

Influence of TV Political Advertising in the 2016 Election

Anton Bosneaga, Angikaar Chana, Brendan Foo, Arsh Hothi, Dhangur Singh

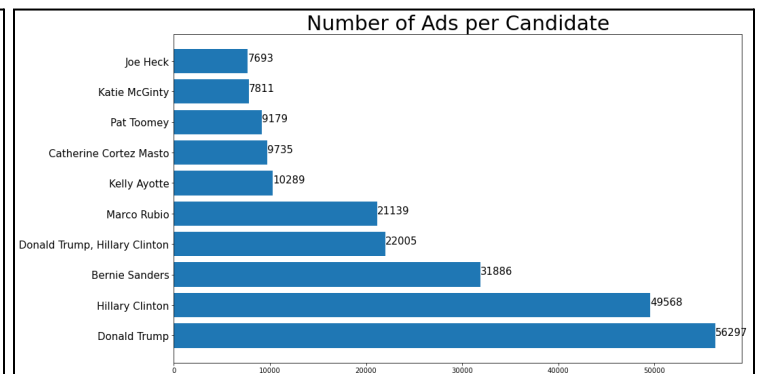
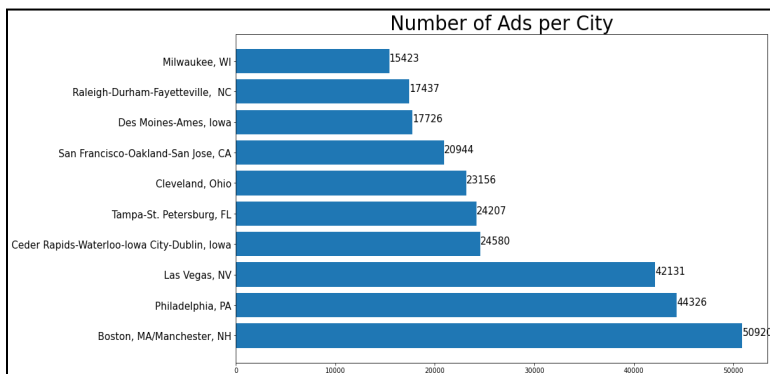
Prof. Gerry Benoit - DATASCI 200 - December 6, 2022

Introduction

Our research aims to assess the various ways in which political advertisements were used in the 2016 presidential election and what impact they had on the outcome of the election. The distribution of advertising resources of the old media (TV, print, etc.) and new media channels has been the subject of animated debate in recent years. Candidates are coming out with new strategies and methods to influence voters. These strategies seem to tend towards disfavoring TV advertising compared to its role in the past. We know that candidates have developed strategies in order to optimize how their outreach works. This is important to analyze in the current political environment due to political advertising expanding into new digital platforms such as social media.

Data Overview/Initial EDA

The data we are looking at comes from a few sources. The first is an archive of political TV ads for various candidates and networks. There are several variables that helped us form our research question that we will talk about individually. We also used various secondary sources for our research sub-questions, which we address in the following section. Some sources stem from data from the 2016 presidential election which aims to help us understand the effect of political ads on the outcome of the election. From the following graphs, we can get an idea of the distribution of ads for each city, candidate, and by subject.



Research Question

Our goal for this analysis is to answer one main research question:

Are television ads an effective channel of advertising for political campaigns?

Five sub-questions were explored in order to answer this general question:

What impact do TV Ads have in Swing States? Is there some connection between the number of ads shown and who won the election?

- Motivation: If we can understand the way in which the number of ads shown affects the outcome of the election or who will win the state, then we can use that to further investigate whether it is effective or not.
- Sanity Check: The data necessary to conduct this analysis is the number of ads aired, per candidate and per state. This involves filtering for our candidates, grouping by location, then further manipulating the data to group by state. Along with this, we can use data from external sources to identify which states are classified as swing states.

Do top donors influence the subjects covered in campaign TV ads?

- Motivation: This sub-question explores if TV ads appeal to the interests of top donors of campaigns in order to study if TV ads are truly effective in representing mutual interests between donors and candidates.
- Sanity Check: To ensure that the data used to answer this question was relevant, we created subsets of data that were specific to answering the question. The primary dataset was filtered by candidate, subject, and ad message (pro and con). The secondary datasets were created from scratch using data from OpenSecrets¹ and further fact-finding.

