

NBER WORKING PAPER SERIES

OPPOSITION MEDIA, STATE CENSORSHIP, AND POLITICAL ACCOUNTABILITY:
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Working Paper 25916
<http://www.nber.org/papers/w25916>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
June 2019

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Opposition Media, State Censorship, and Political Accountability: Evidence from Chavez's Venezuela

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NBER Working Paper No. 25916
June 2019
JEL No. D7,D8

ABSTRACT

This paper investigates the role of opposition media and state censorship in political accountability using evidence from the closing of RCTV, a popular opposition television channel in Venezuela. The government did not renew RCTV's license, and the channel was replaced overnight, during May 2007, by a pro-government channel. Based upon this censorship of opposition television, we have three key findings. First, using Nielsen ratings data, viewership fell, following the closing of RCTV, on the pro-government replacement, but rose on Globovision, the only remaining television channel for opposition viewers. This finding is consistent with a model in which viewers have a preference for opposition television and substitute accordingly. Second, exploiting the geographic location of the Globovision broadcast towers, Chavez approval ratings fell following the closing of RCTV in places with access to the Globovision signal, relative to places without access. Third, in places with access to the Globovision signal, relative to places without, support for Chavez in electoral data also fell following the closing of RCTV. Taken together, these findings suggest that opposition media and viewer responses to censorship can help to hold governments and incumbent politicians accountable.

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1 Introduction

Opposition media has the potential to help voters hold incumbent politicians and parties accountable. By reporting on the performance of government, including coverage of scandals and corruption, the media provides information to voters that is useful when deciding whether or not to re-elect incumbent politicians and parties.¹ In this way, the media also provides incentives for officials to act in the best interests of their constituents.² In fragile democracies, opposition media might also help opposition voters to counter moves towards authoritarianism and to facilitate collective action against the government.

Despite these potential benefits of opposition media to society, incumbent governments, given the threats to their power, face incentives to limit press scrutiny of their office. These limitations on opposition media may take a variety of forms, from licensing requirements to restricting access to government officials to outright censorship. Censorship itself can be manifested in variety of ways, from the closing of opposition media outlets to content requirements to the outright blocking of specific media reports.

When the government censors opposition media, what are the effects on support for incumbent politicians? Is censorship effective? And how does the answer to this question depend upon how voters respond to censorship? Possible responses by voters include discounting, by which rational voters may simply account for censorship when processing content, understanding that censorship implies a loss of access to information that might reflect negatively on the government. This type of discounting should reduce the impact of censorship (Chiang and Knight (2011)). Even in the absence of discounting, however, opposition voters might respond to censorship and the associated change in ideological content by switching away from censored outlets and towards other opposition outlets when available (Durante and Knight (2012)). Moreover, if other opposition outlets are not available, viewers can respond to censorship by simply tuning out, reducing their overall media consumption (Knight and Tribin (2019)). By processing information in a sophisticated way and by adjusting their media consumption patterns, voters can limit the effectiveness of government censorship of opposition media outlets.

We investigate these issues in the setting of Venezuela during the Presidency of Hugo Chavez. In particular, we examine the effects of the Chavez government replacing RCTV, a popular opposition television channel with national coverage, with a pro-government public channel, TVES. The change occurred overnight, on May 27, 2017, following the expiration of RCTV's license and the government's decision to not renew the license. This new channel, TVES, inherited both the channel number and the broadcast

¹See, among others, Ferraz and Finan (2008)

²See, among others, Besley and Burgess (2002) and Ferraz and Finan (2011).

infrastructure of RCTV. Two large metro areas, Caracas and Valencia, retained access to opposition television via Globovision, the remaining source of opposition news available via broadcast signal following the closing of RCTV, while the remainder of the country no longer had access to opposition television via broadcast signal. We incorporate information on the Globovision broadcast towers and, using the Irregular Terrain Model, predict the strength of the Globovision broadcast signal across municipalities.

