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Medicaid Expansion

A case study of Arkansas and Mississippi

Introduction

For the last hundred years, healthcare has been a hot button issue in national politics. Of the various government subsidized health programs, Medicaid represents $1 or every $6 spent on healthcare in the United States (Rudowitz et al., 2021). With the onset of the COVID-19 pandemic, healthcare access is all the more important. However, the question of effectiveness is always lingering. Does an increase in billions of dollars of spending effectively improve outcomes? In 2019, the expansion of medicaid cost $93.8 billion, making it one of the most expensive expansion in healthcare of the century (Rudowitz et al., 2021). In order to discover if this program is cost effective one must first see if the program is effective period. Utilizing a natural experiment between Arkansas and Mississippi, this paper investigates the effectiveness of Medicaid expansion on decreasing common causes of death for the poor. Also included is a brief history of healthcare policy in the United States as well as information on how the Affordable Care Act has changed Medicare.

Policy Description

History

The earliest involvement of the US federal government in healthcare was the establishment of 40 hospitals in the antebellum south as part of reconstruction. With the rise of progressivism and populism in the early 20th century, national healthcare reform and other social welfare programs became more commonplace in developed countries. For example, in 1911 the United Kingdom passed the Nation Insurance Act which would later become the National Health Service in 1948. The earliest efforts toward universal health coverage were led by Theodore Roosevelt, these efforts were only later realized when Franklin Delanor Roosevelt included publicly funded healthcare programs as part of his new deal legislation. Later, Harry S. Truman proposed universal health care which failed to pass due in part to opposition from national medical groups (Manchikanti et al, 2017).

The biggest reform of the 20th century came with the creation of Medicaid and Medicare through the Social Security Amendments of 1965. This legislation was spearheaded and signed into law by President Lyndon B. Johnson. Within the first three years nearly 20 million individuals enrolled. Coverage included up to 90 days of hospital care and 100 days each of nursing home care and home health care visits (Patel & Rushefsky, 1995). Over the next decades, more reforms were proposed including a call for nationalized health insurance and employer mandated health

insurance, though criticisms of cost led to their failure. The next successful change was the Consolidated Omnibus Budget Reconciliation Act (COBRA) of 1985 which allowed employees to continue with their group health insurance for a limited time after their employment had ended. The next push for reform occurred during the Clinton administration headed by The First Lady and future presidential candidate Hillary Clinton. However, their only success came with the passage of the State Children's Health Insurance program (SCHIP) which provided health insurance coverage for uninsured children who didn't qualify for medicaid. Under George W. Bush the Medicare Modernization Act passed which expanded coverage of prescription medication for medicare recipients (Manchikanti et al, 2017b).

Arguably the biggest healthcare overhaul of this century has been with the passage of the Affordable Care Act under the Obama Administration in 2010. The 2006 Massacusettes expansion of health coverage, often called Romneycare after the then governor Mitt Romney, acted as a blueprint for the ACA. The three primary goals of the ACA were to increase the number of insured individuals, improve the quality of care, and reduce the costs of healthcare overall. The ACA is credited with increasing the number of insured by over 20 million, though an estimated 6 million lost their insurance due to regulatory changes. The majority of this increase can be credited to Medicaid expansion (Manchikanti, 2017a).

Medicaid Expansion and the ACA

Medicaid, as it exists now, is a state and federal partnership that provides health insurance for low-income individuals, including children, parents, the elderly, and some with disabilities. Before Medicaid expansion, the qualifying population for medicaid was: pregnant individuals and children 18 and under in families earning below 138% of the federal poverty line, some low income parents or caretakers, and most seniors and disabled individuals who receive Supplemental Security Income (SSI). States may also receive additional funding to cover "optional" populations, this include: some individuals in the previous groups who earn more than 138% of the federal poverty line, seniors and disabled individuals not receiving SSI but with income below the poverty line, "medically needy" individuals with higher than qualifying incomes that have high medical expenses that reduce their disposable income, and others with higher incomes that need long term support. With the implementation of the ACA, states also have the ability to cover all non-disabled adults with income below 138% of the federal poverty line. (*Policy Basics: Introduction to Medicaid*, 2020).

Just as there is a mandatory and optional population to cover, the same exists for benefits provided. Some of the mandatory benefits include in and outpatient hospital services, physician care, home health, laboratory and x-ray services, family planning, pediatric care, birth center and midwife services, EPSDT, as well as nursing facility access. Some of the optional benefits include prescription drugs, physical/occupational therapy, specialized care (podiatry, dental, optometry, speech

and hearing services, ect), hospice, and private nursing services among others (*Mandatory & Optional Medicaid Benefits*, n.d.).

