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Medicaid Expansion: The Choice Afforded to States by the Affordable Care Act

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Medicaid Expansion: The Choice Afforded to States by the Affordable Care Act

*Calculating the Economic Difference Medicaid
Expansion May Have Had on an Expansion State
(Kentucky) vs. a Non-Expansion State (Tennessee)*

By Robert Michael Hatfield

University of Kentucky Martin School of Public Policy and
Administration

Spring 2022

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Executive Summary

The issue I studied is the decision states have been afforded to expand Medicaid with the Affordable Care Act (ACA). I was curious to determine the health and economic impact on states that have and have not chosen to expand Medicaid. Specifically, I targeted Kentucky (expansion state) and Tennessee (non-expansion state). Tennessee and Kentucky are similar populations, have similar political inclinations, and are both very rural states. At its core, Medicaid expansion is an opportunity to improve health for lower-income and disabled Americans. However, there are economic implications associated with Medicaid expansion as well. The goal of this research is to determine if there are economic benefits associated with states choosing to expand Medicaid. If so, this is information that needs to be communicated with states that have not chosen to expand. The majority of the data collection for this study is administrative data. The administrative data will show the Medicaid enrollment numbers in each state and how they have changed since the ACA and Medicaid expansion, but it will also show other factors pertaining to individual's well-being in each state such as earnings and employment for all counties in each state on from the period of 2010-2018. Originally, my plan was to use the 20 least earning counties because those counties would be the most likely to be impacted by a Medicaid policy. However, this resulted in what I believe to be bias in my model. Therefore, I reverted back to all counties in each state.

With this data related to total earnings and total employment from all counties in Kentucky and Tennessee I wanted to run a difference-in-differences model with the treatment occurring in 2014 with Kentucky expanding Medicaid at that time and Tennessee remaining in traditional Medicaid. The results of this model after implementing and cleaning / organizing my data were

somewhat surprising to me. I ran two separate xtregs with fixed effects for total earnings¹ and then total employment². With a 95% confidence interval I found the following results:

- xtreg total_earnings interact i.year, fe
 - coef. = -53114.37
 - t = -6.52
 - $p > |t| = 0.000$

- xtreg total_employment interact i.year, fe
 - coef. = -2558.314
 - t = -5.58
 - $p > |t| = 0.000$

This indicates that we can say with a high degree of confidence that there was an impact on total earnings and total employment in 2014. However, the result of that that impact turned out to be negative in Kentucky. This is important information for government officials to understand.

Currently, there are 12 states that have not yet expanded Medicaid. Those states are Alabama, Florida, Georgia, Kansas, Mississippi, North Carolina, South Carolina, South Dakota, Tennessee, Texas, Wisconsin, and Wyoming. Noticeably, these states are predominately conservative states. From its beginning, the Affordable Care Act has been entrenched in politics. Many conservative states have labeled it as Obamacare to establish a negative connotation to this piece of legislation. It is no surprise that the Medicaid expansion provision is any different.

Coincidentally, in 2014, Kentucky had Steve Beshear, a democrat, as its governor. This is what made Medicaid expansion possible in Kentucky. Recently in Kentucky, governor Matt Bevin

¹ Bureau of Economic Analysis. CAINC91 Gross Flow of Earnings, Inflows of Earnings, County. 2022.

² Bureau of Economic Analysis. CAEMP25N Total Full-Time and Part-Time Employment by NAICS Industry, County. 2022.

surmised that Medicaid—and other social benefit programs like it—discourages employment and hurts the economy. This is a widely held belief in the republican party. Governor Bevin campaigned with the idea that he would end Medicaid expansion in Kentucky. After much push back, he resorted to attempting to implement work requirements with an 1115 waiver labeled KY HEALTH. These requirements would ensure that able-bodied Medicaid recipients would have to meet certain thresholds related to hours worked every month in order to retain their Medicaid benefits. The Medicaid program in Kentucky today could look much different if he had the information conducted through this research. However, there are likely numerous other measures that show the benefits to Medicaid expansion, but as it pertains to total employment and earnings in Kentucky and Tennessee counties, there was a negative correlation.

Another reason that states have opted to not expand Medicaid is concern of the cost in their states. This was a widely held concern that it would cost states—and more importantly—individuals in those states a much higher amount to expand Medicaid. However, as it relates to state expense, it is significantly cheaper than traditional Medicaid. For example, in Kentucky the state and federal percentages of cost for traditional and expansion in 2020 are as follows:

- Traditional – 78.02% Federal and 21.98% State
- Expansion – 90% Federal and 10% State

Whereas Tennessee only has traditional Medicaid and their percentage of the cost for 2020 are:

- Traditional – 71.41% Federal and 28.59% State

Overall, their cost is slightly lower than Kentucky's total cost. However, Kentucky covers a much larger portion of their population than Tennessee does. According to Kentucky's Department for Medicaid Services, as of March 2022 Kentucky had 1.6 million people enrolled

in Medicaid³. Whereas Tennessee's Medicaid, TennCare, posted that their state covers 1.5 million individuals⁴. This appears to be very similar enrollment numbers until you see the percentages of individuals in each state that are covered by Medicaid. Kentucky's total population is 4.5 million.⁵ This results in approximately 35% of the total population covered by Medicaid in Kentucky. Additionally, Tennessee has a total population of 6.9 million.³ This results in approximately 22% of the total population covered by Medicaid in Tennessee. Although Kentucky is paying slightly more than Tennessee to fund their Medicaid program, they are covering a much higher percentage of their total population by doing so. This shows how cost-efficient the Medicaid program is in Kentucky.

³ Kentucky Cabinet for Health and Family Services. Department for Medicaid Services – Division of Fiscal Management Medicaid Statistics. <https://chfs.ky.gov/agencies/dms/dafm/Pages/statistics.aspx>. 2022

⁴ Division of TennCare. TennCare Overview. <https://www.tn.gov/tenncare/information-statistics/tenncare-overview.html>. 2022.

⁵ United States Census Bureau. Quick Facts – Kentucky; Florida; Tennessee. 2021.

