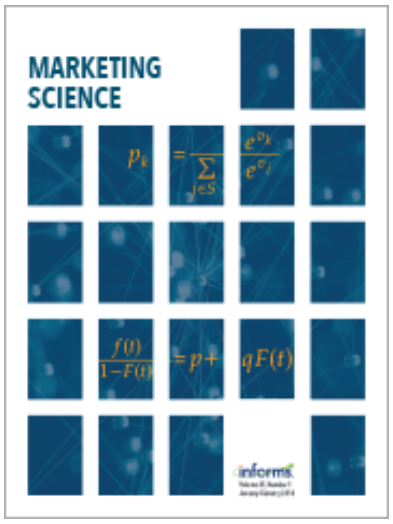

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Impact of Political Television Advertisements on Viewers' Response to Subsequent Advertisements

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Abstract. Political advertisements on television can affect viewers and may, consequently, influence the effectiveness of subsequent ads. Such ad-to-ad spillover effects—where one ad influences how viewers respond to a subsequent ad—have drawn concerns from nonpolitical advertisers, raising the question: how do political ads on television impact viewers' response to subsequent ads? We empirically investigate this question using two outcomes of ad response: ad viewership and online conversations about ads. We use data on 849 national political television ads from the 2016 election and leverage a quasi-experimental design to delineate the effect that a political ad has on the subsequent ad. We show that, counterintuitively, political ads spur positive spillover effects. Specifically, ads that follow a political ad, compared with ads that follow a nonpolitical ad, experience an 89% reduction in audience decline and thus air to larger audiences. Additionally, we find evidence that viewers engage in more positive online ad chatter about ads that air after political ads, with these ads experiencing a 3% increase in positive chatter after the ad. Our investigation contributes to research on advertising that has yet to explore ad-to-ad spillover effects and, more broadly, provides insights into how political messages influence consumers.

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Keywords: television advertising • quasi-experiment • ad effectiveness • online word-of-mouth • political marketing

1. Introduction

The volume of political communications that consumers are exposed to each day is on the rise. Evidence for this includes the increases in political news consumption (Otterson 2017, Adgate 2018), political protests and rallies (Kauffman 2018), research on political topics (Jung et al. 2017), and social media conversations about politics (Anderson et al. 2018). Another contributing factor to the ubiquity of political communication is the growth of political advertising (*eMarketer* 2018a). Enormous spending by candidates, political parties, and political action committees (PACs) is fueling intense political campaigns. In the 2016 U.S. election cycle, these entities spent $6 billion on television advertising; as a result, political ads accounted for 8% of U.S. television ad revenue in 2016 (Kaye 2017).

Although most research on political media focuses on its impact on voter turnout and election outcomes (Gordon et al. 2012), exposure to political messages may influence behavior beyond the political context. One marketing context where such spillover effects of political communications is important is advertising. Political advertising can strongly impact viewers, often adversely by spurring negative arousal (Merritt 1984, Klein and Ahluwalia 2005, Phillips et al. 2008). The effects of political ads have begun to worry nonpolitical advertisers who are concerned with how consumers may respond to their marketing message if it follows an exposure to political media. For example, advertisers have expressed fears about how political content near ad exposure impacts consumer's perceptions of the brand's message and integrity (Mullins 2018, Joseph 2019, Vranica 2019). The threat of such negative spillover from political messages has led advertisers to cut spending on platforms that place ads adjacent to political content (Mullins 2018, Vranica 2019). This loss in ad revenue has created concern over the ability of ad platforms to broadcast politically focused media (Vranica 2019). For television advertisers, these concerns are especially paramount. Industry studies suggest that following a political ad on television may hurt ad effectiveness and brand perceptions, even if the political ad's message is positive (McClellan 2016, Stein 2016). Given that the average 30-second television ad costs more than $120,000 to

air on a primetime broadcast show (Katz 2013, p. 69), advertisers are right to be concerned about external factors influencing ad effectiveness, which raises the question: how do political ads affect viewers' response to subsequent ads?

Little is known about the potential spillover effects of political ads on the ads that follow them. Indeed, there is a shortage of research in marketing on ad-to-ad spillover effects, that is, how one ad influences viewers' response to the next ad. Prior work does suggest that spillover, in general, may be possible. For example, the characteristics of a television program can influence how viewers respond to ads that air in the program (Murry et al. 1992, Puccinelli et al. 2015, Fossen and Schweidel 2019a). Additionally, Xu and Wyer (2011) show that priming a viewer with a specific emotional or cognitive state can influence her response to subsequent ads.

The goals of this study are to address the gap in research on ad-to-ad spillover in the context of political advertising and shed light on how the rise in political communications may affect consumers. We do so by investigating viewer response to an ad that follows a political ad on television using two distinct measures of ad response: ad viewership and online conversations about the ad. For the former, if a political ad influences viewership, this impacts the effectiveness of the subsequent ad in terms of the audience size that can be exposed to the ad. The majority of television ads experience viewership decline, where audience size decreases over the course of the ad (Danaher 1995, Schweidel and Kent 2010); thus, a spillover effect influencing this measure of ad response would materialize as either an amplification or an attenuation of viewership decline. For the latter measure, following recent work that shows that viewers often engage in online chatter related to media consumption (Fossen and Schweidel 2017), we explore how political ads impact the volume and valence of online chatter about subsequent ads.

To explore how political ads influence response to subsequent ads, we gather data on national political television ads from 2016, data on the ads that follow the political ads (including their other airings), audience size during the ads, and online chatter about the ads. We rely on a quasi-experimental setting that allows us to delineate the effect of following a political ad on our two outcome measures of ad response using a treatment-effects model. For this purpose, we exploit the standard industry practice that the sequencing of ads within a break is nonsystematic (Wilbur et al. 2013, Fossen and Schweidel 2017, Deng and Mela 2018).

Our results show that political ads have positive spillover effects on subsequent ads such that ads that follow a political ad, as opposed to those that do not, air to more viewers because of lower viewership decline. This spillover effect is substantial: ads that air after political ads, compared with those that do not, see an 89% reduction in viewership decline. This positive spillover occurs regardless of whether the political ad is an attack ad or not, who the ad supports, or who sponsors the ad. Moreover, the magnitude of positive spillover is greater for attack ads (compared with nonattack ads) and pro-Republican ads (compared with pro-Democrat ads). We also find that political ad spillover is moderated by the ad's position in the ad break such that the spillover effect is lower for ads that air later in the break. Additional analysis on a second ad response measure, online ad chatter, shows further evidence of the positive spillover effects of political ads. Specifically, ads that follow a political ad compared with those that do not see a 3% increase in positive chatter in the five-minute window after the ad.

Our findings contribute to extant research on three fronts. First, we provide evidence that ad-to-ad spillover—where one ad influences ad response to the subsequent ad—can occur, contributing to research on television advertising that has yet to investigate ad-to-ad spillover and improving our understanding of the factors that influence ad effectiveness. Second, the ubiquity of political ads makes it imperative to study the potential spillover effects of political communications. Our investigation provides insights into the direction and magnitude of political ad spillover effects for television advertising. Third, our research sheds light on how the rise in exposure to political communications is impacting consumers more broadly. Overall, our findings contribute to research on advertising, ad effectiveness, and political marketing by empirically documenting ad-to-ad spillover in the context of political advertising on television.

2. Conceptual Background

2.1. Political Advertising and Communications

As advertising has significant impacts on electoral outcomes (Gordon and Hartmann 2013), political campaigns spend heavily on advertising. More than $8 billion was spent on advertising during the 2016 U.S. election, with more than 70% going toward television ads (Kaye 2017). Consequently, advertising on mass media has become a strategic imperative for candidates with significant profit consequences for media channels. The growth of political advertising reflects a broader trend of increased political communications, resulting in a rise in the volume of political content that consumers are exposed to each day (Otterson 2017, Anderson et al. 2018).

Given the importance and growth of political advertising, marketing scholars have begun to pay close attention to the topic. The impact of political ads on

outcomes such as vote share and turnout have been explored in prior research (Gordon et al. 2012). Implications of political advertising, such as its impact on partisan viewpoints, can extend beyond the objectives of political campaigns. For example, political ideology can affect product preferences (Ordabayeva and Fernandes 2018), complaining behavior (Jung et al. 2017), and recycling behavior (Kidwell et al. 2013).

Yet, one important issue remains unexplored. Consumers are often exposed to political and nonpolitical messages in close proximity. Political media typically stands in stark contrast to nonpolitical media because of the negative arousal it evokes (Merritt 1984, Klein and Ahluwalia 2005, Phillips et al. 2008). Indeed, political messaging carries a negative connotation regardless of its valence (Duggan and Smith 2016, McClellan 2016, Stein 2016). Political ads also differ from nonpolitical ads because of the market in which they attempt to persuade voters, a market characterized by duopolistic choice and high levels of involvement (Merritt 1984, Phillips et al. 2008). The intermingling of political and nonpolitical media paired with their differences raises the question of how political advertising impacts perceptions of subsequent nonpolitical advertising. These spillover effects have yet to be explored and are the central focus of our work.

2.2. Spillover Effects in Marketing Contexts

Spillover effects have been documented in a variety of marketing contexts. For example, Ahluwalia et al. (2001) find that marketing messages can change beliefs about attributes not mentioned in the message. Kamins et al. (1991) find that happy (sad) ads are viewed more favorably when viewed after a happy (sad) show. Similarly, Puccinelli et al. (2015) find that consumers who watch a sad movie find it more difficult to view energetic ads. Other studies have shown that if viewers are more engaged with a show, they process subsequent ads better (Murry et al. 1992, Dahlén 2005, Fossen and Schweidel *2019a*). Although research has yet to explore ad-to-ad spillover effects, these findings indicate that consumers carryover perceptions from a primary consumption experience to a subsequent one. As such, ads could potentially affect how viewers respond to subsequent ads. Furthermore, these effects might be amplified by events that create a heightened sense of arousal (Murry et al. 1992, Puccinelli et al. 2015).

