State Level Analysis

4/7/2021

Initial Set-Up and (Some) EDA.

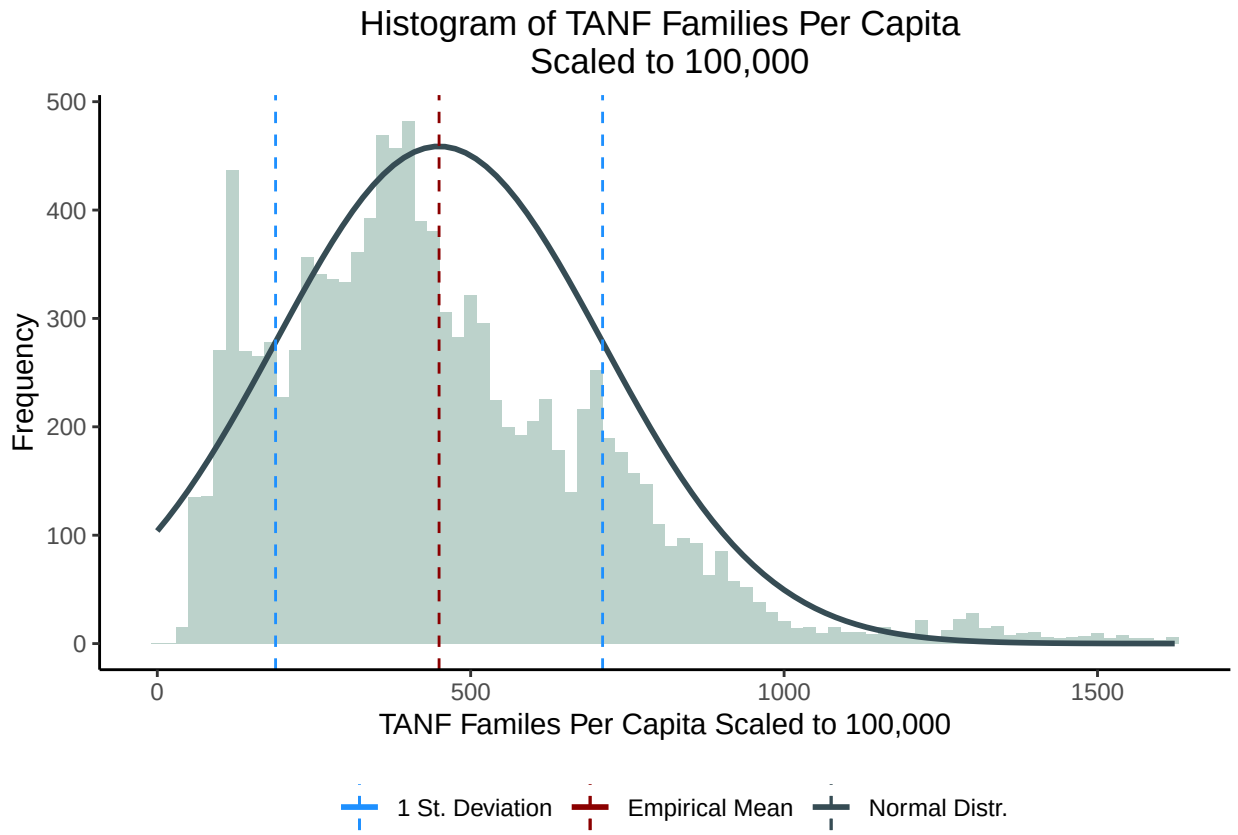
The compiled data consists of 11,628 observations and 11 variables. Refer to Appendix I for definitions of all variables. The year range within the data is 2001 to 2019, inclusive.

The number of households on TANF is scaled by state population and multiplied by a constant of 100,000 to yield the number of households on TANF per 100,000 state residents. This is the outcome variable of interest for the study.

The number of families below the federal poverty line is similarly scaled by state population and multiplied by a constant of 100,000 to yield the number of households below the federal poverty line per 100,000 state residents.

