

# Low-Income Jobs Lost To Covid-19

## Presentation #8

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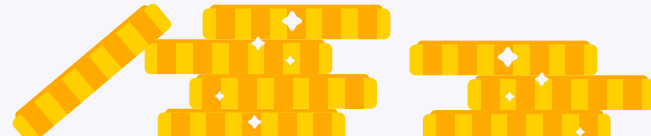
03 FINAL REPORT &  
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UPDATES

02 REVISED PCA &  
RESULTS

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# 01 RECAP

- Talked about updates on our last PCA Results
- Reviewed our plans for our Final Report & discussed our progress so far



# TEAM PROGRESS



25%



Did some revision on our  
Principal Component  
Analysis



50%



Added analysis on linear  
regression  $R^2$



75%



Worked on Final Report  
& Final Presentation



02

# Revision on PCA



	Component 1	Component 2
Health Care Rank 2021	0.50628620	0.15467635
Doses of the COVID-19 Vaccine Administered	0.54527833	-0.06696825
Proportion of Remote Workers	0.45113703	0.21801794
Total Days of Mask Mandate	0.04482315	-0.40083484
Annual Income 2021	-0.29881730	0.55074145
Proportion of Democratic Voters in the 2020 Election	0.38128874	-0.02809592
Gathering Size Ban	-0.07835304	-0.67770537

# PCA Interpretations

$$\text{LowIncomeJobsLost} = 0.049508 + 0.009850 \times \text{Component1} + 0.007802 \times \text{Component 2} + \text{error}$$

Health Care Ranking	$0.50628620 \times 0.009850 + 0.15467635 \times 0.007802 = \mathbf{0.006193704}$
Doses of the COVID-19 Vaccine Administered	$0.54527833 \times 0.009850 - 0.06696825 \times 0.007802 = \mathbf{0.004848505}$
Proportion of Workers that went Remote	$0.45113703 \times 0.009850 + 0.21801794 \times 0.007802 = \mathbf{0.006144676}$
Mask Mandate Length	$0.04482315 \times 0.009850 - 0.40083484 \times 0.007802 = \mathbf{-0.002685805}$
Average Annual Income	$0.38128874 \times 0.009850 - 0.02809592 \times 0.007802 = \mathbf{0.00353649}$
Proportion of Democratic Voter	$-0.29881730 \times 0.009850 + 0.55074145 \times 0.007802 = \mathbf{0.001353534}$
Gathering Size Ban	$-0.29881730 \times 0.009850 + 0.55074145 \times 0.007802 = \mathbf{-0.006059235}$

# PCA Interpretations

Proportion of  
Low-Income  
Jobs Lost =

Health Care Ranking  $\times$  0.006193704 + Doses of the COVID-19  
Vaccine Administered  $\times$  0.004848505 + Proportion of Workers that went Remote  
 $\times$  0.006144676 - Mask Mandate Length  $\times$  0.002685805  
+ Average Annual Income  $\times$  0.00353649 + Proportion of Democratic  
Voters  $\times$  0.001353534 - Gathering Size Ban  $\times$  0.006059235

# Linear Regression $R^2$

PCA  
 $R^2_{\text{adj}} = 0.3871$

Linear Model with all components  
 $R^2_{\text{adj}} = 0.5257$

# BUT

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	0.049508	0.003724	13.293	< 2e-16	***
PC1	0.009827	0.001846	5.323	2.66e-06	***
PC2	0.007792	0.003518	2.215	0.0316	*

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	2.058e-02	2.963e-02	0.694	0.49122	
healthCareRank_21	1.039e-03	4.767e-04	2.180	0.03488	*
DosesAdministered	-2.830e-07	2.453e-07	-1.154	0.25521	
ProportionOfRemoteWorkers	-2.919e-01	9.653e-02	-3.024	0.00424	**
TotalDaysOfMaskMandate	7.051e-05	2.464e-05	2.861	0.00655	**
ProportionDemocratic	2.270e-01	8.161e-02	2.781	0.00807	**
AverageIncome	-2.654e-09	7.860e-09	-0.338	0.73726	
GatheringBanDuration	-5.975e-06	2.971e-05	-0.201	0.84157	



# Linear Regression $R^2$

PCA  
 $R^2_{\text{adj}} = 0.3871$

Linear Model with 3 components  
 $R^2_{\text{adj}} = 0.517$

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	0.049508	0.003724	13.293	< 2e-16	***
PC1	0.009827	0.001846	5.323	2.66e-06	***
PC2	0.007792	0.003518	2.215	0.0316	*

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	-2.334e-02	1.787e-02	-1.306	0.19812	
ProportionOfRemoteWorkers	-2.002e-01	8.138e-02	-2.460	0.01770	*
TotalDaysOfMaskMandate	6.300e-05	2.068e-05	3.046	0.00384	**
ProportionDemocratic	2.110e-01	6.263e-02	3.369	0.00153	**