Issue / Context

Prior to the passage of the ACA, the income levels for Medicaid eligibility were very restrictive and individuals had to meet specific demographic and technical factors including the composition of the household. The coverage was basically limited to very low-income individuals and their children under certain ages as provided in federal legislation and those deprived from parental support. Prior to the passage of the ACA, the maximum income level to get Medicaid coverage could not exceed approximately 30% of the Federal Poverty Level (FPL). Medicaid expansion, made it easier for individuals to qualify for Medicaid coverage. For example, they changed the limit of income from 33% of the Federal Poverty Level (FPL) to 138% FPL. I was curious how Medicaid expansion impacted employment and earnings in expansion states vs non-expansion states. Therefore, I decided to look at the 20 least earning counties in an expansion state (Kentucky) and a non-expansion state (Tennessee).

After the ACA was passed, and signed into law, it was challenged through lawsuits. Ultimately, this lawsuit made it to the U.S. Supreme Court in *National Federation of Independent Business (NFIB) v. Sebelius*. On June 28, 2012, the U.S. Supreme Court made its decision. The U.S. Supreme Court decided that the ACA was, in fact constitutional. However, the Medicaid expansion portion of the ACA was questionable due to its intent to mandate Medicaid expansion for all states. The majority of the Court “found the ACA’s Medicaid expansion unconstitutionally coercive of states because states did not have adequate notice to voluntarily consent to this change in the Medicaid program, and all of a state’s existing federal Medicaid funds potentially were at risk for non-compliance.”⁶ Ultimately, the U.S. Supreme Court

⁶ Kaiser Family Foundation. Focus on Health reform – A Guide to the Supreme Court’s Decision on the ACA’s Medicaid Expansion. August 2012.

decided that it was unconstitutional to mandate Medicaid expansion across all states. Therefore, states were then given the option to decide whether or not to implement Medicaid Expansion.

Financing Medicaid Expansion

States also have the responsibility for the administration of the Medicaid policies and procedures associated with the overall program for their state. States must determine who meets the eligibility criteria and who does not. In addition, states must administer the process for payments to providers who submit claims for reimbursement to the state. One of things that makes the understanding of Medicaid policy so complex and distinct is the joint federal-state nature of the Medicaid program. Since states must share in a percentage of the cost of their Medicaid program, states have the flexibility to set the income thresholds for individuals to be covered by Medicaid. This largely depends on how much funding states have in their budget appropriations to provide their share of matching funds. The federal government's share of most Medicaid expenditures is called the Federal Medical Assistance Percentage (FMAP). FMAP rates have a statutory minimum of 50% and a statutory maximum of 83%. For FY2021, regular FMAP rates range from 50.00% (13 states) to 77.76% (Mississippi)⁷. The percentage of how much funding the federal government provides varies by state. This percentage for each state is calculated each year by an established formula based on the per capita income in individual states. The FMAP formula compares each state's per capita income to the national average. Ultimately, this results in higher federal matching dollars to states with lower per capita income and lower matching dollars to states with higher per capita income. The FMAP formula is:

$$\text{FMAP}_{\text{state}} = 1 - ((\text{Per capita income state})^2 / (\text{Per capita income U.S.})^2 * 0.45)$$

⁷ Congressional Research Service. Medicaid's Federal Medical Assistance Percentage (FMAP). July 29, 2020.

Traditional FMAP and Expansion FMAP are different. Traditional (Tennessee only has traditional) results in a higher burden to the states compared to expansion.

Traditional (Table 1)⁸

Year	FMAP KY	FMAP TN	State Share KY	State Share TN
FY2013	70.55%	66.13%	29.45%	33.87%
FY2014	69.83%	65.29%	30.17%	34.71%
FY2015	69.94%	64.99%	30.06%	35.01%
FY2016	70.32%	65.05%	29.68%	34.95%
FY2017	70.46%	64.96%	29.54%	35.04%
FY2018	71.17%	65.82%	28.83%	34.18%
FY2019	71.67%	65.87%	28.33%	34.13%
FY2020	78.02%	71.41%	21.98%	28.59%

Expansion (Table 2)⁶

Year	FMAP KY	FMAP TN	State Share KY	State Share TN
FY2013	N/A	N/A	N/A	N/A
FY2014	100%	N/A	0%	N/A
FY2015	100%	N/A	0%	N/A
FY2016	100%	N/A	0%	N/A
FY2017	95%	N/A	5%	N/A
FY2018	94%	N/A	6%	N/A
FY2019	93%	N/A	7%	N/A
FY2020	90%	N/A	10%	N/A

⁸ Kaiser Family Foundation. Federal Medical Assistance Percentage (FMAP) for Medicaid and Multiplier. 2022.

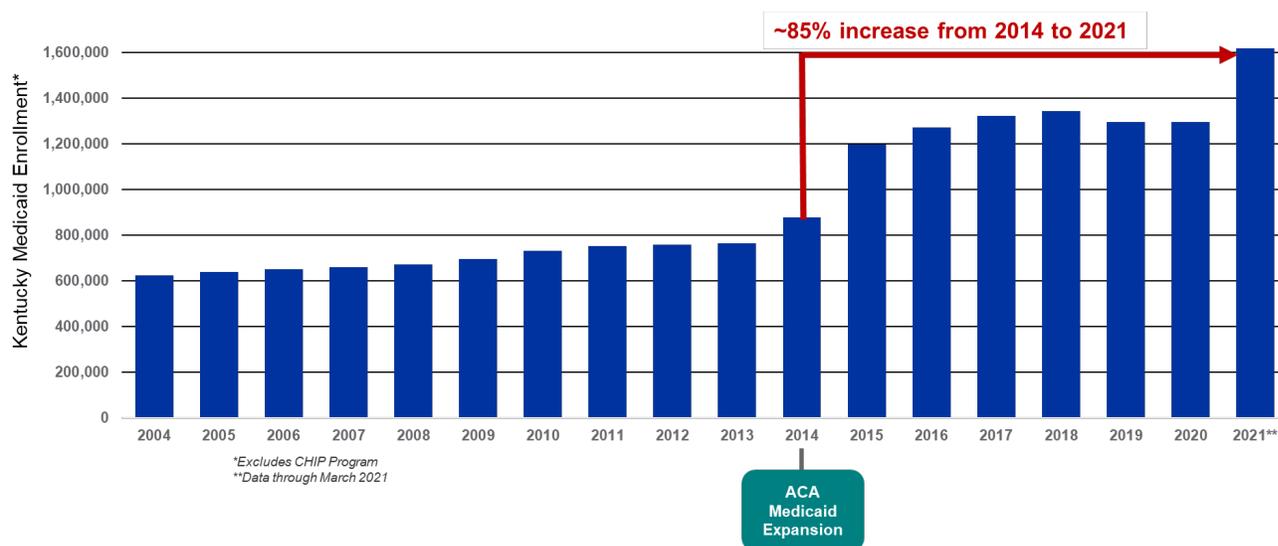
As is evident by the chart above, it is not currently a major financial investment for states to expand Medicaid. It is largely covered by the federal government; specifically, the Center for Medicaid and Medicare Services (CMS). Additionally, there are federally allowable methods to fund the state share (or non-federal share) that refrains from having states use general funds to fund this portion of the cost. I have learned a few of these methods through my professional career at the University of Kentucky (UK HealthCare). Being a non-profit state teaching hospital, UK HealthCare and UofL Health are government entities. This means that they are legally allowed to fund the state share through what is called an intergovernmental transfer (IGT). An IGT is when one level of government transfers funds to another level of government. This ensures that the state of Kentucky remains budget neutral through their expansion of Medicaid. The University of Tennessee hospital (UT Medical Center) is also a non-profit hospital and would be allowed to fund the IGT in Tennessee. However, Vanderbilt University Medical Center is not allowed to fund an IGT because they are a private university. The hospital and the university it is affiliated with, must be a public non-profit, university teaching hospital. Nonetheless, this can be an extremely cost-effective program that leads to a significant increase in individuals who have health insurance.