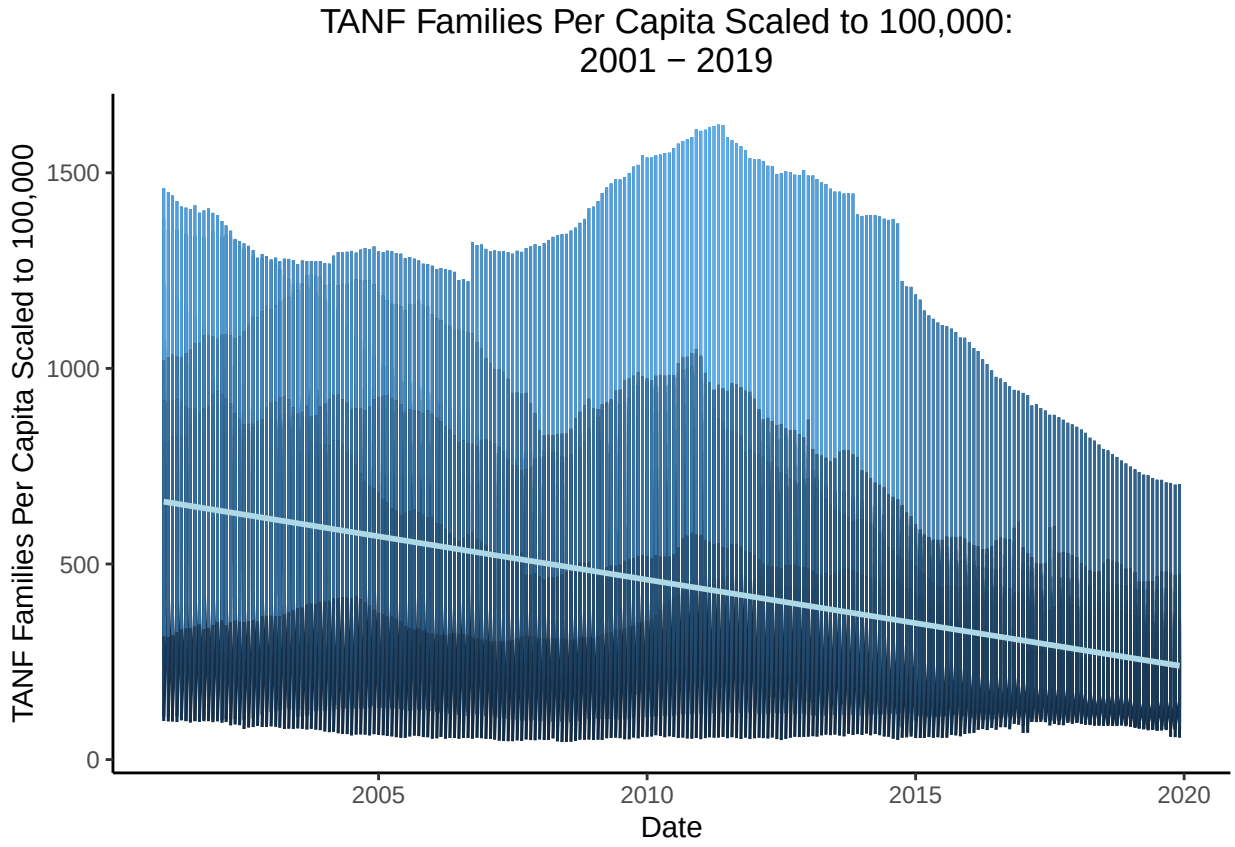
There are 3 missing "NA" observations within the data. These pertain to Delaware with dates of 10/2015, 11/2015, and 12/2015 and are omitted from the data set. There are 5 observations where households on TANF are reported as 0: Idaho with dates of 11/2009 and 12/2009, and Missouri with dates of 1/2006, 2/2006, and 3/2006. These are identified as missing values in the raw data, and are omitted from the data set. The observations pertaining to Washington, D.C. are identified as high-range outliers and are omitted. Subsequent to omissions, the data consists of 11,392 rows.

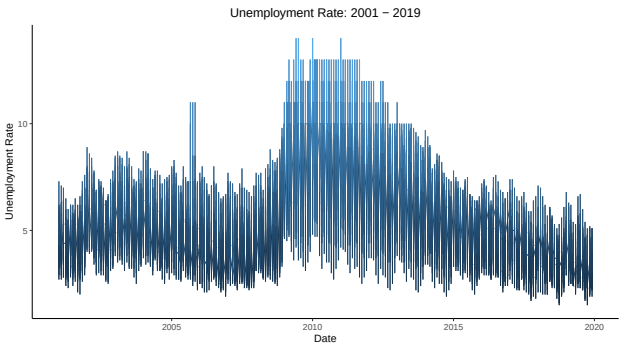
Distribution of Outcome Variable of Interest:

