that the magnitude of this effect is greater for gun-related IPH.

The counterfactual scenario in Figure 4A shows that gun-related IPH deaths were significantly lower in 2010 than they would have been if no states had implemented protections for dating partners. Furthermore, Figure 4B suggests that if all states had expanded the definition of "intimate partner" in 1994, a significant number of additional deaths could have been averted. Expanding the definition of "intimate partner" throughout the country may be an important policy recommendation with the potential to save lives.

Limitations & Future Work

It has been documented that the Supplementary Homicide Reports underestimate IPH. However, as long as this underestimation is not systematically associated with the definition of "intimate partner" it should not affect the results. The SHR data only identifies current dating partners, so we were not able to include former dating partners who are also protected by the amended definition of "intimate partner." Also, we did not have data on cohabitants, another class of individuals that are protected by DVROs. It is possible that the laws we considered may have affected these groups differently. It is likely that we have underestimated the full impact of the dating law by not including former dating partners.

This analysis was conducted at the state level, and thus does not take into account local legislation. Past work has looked at IPH at the city level, and future city-level analyses should incorporate data on who

can file for a DVRO to assess the impact of protecting dating partners while controlling for local legislation and demographic characteristics.

As shown in Table 1, young and black women are more likely to be the victims of dating IPH. As a result, it is possible that laws that do not protect dating partners may disproportionately harm young and black women. Future work should assess racial and age-related patterns in dating and married IPH and explore potential changes in these trends.

The dating law is dependent on a number of other laws and systems. The expanded definition of "intimate partner" enables dating partners to file for domestic violence restraining orders. In addition to prohibiting individuals with a DVRO from purchasing or owning firearms, the 1994 Violent Crime Control Act required federally licensed firearms dealers (FFLs) to conduct background checks for all handgun sales. These background checks should enable FFLs to identify individuals with a DVRO and deny their handgun purchase applications. However, there are significant differences in the state-specific information systems used to conduct background checks. A 2003 analysis of all state-specific information systems showed that 12 states[3] had incomplete records and 7 states[4] lacked completely automated background check systems.[8] According to a 2008 study that linked restraining orders and homicides, about 20% of "the female IPH victims who had a restraining order were killed within 2 days of the order being issued." [9] We do not have data on how many of these deaths were firearm-related. However, this suggests that background check systems need to be updated constantly to be effective, and that removal of guns from the possession of individuals with a DVRO needs to happen immediately after the DVRO is obtained. California is one of the only states that funds a police program to search for and seize guns from individuals with a DVRO. We do not have adequate data to capture state-specific variation in enforcement of the possession or purchase restrictions associated with DVROs. Future

[3] Colorado, Connecticut, Illinois, Michigan, Missouri, Nebraska, New Hampshire, North Dakota, Rhode Island, South Carolina, Tennessee and Utah

[4] Hawaii, Missouri, Nebraska, North Dakota, Rhode Island, Texas and Washington

research is necessary to evaluate differences in enforcement and background check system quality across states.

It is not possible to account for the potential spillover effect of interstate gun purchases and the effect they may have on IPH. There is also no data on the percentage of gun sales made by federally licensed firearms dealers, compared to the percentage made at gun shows where there is currently no requirement for a background check. In states where a large percentage of gun purchases are made at gun shows, we would expect the impact of the dating law to be minimal since without background checks there is no way to prohibit an individual with a DVRO from purchasing a firearm.

There is vast heterogeneity in gun ownership rates across states. In 2002 according to data from the Behavioral Risk Factor Surveillance Study, household gun ownership rates ranged from 5.2% in the District of Columbia to 62.8% in Wyoming. [10] Miller et al. acknowledge that firearm prevalence and state regulation may be circular, with lower gun prevalence rates making it easier to pass gun control legislation, and stronger regulation limiting gun ownership. [11] However, it is unlikely that this is the case in this analysis because the law in question is tangentially related to gun ownership and targets a specific population of gun owners. As of July 2013, there were 4,658 active records of individuals with domestic violence restraining orders in the National Instant Criminal Background Check System (NICS).[12] In 2008, background checks resulted in approximately 2,000 firearm purchase denials due to domestic violence restraining orders. [13] Thus, it is unlikely that state-level gun ownership rates are significantly affected by this legislation, rendering Miller's theory of the circular relationship between gun ownership and gun legislation less of a concern.

As with all studies of this type, it is possible that some unobserved factor occurred at the same time as the passage of this law that could account for the observed association. However, since the expanded definition of "intimate partner" was implemented at different times across states, this is not likely. Even

after we control for the number of married IPH we see a change in the trend of dating IPH, which is what we would expect to see if the expanded law was effective. It is possible that this expanded law was passed alongside other laws as part of a statewide domestic violence package, but in that case we would expect to see a similar or greater effect on married IPH counts compared to dating IPH counts. The differential effect on dating intimate partner violence strongly suggests that the dating law is at least partially responsible for the changes observed.

Conclusions

Expanding the definition of "intimate partner" to include dating partners appears to be associated with reductions in dating intimate partner homicide. Unlike other laws, which can be very heterogeneous across states and are therefore difficult to evaluate, the language of this dating law is simple and was almost exactly the same across states. The evidence suggests that expanding this law may have a protective effect and potentially reduce the number of dating intimate partner homicides per year in the United States.

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