Medicaid, specifically Medicaid reimbursement for providers, is a complex, incrementally changing, black box to which not many people enjoy exploring. The way that providers are reimbursed is very complex. It is accomplished by an intergovernmental transfer (IGT). In this example of Medicaid dollars, I will use Kentucky's Department for Medicaid Services (DMS). To reimburse providers in Kentucky, CMS will wire funds to DMS through an IGT after DMS has paid the federal match (likely supplied by providers), then DMS will send those funds to the

Managed Care Organizations MCOs the likes of whom have a contract with the commonwealth of Kentucky, followed by MCOs paying the providers. These payments that flow all the way from CMS to providers are known as supplemental payments.

Increase in Medicaid Enrollment: Positive Impact on Uninsured Rates

The number of uninsured people in Kentucky has decreased demonstrably because of the Affordable Care Act (ACA). This is a direct result of the ACA expanding Medicaid from approximately 30% of the federal poverty level to 138%. This is a monumental leap and has directly correlated to the significant increase in Medicaid enrollment numbers. Prior to the ACA, only 607,000 Kentuckians were enrolled in Medicaid. Now, there are more than 1.6 million⁹; which is approximately 36% of Kentucky's total population. This has resulted in the Medicaid program having a prominent seat at the table where federal and state health policy decisions are made. (Figure 1)¹⁰.



⁹ Cabinet for Health and Family Services – Department for Medicaid Services. Monthly Membership Counts by County. March 2, 2021.

¹⁰ Cabinet for Health and Family Services – Department for Medicaid Services. 2022

Noted above, you can see that the Medicaid enrollment numbers have doubled in Kentucky since their decision to expand Medicaid. This has resulted in an additional 800,000+ individuals receiving coverage for certain health services. If it is determined that there has not been a tremendous health and economic impact in Kentucky since they expanded Medicaid in 2014, then I am quite confident there will be in the next 10 years.

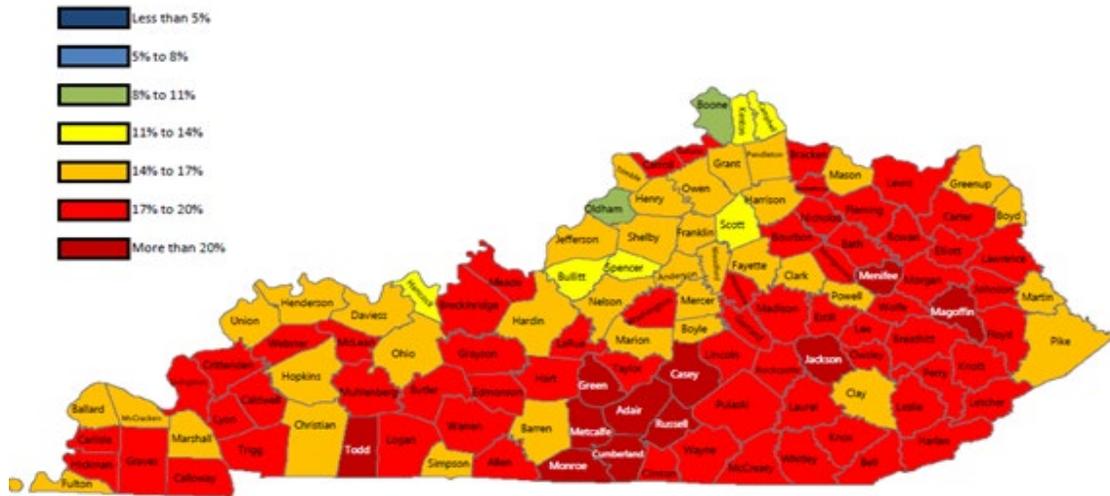
In Kentucky, 29 out of 120 counties have over 50%¹¹ of their population enrolled in Medicaid.¹² Of those 29 counties, 10 are over 70%. In total, approximately one in every three Kentuckians are enrolled in Medicaid. All 29 of these counties with greater than 50% Medicaid are located in south-eastern Kentucky. Prior to the ACA, this region of Kentucky had some of the highest uninsured rates in the nation. As you can imagine, they are now covered at a significantly higher rate. Additionally, the uninsured rates in Kentucky improved significantly with the decision to expand Medicaid. The counties in Kentucky that had the highest uninsured rates prior to Medicaid expansion, all of a sudden were the counties with the lowest uninsured rates as is depicted in the figures below from the Kentucky Equal Justice Center.(Figure 2 and Figure 3)¹³

¹¹ Kentucky Cabinet for Health and Family Services. Department for Medicaid Services Monthly Membership by County. November 2020.

