Legal protection of dating partners and intimate partner homicide: Evidence from the U.S. states, 1976–2010

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Intimate Partner Homicide among Dating Partners

Domestic violence is a huge problem (>1300 homicides in 2010;
44% of all women shot were killed by an intimate partner)

Although IPH cases have been nearly halved over the last 35 years,
still represent 12% of all US homicides

Violent Crime Control Act (1994) bans individuals with a DVRO from obtaining firearms

But DVROs only accesible to "intimate partners":
federal law and many states omit dating partners who neither cohabit nor have a child

Intimate Partner Homicide among Dating Partners

Vigdor and Mercy (2006) found significant reductions in IPH from state-level DVRO protections

We follow-up with a state-level analysis of how the scope of intimate partner definitions affects IPH among current dating partners

Could a simple change in the legal definition of "intimate partners" have a substantial effect on homicide rates?

Outline of Talk

Intimate Partner Homicide (IPH) Victims by Status, 2010	Married, Separated, or Divorced	Current Dating
Total Victims	669	608
Black Victims	20.8 %	39.1 %
Young Victims	25.9 %	56.6 %
Female Victims	83.9 %	76.3 %
Gun-Related Victims	63.8 %	42.9 %

Intimate Partner Homicide Rates, by Relationship Status

Drawn from 1976–2010 FBI Supplementary Homicide Reports

Available: IPH by current spouse, former spouse, current dating partner

Data & Data Problems

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Intimate Partner Homicide Rates, by Relationship Status

Likely undercounts; former partners and same-sex partners not identified in SHRs

Incomplete reporting; we exclude states that report less than 20% of the time (FL, MT, ND, VT)

Timing of Extension of DVRO Protections to Dating Partners

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

Timing of Extension of DVROs to Current Dating Partners, by State

Law Center to Prevent Gun Violence identifies state statutes relating to domestic violence and defines "intimate partner"

Timing of Extension of DVRO Protections to Dating Partners

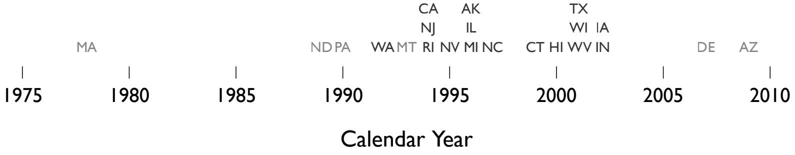
1978	Massachusetts
1989	North Dakota
1990	Pennsylvania
1992	Washington
1993	Montana
1994	California, New Jersey, Rhode Island
1995	Nevada
1996	Alaska, Illinois, Michigan
1997	North Carolina
1999	Connecticut
2000	Hawaii
2001	West Virginia, Texas, Wisconsin
2002	Iowa, Indiana
2007	Delaware
2009	Arizona

Timing of Extension of DVROs to Current Dating Partners, by State

Use Lexis-Nexus & state law libraries to find when these statutes first include "dating partners" in IP definition (either initial passage or amendment)

22 states took this step in the study period

Spread of Laws Protecting Dating Partners



Most of these 22 states acted in 1994 or later

In exploratory work so far, haven't found strong predictors of timing (at least among our covariates)

Suggested explanations welcome!

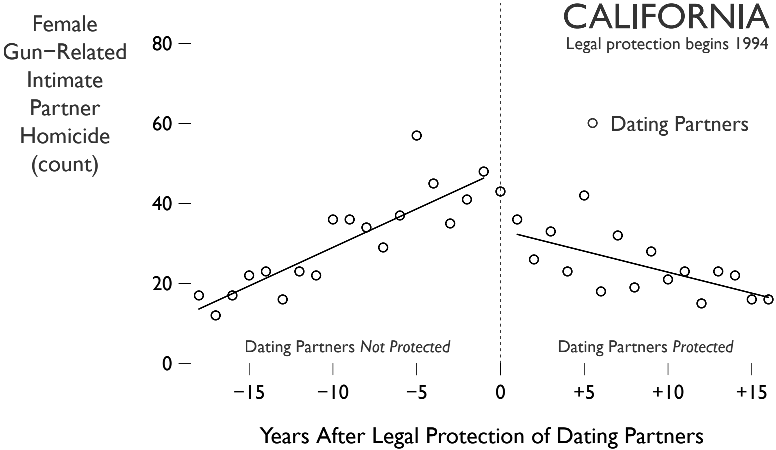
First Cut: Exploratory Data Analysis

Our basic strategy:
exploit the timing of extension of DVRO protections to dating partners
as if that timing were random

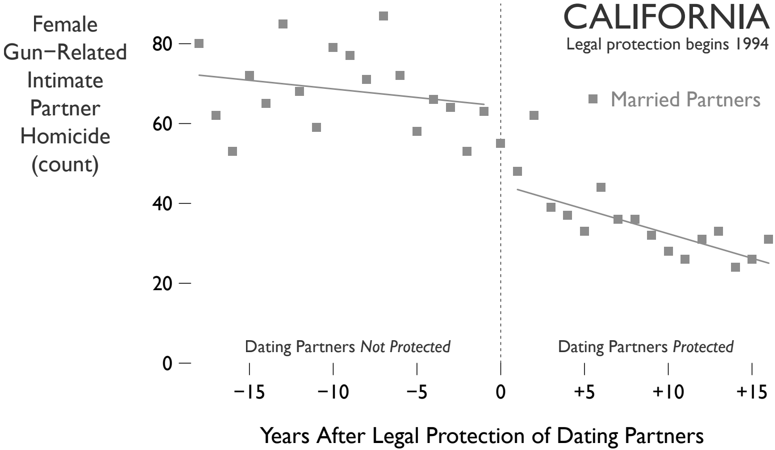
See if the pattern of dating partner IPH changes around that year,
either in level or trend

Compare these changes to patterns in married partner IPH

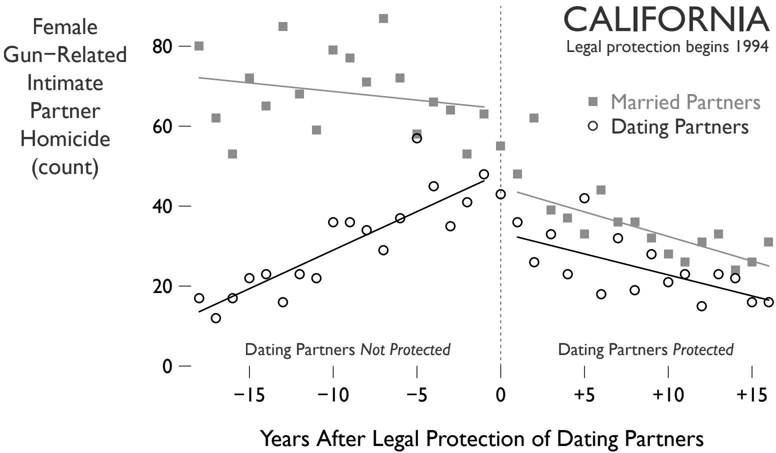
As an example, consider the largest state, California,
which extended DVRO to dating partners in 1994



IPH among dating partners in CA shifted strongly around the timing of DVRO extension, both in level and slope

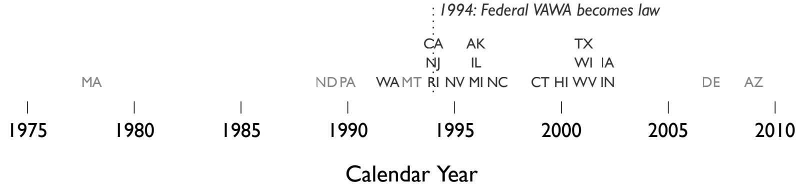


Married partners also saw a level improvement, and a smaller slope reduction



Changes are qualitatively similar for married and dating partners, but stronger for dating. Only slope of dating IPH changed direction