Do certain television programs favor one candidate over the other?

- Motivation: This sub-question aims to investigate whether the political orientation of a TV program could be relevant to advertising candidates, which can provide insight into the effectiveness of political ads to a certain viewing cohort.
- Sanity Check: To assess the question more pointedly, we filtered our dataset for ads that included either Hillary Clinton or Donald Trump. Then, we used `value_count` methods to derive the number of occurrences for Clinton, Trump, and both together.

Is there a relationship between the time an ad was aired and the political candidate?

- Motivation: As the election landscape changes quickly and the techniques that politicians use to promote their campaigns evolve, we hope to uncover the patterns or trends that help identify the ways in which candidates strategize advertisements with respect to time.
- Sanity Check: We had to account for an anomalous observation that contained data about ads from 2014 which we decided did not belong in the analysis for the 2016 presidential election, as the time gap could have introduced some bias. We then used the `groupby` method on `start_time` by the day and by the hour to achieve an appropriate timeseries plot. Additionally, we had to consider how we interpret the analysis as the timeseries data is based on UTC time and the results varied due to the variation of TV viewing patterns on the East and West coast.

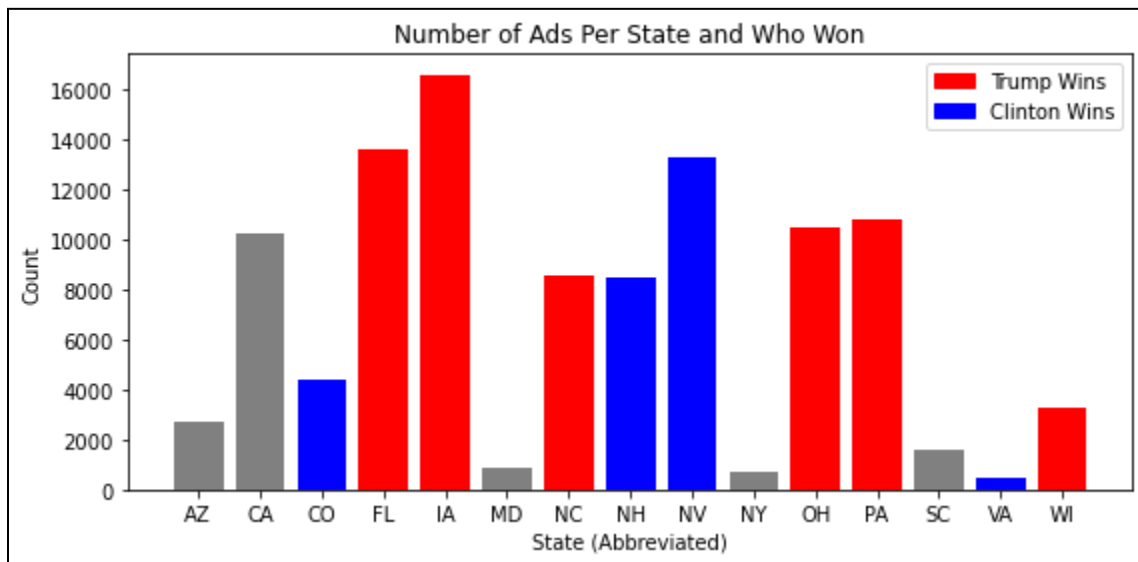
¹ Open Secrets. "2016 Presidential Race," 2017. <https://www.opensecrets.org/pres16>.

What was the impact of negative advertising on the general election?

- Motivation: Negative advertising was a major part of the 2016 presidential campaign. Understanding the way that negative advertising was used by the two major parties allows us to paint a more complete picture of the impact of advertising on that election cycle and perhaps glean insights about the overall impact of negative advertising more broadly.
- Sanity Check: A key way to ensure that our negative ad data was correctly attributed was to look at the organizations that were paying for a given group of ads and attempting to determine their affiliation. Beyond that, we used basic groupby methods and counts in order to ensure that we were separating the data in ways that made sense and no data was counted twice.