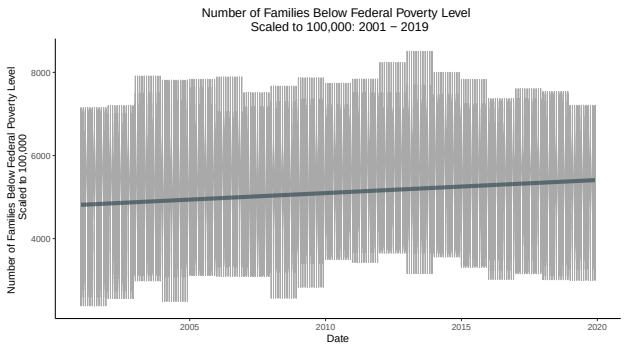


The distribution of the outcome variable of interest is presented above. The number of households on TANF by state is a discrete count variable, but approximate Normality is assumed under sufficient number of observations. The data is skewed right.

Two control variables are included within the data: state unemployment rate and the number of households below the federal poverty line per 100,000 state residents.

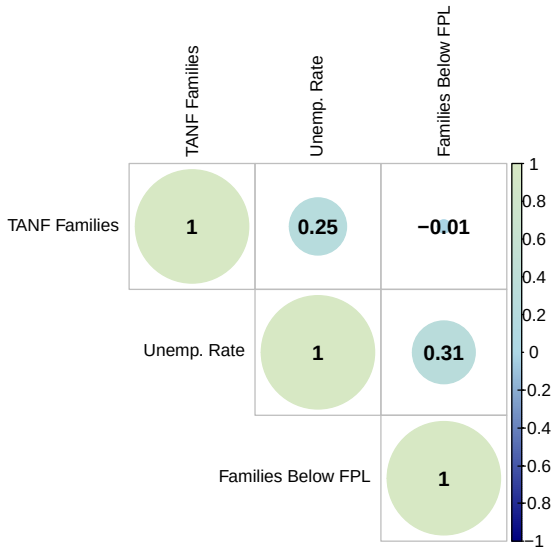






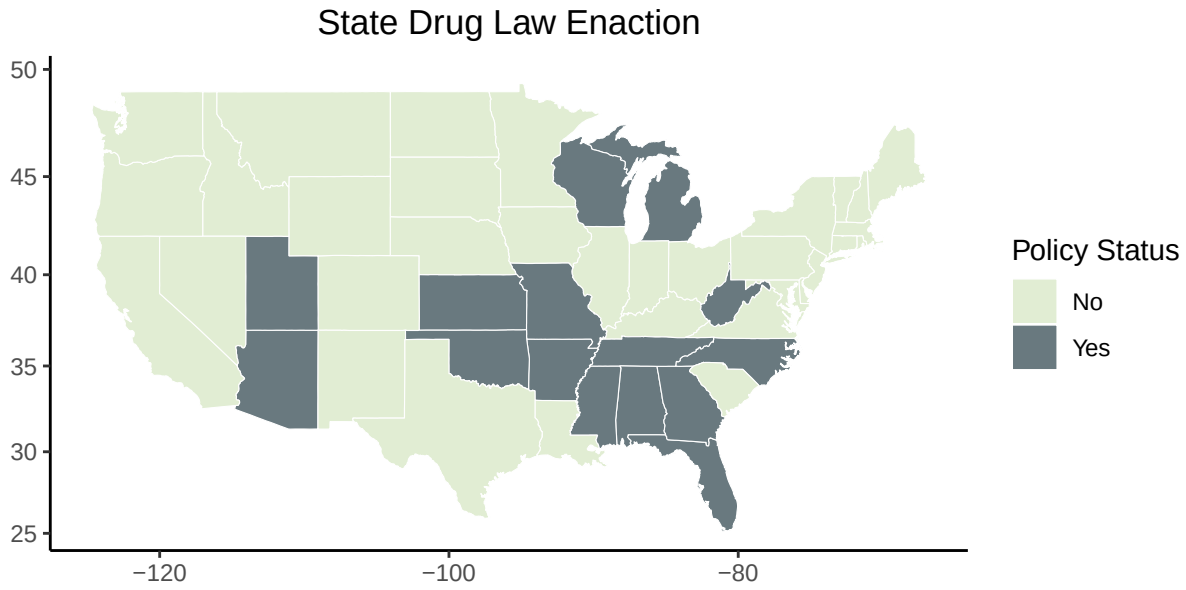
The unemployment rate across all states displays varying time trends, emphasized by a significant increase in unemployment rate under the Great Recession. The number of households below the federal poverty line per 100,000 state residents does not display a significant linear trend across the included states.

To further define potential relationships within the data, a correlation heatmap is generated.