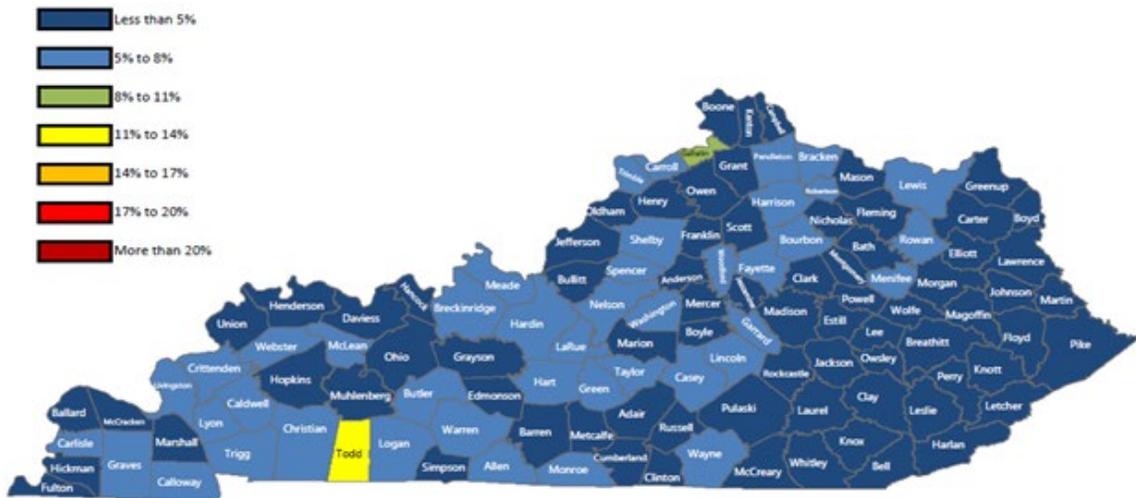
¹² United States Census Bureau. Kentucky Population Topped 4.5 Million in 2020. August 2021.

¹³ Kentucky Equal Justice Center. New Baseline Report Shows Kentucky's Gains Under ACA, Medicaid Expansion. 2019.

Percentage of the Population Under 65 that was Uninsured Prior to ACA
 [2012 Small Area Health Insurance Estimates]



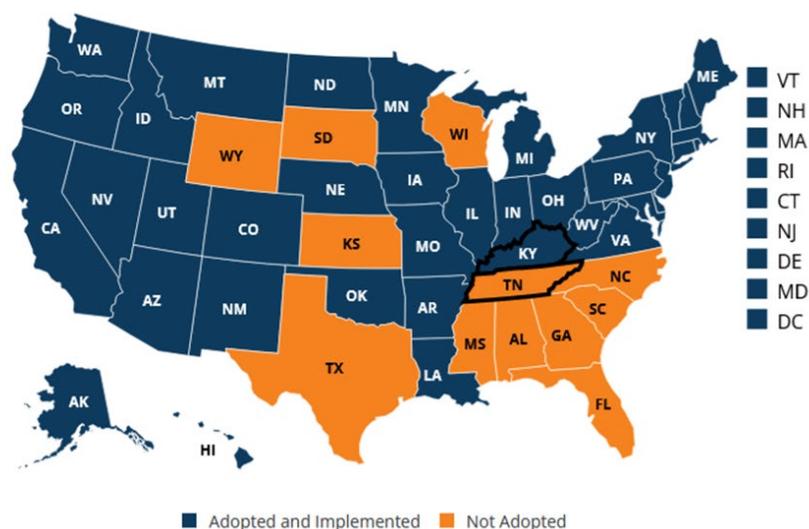
Potential Percentage of the Population Under 65 that is Uninsured
 [Assumes 75% of New Enrollees previously uninsured / KHBE 8-19-2015 Enrollment / Medicaid 2013 VS JAN - JUN 2015]



Why not expand Medicaid?

For every reason I have stated above that supports Medicaid expansion yielding positive results in Kentucky, there are equal number of reasons for states to decide that expanding Medicaid is not the best decision for their state. The first, and likely most common, reason that states chose

not to expand Medicaid is due to politics. To date, all but twelve states have implemented Medicaid expansion. Those that have not are Alabama, Florida, Georgia, Kansas, Mississippi, North Carolina, South Carolina, South Dakota, Tennessee, Texas, Wisconsin, and Wyoming (Figure 4)¹⁴.



Typically, these twelve states tend to be conservative states. In the early stages of the Affordable Care Act, and ultimately Medicaid expansion, people refused because it was labeled as “Obamacare”. Additionally, Medicaid—due to its longstanding stigma—was largely viewed as a welfare program by many throughout the country. Although the nonfederal share, or the state match, to fund the Medicaid programs in each state were heavily dependent on the federal government as opposed to states, there was still genuine concern amongst states that these match rates would eventually shift to be close to traditional Medicaid rates. That would result in a large increase in state spending due to the significant increase of Medicaid enrollees with expansion.

¹⁴ Kaiser Family Foundation. Status of State Medicaid Expansion Decisions: Interactive Map. 2022.

This was worrisome to certain states regardless of politics. These three factors resulted in Medicaid expansion being a non-starter for many states.

If there is a definitive social benefit to expanding Medicaid in relation to earnings and employment, then that should be conveyed to the states who have not yet expanded and encourage them to do so. However, if states have had no impact, or even a negative impact, then they need to know they have a problem so that they can begin searching for a solution. This information is such that any governmental leader will need to so that they can make an informed decision for their state. This is the job that is required of a policy analyst to present data in an informative way, so that the governmental leaders such as governors, health secretaries, legislators, etc. can have the information they need to make sound decisions. Specifically, when these decisions have as great an impact on vulnerable populations that Medicaid policy does.

Problem Statement

Has Medicaid expansion provided a social benefit in the categories of total earnings and total employment to states who have chosen to expand? I plan to study the economic impact that Medicaid expansion has had on total employment and total earnings in every county in each state. This is necessary information for a leader in state government such as the Governor or Health Secretary to do their job to the best of their ability. Especially if they are searching for a policy that would improve these two categories.

Hypothesis

I believe that states who have chosen to expand Medicaid, will have had a positive impact for their citizens (i.e. greater earnings and employment) than states who have not expanded Medicaid. If there is a break point in 2014, where Kentucky improves, then that is information that Tennessee and other states who have not expanded Medicaid need to know as they decide to expand or not expand. The null hypothesis would be that there was no impact in the areas of total earnings and total employment.