In the years after the ACA's passage, numerous legal challenges were brought against it. Most notably *National Federation of Independent Business v. Sebelius* which made it to the Supreme Court on appeal as *California v. Texas.* The Supreme Court upheld all the provisions of the ACA but made Medicaid expansion essentially optional for states (*ACA Survives Legal Challenge, Protecting Coverage for Tens of Millions*, 2019). As of April 2022, 39 states including Washington D.C. have adopted Medicaid expansion while 12 have not (*Status of State Medicaid Expansion Decisions: Interactive Map*, 2022).

Critical Reception

The success of Medicaid expansion for health outcomes has been overwhelmingly positive. Estimates indicate that the policy has saved the lives of at least 19,200 adults 55-64 years old from 2014-2017. For states who did not expand, an estimated 15,600 adults died prematurely. There's an estimated 39-64% reduction in annual mortality rate for older adults gaining coverage. (Broaddus & Aron-Dine, 2019). Using county level data, Borgschulte and Vogler found a 3.6 percent decrease in mortality for ages 20-64 (2020). Additional research focused on specific conditions and diseases. A meta analysis conducted by the Kaiser Family Foundation found that a body of research indicates an increase in coverage for cancer patients as well as better access to screenings and preventative care, however results on improved survival

outcomes are mixed. For individuals with diabetes, studies found increases in coverage and affordability of healthcare; though there are mixed results on the utilization of preventative care as well as changes in the prevalence of diabetes overall. Expansion significantly increased maternal health and access with no definitive results on fetal and infant health (Guth & Ammula, 2021).

A source of significant criticism of the ACA is the cost. According to Manchikanti, Helm II, et al., healthcare exchange enrollment has been lackluster to the tune of 10 million fewer enrollees than projected; while the number of individuals covered by private insurance is steadily decreasing. The increasing price of insurance premiums and care has put a burden on consumers while those on Medicaid are restricted by limited provider networks. Not to mention the estimated 6 million individuals who lost their health insurance entirely. Essentially, the ACA improved conditions for the poor through medicaid expansion but worsened conditions for the middle class despite the implementation of the Insurance Exchange Networks. While coverage has increased overall, access and quality of care has not. As federal funding for medicaid expansion phases out, state legislatures are grappling with the need to cover the cost as criticism continues to grow (2017a).

Data and Analysis

Method

A controlled experiment is the only way to determine causality of a treatment. Unfortunately, national economic policies can't be studied in a lab experiment so one must utilize causal inference statistical methods to estimate causality. One such method is a difference-in-differences, a quasi-experimental identification strategy. Difference-in-differences is a natural experiment where exposure to treatment and control conditions occurs without exterior intervention. Specifically, this analysis uses a 2x2 DD design with areas of interest with and without treatment and a time period before and after treatment (Cunningham, 2021, Ch. 9).

In order to best test the effectiveness of Medicaid expansion, the analysis requires a value to measure success. Since Medicaid expansion aims to improve health outcomes, mortality is an obvious metric of choice. However, since variables such as crime, risky behavior, culture, environmental exposure, finances, and others can all impact mortality independent of health insurance, it's important to be more specific with the death metric (Puterman et al., 2020). To do so the analysis utilizes causes of death that most affect the population of interest. To find these causes of death the analysis employs the 50 poorest counties, by poverty rate, from 2013. 2013 is the year before the first medicaid expansions took place making it optimal for calculating deaths that were most common before medicaid expansion took place. The data came from the US Census Bureau's Small Area Income and Poverty Estimates. From here,

one can calculate the top ten causes of death for these counties using data from the CDCs compressed mortality file for individuals 18- 64. The resulting causes of death include forms of cancer such as breast, lung, and colon as well as a number of different heart attacks, various cardiovascular diseases, and septicaemia- all of which can be prevented or delayed through healthcare access and preventative care (See Appendix Section I for specific conditions). These deaths are the ones counted as the response variable in the analysis.

Since Medicaid expansion was implemented on a state level the treatment and control groups will be states. The states of choice are Arkansas and Mississippi. In 2014 the Arkansas state legislature expanded medicaid while Mississippi did not. This is the source of the treatment. Arkansas and Mississippi are neighboring states with similar geographies and demographic characteristics, including median household income and housing costs. Both populations are around three million, with similar high school and college graduation rates. Age distribution and veteran populations are also very similar. Healthcare indicators such as smoking rates and obesity are essentially uniform between the two states (*U.S. Census Bureau Quickfacts: Mississippi; Arkansas*, n.d.).

