

## Supplementary Appendix

Supplement to: Boettiger DC, White JS. “Cigarette pack prices and sales following policy changes in California, 2011-2018.”

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**Table A.** States excluded from synthetic control group and reason

Policy	States
Under-21 age restriction on tobacco sales introduced between 2011-2018	Hawaii, Maine, New Jersey, Oregon [1]
Tax on cigarettes introduced between 2011-2018	Alabama, Connecticut, Delaware, Hawaii, Illinois, Kansas, Louisiana, Massachusetts, Minnesota, Nevada, New Hampshire, Ohio, Oregon, Pennsylvania, Rhode Island, Vermont, West Virginia [2]

**Table B.** States with non-zero weights in synthetic California for cigarette price and cigarette sales

State	Weight	
	Cigarette price	Cigarette sales
Arizona	0.000	0.263
Arkansas	0.365	0.000
Colorado	0.592	0.177
Iowa	0.011	0.000
Michigan	0.032	0.000
New York	0.000	0.184
Utah	0.000	0.151
Washington	0.000	0.225
MSPE	0.0006	0.0115

Note: MPSE, mean squared prediction error. Thirty states were included in the pool of possible controls: Alaska, Arizona, Arkansas, Colorado, Florida, Georgia, Idaho, Indiana, Iowa, Kentucky, Maryland, Michigan, Mississippi, Missouri, Montana, Nebraska, New Mexico, New York, North Carolina, North Dakota, Oklahoma, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, Wisconsin, and Wyoming.

**Table C.** Cigarette price predictor variable means

Predictor variable	Means		
	California	Synthetic California	All control states
Percentage <25 years	14.522	13.645	13.978
Ln(income per capita)	11.087	10.920	10.927
Percentage <18 years who drink alcohol	54.747	53.942	51.479
Cigarette price 2011	6.042	6.026	6.415
Cigarette price 2013	5.951	5.934	6.275
Cigarette price 2014	5.804	5.827	6.257
Cigarette price 2016	5.887	5.908	6.362

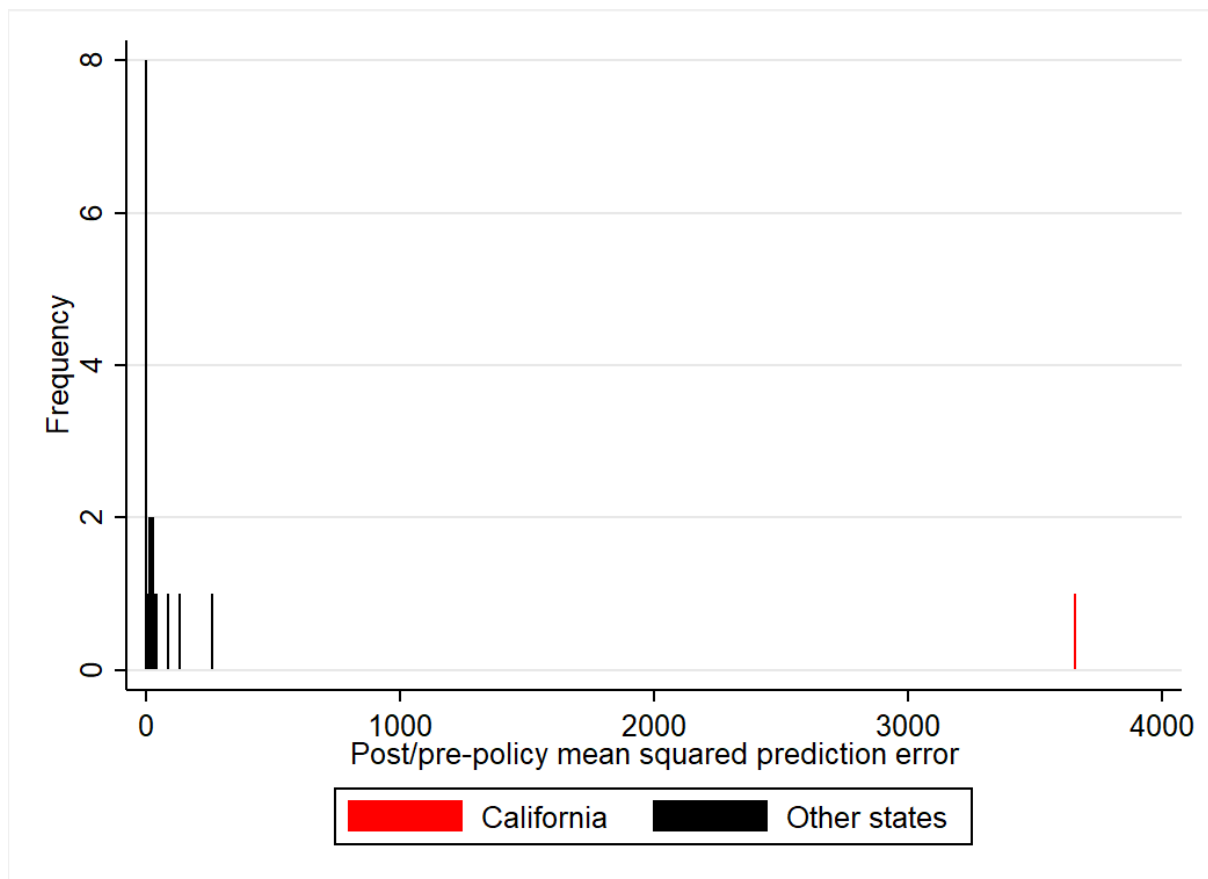
Note: All variables except cigarette price are averaged for the 2011-2016 period. Income per capita and cigarette price variables are expressed in 2018 dollars.

