

## Fondren Library Data Repository for Data Science Education and Experiential Learning, Phase I

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### ABSTRACT

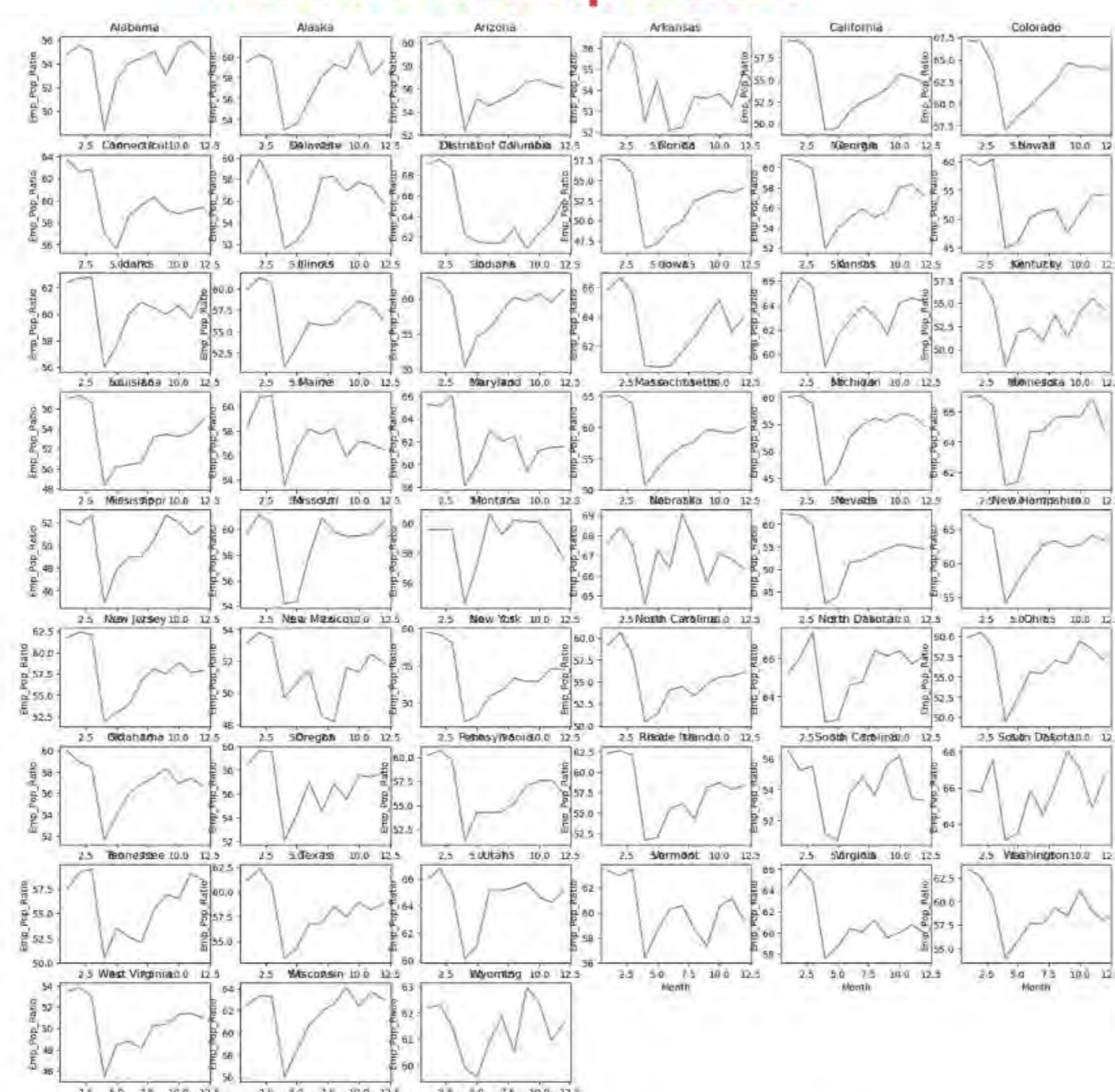
The objective of this research is to investigate the impact of government fiscal relief measures on employment during 2020 economic downturns in the United States. Utilizing a panel dataset comprising 50 states and the District of Columbia from 2020 to 2021, the study employs a 2-stage least squares regression model to estimate the influence of government fiscal relief policies on employment levels. The findings reveal **no statistically significant relationships** between government fiscal relief measures and employment during recessions in the United States.

