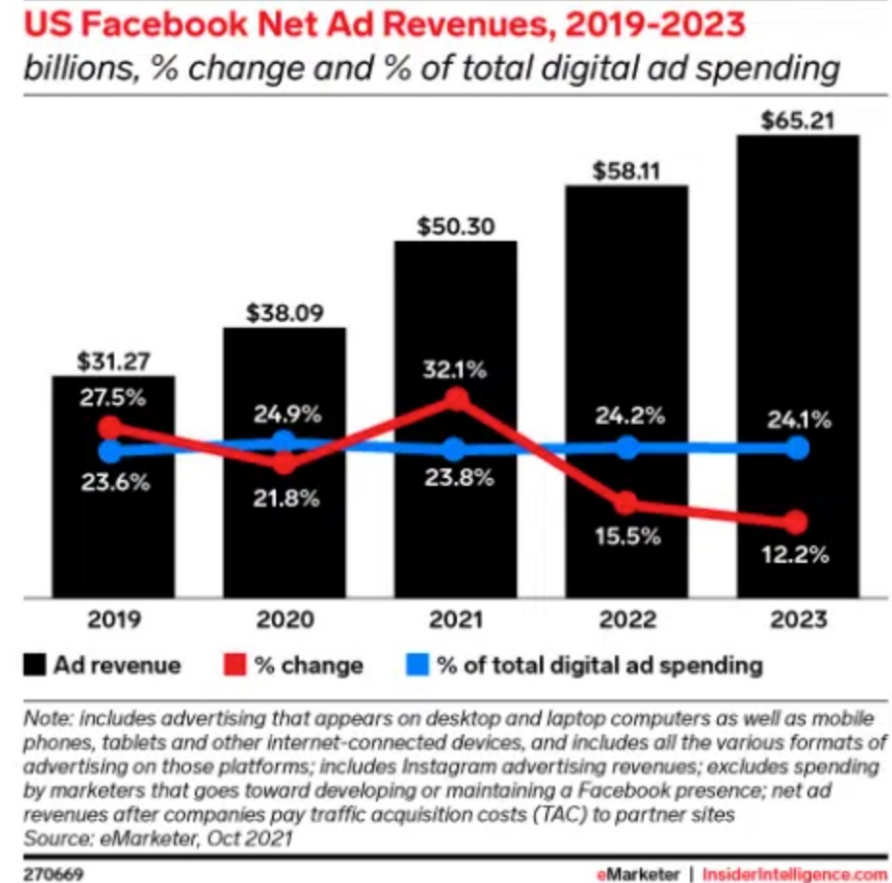


The Effect of Facebook Ad Spending on Elections

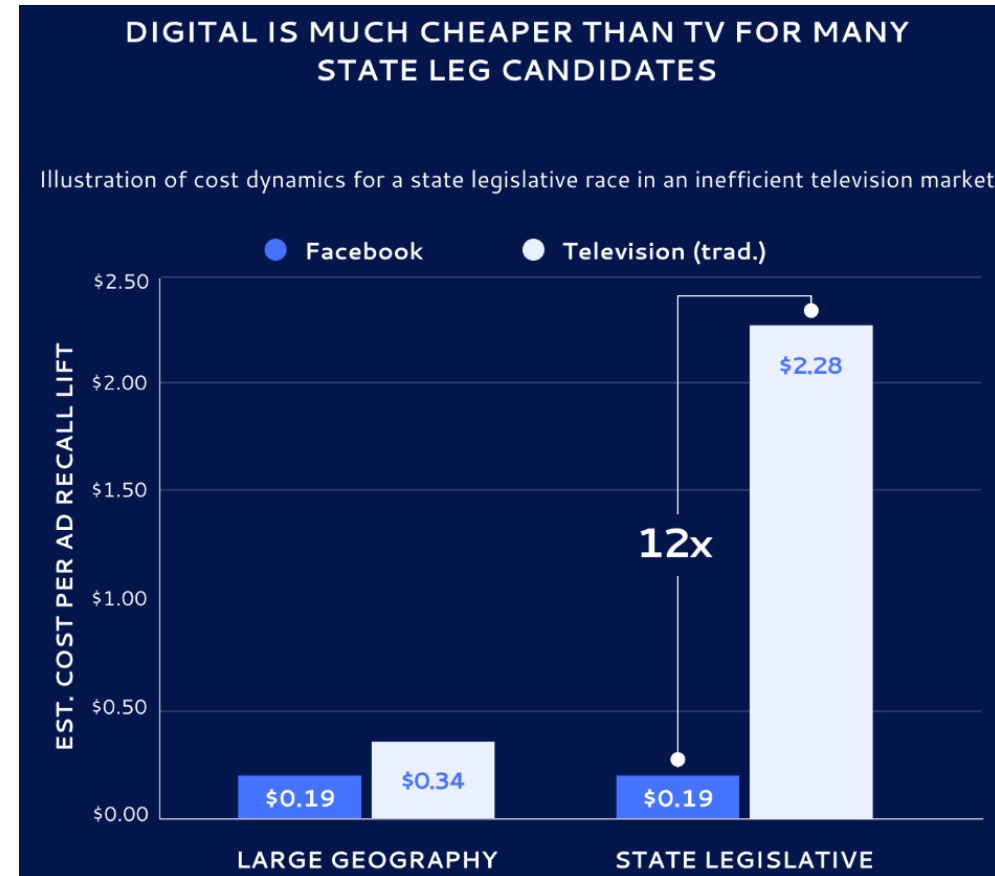