**Table D.** Cigarette sales predictor variable means

Predictor variable	Means		
	California	Synthetic California	All control states
Ln(cigarette price)	1.781	2.038	1.824
Percentage <25 years	14.522	14.075	13.978
Ln(income per capita)	11.087	11.014	10.927
Percentage <18 years who drink alcohol	54.747	52.756	51.479
Cigarette pack sales per capita 2011	26.000	25.931	52.590
Cigarette pack sales per capita 2013	23.900	23.870	49.613
Cigarette pack sales per capita 2015	22.300	22.411	46.987

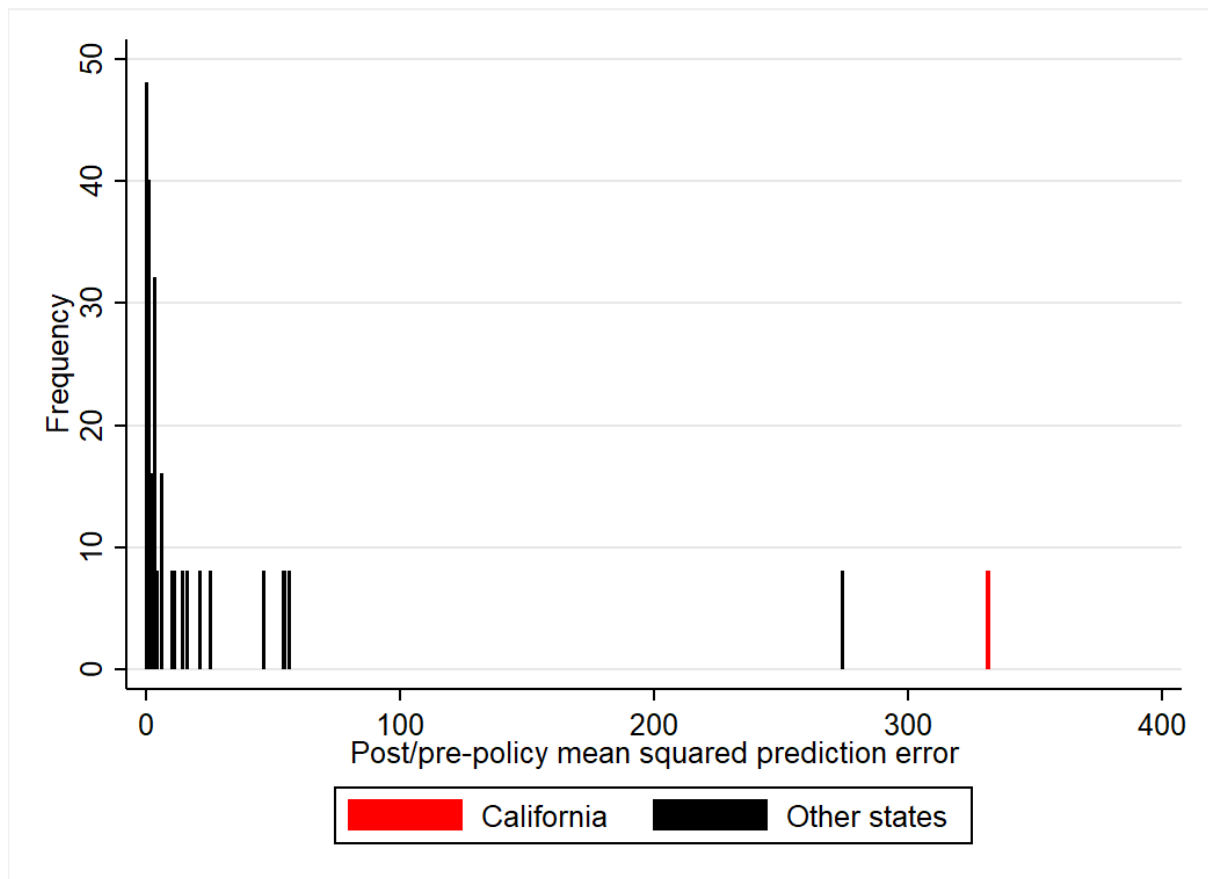
Note: All variables except cigarette pack sales are averaged for the 2011-2016 period. Income per capita and cigarette price variables are expressed in 2018 dollars.

