

The Role of the Political Economy on State Laws Related to Medical Marijuana

Priscillia Hunt and Clinton Saloga

RAND Health and RAND Justice, Infrastructure and Environment

WR-1004-NIDA

June 2013

Prepared for National Institute on Drug Abuse

RAND working papers are intended to share researchers' latest findings and to solicit informal peer review. They have been approved for circulation by RAND Health and RAND Justice, Infrastructure and Environment but have not been formally edited or peer reviewed. Unless otherwise indicated, working papers can be quoted and cited without permission of the author, provided the source is clearly referred to as a working paper. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.. **RAND**® is a registered trademark.



Preface

This study is part of a larger project in RAND Health and RAND Justice, Infrastructure and Environment (JIE) units funded by the National Institute on Drug Abuse (R01DA032693-01). The project aims to provide the most complete account to date of the nuanced features of medical marijuana laws and their implications for health at three geographic levels: state, county, and local neighborhoods. This study focuses on state-level medical marijuana laws and analyzes the political economy to better understand why we observe particular law adoption patterns.

RAND Health is a major research division within the RAND Corporation, a nonprofit institution headquartered in Santa Monica, California. RAND Health's mission is to serve as the world's most trusted source of objective analysis and effective solutions for improving health. We are dedicated to reducing the cost of healthcare while improving the health of individuals, communities, and populations in the U.S. and worldwide.

RAND JIE conducts research and analysis in civil and criminal justice, homeland security, critical infrastructure protection, public and occupational safety, transportation and transportation safety, the environment, energy, economic development, space, and telecommunications—all areas in which RAND has a long track record and deep reservoirs of expertise.

Abstract

This article studies the political economy determinants of medical marijuana laws (MMLs) using a new empirical classification of states' underlying views on medical marijuana (MM). We find that the proportion of Republican voters is negatively associated with a Mixed Supply legal class in which the set of laws, nearly always passed by the state legislature, permit various modes of supply (e.g. home cultivation, dispensaries, state-authorized, and/or “appropriate supply”). We also find that increases in the self-reported proportion of Republican voters increases the likelihood of having a Home Remedy legal framework—the legal class characterized by voters passing ballot initiatives in which home cultivation is always (and usually the only) permissible form of supply, patient registration is recommended, and MM may be used for the narrowest definition of pain.

Table of Contents

Preface.....	ii
Abstract.....	ii
Tables.....	iv
Acknowledgments.....	v
1. Introduction.....	1
2. Background.....	3
3. Method.....	4
Population and Study Design.....	4
Statistical Analysis.....	6
3. Results.....	7
4. Discussion and Conclusions.....	9
Discussion.....	9
Limitations.....	10
Conclusion.....	10
5. References.....	12
Appendix.....	14

Tables

Table 1: Summary statistics of analytical sample, 2006-2010	6
Table 2: Average Marginal Effects on Probability of MM Legal Class Affiliation.....	8
Table 3: Pairwise correlation matrix of independent variables	14

Acknowledgments

Authors would like to acknowledge valuable comments and edits by Paul Steinberg.

1. Introduction

With two U.S. states—Washington and Colorado—having recently transitioned from marijuana legalized for medical purposes to marijuana also legalized for recreational use, there is renewed debate about what has contributed to states’ adoption of medical marijuana laws (MMLs). One explanation is that states’ political economy—defined as their market regulations, political and social beliefs, and local-, county- and state-level institutions—influenced the probability of voting for medical marijuana (MM) (Hall & Schiefelbein, 2011). In particular, research indicates states legalized MM when there was lower church attendance, lower proportions of Republican voters, and lower levels of property right protection and voluntary transactions (economic freedom¹). One limitation of this research is the assumption that all MMLs are homogenous. Not all states that legalize MM adopt the same set of provisions, however, and it may be that the political economy factors that determine one set of MM provisions are not the same factors determining another set of MM provisions.