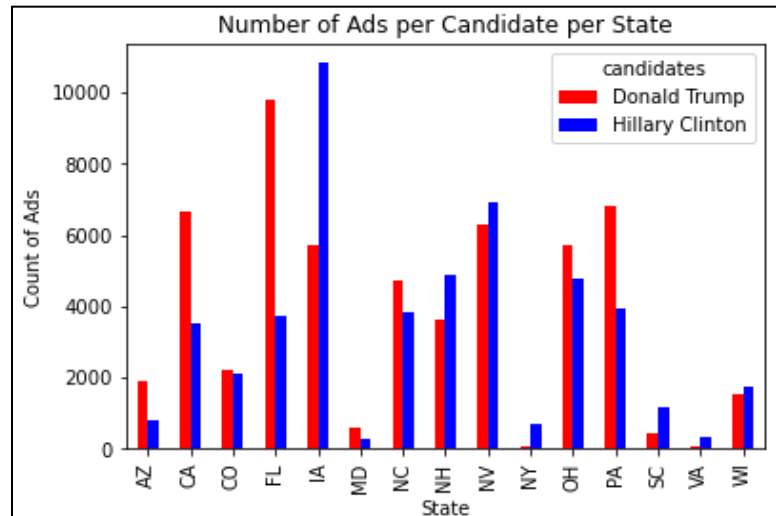
Impact of TV Ads on Swing States

One way that we operationalized our research question was to look into the impact that ads had in swing states.



In this graph, we can see the number of ads on the Y axis and states on the X axis. From there, we colorized the bars for states that Politico, a political journalism newspaper company, identified as swing states (Mahtesian, Charlie. Politico, What are the swing states in 2016?). The eleven states considered swing states in 2016 were: Colorado, Florida, Iowa, Michigan, Nevada, New Hampshire, North Carolina, Ohio, Pennsylvania, Virginia and Wisconsin. Unfortunately, we could not find data regarding ads in Michigan, or it could be the case that no ads were aired there. However, this seems unlikely due to further research. States colored red are swing states that Donald Trump won during the general election, and states colored blue are ones that Hillary Clinton won. For comparison, the gray columns are non-swing states added for comparison sake. From this graph, we can see that, on average, more ads were aired in swing states. Further, Trump ended up winning 6 out of the 10 shown, in contrast to Hillary who only won 4.

Further, we break down the graph to the right to see the number of ads each candidate showed in each state. Interestingly, there is a lot of variation in the number of ads shown and which candidate won the state. For instance, Trump showed the most ads in Colorado but Clinton won that state, and Hillary showed more ads in Iowa and Wisconsin but Trump won those. For the rest of the swing states, the candidate that showed the most ads won the state (Florida-Trump, North Carolina-Trump, New Hampshire-Clinton, Nevada-Clinton, Ohio-Trump, Pennsylvania-Trump, and Virginia-Clinton).



Top Donors and Ad Subjects

For this specific analysis, the chosen candidates for the two political parties in the 2016 election were chosen to look at: Hillary Clinton and Donald Trump. In addition to the main dataset, from which Clinton and Trump specific sets were created, an additional data source in the form of donor data from OpenSecrets organized from highest donation amount to lowest was used to create two new sets: one for each candidate. Looking through these sets and with additional fact-finding work, three top subjects that mattered to or concerned top donors for each candidate were highlighted. They were as follows:

- Hillary Clinton: Jobs, Education, Civil Rights (no particular order)
- Donald Trump: Candidate Biography, Economy, Jobs (no particular order)

It seemed a good place to start by looking at the number of ads that were positive (in the candidate's favor) and related to respective candidates' top donors' top subjects.

Surprisingly, in Table 1 (shown on the next page), the top subjects of concern of Trump's donors did not seem to be addressed by positive Trump ads. However, Clinton's ads did address the top subjects of the campaign's donors. Clinton's ads also covered the top ad subjects of Trump's donors, more so than Trump's ads.

A graph was also created to illustrate this anomaly (Graph 1). Though this seems bizarre, this may not be completely unexpected as Trump's campaign raised less money than Clinton's and also focused more on an internet advertising campaign than TV.

The analysis then shifted towards exploring negative ads about candidates. Instead of running positive ads for their respective donors' top subjects, the candidates could also have run ads that were negative (against) the other candidate for their shortcomings in those very top subjects.

