

Analyzing Crucial Swing State Behavior to Improve Election Predictions

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Presentation Outline

- Analyze the important events leading up to the 2020 presidential election such as racial justice protests and the stock market crash
- Study the Trump administrations' decisions on topics such as healthcare, Supreme Court nominations, and COVID-19
- Derive a Swing State Index for a reliable indicator of swing states' voting patterns
- Use statistical methods such as hierarchical clustering to reveal key events that impacted swing state behavior based on the swing state index
- Connect the political knowledge with clustering methods to present the most important factors in President Biden's victory



Overview of Events



GOVERNMENT RESPONSES

According to a Stanford survey, the Trump administration's response to COVID-19 has caused **"40 percent of U.S. adults [to be] ... more likely to vote for Democratic candidates in the U.S. election"**

(Duffin 2020)



NOTABLE ISSUES

A survey conducted for the Associated Press showed that **"roughly a fifth of all voters said the racial justice protests were the single most important factor when voting in the election"**

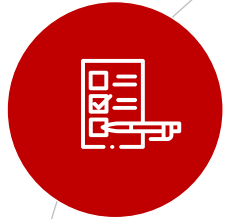
(Ramirez 2020)

Trump Administration Reactions to COVID-19

- President Trump refrained from “a nationwide strategy to combat the coronavirus in [favor] of allowing state governors to form their own plans”
- He mocked “the virus as a media conspiracy” (Bennett 2020) despite contracting it himself, causing many to question his trustworthiness
- He constantly disregarded the scientific research related to COVID-19, “undermin[ing] public health experts, scientists, and physicians who have been trying to address this issue” (Wallace 2020)

OTHER NOTABLE EVENTS & DECISIONS

Healthcare
Efforts to weaken the
Affordable Care Act



**Supreme
Court
Justices**
Nominated more
conservative judges

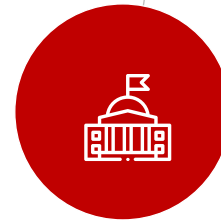


**Black Lives
Matter**

"Toxic propaganda"
(Niedzwiadek 2020)