Based upon an analysis of this intervention, we have three key findings. First, using Nielsen ratings data, we find that viewers responded strongly, in terms of adjusting their media consumption patterns, to the change in ideological content. In particular, we find a sharp reduction in viewership of TVES, relative to RCTV, following the change. Likewise, we find a corresponding increase in viewership of Globovision, the remaining opposition television channel, in the two metro areas with access to the broadcast signal. Taken together, these two findings suggest that voters respond to censorship of opposition media outlets by switching to other opposition channels when available.

Second, using geographic variation in the Globovision signal across municipalities, we examine annual survey data (Latin Barometer) conducted both before and after the closing of RCTV. In particular, we document a reduction in approval ratings for Chavez in those municipalities with access to the Globovision signal, relative to cities without such access, following the closing of RCTV. These effects tend to fade over time, as access to the Globovision signal matters less towards the end of our sample period when compared to the period just following the closing of RCTV.

Third, we document similar patterns in municipality-level electoral returns data covering two elections prior to the closing of RCTV and three elections following the closing of RCTV. In particular, we find a reduction in the Chavez vote share in municipalities with access to the Globovision signal, relative to cities without the signal, following the closing of RCTV. Similarly to the results for approval ratings, these effects tend to fade over time, as access to the Globovision signal matters less towards the end of our sample period, when compared to the period just following the closing of RCTV.

Taken together, these three findings suggest that viewers with access to the broadcast signal increased their viewership of Globovision, leading to a reduction in support for Chavez, relative to viewers in areas that no longer had access to opposition television via broadcast signal, following the closing of RCTV. Thus, censorship appears to have increased support for the Chavez government in areas without access to other opposition television channels, relative to areas that retained access to opposition television. This suggests that behavioral changes in media consumption patterns are an effective response to censorship. Yet these differences across municipalities fade over time, suggesting that viewers in areas without other opposition channels might adjust to their new media environment and discount censored material accord-

ingly. We formalize these ideas in the context of a model of an informative media and government censorship of negative media reports. In the model, voters account for censorship when processing of media reports and have a preference for opposition media. While voters might be manipulated by censorship in the short run, they discount appropriately in the long run after learning about the censorship environment from the lack of negative media reports about the government.

The paper proceeds as follows. We next review the relevant literature and then provide a more detailed overview of the setting. We then describe our empirical results regarding changes in viewership, approval ratings, and electoral returns. Following a theoretical explanation for these results, the final section concludes.

2 Related Literature

This paper contributes to several literatures on the political economy of the media. Studies on media consumption patterns include Durante and Knight (2012), who show that right-leaning viewers were more likely to watch public television during periods in which it was controlled by Silvio Berlusconi, the leader of the center-right coalition in Italy during the 1990s and early 2000s. Likewise, Knight and Tribin (2019), also using data from Venezuela, examine high frequency changes in ratings for news programs that are interrupted by *cadenas*, government propaganda that is not announced in advance to stations and viewers. The key finding is that the drop-off in ratings is particularly pronounced on opposition-aligned channels when they are airing news programming, consistent with a preference for like-minded information (Gentzkow and Shapiro (2010)). Thus, these studies document that viewers are not passive receivers of information and instead respond to changes in ideological content, both in the short run and in the longer run.

On the persuasive effects of opposition media and state censorship, Enikolopov, Petrova and Zhuravskaya (2011) find that access to opposition media in Russia reduced support for the incumbent government. Adena et al. (2015) document that government-controlled radio facilitated the rise of Nazi party in Germany during the 1930s. Chen and Yang (2019) conduct a field experiment in which students in China are provided free access to the uncensored internet. When combined with encouragement, acquisition of information increases, leading to changes in knowledge, beliefs, and attitudes.³

³Regarding the supply side, King, Pan and Roberts (2013) show that censors in China allow a significant amount of controversial material on social media to go uncensored but are particularly likely to block posts facilitating collective action. Consistent with this idea, Enikolopov et al. (2019) document that social media availability plays a key role in protest activity against the government in Russia.