2.3. Spillover Effects of Political Ads

Why might political ads impact how viewers respond to subsequent ads? The final moments of an ad, which occur right as the next ad begins airing, tend to have the strongest impact on shaping viewers' emotional response (Baumgartner et al. 1997). Thus, the effects of political ads on viewers have the potential to spillover and impact viewers during a subsequent ad. We turn to research in political marketing for insights into how political ads might influence viewers.

Past work suggests that political ads may spur negative spillover. For example, studies show that, in general, individuals are negatively disposed toward political advertising as it often incites negative arousal (Merritt 1984, Klein and Ahluwalia 2005, Phillips et al. 2008). A recent Pew Research study supports this notion, finding that nearly 40% of Americans are aggravated by political content (Duggan and Smith 2016). Such negative connotation of political messaging persists regardless of its valence (McClellan 2016, Stein 2016), although attack ads may spur higher levels of disdain (Phillips et al. 2008). Media context effects pertaining to mood suggest that the negative arousal spurred by political ads may encourage viewers to react negatively to a subsequent ad (Kamins et al. 1991, Puccinelli et al. 2015). Therefore, it seems that political ads may spur negative spillover effects, which would validate advertisers' concerns that political ads damage the effectiveness of subsequent ads (Stein 2016, Joseph 2019, Vranica 2019).

In contrast, mood maintenance and affective contrast theories suggest that the negative arousal spurred by political ads may encourage positive spillover (Wegener and Petty 1994). Specifically, negative arousal generated by a political ad may make the next ad seem positive or motivate viewers to seek a positive state, thereby improving response toward the next ad.

In addition to negative arousal, two other mechanisms suggest that political ads may spur positive spillover. First, although political ads are more likely to incite negative arousal, the right mix of valence, message, and audience may yield a political ad that spurs a positive state by rousing enthusiasm or ingroup loyalties (Brader 2005, Klein and Ahluwalia 2005, Phillips et al. 2008). Second, political ads may intensify attention (Brader 2005, Gilens and Cohen 2007, Lau et al. 2007). The hedonic contingency theory on mood maintenance (Wegener and Petty 1994) suggests that viewers in a state of attention or positive arousal are motivated to stay in such positive states. Thus, viewers' response toward the ad that follows a political ad may be enhanced.

Because past research indicates that both positive and negative spillover effects from political ads may be possible, we treat the nature of the relationship between political ads and viewers' response to subsequent ads as an empirical question. We also probe the plausibility of the three mechanisms discussed

previously that may drive these spillover effects: political ads can (1) increase negative arousal (spurring positive or negative spillover), (2) increase positive arousal (spurring positive spillover), and (3) increase attention (spurring positive spillover). Additionally, given that ad valence, political party, and sponsorship play an important role in impacting how political ads influence viewers (Merritt 1984, Klein and Ahluwalia 2005, Phillips et al. 2008, Wang et al. 2018), we explore how political ad spillover varies across these political ad characteristics.

2.4. Details of Empirical Analyses

We use ad viewership, which has been used extensively to study ad effectiveness, as our primary measure of ad response (Danaher 1995, Teixeira et al. 2010, Wilbur et al. 2013, Schweidel et al. 2014). To provide a comprehensive view of how political ads influence subsequent ads, we study an additional measure of ad response, viewers' online chatter about ads, which also has been used to examine ad effectiveness (Fossen and Schweidel 2017, Tirunillai and Tellis 2017).

A key element of our inquiry into the spillover effects of political ads pertains to the sequencing of ads within an ad break. Advertisers pay for the majority of ads several months before airing, and, at best, can only negotiate airtime at quarter-hour-levels (Katz 2013, p. 152). However, advertiser-network contracts rarely write-in the airing time of an ad or even state the specific show in which an ad will air (Liaukonyte et al. 2015). Networks make the sequencing decisions about which ads to air across programs and commonly use a random order within ad breaks (Wilbur et al. 2013), an assertion further verified in more recent data sets on television advertising (Deng and Mela 2018, McGranaghan et al. 2019). Networks compensate advertisers for shortage in reach by rerunning the ad in a comparable spot on the same or a similar show to make up the remaining rating points (Katz 2013, p. 200). Consequently, advertisers currently have limited control over the selection of a specific time to air an ad.

We leverage this common current television industry practice of nonsystematic ad sequencing to discern the impact of following a political ad on the subsequent ad. We conceptualize *the event of following a political ad* as the *treatment* condition compared with the *control* condition, which is *the event of not following a political ad*. In the next sections, we describe the data and model framework with which we conduct this investigation.

3. Data

3.1. Television Advertising Data

We collect data on television advertising from the 2016 U.S. election season from Kantar Media's Stradegy database. Our data include national,[1] primetime[2] political ads from the 2016 election (political ad p) and all ads that immediately follow a political ad (ad i).[3] The data also include all other national primetime airings of ad i during the 2016 election when ad i does not follow a political ad. Thus, when a specific ad airs after a political ad, we have data on these airings and data on all other airings of that same ad during the 2016 election. Overall, our data includes 43,089 ad instances that aired from June 30 to November 8, 2016 (Election Day). These ad instances include 738 ad creatives for 470 brands that aired on 87 networks across 1,196 programs. Of the 43,089 ad instances, 849 follow a political ad. As we focus on national political ads, the majority of these political ads concern the presidential election.

We also collect data on several ad characteristics from Stradegy that have been shown to impact response to television ads (Danaher and Green 1997, Fossen and Schweidel 2017). We obtain information on the ad creative, product category of the advertised brand, when the ad airs (time, day of the week, and days until Election Day), position of the ad in the break and in the program, number of ads in the break, ad length, and characteristics of the program (specific program and genre). Following previous work on political ad effectiveness (Klein and Ahluwalia 2005, Phillips et al. 2008, Wang et al. 2018), we also collect information about the political ads, including who the ad supports, who sponsors the ad, and if the ad is an attack ad or not.[4]

3.2. Ad Response Measures

In our primary analysis, we explore the spillover effect of political ads on subsequent ads by using data on audience size during ads. To enhance the relevance of our findings regarding these spillover effects, we consider an alternative measure of ad response: online ad chatter, measured through the volume and valence of online conversations about the ad. We detail this investigation, including data description, in the section on additional analyses.

We obtained data on audience size from Comscore, Inc.'s TV Essentials, which includes set-top box tuning data from more than 20 million U.S. households (Comscore TV Essentials 2020).[5] The most granular measure of audience size reported by TV Essentials is the number of televisions tuned in to a program during each 30-second interval (e.g., the number of viewers watching *Sunday Night Football* from 8:00:00 p.m. to 8:00:30 p.m., from 8:00:30 p.m. to 8:01:00 p.m., and so on). We determine audience size at the beginning and end of an ad using two approaches. For our primary approach, we treat audience size as constant; that is, audience size at 8:00:00 p.m. represents the number of households tuned in from 8:00:00 p.m. to 8:00:29 p.m.[6]

TV Essentials reports audience size, measured every second (not shown to data users), averaged over each 30-second interval. Although data for 30-second intervals captures a granular level of viewership, the intervals do not always line up with the beginning and end of an ad. Thus, these data could suffer from measurement error that second-level data would avoid. To address this issue, we explore descriptive statistics, robustness analyses, out-of-sample second-level viewership data, and simulations to show that our key results are not an artifact of the 30-second intervals reported in TV Essential's data. We detail these analyses in the online appendix.

3.3. Descriptive Statistics

3.3.1. Political Ads. Tables 1 and 2 show descriptive statistics about the political ads in our data. Table 1 illustrates the ad activity by political advertiser and shows that most of the ad instances were run by candidates (80%), followed by PACs (18%) and political parties (2%). Additionally, the majority of the ad instances are pro-Democrat (70%), followed by pro-Republican (22%) and other political ads (8%).[7] The final group contains ads for third party candidates and ads about ballot measures. Also, the large number of unique ad creatives aired relative to the number of ad instances in Table 1 indicate that political ad creatives are not repeated often.

Table 2 provides additional descriptive statistics about the content of political ads. Of note, the majority of the political ads are attack ads (70%). Additionally, we see that pro-Democrat ads and pro-Republican ads are similar regarding their characteristics including the likelihood to be attack ads, ad length, position in the ad break and program, and length of the ad break in which they air. The average number of days until Election Day from airing, however, does vary, as Table 2 suggests that pro-Republican ads ran closer to Election Day.

3.3.2. Ad Characteristics. Tables 3–5 and Online Appendix Tables 1 and 2 present descriptive statistics about all the ads in our data. We see in Table 3 that the average ad loses 1.09% of its audience from the beginning to the end of the ad, indicating that, on average, viewership declines as ads air, consistent with prior research (Danaher 1995, Schweidel and Kent 2010).

