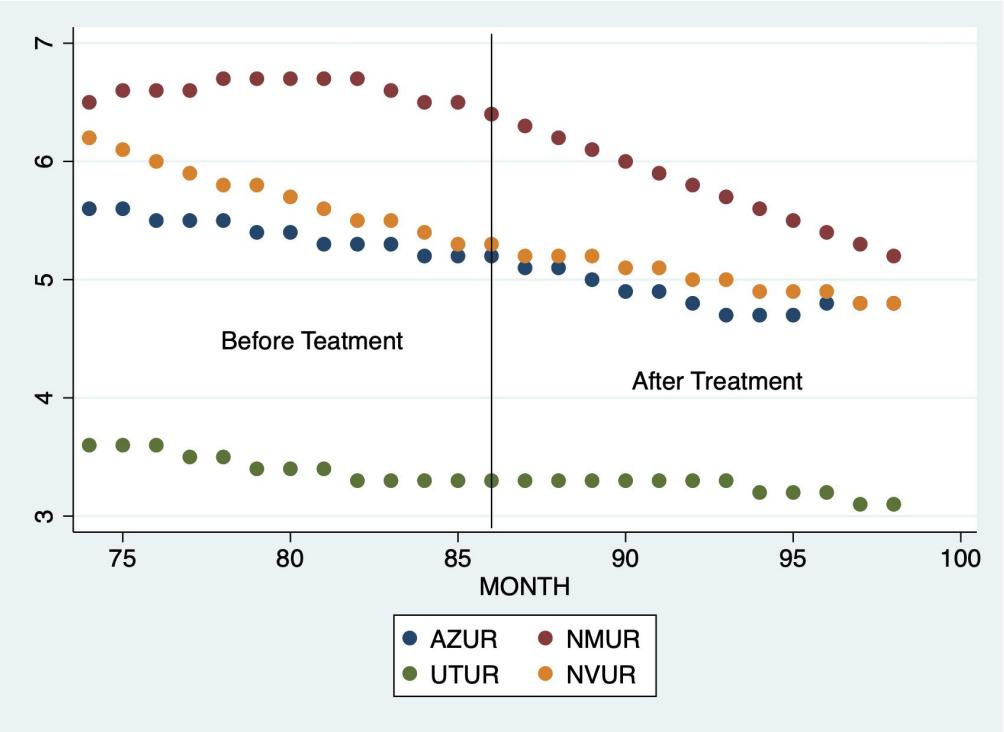
# Data

- The data we used for this experiment comes from the FRED database.
- We are using a difference-in-differences(DiD) estimation to compare the mean unemployment rates for a one month through 4 month period.
- The results from Arizona will be compared to Utah, New Mexico, and Nevada.
- The change occured in January 2017, where there was an increase in the Arizona minimum wage from $8.05 to $10 per hour.
- Utah, New Mexico, and Nevada all kept their minimum wages of $7.25, $7.50, and $8.25 respectively.

# Data




Assumptions

- Parallel Trends
- Common Shocks

# Goal

- Use data to understand if there is any effect on the unemployment rate caused by an increase in the minimum wage.
- **Method:** Difference-in-Differences

# Step 1

Find **mean unemployment rate** for each state **before** the change in minimum wage in Arizona (for a *y* month period)

| Unemployment Rate Before | Mean y =1 | Mean y = 2 | Mean y = 3 | Mean y = 4 |
|---|---|---|---|---|
| AZ | 5.2 | 5.2 | 5.23 | 5.25 |
| UT | 3.3 | 3.3 | 3.3 | 3.3 |
| NV | 5.3 | 5.35 | 5.4 | 5.43 |
| NM | 6.5 | 6.5 | 6.53 | 6.58 |

# Step 2

Find **mean unemployment rate** for each state **after** the change in minimum wage in Arizona (for the same *y* month period)

| Unemployment Rate After | Mean y =1 | Mean y = 2 | Mean y = 3 | Mean y = 4 |
|---|---|---|---|---|
| AZ | 5.1 | 5.1 | 5.07 | 5.03 |
| UT | 3.3 | 3.3 | 3.3 | 3.3 |
| NV | 5.2 | 5.2 | 5.2 | 5.18 |
| NM | 6.3 | 6.25 | 6.2 | 6.15 |

