The relationship between Male and Female Did-Not-Work rates and Poverty Rates

Nathan Hans, Stella Rose, Carlos Araujo

Summary

Census data allows us to visualize the relationships between many key metrics in the United States. Two of those metrics are did-not-work rates and poverty rates. Census data allows us to capture these metrics with the additional granularity of male & female. We would like to test whether there is a significant relationship between male & female did-not-work disparity (i.e. female did not work rates - male did not work rate) and poverty rates across the US, for the population aged 16-65.

Hypotheses

Null Hypothesis:
There is no statistically significant relationship between did-not-work disparity (female vs. male) and poverty rates within the United States

Alternative Hypothesis:
We reject the null hypothesis, and conclude that there is a statistically significant relationship between did-not-work disparity (female vs. male) and poverty rates within the United States

Key Definitions & Metrics

Male Did Not Work Rate =

```
census_pd_combined["Male DNW %"] = 100 * census_pd_combined["Total Male Did Not Work"] /
census_pd_combined["Total Male Workforce"]
```

Female Did Not Work Rate =

```
census_pd_combined["Female DNW %"] = 100 * census_pd_combined["Total Female Did Not Work"] /
census_pd_combined["Total Female Workforce"]
```

Did Not Work Disparity =
(Female Did Not Work Rate) - (Male Did Not Work Rate)

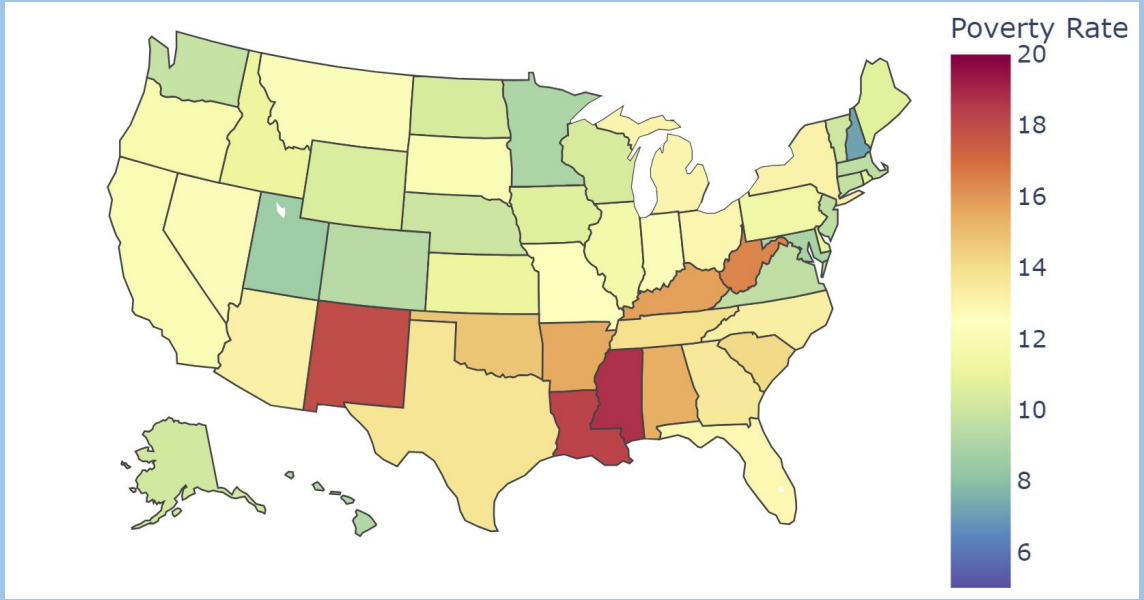
Poverty rate =

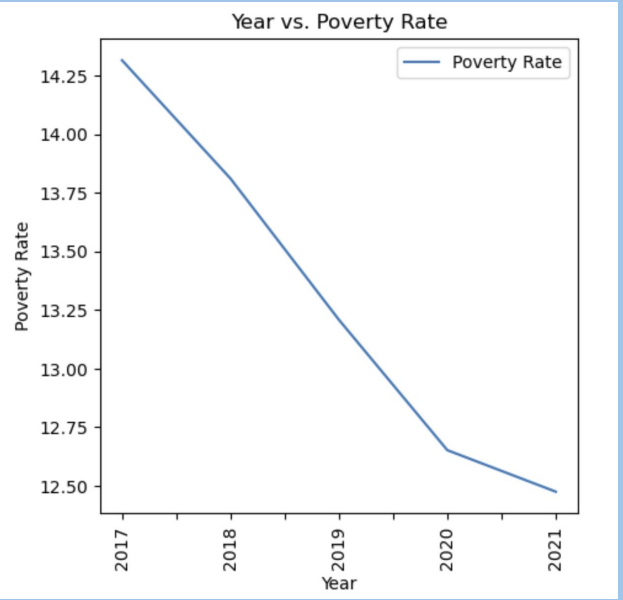
```
census_pd_combined['Poverty Rate'] = 100 * census_pd_combined["Poverty Count"] /
census_pd_combined["Population"]
```