Importantly, we see from Table 4 that ads that follow political ads are similar to those that do not. Table 4 illustrates that the distributions of ad instances across product category of the advertised brand, day of the week the ad airs, and time the ad airs are very similar when comparing ads that follow political ads versus those that do not. We see little evidence that networks select certain types of ads to

Table 1. National Political Television Ads by Political Advertiser

Political advertiser	Description	Unique ad creatives aired	Number of ad instances
Pro-Democrat ads			
Clinton for President	Candidate	78	573
Democratic Congressional Campaign Committee	Democratic party committee	1	1
Democratic National Committee	Democratic party committee	5	14
Priorities USA Action	Liberal PAC	2	3
Pro-Republican ads			
45Committee Organization	Conservative PAC	1	1
Future 45 Political Organization	Conservative PAC	16	50
Great America PAC	Conservative PAC	3	7
NRA Political Victory Fund	Conservative PAC	3	18
Rebuilding America Now	Conservative PAC	2	2
Stop Hillary PAC (now known as Committee to Defend the President)	Conservative PAC	1	2
Trump for President	Candidate	35	107
Other political ads			
45Committee Organization	Conservative PAC	5	14
Californians Against the Deceptive RX Proposition	Nonpartisan PAC	2	3
Californians For Population Stabilization	Nonpartisan PAC	1	1
Federation for American Immigration Reform	Nonpartisan PAC	1	1
Oklahomans For Criminal Justice Reform	Nonpartisan PAC	1	1
Purple Pac Incorporated	Libertarian PAC	2	20
Stein for President	Candidate	2	3
Vote 4 Energy Organization	Nonpartisan PAC	6	19
Vote Vets Action Fund	Nonpartisan PAC (liberal-leaning)	3	4
Vote Yes on Soda Tax	Nonpartisan PAC	1	3
Yes On Prop 61	Nonpartisan PAC	1	2
All Political Ads		172	849

Note. Our data include national political ads that aired from June 30th until Election Day 2016.

Table 2. Ad Characteristics of National Political Television Ads

Political ads by party and ad type	Number of ad instances	Ad length (s)		Ad position in break		Break position in program		Number of ads in break		Days until Election Day	
		Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)
All pro-Democrat ads	591	28.60	(6.69)	4.54	(2.56)	3.53	(2.73)	9.59	(3.15)	51.55	(37.32)
Pro-Democrat attack ads	415	29.12	(5.44)	4.53	(2.42)	3.49	(2.54)	9.62	(3.15)	51.33	(32.44)
Pro-Democrat nonattack ads	176	27.39	(8.88)	4.58	(2.87)	3.63	(3.14)	9.52	(3.15)	52.07	(46.97)
All pro-Republican ads	187	31.31	(8.52)	4.12	(2.28)	3.99	(3.45)	8.70	(2.81)	26.16	(32.75)
Pro-Republican attack ads	147	31.67	(9.59)	4.08	(2.32)	4.13	(3.68)	8.60	(2.87)	25.22	(35.68)
Pro-Republican nonattack ads	40	30.00	(0.00)	4.28	(2.15)	3.50	(2.44)	9.08	(2.59)	29.60	(18.23)
All other political ads	71	25.56	(8.17)	3.10	(1.77)	3.68	(3.35)	8.21	(2.02)	55.85	(34.04)
Other political attack ads	29	31.03	(5.57)	4.07	(1.46)	3.03	(1.40)	8.59	(2.10)	58.76	(24.65)
Other political nonattack ads	42	21.79	(7.56)	2.43	(1.65)	4.12	(4.16)	7.95	(1.95)	53.83	(39.41)
All political ads	849	28.95	(7.41)	4.33	(2.47)	3.65	(2.96)	9.28	(3.04)	46.32	(37.64)

air following political ads or air such ads at certain times or certain days, thus providing credibility to our argument that ad sequencing can be treated as nonsystematic (Wilbur et al. 2013, Fossen and Schweidel 2017). Additionally, we see in Table 5 that the distribution of all ad instances across ad position mirrors the distribution of ad instances for the top three product categories and across the three most popular genres, providing further evidence of nonsystematic sequencing. Although the vast majority of comparisons in Tables 4 and 5 support this assumption, a few comparisons do not. Notably, political ads are more likely to precede television show and movie ads and less likely to precede restaurant and insurance ads. Thus, in our empirical analysis, we control for a variety of ad characteristics, including fixed effects for the brand's product category and for each ad creative.

3.3.3. Political Ads and Viewers' Response to Subsequent Ads. Table 6 presents model-free evidence of the impact of political ads on viewers' response to subsequent ads. We see that the average percentage change in viewership during all nonpolitical ads in our data (1.09% drop in audience size during the ad) is very similar to the percentage change in viewership during political ads (1.19% drop) and for ads that do not follow political ads (1.10% drop). For ads that do not follow political ads, after excluding ads that air first in an ad break, we see that there is an average 0.55% drop in audience size during the ad. This is because the majority of viewership change occurs at the start of an ad break (Schweidel et al. 2014). As ads that follow political ads cannot air first in an ad break, we compare the average percentage change in viewers during ads that follow political ads to this baseline audience size drop of 0.55%. Using this comparison, Table 6 presents evidence that ads that follow political ads see substantially smaller declines in audience size, only a 0.30% drop, than ads that do not follow political ads. This positive spillover for ads that follow political ads seems to hold across almost all types of political ads, regardless of if the ad is an attack ad, who the ad supports, or who sponsors the ad, with only a few exceptions which constitute a very small portion of the political ads.

Table 7 considers the impact of political ads on the viewership of subsequent ads across different ad positions and illustrates a few key findings. First, we observe that most of the changes in viewership occur across the first three ad slots, a finding consistent with Wilbur et al. (2013). Second, we see further evidence in

Table 3. Descriptive Statistics for Ad Characteristics

Variable	Mean	(SD)	Minimum	25%	Median	75%	Maximum
Ad characteristics							
Ad length (in seconds)	23.17	(10.80)	5.00	15.00	15.00	30.00	90.00
Ad position in break	4.53	(2.74)	1.00	2.00	4.00	6.00	22.00
Break position in program	4.07	(3.83)	1.00	2.00	3.00	5.00	46.00
Days until Election Day from airing	57.36	(36.53)	0.00	26.00	55.00	87.00	131.00
Number of ads in break	8.91	(2.97)	1.00	7.00	9.00	11.00	25.00
Ad viewership							
Number of viewers at beginning of ad	1,104,966	(1,927,202)	11,803	265,265	531,744	1,093,183	24,580,701
Number of viewers at end of ad	1,092,991	(1,907,927)	11,914	262,533	526,849	1,080,115	23,753,267
Percentage change in viewers during ad	–1.09%	(2.69%)	–33.32%	–1.10%	0.00%	0.04%	31.28%

Note. Percentage changes in viewers is calculated as follows: (number of viewers at ad's end – number of viewers at ad's beginning)/(number of viewers at ad's beginning).

Table 4. Ad Characteristics Across Ad Position

Product category of the advertised brand	Number of ad instances (%)					
	Ads that do not follow political ad (excluding first ads in break)		Ads that follow political ad		All ad instances	
	n	(%)	*n*	(%)	*n*	(%)
Apparel	916	(2%)	22	(3%)	1,019	(2%)
Banking/financial	1,144	(3%)	32	(4%)	1,423	(3%)
Beauty	1,800	(5%)	47	(6%)	1,939	(4%)
Car accessories	124	(0%)	7	(1%)	165	(0%)
Cars	3,007	(8%)	80	(9%)	4,004	(9%)
Cleaning products	1,418	(4%)	31	(4%)	1,571	(4%)
Computer accessories	428	(1%)	9	(1%)	525	(1%)
Dental care	541	(1%)	12	(1%)	608	(1%)
Education	242	(1%)	17	(2%)	272	(1%)
Food/drink	5,260	(14%)	108	(13%)	5,827	(14%)
Home furnishings	419	(1%)	13	(2%)	450	(1%)
Home improvement	404	(1%)	27	(3%)	468	(1%)
Hospitals	48	(0%)	5	(1%)	55	(0%)
Hotels	1,018	(3%)	20	(2%)	1,145	(3%)
Insurance	4,253	(11%)	50	(6%)	5,007	(12%)
Medicine/vitamins	5,232	(14%)	114	(13%)	6,093	(14%)
Movies	276	(1%)	33	(4%)	338	(1%)
Other	635	(2%)	36	(4%)	722	(2%)
Pets	639	(2%)	15	(2%)	678	(2%)
Phones	394	(1%)	8	(1%)	485	(1%)
Restaurants	5,341	(14%)	50	(6%)	6,071	(14%)
Retailers	1,216	(3%)	38	(4%)	1,341	(3%)
Technology (other)	565	(2%)	19	(2%)	633	(1%)
Television shows	159	(0%)	25	(3%)	192	(0%)
Wireless internet and cable providers	1,731	(5%)	31	(4%)	2,058	(5%)

When ad airs	Ads that do not follow political ad (excluding first ads in break)		Ads that follow political ad		All ad instances	
Sunday	5,783	(16%)	133	(16%)	6,682	(16%)
Monday	5,687	(15%)	127	(15%)	6,621	(15%)
Tuesday	6,368	(17%)	150	(18%)	7,385	(17%)
Wednesday	5,503	(15%)	145	(17%)	6,377	(15%)
Thursday	5,253	(14%)	110	(13%)	6,037	(14%)
Friday	4,736	(13%)	103	(12%)	5,461	(13%)
Saturday	3,880	(10%)	81	(10%)	4,526	(11%)
7:00–7:29 p.m.	317	(1%)	6	(1%)	390	(1%)
7:30–7:59 p.m.	449	(1%)	13	(2%)	549	(1%)
8:00–8:29 p.m.	3,744	(10%)	109	(13%)	4,532	(11%)
8:30–8:59 p.m.	4,905	(13%)	143	(17%)	5,855	(14%)
9:00–9:29 p.m.	6,643	(18%)	132	(16%)	7,661	(18%)
9:30–9:59 p.m.	8,053	(22%)	183	(22%)	9,137	(21%)
10:00–10:29 p.m.	6,035	(16%)	112	(13%)	6,971	(16%)
10:30–10:59 p.m.	7,064	(19%)	151	(18%)	7,994	(19%)

Table 7 that political ads have similar audience size changes compared with those of nonpolitical ads. Third, we observe no clear relationship between viewership decline during political ads and the magnitude of the proposed political ad spillover (final column), suggesting that the spillover effects from political ads to subsequent ads in terms of audience size may not depend on viewership decline during the political ad. Last, we see some evidence that the influence of political ads on the viewership of subsequent ads may vary across ad position. Particularly, Table 7 shows that, although most political ads may spur positive spillover effects resulting in more viewers for the subsequent ad (81.5% of ad instances that follow a political ad see positive spillover), political ads that air first in the ad break or later in the ad break (after ad position 8) may not spur positive spillover effects.