The correlation heatmap indicates that no issues of multicollinearity are present within the data: a general criterion for the presence of multicollinearity is an absolute correlation coefficient greater than 0.70 among two or more feature variables. A modest positive correlation of 0.25 is observed between the number of households on TANF per 100,000 state residents and the number of households below the federal poverty line per 100,000 state residents. The correlation between the number of households on TANF per 100,000 state residents and unemployment rate is -0.01, indicating that unemployment rate likely does not contribute significant information for the prediction of the number of households on TANF per 100,000 state residents.

Identification of Policy States.

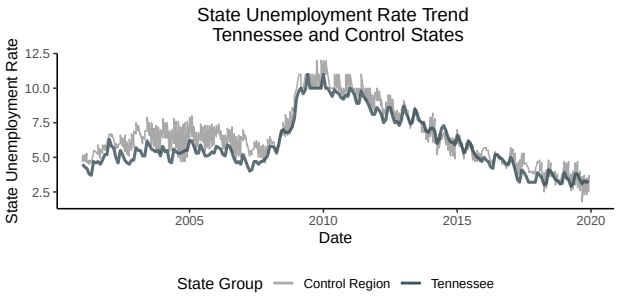


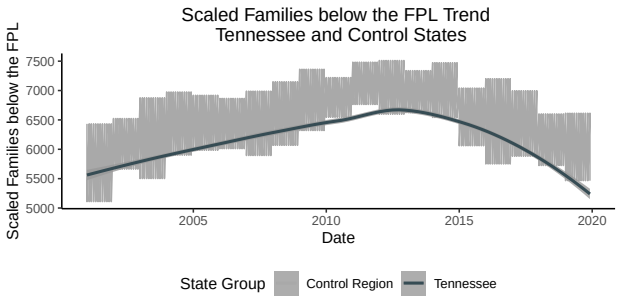
State Level Analysis.

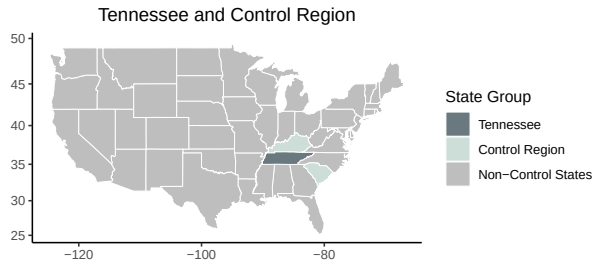
Case: Tennessee.

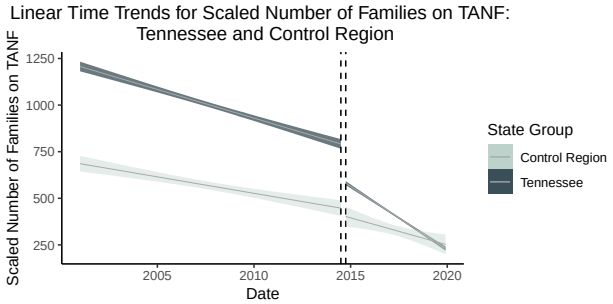
Policy Date: 07/2014.

Control Region: Kentucky, South Carolina.