Summary Statistics (US by Year)

	2017	2018	2019	2020	2021
Poverty Rate	14.3%	13.8%	13.2%	12.7%	12.5%
Male Did Not Work Rate	20.3%	19.9%	19.5%	19.1%	19.3%
Female Did Not Work Rate	22.6%	22.0%	21.5%	20.8%	20.8%
Did Not Work Disparity	2.3	2.2	2.0	1.7	1.5

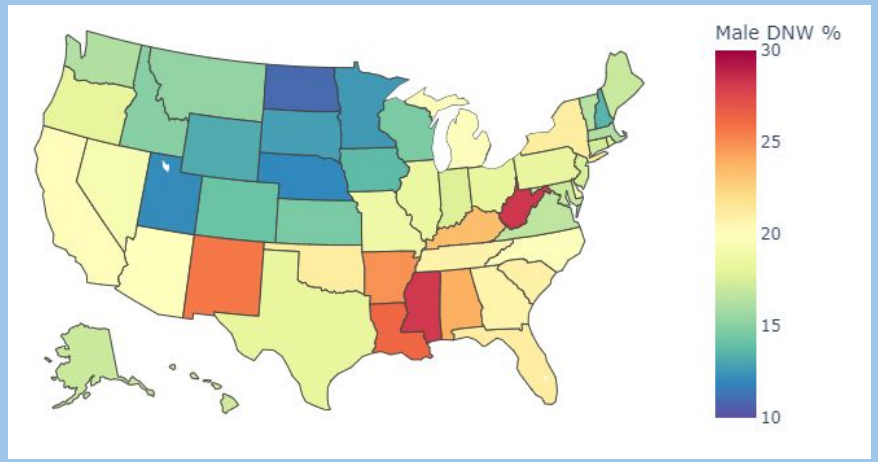
Poverty Rates by US State (2021) and by Year