Provisions in state statutes vary about whether to permit dispensaries and/or home cultivation; whether patients are required to register; what the medical conditions are for which physicians can recommend MM; and so on (Pacula, Boustead, & Hunt, 2013). Given that specific provisions in MMLs influence consumption patterns (Anderson & Rees, 2011) and public health outcomes (Pacula, Heaton, Powell, & Sevigny, forthcoming), it is important to identify political economy factors that influence the various laws in place, rather than simply the determinants of having an MML or not.

Because there are a wide range of MM provisions in state statutes, it is not analytically feasible to assess them all. Fortunately, a number of classifications have been developed to reduce the complexity of the combination of laws and allow for the more efficient, useful analysis of MMLs. In this paper, we describe the political economy of MMLs using a classification identified through latent class analysis in Hunt, Miles, & Boustead (2013). The use of this statistical method detected five distinct legal classes, each of which is characterized by a pattern of conditional probabilities representing the chance that jurisdictions adopted provisions in a legal database in Pacula et al. (2013). Classes are based on the analysis of provisions that can theoretically affect access, availability, and enforcement of MMLs. The five MML classes are:

- (1) **Unacceptable:** There are no legal provisions for medical marijuana.
- (2) **Research Purposes:** Researchers may obtain marijuana for therapeutic research.

¹The index of economic freedom used is described as one that should measure “the extent to which rightly acquired property is protected and individuals are engaged in voluntary transactions” (Bueno, Ashby, McMahon, & Martinez, 2012).

- (3) **Pharmaceutical Framework:** Physicians may prescribe marijuana, but there are no provisions for supply mechanisms.
- (4) **Home Remedy:** Marijuana produced at home is always permitted for a limited scope of health conditions.
- (5) **Mixed Supply:** Legal provisions allow dispensaries, home cultivation, state-authorized supply, most appropriate supply, or some combination of these supply mechanisms.

Using the assignment of each of the 50 U.S. states to a class in each year over the period 2006 to 2010, we perform multinomial probit regression analysis to describe if and how states' political economy characteristics are determinants of each of these five MML classes. This paper aims to improve our understanding of what drives states' adoption of various MM provisions.

2. Background

Although the use of MM for research purposes has been a part of many states' legal frameworks since the 1970s and 1980s, the modern transition of MMLs started in 1996 when California residents voted in favor of Proposition 215 (the Compassionate Use Act of 1996), which allowed for producing, distributing and consuming marijuana for health conditions without the threat of state prosecution. Arizona voters passed a set of MMLs in 1996 as well; however, they included language allowing physicians to prescribe MM, which was determined to violate federal laws, so the state laws were not effectuated (Hunt et al., 2013). By January 1, 2012, 17 states and the District of Columbia (D.C.) had enacted MMLs that vary along a number of dimensions, including legal protections for patients, caregivers, and physicians; health conditions covered; patient registration requirements; and supply mechanisms permitted.

Research on MMLs has tended to focus on health and crime outcomes and the political and legal conflicts of state versus federal laws in the United States. Little has been done to understand the political economy context in which MMLs were passed over the past 15 years. One exception was a cross-sectional study examining how much economic freedom, educational attainment, income, religion, Republican voters, urbanization, and age were associated with having an MML in effect by 2010 (Hall & Schiefelbein, 2011). However, that study assumed two MML classes—legal and not legal—but the idea of such a classification is not well supported in the legal literature. Based on some of the existing MMLs as of 2011 and 2013 respectively, two studies developed classifications in which states were grouped into seven categories distinguished by legal certainty of access to MM (Marijuana Policy Project, 2011) and five categories differentiated on criminalization (Marijuana Policy Project, 2013). Mikos (2009) identifies five categories of states with MMLs based on legal protections and state involvement. Hunt et al. (2013) use latent class analysis (LCA) on 22 provisions of MMLs made effective over the period 1990 to 2012 to identify five statistically and conceptually distinct classifications (the classification scheme used in this paper).