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##
## <table style="text-align:center"><caption><strong>Table 2 (A). Policy Regression for Tennessee.</str
## <tr><td colspan="2" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## <tr><td style="text-align:left"></td><td>Basic</td></tr>
## <tr><td colspan="2" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## <tr><td style="text-align:left"></td><td>(9.2148)</td></tr>
## <tr><td style="text-align:left">Number Below Federal Poverty Level (per 100,000)</td><td>0.0117</td>
## <tr><td style="text-align:left"></td><td>(0.0162)</td></tr>
## <tr><td style="text-align:left">Unemployment Rate (in %)</td><td>-15.0213<sup>***</sup></td></tr>
## <tr><td style="text-align:left"></td><td>(3.0013)</td></tr>
## <tr><td style="text-align:left">N</td><td>684</td></tr>
## <tr><td style="text-align:left">R<sup>2</sup></td><td>0.9708</td></tr>
## <tr><td style="text-align:left">Adjusted R<sup>2</sup></td><td>0.9698</td></tr>
## <tr><td colspan="2" style="border-bottom: 1px solid black"></td></tr><tr><td colspan="2" style="text
## <tr><td colspan="2" style="text-align:left"><sup>&sstarf;&sstarf;&sstarf;</sup>p<0.01; <sup>&sstarf;
## <tr><td colspan="2" style="text-align:left">TANF rate scaled to 100,000 inhabitants.</td></tr>
## </table>
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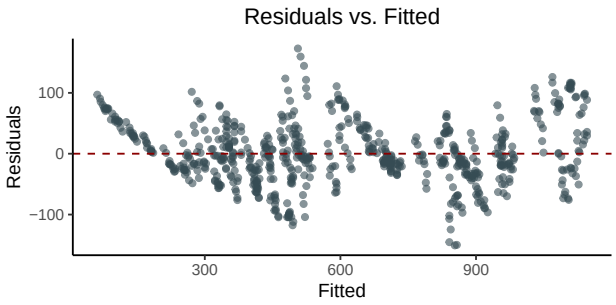
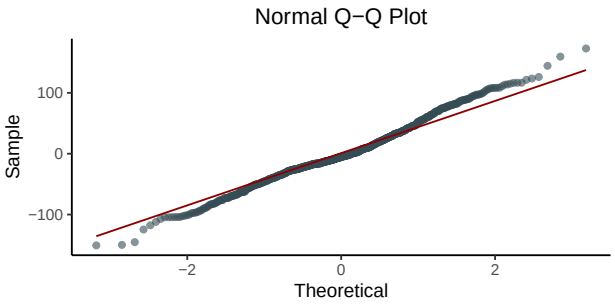
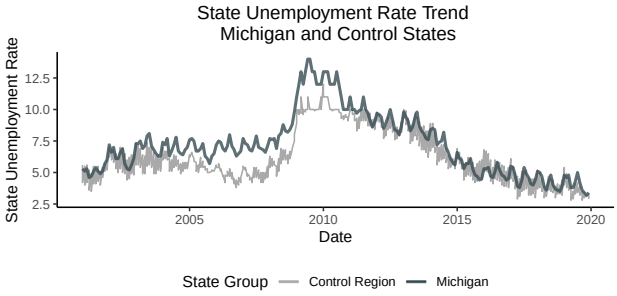


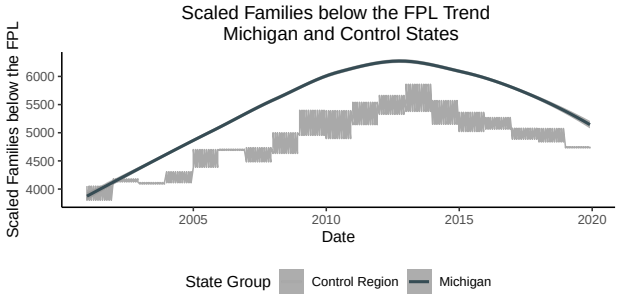


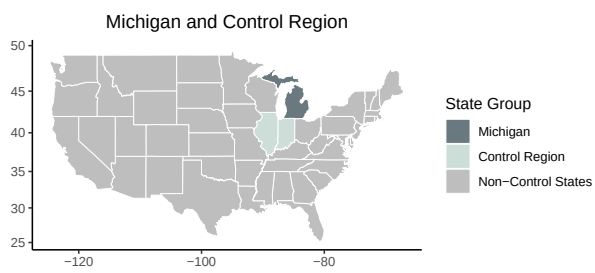
Case: Michigan.

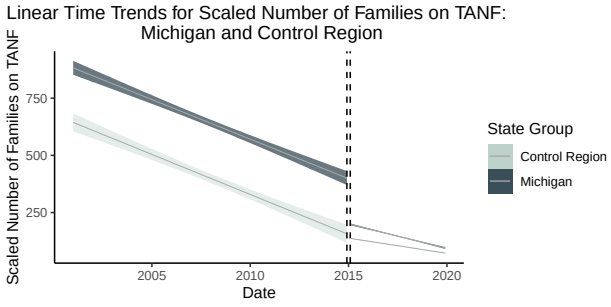
Policy Date: 12/2014.

Control Region: Indiana, Illinois.