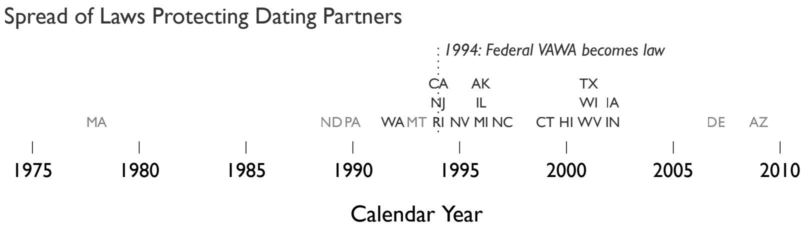
Spread of Laws Protecting Dating Partners



Obvious confounder driving similarity among married and dating partners in the California case:

Federal Violence Against Women Act (VAWA) passed in 1994, protecting married partners at the same time as CA protected dating partners

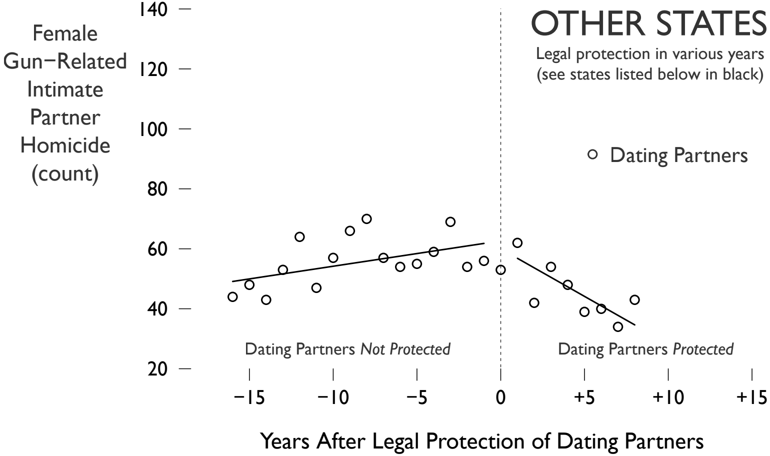
Likewise the aforementioned Violent Crime Control Act of 1994



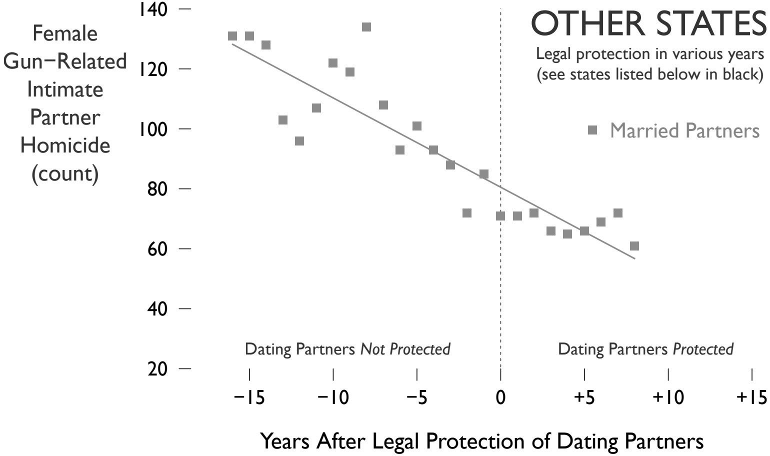
We can tease apart these effects by looking at other, smaller states

Data too noisy to examine by state, so we *aggregate* based on years before or after state DVRO extension to dating partners

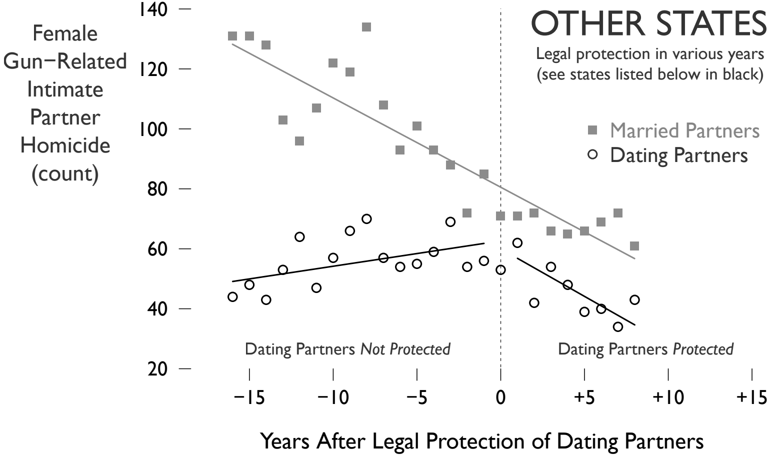
States in gray had incomplete time series and are omitted from this exercise to avoid biased slopes



In states other than California,
there is a strong slope reversal around the extension of DVRO to dating partners



But no change at all in the trend in married IPH, which is consistently downward



We consider this strongly suggestion of a large protective effect of state DVRO protections on dating partner IPH

Second Cut: Controlling for Confounders

We think the data speak for themselves,
but it's reasonable to fear uncontrolled confounders

What about state demographics, economic performance, crime,
and other state laws that might prevent IPH?

We turn to a panel data model that controls for these factors, state fixed effects,
underlying trends and the effect of VAWA/VCCA passage in 1994

Data are from 46 states, available years by state from 1976–2010,
and limited to reporting areas within states (approximately 50% by population)

Model of dating partner IPH: Negative Binomial of a panel of interrupted time series,
estimated by maximum likelihood

Variable	Description
Female Gun IPH$_{it}$	Female dating partners killed by guns
Female All IPH$_{it}$	Female dating partners killed, all causes
All Sex All Cause IPH$_{it}$	Dating partners killed, all sexes and causes
Intimate Partner Protection	Do state DVRO laws protect dating partners?
$\log n_{it}$	Dating partners at risk (estimated)
Median Income (\$k)$_{it}$	Median household income of state (yearly)
log(Total Crime$_{it}$)	Count of all violent crimes by state and year
% Urban$_{it}$	Urban population, by state and year
% Black$_{it}$	Black population, by state and year
% Age $\leq 35_{it}$	Young population, by state and year
Confiscate$_{it}$	Domestic violence incident $\rightarrow$ police can confiscate guns
Misdemeanor$_{it}$	Domestic violence misdemeanor blocks gun possession
DVRO$_{it}$	Restraining order blocks gun possession
Temp DVRO$_{it}$	Temporary DVRO blocks gun possession

Variable	Source
Female Gun IPH_{it}	FBI Supplementary Homicide Reports (SHRs)
Female All IPH_{it}	FBI SHRs
All Sex All Cause IPH_{it}	FBI SHRs
Intimate Partner Protection	Coded from Lexis-Nexus & state law libraries
$\log n_{it}$	National Historical Geographic Information System (NHGIS)
Median Income ($k)$_{it}$	NHGIS
log(Total Crime_{it})	Uniform Crime Reporting Statistics
% Urban_{it}	NHGIS
% Black_{it}	NHGIS
% Age $\leq 35_{it}$	NHGIS
Confiscate_{it}	Mercy & Vigor (2006); limited to 1982–2002
Misdemeanor_{it}	Mercy & Vigor (2006); limited to 1982–200
DVRO_{it}	Mercy & Vigor (2006); limited to 1982–200
Temp DVRO_{it}	Mercy & Vigor (2006); limited to 1982–200