As further model-free evidence, we explore the average percentage change in viewership at the ad creative-level. Recall that our data include ads that follow a political ad (ad *i*) and all other airings of ad *i* during the 2016 election that do not follow a political ad. Thus, we can explore the average percentage change in viewership during a given ad when it airs after a political ad and compare it to the average percentage change in viewership during the *same* ad when it does not air after a political ad. We conduct this comparison for the 738 ad creatives in our data, which air on average 59 times in our data. We find that 72% of the ad creatives see smaller declines in viewership during the ad when they air after a political ad compared with when the same ad does not air after a political ad. We plot the distribution of the differences in the percentage change in viewership during the ad when it follows a political ad compared with when it does not in Online Appendix Figure 1(a). We observe that viewership is on average 0.66% (SD = 1.76%) higher for airings that follow a political ad. Online Appendix Figure 1(b) shows the same difference holding ad position constant so that the difference is between (1) the average percentage change in viewership during ad *i* when it airs after a political ad in ad position *j* and (2) the average percentage change in viewership during ad *i* when it does not air following a political ad in the same ad position *j*. Panel (b) illustrates these differences for ad positions 3–6 (see Table 5 for the distribution of ads) and also shows smaller declines in viewership for airings that follow political ads (viewership is on average 0.07% (SD = 1.20%) higher for airings that follow a political ad).

Overall, the model-free evidence suggests that (1) ad-to-ad spillover is possible and (2) political ads may have positive spillover effects on viewers' response to subsequent ads in terms of attenuating viewership decline and, thus, increasing the number of viewers that can be exposed to the ad. We next

Table 5. Ad Characteristics Across Ad Position

	Number of nonpolitical ad instances		Number of ad instances for top three product categories		Number of ad instances airing on top three program genres		Number of ad instances that follow political ad		Ad length		Break position in program	
Ad position	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	Mean	(SD)	Mean	(SD)
1	5,030	(11.67%)	1,886	(10.48%)	3,813	(12.64%)	0	(0.00%)	26.73	(11.32)	4.87	(4.83)
2	6,472	(15.02%)	2,836	(15.76%)	4,696	(15.57%)	89	(10.48%)	23.66	(11.03)	4.41	(4.31)
3	6,601	(15.32%)	2,800	(15.56%)	4,656	(15.44%)	118	(13.90%)	23.29	(11.24)	4.30	(4.03)
4	5,929	(13.76%)	2,490	(13.84%)	4,133	(13.71%)	163	(19.20%)	23.18	(10.81)	4.03	(3.73)
5	5,260	(12.21%)	2,163	(12.02%)	3,630	(12.04%)	122	(14.37%)	22.67	(10.61)	3.82	(3.50)
6	4,404	(10.22%)	1,843	(10.24%)	2,977	(9.87%)	110	(12.96%)	22.37	(10.26)	3.72	(3.56)
7	3,283	(7.62%)	1,377	(7.65%)	2,191	(7.27%)	97	(11.43%)	21.74	(10.33)	3.49	(2.87)
8	2,363	(5.48%)	984	(5.47%)	1,571	(5.21%)	68	(8.01%)	21.49	(9.56)	3.54	(2.99)
9	1,534	(3.56%)	658	(3.66%)	1,012	(3.36%)	42	(4.95%)	20.93	(9.65)	3.56	(2.74)
10	949	(2.20%)	387	(2.15%)	642	(2.13%)	18	(2.12%)	21.22	(9.02)	3.57	(2.98)
11	546	(1.27%)	235	(1.31%)	352	(1.17%)	7	(0.82%)	21.37	(9.85)	3.77	(2.87)
12	291	(0.68%)	135	(0.75%)	185	(0.61%)	2	(0.24%)	20.45	(8.23)	3.70	(2.49)
13	169	(0.39%)	68	(0.38%)	106	(0.35%)	5	(0.59%)	21.57	(7.98)	3.98	(2.65)
14	96	(0.22%)	48	(0.27%)	61	(0.20%)	2	(0.24%)	21.72	(11.49)	3.70	(1.74)
15+	162	(0.38%)	81	(0.45%)	130	(0.43%)	6	(0.71%)	24.01	(13.48)	4.40	(2.24)

detail our empirical model to further investigate political ad spillover.

4. Model Specification

To investigate the impact of political ads on viewership of subsequent ads, we model viewership at the end of ad i as:

$$LogViewersEnd_i = \mu + LogViewersBeg_i\alpha + Z_i\gamma + AfterPoliticalAd_i\beta + \varepsilon_i. \quad (1)$$

$LogViewersEnd_i$ is the log of the number of viewers at the end of ad i,[8] which we model as a function of an intercept term (μ), $LogViewersBeg_i$ (log of the number of viewers at the beginning of ad i), ad-specific control

Table 6. Model-Free Evidence of the Relationship Between Political Ads and Viewers' Response to Subsequent Ads

Ad type	Number of ad instances	Percentage change in viewers during ad (mean (SD))
All nonpolitical ad instance	43,089	–1.09% (2.69%)
Political ads	849	–1.19% (2.71%)
Ads that dont't follow political ad	42,240	–1.10% (2.71%)
Ads that dont't follow political ad (excluding first ads in break)	37,210	–0.55% (1.88%)
Ads that follow political ad: any	849	–0.30% (1.51%)
Ads that follow political ad: attack, pro-Democrat, candidate/party sponsored	412	–0.22% (1.46%)
Ads that follow political ad: attack, pro-Democrat, PAC sponsored	3	–0.66% (2.06%)
Ads that follow political ad: nonattack, pro-Democrat, Candidate/party sponsored	176	–0.30% (1.41%)
Ads that follow political ad: nonattack, pro-Democrat, PAC sponsored	0	No ads in this category
Ads that follow political ad: attack, pro-Republican, candidate/party sponsored	69	–0.14% (1.02%)
Ads that follow political ad: attack, pro-Republican, PAC sponsored	78	–0.05% (0.94%)
Ads that follow political ad: nonattack, pro-Republican, candidate/party sponsored	38	–0.16% (1.26%)
Ads that follow political ad: nonattack, pro-Republican, PAC sponsored	2	–1.22% (1.33%)
Ads that follow political ad: attack, other, candidate/party sponsored	3	–0.04% (0.22%)
Ads that follow political ad: attack, other, PAC sponsored	26	–0.26% (0.97%)
Ads that follow political ad: nonattack, other, candidate/party sponsored	3	–0.66% (0.51%)
Ads that follow political ad: nonattack, other, PAC sponsored	39	–2.09% (2.99%)

Note. Percentage changes in viewers is calculated as follows: (number of viewers at ad's end – number of viewers at ad's beginning)/(number of viewers at ad's beginning).

Table 7. Model-Free Evidence of the Relationship between Political Ads and Viewers' Response to Subsequent Ads Across Ad Position

Ad position	Number of ad instance	Number of ad instances that follow political ad	All nonpolitical ad instances	Political ads	Ads that do not follow political as	Ads that follow political ad: any	Difference between ads that follow political ad and those that do not
			Percentage change in viewers during ad				
			Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	
1	5,030	0	–5.20% (4.04%)	–5.16% (3.06%)			
2	6,472	89	–2.52% (3.00%)	–3.32% (3.34%)	–2.58% (3.01%)	–2.71% (2.40%)	–0.14%
3	6,601	118	–0.93% (1.74%)	–1.19% (2.68%)	–0.94% (1.74%)	–0.73% (1.60%)	0.21%
4	5,929	163	–0.23% (1.03%)	–0.14% (0.81%)	–0.23% (1.03%)	–0.19% (1.01%)	0.04%
5	5,260	122	0.03% (0.74%)	0.01% (0.61%)	0.03% (0.75%)	0.14% (0.64%)	0.11%
6	4,404	110	0.15% (0.68%)	0.15% (0.70%)	0.15% (0.68%)	0.16% (0.57%)	0.01%
7	3,283	97	0.24% (0.67%)	0.29% (0.56%)	0.24% (0.67%)	0.26% (0.67%)	0.02%
8	2,363	68	0.29% (0.65%)	0.17% (0.69%)	0.29% (0.64%)	0.36% (0.85%)	0.07%
9	1,534	42	0.33% (0.75%)	0.32% (0.46%)	0.33% (0.74%)	0.19% (0.98%)	–0.14%
10	949	18	0.32% (0.88%)	0.18% (0.45%)	0.32% (0.88%)	0.26% (0.89%)	–0.07%
11	546	7	0.40% (0.93%)	–0.06% (0.09%)	0.39% (0.93%)	0.82% (0.89%)	0.42%
12	291	2	0.19% (0.97%)	0.02% (0.67%)	0.19% (0.97%)	0.03% (0.05%)	–0.16%
13	169	5	0.16% (1.28%)	0.08% (0.64%)	0.15% (1.22%)	0.56% (2.80%)	0.41%
14	96	2	0.21% (0.98%)	1.55% (0.13%)	0.20% (0.99%)	0.58% (0.34%)	0.38%
15+	162	6	0.46% (1.07%)	0.84% (1.05%)	0.49% (1.01%)	–0.24% (2.06%)	–0.73%

Notes. Percentage changes in viewers is calculated as follows: (number of viewers at ad's end – number of viewers at ad's beginning)/(number of viewers at ad's beginning). See Table 5 for number of ad instances for each ad position.

variables that may impact ad response (Z_i), and characteristics of the political ad that precedes ad i ($AfterPoliticalAd_i$), if applicable.[9] If ad i is not preceded by a political ad, all elements of $AfterPoliticalAd_i$ equal zero.