The differences between classifications of MMLs may have important implications for estimating the harms and effects of MM. (Pacula et al., forthcoming) find that differential health impacts are observed across states with differing laws on dispensaries and home cultivation over time. Another study finds that levels of consumption differ by states that have voted in favor of legalizing MM (Anderson & Rees, 2011) but that actually have adopted different provisions. Therefore, the heterogeneity of MMLs is non-trivial and estimating the political economy determinants of various laws allows us to begin understanding important links between the types of MMLs, why certain MMLs are adopted, and the subsequent health and safety consequences of those MMLs.

3. Method

Population and Study Design

We use the legal classification of MMLs in Hunt et al. (2013) for 50 U.S. states over the period 2006 and 2010 inclusive. The legal classification of states is based on a legal database in Pacula et al. (2013) of states' adoption patterns to 22 legal items addressing legal protections, types of health conditions covered, process of obtaining MM, method of enactment, and supply mechanisms. At each year, each jurisdiction is classified into one of five distinct categories, which were statistically identified through latent class analysis as: (1) Unacceptable; (2) Research Purposes; (3) Pharmaceutical Framework; (4) Home Remedy; (5) Mixed Supply.

The year in which a state is considered to have passed a law is based on the first day of the following year; for example, if a state effected a provision in November 2000, the provision is considered to have passed in 2001 (or January 1, 2001). There is an analytical reason for this; state-level variables used for analysis in the United States are most often calculated in a month "of the following year" or based on mid-year to mid-year estimates. To ensure consistency in the year of the laws and other variables of analysis, the latent class analysis was performed on a legal database that used this approach for determining the year in which a law was made effective. Further details of the methodology and laws identifying the classes are published elsewhere (Hunt et al., 2013).

As for independent variables, we follow previous research on political economy factors associated with MML adoption (Hall & Schiefelbein, 2011). From the Census Bureau, we obtained the following data by state and year: the percentage of the state population over the age of 65 (U.S. Census Bureau, 2012); the percentage of the state population over 25 years of age that have at least a bachelor's degree (2012); (U.S. Census Bureau, 2011); and the percentage of the state population that lives in urbanized areas (U.S. Department of Commerce, Bureau of Census, 2011).² From the Bureau of Economic Analysis, we obtained annual per-capita personal income (in \$1,000's) for each state (U.S. Department of Commerce, Bureau of Economic Analysis, 2012).

We also collected data from non-governmental sources. First, we obtained each state's overall Economic Freedom index, as calculated by the Fraser Institute (Bueno, Ashby, McMahan, & Martinez, 2012). This variable is comprised of state- and local-level indicators for the size of government, tax rates and discriminatory taxation, regulation, and legal system and property rights. The value of the Economic Freedom index ranges between 0 and 10, with higher numbers indicating greater levels of economic freedom. We also collected the results of a

²2006–2009 values were linearly interpolated using figures from the 2000 and 2010 censuses.

nationwide Gallup Poll from 2006 to 2010 on political party identification, defining the variable “Republican” as the proportion of respondents that identify as Republican or Lean Republican (2007) (Jones, 2009; Jones, 2011).³ Finally, we obtained results from a separate series of Gallup Polls on church attendance (“Church”), designating the proportion of respondents in each state who report attending church, synagogue, or mosque at least once a week or almost every week (Newport, 2006; Newport, 2010).⁴

Table 1 below presents a statistical summary of the data used for analysis. Given 50 jurisdictions (D.C. does not have data for economic freedom) by five years, we have a total analytic sample of 250 units. Most state-years are characterized by the Unacceptable legal framework (44%), in which no statute on patients’ use of marijuana was in place. The Pharmaceutical Framework represents state-years in which provisions on pharmacy supply and physician prescribing were in place (even though they could not be made legally effective). This is the second most prevalent class in the data (21%). The third most prevalent class is Mixed Supply (18%), in which the various supply mechanisms—dispensaries, state authorities, home cultivation, and/or “most appropriate”—were permissible. Approximately 12% of state-years over the period investigated can be characterized by the Research Purposes framework, wherein marijuana may be consumed for therapeutic research only. The class with the lowest prevalence, Home Remedy (5%), always permits home cultivation and usually no other form of supply, recommends patient registration, and only permits marijuana use for the narrowest definition of pain.