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##
## <table style="text-align:center"><caption><strong>Table 2 (B). Policy Regression for Michigan.</stro
## <tr><td colspan="2" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## <tr><td style="text-align:left"></td><td>Basic</td></tr>
## <tr><td colspan="2" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## <tr><td style="text-align:left"></td><td>(17.4633)</td></tr>
## <tr><td style="text-align:left">Number Below Federal Poverty Level (per 100,000)</td><td>-0.0689<sup
## <tr><td style="text-align:left"></td><td>(0.0239)</td></tr>
## <tr><td style="text-align:left">Unemployment Rate (in %)</td><td>42.9279<sup>***</sup></td></tr>
## <tr><td style="text-align:left"></td><td>(5.1240)</td></tr>
## <tr><td style="text-align:left">N</td><td>684</td></tr>
## <tr><td style="text-align:left">R<sup>2</sup></td><td>0.8834</td></tr>
## <tr><td style="text-align:left">Adjusted R<sup>2</sup></td><td>0.8793</td></tr>
## <tr><td colspan="2" style="border-bottom: 1px solid black"></td></tr><tr><td colspan="2" style="text
## <tr><td colspan="2" style="text-align:left"><sup>&sstarf;&sstarf;&sstarf;</sup>p<0.01; <sup>&sstarf;&
## <tr><td colspan="2" style="text-align:left">TANF rate scaled to 100,000 inhabitants.</td></tr>
## </table>
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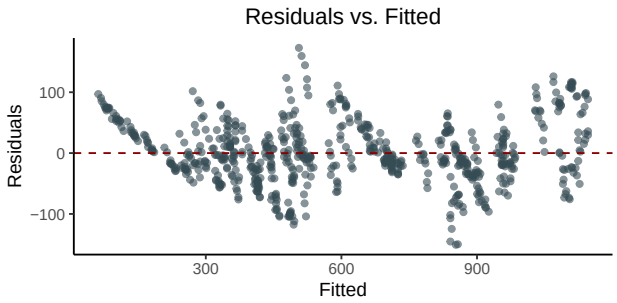
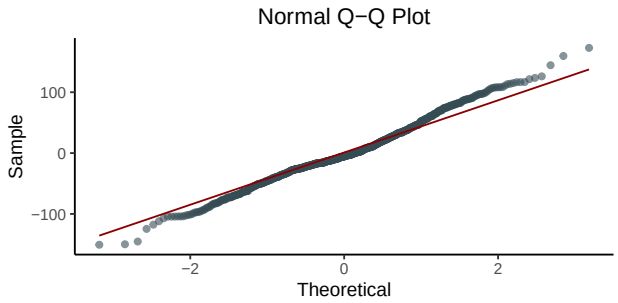
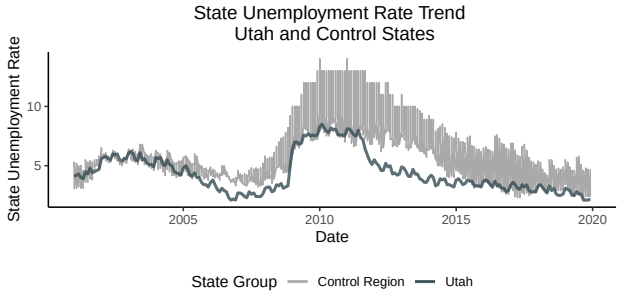


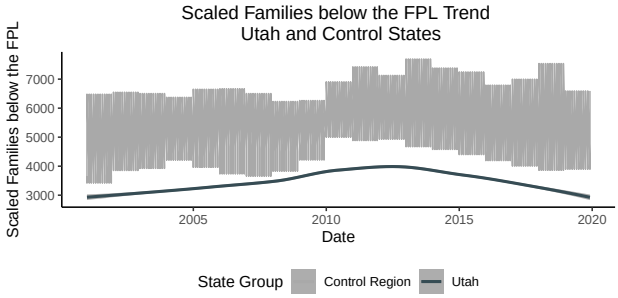


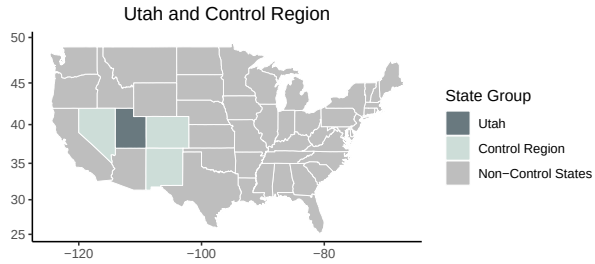
Case: Utah.

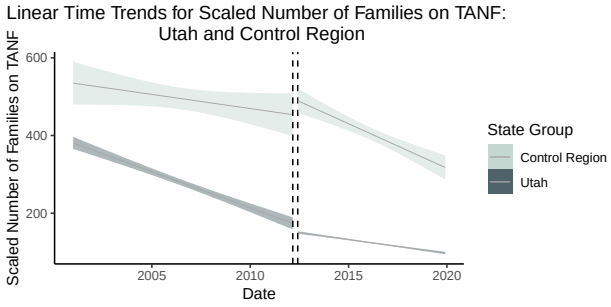
Policy Date: 03/2012.