Voter processing of information has played a key role in the theoretical literature on state censorship. The basic idea is that a lack of media reports might reflect either no information available to the media or government censoring of negative media reports. Shadmehr and Bernhardt (2015) argue that governments might gain by committing to less censorship since this leads voters to update more favorably towards the government upon receiving no media reports. Guriev and Treisman (2015) develop an informational model in which dictators can survive via manipulation of information, including censorship and propaganda, rather than via more traditional means, such as repression.

This paper is also related to a literature on media capture. Besley and Prat (2006) develop a model in which, even in the absence of state censorship, private media outlets might self censor negative information about the government in exchange for favorable policies. Media capture benefits governments by concealing potentially damaging information from the electorate, thereby increasing re-election rates. Such media capture is less likely under media pluralism, providing an additional motive for competition. Szeidl and Szucs (2017) examine media capture in Hungary, documenting that media outlets provide favorable coverage of the government in exchange for government advertising. In terms of incentives for favorable coverage in our context, the government provided sticks, revoking the broadcast license of RCTV, rather than carrots, in response to unfavorable coverage.

While there are only a few empirical studies on the persuasive effects of censorship, there is of course a large and active literature, more generally, on the persuasive effects of media bias. Evidence that biased outlets may influence voting outcomes include Durante, Pinotti and Tesei (2017), DellaVigna and Kaplan (2007), George and Waldfogel (2003), Gentzkow, Shapiro and Sinkinson (2011), Gerber, Karlan and Bergan (2009), Martin and Yurukoglu (2017), Prat (2014), and Snyder and Stromberg (2010). Chiang and Knight (2011) argue that any persuasive effects of bias might be limited by voter discounting. In particular, based upon responses to newspaper endorsements in U.S. Presidential elections, voters appear to discount biased information. That is, cross-over endorsements, those for Republican candidates from left-leaning papers and for Democratic candidates from right-leaning papers, are more influential than less surprising endorsements, those for Republican candidates from right-leaning papers and for Democratic candidates from left-leaning papers. This limits the influence of media bias in the sense that shifting a newspaper's ideology towards the right reduces the electoral impact of an endorsement of a Republican candidate by that newspaper.

Martin and Yurukoglu (2017), like us, simultaneously consider, in the context of cable TV news, consumer preferences for like-minded information and persuasion by biased media outlets. One finding is that the media may lead to increased polarization via a feedback loop, with Fox News, for example, shifting

viewer ideology towards the right, further increasing their preference for right-leaning content. Our results, by contrast, document that the electoral effects of censorship, if anything seem to fade over time. We argue that this is consistent with a model in which viewers learn about both government performance and the censorship environment from news reports. While censorship might be effective in the short run, viewers learn about the degree of censorship over time and discount accordingly. That is, voters recognize that censorship entails a loss of information that might reflect negatively upon the government. Due to this learning and discounting, the effects of censorship may tend to fade over time.

Our study is also closely related to independent work by Kronick and Marshall (2018), who, like us, study the electoral effects of the closing of RCTV in Venezuela. Their comparison is between areas with significant cable penetration (RCTV re-emerged on cable later in 2007) and areas without significant cable penetration, the idea being that areas with access to cable are less influenced by the closing of RCTV, when compared to areas with less access to cable. Relative to our study, their geographic variation is more fine-grained. In particular, while our analysis uses municipalities as the unit of observation, they use polling stations as the unit of observation and exploit variation across these smaller geographic units and within parishes (geographic units that are larger than polling stations and smaller than municipalities). They study electoral returns and find that retaining access to RCTV via cable access led to a relative increase in support for Chavez. They argue that this finding is consistent with viewers who lost access to RCTV punishing Chavez for closing RCTV at the ballot box. Our study, by contrast, does not use variation in cable penetration but instead exploits geographic variation in access to the Globovision signal. We argue that our finding, losing access to opposition TV leading to an increase in support for Chavez, can be explained by a different mechanism, switching to another opposition channel, Globovision. Given these two different mechanisms and the different sources of geographic variation, the two sets of findings are not inconsistent with one another, and we thus view the two studies as complementary in nature.