The lower portion of the table presents the means and standard deviations for each of the indicators of states’ political economy used in the analysis. The mean of the index for economic freedom is approximately 6.8, with seemingly limited variation given that the range of values is 5.3 to 8.1. Approximately one-quarter of states’ adult population attained at least a bachelor’s degree. Nearly three-quarters of states’ population lived in urban areas, although there was a great deal of variation because some state-years have nearly the entire state living in urban areas (95%). Over the period investigated, the mean income of the sample was \$38,160. Approximately 40% of adults consider themselves Republican and nearly the same proportion report attending church (41%). At the mean, approximately 13% of a state’s population is elderly over the period investigated. There is very little annual change for this variable within a state and much of the variation captured in the analysis is across states.

³The 2006 Political Party Gallup poll does not include Hawaii or Alaska, and Delaware, North Dakota, Wyoming, and District of Columbia, which were omitted because of small samples. 2007 results were not available, and were linearly interpolated from the 2006 and 2008 values where possible. Where 2006 data were missing, 2006 and 2007 values were extrapolated as the average of the 2008–2011 figures.

⁴The 2006 Church Attendance Gallup poll does not include Hawaii or Alaska, and 2007 results were not available. 2007 values were linearly interpolated from 2006 and 2008 figures. For Alaska and Hawaii, the 2006 and 2007 values were extrapolated as the average of the 2008–2010 figures. 2010 church attendance data were provided by email correspondence (Public Relations Specialist, Gallup).

Table 1: Summary Statistics of Analytical Sample, 2006-2010

Variable	Mean	Std. Dev.	Min	Max
<i>Dependent variable (proportion of state-years)</i>				
Unacceptable	0.44			
Research Purposes	0.12			
Pharmaceutical Framework	0.21			
Home Remedy	0.05			
Mixed Supply	0.18			
<i>Independent variables</i>				
Economic Freedom	6.76	0.64	5.33	8.13
Bachelor's	26.94	4.71	16.50	39.00
Income/1000	3,816	561	2,791	5,695
Urban	73.20	14.50	38.60	95.00
Republican	39.38	6.81	23.80	62.00
Elder	12.98	1.68	6.75	17.37
Church	41.41	8.84	23.00	63.00
<i>N</i>	250			

Statistical Analysis

The aim of our analysis is to describe political economy characteristics statistically affecting each class of MMLs. We use each state-year combination as the unit of analysis. We first test the correlation of independent variables (see the Appendix) and perform a multinomial probit regression on class membership. We then calculate average marginal effects of political economy characteristics on the predicted probability of belonging to each of the five classes. We present results of a parsimonious model⁵ regressing MML class on the political economy characteristics described.

⁵A model with year effects was also assessed. Likelihood Ratio tests indicated that neither year dummies nor a linear year effect improved model fit.

3. Results

Results in Table 2 show the average marginal effects on the probability of belonging to each class. At the 1% level, Republican is positively associated with membership in the Unacceptable class (column two). In other words, state-years with higher proportions of Republicans have higher probabilities of a legal framework in which there are no laws on the books permitting patients' MM use.

Holding all else constant, income is negatively associated with the probability of having Home Remedy and Mixed Supply legal frameworks, columns four and five, respectively. The proportion of the population with at least a Bachelor's degree is positively associated with membership in the Home Remedy class. This finding may be rather surprising: At an aggregate level, a higher proportion of educated people in a state increased the probability of having a Home Remedy legal framework, but higher income state-years had lower probabilities of having Home Remedy laws. This may simply be indicative of an interesting set of preferences where richer states do not support Home Remedy provisions but more highly educated states do. Another explanation is that income and education are correlated variables, thus conflating the results.