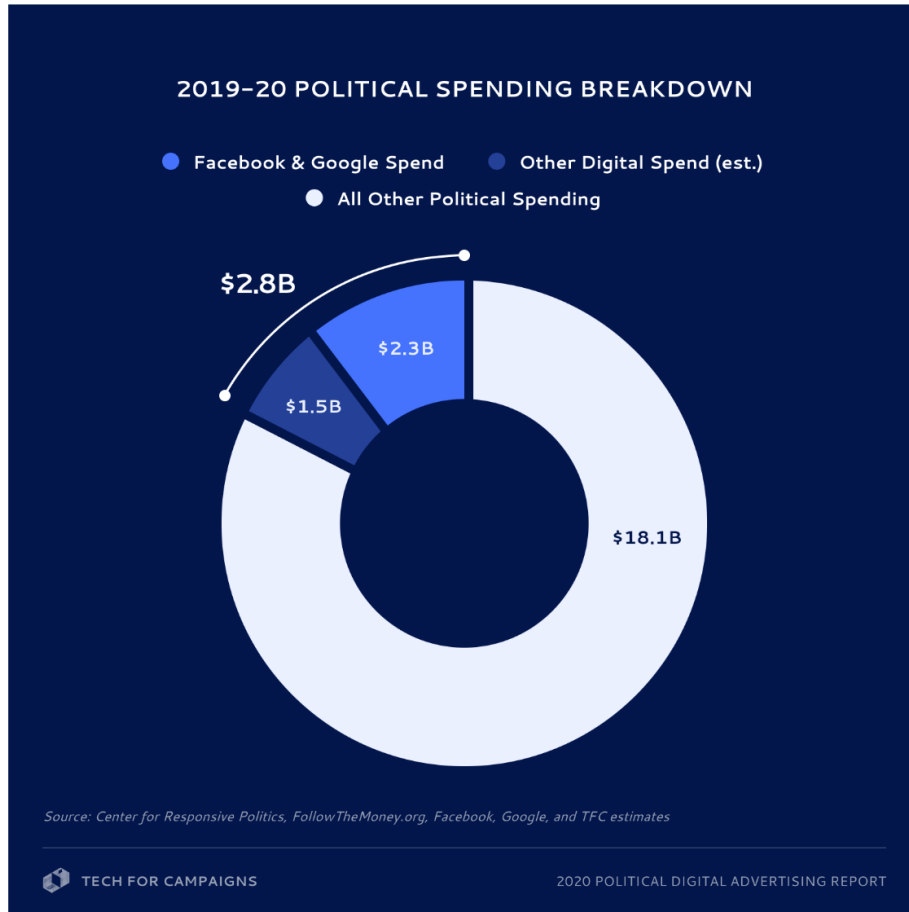
TEAM #19: JACKSON DUKE, SAAD RASHEED,
KELLY SCHWEINSBERG-GEFFEN, MATTHEW CHANG

