

Must access laws for opioid prescription and county gross domestic product

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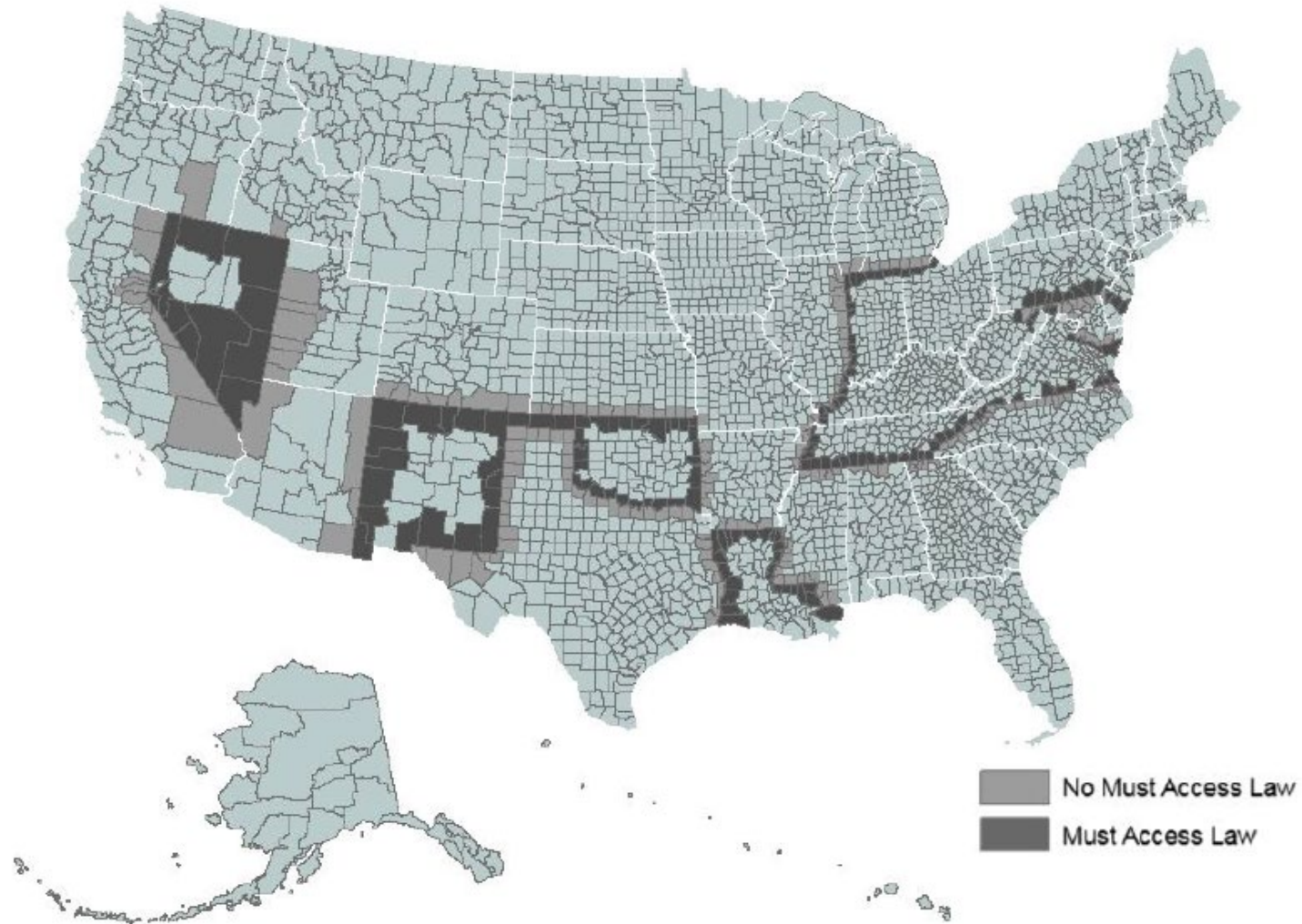
Background