### INTRODUCTION

The COVID-19 pandemic has triggered a significant economic decline in the United States. Unemployment rates surged from 3.5% in February 2020 to 14.7% in April 2020, with the number of unemployed individuals rising from 5.708 million to 23.05 million, according to the data from Bureau of Labor Statistics (BLS). In response, federal government implemented various fiscal relief measures to alleviate the pandemic's economic repercussions. This study aims to examine the effects of these fiscal relief policies on employment during economic downturns in the United States.

Figure 1: Trend in Employment-Population Ratio at State Level (Jan 2020 - Dec 2021)

MINIMUM in April 2020



Prior research has indicated that fiscal relief measures can **positively influence** employment during recessions.

However, the unique circumstances of the 2020 recession, driven by the COVID-19 pandemic and accompanied by lockdowns, social distancing, mask mandates, and travel restrictions, have rendered the impact of fiscal relief measures on employment uncertain. Consequently, this study seeks to explore the effects of fiscal relief policies on employment amidst the economic downturns experienced in the United States during this period.

### MATERIALS

Government Data Sources used:



Datasets used:

- Basic Current Population Survey (CPS)
- Fiscal Relief Measures in Response to COVID-19
- Medicaid Spending
- Minimum Wage Rates and GDP by State

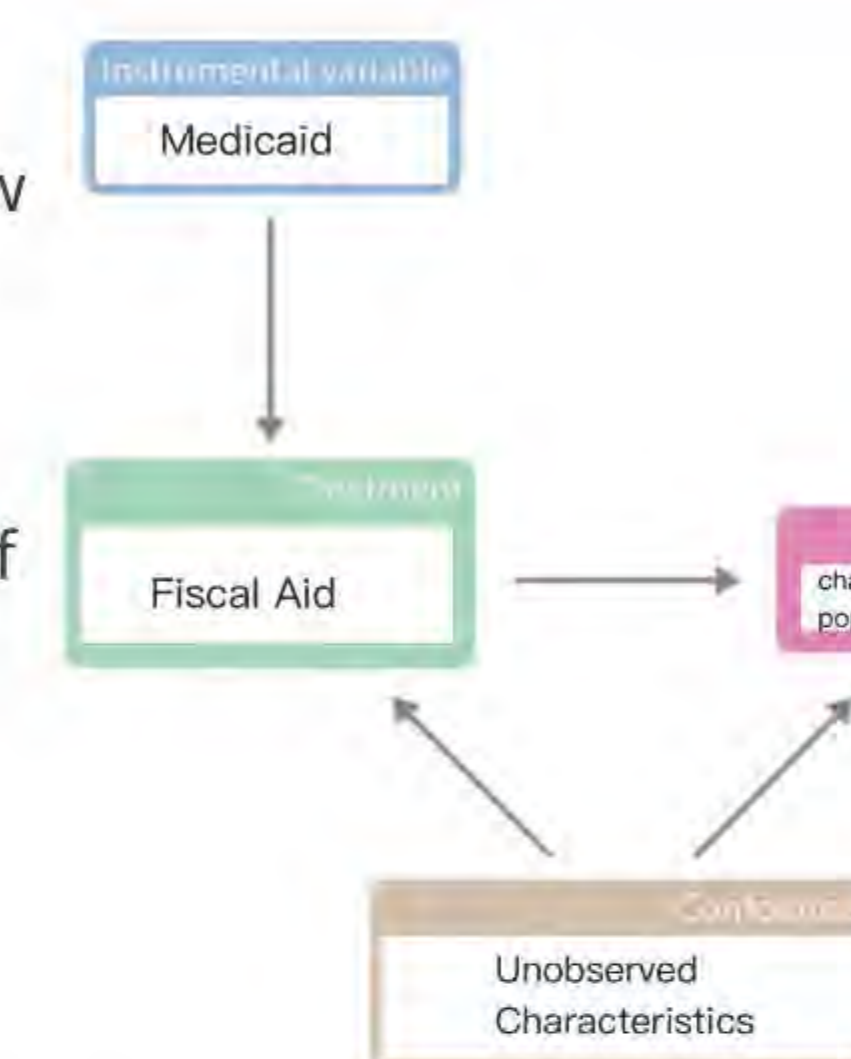
The CPS data was initially gathered at an individual level. To align with the study's focus, I aggregated the data and calculated the employment measures at the state level for each month. My estimates correspond closely with the Census Bureau's tabulation results. However, they do not align with the publicly available BLS results, as the BLS incorporates supplementary data sources and modeling techniques to estimate employment measures for the population.