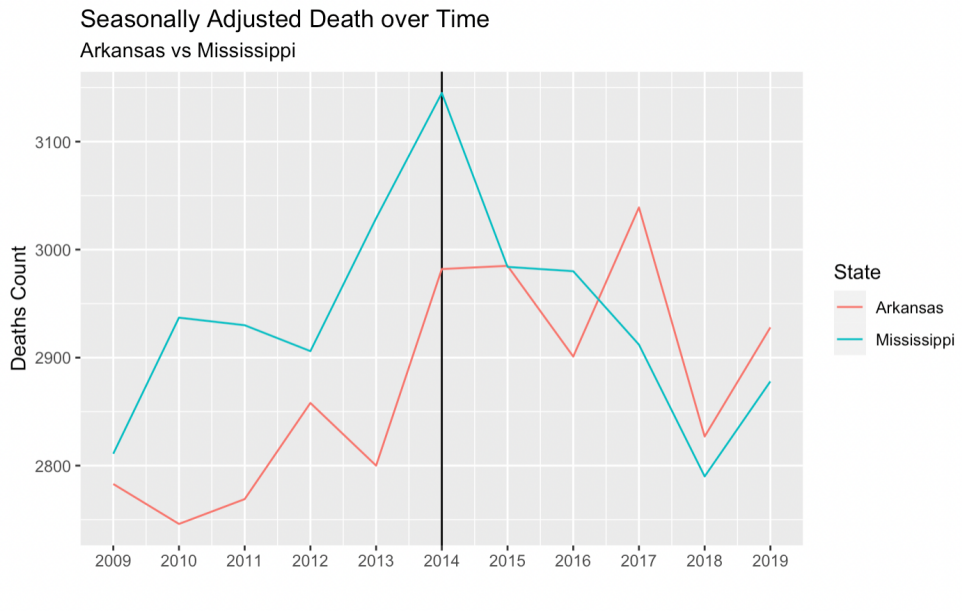
Controls and Assumptions

The biggest difference between the two states is the Black or African American population. Mississippi has nearly double the African American population of Arkansas. This difference is particularly important given that Black populations are the most

economically disadvantaged minority group and have consistently worse healthcare outcomes than their white counterparts. Due to these factors, the Affordable Care Act made a significant impact on healthcare coverage for these individuals (Taylor, 2019). Since monthly data isn't available for this population size it can't be used as a control in the regression. However, as illustrated by the graphic in Appendix Section II the population size has remained relatively constant over time for both states. Meaning that it's safe to exclude it as a variable. The other major difference between the two states is the percentage of the population that's foreign born. Non-US citizens typically don't qualify for Medicaid; most lawfully present immigrants must be US residents for five years before they qualify for healthcare benefits. However there are some exceptions including refugees, asylum seekers and similar populations. (*Health Coverage for Lawfully Present Immigrants*, n.d.) Since these individuals are affected by medicaid expansion, their changes in population could impact the analysis. As displayed in the graphic in Appendix Section III, the population stays relatively constant over time for both states. While there is some volatility in 2015 and 2020, since this represents such a small portion of the population, less than 5%, this variable is unlikely to have a significant impact on the analysis.

Arguably the hardest assumption to meet in a Difference-in-Differences model is the parallel trends assumption. This assumption requires that the trend illustrated in each group before the treatment is parallel and that the trend in the control group remains constant before and after the treatment. The best way to see if the assumption

is met is by visualizing the data (Cunningham, 2021, Ch. 9). Up to the treatment year of 2014 the assumption is met. The death counts are increasing for both states. However, after the treatment year, deaths in Mississippi decreased for the next 4 years while the Arkansas line slope changed signs with each year meaning the assumption is not met. It's worth noting that the graphic displayed is an aggregation of a monthly variable. When displayed monthly, the trends are extremely volatile trends (see Appendix Section VI). Meaning that it's unlikely the parallel trends assumption is met.



In order to bolster the quality of the regression, the model will use two control variables. The first variable is unemployment rate. Over the ten year period of interest, 40-42% of health insurance came through employers (*Health Insurance Coverage of the Total Population*, 2020). So it's reasonable to assume that unemployment does have an impact on healthcare affordability, and therefore access. A graphic illustrating unemployment rates over time is provided in the Appendix Section IV. The other is Supplemental Nutrition Assistance Program usage. SNAP is a federally run program which provides money for low income families to purchase food and move towards self

sufficiency (*Policy Basics: The Supplemental Nutrition Assistance Program (SNAP)*, 2008). Since snap eligibility is income based, similarly to Medicaid, it's a good metric for the size of the qualifying population since food access typically takes precedence over healthcare access, especially for young and healthy individuals. A graph of SNAP usage over time is also available in the Appendix Section V. It's important to test for associations between variables before including them in the analysis in order to prevent bias from multicollinearity. The correlation coefficient is 0.74 indicating a strong positive association. This suggests that only one control variable should be included in the final regression. In the regression both unemployment and SNAP are seasonally adjusted since they both have trends of seasonality. Summary statistics for the variables of interest are displayed in Appendix Section VII.