Background

- Ad spending on social media is projected to reach over \$173 billion in 2022 - will account for 33% of all digital advertising spending in 2022
- Facebook accounts for over 1/3 of that spend in 2022.



Problem Overview



Initial Hypothesis: We expect the number of votes for a candidate to demonstrate an increase based on their Facebook ad spending. With more advertisements targeted at older voters, we predict a larger impact on voter turnout in that demographic.

Literature Survey

The Effect of Social Media on
Elections: Evidence from the
United States

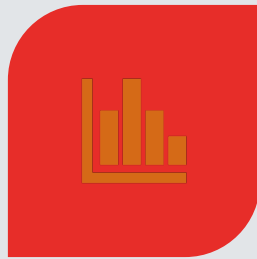
Social Pressure on Social Media:
Using Facebook Status Updates
to Increase Voter Turnout



Data



OVERVIEW



DATA
WRANGLING



HARVARD
DATAVERSE



Pew Research Center



Modeling Approach

Phase 1

Given:

- Region
- Facebook ad dollars spent on state
- Undecided votes won by state

Use:

- Linear Regression
(*Undecided Votes Won* ~ *Ad \$* + *Cat(Region)*)

To:

- Interpret coefficients

Phase 2

Given:

- Region
- Facebook ad dollars spent on demographic (age, gender)
- Change in voter registration by demographic (age, gender) 2016 to 2020

Use:

- Linear Regression
(*Turnout* ~ *Ad \$* + *Cat(Region)* + *Cat(Age)*)
(*Turnout* ~ *Ad \$* + *Cat(Region)* + *Cat(Gender)*)

To:

- Interpret coefficients

Challenges Faced

Missing

Scale

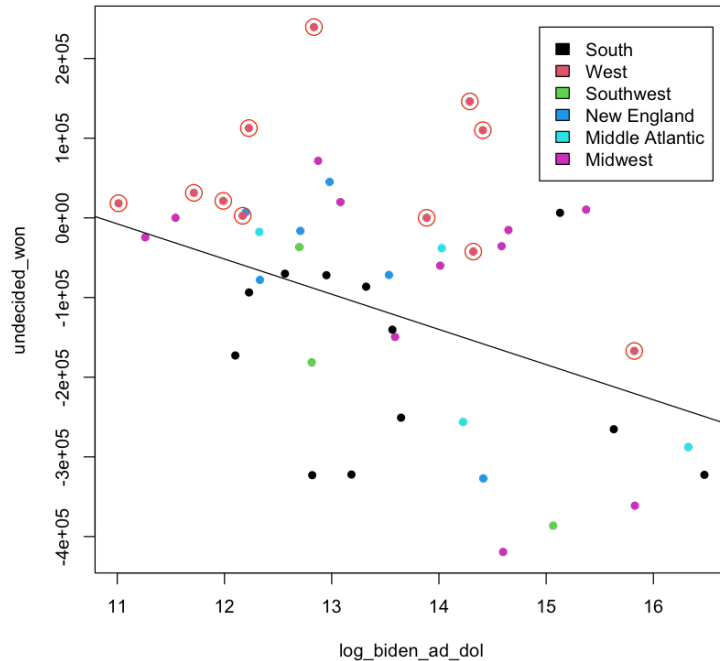
Format

Non-
Linear

Results – Undecided Votes Won

Biden

R-squared: 46.15%, Adj R-squared: 38.076%
Coeff: -44191.22, p-val: 0.0021



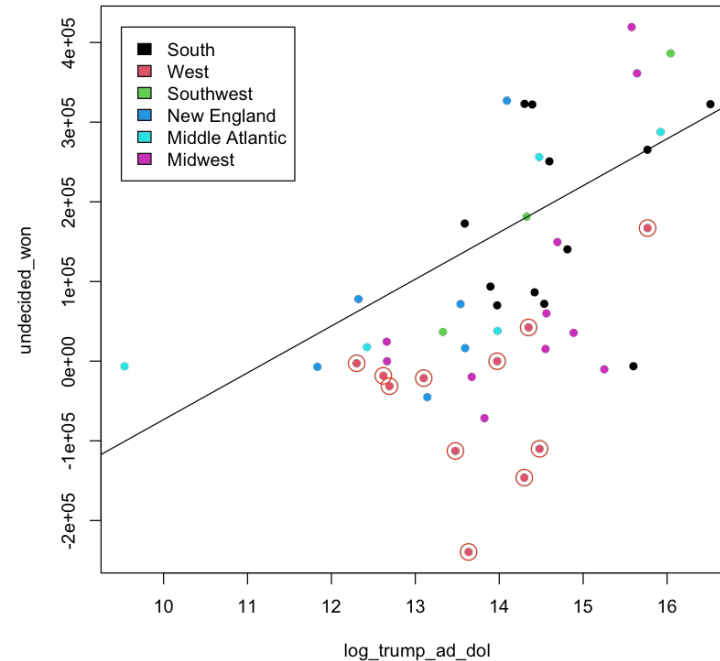
A **1%** increase in Biden's ad spend translates to a **440 decrease** in undecided votes won. However, in the **West**, a **1%** increase in ad spend translates to **1007 votes gained** for Biden.

Significant Variables:
Biden Ad Spend (0.002)
Region.West (0.048)

	lin-lin	lin-log	lin-log (no outliers)
R-squared	31.71	39.42	46.15
Adj R-squared	22.18	20.72	38.08
Ad P-value	0.02	0.04	0.002
Ad Coefficient	-0.02	-38092.65	-44191.22