The ad-specific control variables (Z_i) include the ad characteristics in Table 3 (ad length, ad position in the ad break, ad break position in the program, number of days until Election Day, and number of ads in the ad break) as well as fixed effects for the day of the week and time ad i airs (at half-hour-level), product category of the brand advertised in ad i (25 categories, shown in Table 4), genre of the program in which ad i airs (13 genres, shown in Online Appendix Table 2), program in which ad i airs (1,196 programs), and ad creative (738 ad creatives).[10] These effects allow us to control for characteristics associated with the ad, brand advertised, and program in which the ad airs that might influence $LogViewersEnd_i$. In particular, the ad creative fixed effects control for the impact of the ad content of ad i on $LogViewersEnd_i$, and the program fixed effects control for the impacts of the program in which ad i airs (e.g., program characteristics such as content) and the program's audience characteristics (e.g., audience demographics).

We estimate six variants of Equation (1) where we alter the variables in $AfterPoliticalAd_i$. In model 1, $AfterPoliticalAd_i$ contains only a dummy variable that equals 1 if ad i airs after a political ad. As political ad characteristics may impact political ad spillover, we examine their influence in models 2–5. In model 2, we specify $LogViewersEnd_i$ as a function of whether ad i follows a political attack ad, follows a political nonattack ad, or does not follow a political ad. In model 3, we consider the party that the political ad supports, and in model 4, we account for the political ad's sponsor. We include effects of all three characteristics (attacking tone, party, and sponsorship) in model 5. In model 6, we explore how ad position, an important factor affecting viewership decline (Danaher 1995, Wilbur et al. 2013, Schweidel et al. 2014), moderates spillover. We estimate models 1–6 with cluster-robust standard errors at the brand level.

We leverage the common industry practice that the sequencing of ads in a commercial break is nonsystematic (Wilbur et al. 2013, Fossen and Schweidel 2017, Deng and Mela 2018) to delineate the effect of following a political ad (treatment) on our ad response measure compared with not following a political ad (control).

5. Results

5.1. Impact of Ad Characteristics on Ad Viewership

We begin our results discussion by examining the effects of ad characteristics on viewership at the end of a given ad in Table 8. A positive (negative) coefficient indicates that a variable is associated with a larger (smaller) audience size at the end of the ad. As our data are not at the individual level, we do not

Table 8. Impact of Political Advertising on Audience Size of the Subsequent Ad (Model 1)

Variables	Estimate	(SE)	Effect size	Estimated change in audience decline
Intercept	**0.071**	**(0.011)**		
$LogViewersBeg_i$	**0.994**	**(0.001)**		
After political ad variables				
Follows political ad: any	**0.005**	**(0.001)**	**0.49%**	**–88.50%**
Ad characteristics				
Ad length (in seconds)	**–0.000**	**(0.000)**	**–0.03%**	**4.80%**
Ad position in break	**0.006**	**(0.000)**	**0.56%**	**–101.60%**
Break position in program	**–0.000**	**(0.000)**	**–0.01%**	**2.42%**
Days until Election Day from airing	**0.000**	**(0.000)**	**0.00%**	**–0.52%**
Number of ads in break	**–0.002**	**(0.000)**	**–0.15%**	**27.38%**
Fixed effects for day and time ad airs, product category of brand advertised, ad creative, program genre, and program			Yes	
R^2			0.9996	

Notes. Estimates with $p \leq 0.05$ are bold. Estimates with $p \leq 0.10$ are italic. The effect size is the impact of a one-unit increase of the variable on $ViewersEnd_i$ calculated as (exp(coef) – 1) × 100. The estimated change in audience decline is the nonrounded effect size divided by the average percentage change in viewers during nonfirst ads (–0.55%, as shown in Table 6), expressed as a percentage. Results are not sensitive to the inclusion of the fixed effects for the product category of the brand advertised because of the inclusion of the fixed effects for ad creative.

observe whether a viewer tunes into or out of a program. As such, an increase in audience size over the course of an ad may be the result of fewer people changing the channel and/or more individuals tuning into the program who were not previously viewing the program. As our data show (Table 3) and past literature suggests (Schweidel and Kent 2010) that viewership drops over the course of most ads, a variable that positively impacts viewership during an ad likely stems from reducing this loss in viewership.

Consistent with past research, we find negative effects on audience size for longer ads and longer ad breaks (Danaher 1995). Furthermore, ads that air later in the ad break retain more viewers than those that air earlier in the break, consistent with Schweidel et al. (2014). We also observe a negative relationship between viewership and the ad break's position in the program and a positive relationship between viewership and the number of days until Election Day, although these effects are very small.

5.2. Impact of Political Television Ads on Ad Viewership

Tables 8–10 show the impact of political ads on viewership of subsequent ads. Overall, consistent with our model-free evidence, we find strong support that (1) ad-to-ad spillover occurs and (2) political ads spur positive spillover effects in terms of increasing the size of the audience that is exposed to the subsequent ad.

Specifically, from our model 1 results (Table 8), we find that ads that air after a political ad experience improved viewer retention. This effect size is substantial as ads that air after a political ad, compared with ads that do not follow a political ad, garner an additional 0.49% boost in total viewership because of an estimated 89% reduction in viewership decline during the ad. Comparing this effect size to those of the other ad characteristics, this gain in viewership (0.49%) could offset the loss in viewers from networks airing three additional ads (3 × –0.15%) in each of their ad breaks that contains a political ad. As a 30-second ad costs on average over $120,000 to air once on a primetime broadcast program (Katz 2013, p. 69), this effect size of political ad spillover has substantial implications for television networks.

Table 9 shows the results of models 2–4 and illustrates that this positive spillover from a political ad to the subsequent ad remains consistent across a range of political ad characteristics. First, we find that the positive spillover from political ads is not dependent on whether the political ad is an attack ad or not. However, ads following political attack ads see more positive spillover than ads following political non-attack ads. Second, we find that ads that follow a political ad irrespective of whether it is pro-Democrat or pro-Republican see higher audience levels than ads that do not follow a political ad. This result highlights that our primary effect is not driven by pro-Democrat political ads, which make up the majority of our data; in fact, we find that pro-Republican ads spur more positive spillover than pro-Democrat ads.[11] Last, we find that ads that follow a political ad irrespective of whether the political ad is sponsored by a candidate/party or by a PAC see higher audience levels than ads that do not follow a political ad.

Table 10 shows the results from model 5, which examines the political ad characteristics jointly. We see further evidence that political ads are associated with positive spillover in terms of lower losses in viewership for subsequent ads. The political ad types

Table 9. Impact of Political Advertising and Its Characteristics on Audience Size of the Subsequent Ad (Models 2–4)

	Model 2				Model 3				Model 4			
Variables	Estimate	(SE)	Effect size	Estimated change in audience decline	Estimate	(SE)	Effect size	Estimated change in audience decline	Estimate	(SE)	Effect size	Estimated change in audience decline
Intercept	**0.084**	**(0.011)**			**0.084**	**(0.011)**			**0.084**	**(0.011)**		
LogViewersBeg$_i$	**0.994**	**(0.001)**			**0.994**	**(0.001)**			**0.994**	**(0.001)**		
After political ad variables												
Follows political ad: attack	**0.005**	**(0.001)**	**0.55%**	**−99.52%**								
Follows political ad: nonattack	**0.003**	**(0.001)**	**0.34%**	**−61.99%**								
Follows political ad: pro-Democrat					**0.004**	**(0.001)**	**0.43%**	**−77.75%**				
Follows political ad: pro-Republican					**0.007**	**(0.001)**	**0.71%**	**−129.52%**				
Follows political ad: other					0.004	(0.003)	0.40%	−73.51%				
Follows political ad: candidate/party sponsored									**0.005**	**(0.001)**	**0.48%**	**−88.04%**
Follows political ad: PAC sponsored									**0.005**	**(0.002)**	**0.50%**	**−90.75%**
Ad characteristics												
Ad length (in seconds)	**−0.000**	**(0.000)**	**−0.03%**	**4.80%**	**−0.000**	**(0.000)**	**−0.03%**	**4.77%**	**−0.000**	**(0.000)**	**−0.03%**	**4.80%**
Ad position in break	**0.006**	**(0.000)**	**0.56%**	**−101.60%**	**0.006**	**(0.000)**	**0.56%**	**−101.59%**	**0.006**	**(0.000)**	**0.56%**	**−101.60%**
Break position in program	**−0.000**	**(0.000)**	**−0.01%**	**2.43%**	**−0.000**	**(0.000)**	**−0.01%**	**2.43%**	**−0.000**	**(0.000)**	**−0.01%**	**2.42%**
Days until Election Day from airing	**0.000**	**(0.000)**	**0.00%**	**−0.52%**	**0.000**	**(0.000)**	**0.00%**	**−0.52%**	**0.000**	**(0.000)**	**0.00%**	**−0.52%**
Number of ads in break	**−0.002**	**(0.000)**	**−0.15%**	**27.37%**	**−0.002**	**(0.000)**	**−0.15%**	**27.36%**	**−0.002**	**(0.000)**	**−0.15%**	**27.38%**
Fixed effects for day and time ad airs, product category of brand advertised, ad creative, program genre, and program			Yes				Yes				Yes	
R^2			0.9996				0.9996				0.9996	

Notes. Estimates with $p \leq 0.05$ are bold. Estimates with $p \leq 0.10$ are italic. See note under Table 8 for calculation of effect size and estimated change in audience decline.

