

Web Appendix

The Revolution Will Be Hard to Evaluate: How Co-Occurring Policy Changes Affect Research on the Health Effects of Social Policies

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Supplemental Methods

Web Appendix 1: Survey assessing relevant journals for inclusion

We developed a short online survey of population health researchers, disseminated through the authors' professional networks via email, Twitter, and LinkedIn. The survey stated: "We'd like to identify an illustrative set of journals where important research on the health effects of social policies is published. We want journals that are (a) high impact, (b) reflect diverse disciplines, and (c) publish original quantitative research on how social policies influence population health." For each of 5 disciplines (epidemiology, public health, clinical medicine, sociology/demography, and economics/health policy), we provided 8 candidate journals, informed by the highest ranking general-topic journals in each field across all countries/regions according to Scimago Journal Rankings. We asked respondents to rank the most important journals to include in each of the 5 fields, with the option to skip fields with which the respondent is not familiar. Response options were ordered randomly for each respondent. This survey was deemed not to be human subjects research by the University of California, San Francisco Human Research Protection Program.

We received 66 anonymous responses, with self-identified primary disciplines of epidemiology (27 respondents), public health (15), medicine (7), sociology/demography (9), economics/health policy (7), and other disciplines (7). The table below summarizes the rankings results.

A clear "top journal" for research on the health effects of social policies emerged in each discipline and our study included all of these top-ranking journals. The 5 other journals we included were ranked 2nd or 3rd. There were 29 additional journals suggested by respondents, none of which were suggested by more than one or two respondents, except Health Services Research, which was suggested by 4 of 66 respondents. There were 11 additional disciplines suggested by respondents (e.g. geography, social work) but none was suggested by more than one respondent.

Web Table 1: Top-ranking journals publishing high-impact research on the health effects of social policies, according to a convenience sample of 66 population health reviewers

Discipline	Journal	Votes for 1 st place	Included in current study
Epidemiology	<i>American Journal of Epidemiology</i>	26	Yes
	<i>Journal of Epidemiology and Community Health</i>	9	
	<i>Epidemiology</i>	7	
	<i>International Journal of Epidemiology</i>	4	
	<i>Annals of Epidemiology</i>	3	
	<i>European Journal of Epidemiology</i>	2	
	<i>Epidemiologic Reviews</i>	1	
	<i>Journal of Clinical Epidemiology</i>	0	
Public health	<i>American Journal of Public Health</i>	42	Yes
	<i>Lancet Public Health</i>	8	
	<i>American Journal of Preventive Medicine</i>	3	Yes
	<i>Morbidity and Mortality Weekly Report</i>	3	
	<i>Preventive Medicine</i>	1	
	<i>BMC Public Health</i>	1	
	<i>Eurosurveillance</i>	0	
	<i>Bulletin of the WHO</i>	0	
Medicine	<i>New England Journal of Medicine</i>	24	Yes
	<i>Journal of the American Medical Association</i>	11	Yes
	<i>Lancet</i>	9	Yes
	<i>PLoS Medicine</i>	4	
	<i>British Medical Journal</i>	3	
	<i>Science</i>	3	
	<i>Annals of Internal Medicine</i>	2	
	<i>Nature Medicine</i>	2	
Sociology/demography	<i>Social Science & Medicine</i>	30	Yes
	<i>American Sociological Review</i>	10	
	<i>Demography</i>	6	Yes
	<i>American Journal of Sociology</i>	4	
	<i>Journal of Health and Social Behavior</i>	4	
	<i>Social Forces</i>	1	
	<i>Demographic Research</i>	0	
	<i>European Sociological Review</i>	0	
Economics/health policy	<i>Health Affairs</i>	38	Yes
	<i>Journal of Health Economics</i>	8	
	<i>American Economic Review (AER)</i>	7	Yes
	<i>Milbank Quarterly</i>	4	
	<i>Health Policy</i>	1	
	<i>American Journal of Political Science</i>	0	
	<i>Quarterly Journal of Economics</i>	0	
	<i>Journal of Political Economy</i>	0	

Web Appendix 2: Social policy study inclusion and exclusion criteria

Included:

- Original, empirical studies aiming to make inferences about the causal effects of one or more social policies on health-related outcomes
 - Although the boundaries of “social policies” are fuzzy, we focused on non-medical, population-based or targeted policies that are adopted at a community or higher level and affect social determinants of health or social inequalities in health.
 - We defined health-related outcomes broadly, to include morbidity, mortality, and health conditions, as well as factors related to health outcomes such as smoking, neighborhood availability of health foods, health expenditure, utilization of health services homelessness, and sales of healthy and unhealthy products
- Other inclusions:
 - Economic, welfare, unemployment, family and child-related policies
 - Food and nutrition-related policies
 - Drug and alcohol policies
 - Road safety policies
 - Immigration policies
 - Firearm policies
 - Policies regulation federal school meals

Excluded:

- Studies that pertained to health care, health insurance, interventions delivered in the clinical setting, medications, medical procedures, or medical devices, including studies of preventive or treatment-oriented health services, the Affordable Care Act, and Medicaid expansion
- Systematic reviews and meta-analyses
- Qualitative and ethnographic studies
- Hypothesis-generating studies
- Simulation studies, unless they estimated the effects of existing policies
- Studies that leverage policy changes as an instrument to study the effects of endogenous variables such as educational attainment or income (these studies do not estimate the effects of social policies)
- Other exclusions:
 - Interventions delivered in the clinical setting, even if they are delivering social services (e.g. housing supports)
 - Surveys about potential responses to hypothetical regulations used to project the impacts of future/potential policies
 - RCTs unless used to evaluate and actual, real-world policy
 - Studies of the effects of lawsuits
 - Studies about cancer screening or communicable testing incentives, guidelines, recommendations and policies
 - Mechanisms and structures of health care payments; health care finance mechanisms and models
 - Studies of industrial/macroeconomic policies with productivity, employment,

- income, or wages as outcomes
- Studies on health care spending
- Studies of the health information exchange
- Millennium development goals
- Infectious disease harm reduction
- Mass drug administration
- Democracy, regime type, or free and fair elections
- Community-based interventions around medication access and adherence
- Vaccination policies
- Federal funding for research
- Physician shortages
- Expansions of family planning services
- Mental health policies, even if they have components that are not about health insurance or health services – e.g. stigma reduction campaigns (still mainly a health services policy)
- Funding for prevention programs or primary care
- Incentives for behavior change in Medicaid
- Moving to Opportunity
- Government funding earmarked for different purpose but not associated with a particular policy

Web Appendix 3: Assessment of inter-rater reliability for inclusion and exclusion

We sought to assess the replicability and reliability of classifying each journal's 2019 articles as "studies of the health effects of social policies" or not. We recruited one analyst to independently review a random subsample of the journal articles we initially reviewed for inclusion. The analyst's training background was an MPH in Environmental Health. We provided her with some background on the project, some general training in what constitutes a social policy, and the definitions and inclusion/exclusion criteria provided in the main text and Web Appendix of our paper. We provided the analyst with 31 full-text manuscripts: 10 meeting inclusion criteria and 21 studies not meeting inclusion criteria. The analyst classified 28 of the 31 studies in concordance with our determination of inclusion/exclusion. Conflicts for the three discordant studies were easily resolved with the determination to exclude after further clarifying that a composite index of country-level participation in conflict and individually-initiated abstinence-based fertility control were not measures of social policies, and that the exclusion of instrumental variables studies only applied to studies in which leverage policy changes as an instrument to study the effects of endogenous variables such as educational attainment or income.

Web Appendix 4: Database selection

For each social policy study, we identified any corresponding quantitative databases capturing the content, locations, and times of adoption of that index policy and related policies in the same domain. We searched the scientific literature; websites of domain-relevant research institutions, scientific centers, and organizations; and the internet to identify relevant, publicly available databases. We also asked the authors of each index social policy study for policy database recommendations. When possible, we included databases that were provided on request from individual investigators.

If more than one policy database was available, we selected the one that was most amenable to this analysis: first, the one requiring the least data cleaning or manipulation (i.e., panel data structure and variables coded); then, among those remaining, the one with the greatest clarity of variable definitions, followed by the least missingness, and most comprehensiveness (number of policies and time points). For example, the *American Journal of Preventive Medicine* published a January 2019 study on the association of state firearm legislation with intimate partner homicide using the RAND State Firearm Law Database (1); several state firearm law databases exist, and we selected the one developed by Siegel and colleagues because it had the cleanest data, most precise variable definitions, and covered the greatest number of policies (2,3). The database selected for our analysis was not always the one used in the index policy.

For studies evaluating national-level policies, we treated the corresponding database as the one with country-level panel data, even if the corresponding study did not include data from other countries—for example, if the authors used an interrupted time series design. If we could not find a database that included the location in the index study (e.g. China), we used the best available database covering other geographic units, if one was available (e.g. OECD countries). We excluded studies and domains for which we could not identify or access a corresponding database.

Web Appendix 5: Database coding

Each database is formatted with one row per place and time period. Each policy was a separate column indicating the value of the policy measure for the given place and time. The time periods were defined based on the finest resolution available in the data set (in most cases, years). The types and formats of policy information varied across databases. For example, some included exclusively binary indicators of when each policy was adopted while others provided information on benefit generosity, implementation, access, or scope (e.g. number of Supplemental Nutrition Assistance Program participants by state and year). Some databases code laws very specifically (e.g. whether a country child family leave policy requires a minimum employee tenure) while others were more general (e.g. whether a country has any policy to increase immigration). Some included dates of enactment, dates the laws became effective, and dates that the laws were amended, if relevant; we included these as separate policy measures. Most included laws, resolutions, and regulations, but excluded executive orders and determinations resulting from legal cases. We included all available policy measures for the heatmaps. For subsequent analyses, when multiple measures of the same policy were available (e.g. year of adoption and number of participants), we selected the measure used in the publication in the original search which invoked the policy, if relevant, or the measure we judged to be the most representative.

We converted categorical policy variables to a series of dichotomous variables, with “no policy” serving as the reference category. Some policies were subordinate to umbrella policies. For example, provisions regulating cannabis delivery services are only applicable in jurisdictions where recreational cannabis is legal. For jurisdictions and times in which the umbrella policy was not active, provisions conditional on that umbrella policy were coded to 0. We treated two policies where one is nested in the other as separate policy variables. For example, handguns are a type of gun; we treated policies requiring a waiting period on purchases of all handguns and policies requiring a waiting period on purchases of all guns as separate policy variables.

Some databases simply provided a list of the dates of adoption of a set of policies, leaving ambiguity about how many time-units prior to policy adoption should be included in the analysis. In applied work, this would likely depend on the health outcome, data availability, and number of time units needed to establish the pre-policy outcome trends. For our analyses, when converting these to jurisdiction-time period datasets, we chose to include three time-units before adoption of the first policy and three time-units after adoption of the last policy (when possible), as similar duration run-in and run-out periods are common in social policy studies. If exact dates of policies were provided, we converted the data to a jurisdiction-month-level panel database. We treated missing data—for example, missingness arising because a country was not an entity in a given year—as missing completely at random. We reported the degree of missingness in Web Table 2 and conducted complete case analysis. Some databases lacked information on all policies for all available years; in this case, we restricted the range of years or set of policies included in the final database to maximize the number of state-year-policy data points included.

Supplemental results

Web Table 2: Social policy studies identified in systematic sample

Citation	Policy	Corresponding policy database	Adequate database identified
Liao Z, Zhou Y, Li H, et al. The Rates and Medical Necessity of Cesarean Delivery in the Era of the Two-Child Policy in Hubei and Gansu Provinces, China. <i>Am J Public Health</i> . 2019;109(3):476–482.	Limiting fertility to 1 child or 2 children	Country-level population and fertility policies	Yes
Boertien D, Vignoli D. Legalizing Same-Sex Marriage Matters for the Subjective Well-being of Individuals in Same-Sex Unions. <i>Demography</i> . 2019;56(6):2109–2121.	Legalization of same-sex marriage	Country-level gay, lesbian, bisexual, and transgender (LGBT) rights policies	Yes
Ahmed S, Fielding D. Changes in maternity leave coverage: Implications for fertility, labour force participation and child mortality. <i>Social Science & Medicine</i> . 2019;241:112573.	Maternity leave coverage	Country-level family and medical leave	Yes
Evans WN, Kroeger S, Palmer C, et al. Housing and Urban Development–Veterans Affairs Supportive Housing Vouchers and Veterans’ Homelessness, 2007–2017. <i>Am J Public Health</i> . 2019;109(10):1440–1445.	Supportive housing vouchers	Country-level housing	No
Högberg B, Strandh M, Petersen S, et al. Education system stratification and health complaints among school-aged children. <i>Social Science & Medicine</i> . 2019;220:159–166.	Stratification of students by ability	Country-level education	No
Bose B, Heymann J. Effects of tuition-free primary education on women’s access to family planning and on health decision-making: A cross-national study. <i>Social Science & Medicine</i> . 2019;238:112478.	Tuition-free primary education	Country-level education	No
Delaruelle K, van de Werfhorst H, Bracke P. Do comprehensive school reforms impact the health of early school leavers? Results of a comparative difference-in-difference design. <i>Social Science & Medicine</i> . 2019;239:112542.	Comprehensive school reforms	Country-level education	No
Rajmil L, Fernández de Sanmamed M-J. Austerity Policies and Mortality Rates in European Countries, 2011–2015. <i>Am J Public Health</i> . 2019;109(5):768–770.	Austerity	Country-level macroeconomic and fiscal	No