Control Region: Colorado, New Mexico, Nevada.










```
Call:
   felm(formula = scale_tanf_fams ~ drug_law + scale_num_below_fpl +      unemp_rate | year_cat + state

Residuals:
    Min      1Q  Median      3Q     Max
-207.57  -52.43   15.57   52.98  250.88

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
drug_law1          -90.23903   12.95668  -6.965 6.41e-12 ***
scale_num_below_fpl  -0.02996    0.01040  -2.880  0.00407 **
unemp_rate         -11.23022    2.46674  -4.553 6.04e-06 ***
---
Signif. codes:  0 ’***’ 0.001 ’**’ 0.01 ’*’ 0.05 ’.’ 0.1 ’ ’ 1

Residual standard error: 79.43 on 887 degrees of freedom
Multiple R-squared(full model): 0.8926   Adjusted R-squared: 0.8896
Multiple R-squared(proj model): 0.07197   Adjusted R-squared: 0.04686
F-statistic(full model):  307 on 24 and 887 DF, p-value: < 2.2e-16
F-statistic(proj model): 22.93 on 3 and 887 DF, p-value: 2.66e-14

##
## <table style="text-align:center"><caption><strong>Table 2 (C). Policy Regression for Utah.</strong></
## <tr><td colspan="2" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## <tr><td style="text-align:left"></td><td>Basic</td></tr>
## <tr><td colspan="2" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## <tr><td style="text-align:left"></td><td>(12.9567)</td></tr>
## <tr><td style="text-align:left">Number Below Federal Poverty Level (per 100,000)</td><td>-0.0300<sup
## <tr><td style="text-align:left"></td><td>(0.0104)</td></tr>
## <tr><td style="text-align:left">Unemployment Rate (in %)</td><td>-11.2302<sup>***</sup></td></tr>
```

```
## <tr><td style="text-align:left"></td><td>(2.4667)</td></tr>
## <tr><td style="text-align:left">N</td><td>912</td></tr>
## <tr><td style="text-align:left">R<sup>2</sup></td><td>0.8926</td></tr>
## <tr><td style="text-align:left">Adjusted R<sup>2</sup></td><td>0.8896</td></tr>
## <tr><td colspan="2" style="border-bottom: 1px solid black"></td></tr><tr><td colspan="2" style="text
## <tr><td colspan="2" style="text-align:left"><sup>&sstarf;&sstarf;&sstarf;</sup>p<0.01; <sup>&sstarf;&
## <tr><td colspan="2" style="text-align:left">TANF rate scaled to 100,000 inhabitants.</td></tr>
## </table>
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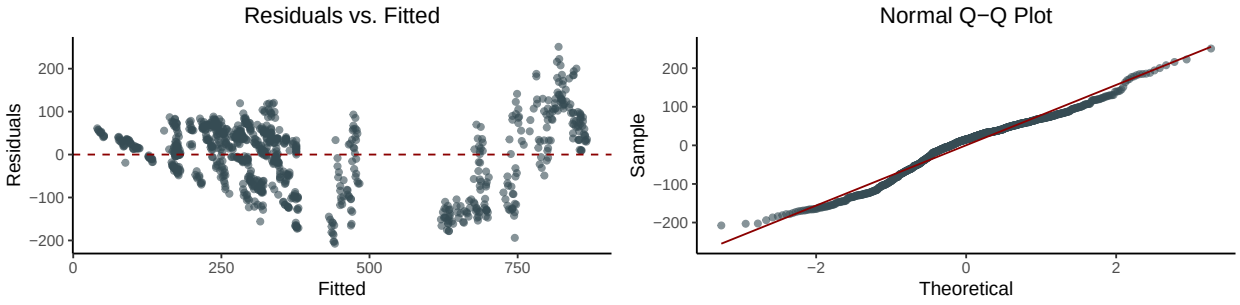
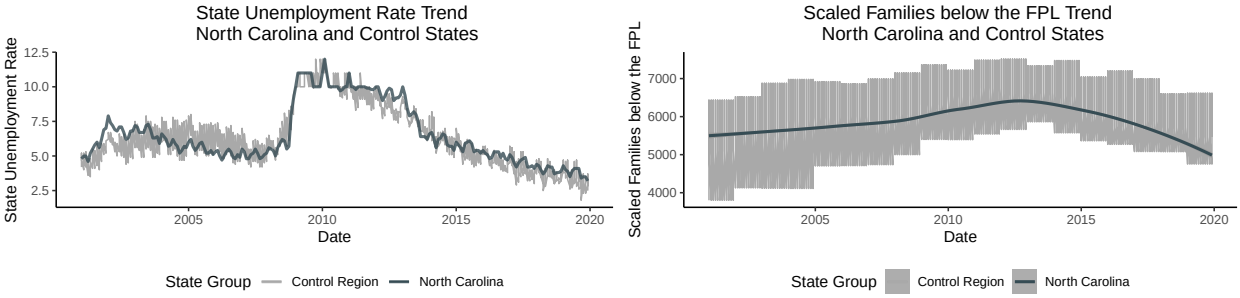
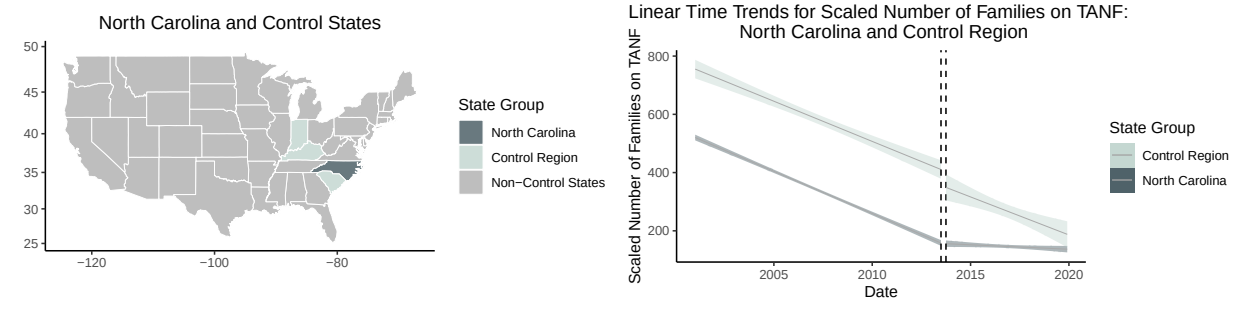


Case: North Carolina.

Policy Date: 07/2013.

Control Region: Kentucky, South Carolina, Indiana.