Table 2 shows that there was some activity in this regard, but negative ads against Trump (helpful for Clinton) were more commonplace than negative ads against Clinton (helpful for Trump) across both of their top donors' top subjects. Graph 2 further illustrates this point. This may have been because the Trump campaign could have put more resources towards other advertising channels than TV compared to the Clinton campaign.

Table 1

| | Clinton | Trump |
|----------------------------|---------|-------|
| Jobs | 6743 | 2534 |
| Education | 4524 | 1 |
| Civil Rights | 1509 | 0 |
| Economy | 10651 | 15 |
| Candidate Biography | 5789 | 1633 |

Graph 1

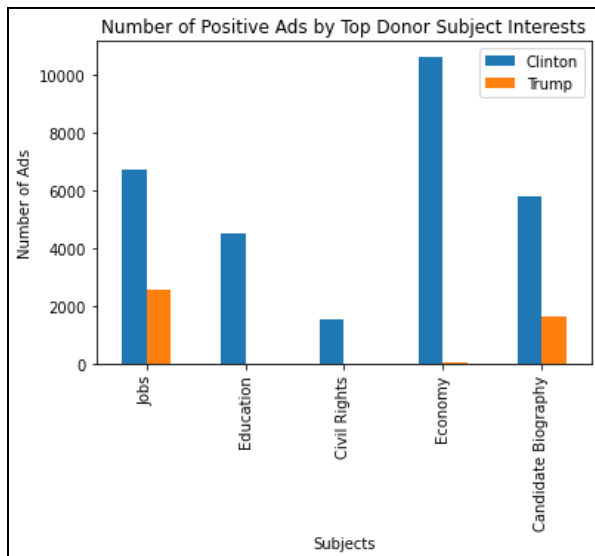
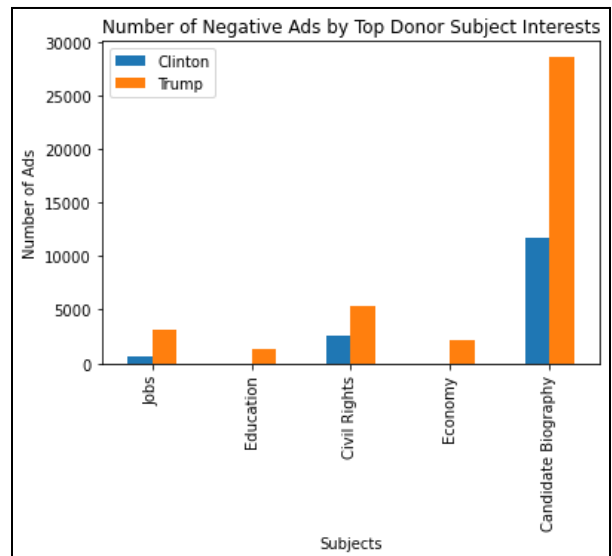


Table 2

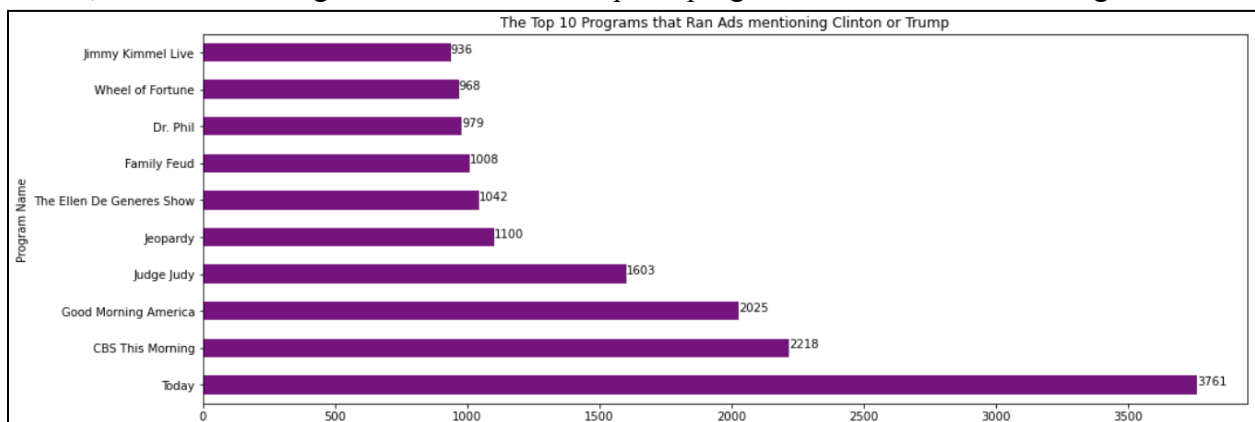
| | Clinton | Trump |
|----------------------------|---------|-------|
| Jobs | 606 | 3160 |
| Education | 0 | 1293 |
| Civil Rights | 2625 | 5341 |
| Economy | 2 | 2209 |
| Candidate Biography | 11758 | 28620 |