Results

The results of the analysis are displayed below:

	Dependent variable:				
	Seas_Death				Deaths
	(1)	(2)	(3)	(4)	(5)
Treat	-10.950***	-3.569	-0.306	0.631	0.918
	(2.790)	(3.446)	(3.404)	(3.560)	(4.476)
Time	2.131	16.326***	7.466***	11.132**	12.252**
	(2.671)	(4.815)	(2.765)	(4.917)	(6.182)
UnemployRT		4.226***		1.287	1.680
		(1.204)		(1.427)	(1.794)
Seas_SnpProp			246.923***	216.513***	207.235***
			(49.054)	(59.542)	(74.858)
Treat:Time	10.575***	10.243***	11.709***	11.469***	11.395**
	(3.777)	(3.699)	(3.619)	(3.630)	(4.564)
Constant	243.550***	204.223***	192.557***	186.861***	185.119***
	(1.972)	(11.366)	(10.304)	(12.090)	(15.199)
Observations	264	264	264	264	264
R^2	0.106	0.147	0.186	0.188	0.129
Adjusted R^2	0.096	0.134	0.173	0.173	0.112
Residual Std. Error	15.279 (df = 260)	14.956 (df = 259)	14.610 (df = 259)	14.616 (df = 258)	18.375 (df = 258)
F Statistic	10.287*** (df = 3; 260)	11.133*** (df = 4; 259)	14.772*** (df = 4; 259)	11.971*** (df = 5; 258)	7.646*** (df = 5; 258)
Note:					*p<0.1; **p<0.05; ***p<0.01

The chart describes five different regressions. The first four equations use only seasonally adjusted variables while the fifth equation does not seasonally adjust the outcome variable. The death variable has relatively little seasonality but the comparison between equation 4 and 5 show that seasonally adjusted death provides a model with a higher R^2 so seasonally adjusted death will be the better outcome variable. The first 4 equations provide comparison for the impact of including the control variables. The addition of the variables individually is statistically significant at a 99% confidence level. However, when both variables are included unemployment rate is no longer

statistically significant. With the addition of unemployment rate to the first equation, the R^2 increase by 0.041 while the addition of the SNAP usage increases the R^2 by 0.08. While the highest R^2 is from the equation with both variables, due to the strong correlation between unemployment rate and SNAP usage, plus the higher R^2 contribution from the SNAP usage variable, the best model is equation 3:

$$\widehat{Deaths} = 192.557 - 0.306(Treatment) + 0.466(Time) + 246.923(SnapProportion) + 11.709(Treatment * Time)$$

The treatment coefficient of -0.306 describes the estimated mean difference in death between states before the intervention. Essentially, Arkansas had slightly lower average death counts than Mississippi. The Time coefficient describes the change in death due to the treatment among the control group, meaning the model estimates a slight increase in death counts in Mississippi after 2014. The SNAP Proportion coefficient indicates that for every 10 percentage point increase in SNAP usage the model suggests an increase of 25 deaths. The interaction variable suggests that, on average, approximately 12 more deaths in Arkansas after treatment than before treatment.

Conclusion

Suffice to say that if Medicaid expansion is meant to save lives, an estimated increase in death after policy implementation is not the ideal outcome. While the increase is relatively low at about 11 individuals, it's still 11 lives that may not have

been lost. One potential explanation for this result is that the data counts heart attacks as a death even if the individual survives. With better health coverage, individuals may have been more likely to go to the hospital where they could be revived from a heart attack, or multiple heart attacks, but still be counted as a death in the data where they may not have been elsewhere.

Another of the diseases in the count is septicemia, which is an extreme immune response to an infection or injury (*Sepsis*, n.d.). Studies suggest that as many as 35% of septic shock cases were from hospital acquired infections (HAIs) (Markwart et al., 2020) and at any time, an estimated 1 in 31 inpatients have an infection related to hospital care (Office of Infectious Disease & (OIDP), 2021). So there's the potential that increased hospital access could increase one's risk of contracting an HAI which could lead to sepsis and then death. Additionally, hospitals increase exposure to so called superbugs. Superbugs are viruses, bacteria, parasites, and fungi that are resistant to antibiotics and other standard forms of treatment. This resistance to treatment makes superbugs particularly dangerous, and often deadly (Tosh, 2022). Superbugs such as Carbapenem-resistant Enterobacteriaceae (CRE), Methicillin-resistant *Staphylococcus aureus* (MRSA), and Vancomycin-resistant Enterococcus (VRE) are particularly common in hospitals. An estimated 1 in 7 catheter and surgery related HAIs are from antibiotic resistant bacteria. For long term acute care the number is 1 in 4 (*CDC Newsroom*, 2016). It's plausible to conclude that this small increase in deaths could be from more

patients catching superbugs since hospital stays have become more affordable, and therefore accessible, for millions of individuals.