Regidor E, Mateo A, Barrio G, et al. Mortality in Spain in the Context of the Economic Crisis and Austerity Policies. <i>Am J Public Health</i> . 2019;109(7):1043–1049.	Austerity	Country-level macroeconomic and fiscal	No
Patler C, Hamilton E, Meagher K, et al. Uncertainty About DACA May Undermine Its Positive Impact On Health For Recipients And Their Children. <i>Health Affairs</i> . 2019;38(5):738–745.	Deferred Action for Childhood Arrivals	Country-level immigration	Yes
Bruzeliuss E, Baum A. The Mental Health of Hispanic/Latino Americans Following National Immigration Policy Changes: United States, 2014–2018. <i>Am J Public Health</i> . 2019;109(12):1786–1788.	Modified Immigration and Customs Enforcement (ICE)	Country-level immigration	Yes
Ku L, Brantley E, Pillai D. The Effects of SNAP Work Requirements in Reducing Participation and Benefits From 2013 to 2017. <i>Am J Public Health</i> . 2019;109(10):1446–1451.	Supplemental Nutritional Assistance Program	Country- and state-level poverty and social welfare	Yes, state-level
Ettinger de Cuba S, Chilton M, Bovell-Ammon A, et al. Loss Of SNAP Is Associated With Food Insecurity And Poor Health In Working Families With Young Children. <i>Health Affairs</i> . 2019;38(5):765–773.	Supplemental Nutritional Assistance Program	Country- and state-level poverty and social welfare	Yes, state-level
Heflin CM, Ingram SJ, Ziliak JP. The Effect Of The Supplemental Nutrition Assistance Program On Mortality. <i>Health Affairs</i> . 2019;38(11):1807–1815.	Supplemental Nutritional Assistance Program	Country- and state-level poverty and social welfare	Yes, state-level
Rummo PE, Noriega D, Parret A, et al. Evaluating A USDA Program That Gives SNAP Participants Financial Incentives To Buy Fresh Produce In Supermarkets. <i>Health Affairs</i> . 2019;38(11):1816–1823.	Supplemental Nutritional Assistance Program	Country- and state-level poverty and social welfare	Yes, state-level
Cuba SAE de, Bovell-Ammon AR, Cook JT, et al. SNAP, Young Children’s Health, and Family Food Security and Healthcare Access. <i>American Journal of Preventive Medicine</i> . 2019;57(4):525–532.	Supplemental Nutritional Assistance Program	Country- and state-level poverty and social welfare	Yes, state-level
Franckle RL, Thorndike AN, Moran AJ, et al. Supermarket Purchases Over the Supplemental Nutrition Assistance Program Benefit Month: A Comparison Between Participants and Nonparticipants. <i>American Journal of Preventive Medicine</i> . 2019;57(6):800–807.	Supplemental Nutritional Assistance Program	Country- and state-level poverty and social welfare	Yes, state-level
Heflin C, Arteaga I, Hodges L, et al. SNAP benefits and childhood asthma. <i>Social Science & Medicine</i> . 2019;220:203–211.	Supplemental Nutritional	Country- and state-level poverty and social welfare	Yes, state-level

	Assistance Program		
Hamad R, Batra A, Karasek D, et al. The Impact of the Revised WIC Food Package on Maternal Nutrition During Pregnancy and Postpartum. <i>Am J Epidemiol</i> . 2019;188(8):1493–1502.	Women, Infants, and Children	Country- and state-level poverty and social welfare	Yes, state-level
Hughes C. Reexamining the Influence of Conditional Cash Transfers on Migration From a Gendered Lens. <i>Demography</i> . 2019;56(5):1573–1605.	Conditional cash transfer	Country-level cash transfer	No
Angeles G, de Hoop J, Handa S, et al. Government of Malawi’s unconditional cash transfer improves youth mental health. <i>Social Science & Medicine</i> . 2019;225:108–119.	Unconditional cash transfer	Country-level cash transfer	No
Litwin A, Perova E, Reynolds SA. A conditional cash transfer and Women’s empowerment: Does Bolsa Familia Influence intimate partner violence? <i>Social Science & Medicine</i> . 2019;238:112462.	Conditional cash transfer	Country- and local (Brazil)-level cash transfer	No
Lebihan L, Mao Takongmo C-O. Unconditional cash transfers and parental obesity. <i>Social Science & Medicine</i> . 2019;224:116–126.	Unconditional cash transfer	Country-level dependent child cash transfers and credits	Yes
Shahidi FV, Muntaner C, Shankardass K, et al. The effect of unemployment benefits on health: A propensity score analysis. <i>Social Science & Medicine</i> . 2019;226:198–206.	Unemployment benefits	Country-level unemployment, sick leave, and pension benefits	Yes
Chen X, Wang T, Busch SH. Does money relieve depression? Evidence from social pension expansions in China. <i>Social Science & Medicine</i> . 2019;220:411–420.	Pension generosity	Country-level unemployment, sick leave, and pension benefits	Yes
Park W, Baek J. The impact of employment protection on health: Evidence from fixed-term contract workers in South Korea. <i>Social Science & Medicine</i> . 2019;233:158–170.	Employment protections	Country-level employment protections	No
Stacey N, Mudara C, Ng SW, et al. Sugar-based beverage taxes and beverage prices: Evidence from South Africa’s Health Promotion Levy. <i>Social Science & Medicine</i> . 2019;238:112465.	Sugar-sweetened beverage tax	Country-level food, beverage, nutrition	No
Massri C, Sutherland S, Källestål C, et al. Impact of the Food-Labeling and Advertising Law Banning Competitive Food and Beverages in Chilean Public Schools, 2014–	Banning sales of competitive food and beverages in schools	Country-level food, beverage, nutrition	No

2016. Am J Public Health. 2019;109(9):1249–1254.			
Lin B-H, Guthrie JF, Smith TA. Dietary Guidance and New School Meal Standards: Schoolchildren’s Whole Grain Consumption Over 1994–2014. American Journal of Preventive Medicine. 2019;57(1):57–67.	School meal standards	Country-level food, beverage, nutrition	No
Haghpanahan H, Lewsey J, Mackay DF, et al. An evaluation of the effects of lowering blood alcohol concentration limits for drivers on the rates of road traffic accidents and alcohol consumption: a natural experiment. The Lancet. 2019;393(10169):321–329.	Lowering legal blood alcohol concentration limit for drivers	Country-level alcohol control	No
Hamad R, Modrek S, White JS. Paid Family Leave Effects on Breastfeeding: A Quasi-Experimental Study of US Policies. Am J Public Health. 2018;109(1):164–166.	Paid family leave	State-level family and medical leave	No
Lin M, Wang Q. Center-based childcare expansion and grandparents’ employment and well-being. Social Science & Medicine. 2019;240:112547.	Expansion of childcare centers	Province (China)-level childcare policies	No
Pilkauskas N, Micheltore K. The Effect of the Earned Income Tax Credit on Housing and Living Arrangements. Demography. 2019;56(4):1303–1326.	Earned Income Tax Credit	State-level poverty and social welfare policies	Yes
Gertner AK, Rotter JS, Shafer PR. Association Between State Minimum Wages and Suicide Rates in the U.S. American Journal of Preventive Medicine. 2019;56(5):648–654.	Minimum wage	State-level labor	Yes
Ferdinand AO, Aftab A, Akinlotan MA. Texting-While-Driving Bans and Motor Vehicle Crash-Related Emergency Department Visits in 16 US States: 2007–2014. Am J Public Health. 2019;109(5):748–754.	Banning texting while driving	State-level road safety policies	No
Torche F, Sirois C. Restrictive Immigration Law and Birth Outcomes of Immigrant Women. American Journal of Epidemiology. 2019;188(1):24–33.	Various anti-immigrant inclusion	State-level immigration	No
Myran DT, Chen JT, Bearnot B, et al. Alcohol Availability Across Neighborhoods in Ontario Following Alcohol Sales Deregulation, 2013–2017. Am J Public Health. 2019;109(6):899–905.	Alcohol sales deregulation	Canadian province-level alcohol control	No
Tessler RA, Mooney SJ, Quistberg DA, et al. State-Level Beer Excise Tax and Firearm	Beer excise tax	State-level alcohol control	Yes

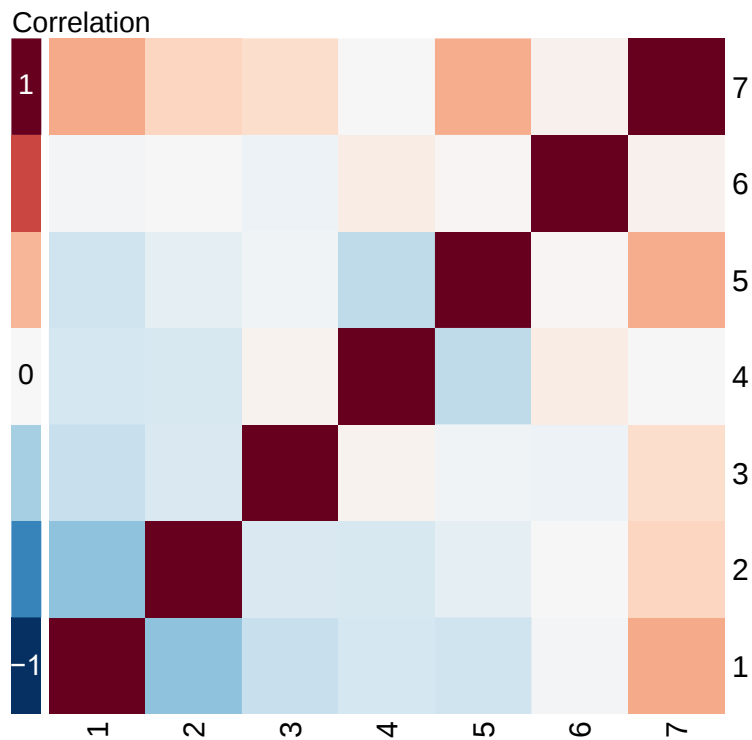
Homicide in Adolescents and Young Adults. American Journal of Preventive Medicine. 2019;56(5):708–715.			
Lira MC, Xuan Z, Coleman SM, et al. Alcohol Policies and Alcohol Involvement in Intimate Partner Homicide in the U.S. American Journal of Preventive Medicine. 2019;57(2):172–179.	Overall alcohol control policy stringency	State-level alcohol control	Yes
Everson EM, Dilley JA, Maher JE, et al. Post-Legalization Opening of Retail Cannabis Stores and Adult Cannabis Use in Washington State, 2009–2016. Am J Public Health. 2019;109(9):1294–1301.	Legalization of cannabis for recreational use	State-level recreational cannabis	Yes
Mooney AC, Neilands TB, Giannella E, et al. Effects of a voter initiative on disparities in punishment severity for drug offenses across California counties. Social Science & Medicine. 2019;230:9–19.	Punishments for drug offenses	State-level drug offense laws	No
Doucette ML, Crifasi CK, Frattaroli S. Right-to-Carry Laws and Firearm Workplace Homicides: A Longitudinal Analysis (1992–2017). Am J Public Health. 2019;109(12):1747–1753.	Right-to-Carry firearm laws	State-level firearms	Yes
Klarevas L, Conner A, Hemenway D. The Effect of Large-Capacity Magazine Bans on High-Fatality Mass Shootings, 1990–2017. Am J Public Health. 2019;109(12):1754–1761.	Large-capacity magazine bans	State-level firearms	Yes
Sivaraman JJ, Ranapurwala SI, Moracco KE, et al. Association of State Firearm Legislation With Female Intimate Partner Homicide. American Journal of Preventive Medicine. 2019;56(1):125–133.	Various firearms restrictions	State-level firearms	Yes
Ghiani M, Hawkins SS, Baum CF. Associations Between Gun Laws and Suicides. Am J Epidemiol. 2019;188(7):1254–1261.	Various firearm restrictions	State-level firearms	Yes
Levy DT, Yuan Z, Li Y, et al. The Minnesota SimSmoke Tobacco Control Policy Model of Smokeless Tobacco and Cigarette Use. American Journal of Preventive Medicine. 2019;57(4):e103–e115.	Various tobacco control	State-level tobacco control	Yes
Stallings-Smith S, Hamadi HY, Peterson BN, et al. Smoke-Free Policies and 30-Day Readmission Rates for Chronic Obstructive Pulmonary Disease. American Journal of Preventive Medicine. 2019;57(5):621–628.	Clean air restrictions	State- and local-tobacco control	Yes