Perhaps unexpectedly, church attendance is statistically significant and positively associated with having a Research Purposes framework, column three. Additionally, church attendance is negatively associated with having a Pharmaceutical or a Mixed Supply framework (columns four and six, respectively). One explanation we provide is related to the propensity to vote. Since church attendance is strongly associated with a higher probability of voting (Gerber, Gruber, & Hungerman, 2008), any differences in the frequency of MMLs on voting ballots can influence our results. For example, if states with greater church attendance were more likely to have a research statute on their ballots, since they are also states with greater levels of voting, the preferences of church attendees is more prevalent in our analysis.

There are more statistically significant findings for the various political economic characteristics and belonging to the Mixed Supply framework. Specifically, the economic freedom index, proportion of Republican/Republican leaning adults, proportion of elderly population, and proportion of adults attending church are statistically significant at the 1% level and *negatively* associated with having a Mixed Supply framework.

Table 2: Average Marginal Effects on Probability of MM Legal Class Affiliation

	Class of MML				
	Unacceptable	Research	Pharmaceutical	Home Remedy	Mixed Supply
Economic Freedom	0.1224 (0.0764)	-0.0991 (0.0606)	0.1033* (0.0535)	-0.0236 (0.0209)	-0.1031*** (0.0207)
Bachelor's	-0.0135 (0.0162)	-0.0031 (0.0195)	-0.0050 (0.0094)	0.0226*** (0.0039)	-0.0010 (0.0027)
Income/1000	-0.0013 (0.0116)	0.0204 (0.0131)	0.0138* (0.0071)	-0.0142*** (0.0028)	-0.0186*** (0.0030)
Urban	-0.0052 (0.0047)	0.0084* (0.0046)	-0.0048 (0.0037)	-0.0010 (0.0007)	0.0025*** (0.0008)
Republican	0.0241*** (0.0079)	-0.0143* (0.0082)	-0.0019 (0.0060)	0.0037** (0.0016)	-0.0116*** (0.0037)
Elderly	0.0677** (0.0287)	-0.0447 (0.0280)	0.0227 (0.0205)	0.0007 (0.0090)	-0.0464*** (0.0086)
Church Attendance	-0.0014 (0.0092)	0.0328*** (0.0098)	-0.0098** (0.0044)	-0.0020 (0.0022)	-0.0196*** (0.0016)
Observations	250	250	250	250	250

Notes: Robust standard errors in parentheses. *** p -value < 0.01, ** p -value < 0.05 and * p -value < 0.10.

4. Discussion and Conclusions

Discussion

This study makes several contributions to the MM literature. First, we have contributed to the growing literature differentiating MMLs across jurisdictions and within jurisdictions. We find the two classes that effectively permit MM use—Home Remedy and Mixed Supply⁶—differ in terms of political economy characteristics. States-years with more Republicans have *higher* probabilities of having a Home Remedy framework and *lower* probabilities of Mixed Supply. This finding may be associated with the Republican Party's attitudes toward government regulation and a view that increasing channels of supply imply increased state regulation of the MM market. It is important to emphasize this is an aggregate result; it does not reflect individual determinants of voting behavior for MM. This study cannot determine why the Republican Party is differentially associated with the two classes, which opens up an interesting avenue of further research to examine what aspects of the MMLs and the Party's views influence their voting behavior.

What is also particularly interesting about this finding is that it corresponds to findings in Hunt et al. (2013) in which the most likely class transitions are from Unacceptable to Home Remedy and then Mixed Supply. An implication from this study is that states transition out of Unacceptable when Home Remedy-type provisions are on the voter ballot and there is a relatively higher proportion of Republicans. Then, during a period when the proportion of Republicans falls, state legislatures implement Mixed Supply-type of provisions.

Second, we uncovered a potentially interesting effect of income and education on MMLs. While states' higher income *decreases* the probability of having Home Remedy and Mixed Supply frameworks, states' higher income *increases* the probability of a Pharmaceutical framework. We offer a couple of reasons for this result. We may be actually capturing a price effect, where lower-income states believe MM would be priced lower in Home Remedy and Mixed Supply laws since people can cultivate at home or purchase at dispensaries competing with one another, thus driving prices downward to the perfectly competitive price. Another possibility is that it is an income effect and states with higher income preferred the principles of a Pharmaceutical framework, despite the fact that the provisions class conflicts with federal law and could not be implemented.