**Figure A.** Ratio of post-policy MSPE and pre-policy MSPE: Cigarette pack price



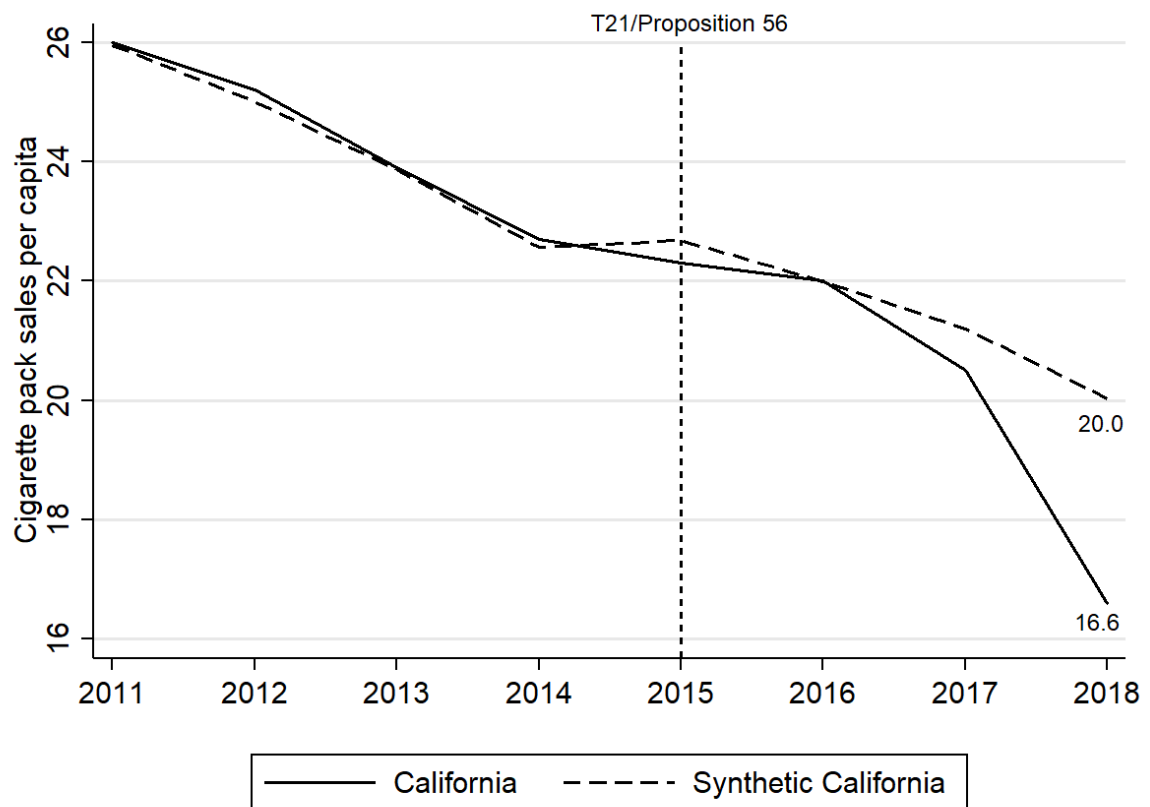
Note: Permutation-based testing was used to compare the treated and synthetic control populations. We estimated the placebo effect by assuming each state in the control pool had been treated instead of California. We calculated a p-value as the proportion of placebo effects at least as large as California's effect, standardized by how closely the control state resembles California. MSPE = mean squared prediction error.