While there are any number of explanations for these results, it's important to note that there's far more to the story than this paper addresses. Additionally, the R^2 for the final regression is 0.186, indicating that only 18.6% of the trends in death can be explained by the input variables. The Affordable Care Act was a massive change to US healthcare which will require an extensive body of literature to understand proficiently. Simply put, there is more work to be done.

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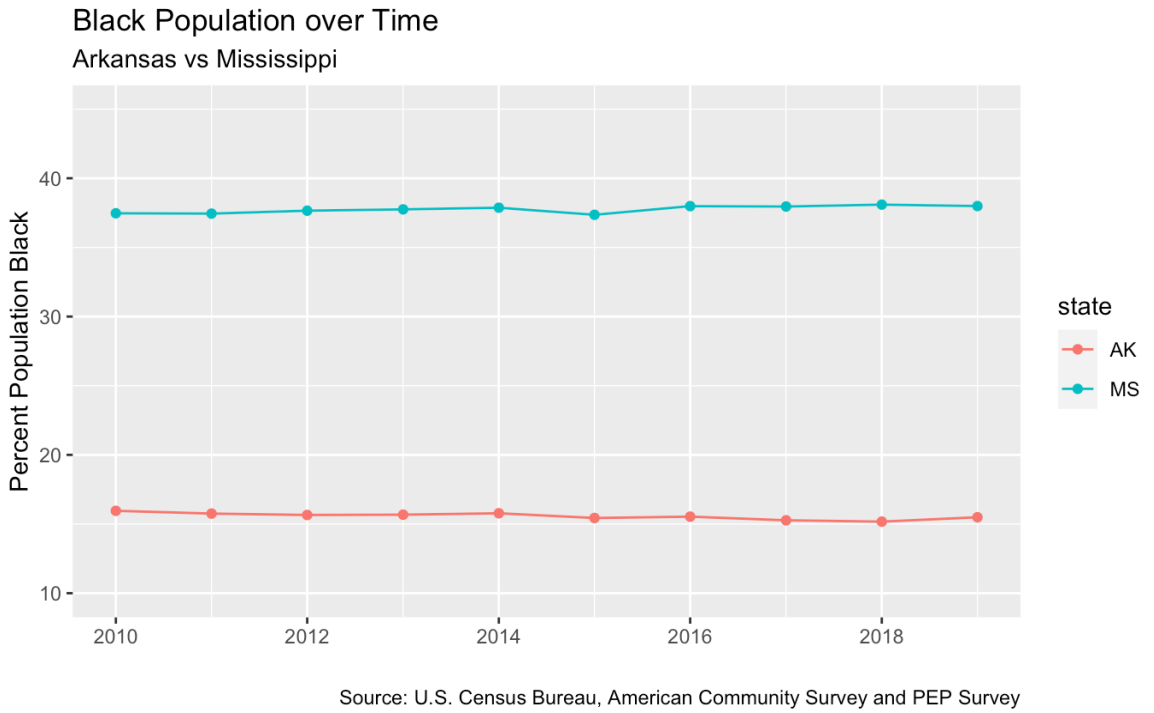
Appendices

Appendix I

	Cause of Death	Counts
1	Bronchus or lung, unspecified - Malignant neoplasms	24287
2	Acute myocardial infarction, unspecified	17347
3	Atherosclerotic heart disease	8539
4	Chronic obstructive pulmonary disease, unspecified	6043
5	Atherosclerotic cardiovascular disease, so described	5828
6	Hypertensive heart disease without (congestive) heart failure	5424
7	Breast, unspecified - Malignant neoplasms	5318
8	Cardiac arrest, unspecified	4332
9	Colon, unspecified - Malignant neoplasms	3013
10	Septicaemia, unspecified	2894

Source: National Center for Health Statistics (Compressed Mortality File 2013)