Hernandez EM, Vuolo M, Frizzell LC, et al. Moving Upstream: The Effect of Tobacco Clean Air Restrictions on Educational Inequalities in Smoking Among Young Adults. <i>Demography</i> . 2019;56(5):1693–1721.	Clean air restrictions	Local-level tobacco control	Yes
Kingsley M, Setodji CM, Pane JD, et al. Short-Term Impact of a Flavored Tobacco Restriction: Changes in Youth Tobacco Use in a Massachusetts Community. <i>American Journal of Preventive Medicine</i> . 2019;57(6):741–748.	Restrictions on flavored tobacco products	Local-level tobacco control	Yes
Parmar D, Banerjee A. Impact of an employment guarantee scheme on utilisation of maternal healthcare services: Results from a natural experiment in India. <i>Social Science & Medicine</i> . 2019;222:285–293.	Guaranteed employment for rural workers	India local-level poverty and social welfare	No
Matthay EC, Farkas K, Rudolph KE, et al. Firearm and Nonfirearm Violence After Operation Peacemaker Fellowship in Richmond, California, 1996–2016. <i>Am J Public Health</i> . 2019;109(11):1605–1611.	Firearm violence prevention fellowship	City-level firearm violence prevention policies	No
Wright M, McKelvey W, Curtis CJ, et al. Impact of a Municipal Policy Restricting Trans Fatty Acid Use in New York City Restaurants on Serum Trans Fatty Acid Levels in Adults. <i>Am J Public Health</i> . 2019;109(4):634–636.	Restricting trans fatty acid use in restaurants	City-level food, beverage, nutrition	No
Lee MM, Falbe J, Schillinger D, et al. Sugar-Sweetened Beverage Consumption 3 Years After the Berkeley, California, Sugar-Sweetened Beverage Tax. <i>Am J Public Health</i> . 2019;109(4):637–639.	Sugar-sweetened beverage tax	City-level food, beverage, nutrition	No
Roberto CA, Lawman HG, LeVasseur MT, et al. Association of a Beverage Tax on Sugar-Sweetened and Artificially Sweetened Beverages With Changes in Beverage Prices and Sales at Chain Retailers in a Large Urban Setting. <i>JAMA</i> . 2019;321(18):1799–1810.	Sugar-sweetened beverage tax	City-level food, beverage, nutrition	No
Couttenier M, Petrencu V, Rohner D, et al. The Violent Legacy of Conflict: Evidence on Asylum Seekers, Crime, and Public Policy in Switzerland. <i>American Economic Review</i> . 2019;109(12):4378–4425.	Regulations on formal labor market involvement for refugees	Local-level (Switzerland) immigrant integration	No

Web Table 3: Variables dropped from statistical models due to strong correlations with other predictors

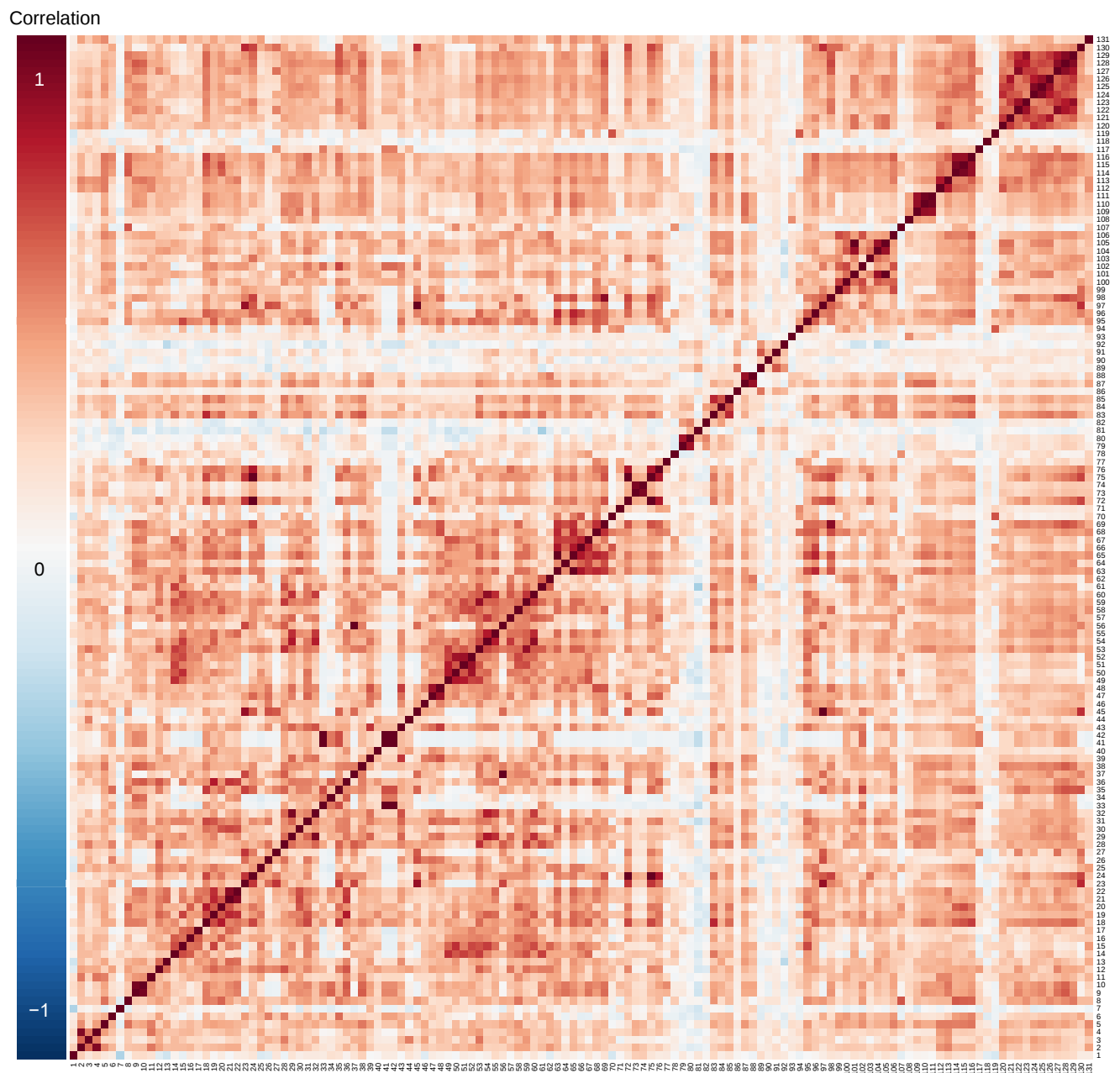
Model type	Database	Predictor policy variables per model (N, across models)	Predictor variables dropped (range, across models)
Estimation of proportion of variance in each policy explained by other policies in the same database (R^2)	State poverty and social welfare	10 – 10	0 - 0
	State labor and worker welfare	25 - 25	0 - 0
	State firearms	121 - 122	8 - 9
	State recreational cannabis	22 - 23	7 - 8
	State alcohol control	57 - 57	0 - 0
	State tobacco control	32 - 33	1 - 2
	Country family leave	97 - 98	2 - 3
	Country fertility and immigration	29 - 29	0 - 0
	Country dependent child benefits	5 - 5	0 - 0
	Country unemployment, sick leave, and pension benefits	21 - 21	0 - 0
	Country LGBT rights	40 - 40	0 - 0
	County tobacco control	33 - 37	3 - 7
	City tobacco control	39 - 40	0 - 1
Estimation of impacts on precision (simulated outcome with panel fixed effects)	State poverty and social welfare	11 – 11	0 - 0
	State labor and worker welfare	26 - 26	0 - 0
	State firearms	122 – 122	9 - 9
	State recreational cannabis	23 - 23	8 - 8
	State alcohol control	58 – 58	0 - 0
	State tobacco control	33 - 33	2 - 2
	Country family leave	98 – 98	3 - 3
	Country fertility and immigration	30 - 30	0 - 0
	Country dependent child benefits	6 – 6	0 - 0
	Country unemployment, sick leave, and pension benefits	22 – 22	0 - 0
	Country LGBT rights	41 - 41	0 - 0
	County tobacco control	34 – 34	7 - 7
	City tobacco control	33 - 33	8 - 8

Web Figure 1: Heatmap of correlations among dependent child benefit policy measures across country-years, 35 countries, 1960-2015



Legend: High degrees of positive and negative correlation are indicated by the darkest red and blue colors, respectively. Policies: 1: Universal child benefit (amount). 2: Employment-based child benefit (amount). 3: Income-tested child benefit (amount). 4: Child tax allowance (amount). 5: Child tax credit (amount). 6: Child tax rebate (amount). 7: Total child benefit (amount).

Web Figure 2: Heatmap of correlations among firearm policy measures across state-years, 50 states, 1991-2018



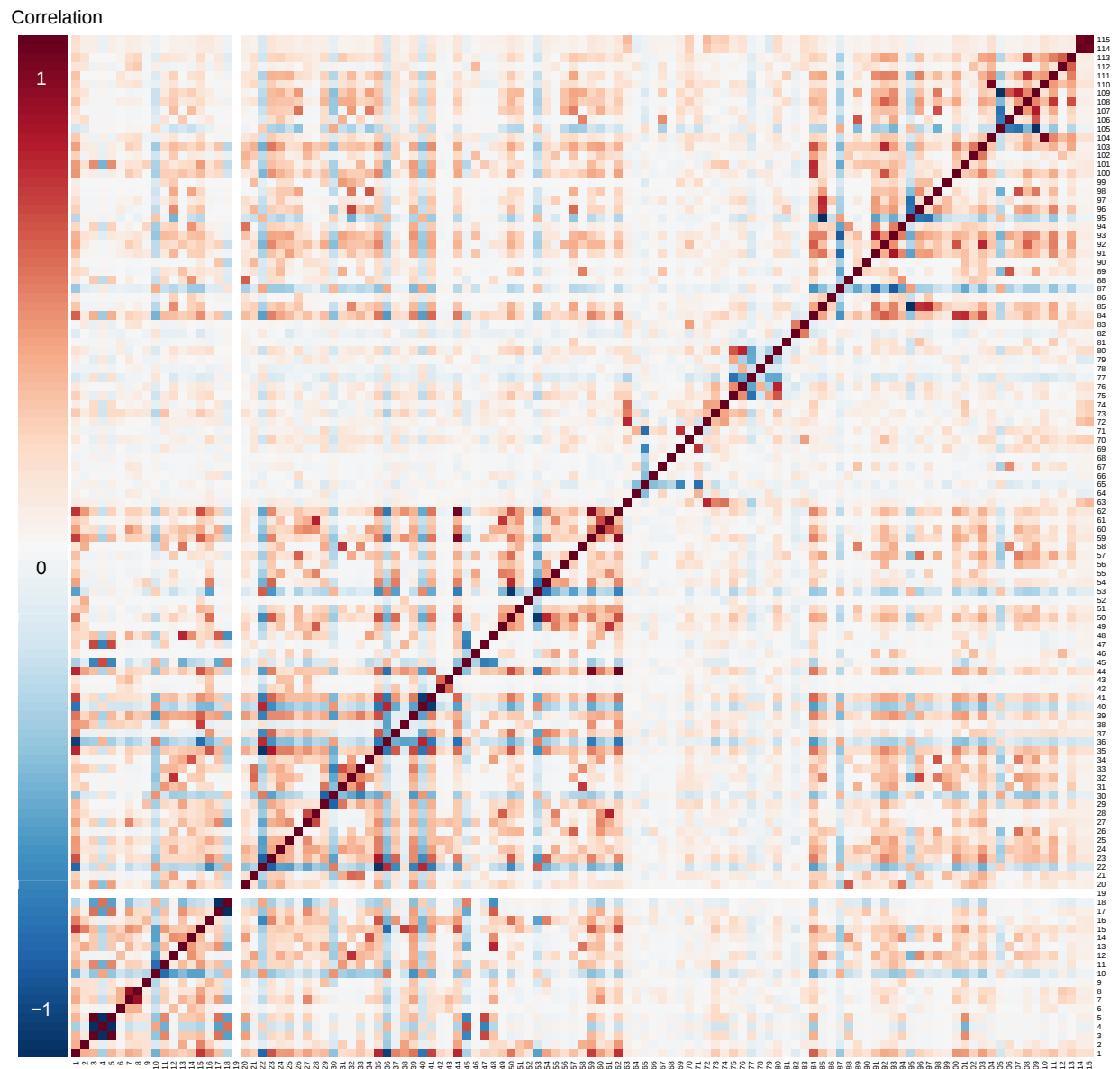
Legend: High degrees of positive and negative correlation are indicated by the darkest red and blue colors, respectively. Policies 1: Firearm possession is prohibited for all people with a felony conviction. 2: Firearm possession is prohibited for people who have been involuntarily committed to an inpatient facility. 3: Firearm possession is prohibited for people who have been involuntarily committed to an outpatient facility. 4: Firearm possession is prohibited if person is deemed by court to be a danger to oneself or others. 5: Firearm possession is prohibited for people with a drug misdemeanor conviction. 6: Firearm possession is prohibited for some people