Table 10. Impact of Political Advertising and Its Characteristics on Audience Size of the Subsequent Ad (Model 5)

Variables	Number of ad instances	Estimate	(SE)	Effect size	Estimated change in audience decline
Intercept		**0.084**	**(0.011)**		
$LogViewersBeg_i$		**0.994**	**(0.001)**		
After political ad variables					
Follows political ad: attack, pro-Democrat, candidate/ party sponsored	412	**0.005**	**(0.001)**	**0.46%**	**−83.38%**
Follows political ad: attack, pro-Democrat, PAC sponsored	3	−0.006	(0.014)	−0.56%	102.70%
Follows political ad: nonattack, pro-Democrat, candidate/party sponsored	176	**0.004**	**(0.001)**	**0.37%**	**−67.25%**
Follows political ad: nonattack, pro-Democrat, PAC sponsored	0	No ads in this category			
Follows political ad: attack, pro-Republican, candidate/party sponsored	69	**0.009**	**(0.002)**	**0.87%**	**−157.72%**
Follows political ad: attack, pro-Republican, PAC sponsored	78	**0.007**	**(0.002)**	**0.69%**	**−124.69%**
Follows political ad: nonattack, pro-Republican, candidate/party sponsored	38	*0.004*	*(0.002)*	*0.43%*	*−77.37%*
Follows political ad: nonattack, pro-Republican, PAC sponsored	2	0.018	(0.017)	1.77%	−321.80%
Follows political ad: attack, other, candidate/ party sponsored	3	0.006	(0.006)	0.64%	−116.94%
Follows political ad: attack, other, PAC sponsored	26	**0.008**	**(0.003)**	**0.83%**	**−150.60%**
Follows political ad: nonattack, other, candidate/ party sponsored	3	**0.022**	**(0.003)**	**2.18%**	**−396.85%**
Follows political ad: nonattack, other, PAC sponsored	39	−0.001	(0.005)	−0.14%	25.81%
Ad characteristics					
Ad length (in seconds)		**−0.000**	**(0.000)**	**−0.03%**	**4.76%**
Ad position in break		**0.006**	**(0.000)**	**0.56%**	**−101.58%**
Break position in program		**−0.000**	**(0.000)**	**−0.01%**	**2.40%**
Days until Election Day from airing		**0.000**	**(0.000)**	**0.00%**	**−0.52%**
Number of ads in break		**−0.002**	**(0.000)**	**−0.15%**	**27.35%**
Fixed effects for day and time ad airs, product category of brand advertised, ad creative, program genre, and program				Yes	
R^2				0.9996	

Notes. Estimates with $p \leq 0.05$ are bold. Estimates with $p \leq 0.10$ are italic. See note under Table 8 for calculation of effect size and estimated change in audience decline.

that are not significant are those with few occurrences. We also find additional evidence that attack ads spur more positive spillover than nonattack ads (with one exception, other political ads by candidates/parties, which occur infrequently). The results from model 5 also provide further evidence that pro-Republican ads spur more positive spillover than pro-Democrat ads. Table 10 suggests that the content of pro-Republican attack ads may play a role in driving this larger spillover for pro-Republican ads. Last, we see in Table 10 that political ads that are not pro-Democrat or pro-Republican can encourage positive spillover.[12]

5.3. Moderating Impact of Ad Position on Political Ad Spillover

We next analyze our results from model 6 to consider how political ad spillover is moderated by ad position. The results in Table 11 indicate that, although the majority of political ads are associated with lower declines in audience sizes for subsequent ads, this effect weakens for ads that air later in the break. This finding suggests that political ads are more effective at prompting positive spillover when they air earlier in the ad break, specifically in ad positions 3, 4, 5, and 6. We speculate that this may occur because political ads may be less attention-grabbing or arousing later in the break, elements key to the effectiveness of negatively framed ads (Phillips et al. 2008). This argument is consistent with research on moment-to-moment advertising, which shows that when an audience experiences a series of hedonic events, they become immune to the sequence and resort to a weighted average evaluation of the overall experience (Baumgartner et al. 1997). As such, viewers' arousal levels in response to a political ad may be muted if the political ad is preceded by a longer series of nonpolitical ads that spur lower arousal levels.

We also see that political ad spillover in the second ad position, which would arise from a political ad airing in the first position, is not significant. Research on television ads suggests that viewers process the first ad in the break differently than other ads (Danaher 1995, Pieters and Bijmolt 1997, Schweidel et al. 2014, Deng and Mela 2018). Thus, it is possible that our proposed mechanism, which we discuss next, may be less strong in the first ad position.

5.4. Discussion of Possible Mechanisms

Why do political ads spur positive spillover effects? Our findings are consistent with at least three possible explanations advanced by research in political science and marketing, which we discussed in Section 2.3. First, political ads increase viewer attention (Brader 2005, Gilens and Cohen 2007, Lau et al. 2007), which may increase attention and response toward the next ad. This explanation is supported by work on media

Table 11. Impact of Political Advertising on Audience Size of the Subsequent Ad Across Ad Positions (Model 6)

Variables	Number of ad Instances	Estimate	(SE)	Effect size	Estimated change in audience decline
Intercept		**0.071**	**(0.011)**		
LogViewersBeg$_i$		**0.994**	**(0.001)**		
After political ad variables					
Ad in ad position 2 that follows political ad: any	89	−0.000	(0.003)	0.00%	0.02%
Ad in ad position 3 that follows political ad: any	118	**0.011**	**(0.002)**	**1.11%**	**−201.29%**
Ad in ad position 4 that follows political ad: any	163	**0.012**	**(0.001)**	**1.19%**	**−216.64%**
Ad in ad position 5 that follows political ad: any	122	**0.010**	**(0.001)**	**1.00%**	**−182.65%**
Ad in ad position 6 that follows political ad: any	110	**0.006**	**(0.001)**	**0.59%**	**−107.17%**
Ad in ad position 7 that follows political ad: any	97	0.001	(0.001)	0.11%	−19.53%
Ad in ad position 8 that follows political ad: any	68	**−0.004**	**(0.001)**	**−0.37%**	**67.79%**
Ad in ad position 9 that follows political ad: any	42	**−0.008**	**(0.002)**	**−0.79%**	**143.96%**
Ad in ad position 10 that follows political ad: any	18	**−0.010**	**(0.003)**	**−0.95%**	**172.93%**
Ad in ad position 11+ that follows political ad: any	22	**−0.019**	**(0.004)**	**−1.89%**	**343.48%**
Ad characteristics					
Ad length (in seconds)		**−0.000**	**(0.000)**	**−0.03%**	**4.72%**
Ad position in break		**0.006**	**(0.000)**	**0.56%**	**−102.04%**
Break position in program		**−0.000**	**(0.000)**	**−0.01%**	**2.43%**
Days until Election Day from airing		**0.000**	**(0.000)**	**0.00%**	**−0.53%**
Number of ads in break		**−0.001**	**(0.000)**	**−0.15%**	**27.12%**
Fixed effects for day and time ad airs, product category of brand advertised, ad creative, program genre, and program				Yes	
R^2				0.9996	

Notes. Estimates with $p \leq 0.05$ are bold. Estimates with $p \leq 0.10$ are italic. See note under Table 8 for calculation of effect size and estimated change in audience decline.

context effects that shows that increased attention toward an event can improve response toward an ad that follows the event (Murry et al. 1992, Dahlén 2005, Fossen and Schweidel 2019a). Second, the positive spillover may occur because of positive emotional states being spurred by political ads (Merritt 1984, Brader 2005, Phillips et al. 2008), resulting in a positive impact on viewers' response to subsequent ads. This explanation is supported by theories on mood maintenance that purport that viewers in a positive state are motivated to stay in that positive state (Wegener and Petty 1994). Third, the positive political ad spillover is consistent with the idea that political advertising generally spurs negative arousal in viewers (Klein and Ahluwalia 2005, Phillips et al. 2008). This negative arousal makes the subsequent ad appear more positive to the viewers and/or motivates them to seek a positive state, thus improving response to the subsequent ad. This explanation is consistent with theories on affective contrast (McMullen 1997).

We probe the plausibility of each explanation using additional analyses. For the first explanation, we leverage our primary measure of ad response, which has been used as an operationalization of viewer attention toward an ad (Danaher 1995, Teixeira et al. 2010, Wilbur et al. 2013, Schweidel et al. 2014, Deng and Mela 2018). We explore an alternative to model 1 where we characterize political ads as either having higher viewership decline (above median), that is, viewers paid less attention to the political ad, or lower viewership decline (below median), that is, viewers paid more attention to the political ad. We find that both types of political ads generate positive spillover to the subsequent ad in terms of reduced audience decline, with political ads that experience higher viewership decline (viewers paid less attention) spurring larger positive spillover effects than political ads that experience lower viewership decline (viewers paid more attention).[13] Thus, we do not find support for the first potential explanation; that is, political ads increase viewer attention, thus spurring positive spillover effects.