Additionally, we may have uncovered an interesting set of preferences where richer states do not support Home Remedy provisions, but more highly educated states do. We emphasize that this does necessarily reflect individuals and the preferences of higher-educated and earning

⁶The Pharmaceutical Framework class did not adopt laws effectively allowing supply through any legal channel.

individuals; a statistical relationship at the individual level can be reversed at higher levels of aggregation, such as the state (King, 1997; Glaeser & Sacerdote, 2007). It may be, for example, that while we find richer states are less likely to have Home Remedy and Mixed Supply classes, individuals prefer one or both of these legal classes when their income increases.

There are some limitations to this particular finding for income and education because they are highly correlated. Thus, an interesting avenue of research may be to understand whether price expectations influence the adoptions of health laws and whether income has an independent effect from education on class membership.

Finally, we provide evidence that contrasts with—and some evidence that supports—previous findings for the political economy determinants of MMLs. Previous research found that Economic Freedom, Republican, and Church negatively affected states' probabilities of having MMLs (Hall & Schiefelbein, 2011). That contrasts with this study in which Republican positively (negatively) affects membership to the Home Remedy (Mixed Supply) class and Economic Freedom has no statistically significant effect on (negatively affects) membership to the Home Remedy (Mixed Supply) class.

Limitations

This is the first study we are aware of that considers the political economy context of a variety of MM legal frameworks; however, several limitations warrant discussion. First, we use the legal classification identified in Hunt et al. (2013); yet, as noted earlier, there are other existing classifications (Mikos, 2009; Marijuana Policy Project, 2011). We decided to apply a classification built from latent class analysis and, thus, reduce some forms of bias or unreliability. Another study limitation is identification of the direction of causality in our findings. For example, it is uncertain from this analysis whether living in urban areas causes groups of people to vote in favor of varying supply mechanisms or whether having certain MMLs in place draws people to locate in certain areas. However, it seems highly unlikely that people move into and out of states as a result of an MML class in large enough numbers at the state level to introduce endogeneity. As such, we argue that our results indicate political economy characteristics that are determinants of certain MMLs.

Conclusion

Our analysis was aimed at building evidence about what drives the adoption of state MMLs, particularly the political economy. We find indicators of states' political economy determine differential probabilities of membership to MML classes. By showing evidence that states with comparable MMLs may also have similar political economy characteristics, we contribute two points to the literature on MMLs. First, we lend support to the need for a more composite measure of MMLs besides a simple binary indicator for whether MM is legal or not. Second, our findings suggest that a state's political economy characteristics influence the MMLs that are

adopted. By using a legal classification that was both consistent over time and comprised of more than two classes (e.g. legal, not legal), this study was able to identify nuances in the political economy of state-level MMLs. The differential effect of Republican and Economic Freedom on membership to each of the classes that effectively permit MM use is an innovative finding identified through our approach and one important consideration as states continue to put in place a variety of MMLs in the future.