Appendix II



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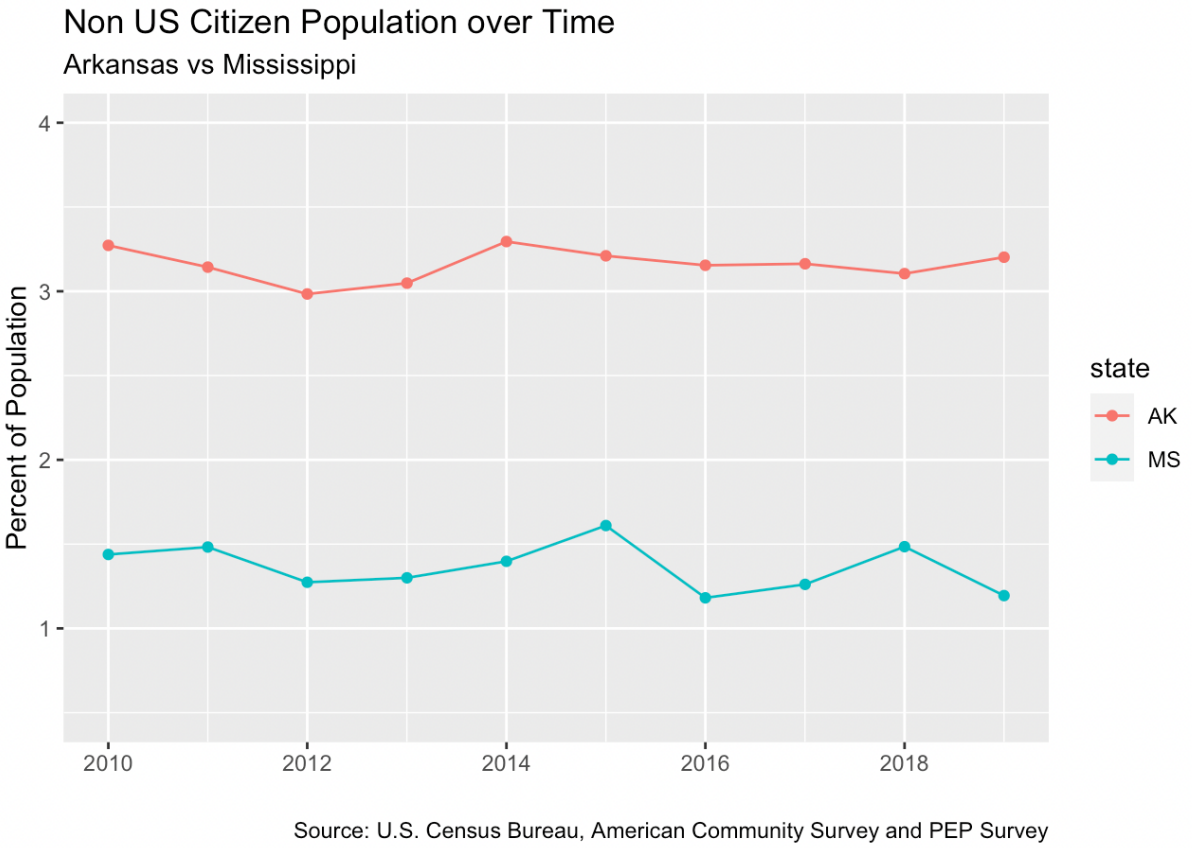
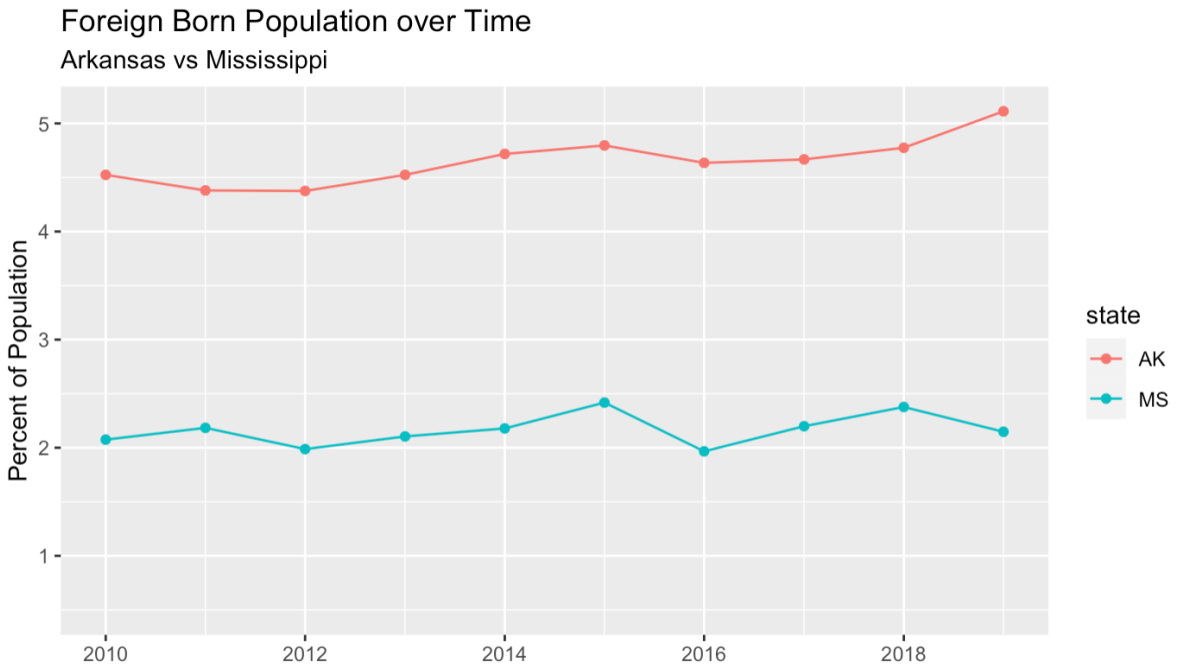
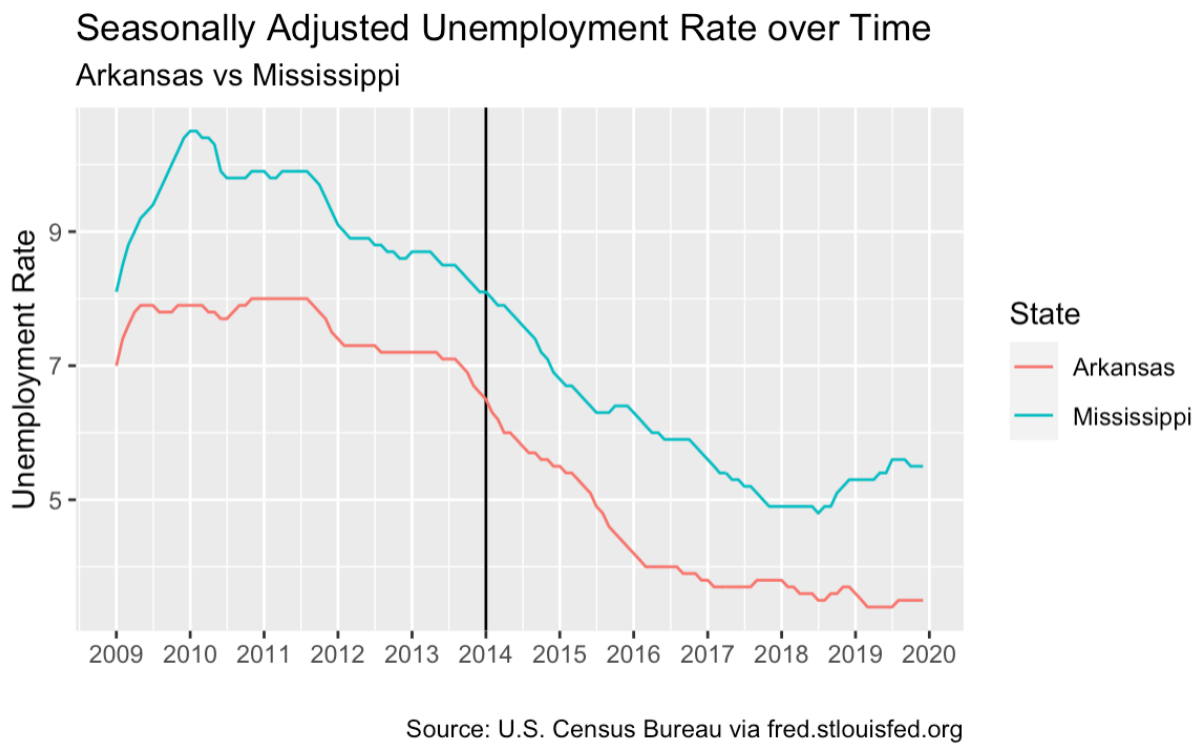