with alcohol-related problems. 7: Firearm possession is prohibited for some people with alcoholism. 8: People are required to relinquish their firearms after they become prohibited from possessing them. 9: Firearm possession is prohibited for people who have committed a violent misdemeanor punishable by less than one year of imprisonment. 10: Handgun possession is prohibited for people who have committed a violent misdemeanor punishable by less than one year of imprisonment. 11: Firearm possession is prohibited for people who have committed a violent misdemeanor punishable by more than one year of imprisonment. 12: State dealer license required for sale of all firearms. 13: State dealer license required for sale of handguns. 14: All private sellers and licensed dealers are required to keep and retain records of all firearm sales. 15: All private sellers and licensed dealers are required to keep and retain records of handgun sales. 16: Licensed dealers are required to keep and retain records of all firearm sales. 17: Licensed dealers are required to keep and retain records of handgun sales. 18: All private sellers and licensed dealers are required to report all firearm sales records to the state. 19: All private sellers and licensed dealers are required to report handgun sales records to the state. 20: Licensed dealers are required to report all firearm sales records to the state. 21: Licensed dealers are required to report handgun sales records to the state. 22: Dealers can retain sales records for at least 60 days after firearm purchase. 23: Ban on non-commercial dealers. 24: Mandatory reporting of stolen guns by all firearm dealers. 25: State requires at least one store security precaution for firearm dealers. 26: Mandatory police inspections of dealers. 27: Vendor license required to sell ammunition. 28: A license or permit is required to purchase all firearms. 29: A license or permit is required to purchase handguns. 30: Buyers must be fingerprinted at point of purchase. 31: Safety training or testing required prior to issuing a firearm license or permit. 32: Permit process involves law enforcement. 33: Gun owners must register their firearms with the state. 34: Gun owners must register their handguns with the state. 35: De facto registration of firearms is in place because of a recordkeeping requirement for all gun sales. 36: De facto registration of handguns is in place because of a recordkeeping requirement for all handgun sales. 37: Permit required to purchase ammunition. 38: All of the state's high-risk gun possession prohibitions also apply to ammunition possession. 39: Purchase of handguns from licensed dealers and private sellers restricted to age 21 and older. 40: Purchase of long guns from licensed dealers and private sellers restricted to age 18 and older. 41: Purchase of long guns from licensed dealers restricted to age 21 and older. 42: Purchase of long guns from licensed dealers and private sellers restricted to age 21 and older. 43: No possession of handguns until age 21. 44: No possession of long guns until age 18. 45: No possession of long guns until age 21. 46: Mandatory reporting of lost and stolen guns by firearm owners. 47: Purchase of any type of ammunition restricted to age 18 and older. 48: Purchase of handgun ammunition restricted to age 21 and older. 49: Universal background checks required at point of purchase for all firearms. 50: Universal background check required at point of purchase for handguns. 51: Background checks required for all gun show firearm sales at point of purchase. 52: Background checks required for gun show handgun sales at point of purchase. 53: Background checks conducted through permit requirement for all firearm sales (or universal background checks). 54: Background checks conducted through permit requirement for all handgun sales (or universal background checks). 55: State can retain background check records for at least 60 days. 56: Background checks required for ammunition purchase. 57: Background checks for gun sales or permits have more than a three day period in which they can be completed. 58: Required background checks include an explicit requirement for search of state mental health records. 59: State conducts separate background checks, beyond the federal NICS check, for all firearms. 60: State conducts separate

background checks, beyond the federal NICS check, for handguns. 61: Waiting period is required on all firearm purchases from dealers. 62: Waiting period is required on all handgun purchases from dealers. 63: Ban on sale of assault weapons beyond just assault pistols. 64: Ban on sale of assault weapons using a one-feature definition. 65: Ban on sale of assault weapons which includes a list of banned weapons. 66: Grandfathered weapons must be registered. 67: Transfer of grandfathered weapons is prohibited. 68: Ban on sale large capacity magazines beyond just ammunition for pistols. 69: No magazines with a capacity of more than 10 rounds of ammunition may be sold. 70: Possession of pre-owned large capacity magazines is prohibited. 71: Buyers can purchase no more than one handgun per month with no or limited exceptions. 72: No person may purchase a firearm with the intent to re-sell without the buyer going through a background check or having already gone through a background check. 73: No person may purchase a firearm with the intent to re-sell to a person who is prohibited from buying or possessing a firearm. 74: No person may purchase a handgun with the intent to re-sell to a person who is prohibited from buying or possessing a firearm. 75: No person may purchase a firearm on behalf of another person. 76: No person may purchase a handgun on behalf of another person. 77: All handguns sold must have either ballistic fingerprinting or microstamping so that they can be identified if used in a crime. 78: Law enforcement officers can confiscate firearms from any person who is deemed by a judge to represent a threat to themselves or others. 79: No gun carrying allowed on college campuses except for concealed weapon permittees. 80: No gun carrying on college campuses, including concealed weapons permittees. 81: No gun carrying on elementary school property, including concealed weapons permittees. 82: No open carry of handguns is allowed in public places. 83: No open carry of long guns is allowed in public places. 84: No open carry of handguns is allowed in public places unless the person has a concealed carry or handgun carry permit. 85: No open carry of long guns is allowed in public places unless the person has a permit. 86: Permit required to carry concealed weapons. 87: "May issue" state. 88: Applicants are required to make a heightened showing to obtain a concealed carry permit. 89: Concealed carry permit process requires a background check. 90: Background check process for a concealed carry permit explicitly requires a check of the NICS database. 91: Concealed carry permit renewal requires a new background check. 92: Authorities are required to revoke concealed carry permits under certain circumstances. 93: No stand your ground law. 94: State has a law that requires review of personalized gun technology. 95: Safety lock required for handguns sold through licensed dealers. 96: Safety lock required for handguns sold through all dealers. 97: All firearms in a household must be stored securely (locked away) at all times. 98: Safety lock is required for handguns and must be approved by state standards. 99: Criminal liability for negligent storage of guns, regardless of whether child gains access. 100: Criminal liability for negligent storage of guns if child gains access. 101: Criminal liability for negligent storage of guns if child uses or carries the gun. 102: Criminal liability for negligent storage applies regardless of whether gun is loaded or unloaded. 103: Criminal liability for negligent storage applies to access by children less than 18 years old. 104: Criminal liability for negligent storage applies to access by children less than 16 years old. 105: Criminal liability for negligent storage applies to access by children less than 14 years old. 106: Ban on junk guns (sometimes called "Saturday night specials"). 107: Dealers are liable for damages resulting from illegal gun sales. 108: No law provides blanket immunity to gun manufacturers or prohibits state or local lawsuits against gun manufacturers. 109: State law does not preempt local regulation of firearms in any way. 110: Any state law that preempts local regulation of firearms is narrow in its scope (i.e., in one area of regulation). 111: State law does not completely preempt local regulation of

firearms. 112: People convicted of a misdemeanor crime of domestic violence against a spouse, ex-spouse, or cohabitating partner are prohibited from possessing firearms. 113: All people convicted of a misdemeanor crime of domestic violence are prohibited from possessing firearms. 114: People convicted of a misdemeanor crime of domestic violence against a spouse, ex-spouse, or cohabitating partner are required to surrender their firearms. 115: People convicted of a misdemeanor crime of domestic violence against a spouse, ex-spouse, or cohabitating partner are required to surrender their firearms with no exceptions. 116: The surrender provisions apply if the defendant is a dating partner of the victim. 117: State law allows law enforcement to remove firearms from MCDV offenders. 118: State law requires law enforcement to remove firearms from the scene of a domestic violence incident. 119: All firearms must be removed from the scene of a domestic violence incident. 120: State law automatically prohibits domestic violence-related restraining order (DVRO) subjects from possessing firearms. 121: DVROs are automatically prohibiting if the subject is a dating partner of the petitioner. 122: Ex parte (temporary) DVRO subjects are automatically prohibited from possessing firearms. 123: Ex parte DVROs are prohibiting if the petitioner is a dating partner of the DVRO subject. 124: State law requires DVRO subjects to surrender their firearms. 125: No additional finding is required before the firearm surrender provisions apply. 126: The surrender provisions apply if the subject is a dating partner of the petitioner. 127: State law requires ex parte DVRO subjects to surrender their firearms. 128: No additional finding is required before the ex parte DVRO firearm surrender provisions apply. 129: The ex parte DVRO surrender provisions apply if the subject is a dating partner of the petitioner. 130: Law enforcement officials are required to remove firearms from people subject to a domestic violence-related restraining order. 131: A stalking conviction is prohibitive for firearm possession.

Web Figure 3: Heatmap of correlations among family leave-related policy measures across country-years, 190 countries, 1995-2016



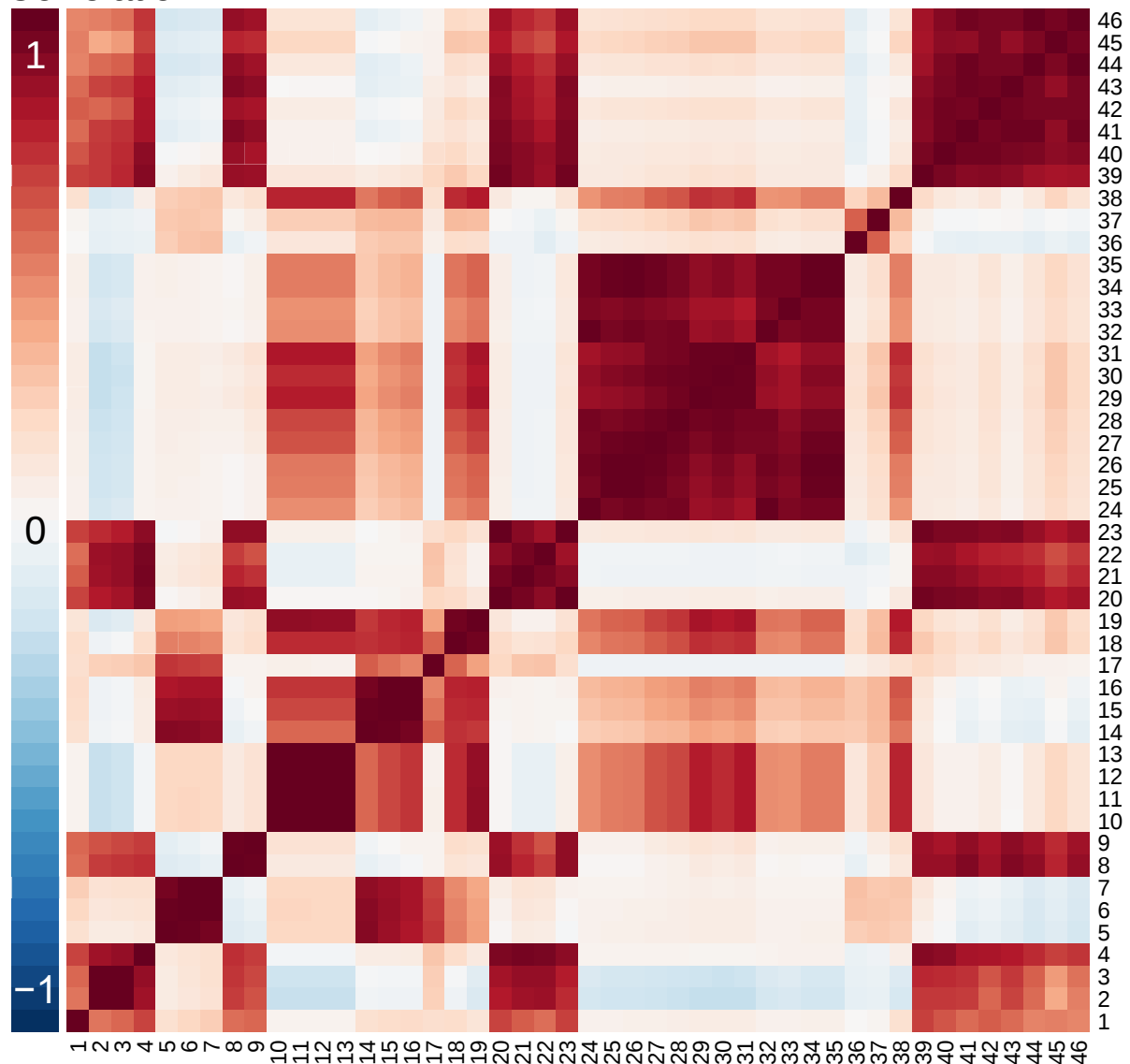
Legend: High degrees of positive and negative correlation are indicated by the darkest red and blue colors, respectively. Policies: 1: Child health leave, any. 2: Child health leave for general health needs, maximum child age. 3: Child health leave for general health needs, rate depends on other reasons. 4: Child health leave for general health needs, rate has no variation. 5: Child health leave for general health needs, rate depends on number of children. 6: Child health leave for general health needs, duration. 7: Child health leave for general health needs requires minimum tenure and/or duration of contributions to social insurance fund, any. 8: Child health leave for general health needs requires minimum tenure and/or duration of contributions to social insurance fund, months required. 9: Child health leave for general health needs, depends on other reasons. 10: Child health leave for general health needs, length has no variation. 11: Child health

leave for general health needs, length depends on child's age. 12: Child health leave for general health needs, length depends on number of children. 13: Child health leave for general health needs, length depends on health needs of child with disability. 14: Child health leave for general health needs, length depends on marital status. 15: Child health leave for general health needs, wage replacement rate. 16: Child health leave for serious illness, maximum child age. 17: Child health leave for serious illness, rate depends on other reasons. 18: Child health leave for serious illness, rate has no variation. 19: Child health leave for serious illness, rate depends on severity of child illness. 20: Child health leave for serious illness, duration. 21: Child health leave for serious illness, other health conditions covered. 22: Child health leave for serious illness, health conditions covered. 23: Child health leave for serious illness, serious illness covered. 24: Child health leave for serious illness, disability covered. 25: Child health leave for serious illness, hospitalization covered. 26: Child health leave for serious illness, imminent death covered. 27: Child health leave for serious illness requires minimum tenure and/or duration of contributions to social insurance fund, any. 28: Child health leave for serious illness requires minimum tenure and/or duration of contributions to social insurance fund, months required. 29: Child health leave for serious illness, length depends on other reasons. 30: Child health leave for serious illness, length has no variation. 31: Child health leave for serious illness, length depends on child's age. 32: Child health leave for serious illness, length depends on number of employee's children. 33: Child health leave for serious illness, length depends on disability vs. illness. 34: Child health leave for serious illness, length depends on marital status. 35: Child health leave for serious illness, wage replacement rate. 36: No child health leave. 37: Child health leave for serious illness. 38: Child health leave for general health needs. 39: Child health leave for serious illness and general health needs. 40: Child health leave, available to women and men. 41: Child health leave, available to women only for serious health needs. 42: Child health leave, available to women only for general health needs. 43: Child health leave, available to women only for serious and general health needs. 44: Family health leave, any. 45: Family health leave, rate does not vary. 46: Family health leave, rate depends on severity of illness. 47: Family health leave, rate depends on illness vs. disability. 48: Family health leave, rate depends on other reasons. 49: Family health leave duration, duration. 50: Family health leave, limited to special cases such as serious illness or hospitalization. 51: Family health leave for general illness and special cases. 52: Family health leave, limited to other cases. 53: Family health leave, not limited to particular cases. 54: Family health leave, limited to serious illness. 55: Family health leave, limited to disability. 56: Family health leave, limited to hospitalization. 57: Family health leave, limited to imminent death. 58: Family health leave, limited to when spouse is sick. 59: Family health leave, only for specific family members and/or with a same-residency requirement, any. 60: Family health leave requires minimum tenure and/or duration of contributions to social insurance fund, any. 61: Family health leave requires minimum tenure and/or duration of contributions to social insurance fund, months required. 62: Family health leave, wage replacement rate. 63: Maternity leave, any. 64: Maternity leave, rate depends on other reasons. 65: Maternity leave, rate has no variation. 66: Maternity leave, rate depends on worker tenure. 67: Maternity leave, rate depends on income level. 68: Maternity leave, rate depends on child's order among other children. 69: Maternity leave, rate depends on duration of leave. 70: Maternity leave requires minimum contribution to social insurance fund, any. 71: Maternity leave, maximum wage replacement rate. 72: Maternity leave, minimum wage replacement rate. 73: Maternity leave, paid weeks. 74: Maternity leave, maximum weeks before birth. 75: Maternity leave, weeks required after birth. 76: Maternity leave, weeks required before birth. 77: Maternity leave, no required set durations

