

## ECON 7023 Project Proposal - The Impact of Federal Upper Limit Provisions on Drug Accessibility for Medicaid Beneficiaries

In an ideal health care system, quality care is both accessible and affordable. Because the United States government operates with a limited budget for health care spending, there tends to exist a trade-off between health care accessibility and affordability. For example, many more United States citizens were able to obtain health insurance after Obamacare passed through legislation in 2010, but health insurance premiums rose for the general population. A microcosm of this general health care issue is prescription drug accessibility and affordability for individuals enrolled in Medicaid, which in general provides health coverage for low-income people and people with disabilities.

In April 2016, the Affordable Care Act revised the Federal Upper Limit (FUL) provisions so that state Medicaid agencies must reimburse pharmacies for prescription drugs based on the average manufacturing price of pharmaceutically and therapeutically equivalent multiple source drug products instead of the costs of the ingredients in the drug, as was done previously. The U.S. government projected that it would save a few million dollars per year by implementing this rule. Drug manufacturers worried that this new rule would create some complications that could potentially reduce patient access to its drugs, which could eventually lead to worse patient outcomes, such as higher mortality rates and hospital readmission rates. This is precisely what I seek to investigate. My objective is to determine if this change in the calculation of the FUL has negatively impacted drug accessibility for Medicaid beneficiaries.

I will be working with U.S. state-level panel data that has been acquired from the Centers for Medicare & Medicaid Services (CMS), the U.S. Bureau of Economic Analysis, and the Henry J. Kaiser Family Foundation from the years 2014-2017. CMS provides drug utilization data for hundreds of prescribed drugs that are paid for by state Medicaid agencies. There are numerous drugs I could choose to analyze, but I have chosen to analyze just five of the hundred most prescribed drugs over these four years, including Amoxicillin, Fluoxetine, Lamotrigine, Carvedilol, and Morphine Sulfate, which are used to treat sicknesses varying from bacterial infections to bipolar disorder. Drug utilization information serves as a proxy for drug accessibility in this study. I control for state size and income levels by using state population and per capita personal income from 2014-2017 as covariates, which was obtained from the U.S. Bureau of Economic Analysis. Finally, I control for state-level health care accessibility by using the percent of the population enrolled in Medicaid, enrolled in Medicare, and uninsured as covariates and for state-level quality of health by using the percent of the population that smokes and that is obese as covariates, all of which was obtained from the Henry J. Kaiser Family Foundation.

For my initial analysis, I have used pooled OLS to estimate a structural equation for the years 2015 and 2017 in which the logarithm of number of drug prescriptions is the dependent variable and each of the covariates mentioned above, along with a dummy variable for the year 2017 (after the new rule has been implemented), serves as the independent variables in which I use the logarithms of population and per capital personal income instead of their nominal amounts, and I have estimated this structural equation individually for each drug. I am most interested in the estimated coefficient of the time-dummy variable for each drug. My initial results indicate that there is a reduction in the number of prescriptions filled for each of the five drugs from 2015 to 2017, but this time-dummy variable effect is only statistically significant for Morphine Sulfate and weakly statistically significant for Fluoxetine.

In the future, I plan to analyze fixed effects and random effects models for this data, further investigate endogeneity issues, and perform multivariate regression so that I can test estimated coefficients across equations.

Table 1. Summary statistics of the dependent and independent variables over all 50 states from 2014-2017.

Variables	N	mean	SD	min	max
<i>Dependent Variables</i>					
# of Prescriptions of Amoxicillin	200	640	1526	11	76,809
# of Prescriptions of Fluoxetine	200	384	519	11	18,405
# of Prescriptions of Lamotrigine	200	203	216	11	7,205
# of Prescriptions of Carvedilol	200	153	225	11	7,398
# of Prescriptions of Morphine Sulfate	200	192	244	11	12,623
<i>Independent Variables</i>					
Population	200	6,432,000	7,177,000	579,000	39,537,000
Per Capita Personal Income	200	47,105	7,314	34,333	71,033
% of Population Enrolled in Medicaid	200	18.5	4.3	9.0	31.0
% of Population Enrolled in Medicare	200	14.1	2.0	8.0	19.0
% of Population Uninsured	200	8.9	2.9	4.0	17.0
% of Adult Population that Smokes	200	18.0	3.5	8.8	26.7
% of Adult Population that is Obese	200	65.0	3.2	56.6	71.3

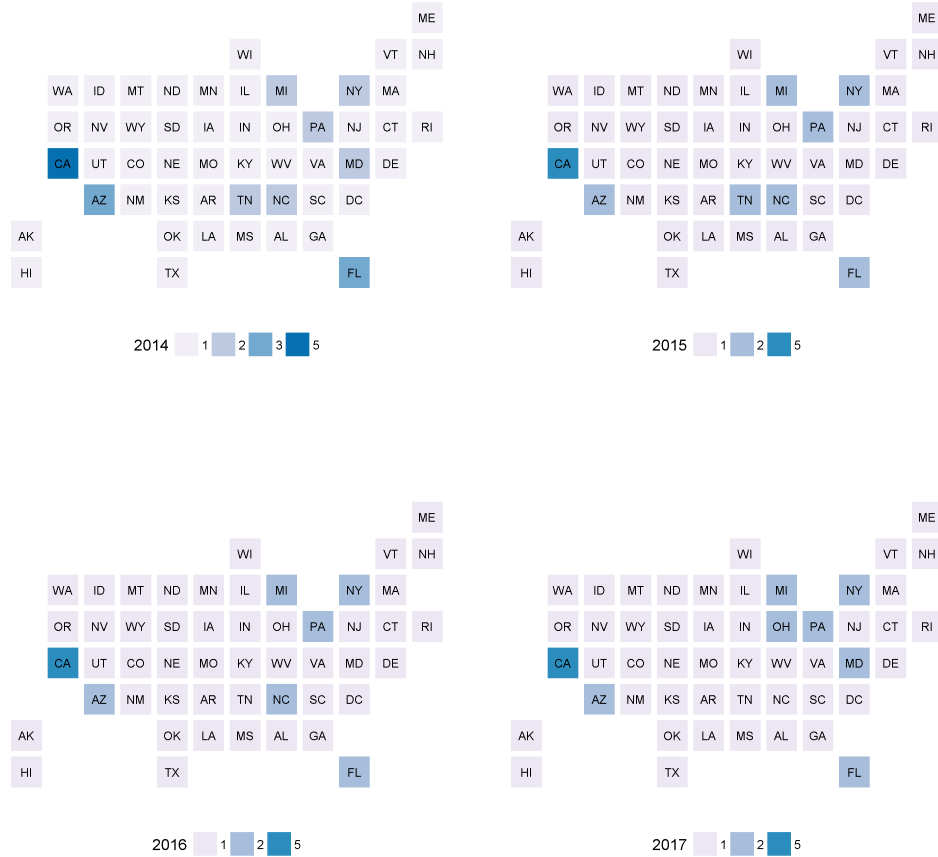


Figure 1: The density of prescriptions of Morphine Sulfate by state from 2014-2017.