Model Specification: Interrupted Time Series with Fixed Effects

$$y_{it} \sim \text{Negative Binomial}\left(\lambda_{it}, \theta\right)$$

$$\log \lambda_{it} = t\delta_1 + D_{it}\delta_2 + (t - s_i)D_{it}\delta_3 + \mathbf{x}_{it}\beta + \alpha_i + \log n_{it}$$

y_{it}	Count of IPH events (various subsets)
t	Deterministic time trend
D_{it}	Did state i protect dating partners in year t?
s_i	Year state i extended protection to dating partners
$(t - s_i)D_{it}$	Trend since extension to partners
$\mathbf{x}_{it}$	Vector of controls
α_i	State fixed effects
$\log n_{it}$	Offset for estimated dating partners at risk

$$y_{it} \sim \text{Negative Binomial}\left(\lambda_{it}, \theta\right)$$

$$\begin{aligned} \log \lambda_{it} &= t\delta_1 + D_{it}\delta_2 + (t - s_i)D_{it}\delta_3 \\ &\quad + V_{it}\delta_4 + (t - 1994)V_{it}\delta_5 + \mathbf{x}_{it}\beta + \alpha_i + \log n_{it} \end{aligned}$$

y_{it}	Count of IPH events (various subsets)
t	Deterministic time trend
D_{it}	Did state i protect dating partners in year t?
s_i	Year state i extended protection to dating partners
$(t - s_i)D_{it}$	Trend since extension to partners
V_{it}	Was Federal VAWA in place in year t?
$(t - 1994)V_{it}$	Trend since adoption of VAWA
$\mathbf{x}_{it}$	Vector of controls
α_i	State fixed effects
$\log n_{it}$	Offset for estimated dating partners at risk

Sex	Female	Female	Female	Female	All Persons
Cause of Death	Gun-Related	Gun-Related	Gun-Related	All Cause	All Cause
Specification	Baseline	Alternate	Static	Baseline	Baseline
D_{it}	-0.181	-0.164	-0.208	-0.181	-0.208
	0.070	0.100	0.060	0.052	0.048
$(t - s_i)D_{it}$	-0.007	-0.007		-0.006	-0.003
	0.008	0.017		0.005	0.005
t	0.015	0.024		0.014	0.009
	0.011	0.018		0.008	0.007
V_{it}	0.072	-0.041	0.144	0.009	-0.061
	0.071	0.079	0.067	0.055	0.050
$(t - 1994)V_{it}$	-0.024	-0.042		-0.021	-0.021
	0.009	0.021		0.007	0.006
Median Income (\$k)$_{it}$	-0.002	-0.009	0.002	0.004	0.002
	0.008	0.012	0.003	0.006	0.006
log(Total Crime$_{it}$)	0.570	0.521	0.776	0.415	0.335
	0.109	0.182	0.084	0.081	0.072
% Urban$_{it}$	-0.726	2.932	-1.156	-0.409	-0.686
	0.789	1.461	0.741	0.620	0.549
% Black$_{it}$	-2.177	-1.762	-1.862	-3.297	-2.599
	2.394	4.942	2.372	1.796	1.631
% Age $\leq 35_{it}$	2.594	-1.295	4.145	2.324	1.560
	2.157	4.205	2.085	1.625	1.415
Confiscate$_{it}$		0.172			
		0.083			
Misdemeanor$_{it}$		0.213			
		0.096			
DVRO$_{it}$		-0.312			
		0.084			
Temp DVRO$_{it}$		-0.057			
		0.091			
(Dispersion)	38.04	53.67	33.81	43.24	29.64
	12.78	28.05	10.25	11.13	4.47
State Fixed Effects?	yes	yes	yes	yes	yes
N	1575	924	1575	1610	1610
log likelihood	-2564	-3112	-2568	-3167	-3580
AIC	5240	3230	5243	6449	7273

Don't worry – no need to squint!

Focus in on key variables...

Sex	Female
Cause of Death	Gun-Related
Specification	Baseline
D_{it}	-0.181
	0.070
$(t - s_i)D_{it}$	-0.007
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t	0.015
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V_{it}	0.072
	0.071
$(t - 1994)V_{it}$	-0.024
	0.009

First specification examines Female Gun-related IPH

"Baseline" model omits controls for other state policies, which have limited data coverage

Key for us: marginal effect by year k after implementation

This is $\delta_2 + k\delta_3$. Always significant ($p < 0.05$) and negative for baseline model of Female Gun-related IPH.

Sex	Female	Female
Cause of Death	Gun-Related	Gun-Related
Specification	Baseline	Alternate
D_{it}	-0.181	-0.164
	0.070	0.100
$(t - s_i)D_{it}$	-0.007	-0.007
	0.008	0.017
t	0.015	0.024
	0.011	0.018
V_{it}	0.072	-0.041
	0.071	0.079
$(t - 1994)V_{it}$	-0.024	-0.042
	0.009	0.021

Our "alternative" specification also examines Female Gun-related IPH and includes controls for other state laws protecting victims of domestic violence

Lose about 40% of our data due to missingness

Sex	Female	Female
Cause of Death	Gun-Related	Gun-Related
Specification	Baseline	Alternate
D_{it}	-0.181	-0.164
	0.070	0.100
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	0.009	0.021

Marginal effect of dating partner protection by year k after implementation is substantively similar but only significance at $p < 0.1$

Of the controlled policies, only gun bans with DVROs significantly reduces dating partner IPH

Sex	Female	Female	Female
Cause of Death	Gun-Related	Gun-Related	Gun-Related
Specification	Baseline	Alternate	Static
D_{it}	-0.181	-0.164	-0.208
	0.070	0.100	0.060
$(t - s_i)D_{it}$	-0.007	-0.007	
	0.008	0.017	
t	0.015	0.024	
	0.011	0.018	
V_{it}	0.072	-0.041	0.144
	0.071	0.079	0.067
$(t - 1994)V_{it}$	-0.024	-0.042	
	0.009	0.021	

We also estimate a simpler "static" model that assumes all policies change only levels of IPH, and not trends

The marginal effects (here, simply δ_2) of dating partner protection are similar to the baseline model: negative and significant at $p < 0.05$

Sex	Female	Female	Female	Female
Cause of Death	Gun-Related	Gun-Related	Gun-Related	All Cause
Specification	Baseline	Alternate	Static	Baseline
D_{it}	-0.181	-0.164	-0.208	-0.181
	0.070	0.100	0.060	0.052
$(t - s_i)D_{it}$	-0.007	-0.007		-0.006
	0.008	0.017		0.005
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	0.071	0.079	0.067	0.055
$(t - 1994)V_{it}$	-0.024	-0.042		-0.021
	0.009	0.021		0.007

We think the biggest action is in Female Gun-Related IPH, but we also consider the baseline specifications for Female All Cause IPH

We obtain similar significant negative marginal effects of dating protection on IPH

Sex *Cause of Death* *Specification*	Female Gun-Related Baseline	Female Gun-Related Alternate	Female Gun-Related Static	Female All Cause Baseline	All Persons All Cause Baseline
D_{it}	-0.181	-0.164	-0.208	-0.181	-0.208
	0.070	0.100	0.060	0.052	0.048
$(t - s_i)D_{it}$	-0.007	-0.007		-0.006	-0.003
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V_{it}	0.072	-0.041	0.144	0.009	-0.061
	0.071	0.079	0.067	0.055	0.050
$(t - 1994)V_{it}$	-0.024	-0.042		-0.021	-0.021
	0.009	0.021		0.007	0.006

Finally, we estimate the baseline specifications for All Sex All Cause IPH

We again obtain similar significant negative marginal effects of dating protection on IPH

Simulation Strategy

Negative Binomial coefficients are a fairly unsatisfying summary of the model

We're interested in the net effect of dating partner protection over time

We'd like to know what the model predicts in the real world, for our 46 states

Solution: Simulate in-sample counterfactual rates of dating partner IPH under different scenarios for the 46 states' (hypothetical) reforms of DVRO protections

We present results in terms of aggregate annual counts of homicides across all states by year under different scenarios, holding all other covariates at their observed values by state and year

Simulation Algorithm

1. Draw a vector of simulated model parameters from the asymptotic multivariate normal distribution implied by the MLE.

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2. Start in an initial year and state, and compute the expected IPH count given the simulated model parameters, the factual values of covariates for that state and year, and a (potentially) counterfactual value of the timing of protection for dating partners.