Graph 2

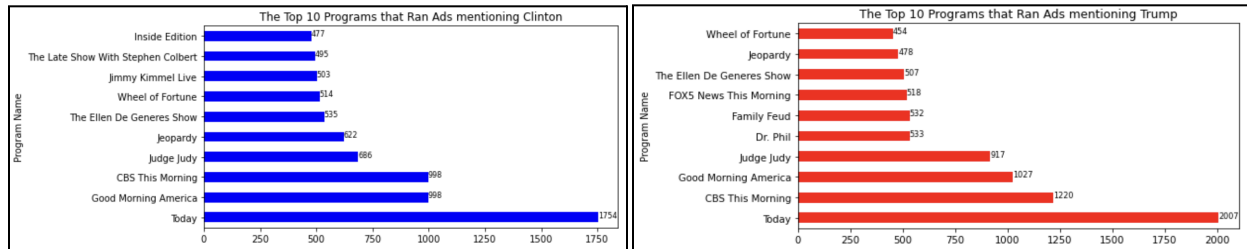


TV Program Preference for Candidates

When investigating whether certain ads seemed to prefer one political party or political candidate over one another, the first step was isolating the top programs that ran ads for either candidate. Hence, we made a histogram to visualize the top-ten programs for both candidates together:



Then, we made two histograms to visualize the top-ten programs for each candidate individually:



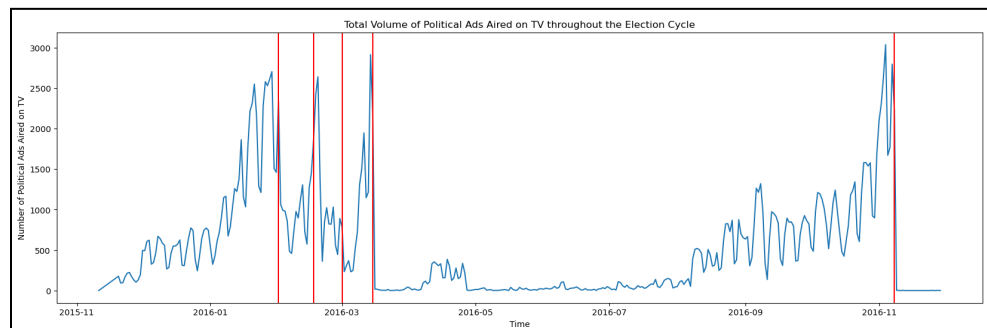
From this data, we can gather the following conclusions:

- The subsidiary visualizations for Clinton and Trump, individually, show that their clusters are similar to half that of the combined dataset: one running nearly 1,750 ads (1st place), one running nearly 1,000 ads (2nd-4th places), and one running nearly 500 ads (5th-10th places).
- While Today ran more ads mentioning Trump, Today ran the most ads mentioning Clinton and Trump by a considerable margin. This is also possibly the case for Judge Judy, which was fourth place for both candidates. Thus, it is unlikely that Today or Judge Judy seemed to have a preference.
- While CBS This Morning and Good Morning America were 2nd-place and 3rd-place, respectively, in the overarching histogram, this was only the case for Trump; Clinton had these two sources swapped. This may suggest that Good Morning America has a preference for Clinton and CBS This Morning has a preference for Trump.
- After fifth place, the rank of certain networks may orient with the political candidates' stances. For example, Clinton had The Late Show with Stephen Colbert – a traditionally left-leaning show – in her top ten while Trump had FOX5 News This Morning – a traditionally right-leaning news program. However, this trend is vulnerable to criticism: a counterexample is Trump's top ten containing the Ellen DeGeneres Show.