3 Institutional Context

This section provides background on the political situation in Venezuela, with a focus on the role of television in politics. We begin by describing Chavez's rise to power and the key elections during our sample period, followed by a discussion of the main television channels, including RCTV and Globovision,

and the events surrounding the closing of RCTV in 2007.

3.1 Political situation

President Hugo Chavez was in office from 1999 until his death in 2013. In 1998, the leftist candidate won the presidential election, with 56 percent of the vote. Chavez promised a "Bolivarian revolution", designed to eliminate exclusion, poverty and government corruption. Since the beginning of Chavez's term, the right-wing opposition was committed to removing him from office.⁴ In April 2002 the opposition led a coup, which failed after some initial successes. Later that year, in December 2002, the opposition organized a strike in the oil industry, aimed at toppling Chavez, but, despite lasting three months, this too was ultimately unsuccessful. Two years later, in 2004, the opposition organized a recall referendum against Chavez.

During our sample period, there were a number of elections, and our empirical analysis of electoral returns focuses on five key elections during Chavez's term. In 2004, the right-wing coalition tried to remove Chavez from power via a presidential recall referendum, as mentioned above, but Chavez won with 59 percent voting against the recall.⁵ Two years later, in the 2006 presidential election, Chavez was re-elected to a second term, with 63 percent of the vote, against the right wing candidate Manuel Rosales. The following year, in December 2007, Chavez proposed to amend the Constitution via a referendum. These amendments included empowering the president to declare states of emergency for unlimited periods, extending Presidential terms from six years to seven years, and, perhaps most importantly, removing Presidential term limits, which restricted Presidents to just two terms in office.⁶ Chavez lost this referendum, with only 49 percent of voters supporting these amendments designed to increase his powers. Another Constitutional referendum was held less than two years later, in February 2009, and Venezuelans did vote this time, with 54 percent supporting, to remove terms limits for the President and other key offices. This opened the door for Chavez to seek re-election for a third term in October 2012, and he won, with 54 percent of votes, against the right-leaning candidate Henrique Capriles. This election occurred during Chavez's illness, and he died just a few months later, in March 2013. He was replaced on an interim basis by his Vice President, Nicolas Maduro, who then won a disputed election in April 2013 and has served as President thereafter.

⁴The description of attempts to revoke President Chavez's mandate are extensively documented in Wilpert (2007), Corrales and Penfold (2011), Nelson (2009), among others

⁵Chang-Tai et al. (2011) analyze the labor market implications of publicly supporting the recall campaign.

⁶See. https://elpais.com/internacional/2007/12/03/actualidad/1196636401_850215.html

3.2 Television in Venezuela

Table 1 provides an overview of television channels in Venezuela. While the key public channel (VTV) tends to align itself with Chavez, the private television channels have tended to align their ideology with the opposition, especially at the start of Chavez's term, supporting the coup in 2002 and providing extensive coverage of anti-government protests during the oil strike later that year.⁷ After these events, the tension between the private media and government was at its peak, and Chavez's stance became very aggressive, referring to the major private television channels (Venevision, RCTV, Globovision and Televen) as the "four Horsemen of the apocalypse".⁸ In 2004, before the recall referendum, Chavez met with the owner of Venevision, which thereafter ceased to participate in the confrontation with President Chavez.⁹ Then, Televen followed the initiative to moderate the anti-Chavez speech around the same period.¹⁰

Following this, only two opposition channels remained. RCTV (Radio Caracas Television) is the oldest station, had the highest ratings, and had national broadcast coverage. In addition to its well-known anti-government tone, RCTV was a major producer of entertainment programming, including soap operas and talk shows.¹¹ Globovision is a news-only channel, providing nearly 20 hours of news per day (Table 1) but its broadcast signal was available in only two large metro areas, Caracas and Valencia. While Globovision content is available nationally via cable, penetration is relatively low during our sample period, and RCTV was the only opposition channel available via broadcast signal in the remainder of the country, outside of these two metro areas.