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3. Iterate by period within the state, computing the IPH count for each year.

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3. Iterate by period within the state, computing the IPH count for each year.
4. Sum up the simulated IPH counts across all states within each year.
   This is a vector of simulated nationwide IPH counts.

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5. Repeat steps 1 to 4 many times to assemble a range of simulated nationwide IPH counts reflecting uncertainty in model parameters.

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6. Summarize this uncertainty with year-wise 95% CIs.

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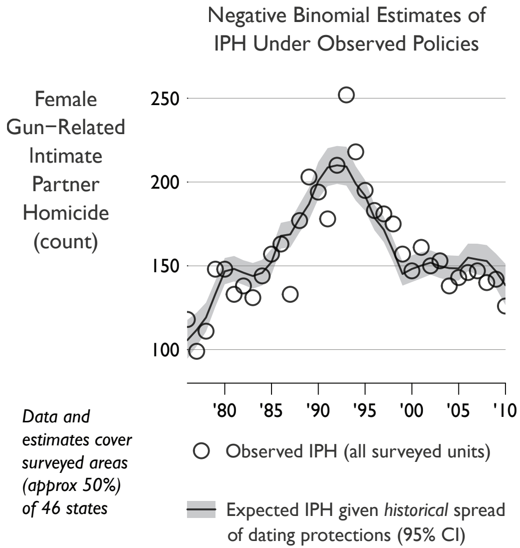
   This is a vector of simulated nationwide IPH counts.
5. Repeat steps 1 to 4 many times to assemble a range of simulated nationwide IPH counts reflecting uncertainty in model parameters.
6. Summarize this uncertainty with year-wise 95% CIs.
7. Repeat steps 1 to 6 as needed for different counterfactual values of protection for dating partners.

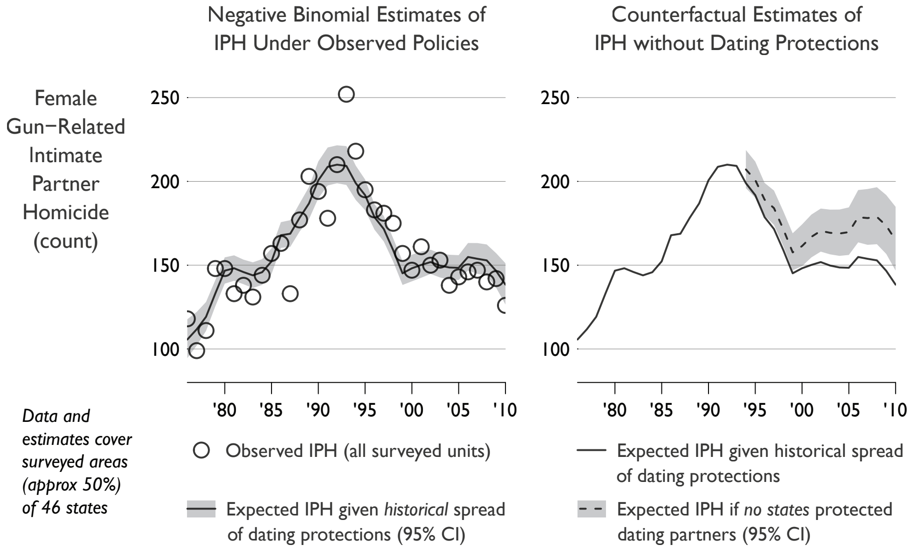


Data and estimates cover surveyed areas (approx 50%) of 46 states

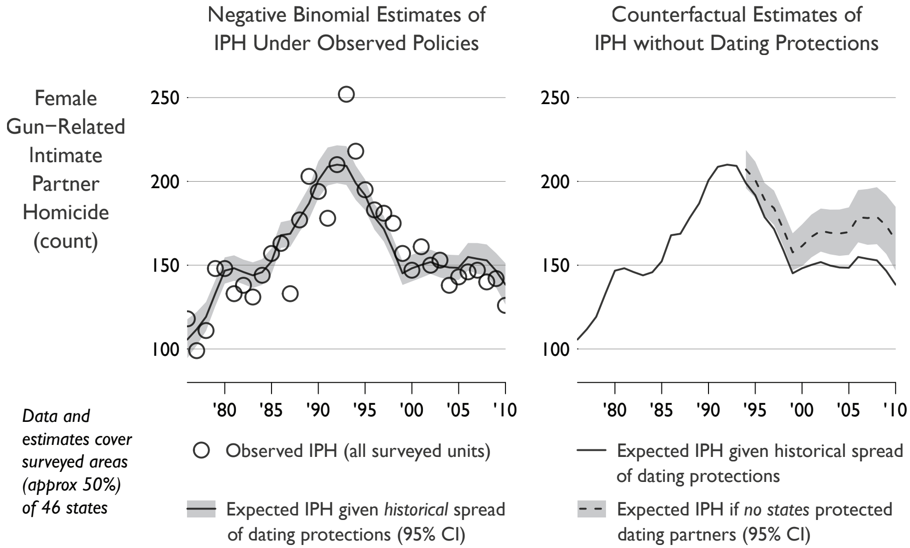
We begin with simulations from the baseline model of Female Gun-Related IPH

As a check, we simulate under the factual implementation of dating partner DVRO in each state, as it happened by year

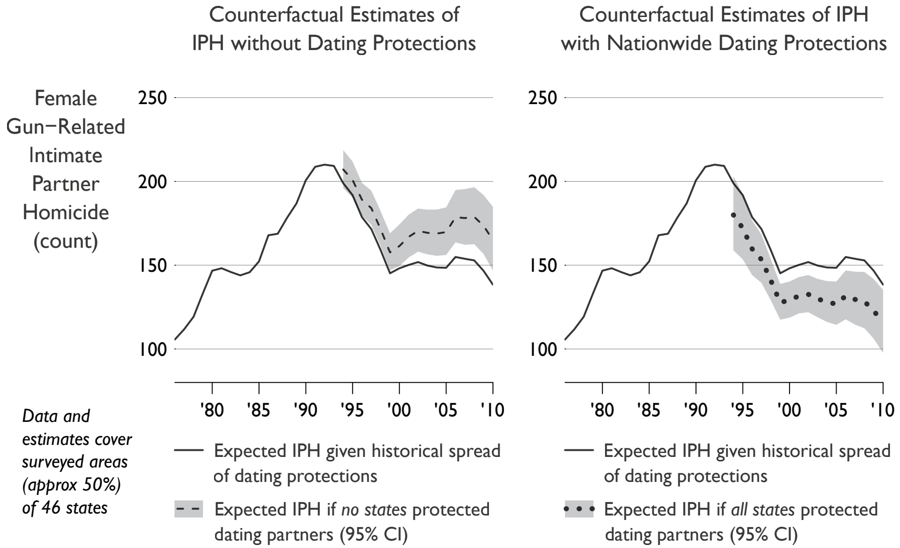
The simulated national rates of dating partner IPH closely match the data