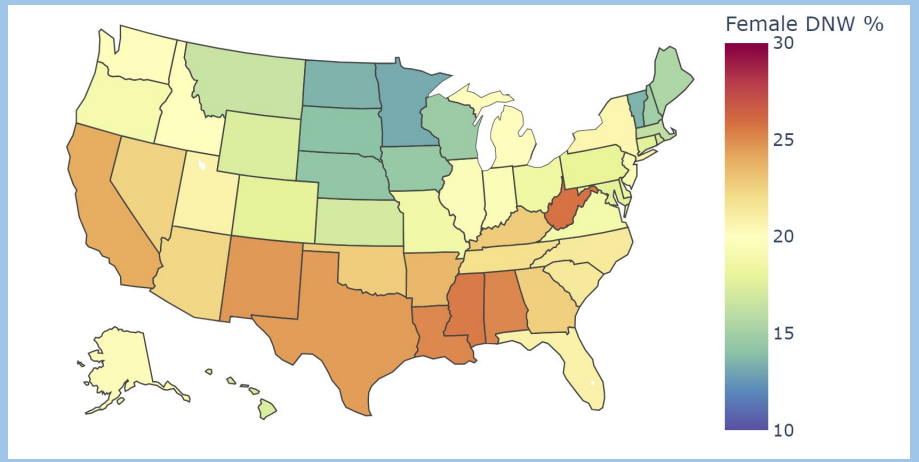




Notes: Louisiana, Mississippi & New Mexico lead the country in poverty rates

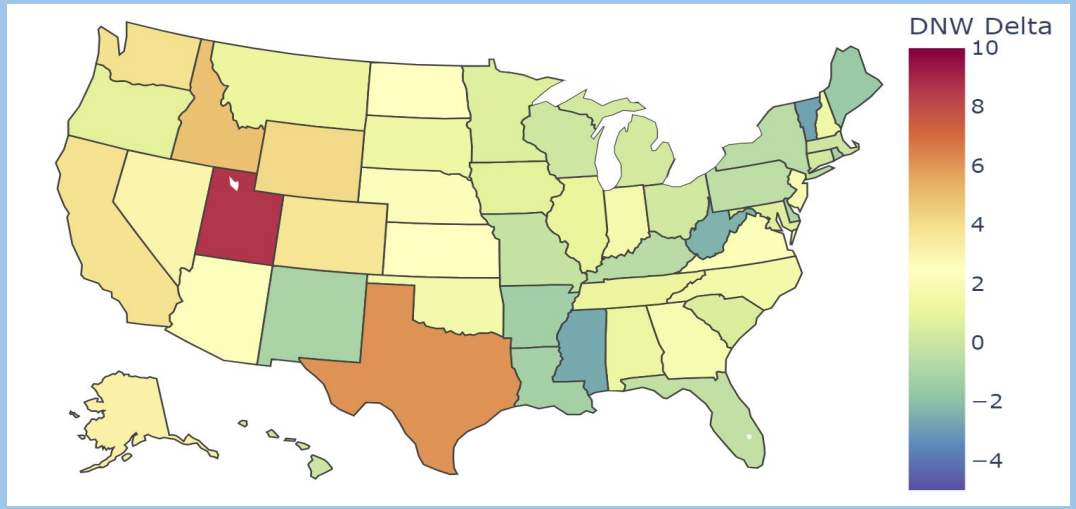
Did Not Work Rates male vs female (2021)

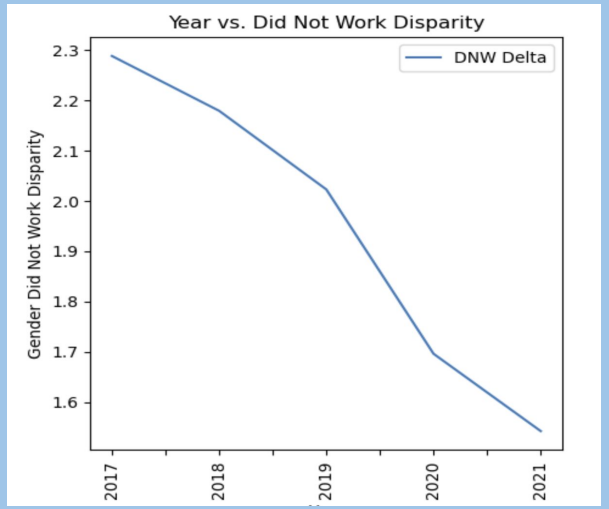




Commentary: Female DNW rates are higher than male DNW, and regional differences are visible.

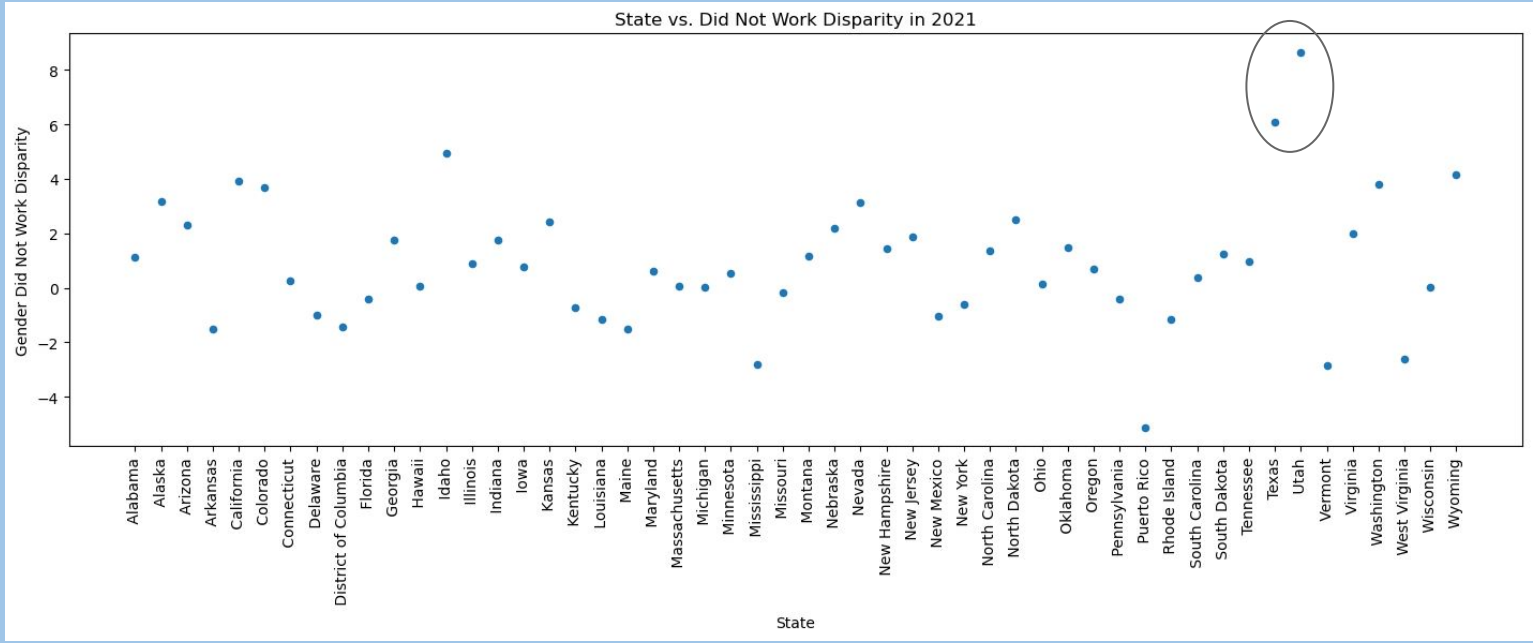
Did Not Work Disparity (2021)