To summarize, there was a partitioning of television channels into opposition (RCTV and Globovision), moderate (Televen and Venevision), and pro-government (VTV). This is consistent with media monitoring during the 2006 Presidential elections. In particular, Figure 1, based upon data reported in EU-EOM (2006), documents that RCTV and Globovision devoted roughly two-thirds of their coverage to the opposition party and only one-third to Chavez. The tone of this coverage, not reported here, followed similar patterns, with decidedly positive coverage of the opposition and decidedly negative coverage of Chavez. The main public channel, VTV, by contrast, provided roughly 85 percent of their coverage to Chavez and only 15 percent to the opposition. This coverage of the opposition was negative, with coverage of Chavez disproportionately positive. The two moderate channels, Venevision and Televen, were

⁷See Nelson (2009) and Dinneen (2012)

⁸Reporters Without Borders (2003) shows that Chavez accused the private channels publicly of : "inciting rebellion and disrespect for legitimate institutions and authorities", "broadcasting false, misleading or biased news reports", "harming the reputation and good name of persons or institutions" and promoting "subversion of public and social order."

⁹http://www.nytimes.com/2007/07/05/world/americas/05venez.html?_r=1&

¹⁰Wilpert (2007)

¹¹While RCTV provided only four hours of news per day (Table 1), these programs had high ratings, as will be shown below.

also biased in favor of the government in terms of the share devoted to each party. In terms of tone, moderate channels tended to provide positive coverage of both parties. To summarize, media monitoring data strongly support the notion that there were only two opposition channels in Venezuela in 2006 and thus only one following the closing of RCTV in 2007.

3.3 The closing of RCTV

In May 2007, the government announced that it would not renew the broadcasting license of RCTV, and, on May 27, it was replaced overnight by TVES, a public channel. TVES inherited both the channel number of RCTV and its broadcast infrastructure. RCTV did re-emerge on cable later that summer, under the name RCTV international.¹² The government's rationale for closing RCTV had two key components: the alleged violations of broadcast laws and the participation in the coup and strike in the oil sector.¹³ The decision to take RCTV off the air was marked by significant public protests, and 70 percent of Venezuelans disapproved of the decision to not renew the license.¹⁴ As discussed above, Globovision was the only remaining broadcast channel aligned with the opposition but, unlike RCTV, which had a national broadcast infrastructure, the broadcast coverage of Globovision was limited to two metro areas. While Globovision was available nationwide via cable subscription, cable penetration was relatively low in Venezuela during our sample period, ranging from 17 percent in 2004, the start of our analysis, to 40 percent of households by 2011, the end of our analysis (Table 2). Similarly, Weisbrot and Ruttenberg (2010) show that the audience share for cable is small, relative to broadcast TV, increasing from roughly 10 percent in 2004 to around one-third in 2010. Thus, broadcast was a more important delivery means than cable, although the gap between the two narrows towards the end of our sample period.

A key question is whether Globovision responded to the closing of RCTV by moderating their tone, and an implicit assumption in our analysis is that Globovision remained a key source of information to opposition voters. According to media monitoring of the 2012 Presidential Election, Capriles, the opposition candidate, received 64 percent of the Globovision coverage, which is nearly identical to the 65 percent share of coverage received by Rosales in the 2006 election, as documented in Figure 1.¹⁵ While Globovision was purchased by a pro-government investor in 2013, this occurred following the end of our

¹²Wilpert (2007). RCTV International was shut down again, from cable, in 2010.

¹³Dinneen (2012)

¹⁴Wilpert (2007)

¹⁵The 2012 monitoring was conducted by the Carter Center and the report is available at https://www.cartercenter.org/resources/pdfs/news/peace_publications/election_reports/venezuela-2012-election-study-mission-final-rpt.pdf (accessed May 3, 2019).

sample period. Thus, this evidence suggests that Globovision remained in opposition to the government during our sample period.

To summarize, Venezuela has been characterized by a tense conflict between the government and the opposition, and this divide was also reflected in the media, with public channels aligned with the government and two key private channels, RCTV and Globovision, aligned with the opposition. Following the closing of RCTV and the opening of TVES, Globovisión became the only source of opposition television, and this was available via broadcast signal in only two metro areas. This left the majority of the territory without any opposition television and with only moderate and pro-government channels. We next examine the implications of this closing of RCTV for media consumption patterns, Chavez approval ratings, and voting returns.