Research Design

I studied the effects that Medicaid expansion has had on each state's total employment, and total earnings at the county-level for all counties in each state. The two different periods of time will be prior to Kentucky's decision to expand Medicaid and following Kentucky's decision to expand Medicaid. Note that the Affordable Care Act was the impetus for expanding Medicaid, but the timing of its passage will have no impact because Kentucky did not immediately expand Medicaid, so they remained aligned with Tennessee until the expansion actually occurred in 2014. After this study, I will hopefully be able to determine the impact that the decision to expand Medicaid had on Kentucky as well as the decision to not expand Medicaid in Tennessee and compare the outcomes. Originally, my plan was to observe the 20 least earning counties in each state. I thought that this method would better focus on a Medicaid population. However, I determined that what I believed to be an endogeneity error in selecting those counties. I believe that I unintentionally implemented bias by selecting certain data. Therefore, I decided that it would be better to observe all counties in each state.

Research Results

Economic impact:

The results of this model after implementing and cleaning / organizing my data were somewhat surprising to me. I ran two separate xtregs with fixed effects for total earnings and then total employment. With a 95% confidence interval I found the following results:

- xtreg total_earnings interact i.year, fe
 - coef. = -53114.37
 - t = -6.52
 - $p > |t| = 0.000$

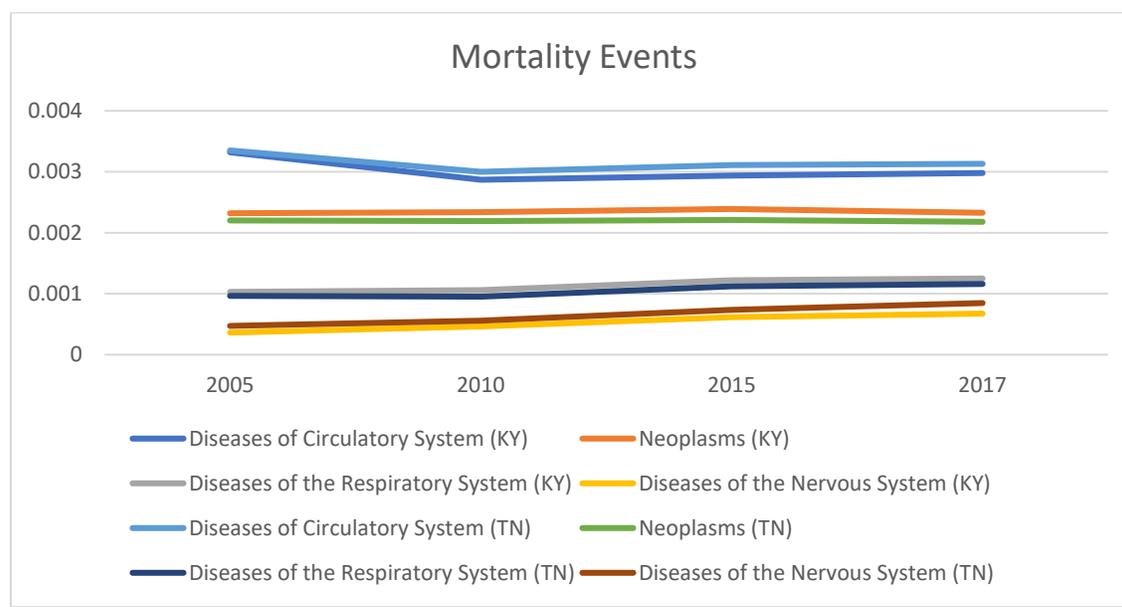
- xtreg total_employment interact i.year, fe
 - coef. = -2558.314
 - t = -5.58
 - $p > |t| = 0.000$

As previously mentioned, this indicates that we can say with a high degree of confidence that there was an impact on total earnings and total employment in 2014. Ultimately, we would reject the null hypothesis as well. Additionally, the result of that impact turned out to be negative in Kentucky. It appears as though since 2014, Kentucky has performed much worse in comparison to Tennessee in relation to total earnings and total employment. Admittedly, I was surprised to find that this was the result of my study. My hypothesis was that more individuals would seek and receive employment in Kentucky because they could now make 138% of the federal poverty level and still qualify for Medicaid coverage. I anticipated that this would lead to many Kentuckians who were at the cutoff to qualify for Medicaid expansion that felt as though they could not have any higher income to seek more earnings or additional employment prior to 2014. This would be similar to an individual declining a raise at work because it would barely qualify them for the next tax bracket and ultimately, they would lose money. Likewise it would

be similar to the Saez study of 2010 on the Earned Income Tax Credit (EITC) that showed individuals bunch at the point just prior to losing their benefit. However, that did not seem to be the case for Kentucky and Tennessee related to Medicaid expansion's impact on total earnings and total employment.

Health impact:

Although this project is an economic study, I wanted to be sure to include a brief mention related to health information as well since this is, in fact, a health policy. Included in the table below, I have graphed some information from the CDC. As is evident in the graph, there has not yet been a substantial change in mortality since 2014 in the areas of circulatory disease, respiratory disease, neoplasms, or nervous system disease (Figure 5)¹⁵.



¹⁵ Data Commons Timelines. Mortality Events. CDC 2017.

Research Limitations / Potential Room for Improvement

In any research study there will be limitations or areas that could be improved. Specifically, with a capstone the scope is often more limited than other more exhaustive studies. For example, if given more time I would have liked to include additional variables and look at more than just Kentucky and Tennessee. If we could replicate this across the country, I would feel much more confident in claiming that there is a negative correlation to Medicaid expansion and total earnings and total employment. With this study, I can only say that there was a negative correlation in Kentucky as opposed to Tennessee. With a more exhaustive study, you could opine on the entirety of Medicaid expansion. Additionally, there is always the possibility that other factors have occurred in Tennessee to cause this growth or other factors that led to Kentucky not performing as well in these two categories.

Conclusion / Recommendation

Prior to running the research model, I would have told you that Medicaid expansion is a decision that every state needs to make. Expanding Medicaid is a decision that provides healthcare coverage to the most vulnerable populations in the country. In my opinion, this inevitably expands access to countless individuals. I understand that the Affordable Care Act was highly politicized by republicans due to the fact that it was signed into law by President Barack Obama. However, the Medicaid expansion provision could be argued that it is a policy in favor of conservatives. It was not Medicare for all, but rather, an olive branch to the working poor that could not receive commercial insurance through their employer or could not afford coverage.