for pre-birth, post-birth, or both. 78: Maternity leave, required set durations for pre-birth. 79: Maternity leave, required set durations for post-birth. 80: Maternity leave, required set durations for pre- and post-birth. 81: Maternity leave, required set durations for pre-birth, post-birth, or both, but unspecified. 82: Maternity leave requires minimum tenure and/or duration of contributions to social insurance fund, any. 83: Maternity leave requires minimum tenure and/or duration of contributions to social insurance fund, months required. 84: Parental leave, any. 85: Parental leave, any incentives for men to take. 86: Parental leave, rate depends on other reasons. 87: Parental leave, rate has no variation. 88: Parental leave, rate depends on worker tenure. 89: Parental leave, rate depends on income level. 90: Parental leave, rate depends on child's order among other children. 91: Parental leave, rate depends on duration of leave. 92: Parental leave requires minimum contribution to social insurance fund, any. 93: Parental leave, maximum wage replacement rate. 94: Parental leave, maximum weeks paid. 95: Parental leave, no incentive for men. 96: Parental leave, incentive for men that leave cannot be transferred to partner. 97: Parental leave, incentive of bonus if both parents take some leave. 98: Parental leave, incentive that benefit is reduced if father does not take minimum leave. 99: Parental leave required for men. 100: Parental leave, minimum wage replacement rate. 101: Parental leave, minimum weeks paid. 102: Parental leave requires minimum tenure and/or duration of contributions to social insurance fund, any. 103: Parental leave requires minimum tenure and/or duration of contributions to social insurance fund, months required. 104: Paternity leave, any. 105: Paternity leave, rate has no variation. 106: Paternity leave, rate depends on income level. 107: Paternity leave, rate depends on duration of leave. 108: Paternity leave requires minimum contribution to social insurance fund, any. 109: Paternity leave, maximum wage replacement rate. 110: Paternity leave, minimum wage replacement rate. 111: Paternity leave, paid weeks. 112: Paternity leave requires minimum tenure and/or duration of contributions to social insurance fund, any. 113: Paternity leave requires minimum tenure and/or duration of contributions to social insurance fund, months required. 114: Sick leave, any. 115: Sick leave is paid.

Web Figure 4: Heatmap of correlations among poverty and social welfare policy measures across state-years, 50 states, 1990-2011

Correlation

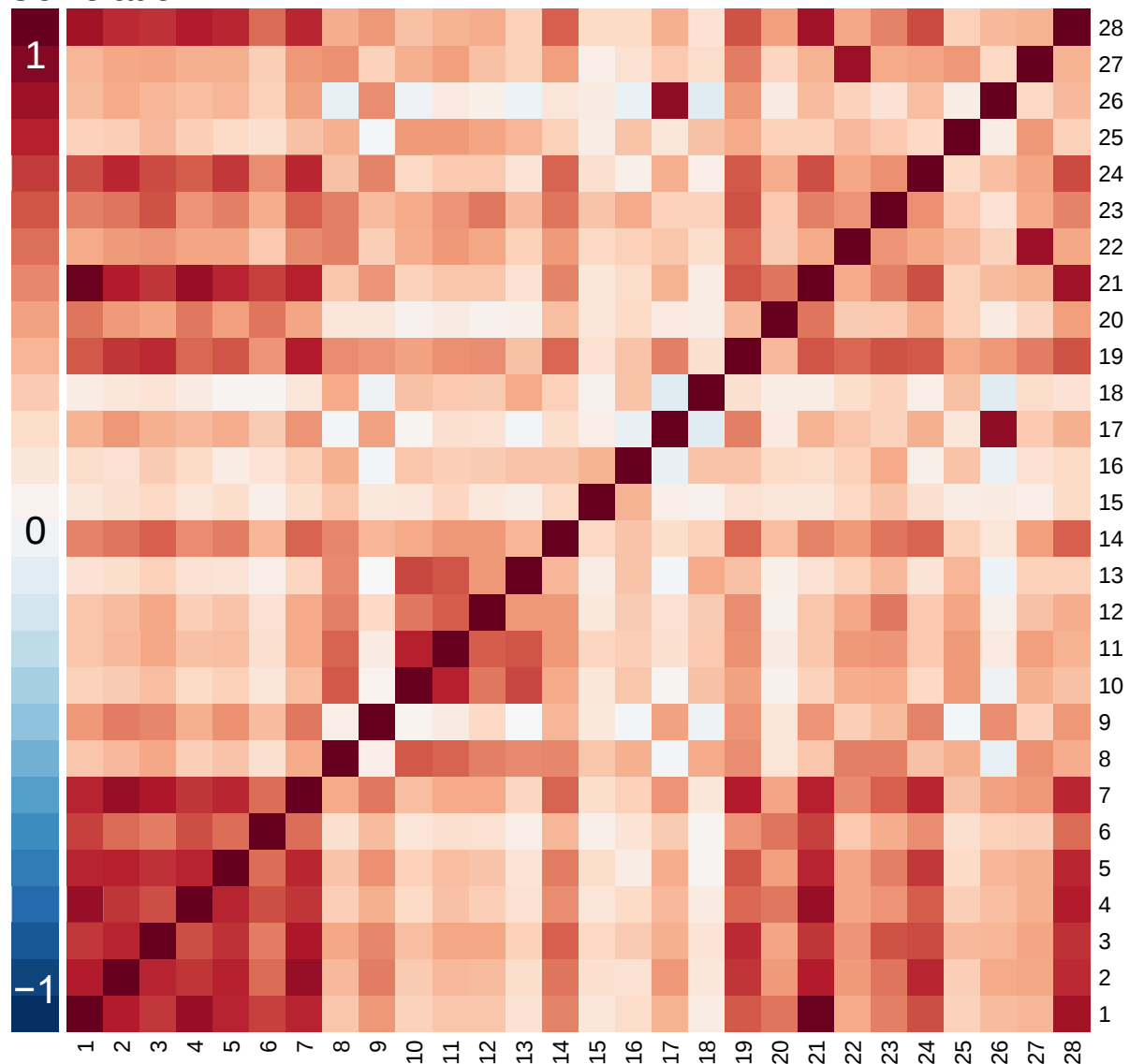


Legend: High degrees of positive and negative correlation are indicated by the darkest red and blue colors, respectively. Abbreviations: AFDC: Aid to Families with Dependent Children. TANF: Temporary Assistance to Needy Families. SNAP: Supplemental Nutrition Assistance Program. FS: Food Stamps. SSI: Supplemental Security Income. EITC: Earned Income Tax Credit. WIC: Special Supplemental Nutrition Program for Women, Infants, and Children. NSLP: National School Lunch Program. SBP: School Breakfast Program. Policies: 1: Workers compensation. 2: AFDC/TANF recipients. 3: AFDC/TANF caseloads. 4: Child-only AFDC/TANF cases. 5: AFDC/TANF benefit for 2-person family. 6: AFDC/TANF benefit for 3-person family. 7: AFDC/TANF benefit for 4-person family. 8: FS/SNAP Recipients. 9: FS/SNAP caseloads. 10: FS/SNAP benefit for 1-person family. 11: FS/SNAP benefit for 2-

person family. 12: FS/SNAP benefit for 3-person family. 13: FS/SNAP benefit for 4-person family. 14: AFDC/TANF/FS 2-person benefit. 15: AFDC/TANF/FS 3-person benefit. 16: AFDC/TANF/FS 4-person benefit. 17: State SSI. 18: Total SSI. 19: SSI/FS Benefit. 20: SSI recipients. 21: SSI recipients who are aged. 22: SSI recipients who are blind. 23: SSI recipients who are disabled. 24: EITC phase-in rate, no dependents. 25: EITC phase-in rate, 1 dependent. 26: EITC phase-in rate, 2 dependents. 27: EITC phase-in rate, 3 dependents. 28: EITC maximum credit, no dependents. 29: EITC maximum credit, 1 dependent. 30: EITC maximum credit, 2 dependents. 31: EITC maximum credit, 3 dependents. 32: EITC phase-out rate, no dependents. 33: EITC phase-out rate, 1 dependent. 34: EITC phase-out rate, 2 dependents. 35: EITC phase-out rate, 3 dependents. 36: State EITC rate. 37: Refundable state EITC. 38: State minimum wage. 39: Medicaid beneficiaries. 40: WIC participants. 41: NSLP, free participants. 42: NSLP, reduced participants. 43: NSLP, total participants. 44: SBP, free participants. 45: SBP, reduced participants. 46: SBP, total participants.

Web Figure 5: Heatmap of correlations among labor policy measures across state-years, 50 states, 1865-2015

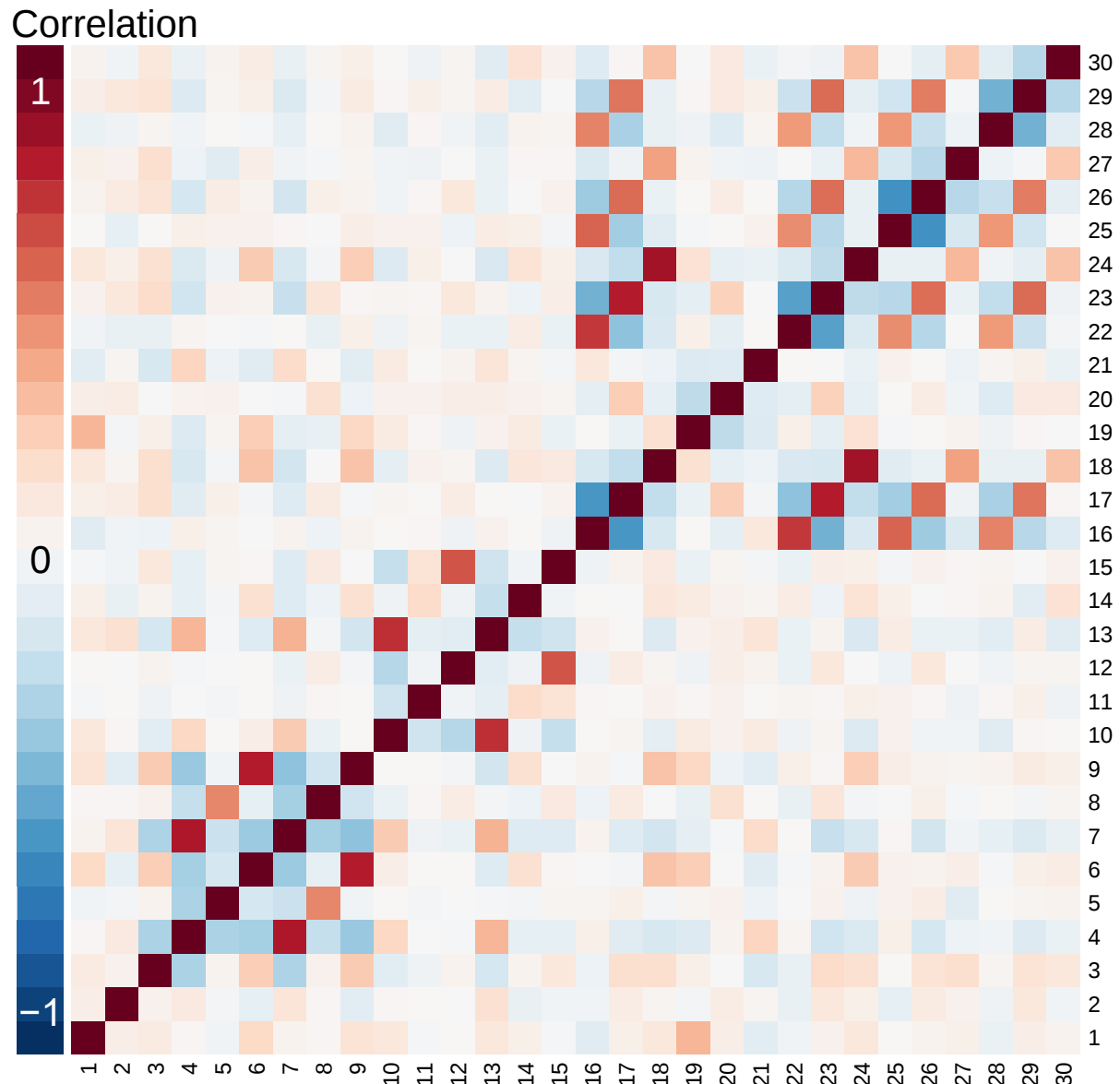
Correlation



Legend: High degrees of positive and negative correlation are indicated by the darkest red and blue colors, respectively. Policies: 1: Accountant licensing, source 1. 2: Architects licensing. 3: Beautician licensing. 4: Child labor standards. 5: Chiropractors licensing. 6: Dentists licensing. 7: Engineer licensing. 8: Fair employment laws. 9: Integrated bar. 10: Collective bargaining rights for state employees. 11: Collective bargaining rights for local teachers. 12: Minimum wage law for men. 13: State minimum wage law above federal level. 14: Prevailing wage law. 15: Labor relations law patterned after Taft-Hartley. 16: Labor relations law patterned after Wagner Act. 17: Right to work law, source 1. 18: State temporary disability insurance program. 19: State pension system. 20: State labor agency. 21: Accountant licensing, source 2. 22: Migratory labor committee. 23: Minimum wage law. 24: Real estate broker licensing. 25:

Retainers agreement. 26: Right to work law, source 2. 27: Seasonal agricultural labor standards.
28: Workmen's compensation.