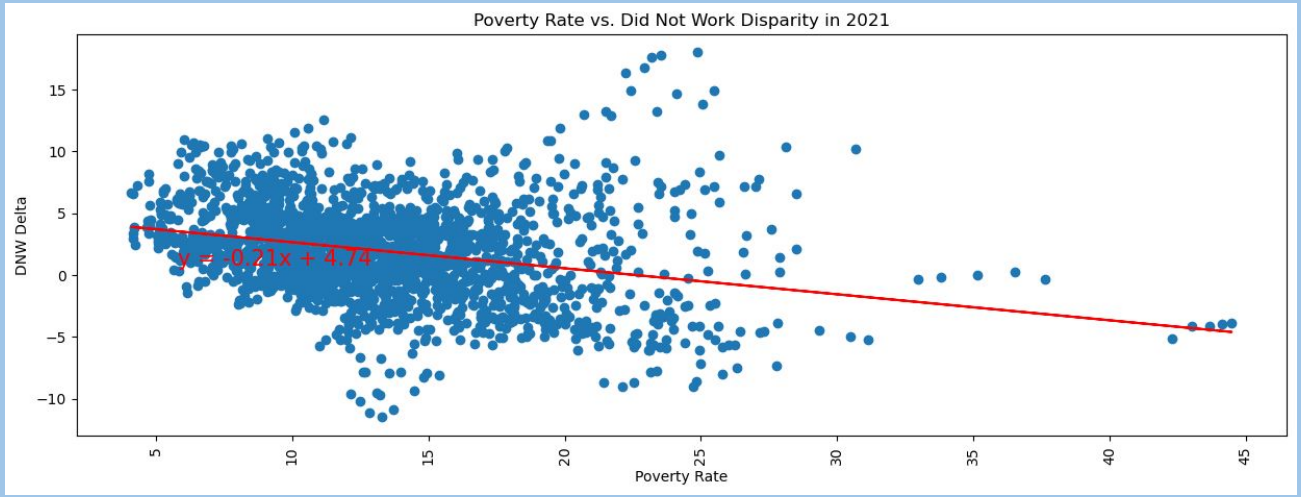
Commentary: DNW disparity is dropping over time, indicating that male vs. female did not work rates are becoming more equal.

Did Not Work Disparity by US State (2021)



Commentary: Texas and Utah have the highest rates of DNW disparity

Linear Regression Analysis



Commentary:

The p value of 1.66e-12 means we can reject the Hnull, and conclude that there is a significant relationship between unemployment disparity and poverty rates

Commentary: as poverty rates decrease, DNW disparity increases

Conclusion

Given our p-statistic is below .05, we can reject the null hypothesis and conclude that there is a statistically significant relationship between did-not-work disparity (female vs. male) and poverty rates within the United States

Which Hypothesis?

~~**Null Hypothesis:**~~
~~There is no statistically significant relationship between did-not-work disparity (female vs. male) and poverty rates within the United States~~

Alternative Hypothesis:
We reject the null hypothesis, and conclude that there is a statistically significant relationship between did-not-work disparity (female vs. male) and poverty rates within the United States