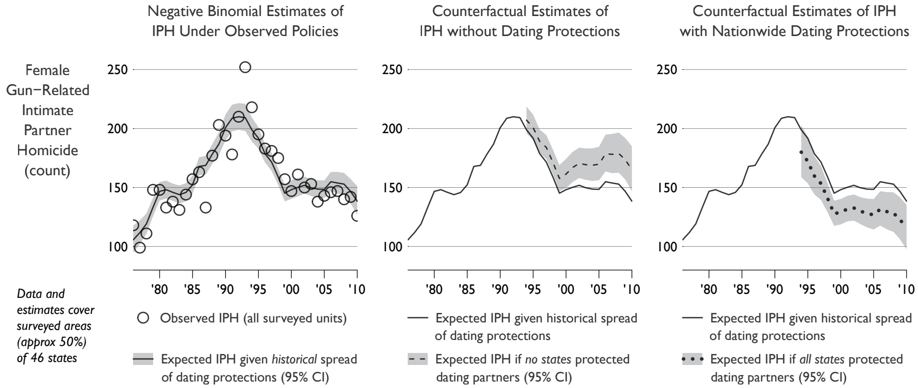
Now consider a counterfactual scenario:
suppose no states added dating protections to DVRO after 1994



We find homicides would have been higher each year nationwide:
perhaps dozens of additional cases in each year in the surveyed area

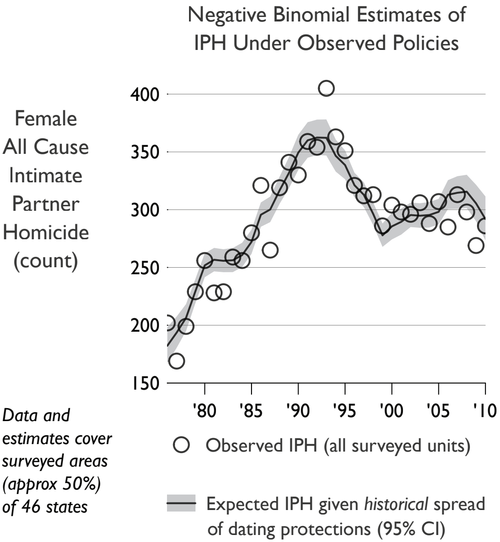


On the other hand, if *all* states had protected dating partners starting in 1994, the model predicts dozens of fewer homicides



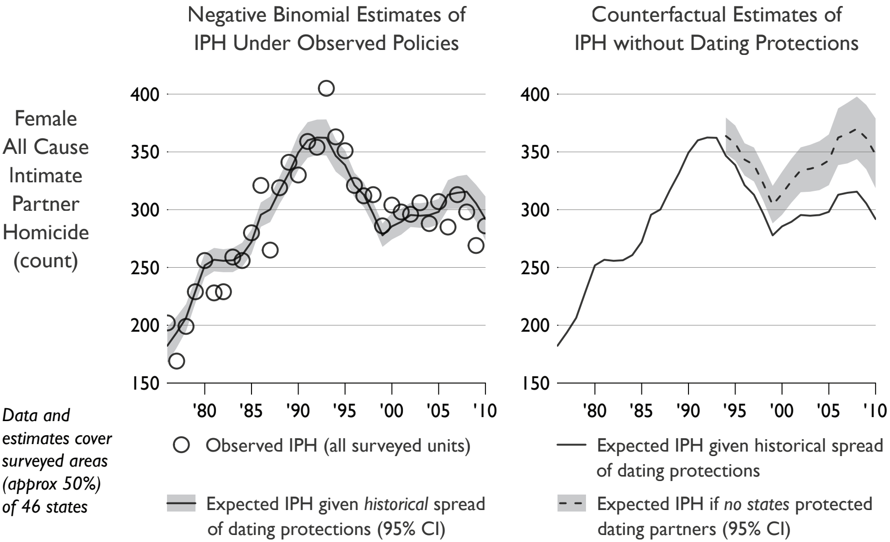
Results are clearly significant at the 0.05 level

Note this pattern of results for Female Gun-Related Homicides – you'll see it again

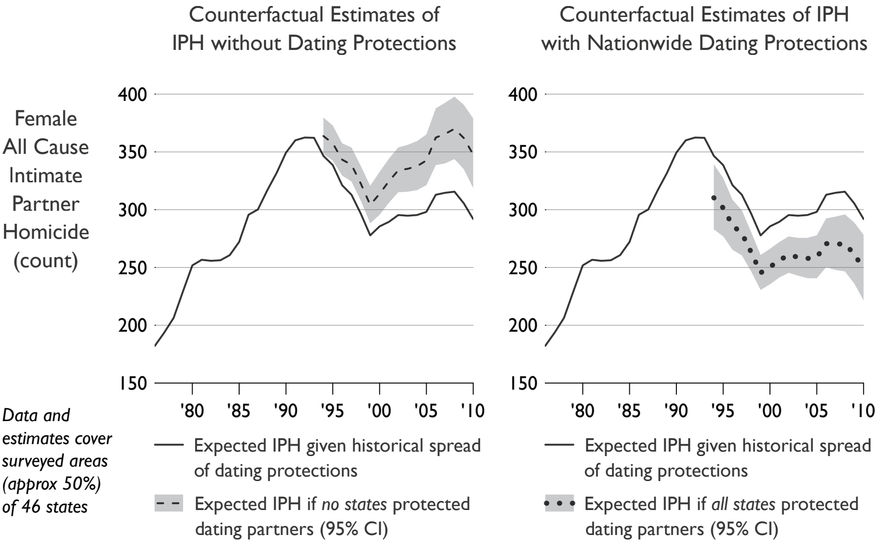


Data and estimates cover surveyed areas (approx 50%) of 46 states

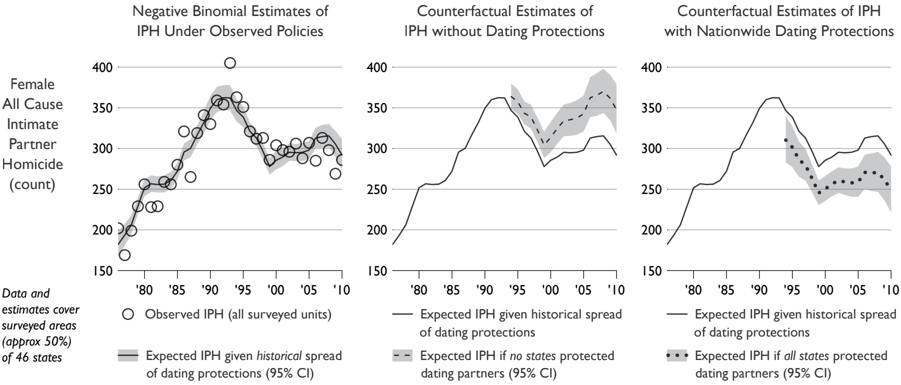
Turning to all causes of Female dating partner IPH, we again check the model against the data...

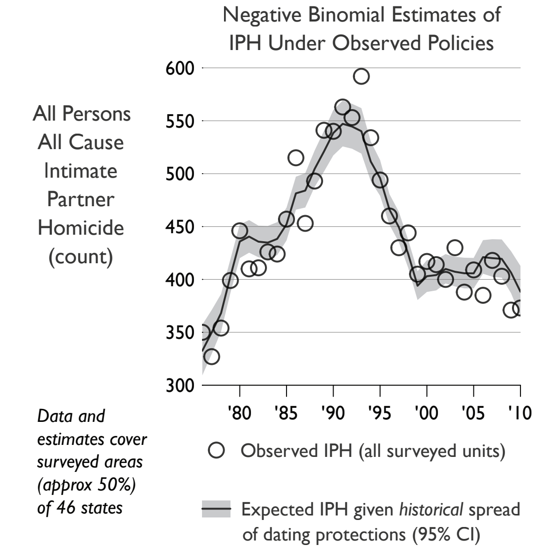


and find the model predicts IPH from all causes would have been significantly higher had no new states extended DVRO protections to dating partners after 1994...