For the second explanation, it seems reasonable to assume that Fox News viewers are more likely to be positively stimulated by pro-Republican ads than viewers of other channels, as Fox News is the favored news network for Republicans (Mitchell et al. 2014). However, evidence from our data suggests that the positive spillover from pro-Republican ads is not higher and is nearly lower ($p = 0.11$) on Fox News (average −0.37% (SD = 0.86%) viewership decline for next ad) than when pro-Republican ads air on other channels (average −0.06% (SD = 1.08%) viewership decline for next ad). Similarly, MSNBC viewers seem more likely to be positively roused by pro-Democrat ads than viewers of other channels, as MSNBC is the favored news network for Democrats (Mitchell et al. 2014). However, spillover from pro-Democrat ads is lower ($p < 0.01$) on MSNBC (average −0.96% (SD = 2.02%) viewership decline for next ad) than when pro-Democrat ads air on other channels (average −0.16% (SD = 1.33%) viewership decline for next ad).[14] Following similar logic, viewers of News/Political shows seem more likely to be positively stimulated by political ads than viewers of other shows. Yet, our data suggest that spillover from political ads is lower ($p < 0.01$) on News/Political programs (average −0.62% (SD = 1.67%) viewership decline for next ad) than spillover from political ads that air on programs of other genres (average −0.15% (SD = 1.41%) viewership decline for next ad). Overall, we do not find support from our data for the second explanation for the positive spillover of political ads.

Our analyses do support the third explanation that political ads spur negative arousal, which makes the next ad appear more positive to the viewer and/or motivates viewers to seek a positive state, thereby improving ad response. Although all political advertising is likely to incite negative arousal, political attack ads should spur higher levels of negative arousal than political nonattack ads (Phillips et al. 2008). Thus, for this explanation to be plausible, we should see greater positive spillover effects generated by political attack ads than political nonattack ads. Our results indeed show such a relationship. Specifically, we find in model 2 (Table 9) that following a political attack ad versus following a political nonattack ad generates larger spillover ($p < 0.0001$). Similarly, political attack ads spur higher spillover than their nonattack counterparts in model 5 (Table 10; $p < 0.0001$ for each of the three comparisons with at least four ad instances (pro-Democrat, candidate/party sponsored; pro-Republican, candidate/party sponsored; and other, PAC sponsored)).[15]

What may seem contradictory to this mechanism is that political ads see similar viewership declines as nonpolitical ads (Table 6). Therefore, if political ads spur negative arousal, then why does this not impact viewership decline for political ads? This may arise because viewers' emotional response toward a television ad is likely to be realized in the ad's final moments (Baumgartner et al. 1997), which occurs right as the next ad begins. Thus, the repercussions of the political ad's impact on viewers are likely to be realized as the next ad begins.

6. Additional Analyses

6.1. Alternative Ad Response Measure: Online Ad Chatter

6.1.1. Data and Model. To conduct a broad investigation into the spillover effects of political ads, we consider a second measure of ad response: online word-of-mouth (WOM) about the ads. We collect

second-level data on the volume and valence of Tweets for the 470 brands in our data from Crimson Hexagon. Crimson Hexagon codes the valence of Tweets as either positive, neutral, or negative using sentiment analysis. We collect Tweets that contain either the brand's name, a hashtag about the brand, or the Twitter handle of the brand.

We explore three outcomes of online WOM: the volume of positive, neutral, and negative Tweets about the advertised brand in ad *i*. Following prior research on television advertising and online WOM (Fossen and Schweidel 2017), we use narrow time windows around the ads to better attribute any changes in chatter to the ad's airing. As such, we operationalize the outcomes as the volume of positive, neutral, or negative Tweets (respectively) about the brand in ad *i* in the five-minute window post-ad.[16] We include two controls related to ad chatter in each analysis. Specifically, we control for (1) the volume of positive, neutral, or negative Tweets (respectively) about the brand in ad *i* in the five-minute window before the ad and (2) the volume of Tweets about the political ads in the five-minute window after the ad. We include the latter control because Twitter chatter about the political ad during ad *i* may impact the volume of Tweets about ad *i*.

Online Appendix Table 3 shows descriptive statistics on the change in positive, neutral, and negative ad chatter. Of note, we see a marginal association between ads that follow a political ad and increases in positive ad chatter. These descriptive statistics, however, do not account for key ad and program characteristics. As such, we model the three outcomes of online ad chatter following the model specification used in the primary analysis for model 1, as detailed in Equation (1), and with the control variables shown in Table 12. We estimate the three models of online ad chatter individually with robust standard errors clustered at the brand-level.

6.1.2. Results. Table 12 shows the results of the spillover effects from political ads on online chatter about the advertised brand in the subsequent ad. Using an alternative measure of ad response, we find additional evidence that political ads have positive spillover effects on the subsequent ad. Specifically, ads that follow a political ad, compared with those that do not, see a 3% increase in positive chatter in the five-minute window after the ad. A meta-analysis on online WOM by Babić Rosario et al. (2016) supports that these results are beneficial for marketers, as they find that the volume of positive online chatter is positively correlated with sales.

6.2. Alternative Explanations

6.2.1. Viewership Decline during Political Ads. If viewers are more likely to change the channel when a political ad airs and tune back in once the political ad is over, this behavior could drive the positive spillover effect we see in our primary analysis in terms of reduced viewership decline for the next ad. As a related concern, if a political ad spurs a sizable viewership decline, the pool of viewers remaining after a political ad may have a lower baseline propensity to change the channel.

We do not see evidence that supports these concerns. Specifically, in Table 7, we observe no clear relationship between viewership decline during

Table 12. Impact of Political Television Ads on Online Ad Chatter for the Subsequent Ad

	Positive WOM			Neutral WOM			Negative WOM		
Variables	Estimate	(SE)	Effect Size	Estimate	(SE)	Effect Size	Estimate	(SE)	Effect Size
Intercept	**0.163**	**(0.076)**		–0.064	(0.134)		–0.066	(0.058)	
After political variable									
Follows political ad: any	**0.029**	**(0.015)**	**2.92%**	0.019	(0.016)		0.020	(0.012)	
Ad characteristics									
Ad chatter pre-ad	**0.295**	**(0.025)**	**34.29%**	**0.384**	**(0.036)**	**46.80%**	**0.273**	**(0.023)**	**31.33%**
Political ad chatter	–0.000	(0.000)		0.000	(0.000)		*0.000*	*(0.000)*	0.01%
Ad length (in seconds)	–0.000	(0.001)		0.001	(0.003)		0.001	(0.001)	
Ad position in break	0.001	(0.001)		0.001	(0.001)		0.000	(0.001)	
Break position in program	0.001	(0.001)		–0.000	(0.001)		0.002	(0.001)	
Days until Election Day from airing	–0.000	(0.000)		–0.000	(0.000)		0.000	(0.000)	
Number of ads in break	–0.001	(0.001)		–0.002	(0.001)		–0.001	(0.001)	
Fixed effects for day and time ad airs, product category of brand advertised, ad creative, program genre, and program	Yes			Yes			Yes		
R^2	0.682			0.823			0.664		

Notes. Estimates with $p \leq 0.05$ are bold. Estimates with $p \leq 0.10$ are italic. See note under Table 8 for calculation of effect size.

political ads and political ad spillover. We further run an alternative model 1 where we characterize political ads as either having high (above median) viewership decline or low (below median) viewership decline and find that both types of political ads spur positive spillover (see Online Appendix Table 12). We also explore an alternative model 1 in which we only include political ads that do not see viewership decline (i.e., change in viewers during the political ad is ≥ 0) in $AfterPoliticalAd_i$. The results show that ads that follow such political ads see positive spillover in terms of reduced viewership decline (see Online Appendix Table 12), and the effect size of this positive spillover (0.0040) is very similar to the effect size that we observe in our main model (0.0049). Thus, we do not find evidence that viewership decline during political ads is a key driver of our results.

Our key result also holds in contexts where viewers are likely to have a lower baseline propensity to change the channel. For example, model 6 shows positive spillover for ads that follow political ads in ad positions that have low viewership decline (Tables 7 and 11). We further estimate two alternatives of model 1 on (1) only ads that air on popular shows with above median viewership and (2) only ads that air on shows with below median viewership decline. In both analyses, we find positive spillover from political ads (Online Appendix Table 12).

6.2.2. Ad Position. To explore if our results are robust when we eliminate the potential for other ad-to-ad-spillover effects, we estimate an alternative model 1 using data on only the first two slots in the break. We find that the key result of positive political ad spillover still holds (Online Appendix Table 12), although the effect is only marginally significant. We also estimate an alternative model 1 that only considers ads that air in the first, second, or third ad positions. We find that ads that follow political ads see a higher audience size than those that do not (Online Appendix Table 12). These two analyses highlight that our key finding is robust if we only consider spillover from political ads that air in the first ad slots of the break. We also explore two additional models with alternative operationalizations of ad position in which we estimate model 1 with (1) ad position specified as a fixed effect rather than a continuous variable and (2) both a linear and quadratic term of ad position. In both analyses, we find that ads that follow political ads see higher viewership than those that do not (Online Appendix Table 12), illustrating that our results are robust to different operationalizations of ad position.

6.2.3. Audience Size. Does audience size impact viewer retention, which, in turn, influences the results? Although the program characteristics in our model help control for this concern, we also estimate two models for robustness: (1) model 1 estimated on ads that air to larger audiences (above median $ViewersBeginning_i$) and (2) model 1 estimated on ads that air to smaller audiences (below median $ViewersBeginning_i$). The results indicate that regardless of audience size, we see positive spillover for ads that follow a political ad (Online Appendix Table 12).

6.2.4. Competition for Ad Time. During elections, ad markets may see increased competition. As a result, strong brands with the bargaining power to get airtime despite increased competition may air more ads during election season than weaker brands. To test the robustness of our results, we gather eight measures of brand strength from the data collected by Lovett et al. (2014), which contains 167 brands that are in our data. We estimate eight variants of model 1 on only those ads that are below the median on these brand strength measures. Across each analysis, we find that ads that follow political ads see higher audience sizes compared with ads that do not (Online Appendix Table 12). Thus, we find evidence of positive spillover from political ads to subsequent ads even if we only consider ads for weaker, lesser known, or less familiar brands.