Source: U.S. Census Bureau, American Community Survey and PEP Survey



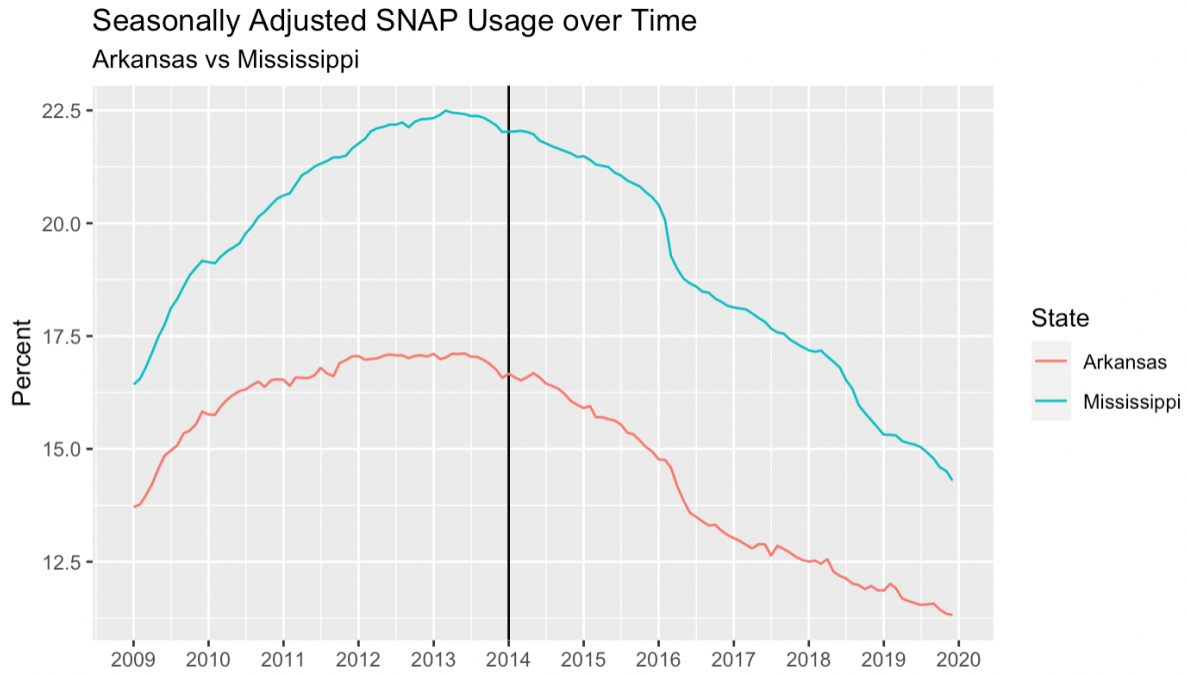
Source: U.S. Census Bureau, American Community Survey and PEP Survey