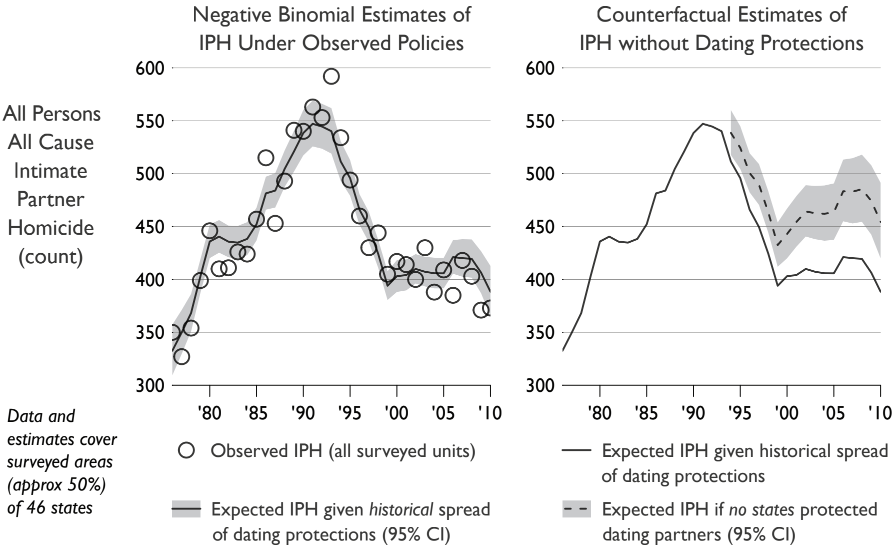
finally, the model still find evidence that nationwide protection would have further reduced homicides


Negative Binomial Estimates of IPH Under Observed Policies
Counterfactual Estimates of IPH without Dating Protections
Counterfactual Estimates of IPH with Nationwide Dating Protections
Female All Cause Intimate Partner Homicide (count)
400
350
300
250
200
150
'80 '85 '90 '95 '00 '05 '10
Data and estimates cover surveyed areas (approx 50%) of 46 states
Observed IPH (all surveyed units)
Expected IPH given *historical* spread of dating protections (95% CI)
Expected IPH given historical spread of dating protections
Expected IPH if *no states* protected dating partners (95% CI)
Expected IPH given historical spread of dating protections
Expected IPH if *all states* protected dating partners (95% CI)



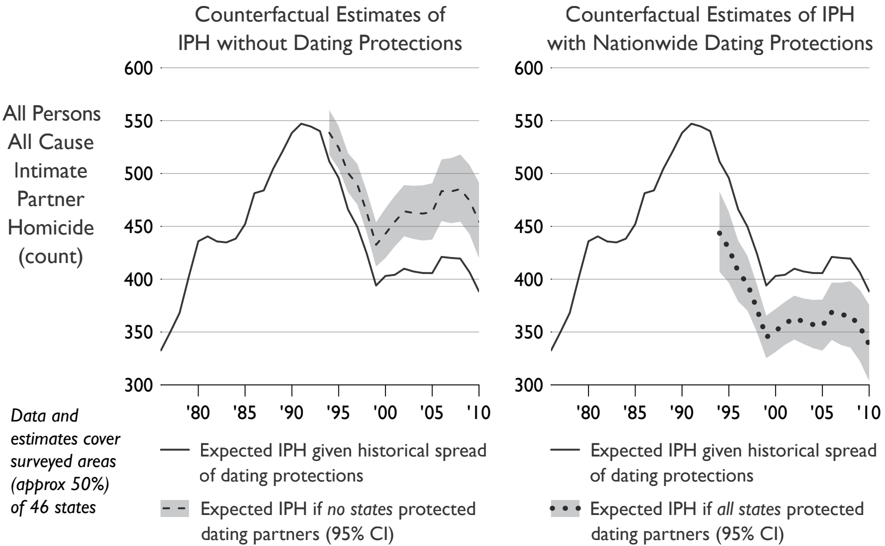
Data and estimates cover surveyed areas (approx 50%) of 46 states

We find these results persist for the total IPH across sexes



As do the counterfactual results

(Results for males alone are not significant; counts are much lower/noisier)


Counterfactual Estimates of IPH without Dating Protections
Counterfactual Estimates of IPH with Nationwide Dating Protections
All Persons All Cause Intimate Partner Homicide (count)
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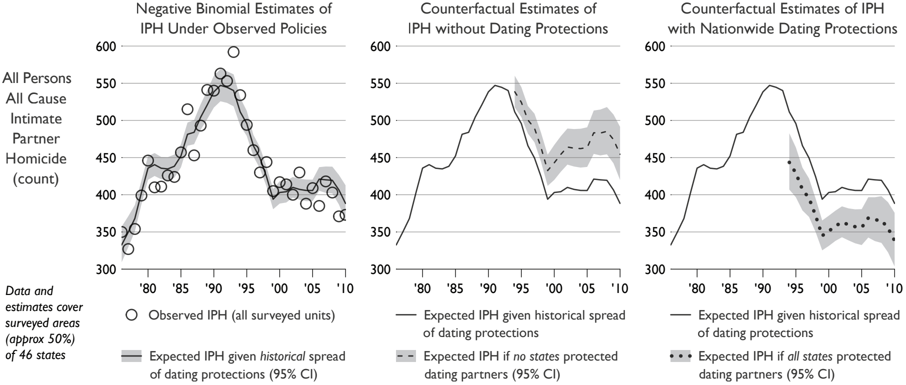

Negative Binomial Estimates of IPH Under Observed Policies
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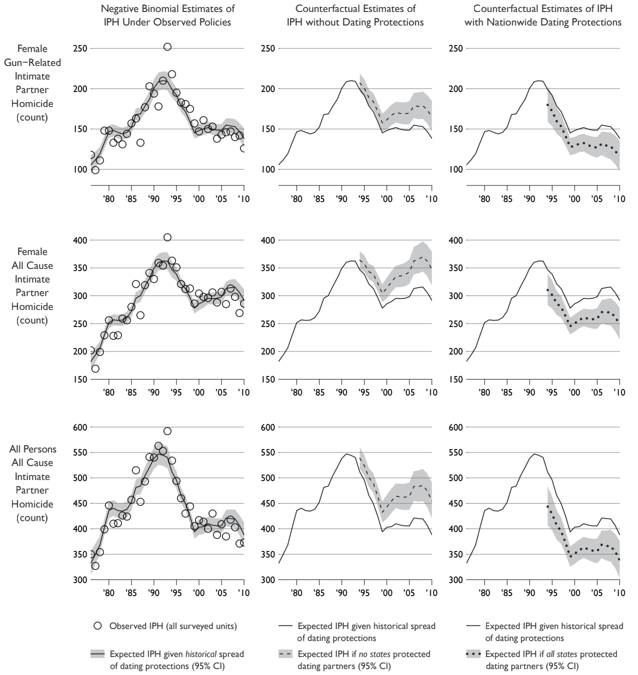


Highly consistent results

What exactly the are the policy implications? How many lives has dating partner protection saved? How many could further extension still save?