Additionally, Medicaid expansion is fiscally responsible—specifically in Kentucky—as the cost is largely the burden of the federal government to bare. The state share is also divvied amongst state entity healthcare providers such as UK HealthCare and UofL Health through an IGT. This ensures that the state's budget is not impacted in a negative way. I concede that this study shows that there has been a negative impact on total earnings and total employment in Kentucky as opposed to Tennessee. Additionally, I understand that many republicans would use this information as ammunition against Medicaid expansion and claim that it discourages people from seeking employment. Able-bodied adults not seeking employment is an issue that needs to be addressed, and republicans can use this study in an attempt to eliminate Medicaid expansion as a way of solving this issue. However, Medicaid expansion has provided access to healthcare to countless individuals throughout the country. This model would need to be replicated throughout the country before there would be sufficient evidence to eliminate Medicaid expansion. Additionally, there would need to be a cost-benefit analysis done to evaluate the true impact that eliminating access to healthcare to that many Kentuckians. Originally, it would save

the state money, but I would surmise that in the long run, this would prove to be more costly to Kentucky and cost many Kentuckians their lives. Medicaid expansion is a vital part of so many lives in Kentucky and throughout the country. In my opinion, the fact that it has had a negative impact on earnings and employment in Kentucky in relation to Tennessee does not matter as much to me as providing access to healthcare to so many Kentuckians. Ultimately, I would still argue that Medicaid expansion provides a much greater benefit to society than not choosing to not expand. However, the results of this study should not be ignored.

Acknowledgements

I would like to thank Dr. Bill Hoyt for his guidance throughout this process. Navigating a capstone project is never easy, but his advice kept me on the right track. Additionally, I would like to thank my boss and mentor Mark Birdwhistell for imparting his Medicaid wisdom over the years. As a former Martin School graduate, he was the one who encouraged me to consider getting an MPA degree from the University of Kentucky. Lastly, I would like to thank all my professors at the Martin School for their instruction and wisdom throughout this program.

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August 2021.

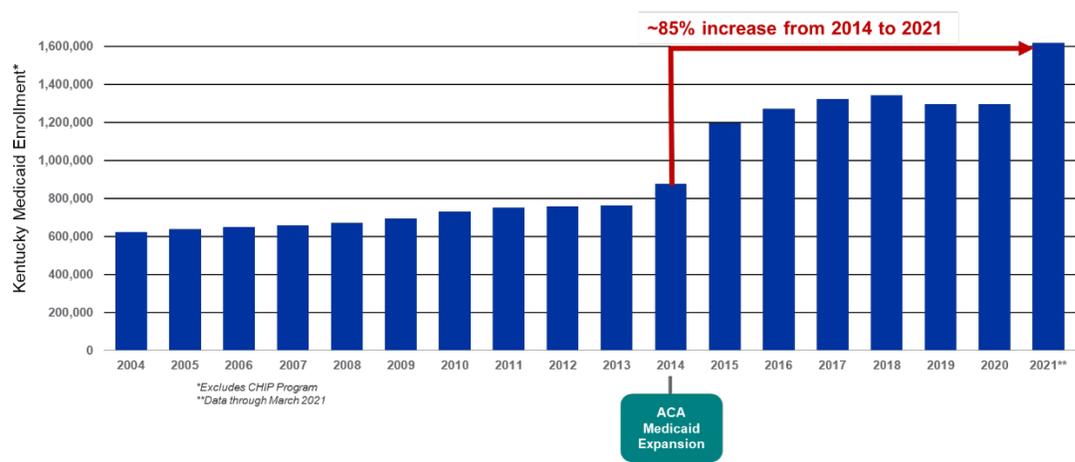
Data Commons Timelines. Mortality Events. CDC 2017.

Appendix**Tables:**

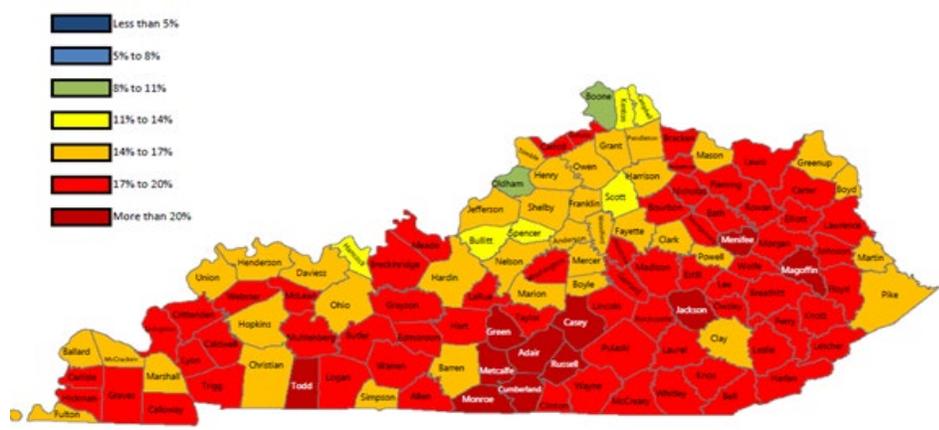
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FY2015	69.94%	64.99%	30.06%	35.01%
FY2016	70.32%	65.05%	29.68%	34.95%
FY2017	70.46%	64.96%	29.54%	35.04%
FY2018	71.17%	65.82%	28.83%	34.18%
FY2019	71.67%	65.87%	28.33%	34.13%
FY2020	78.02%	71.41%	21.98%	28.59%

Year	FMAP KY	FMAP TN	State Share KY	State Share TN
FY2013	N/A	N/A	N/A	N/A
FY2014	100%	N/A	0%	N/A
FY2015	100%	N/A	0%	N/A
FY2016	100%	N/A	0%	N/A
FY2017	95%	N/A	5%	N/A
FY2018	94%	N/A	6%	N/A
FY2019	93%	N/A	7%	N/A
FY2020	90%	N/A	10%	N/A