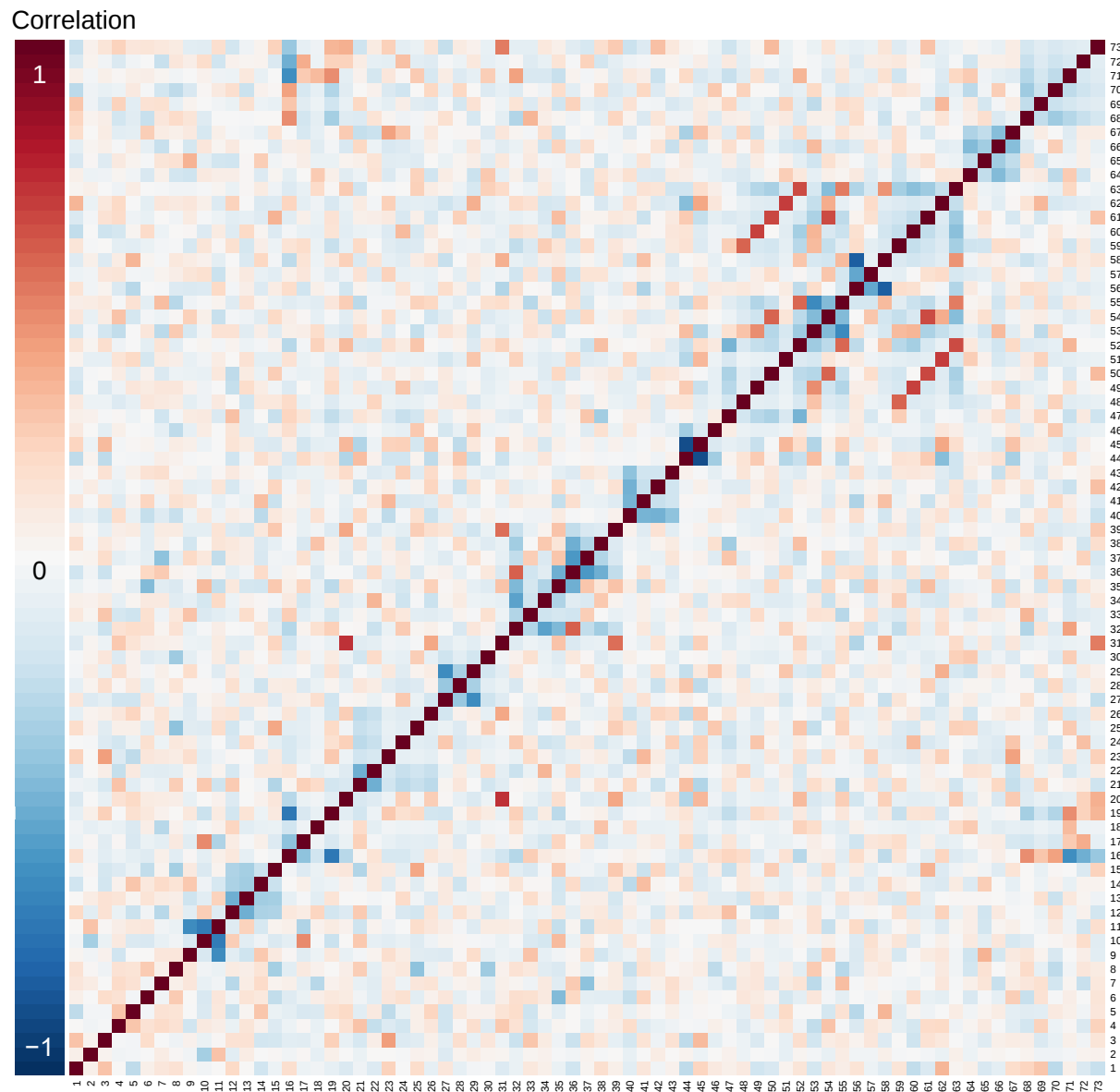
Web Figure 6: Heatmap of correlations among fertility and immigration policy measures across country-years, 199 countries, 1996-2011



Legend: High degrees of positive and negative correlation are indicated by the darkest red and blue colors, respectively. Policies: 1: Encourage the return of citizens. 2: Has policy on adolescent fertility. 3: Has policy on integrating non-nationals. 4: Policy to lower population growth. 5: Policy to maintain population growth. 6: Policy to raise population growth. 7: Policy to lower fertility. 8: Policy to maintain fertility. 9: Policy to raise fertility. 10: Policy to lower rural-urban migration. 11: Policy to maintain rural-urban migration. 12: Policy to raise rural-urban migration. 13: Policy to lower migration into urban agglomerations. 14: Policy to maintain migration into urban agglomerations. 15: Policy to raise migration into urban agglomerations. 16: Policy to lower immigration. 17: Policy to maintain immigration. 18: Policy to raise immigration. 19: Policy to lower emigration. 20: Policy to maintain emigration. 21: Policy to

increase emigration. 22: Policy to lower permanent settlement. 23: Policy to maintain permanent settlement. 24: Policy to raise permanent settlement. 25: Policy to lower temporary workers. 26: Policy to maintain temporary workers. 27: Policy to raise temporary workers. 28: Policy to lower family reunification. 29: Policy to maintain family reunification. 30: Policy to raise family reunification.

Web Figure 7: Heatmap of correlations among alcohol control policy measures across state-years, 50 states, 2003-2018

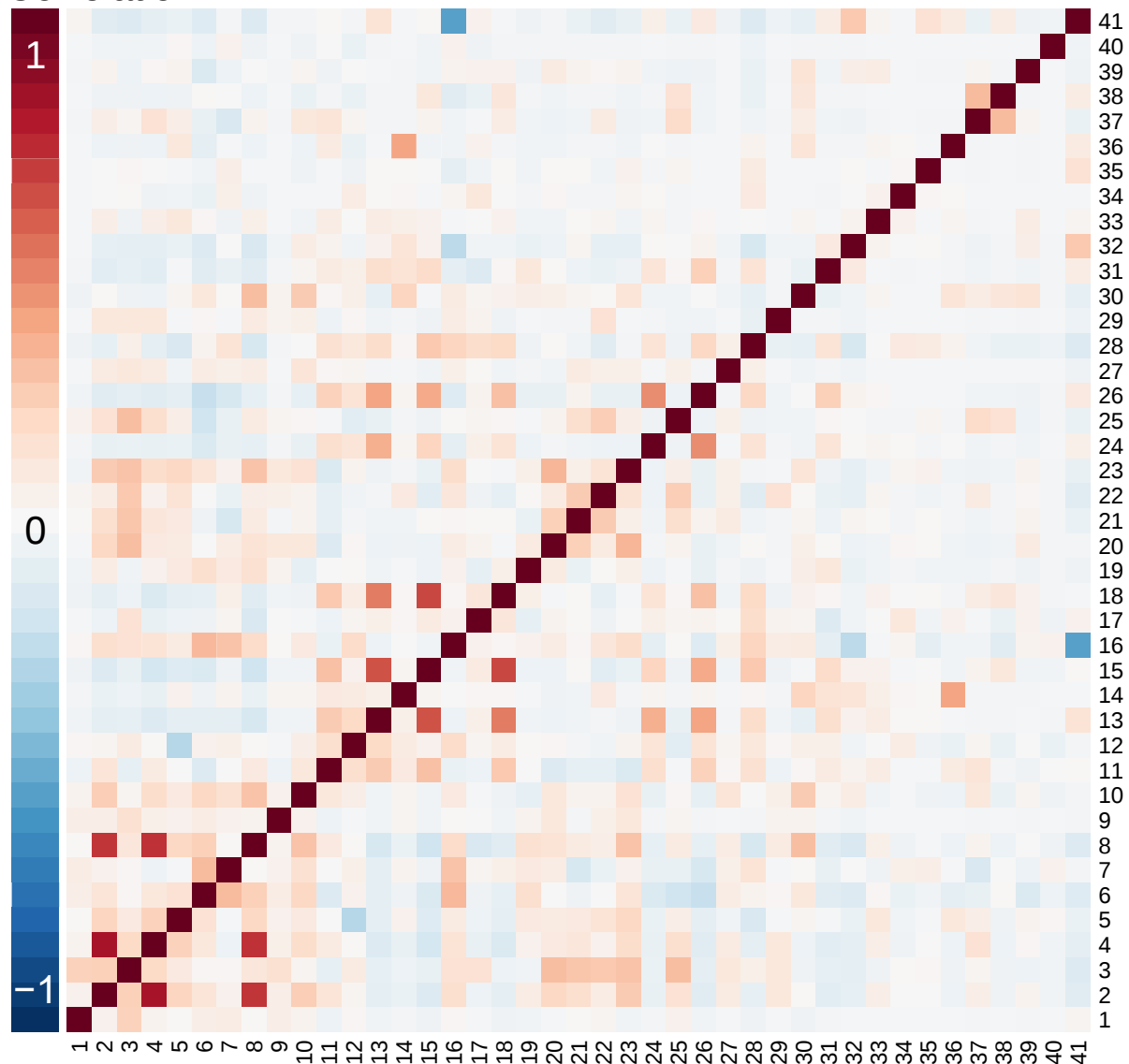


Legend: High degrees of positive and negative correlation are indicated by the darkest red and blue colors, respectively. Policies: 1: Off-premise beer taxes. 2: Adult blood alcohol concentration limit. 3: Fake ID, retailer has no affirmative defense. 4: Fake ID, retailer can seize. 5: Fake ID, supplier liable. 6: Fake ID, user liable. 7: Open containers in motor vehicles prohibited. 8: Underage purchase prohibited. 9: Boating blood alcohol concentration limit .08 or .10, no per se. 10: Boating blood alcohol concentration limit .10, per se. 11: Boating blood alcohol concentration limit .08, per se. 12: No responsible beverage service training. 13: Responsible beverage service training voluntary. 14: Responsible beverage service training mandatory for some. 15: Responsible beverage service training mandatory for all. 16: All private distribution of wine, beer, and spirits. 17: Partial or complete state control of wholesale for wine

and spirits. 18: Private and state wine and spirits stores; most wholesale wine private; wholesale spirits are state controlled. 19: All or most spirits are state controlled; most wine private for stores and wholesale. 20: All wine and spirits sold only in state stores and state wholesale. 21: No restrictions on drink specials. 22: Restricts some drink specials but not happy hour. 23: Restricts some happy hours. 24: Restricts happy hours and unlimited beverages for fixed price. 25: Bans happy hour. 26: Bans happy hour and unlimited beverages for fixed price. 27: No keg registration. 28: Keg registration but lacking key components. 29: Keg registration with 2 key components. 30: Keg registration with 3 key components. 31: Kegs banned. 32: Sellers for off-premise can be under 21 and without supervision. 33: Sellers for off-premise beer can be under 21 and without supervision; sellers of off-premise spirits have to be 21. 34: Sellers for off-premise can be under 21 but with supervision. 35: Sellers for off-premise must be 21. 36: Sellers for on-premise can be under 21 and without supervision. 37: Sellers for on-premise can be under 21 and without supervision but not bartenders. 38: Sellers for on-premise can be under 21 but with supervision. 39: Sellers for on-premise and bartenders must be 21. 40: No social host law. 41: Social host, sub-threshold. 42: Social host, meets threshold. 43: Social host, threshold plus. 44: Sunday sales allowed. 45: Some prohibitions on Sunday sales. 46: Sunday sales prohibited. 47: No law on underage consumption. 48: Lax law on underage consumption. 49: Intermediate 1 law on underage consumption. 50: Intermediate 2 law on underage consumption. 51: Intermediate 3 law on underage consumption. 52: Underage consumption prohibited, no exceptions. 53: Parent/guardian can furnish. 54: Parent/guardian can furnish in private locations. 55: Furnishing prohibited, no exceptions. 56: No underage internal possession law. 57: Underage internal possession allowed with requirements. 58: Underage internal possession banned, no exceptions. 59: Underage possession allowed in private locations. 60: Underage possession allowed with parental consent. 61: Underage possession allowed in private locations with parental consent. 62: Underage possession allowed in parent's home. 63: Underage possession prohibited, no exceptions. 64: No use-lose law. 65: Discretionary authority use-lose. 66: Mandatory authority use-lose. 67: Use-lose with 4 key components. 68: No policies on wholesale price. 69: 1 of 3 restrictions on wholesale price of 1-2 beverage types. 70: 1 of 3 restrictions on wholesale price of all beverage types. 71: All 3 restrictions on wholesale price of spirits. 72: All 3 restrictions on wholesale price of spirits and wine; 1 of 3 restrictions on wholesale price of beer. 73: All 3 restrictions on wholesale price of spirits and wine; 2-3 of 3 restrictions on wholesale price of beer.