Ultimately, we may conclude that it is unclear whether programs have an implicit preference. While a few programs may prefer one candidate due to their political leaning, there is no clearly isolable trend of such political preference amongst top advertisers.

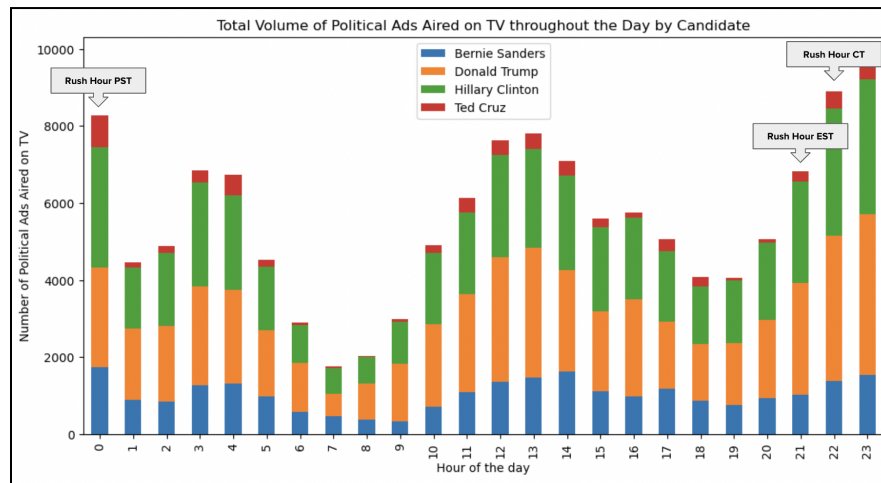
Time Series Analysis

Next, we performed a time series analysis on our cleaned political ads dataset. First, we showcase how the total volume of political ads aired on TV by all candidates changed throughout the election cycle. From this graph, we can see there were peak periods around mid to late March and early November. There



were also several highs throughout January and the middle of February. This is in line with the major election cycle events. The first major contest, the Iowa Primary Caucuses, was held early February. The next major event was Super Tuesday, whose results were a strong indicator of the likely eventual nominee of each political party; hence, the increased investment from all candidates is reflected in the graph. The November event is when the election cycle concludes, with the party nominees (Donald Trump and Hillary Clinton) escalating their efforts accordingly.

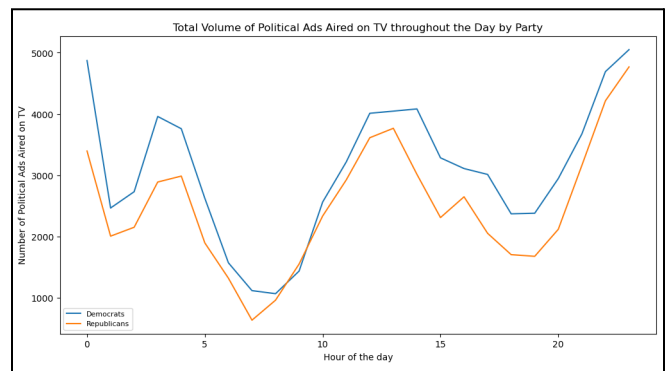
Next, we take a deeper dive into the airings of those political ads by the hour across the election cycle.



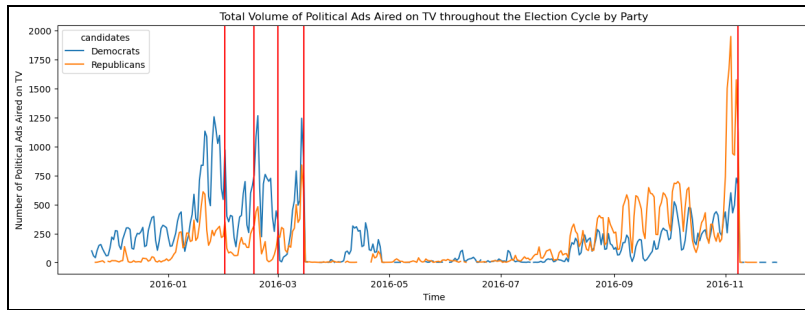
We take one step deeper and show the breakdown of political ads shown throughout the day by the four most relevant candidates (Republican: Donald Trump, Ted Cruz; Democrat: Hillary Clinton and Bernie Sanders). Not surprisingly, all candidates air their ads during the rush hour periods, which are

between 12 PM UTC to 2 PM UTC and 9 PM UTC to 12 AM UTC. There is a surprising high around 3 and 4 AM UTC, which is around 7 PM PST. This would be the time for most people to have dinner so ads would be shown as people are consuming their dinners.