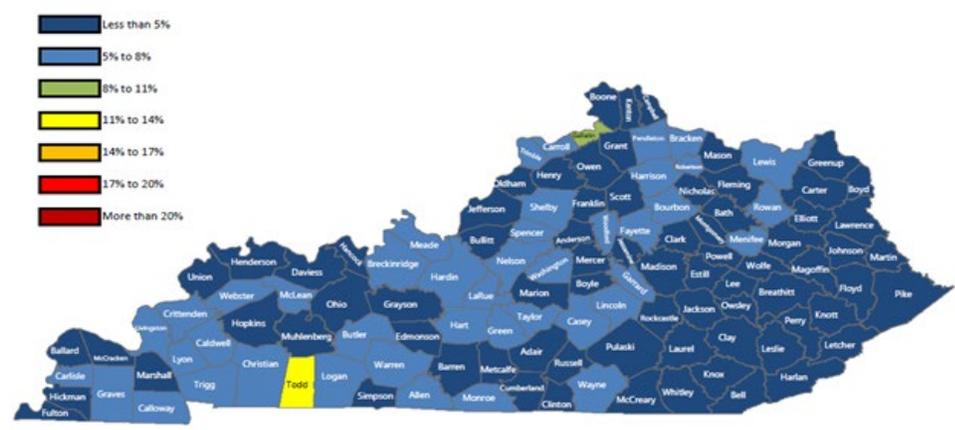
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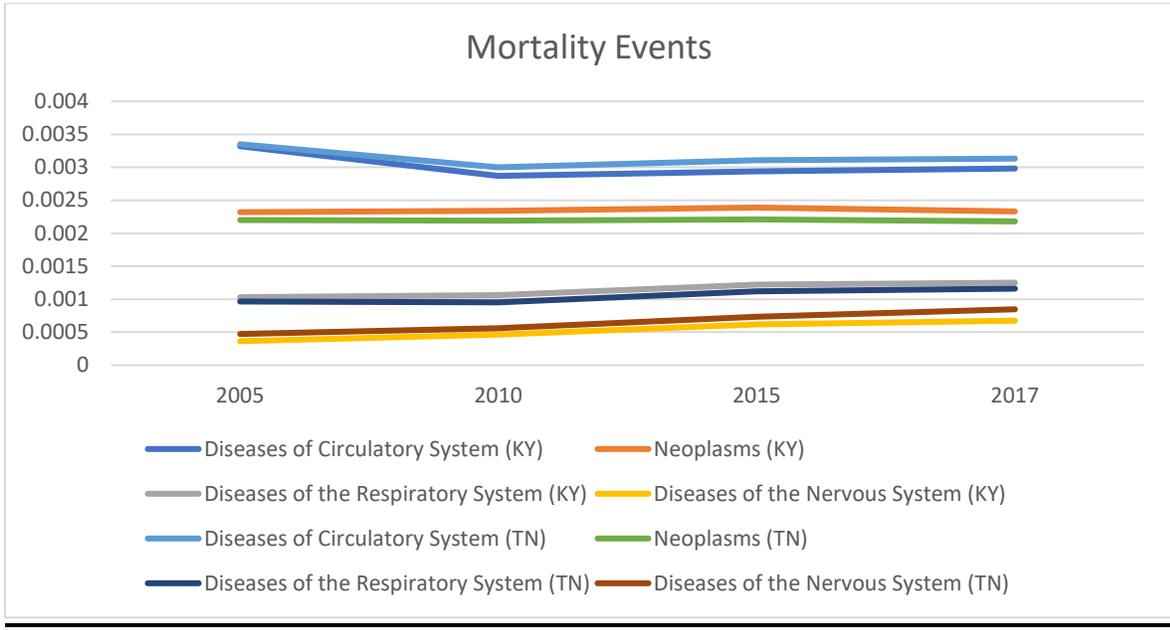
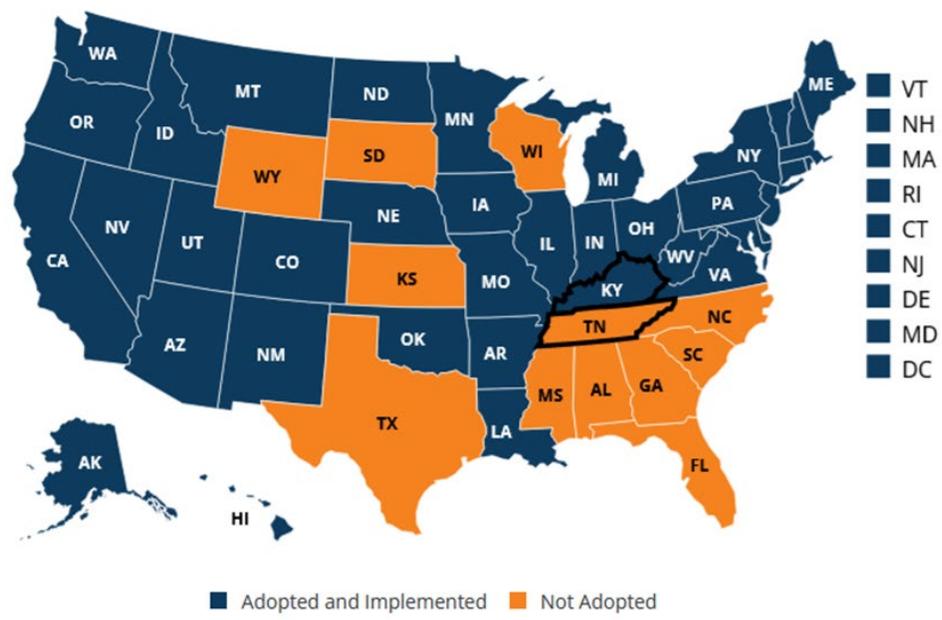


Percentage of the Population Under 65 that was Uninsured Prior to ACA
[2012 Small Area Health Insurance Estimates]



Potential Percentage of the Population Under 65 that is Uninsured
[Assumes 75% of New Enrollees previously uninsured / KHBE 8-19-2015 Enrollment / Medicaid 2013 VS JAN - JUN 2015]