Appendix IV



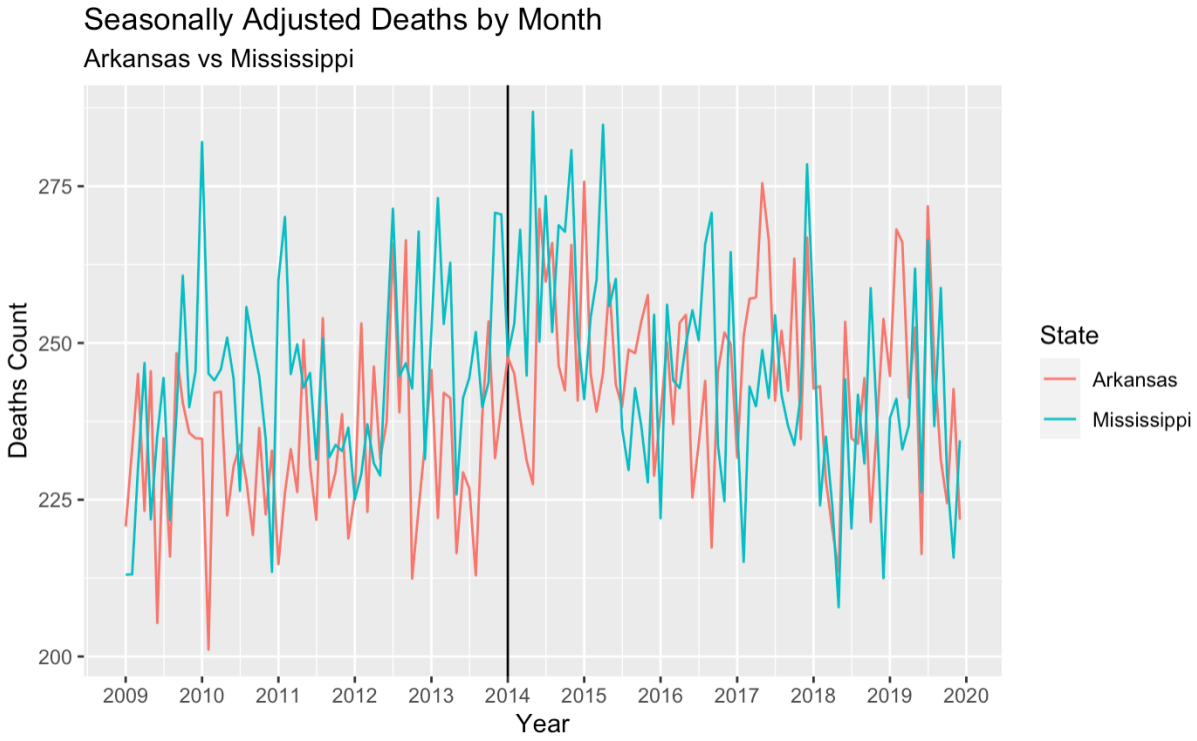
Source: U.S. Census Bureau via fred.stlouisfed.org

Appendix V



Source: U.S. Census Bureau via fred.stlouisfed.org

Appendix VI



Appendix VII

Summary Statistics

Statistic	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
Seas_Death	242.121	16.068	201.105	231.409	241.914	251.791	286.864
UnemployRT	6.622	2.015	3.400	5.075	6.700	8.000	10.500
Seas_SnpProp	0.172	0.032	0.113	0.152	0.169	0.200	0.225