Web Figure 8: Heatmap of correlations among LGBT rights policy measures across country-months, 229 countries, 1729-2020

Correlation



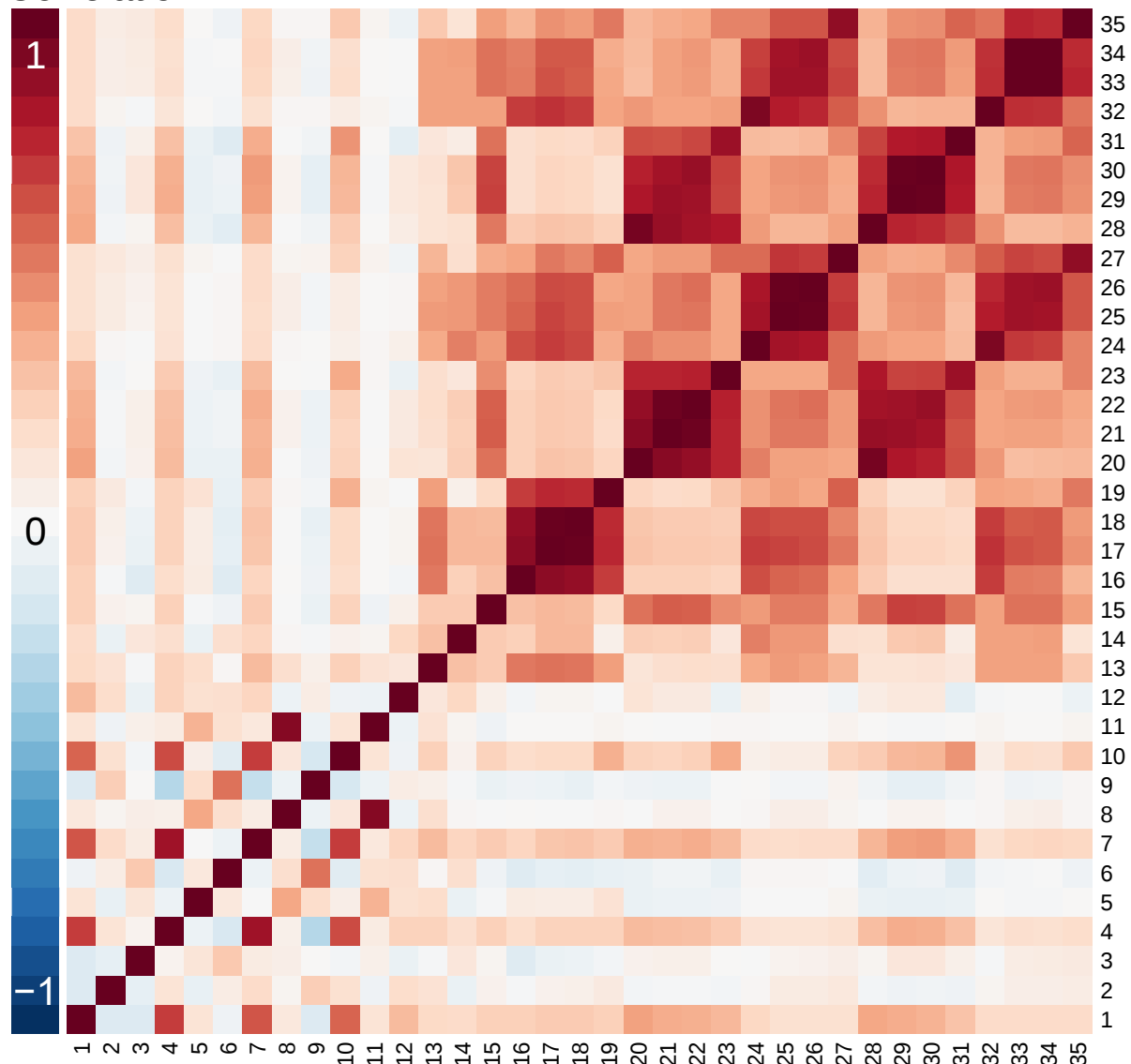
Legend: High degrees of positive and negative correlation are indicated by the darkest red and blue colors, respectively. Abbreviations: LGBT: lesbian, gay, bisexual, and transgender. Policies:

- 1: Homosexual activity, illegal death penalty as punishment.
- 2: LGBT discrimination, no protections.
- 3: Same-sex marriage, not legal.
- 4: LGBT employment discrimination, no protections.
- 5: Unequal age of consent.
- 6: Same-sex adoption, single only.
- 7: Homosexuals serving openly in military, legal.
- 8: LGBT housing discrimination, no protections.
- 9: Homosexual activity, male illegal, female uncertain.
- 10: Same-sex marriage, unrecognized.
- 11: Homosexual activity, legal.
- 12: Equal age of consent.
- 13: LGBT discrimination illegal.
- 14: LGBT employment discrimination, sexual orientation protected only.
- 15: LGBT housing discrimination protection for sexual orientation and gender identity only.
- 16: Blood donations by

men who have sex with men, legal. 17: Conversion therapy not banned. 18: LGBT employment discrimination, protection for sexual orientation and gender identity. 19: Same-sex marriage, foreign same-sex marriages recognized only. 20: Homosexual activity, illegal imprisonment as punishment. 21: Homosexuals serving openly in military, illegal. 22: Right to change legal gender, illegal. 23: Homosexual activity, male illegal, female legal. 24: Same-sex marriage, legal. 25: Same-sex adoption, illegal. 26: Same-sex adoption, legal. 27: Homosexual activity, illegal, other penalty. 28: Right to change legal gender, legal surgery not required. 29: Homosexual activity, illegal, up to life in prison as punishment. 30: LGBT discrimination illegal in some contexts. 31: Conversion therapy banned. 32: Right to change legal gender, legal but requires surgery. 33: Same-sex marriage, civil unions. 34: Same-sex adoption, stepchild adoption only. 35: Same-sex marriage, unregistered cohabitation. 36: LGBT housing discrimination protection for sexual orientation only. 37: Homosexuals serving openly in military, don't ask, don't tell. 38: Same-sex marriage unrecognized, same-sex marriage and civil unions banned. 39: Same-sex adoption, married couples only. 40: Same-sex marriage unrecognized, only same-sex marriage official. 41: Blood donations by men who have sex with men banned.

Web Figure 9: Heatmap of correlations between policy measures across state-months in database of state tobacco control policies, 55 states and territories, June 2003 – December 2020

Correlation

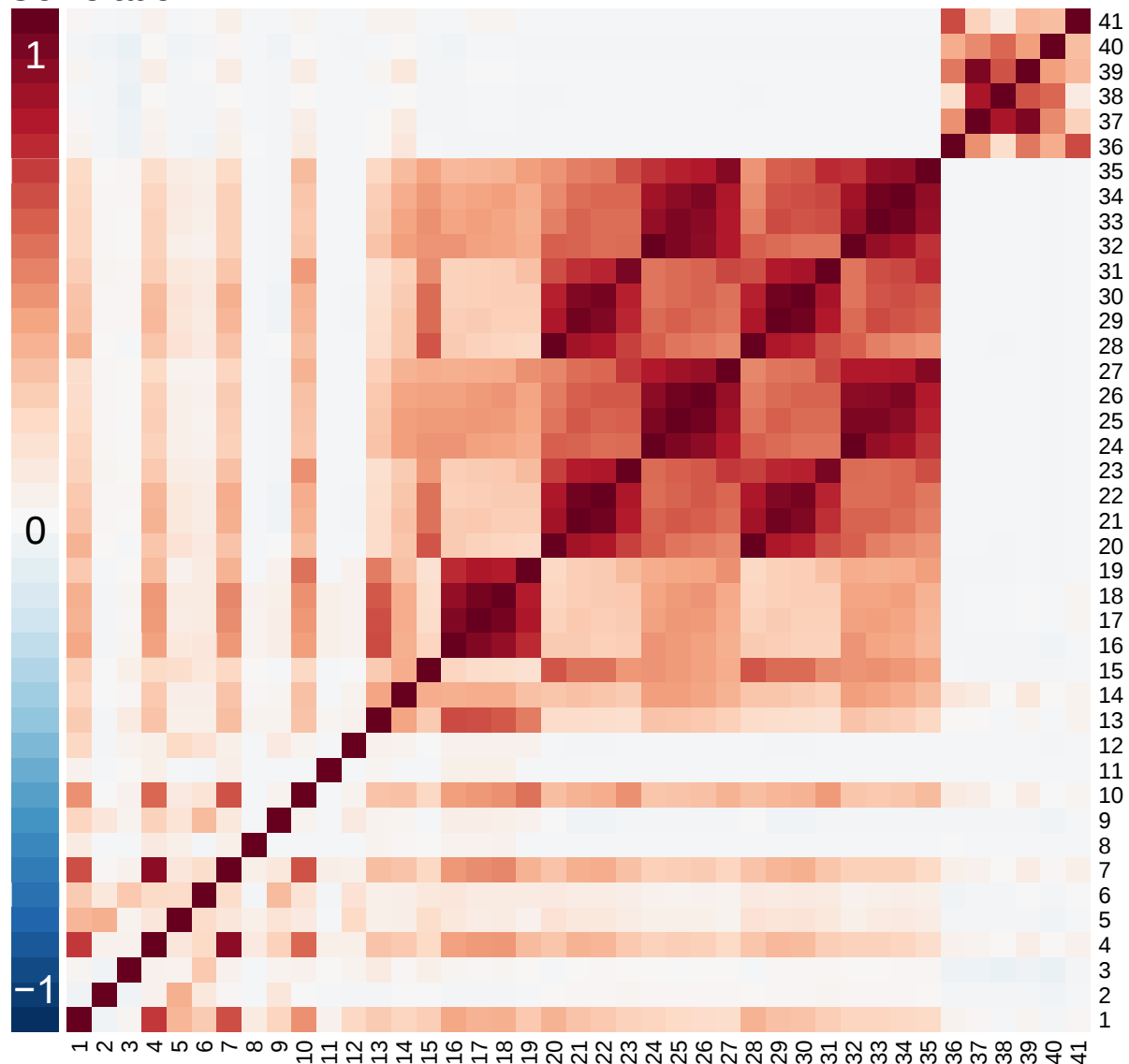


Legend: High degrees of positive and negative correlation are indicated by the darkest red and blue colors, respectively. Policies: 1: 100% clean air in workplaces. 2: Qualified clean air law for workplaces. 3: Some clean air provisions for workplaces. 4: 100% clean air in restaurants. 5: Qualified clean air law for restaurants. 6: Some clean air provisions for restaurants. 7: 100% clean air in bars. 8: Qualified clean air law for bars. 9: Some clean air provisions for bars. 10: 100% clean air in gaming facilities. 11: Qualified clean air law for gaming facilities. 12: Some clean air provisions for gaming facilities. 13: Clean air law addresses e-cigarettes. 14: Clean air law addresses hookah. 15: Clean air law addresses marijuana. 16: 100% clean air in workplaces, includes e-cigarettes. 17: 100% clean air in restaurants, includes e-cigarettes. 18: 100% clean air in bars, includes e-cigarettes. 19: 100% clean air in gaming facilities, includes e-cigarettes. 20:

100% clean air in workplaces, includes recreational marijuana smoke. 21: 100% clean air in restaurants, includes recreational marijuana smoke. 22: 100% clean air in bars, includes recreational marijuana smoke. 23: 100% clean air in gaming facilities, includes recreational marijuana smoke. 24: 100% clean air in workplaces, includes recreational marijuana vaping. 25: 100% clean air in restaurants, includes recreational marijuana vaping. 26: 100% clean air in bars, includes recreational marijuana vaping. 27: 100% clean air in gaming facilities, includes recreational marijuana vaping. 28: 100% clean air in workplaces, includes medical marijuana smoke. 29: 100% clean air in restaurants, includes medical marijuana smoke. 30: 100% clean air in bars, includes medical marijuana smoke. 31: 100% clean air in gaming facilities, includes medical marijuana smoke. 32: 100% clean air in workplaces, includes medical marijuana vaping. 33: 100% clean air in restaurants, includes medical marijuana vaping. 34: 100% clean air in bars, includes medical marijuana vaping. 35: 100% clean air in gaming facilities, includes medical marijuana vaping.