4 Changes in Viewership

Using ratings data, we next examine viewership of news programming in Venezuela during the time period before and after the closing of RCTV. Our data are provided by Nielsen and measure ratings show-by-show and day-by-day, covering the years 2006 and 2007. Ratings are also provided separately for four large cities (Caracas, Valencia, Barquisimeto and Maracaibo) in Venezuela, and we compare two cities (Caracas and Valencia) with access to the Globovision broadcast signal to two cities without access to the signal (Barquisimeto and Maracaibo). In these data, shows are categorized according to their content, and, in some of our analyses, we compare ratings of news programming to ratings of non-news programming. Changes in the ratings of non-news programming, following the closing of RCTV, should be less affected by access to Globovision, which, as noted above, only provides news content. We also exploit the fact that ratings are provided separately for households with and without cable subscriptions. In particular, since Globovision is available via cable on a national basis, access to the Globovision broadcast signal should not matter in terms of viewership patterns for those households with cable subscriptions

4.1 Viewership of News Programming

We begin by examining how viewership of news programming on RCTV and then the replacement, TVES, evolves on a week-by-week basis during the period 2006-2007 and for households without cable subscriptions. Importantly, TVES took over the RCTV broadcast infrastructure, used the same channel number, and began broadcasting almost immediately following the closing of RCTV. Thus, to the extent that

viewers are passive and do not respond to changes in ideological content, there might be no change in viewership patterns following the closing of RCTV.

As shown in Figure 2, by contrast, we find an immediate drop-off in viewership of news programming on TVES, relative to viewership of news programming on RCTV, following the closing of RCTV on May 27, 2007 and for households without cable subscriptions. In particular, viewership falls from roughly 5 to 10 percent prior to the closing of RCTV (i.e. to the left of the dashed line) to very low levels following the closing of RCTV (i.e. to the right of the dashed line) for these households without cable subscriptions. While viewership of RCTV news tended to be higher in the cities with access to the Globovision signal, the low viewership for TVES news is apparent in both types of cities following the closing of RCTV. This result is consistent with a preference for opposition news programming.

Given this finding of very low ratings for TVES, relative to RCTV, we next examine whether these viewers switched from RCTV/TVES to other channels aligned with the opposition. For households without cable, this involved Globovision and, as noted above, this type of switching was only available in cities with access to the Globovision signal. As shown in Figure 3, there was indeed a sharp increase in viewership of Globovision following the closing of RCTV for these households without cable subscriptions and with access to the Globovision signal. Some of this increase is temporary, with a large increase in viewership during the weeks immediately following the closing of RCTV. Note that this temporary increase may reflect viewer interest in Globovision coverage of protests associated with the closing of RCTV. Even following the protests, in the later weeks of 2007, however, there is a noticeable increase in viewership of Globovision, relative to the period prior to the closing of RCTV.

We next examine whether this switching to Globovision in cities with access to the broadcast signal translates into higher viewership of news programming in general, aggregated across all channels. As shown in Figure 4, viewership of news programming tends to be higher in cities with the Globovision signal even before the closing of RCTV, relative to cities without the Globovision signal, for these households without cable subscriptions. Even so, there does appear to be a widening of the gap following the closing of RCTV, reflecting the switching by these households in cities with access to the Globovision signal from RCTV to Globovision. While some of this is temporary and the series is noisy in general, there does appear to be a larger gap in general after the closing of RCTV, when compared to the time period prior to the closing of RCTV. This result is again consistent with a preference for opposition television.