Trump

R-squared: 49.69%, Adj R-squared: 42.3271%
Coeff: 58754.22, p-val: 3e-04

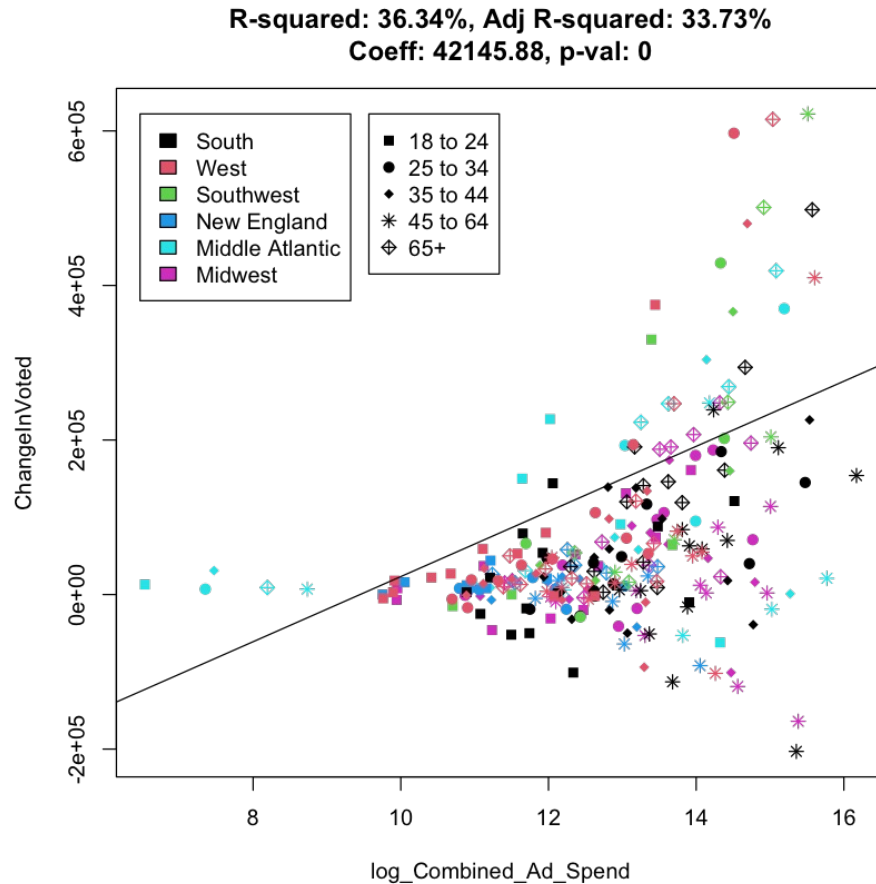


A **1%** increase in Trump's ad spend translates to a **584 increase** in undecided votes won. However, in the **West**, a **1%** increase in ad spend translates to **1275 votes lost** for Trump.

Significant Variables:
Trump Ad Spend (0.0003)
Region.West (0.005)

	lin-lin	lin-log	lin-log (no outliers)
R-squared	37.29	37.39	49.69
Adj R-squared	28.74	28.85	42.33
Ad P-value	0.001	0.001	0.0003
Ad Coefficient	0.0283	66912.09	58754.22

Results - Impact on Age Groups



	lin-lin	lin-log
R-squared	35.09	36.34
Adj R-squared	32.43	33.73
Ad P-val	6e-15	5e-16
Ad Coeff	0.04	42145.88

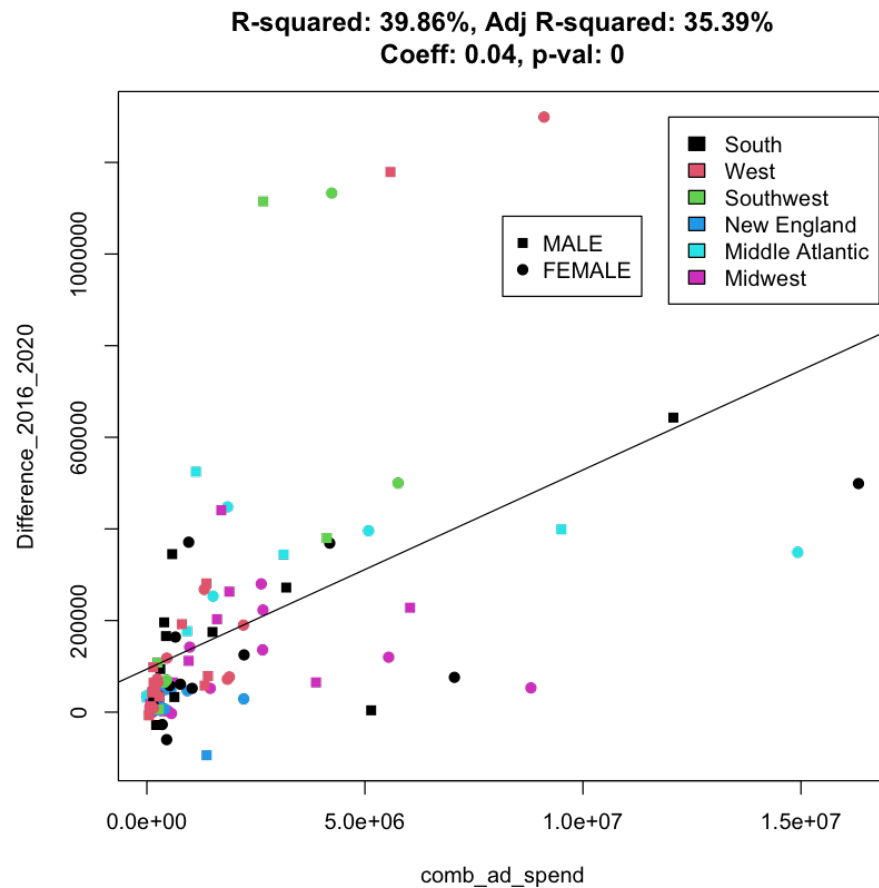
Significant Variables:

Combined Ad Spend ([5e-16](#))
Ages.45-64 ([8e-05](#))
Region.Midwest ([0.0003](#))
Region.New England ([0.003](#))
Region.Southwest ([0.0004](#))

A **1%** increase in combined ad spend translates to a **420 increase** in voter turnout from 2016 to 2020. However, for ages **45-64**, a **1%** increase in combined ad spend translates to **464 decrease** in voter turnout.

Similarly, a **1%** increase in combined ad spend for the **Midwest**, **New England**, and **South** regions translates to **~382 decrease** in voter turnout.

Results – Impact on Gender Groups



	lin-lin	lin-log
R-squared	39.86	32.89
Adj R-squared	35.39	27.90
Ad P-val	1e-08	2e-06
Ad Coeff	0.04	47490

Significant Variables:

Combined Ad Spend (**1e-08**)
Region.Southwest (**0.026**)

A **\$1** increase in ad spending toward either candidate translates to **0.04** increase in votes between 2016 to 2020. This effect was **amplified** in the **Southwest** region.

However, there does **not** appear to be a significant influence on one gender vs another.

Results Summary

Ad Impact on Presidential Election:

- Outside of the **West** region which seemed to reject Trump's ads in favor of **Biden**, **Trump's ads seemed more effective** at bringing out the vote for the 2020 election.

Ad Impact on Age Groups:

- A **1%** increase in ad spend leads to a **420 increase** in voter turnout. However, it doesn't have a large impact on voters of age 45-64 as they were negatively impacted. We also see the regions of New England, Midwest, and South decrease in voter turnout as ad spend increases.

Ad Impact on Gender Groups:

- A **\$1** increase in ad spending toward either candidate translates to **0.04** increase in voter turnout between 2016 to 2020. Since the gender categorical variable is not significant, this means that although female voter turnout average is 93,920 and male voter turnout is higher in comparison, this does not explain the variation in voter turnout. However, the Southwest region variable is significant in the gender analysis indicating that states the southwestern region had a more significant impact on voter turnout than other regions.

Future Research

Given additional time and resources:

Research into additional variables:

- TV ad spend by state
- Twitter interactions
- Facebook group interactions

Perform analysis on other elections

- Senate
- House
- Governor
- European Elections

Test impact of Meta's policy changes

- Meta removed targeting options for "sensitive" campaigns
- Would this change the correlation for the 2024 election?

Works Cited

- <https://www.techforcampaigns.org/impact/2020-political-digital-advertising-report>
- <https://www.princeton.edu/~fujiiwara/papers/SocialMediaAndElections.pdf>
- <https://seriouspod.com/wp-content/uploads/2020/10/Haenschen-using-fb-status-updates-to-increase-voter-turnout.pdf>

Datasets

- https://www.facebook.com/ads/library/?active_status=all&ad_type=political_and_issue_ads&country=US&media_type=all
- <https://electionlab.mit.edu/data>
- <https://www.pewresearch.org/religion/religious-landscape-study/compare/party-affiliation/by/state/>
- <https://independentvoterproject.org/map>
- <https://www.sos.arkansas.gov/elections/research>
- <https://www.sos.state.co.us/pubs/elections/VoterRegNumbers/2020VoterRegNumbers.html>
- <https://www.ohiosos.gov/media-center/press-releases/2021/2021-10-01-a/>
- <https://voteinfo.utah.gov/current-voter-registration-statistics/>
- <https://sos.wyo.gov/Elections/VRStats.aspx>