```
Call:
   felm(formula = scale_tanf_fams ~ drug_law + scale_num_below_fpl +      unemp_rate | year_cat + state

Residuals:
    Min      1Q  Median      3Q     Max
```

```
-150.60  -28.01   -5.37   29.86  172.90

Coefficients:
                      Estimate Std. Error t value Pr(>|t|)
drug_law1           -332.10268    9.21481 -36.040  < 2e-16 ***
scale_num_below_fpl    0.01170    0.01623   0.721    0.471
unemp_rate           -15.02129    3.00129  -5.005 7.18e-07 ***
---
Signif. codes:  0 ’***’ 0.001 ’**’ 0.01 ’*’ 0.05 ’.’ 0.1 ’ ’ 1

Residual standard error: 51.21 on 660 degrees of freedom
Multiple R-squared(full model): 0.9708   Adjusted R-squared: 0.9698
Multiple R-squared(proj model): 0.6872   Adjusted R-squared: 0.6763
F-statistic(full model):954.9 on 23 and 660 DF, p-value: < 2.2e-16
F-statistic(proj model): 483.3 on 3 and 660 DF, p-value: < 2.2e-16
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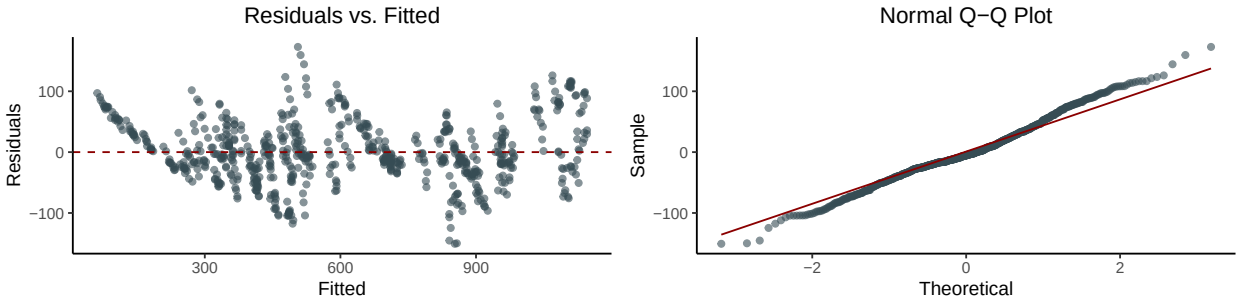

Save

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[1] "done"
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