Cumulative (1994–2010)

Female gun-related intimate partner homicide

Homicides reduced by observed extension to dating partners…			
in reported area	292.3	[130.4,	463.7]
in total population	641.8	[285.3,	1016.6]
Additional reduction achievable with nationwide dating partner protection…			
in reported area	332.4	[157.1,	498.9]
in total population	785.7	[371.4,	1180.1]

Let's sum up the simulated counterfactual differences across years and states

We'll also extrapolate to the "full" population from the surveyed areas
(this probably needs to be redone with better imputation)

	Cumulative (1994–2010)			Recent (2010)		
Female gun-related intimate partner homicide						
Homicides reduced by observed extension to dating partners…						
in reported area	292.3	[130.4,	463.7]	21.5	[7.6,	36.2]
in total population	641.8	[285.3,	1016.6]	48.7	[16.7,	82.3]
Additional reduction achievable with nationwide dating partner protection…						
in reported area	332.4	[157.1,	498.9]	16.9	[3.0,	29.9]
in total population	785.7	[371.4,	1180.1]	42.6	[8.4,	74.6]

Not only are differences in homicides substantively large (several % of total reported homicides)...

but the gap persists to the most recent data in our study

	Cumulative (1994–2010)			Recent (2010)		
Female all cause intimate partner homicide						
Homicides reduced by observed extension to dating partners...						
in reported area	607.7	[351.2,	874.8]	47.5	[24.5,	71.6]
in total population	1406.7	[811.1,	2026.8]	112.6	[57.2,	170.2]
Additional reduction achievable with nationwide dating partner protection...						
in reported area	611.9	[371.8,	842.6]	34.5	[14.6,	53.8]
in total population	1457.1	[883.8,	2008.7]	86.5	[37.5,	133.8]

Similar implications for all cause female IPH among dating partners

	Cumulative (1994–2010)			Recent (2010)		
All persons all cause intimate partner homicide						
Homicides reduced by observed extension to dating partners...						
in reported area	817.7	[508.3,	1139.8]	58.2	[30.9,	86.6]
in total population	1952.0	[1209.0,	2725.0]	141.8	[74.0,	212.1]
Additional reduction achievable with nationwide dating partner protection...						
in reported area	861.7	[555.4,	1159.1]	41.4	[16.3,	65.5]
in total population	2071.4	[1331.6,	2789.8]	104.7	[42.5,	164.6]

And across all dating partner IPH

And recall we are surely undercounting former dating partners and same-sex dating partners

Concluding thoughts

Simple legal changes at the state level extending DVRO protections to dating partners seem to have large preventive effects on intimate partner homicide

Evidence is clear on face and based on a variety of models

This extension is only half complete –
benefits to finishing the job are potentially huge in lives saved

Broader implication: state-level evidence suggests VAWA-style laws may have very positive effects on IPH outcomes

Renewal of VAWA at the federal level has been highly contentious and divided by party – are the stakes even higher than we thought?

Further directions

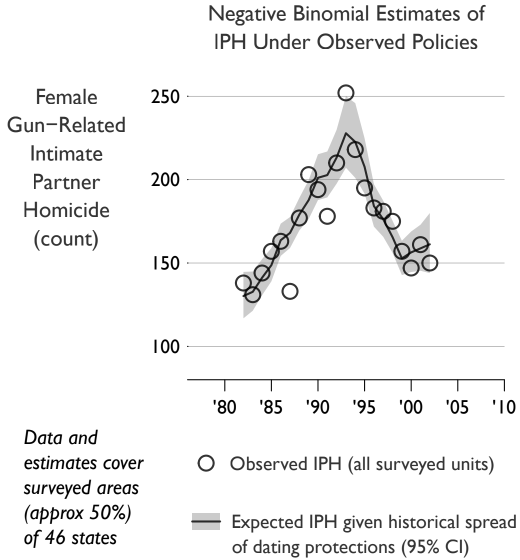
What drives timing of dating partner extension?
Is it reasonable to treat it as egoxenous?

Would laggards be as effective if they extended DVRO to dating partners?

Better imputation models – and issues of undercounting

Subgroup analyses: are the young and non-white at greater risk?

Other ideas?



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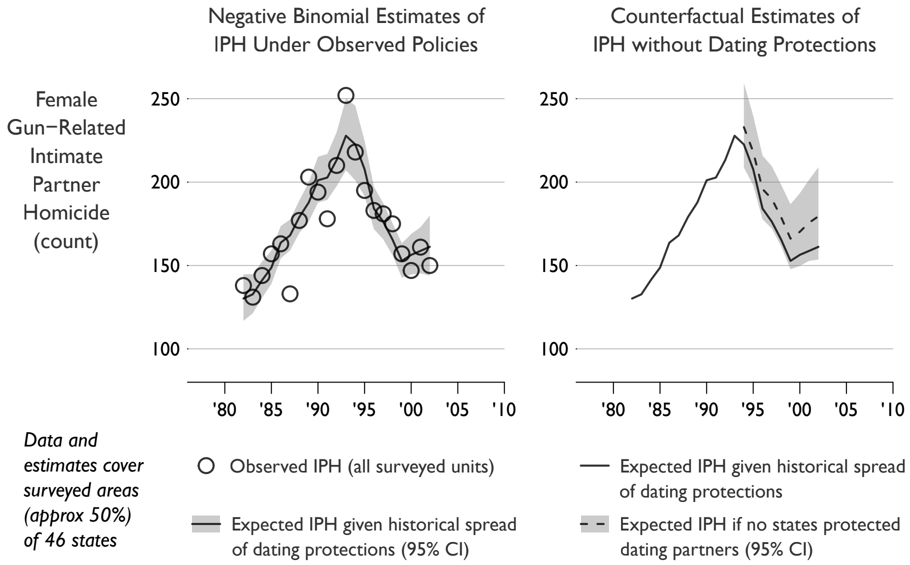
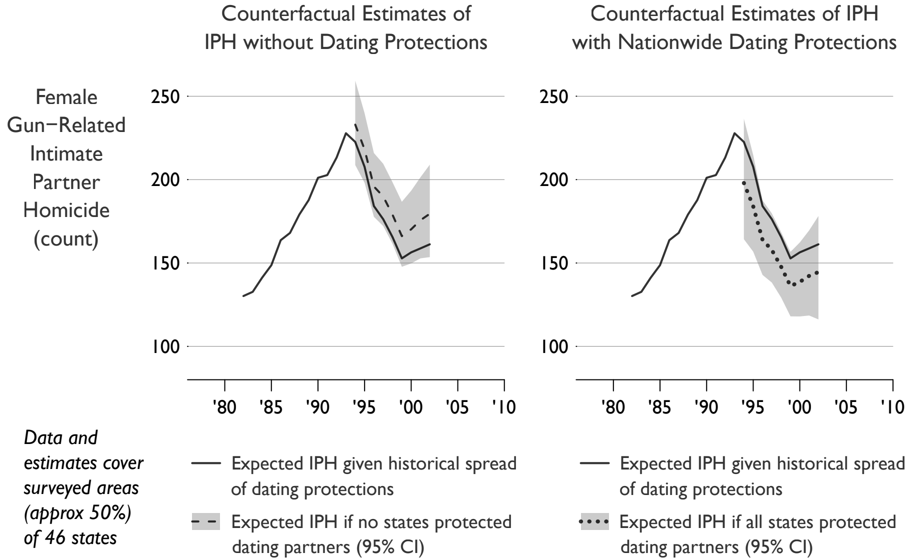
Robustness check: controlling for state laws (limited years)