	PC1	PC2
PC1	1.000000e+00	4.930397e-16
PC2	4.930397e-16	1.000000e+00

	ProportionOfRemoteWorkers	TotalDaysOfMaskMandate	ProportionDemocratic
ProportionOfRemoteWorkers	1.0000000	0.4477956	0.7784750
TotalDaysOfMaskMandate	0.4477956	1.0000000	0.6663876
ProportionDemocratic	0.7784750	0.6663876	1.0000000

03

# FINAL REPORT & PRESENTATION



Report Info
Abstract
Introduction
Methods and Datasets
Original Dataset: Low Income Jobs Lost to COVID-19
Rate of Vaccination
Length of Vaccine Availability
Length of Masking Requirement
Gathering Restrictions (Max Length)
Average Salary per State
Healthcare Rank
Proportion of Democratic Voters
Rate of Jobs that went Remote
Key Statistical Tests
Hypothesis Testing
Principal Component Analysis
Results
Hypothesis Testing
PCA
Discussion

## Length of Vaccine Availability

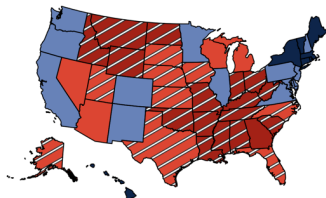
Before doing the hypothesis testing, we had to compute the proportion of people who are vaccinated vs proportion of low income jobs lost in which we divided the percent total population with a completed series to examine the relationship between the estimated proportion of low-income jobs lost due to COVID-19 and the Length of Vaccine Availability (by each state, the obtained p-value of  $6.24 \times 10^{-6}$  in which we reject the null hypothesis & correlation coefficient is 0.60.

These results signify a moderate positive correlation between the proportion of low-income jobs lost per state (by population) and the length of vaccine availability in the US (by each state). Furthermore, the 95% confidence interval of (0.3702306, 0.7418059) does not include 0, which further supports the conclusion that there is a relationship between these variables.

In this graph, we wanted to highlight duration of vaccine availability. If the availability and distribution of vaccines are delayed or prolonged, it can extend the duration of the COVID-19 pandemic. This, in turn, can have severe economic consequences, including business closures, reduced consumer spending, and job losses across various sectors. Low-income workers are often employed in industries that have been disproportionately affected by the pandemic, such as hospitality, retail, and personal services, making them particularly vulnerable to job losses. Also, this issue can result in shifts and changes within industries. Some businesses may struggle to sustain their operations for an extended period, leading to closures or downsizing. This can lead to job losses, particularly for low-income workers employed in sectors that are heavily impacted and unable to adapt to changing market conditions.

Percent Total Population with Completed Series reported to the CDC by State/Territory and for Select Federal Entities

50 - 60% 60 - 70% 70 - 80% 80% + Political Party Democratic Republican



# GITHUB PAGES

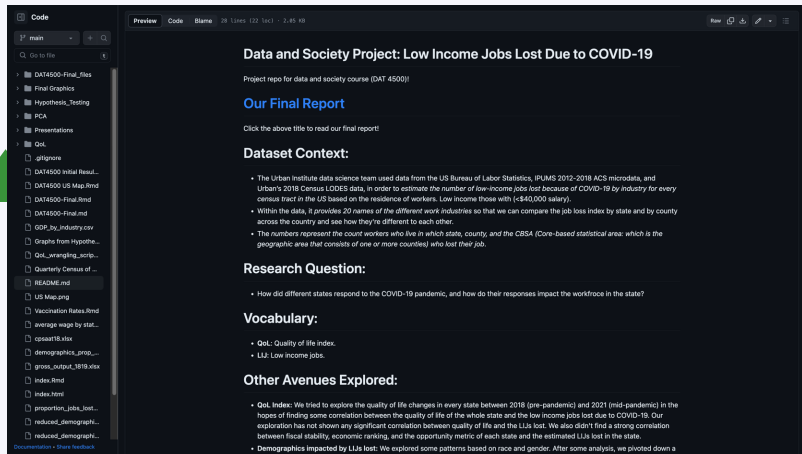


## GitHub Pages Link:

<https://yarrabozaed.github.io/Data-and-Society/>

## GitHub README Link:

<https://github.com/Yarrabozaed/Data-and-Society>



# OUR CHALLENGES



Putting all the final components together for the report

2



Interpreting PCA results correctly

4

1

GitHub pages took some experimentation to setup correctly

3

Putting together our final presentation content



# Final Steps



## Finish our report

Complete all writeup  
components for the final report



## Finish our slides

Complete our final  
presentation slides





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# QUESTIONS?