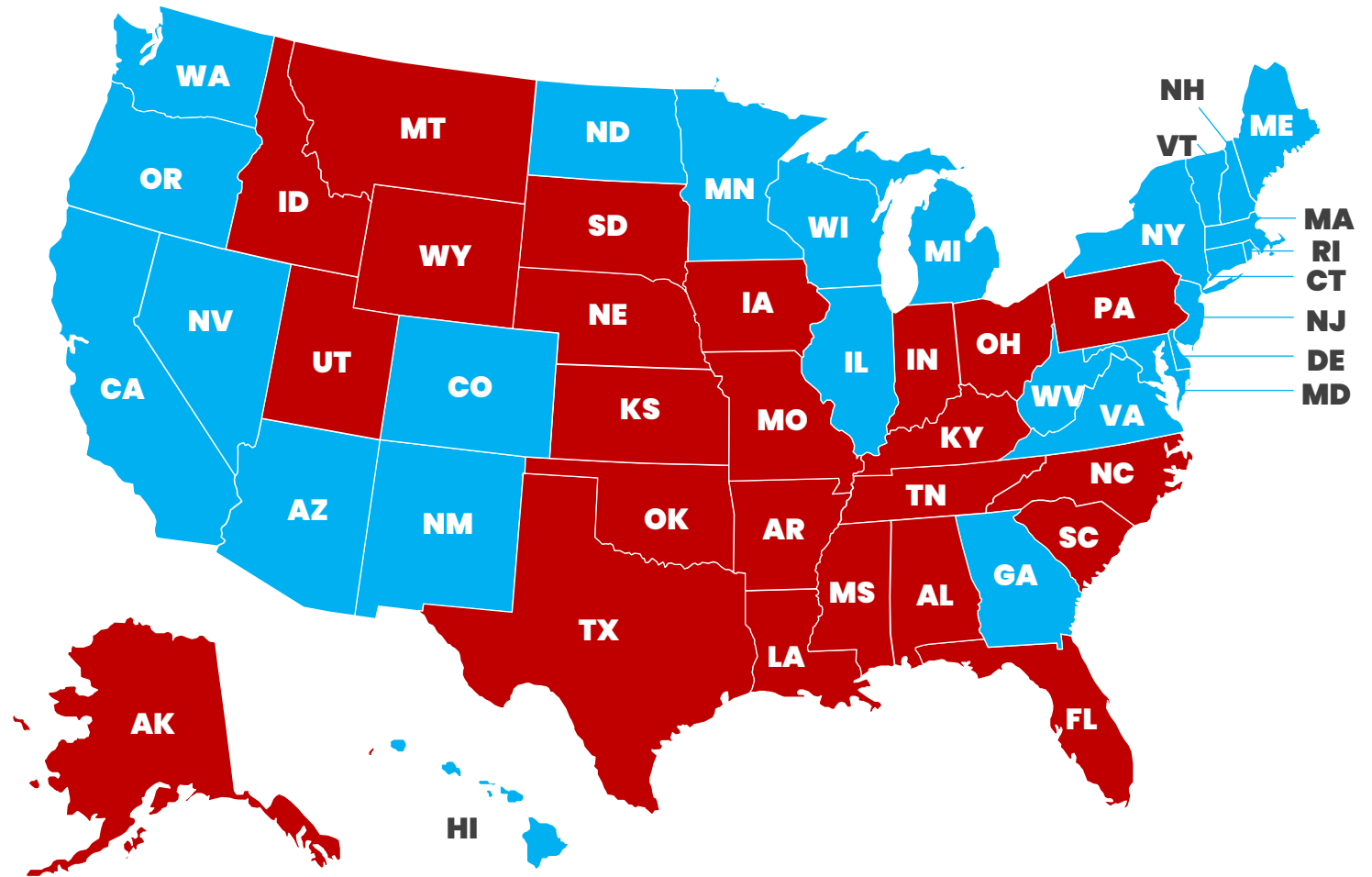


**Impeachmen
t**
Undermined public
confidence



Electoral College

Swing states can reasonably be won by either the Democratic or Republican presidential candidate while safe states consistently lean towards one party

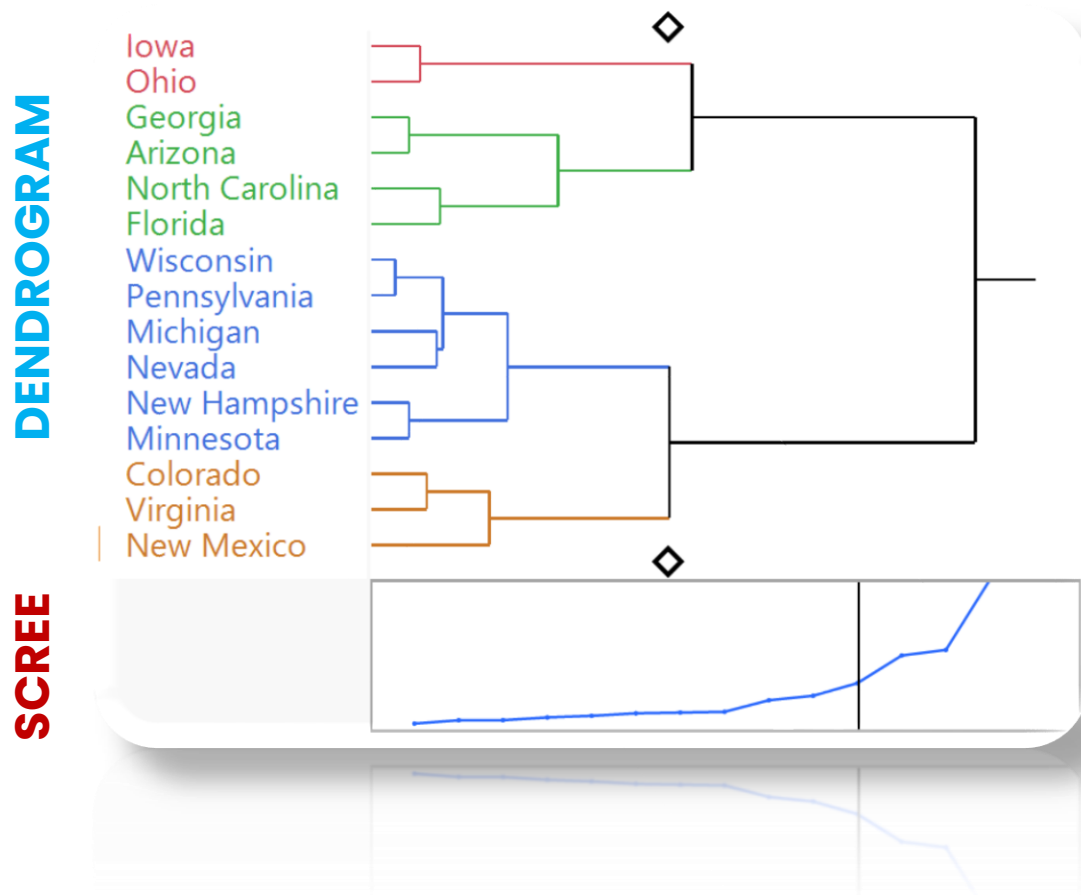


Swing State Index

- Weighs importance of different swing states
- Formula - $(2016\% - 2012\%) * (2020\% - 2016\%) * 10,000$
- **Larger the magnitude and the more negative the swing index, the more that state has “swung” in the past**