7. Discussion

We investigate how political ads on television influence viewers' response to subsequent ads and find that political ads have positive spillover effects using two distinct measures of ad response. Our findings have implications for television networks and advertisers, which we detail here.

7.1. Implications for Television Networks

Industry studies indicate that political ads on television hurt ad effectiveness of subsequent ads (Stein 2016). Illustrating the magnitude of this concern in the industry, during the 2020 Super Bowl, Fox isolated political ads from other paying advertisers in their own ad breaks, a decision that cost Fox millions in ad revenue as it resulted in the network running nonpaid show promos alongside the political ads instead of ads from paying advertisers (Poggi 2020).

Contrary to the industry's current belief, we find that political ads actually spur positive spillover effects as ads that follow a political ad see an 89% reduction in audience decline and a 3% increase in positive ad chatter after the ad compared with ads that follow a nonpolitical ad. We believe that our findings provide at least four key implications for television networks. First, networks could increase revenues from strategically leveraging political ad spillover. For example, our results suggest that the

reduction in viewership decline from political ad spillover could offset the loss in viewers from networks airing three additional ads in a given ad break. Thus, networks could leverage political ad spillover to increase the number of ads that follow political ads in their ad breaks without seeing an increase in lost viewers. Given that the average 30-second ad costs $120,000 to air on a primetime broadcast program (Katz 2013, p. 69) and considering our sample of 849 national primetime political ads, strategic use of political ad spillover by networks could have yielded an extra $300 million in revenue during the 2016 election (849 ad breaks with political ads × 3 ads × $120,000). As another example, an improved understanding of political ad spillover, which our results provide, could have helped Fox avoid millions in lost ad revenue during the 2020 Super Bowl, as discussed previously.

Second, networks commonly use nonsystematic ad sequencing and only vary ad pricing based on ad position for large television events like the Super Bowl (Katz 2013, Wilbur et al. 2013). Our finding that political ads have positive spillover effects on subsequent ads gives networks the opportunity to implement differential pricing and systematic ad sequencing. For differential pricing, networks can opt to charge more for ad slots that follow a political ad. For ad sequencing, networks could (1) use systematic ad sequencing to reward advertisers by placing their ads after political ads and/or (2) more effectively place political ads within the ad break. For the latter point, our findings may encourage networks to place political ads earlier in ad breaks and avoid putting them last if they want the spillover to manifest during the ad break. Specifically, our results suggest that political ads spur the most positive spillover when they air in slots 3, 4, 5, or 6 in the break. Networks can leverage these strategies immediately in programs in which systematic ad sequencing and differential ad pricing are easy to implement, such as in large television events and for the 13% of ad inventory that can be sold programmatically (Peterson 2019). Programmatic ad buying allows for systematic ad sequencing and differential ad pricing through its purchasing model in which advertisers bid on ad slots in real-time similar to online advertising, leading to differential pricing based on ad position (Hill 2014, Ferber 2016, Tuchman et al. 2017). Although currently about 13% of television ad inventory in the United States can be sold programmatically, this number is expected to grow substantially as now more than 54% of U.S. television households can be served addressable ads (Peterson 2019). Reflecting this trend, networks' programmatic ad inventory and advertisers' spending on this inventory continues to increase year-to-year (*eMarketer* 2018b). Our results may encourage networks to accelerate and/or expand their adoption of strategic ad sequencing and pricing strategies, which will become even easier as the industry continues its shift toward programmatic advertising.

Third, we establish that an ad's content influences viewers' response toward the next ad, illustrating the importance of ad-to-ad spillover. This may encourage networks to leverage ad-to-ad spillover in other contexts. Last, our results may shed light on how political content interacts with marketing messages more broadly and may have implications for media companies beyond television networks where consumers are exposed to political messages, such as online.

7.2. Implications for Advertisers

Our findings establish that ad-to-ad spillover is possible, improving advertisers' understanding of the factors that impact ad effectiveness. Additionally, current television industry practices limit advertisers' negotiation power over ad positioning. Advertisers can use our findings to advocate for the inclusion of ad positioning in ad buys and, specifically, negotiate that their ads follow political ads. Advertisers can benefit from using this strategy for ad buys where systematic ad positioning is already used (e.g., large events like the Super Bowl) and will see additional benefit as the industry shifts to programmatic ad buying. Last, our results may encourage advertisers outside of the television context to experiment with advertising next to political content. This experimentation may be beneficial for online advertisers, given that they commonly blacklist political topics to avoid having their ads appear near political content (Vranica 2019).

7.3. Limitations and Directions for Future Research

Our research is subject to limitations that we believe could motivate future work. To begin, our data are not obtained from a single source, which restricts us from observing individual behavior. Such data would allow us to explore the role of viewer characteristics in moderating political ad spillover.[17] Additionally, our data on the changes in behaviors following political ads are restricted to differences observed in the short term. Thus, our analysis is not intended to assess the long-term effects of political ad spillover. Future work may consider how long the effects of political ad spillover persist and if they are present in other advertising contexts, such as online.

Although we explore three possible mechanisms behind our main finding, laboratory experiments could provide new insights into the drivers of political ad spillover. Indeed, probing if positive spillover is generalizable to other ads that evoke negative arousal may be a fruitful avenue for future work. To forward such research, we conjecture that public

service announcements (PSAs) may yield positive spillover as they may also spur negative arousal. We code a new variable that equals 1 if ad i is preceded by a PSA (and 0 otherwise) and re-estimate model 1. Like political ads, PSAs also spur positive spillover, increasing audience size for the next ad (β = 0.007, SE = 0.002). More rigorous analysis could offer further insights. In a similar vein, in our analyses we speculate on the reason why political ad spillover is moderated by ad position. More exploration of the driver(s) of this relationship would be beneficial.

Our study makes an initial foray into understanding the effects of political advertising and its implications for channels, campaigns, and advertisers. We hope our research encourages further investigation into the rise of political communications and its impact on consumer behavior.

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Endnotes

[1] National ad buys typically make up 25%–30% of a presidential candidate's television advertising spending (Miller 2015), and the percentage is expected to increase as the rising costs of local ad inventory in battleground markets during elections make national ad buys more economical and efficient (Passwaiter 2017).

[2] Primetime in the United States is 8:00 p.m. to 11:00 p.m. on Monday through Saturday and 7:00 p.m. to 11:00 p.m. on Sunday.

[3] We focus on examining spillover impacts of political ads on the subsequent nonpolitical ad. Thus, our primary analysis does not include back-to-back political ads. We conduct an additional analysis including those ads and the key results are consistent with those obtained from the primary model.

[4] For the latter, two coders viewed each political ad, and initial coder agreement was 94% on whether an ad was an attack ad. Disagreements were reconciled using a third coder. Coding directions are in the online appendix.

[5] Past research has also used TV Essentials to measure ad viewership (Du et al. 2019, Fossen and Schweidel 2019b).

[6] We detail the secondary approach in the online appendix.

[7] Despite a majority of pro-Democrat ads, our key result holds regardless of whom the political ad supports, with pro-Democrat ads being associated with smaller spillover effects than pro-Republican ads (see Results). We also explore an analysis that does not include pro-Democrat ads and still find evidence of spillover from political ads (see online appendix).

[8] We test four alternative outcomes for robustness, all of which present consistent results (see online appendix for details).

[9] Note that the number of viewers at the end of a given ad equals the number of viewers at the beginning of the next ad.

[10] For robustness, we test program × day of the week fixed effects to control for possible additional characteristics of the ad break and find the key results do not vary in this alternative analysis. We also explore an analysis in which we control for brand fixed effects and, similarly, find the key results do not vary from our proposed model.

[11] To further illustrate that pro-Democrat ads do not drive political ad spillover, we explore an analysis that excludes pro-Democrat ads in $AfterPoliticalAd_i$ and still find that political ads spur positive spillover effects (see online appendix).

[12] As proximity to Election Day may impact how viewers respond to political ads, we further test an interaction with $AfterPoliticalAd_i$ and days until Election Day but found the interaction to not be significant. This may occur because the pool of viewers who is more attentive to political ads as Election Day approaches may be offset by the pool of viewers that is satiated by political ads and becomes less attentive to them as Election Day draws nearer.

[13] See online appendix Table 12 for detailed results from this alternative analysis.

[14] We do not have enough instances of pro-Democrat ads airing on Fox News (n = 2) or pro-Republican ads airing on MSNBC (n = 2) to do the opposite comparison for negative arousal.

[15] The finding that political nonattack ads spur positive spillover is still consistent with this mechanism as studies suggest that even positive political advertising can stimulate negative arousal in viewers (Duggan and Smith 2016, McClellan 2016, Stein 2016).

[16] We test four alternative operationalizations of the outcomes for robustness: (1) primary specification without log transformations, (2) log transformations of the difference in positive/neutral/negative Tweets about the brand in ad i five-minutes after the ad to five minutes before the ad, (3) difference in positive/neutral/negative Tweets about the brand in ad i five minutes after the ad to five minutes before the ad, and (4) primary specification with ten-minute measurement windows. These alternative analyses present consistent results (see online appendix).

[17] We probe how viewer characteristics may moderate political ad spillover by using program characteristics. These analyses, which are detailed in the online appendix, do not reveal a strong systematic pattern of program characteristics moderating political ad spillover, possibly because program characteristics are a coarse way to measure viewer heterogeneity or because a larger sample of political ads is needed. We think this is an important area for future research.

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