Similar results, but not quite significant at 0.05 level



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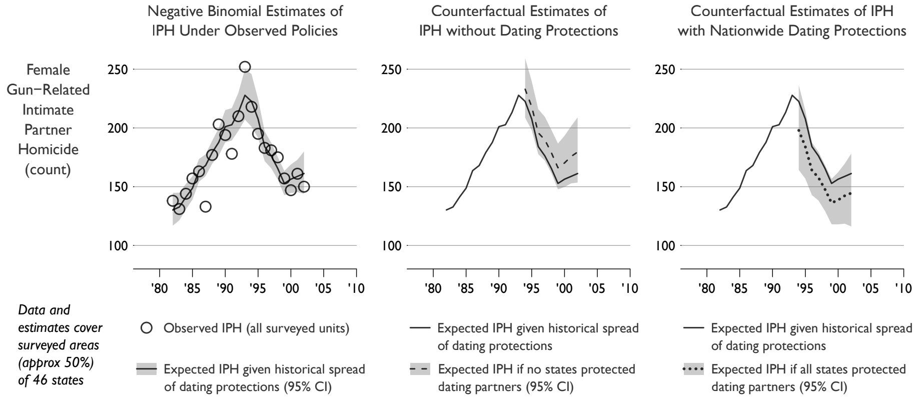

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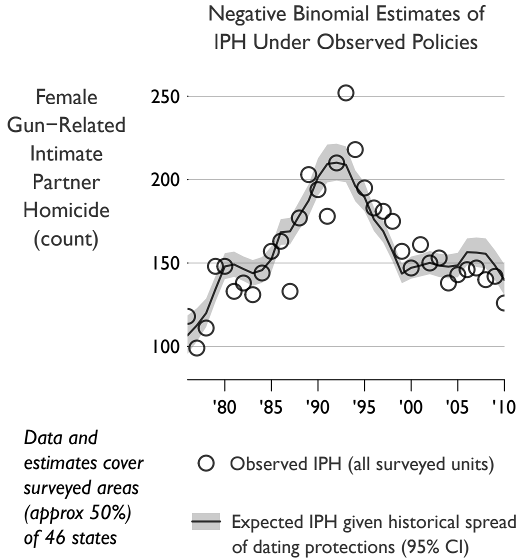

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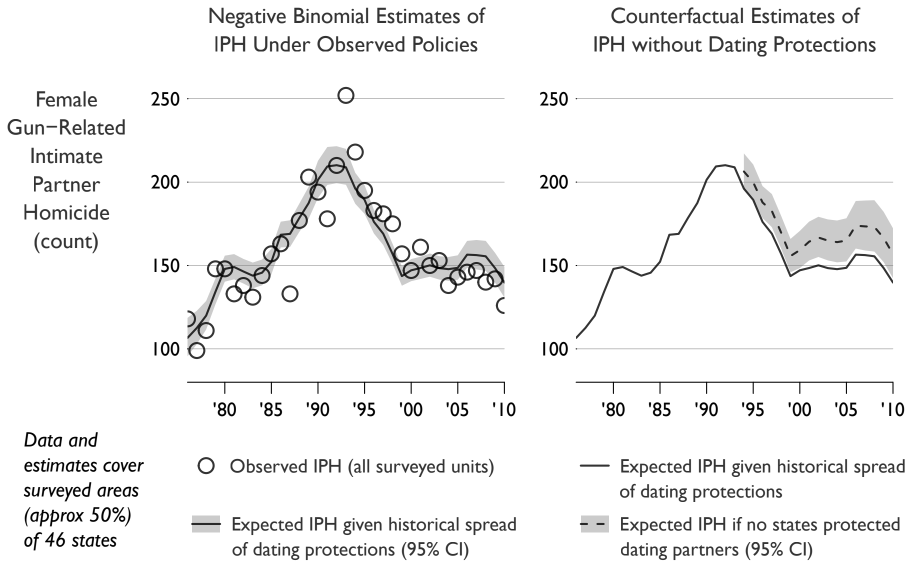
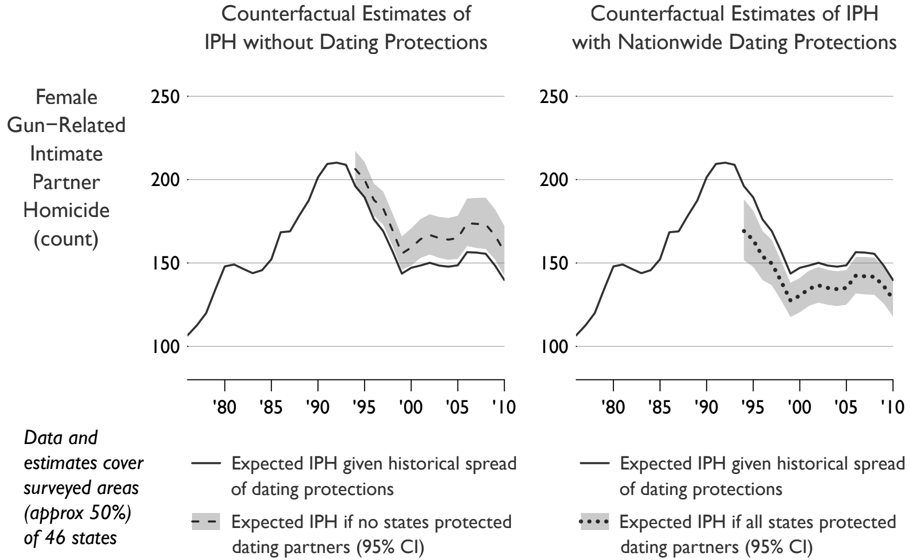
Robustness check:
Static Model



Extremely similar results: the models are driven by level changes after accounting for prior and VAWA trend effects



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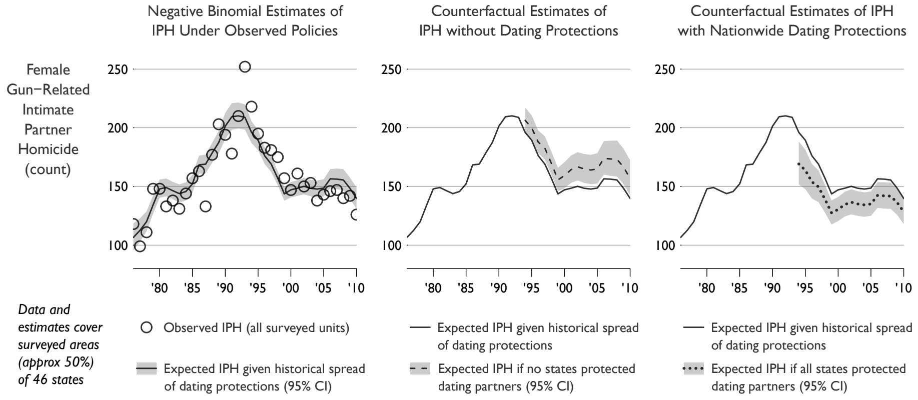
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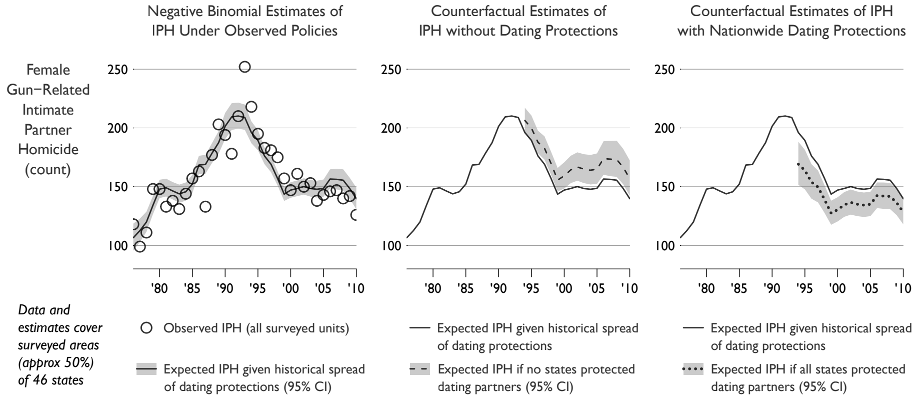
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