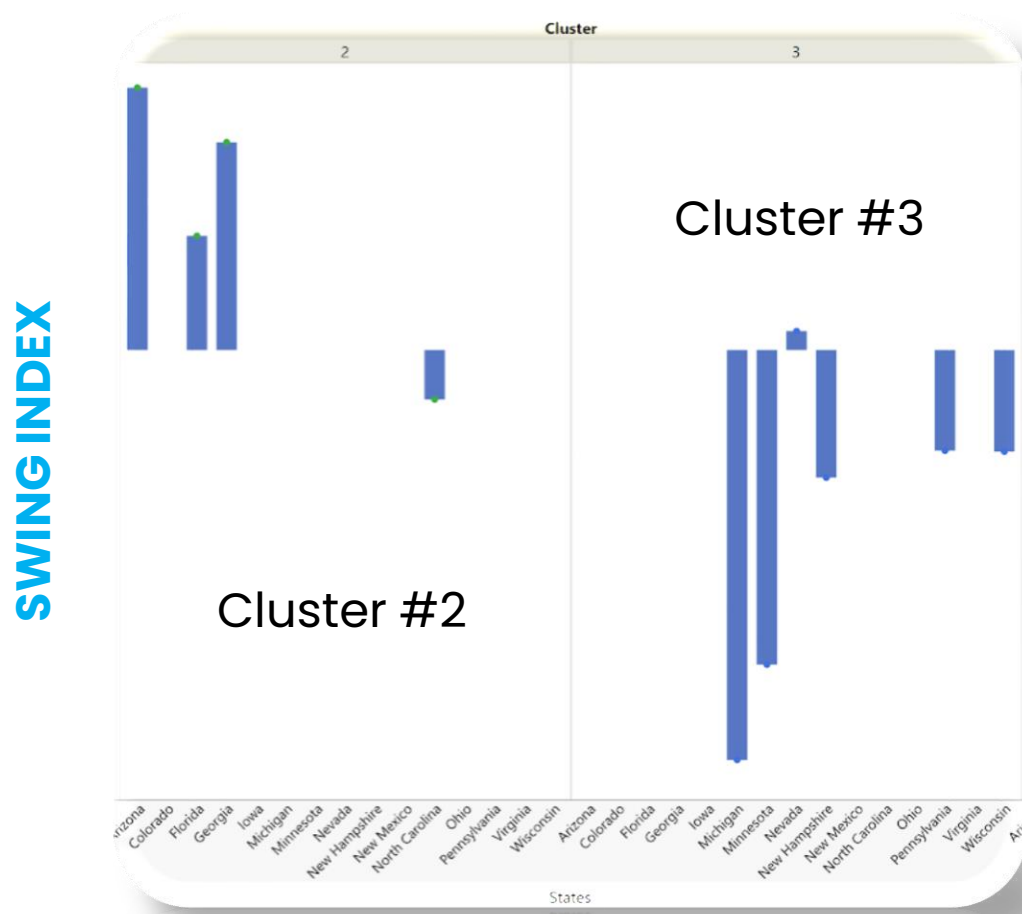
States	Electoral Votes	2012 (Actual)	2016 (Actual)	2020 (Actual)	Swing Index
Iowa	6	-5.8%	9.4%	8.2%	-1.1
Ohio	18	-3.0%	8.1%	8.2%	0.14
Georgia	16	7.8%	5.1%	-0.3%	2.31
North Carolina	15	2.0%	3.7%	1.3%	-0.55
Arizona	11	9.0%	3.5%	-0.3%	2.92
Florida	29	-0.9%	1.2%	3.3%	1.27
Wisconsin	10	-6.9%	0.8%	-0.7%	-1.13
Pennsylvania	20	-5.4%	0.7%	-1.0%	-1.12
Michigan	16	-9.5%	0.2%	-2.7%	-4.56
New Hampshire	4	-5.6%	-0.4%	-7.2%	-1.42
Minnesota	10	-7.7%	-1.5%	-7.2%	-3.50
Nevada	6	-6.7%	-2.4%	-1.6%	0.21
Colorado	9	-5.4%	-4.9%	-13.0%	-0.33
Virginia	13	-3.9%	-5.3%	-9.4%	0.76
New Mexico	5	-10.2%	-8.2%	-10.6%	-0.23