- Opioid epidemic
- Variation in state response
- Must Access laws for the PDMP

Table 1 State laws enacting PDMP must access provision between 1998 and 2016

State	Year must access law was enacted
Connecticut	2015
Indiana	2014
Kentucky	2012
Louisiana	2014
Massachusetts	2014
Nevada	2015
New Jersey	2015
New Mexico	2012
New York	2013
Ohio	2015
Oklahoma	2015
Pennsylvania	2015
Tennessee	2013
Vermont	2015
Virginia	2015
West Virginia	2012

Figure 1 Border counties used in the analysis



$$\begin{aligned} \text{Log of } GDP_{c,m,t} = & \alpha_0 + \alpha_1(\text{Must access law})_{c,m,t} + \alpha_2 X_{c,m,t} + \alpha_3 M_{c,m,t} + \text{Time trend}_t \\ & + \text{Year}_{c,m,t} + \text{State}_c + \text{Adjacent county pair}_m + \mu_{c,m,t} \end{aligned} \quad (1)$$

Appendix Table C: Placebo test on direct and mediator effects

VARIABLES	(1) Direct effect on log of GDP	(2) Labor force participation rates	(3) Employment to population ratio	(4) Opioid prescription rates
Placebo county PDMP must access law	-0.000554 (0.0150)	-0.000671 (0.00184)	-0.000350 (0.00166)	0.0160 (0.771)
Labor force participation rate	32.86*** (6.435)			
Employment to population ratio	-36.09*** (6.953)			
Opioid prescribing rates	0.00376*** (0.000799)			
Constant	87.64*** (21.39)	17.12*** (2.433)	15.03*** (2.248)	6,949*** (1,201)
All Controls	Yes	Yes	Yes	Yes
Observations	1,299	1,428	1,428	1,299
R-squared	0.993	0.934	0.946	0.925

Robust standard errors in parentheses; All regression models are weighted by county population
 *** p<0.01, ** p<0.05, * p<0.1

Appendix Table D: Heterogeneity in unemployment rate, poverty rates and GINI index

VARIABLES	(1) Log of GDP	(2) Log of GDP	(3) Log of GDP	(4) Log of GDP
PDMP must access law	0.0606** (0.0241)	0.180** (0.0756)	0.173*** (0.0635)	0.676** (0.285)
Unemployment rate	-0.264*** (0.0459)	-0.269*** (0.0460)	-0.281*** (0.0486)	-0.276*** (0.0463)
PDMP must access law × Unemployment rate		-0.0188* (0.0112)		
Poverty rate	0.0137 (0.0108)	0.0138 (0.0108)	0.0166 (0.0107)	0.0136 (0.0108)
PDMP must access law × Poverty rate			-0.00935* (0.00481)	
Gini index	5.550*** (1.027)	5.613*** (1.025)	5.601*** (1.026)	5.832*** (1.022)
PDMP must access law × GINI index				-1.373** (0.629)
Constant	110.1*** (23.83)	114.0*** (24.19)	110.2*** (23.87)	107.5*** (23.85)
All controls	Yes	Yes	Yes	Yes
All mediators	Yes	Yes	Yes	Yes
Observations	1,299	1,299	1,299	1,299
R-squared	0.993	0.993	0.993	0.993

Robust standard errors in parentheses; All regression models are weighted by county population
 *** p<0.01, ** p<0.05, * p<0.1