Tools: Python, Tableau

### METHODS

2-Stage Least Square

Figure 2: Model Overview  
The study employs a 2-stage least squares regression model to estimate the influence of fiscal relief policies on employment levels.



First stage:

$$\frac{Aid_s}{N_s} = \beta_0 + \beta_1 * \frac{Medicaid_s}{N_s} + \beta_2 * Controls + \epsilon_s$$

- Instrument variable: medicaid spending in 2019

Second stage:

$$\frac{\Delta Emp - Pop Ratio_{s,\Delta t}}{N_{s,\Delta t}} = \beta_0 + \beta_1 * \frac{Aid_s}{N_s} + \beta_2 * Controls + \epsilon_s$$

- Dependent variable: change in employment-population ratio from April 2020 to each month after April 2020.
- Main covariate: fiscal relief (Aid)
- Control variables: minimum wage rate, GDP, union rate, etc

Why 2-stage least square:

Because state fiscal relief outlays are endogenous to a state's economic environment, simple OLS results are biased downward.

### RESULTS

Figure 3: Distribution of Fiscal Aid (Outlays) (by total dollar amount)



- ★ top 5 (distribution of dollar amount)
- ★ new top 3 (distribution of dollar amount normalized by state population)

Table 1: Second Stage Regression Results (N=51)

Period	Beta1	p-value	std err	R2	Adj R2	F-statistic
May 2020	0.04	0.97	0.97	0.67	0.62	14.87
Jun 2020	-2.99	0.37	3.29	-0.10	-0.25	4.54
Jul 2020	-3.80	0.35	4.04	-0.13	-0.28	4.34
Aug 2020	-3.04	0.45	4.02	0.19	0.08	5.51
Sept 2020	-2.25	0.55	3.68	0.43	0.35	8.45
Oct 2020	0.16	0.95	2.78	0.67	0.62	14.86
Nov 2020	0.48	0.84	2.31	0.62	0.57	11.96
Dec 2020	0.15	0.95	2.56	0.59	0.53	10.55
Jan 2021	-0.85	0.74	2.58	0.58	0.52	10.47
Feb 2021	-0.75	0.80	2.99	0.48	0.41	6.91
Mar 2021	-0.85	0.76	2.69	0.57	0.51	10.20
Apr 2021	0.21	0.94	2.71	0.58	0.53	10.32
May 2021	-0.48	0.84	2.36	0.55	0.49	9.35
Jun 2021	-0.82	0.75	2.59	0.52	0.45	8.14
Jul 2021	1.01	0.70	2.57	0.44	0.36	6.73
Aug 2021	0.55	0.83	2.48	0.55	0.48	9.02
Sept 2021	1.56	0.57	2.74	0.45	0.37	7.27
Oct 2021	1.35	0.66	3.02	0.50	0.43	8.18
Nov 2021	2.72	0.48	3.84	0.30	0.20	5.62
Dec 2021	2.22	0.64	4.65	0.34	0.25	5.58

- baseline period: April 2020
- p-values are large
- Beta1 are sometimes negative
- R-Square are occasionally negative

The analysis conducted in this study provides no evidence of a statistically significant correlation between fiscal relief measures and employment during the 2020 recession in the United States.

### DISCUSSION & CONCLUSION

Discussion and Conclusion:

Different from prior study, the analysis of this research implies that the state fiscal relief policies implemented during this period may not have had a considerable impact on employment levels amid the 2020 economic crisis in the nation.

The unprecedented nature of the COVID-19 pandemic, coupled with lockdowns, social distancing, mask mandates, and travel restrictions, has made the influence of fiscal relief measures on employment less predictable.

Additionally, fiscal assistance may not be able to fully compensate for the lack of employment opportunities during such a unique crisis. Consequently, the findings of this study may not be applicable to other recessionary periods or contexts.

Future Study:

- exploring alternative policy interventions that could potentially have a more significant impact
- investigating the impact of fiscal relief measures on various sectors of the economy and the potential for long-term positive outcomes
- examining the effectiveness of fiscal relief policies in other countries and comparing the results to identify best practices and strategies that can be adapted to different contexts

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