Research Results:

```
. xtreg total_earnings interact i.year, fe
```

```
Fixed-effects (within) regression      Number of obs   =    1,935
Group variable: county_state         Number of groups =     215
```

```
R-sq:                                Obs per group:
  within = 0.1882                      min =          9
  between = 0.0287                     avg =         9.0
  overall = 0.0134                      max =          9
```

```
corr(u_i, Xb) = 0.0506                 F(9,1711)      =    44.07
                                          Prob > F       =    0.0000
```

total_earnings	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
interact	-53114.37	8146.292	-6.52	0.000	-69092.11	-37136.63
year						
2011	19073.8	8528.696	2.24	0.025	2346.024	35801.57
2012	39036.61	8528.696	4.58	0.000	22308.84	55764.38
2013	40881.33	8528.696	4.79	0.000	24153.56	57609.11
2014	83509.6	9664.976	8.64	0.000	64553.19	102466
2015	101897.3	9664.976	10.54	0.000	82940.86	120853.7
2016	117715.2	9664.976	12.18	0.000	98758.76	136671.6
2017	133159.2	9664.976	13.78	0.000	114202.7	152115.6
2018	152330.1	9664.976	15.76	0.000	133373.7	171286.5
_cons	315964	6030.699	52.39	0.000	304135.7	327792.3

```
. xtreg total_employment interact i.year, fe
```

```
Fixed-effects (within) regression
Group variable: county_stamd
```

```
Number of obs   =    1,935
Number of groups =     215
```

```
R-sq:
```

```
  within = 0.0813
  between = 0.0159
  overall = 0.0053
```

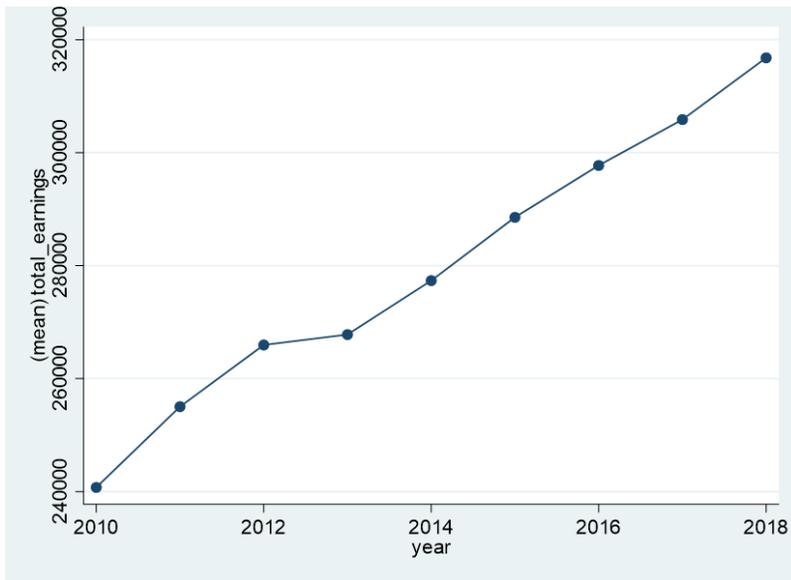
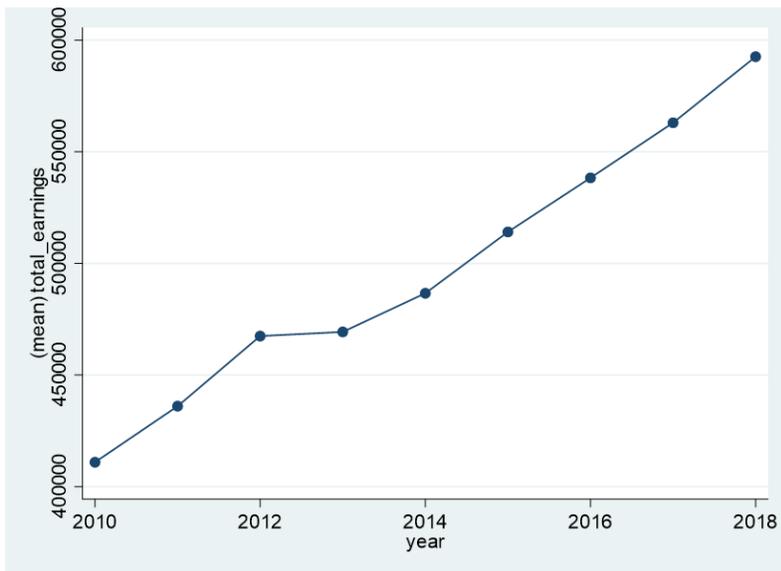
```
Obs per group:
```

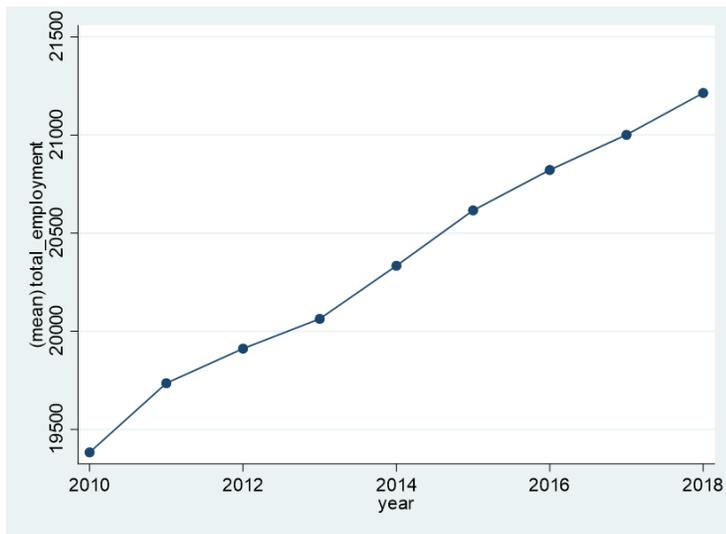
```
   min =     9
   avg =    9.0
   max =     9
```

```
corr(u_i, Xb) = 0.0530
```

```
F(9,1711)       =    16.83
Prob > F        =    0.0000
```

total_empt	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
interact	-2558.314	458.1252	-5.58	0.000	-3456.858	-1659.769
year						
2011	537.293	479.6306	1.12	0.263	-403.4312	1478.017
2012	850.386	479.6306	1.77	0.076	-90.33817	1791.11
2013	1183.567	479.6306	2.47	0.014	242.8432	2124.292
2014	3151.984	543.5319	5.80	0.000	2085.927	4218.042
2015	3714.859	543.5319	6.83	0.000	2648.802	4780.916
2016	4259.464	543.5319	7.84	0.000	3193.407	5325.521
2017	4740.571	543.5319	8.72	0.000	3674.513	5806.628
2018	5261.533	543.5319	9.68	0.000	4195.476	6327.59
_cons	27170.81	339.1501	80.11	0.000	26505.62	27836.01

KY Earnings*TN Earnings*

KY Employment*TN Employment*