**Figure B.** Ratio of post-policy MSPE and pre-policy MSPE: Cigarette pack sales



Note: Permutation-based testing was used to compare the treated and synthetic control populations. We estimated the placebo effect by assuming each state in the control pool had been treated instead of California. We calculated a p-value as the proportion of placebo effects at least as large as California's effect, standardized by how closely the control state resembles California. MSPE = mean squared prediction error.

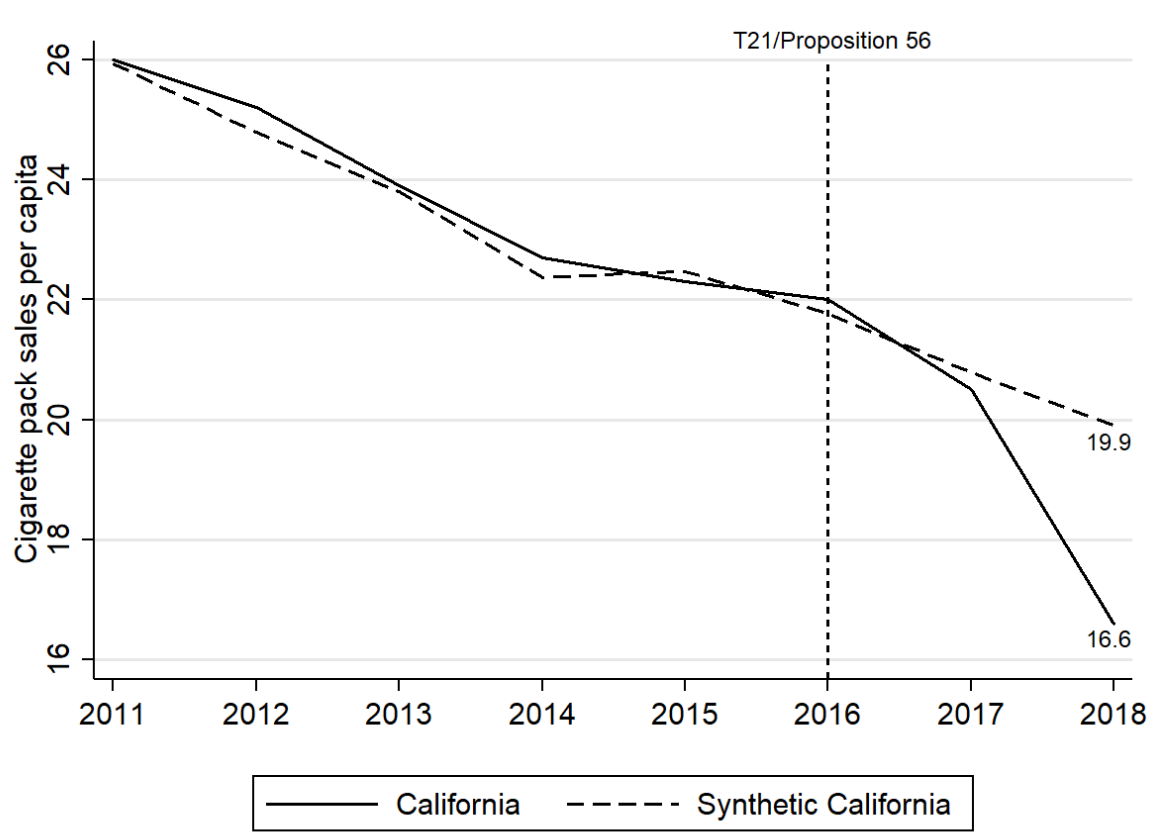
Figure C. Sensitivity analysis with intervention starting in 2015



Note: The vertical dashed line indicates when policies implemented.



**Figure D.** Sensitivity analysis with New York excluded from synthetic control donor pool



Note: The vertical dashed line indicates when policies implemented.

## References

1. Campaign for Tobacco-Free Kids. States and Localities That Have Raised the Minimum Legal Sale Age for Tobacco Products to 21. Available at: [https://www.tobaccofreekids.org/assets/content/what\\_we\\_do/state\\_local\\_issues/sales\\_21/states\\_localities\\_MLSA\\_21.pdf](https://www.tobaccofreekids.org/assets/content/what_we_do/state_local_issues/sales_21/states_localities_MLSA_21.pdf). Accessed 12 Dec 2019.
2. Orzechowski and Walker. The Tax Burden on Tobacco, 1970-2018. Available at: <https://chronicdata.cdc.gov/Policy/The-Tax-Burden-on-Tobacco-1970-2018/7nwe-3aj9>. Accessed 21 Nov 2019.