We then look at how political ads shown throughout the day vary by the political party (Democrats versus Republicans among only the top 2 candidates from each party). Throughout the day, it appears that Democrats are more aggressive in their showing of political ads throughout the day. However, we must also consider that in the 2016 election cycle, Bernie Sanders and Hillary Clinton were the two most prominent candidates and there was little focus on the other candidates. Whereas for the Republican party, there was fierce competition among several candidates other than Donald Trump and Ted Cruz. This includes John Kasich, Marco Rubio, Jeb Bush, and Ben Carson. Our analysis excluded the other candidates, which could have resulted in a lower total number of political ads aired throughout the day. This becomes a bit more obvious when we take a look at the total number of ads shown throughout the entire election cycle.



In the graph below, when only considering the top 2 candidates, we can see in the early stages of the election cycle, democrats had many more political ads aired. Once the playing field leveled

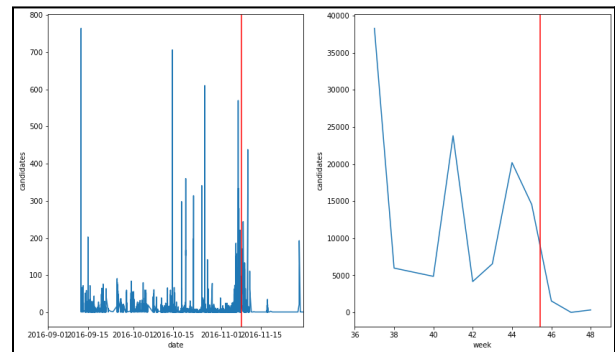


and closer to the end of the election cycle, where it came to just Hillary Clinton versus Donald Trump, we can see that the Republican party had an advantage in political ads over the Democrat party. This difference became even more

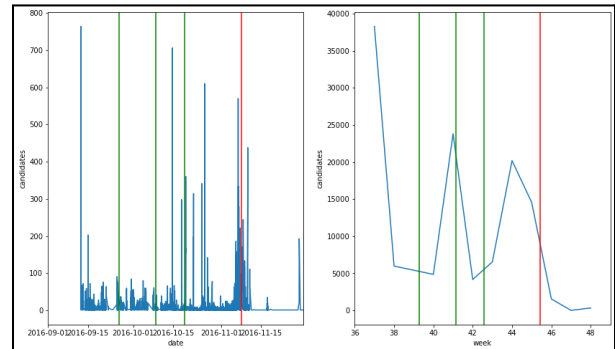
overwhelming in the last few weeks of the election cycle. This difference may have contributed to candidate Donald Trump eventually winning the Presidential Race.

Negativity in Political TV Advertising Over Time

The prevalence of negative advertising was highly variable over time. If we look at the distribution of ads over time, that is, the times when the most negative ads were aired. We can see that the frequency of negative ads shows some distinct patterns. The intensity of negative ads spiked around key events like marquee debates, opposition research releases, election day, etc.



The four graphs to the right all contain exactly the same information, only plotted slightly differently. The two graphs on the left have the raw negative frequencies aggregated by day. The two graphs on the right have the exact same frequencies but aggregated by the week. The two top graphs have only one event plotted, the red line that indicates election day. The two bottom graphs have three additional key events plotted in green - the three major presidential debates.