Table 2 Estimates of PDMP must access law on real GDP

Outcome	(1) Log of real GDP	(2) Log of real GDP	(3) Log of real GDP	(4) Log of real GDP	(5) Log of real GDP
VARIABLES					
PDMP must access law	0.237*** (0.0670)	0.0434* (0.0235)	0.0606** (0.0241)	0.0873*** (0.0337)	0.0963*** (0.0332)
Labor force participation rate			33.18*** (6.271)	35.40*** (10.12)	29.46*** (10.09)
Employment to population ratio			-36.52*** (6.770)	-40.10*** (10.94)	-33.61*** (10.91)
Opioid prescribing rates			0.00383*** (0.000799)	0.00277*** (0.000789)	0.00227*** (0.000794)
Log of total drug abuse violations				0.302*** (0.0366)	
Log of total drug abuse sale/manufacture					0.0432** (0.0216)
Log of total drug possession					0.278*** (0.0354)
Unemployment rate		-0.0142 (0.0103)	-0.264*** (0.0459)	-0.302*** (0.0732)	-0.257*** (0.0731)
log of real med household income		1.711*** (0.228)	1.469*** (0.219)	1.459*** (0.249)	1.471*** (0.253)
Share of African American		3.545*** (0.459)	3.209*** (0.441)	2.113*** (0.507)	2.039*** (0.500)
Poverty rate		0.0310*** (0.0113)	0.0137 (0.0108)	0.00434 (0.0131)	0.00454 (0.0134)
GINI index		5.520*** (1.040)	5.550*** (1.027)	5.252*** (1.180)	5.048*** (1.199)
Establishments per 1000 population		0.0543*** (0.00855)	0.0410*** (0.00921)	0.0334*** (0.00885)	0.0335*** (0.00884)
Share of population with bachelors or more		0.0955*** (0.00730)	0.105*** (0.00675)	0.0805*** (0.00908)	0.0803*** (0.00925)
Linear time trend		-0.0804*** (0.0125)	-0.0568*** (0.0120)	-0.0563*** (0.0185)	-0.0598*** (0.0182)
Constant	13.71*** (0.0271)	152.6*** (24.94)	110.1*** (23.83)	109.7*** (36.85)	116.2*** (36.22)
Year fixed effects	No	Yes	Yes	Yes	Yes
State fixed effects	No	Yes	Yes	Yes	Yes
Border county pair fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	1,428	1,428	1,299	915	873
R-squared	0.773	0.991	0.993	0.994	0.993

Robust standard errors in parentheses; All regression models are weighted by county population

*** p<0.01, ** p<0.05, * p<0.1

Table 2 Estimates of PDMP must access law on real GDP

Outcome	(1) Log of real GDP	(2) Log of real GDP	(3) Log of real GDP	(4) Log of real GDP	(5) Log of real GDP
VARIABLES					
PDMP must access law	0.237*** (0.0670)	0.0434* (0.0235)	0.0606** (0.0241)	0.0873*** (0.0337)	0.0963*** (0.0332)

Table 3 Efficacy of must access law effects

VARIABLES	(1) Labor force participation rate	(2) Employment-to- population ratio	(3) Opioid prescription rates
PDMP must access law	0.00732*** (0.00262)	0.00690*** (0.00246)	-2.573** (1.181)
Labor force participation rate			
Employment to population ratio			
Opioid prescribing rates			
Unemployment rate	-0.00566*** (0.00105)	-0.0121*** (0.000963)	-0.236 (0.550)
log of real med household income	0.0601*** (0.0208)	0.0548*** (0.0194)	-5.437 (12.83)
Share of African American	-0.0724 (0.0461)	-0.0664 (0.0426)	-14.61 (28.19)
Poverty rate	-0.00385*** (0.000942)	-0.00352*** (0.000873)	1.334* (0.703)
GINI index	0.121 (0.0973)	0.105 (0.0913)	-81.79 (63.15)
Establishments per 1000 population	0.00178*** (0.000688)	0.00163** (0.000634)	2.470*** (0.490)
Share of population with bachelors or more	0.00305*** (0.000835)	0.00285*** (0.000768)	0.0370 (0.388)
Linear time trend	-0.00983*** (0.00126)	-0.00870*** (0.00117)	-2.938*** (0.598)
Constant	19.67*** (2.499)	17.47*** (2.319)	6,015*** (1,183)
Year fixed effects	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes
Border county pair fixed effects	Yes	Yes	Yes
Observations	1,428	1,428	1,299
R-squared	0.934	0.947	0.926

Tests of efficacy . . .

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PDMP must access law	0.00732*** (0.00262)	0.00690*** (0.00246)	-2.573** (1.181)

Questions?

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