# Step 3

**Subtract** each state's step 2 results from their step 1 results. This gives how much the unemployment rate changed since the treatment.

| Before - After | Mean y =1 | Mean y = 2 | Mean y = 3 | Mean y = 4 |
|---|---|---|---|---|
| AZ | 0.1 | 0.1 | 0.17 | 0.23 |
| UT | 0 | 0 | 0 | 0 |
| NV | 0.1 | 0.15 | 0.2 | 0.25 |
| NM | 0.2 | 0.25 | 0.33 | 0.43 |

**Example:** Arizona's 1 month mean unemployment rate decreased by .1

# Step 4

- **Subtract** the difference in Arizona's mean unemployment rates before and after the treatment from those in the control groups.
- This will isolate the change caused by the increase in unemployment, or in other words, give us the true treatment effect.

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- This will isolate the change caused by the increase in unemployment, or in other words, give us the treatment effect.

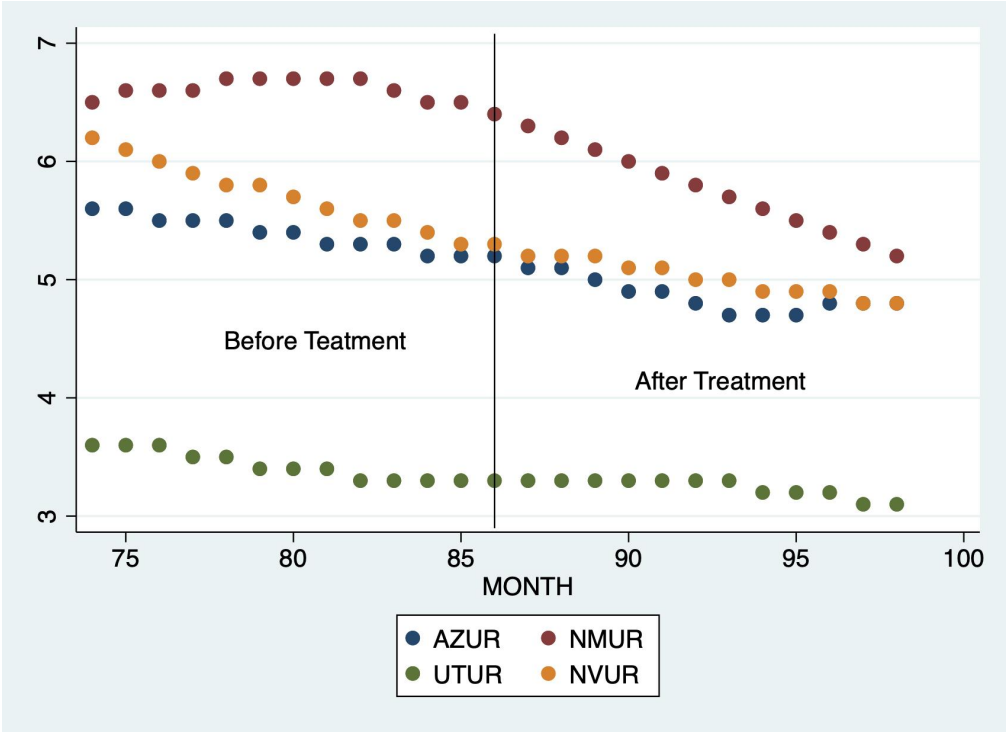
| Treatment Effect (AZ - other) | Mean y =1 | Mean y = 2 | Mean y = 3 | Mean y = 4 |
|---|---|---|---|---|
| UT | 0.1 | 0.1 | 0.17 | 0.23 |
| NV | 0 | -0.05 | -0.03 | -0.02 |
| NM | -0.1 | -0.15 | -0.17 | -0.2 |
| | | | | |
| Average Treatment Effects | 0.000% | -0.033% | -0.010% | 0.003% |

# Results

**Arizona's unemployment rate decreased at a slower rate** relative to the control group **during the 2 and 3 month period**.

It also did not relatively change at all during the one month period, and **decreased at a slightly faster rate during the 4 month period.**

# Potential Issues




The common shocks and parallel trend assumption may not hold.

Examples of why not:

1. Lots of shocks happen in January because of how our voting works.
2. None of the control states have the same slope as Arizona, only similar ones.