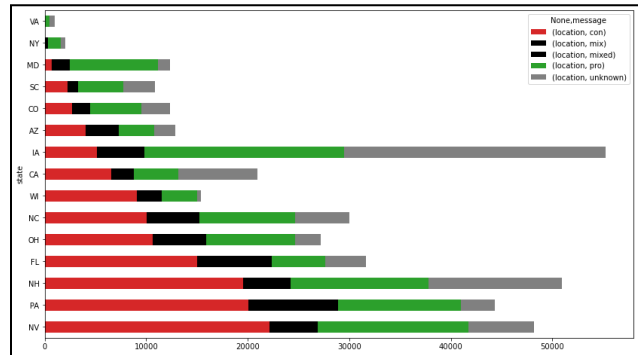


We see that the negative ad spikes were correlated with some of these events. Mainly, there is a large spike just before the election and another spike around the second presidential debate. We have also verified that some of the smaller spikes in the per-day graph follow other important events in the 2016 campaign. Some spikes were caused by campaigns trying to capitalize on various scandals or events like opposition research releases by targeting their opponent with negative advertising.

If we grant that many of the negative ads appear to have been run by outside groups, theoretically insulated from the main campaigns. The loose coordination of negative ads seems to have led to spikier and less concentrated negative ad pushes.

Negativity in Political TV Advertising by State

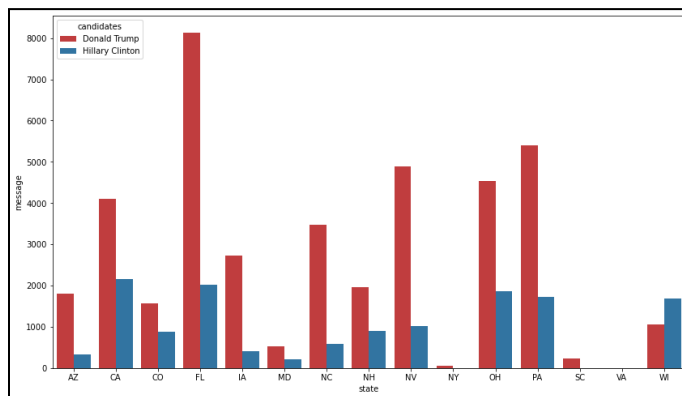
Negative advertising was highly concentrated in swing states and states that one of the campaigns were trying to defend or gain ground. According to our dataset, some states did not see any negative advertising from the two major campaigns and their affiliates. In the states where negative advertising was used at all, it usually made up a significant portion of the overall advertising volume.



In the graph above, we look at the breakdown of negative ads by state. We can see a clear targeting of swing states and “battleground” states for the 2016 election cycle. It appears that negative advertising was more concentrated in contentious states rather than positive and mixed advertising. On the other hand, our dataset shows that some non-battleground states saw no negative advertising whatsoever. While this is likely not entirely true, the completeness of our dataset indicates that negative ads were highly concentrated in just a handful of important states.

Negativity in TV Advertising by Candidate

If we zoom in on only the presidential race, we can see that one of the two major presidential campaigns used negative ads at a much higher rate than the other.



The graph to the left explores the candidate level breakdown of negative ads by state. We can immediately identify which major party candidate used more negative ads. In many cases, the difference between the two political campaigns is denominated in hundreds of percent. The magnitude of negative ads also appears to correlate with the stated electoral strategy of each campaign, e.g. the Clinton campaign was attempting to frame Trump via negative ads in a variety of battleground states.

We can see that in any states where notable quantities of negative ads were used, anti-Trump ads vastly outnumber anti-Clinton ads. In other words, the Clinton campaign and its affiliates were the primary originators of negative ads in the 2016 presidential campaign. This was true in all states except Wisconsin. This is a vital takeaway when considering ads’ impacts on the election.

Further Applications & Conclusion

After conducting analysis based on our sub-questions, the results seemed to indicate that TV advertisements were somewhat effective during the 2016 campaign. Under each section, Hillary Clinton's campaign and the Democrats seemed to edge out over Donald Trump and the Republicans in the general election campaign when it came to advertisements and advertising strategy. Despite this, Clinton still lost the election.

While we do not claim that the outcome of the election was directly related to advertising strategy, our analysis can serve as a starting point towards identifying some of the possible reasons and causes for this outcome. One possible reason is that TV ads may not be less effective than it was in the past but there may be more effective advertising channels now available, especially those related to social media and the internet. All that considered, TV advertising is still alive and well-utilized by political campaigns, as seen in the report.

For all notebooks and data:

https://github.com/UC-Berkeley-I-School/Project2_Hothi_Singh_Foo_Chana_Bosneaga