Hierarchical Clustering



- Hierarchical clustering method divides 15 swing states into four clusters, using the 2012, 2016, and 2020 election results
- The “bottom-up approach” was selected because the join pattern can reveal unique characteristics of each state
- Four clusters were chosen based on the Scree plot which identifies the optimal number of clusters (based on where the graph “bends” like an elbow)

Clustering Analysis



- First cluster displays a Republican trend
- The second cluster has states with election trends in one direction (except for North Carolina)
- **The majority of the states in the third cluster have a negative swing index (most inconsistent swing states)**
- States in the fourth cluster have voted Democratic by a margin greater than 3% for the past three elections

Most Important Swing States

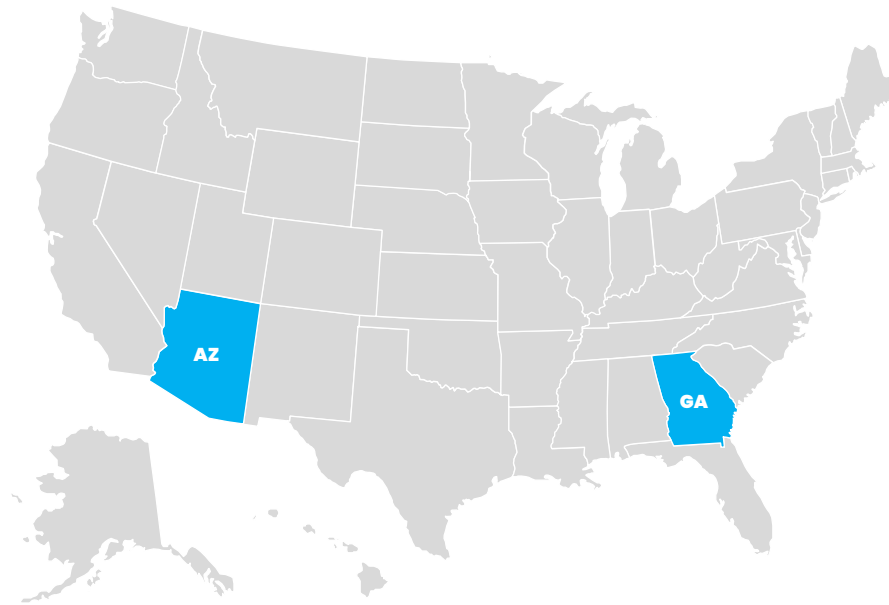
Clustering History

Number of Clusters	Distance	Leader	Joiner
14	0.194112187	Wisconsin	Pennsylvania
13	0.302497298	Georgia	Arizona
12	0.305005698	New Hampshire	Minnesota
11	0.394441634	Iowa	Ohio
10	0.446849363	Colorado	Virginia
9	0.527686265	Michigan	Nevada
8	0.553445115	North Carolina	Florida
7	0.577730743	Wisconsin	Michigan
6	0.951416439	Colorado	New Mexico
5	1.096840607	Wisconsin	New Hampshire
4	1.505588474	Georgia	North Carolina
3	2.400876896	Wisconsin	Colorado
2	2.582226484	Iowa	Georgia
1	4.867940942	Iowa	Wisconsin

- Each individual cluster combines with another cluster one at a time until the optimal number of clusters is reached
- Six states chosen – Minnesota/Michigan, Wisconsin/Pennsylvania, and Georgia/Arizona
- **By studying events that influenced the two most strongly connected pairs and the two states that “swung” the most, the most important incidents that affected the election can be identified**

A photograph of Joe Biden, smiling and standing behind a podium. The image is overlaid with a blue tint. The text 'Arizona and Georgia' is written in white, bold, sans-serif font over the lower part of the image.