Web Figure 10: Heatmap of correlations between policy measures across county-months in database of county tobacco control policies, 772 counties, October 1986 – December 2020

Correlation

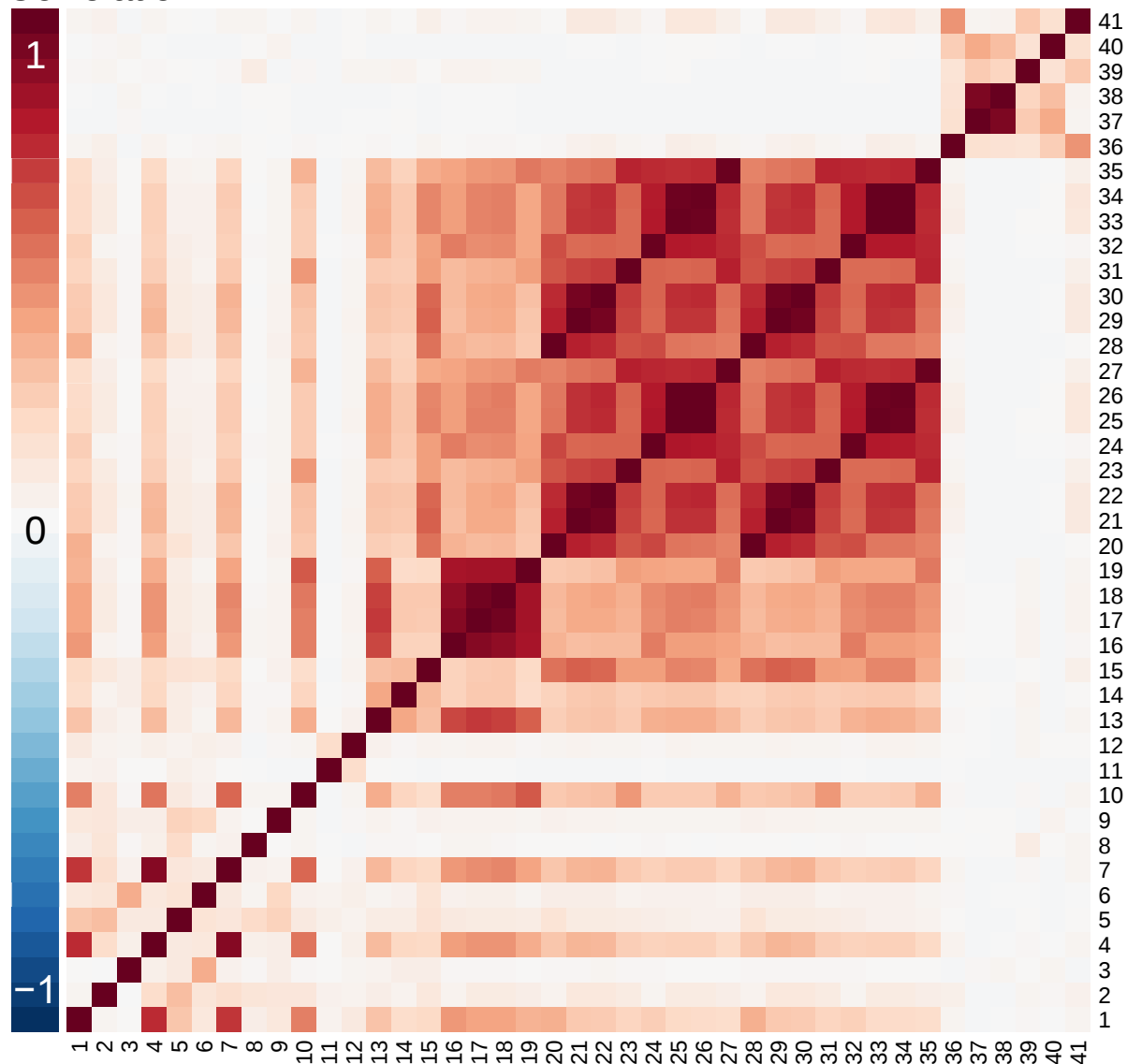


Legend: High degrees of positive and negative correlation are indicated by the darkest red and blue colors, respectively. Policies: 1: 100% clean air in workplaces. 2: Qualified clean air law for workplaces. 3: Some clean air provisions for workplaces. 4: 100% clean air in restaurants. 5: Qualified clean air law for restaurants. 6: Some clean air provisions for restaurants. 7: 100% clean air in bars. 8: Qualified clean air law for bars. 9: Some clean air provisions for bars. 10: 100% clean air in gaming facilities. 11: Qualified clean air law for gaming facilities. 12: Some clean air provisions for gaming facilities. 13: Clean air law addresses e-cigarettes. 14: Clean air law addresses hookah. 15: Clean air law addresses marijuana. 16: 100% clean air in workplaces, includes e-cigarettes. 17: 100% clean air in restaurants, includes e-cigarettes. 18: 100% clean air in bars, includes e-cigarettes. 19: 100% clean air in gaming facilities, includes e-cigarettes. 20:

100% clean air in workplaces, includes recreational marijuana smoke. 21: 100% clean air in restaurants, includes recreational marijuana smoke. 22: 100% clean air in bars, includes recreational marijuana smoke. 23: 100% clean air in gaming facilities, includes recreational marijuana smoke. 24: 100% clean air in workplaces, includes recreational marijuana vaping. 25: 100% clean air in restaurants, includes recreational marijuana vaping. 26: 100% clean air in bars, includes recreational marijuana vaping. 27: 100% clean air in gaming facilities, includes recreational marijuana vaping. 28: 100% clean air in workplaces, includes medical marijuana smoke. 29: 100% clean air in restaurants, includes medical marijuana smoke. 30: 100% clean air in bars, includes medical marijuana smoke. 31: 100% clean air in gaming facilities, includes medical marijuana smoke. 32: 100% clean air in workplaces, includes medical marijuana vaping. 33: 100% clean air in restaurants, includes medical marijuana vaping. 34: 100% clean air in bars, includes medical marijuana vaping. 35: 100% clean air in gaming facilities, includes medical marijuana vaping. 36: Excise taxes on cigarettes. 37: Excise taxes on cigars. 38: Excise taxes on little cigars. 39: Excise taxes on non-combustible tobacco. 40: Excise taxes on other combustible tobacco products. 41: Excise taxes on nicotine delivery devices or e-cigarette products.

Web Figure 11: Heatmap of correlations between policy measures across city-months in database of city tobacco control policies, 3,204 cities, October 1986 – December 2020

Correlation



Legend: High degrees of positive and negative correlation are indicated by the darkest red and blue colors, respectively. Policies: 1: 100% clean air in workplaces. 2: Qualified clean air law for workplaces. 3: Some clean air provisions for workplaces. 4: 100% clean air in restaurants. 5: Qualified clean air law for restaurants. 6: Some clean air provisions for restaurants. 7: 100% clean air in bars. 8: Qualified clean air law for bars. 9: Some clean air provisions for bars. 10: 100% clean air in gaming facilities. 11: Qualified clean air law for gaming facilities. 12: Some clean air provisions for gaming facilities. 13: Clean air law addresses e-cigarettes. 14: Clean air law addresses hookah. 15: Clean air law addresses marijuana. 16: 100% clean air in workplaces, includes e-cigarettes. 17: 100% clean air in restaurants, includes e-cigarettes. 18: 100% clean air in bars, includes e-cigarettes. 19: 100% clean air in gaming facilities, includes e-cigarettes. 20:

100% clean air in workplaces, includes recreational marijuana smoke. 21: 100% clean air in restaurants, includes recreational marijuana smoke. 22: 100% clean air in bars, includes recreational marijuana smoke. 23: 100% clean air in gaming facilities, includes recreational marijuana smoke. 24: 100% clean air in workplaces, includes recreational marijuana vaping. 25: 100% clean air in restaurants, includes recreational marijuana vaping. 26: 100% clean air in bars, includes recreational marijuana vaping. 27: 100% clean air in gaming facilities, includes recreational marijuana vaping. 28: 100% clean air in workplaces, includes medical marijuana smoke. 29: 100% clean air in restaurants, includes medical marijuana smoke. 30: 100% clean air in bars, includes medical marijuana smoke. 31: 100% clean air in gaming facilities, includes medical marijuana smoke. 32: 100% clean air in workplaces, includes medical marijuana vaping. 33: 100% clean air in restaurants, includes medical marijuana vaping. 34: 100% clean air in bars, includes medical marijuana vaping. 35: 100% clean air in gaming facilities, includes medical marijuana vaping. 36: Excise taxes on cigarettes. 37: Excise taxes on cigars. 38: Excise taxes on little cigars. 39: Excise taxes on non-combustible tobacco. 40: Excise taxes on other combustible tobacco products. 41: Excise taxes on nicotine delivery devices or e-cigarette products.

Web Appendix 6: R statistical code for simulating variance inflation due to policy co-occurrence

```
# Generalized code for evaluating impacts of policy co-occurrence on the variance of
effect estimates

rm(list=ls())
require(reshape2)
require(clubSandwich)

# Bring in data
load("mydata.rdata")
# data is formatted with one row per jurisdiction-time period and one column for
each policy variable.
# The jurisdiction identifier variable is named "geo" and the time unit identifier
variable is "time".
# the "data" object contains the data.
# the "vars" object is a character vector containing the names of the policy
variables.
# the "bin" object is a character vector containing the names of the policy
variables that are binary.
# the "cont" object is a character vector containing the names of the policy
variables that are continuous.

# Set number of simulations
nsims <- 1000

#####
#####
# Simulate
#####
#####

# Set simulation parameters
outcome_mean <- 100 # Outcome variable mean (normally distributed)
outcome_sd <- 5 # Outcome standard deviation
prop_variance_expl <- 0.10 # 10% of variance in outcome explained by other policy
variables

# Initialize results object
results <- list()

# Iterate through simulations
for (i in 1:nsims) {
  print(paste0("***** sim ",i))
  set.seed(i)

  result <- data.frame(sim_num = i, var = vars, var_obs = NA, var_sim = NA)

  for (policy in vars) {
    print(policy) # this is the index policy

    # Identify non-index policies
    other_policies <- vars[vars!=policy]

    # Simulate outcome
    error <- rnorm(nrow(data), mean = outcome_mean, sd = outcome_sd)
    rand_expl_policy <- sample(other_policies, 1) # select random policy that will
explain 10% of the variation in the outcome
    while (var(data[,rand_expl_policy])==0 ) rand_expl_policy <-
sample(other_policies, 1) # if the randomly selected explanatory policy has variance 0
(no variation), pick a different one
```

```

    beta <- sqrt(prop_variance_expl * var(error) / (1-prop_variance_expl) /
var(data[,rand_expl_policy]) ) # Calculate coefficient to put on explanatory policy
variable
    data$y <- beta*data[,rand_expl_policy] + error
    rm(error, beta)
    #var(resid(lm(data$y ~ data[,rand_expl_policy]))) / var(data$y) # Check. Should
by 0.9. i.e. 90% var in y not explained by rand_expl_policy

    # Identify SE's of effect estimates in observed data, controlling for other
policies
    # Model: E(Y|X) = B0 + state FEs + year FEs + measure of policy of interest +
measures of for control policies
    model <- lm(as.formula(paste0("y ~ ",paste0(vars,collapse="+"), "+ as.factor(time)
+ as.factor(geo)")),
                data = data)
    summary(model)
    std.err <- coef_test(model, vcov = "CR2", cluster = data$geo, test =
"Satterthwaite")[,2]

    # Pull variance
    if (policy %in% row.names(coef(summary(model)))) {
        result$var_obs[result$var==policy] <-
(std.err[row.names(coef(summary(model)))==policy])^2
    }

    rm(model, std.err)

    # Simulate variance of effect estimates for randomly distributed policies

    sim_data <- data
    vars_temp <- vars
    for (var in bin [bin !=rand_expl_policy]) {
        sim_data[,var] <- rbinom(n = nrow(data), size = 1, prob = mean(data[,var], na.rm
= T))
        if (sum(sim_data[,var])==1 | sum(sim_data[,var])==0) vars_temp <-
vars_temp[vars_temp!=var] # if the sim var is all 0 or all 1 by chance, drop it from
the predictor list
    }
    for (var in cont[cont!=rand_expl_policy]) sim_data[,var] <- rnorm( n = nrow(data),
mean = mean(data[,var], na.rm = T), sd = sd(data[,var], na.rm = T))

    # Calc simulated variance
    sim_model <- lm(as.formula(paste0("y ~ ",paste0(vars_temp,collapse="+"), "+
as.factor(time) + as.factor(geo)")),
                data = sim_data)
    summary(sim_model)
    std.err <- coef_test(sim_model, vcov = "CR2", cluster = sim_data$geo, test =
"Satterthwaite")[,2]
    rm(vars_temp)

    # Pull simulated variance
    if (policy %in% row.names(coef(summary(sim_model)))) {
        result$var_sim[result$var==policy] <-
(std.err[row.names(coef(summary(sim_model)))==policy])^2
    }

    rm(other_policies, rand_expl_policy, sim_data, sim_model, std.err)
    data$y <- NULL
}

# Calculate percent variance inflation
result$perc_base_sim <- round(abs(result$var_obs - result$var_sim) / result$var_sim
* 100, 2)

```

```

    print(result)
    results[[i]] <- result
}

###
# Collapse across sets of results
###

results_collapsed <- do.call(rbind, results)

head(results_collapsed)
summary(results_collapsed)

###
# Save results
###

write.csv(results_collapsed, "results.csv", row.names = F)

# END

```

References

1. Sivaraman JJ, Ranapurwala SI, Moracco KE, et al. Association of State Firearm Legislation With Female Intimate Partner Homicide. *American Journal of Preventive Medicine*. 2019;56(1):125–133.
2. State-by-State Firearm Law Data | State Firearm Laws. (<http://www.statefirearmlaws.org/>). (Accessed February 6, 2020)
3. Siegel M, Pahn M, Xuan Z, et al. Firearm-Related Laws in All 50 US States, 1991–2016. *Am J Public Health*. 2017;107(7):1122–1129.