5. References

- Anderson, D., & Rees, D. 2011. *Medical Marijuana Laws, Traffic Fatalities, and Alcohol Consumption*. Discussion Paper no. 6112. Institute for the Study of Labor (IZA).
- Bueno, A., Ashby, N., McMahon, F., & Martinez, D. 2012. *Economic Freedom of North America 2012*. Fraser Institute.
- Gerber, A., Gruber, J., & Hungerman, D. 2008. *Does Church Attendance Cause People to Vote? Using Blue Laws' Repeal to Estimate the Effect of Religiosity on Voter Turnout*. no. 14303. National Bureau of Economic Research.
- Glaeser, E., & Sacerdote, B. 2007. *Aggregation Reversals and the Social Formation of Beliefs*. NBER Working Paper No. 13031. National Bureau of Economic Research.
- Hall, J., & Schiefelbein, J. 2011. The Political Economy of Medical Marijuana Laws. *Atlantic Economic Journal*, 39(2): 197–198.
- Hunt, P., Miles, J., & Boustead, A. 2013. *Understanding patterns in medical marijuana laws: a latent class and transition analysis*. no. WR-1002-NIDA. Santa Monica: RAND Corporation.
- Jones, J. M. 2007. Democratic Edge in Partisanship in 2006 Evident at National, State Levels. Retrieved from <http://www.gallup.com/poll/26308/democratic-edge-partisanship-2006-evident-national-state-levels.aspx>
- Jones, J. M. 2009. State of the States: Political Party Affiliation. Retrieved from <http://www.gallup.com/poll/114016/state-states-political-party-affiliation.aspx#2>
- Jones, J. M. 2011. Number of Solidly Democratic States Cut in Half From '08 to '10. Retrieved from <http://www.gallup.com/poll/146234/number-solidly-democratic-states-cut-half.aspx#3>
- King, G. 1997. *A Solution to the Ecological Inference Problem*. Princeton: Princeton University Press.
- Marijuana Policy Project. 2011. *State-By-State Medical Marijuana Laws*.
- Marijuana Policy Project. 2013, June 6. State Policy. Retrieved from <http://www.mpp.org/states/>
- Mikos, R. 2009. On the Limits of Supremacy: Medical Marijuana and the States' Overlooked Power to Legalize Federal Crime. *Vanderbilt Law Review*, 62(5): 1421–1482.
- Newport, F. 2006. Church Attendance Lowest in New England, Highest in South. Retrieved from <http://www.gallup.com/poll/22579/church-attendance-lowest-new-england-highest-south.aspx#2>
- Newport, F. 2010. Mississippians Go to Church the Most; Vermonters, Least.
- Pacula, R. L., Boustead, A., & Hunt, P. 2013. *Words Can Be Deceiving: A Review of Variation Among Legally Effective Medical Marijuana Laws in the United States*. no. WR-1005-NIDA. Santa Monica: RAND Corporation.
- Pacula, R. L., Heaton, P., Powell, D., & Sevigny, E. forthcoming. Reconsidering the Impact of Medical Marijuana on Marijuana Use.
- U.S. Census Bureau. 2011. 2010 American Community Survey. Retrieved from <http://proximityone.com/edattain.htm>
- U.S. Census Bureau. 2012. *Population Estimates for the U.S., Regions, and States by Selected Age Groups and Sex*. Washington, DC: Population Estimates Program, Population Division. Retrieved from <http://www.census.gov/popest/data/intercensal/index.html>

- U.S. Department of Commerce, Bureau of Census. 2011. *Lists of Population, Land Area, and Percent Urban and Rural in 2010 and Changes from 2000 to 2010*. Washington, DC: U.S. Dept. of Commerce, Bureau of the Census. Retrieved from <http://www.census.gov/geo/reference/urban-rural-2010.html>
- U.S. Department of Commerce, Bureau of Census. 2012. The 2012 Statistical Abstract: Educational Attainment by State. Retrieved from http://www.census.gov/compendia/statab/cats/education/educational_attainment.html
- U.S. Department of Commerce, Bureau of Economic Analysis. 2012. Personal income, per capita personal income, disposable personal income, and population (SA1-3, SA51-53).

Appendix

Table 3: Pairwise correlation matrix of independent variables

	Income	Elderly	Bachelor's	Urban	Church	Republican	Economic Freedom
Income	1.00						
Elderly	-0.134*	1.00					
Bachelor's	0.847*	-0.194*	1.00				
Urban	0.531*	-0.276*	0.515*	1.00			
Church	-0.481*	-0.051	-0.503*	-0.222*	1.00		
Republican	-0.565*	-0.269*	-0.557*	-0.297*	0.460*	1.00	
Economic Freedom	-0.026	-0.313*	-0.079	0.057	0.378*	0.437*	1.00

* p -value < 0.05.