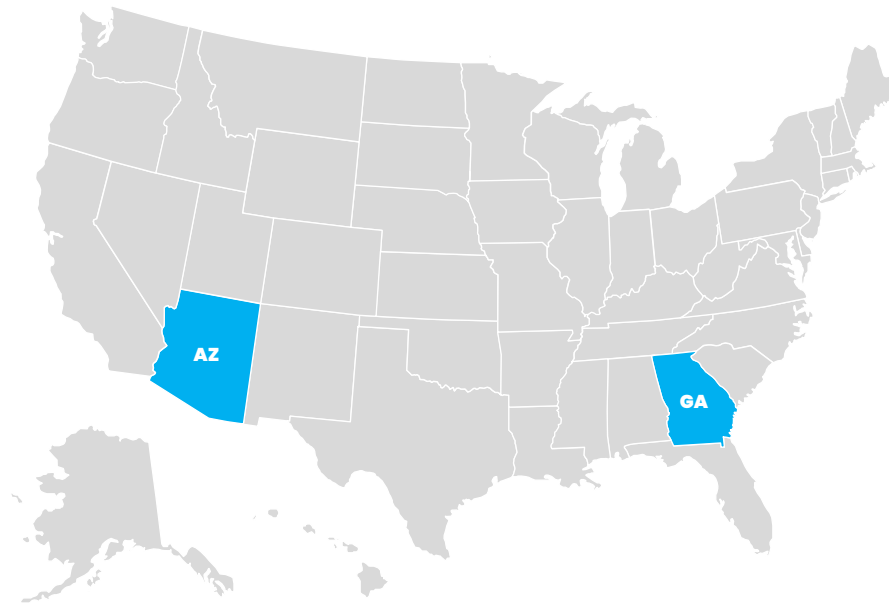
Arizona and Georgia



- Both states have a Democratic trend in the past 8 years
- Arizona had not voted blue in over 60 years prior to 2020
- Both states exhibit shifting demographics, a large Black population, and strong support for Black Lives Matter
- **Racial justice played a significant part in Georgia and Arizona's continued trend to a bluer state**

A photograph of Joe Biden, smiling and standing behind a podium. The image is overlaid with a blue gradient. The text 'Pennsylvania and Wisconsin' is written in white, bold, sans-serif font across the middle of the image.

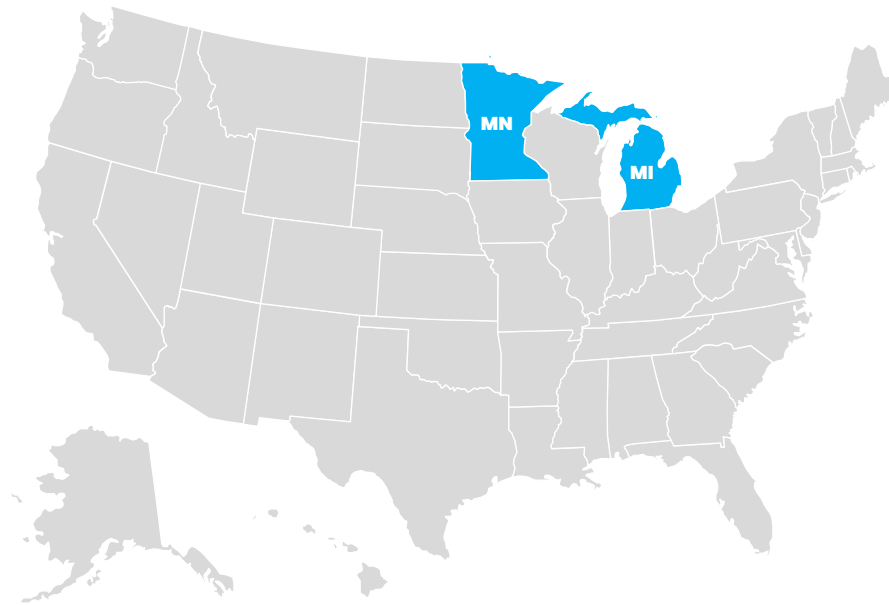
Pennsylvania and Wisconsin



- Many Wisconsin voters said that they switched to Trump in 2016 after their health insurance costs went up in 2012 under Obama
- In Pennsylvania, 97% of senior voters stated that healthcare was their top consideration in the 2020 election
- **Health care improvements may have caused Pennsylvania and Wisconsin voters to vote Democratic**

A photograph of Joe Biden, smiling and standing behind a podium. The image is overlaid with a blue tint. The text "Michigan and Minnesota" is written in white, bold, sans-serif font across the lower part of the image.

Michigan and Minnesota



- In Michigan, the increase in black voters largely voted blue, with “94 percent support[ing] ... Black Lives Matter” (Haddad 2020)
- Minnesota saw an increase in turnout among college voters who “wanted to see a swift COVID-19 response” (Jackson 2020)
- **The election behavior of Michigan and Minnesota was largely attributed to a change in voting demographics**

Conclusion

- A Swing State Index and hierarchical clustering methods were used to study the swing state behavior for 15 key swing states
- The four clusters revealed different voting patterns, and Arizona, Georgia, Pennsylvania, Wisconsin, Michigan, and Minnesota were further studied to identify those factors
- **A worsened COVID-19 situation, reinvigorated movements like Black Lives Matter, and increased dissatisfaction towards President Trump's healthcare policies fueled several states to turn from red to blue**
- Future events can be paralleled with the impact of past events and decisions on election results to make more accurate predictions regarding key swing states



Thank you!
Any questions?

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