4.2 Switching Rates

To quantify these results, we next calculate switching rates. That is, we measure the fraction of the reduction in the consumption of opposition news on RCTV that was offset by the increased consumption of opposition news on Globovision in cities with access to the broadcast signal. An exclusive focus on ratings suggests relatively low switching rates: the viewership of opposition news on RCTV in cities with access to the Globovision fell from 8.91 percent of households to 0 percent following the closing of RCTV, and viewership of Globovision news rose from 1.30 percent to only 2.25 percent.¹⁶ But, as noted above, Globovision offers 19.57 hours of news per day, compared to 4.10 hours on RCTV. Thus, daily viewership of news on RCTV fell by 21.89 minutes per household, while daily viewership of news on Globovision rose by 11.16 minutes. This implies an economically significant switching rate of 51 percent, meaning that over half of the reduction in viewership of news on RCTV was offset by increased viewership of Globovision where available. We will return to this issue of switching rates later in the paper when developing persuasion rates.

4.3 Viewership of non-news Programming

For comparison purposes, we next examine changes in the ratings of non-news programming. These ratings, following the closing of RCTV, should be less affected by access to Globovision, which is news only. As shown in Figure 5, there was a sharp reduction in viewership of non-news programming across all cities following the closing of RCTV. This sharp reduction in viewership of non-news is likely driven by the loss of popular entertainment programming on RCTV and the associated lack of interest in the entertainment programming offered by TVES. More importantly, the viewership patterns for non-news, both before and after the closing of RCTV, are similar for both cities with and without access to the Globovision signal. Thus, the relative decrease in consumption of news in cities without access to the Globovision signal cannot be solely explained by general trends in television viewership across both news and non-news programming in these cities.

4.4 The Role of Cable

We next compare these trends in viewership for households with and without cable subscriptions. Since Globovision is available in all cities via cable subscriptions, we should expect a similar pattern of switching

¹⁶These are average ratings in Globovision cities before and after the closing of RCTV in Figures 2 and 3.

regardless of whether or not the city has access to the Globovision broadcast signal. As shown in Figure 6, there is again an immediate drop-off in viewership on RCTV/TVES following the closing of RCTV and the opening of TVES on May 27 and the patterns, for cities with and without access to the Globovision signal, is quite similar to that for households without cable (Figure 2). We next analyze viewership of Globovision programming for these households with cable, comparing cities with and without access to the Globovision signal. As shown in Figure 7, there is again a sharp increase in viewership of Globovision following the closing of RCTV, and these patterns are present in both cities with and without access to the Globovision signal. In terms of overall news viewership for these households with cable subscriptions, there do not appear to be systematic differences between cities with and without access to the Globovision signal (Figure 8). This is in contrast to the widening gap between cities with and without access to the Globovision signal for households without cable (Figure 3). Finally, for comparison with Figure 5, we examine trends in viewership of non-news programming for households with cable. As shown in Figure 9, we again find a reduction of viewership of non-news for households with cable following the closing of RCTV, a trend that is apparent for both cities with and without access to the Globovision signal.

Taken together, the fact that viewership trends for these households with cable access is similar across cities with and without access to the Globovision signal suggests that our baseline results are not driven by other factors that may have changed in these cities. Instead, it is consistent with our interpretation that access to the Globovision signal led to changes in viewership patterns for households without cable following the closing of RCTV.

4.5 Summary

We find sharp changes in viewership patterns following the government closing of RCTV and the corresponding change in station ideology. In particular, viewers quickly moved away from TVES, and we also document a corresponding increase in viewership of Globovision for households either with access to the station via broadcast signal or via a cable subscription. This leads to differences in both the ideological bundle consumed by viewers and in exposure to news overall. In the remainder of the paper, we examine whether these changes in news consumption patterns affect approval ratings for Chavez in survey data and,

ultimately, his electoral performance at the ballot box.

5 Chavez Approval Ratings

Using survey data, we next examine trends in evaluations of Chavez, before and after the closing of RCTV in May 2007 and accounting for the Globovision broadcast signal. To do so, we examine annual survey data 2005-2011 from Latin Barometer. These surveys occur towards the end of the calendar year and we thus have two years (2005 and 2006) of surveys prior to the closing of RCTV in May 2007 and five years of surveys after the closing of RCTV (2007-2011). In these data, respondents evaluate Chavez on a 1 to 10 scale (with 1 representing very bad and 10 representing very good).

We also use these survey data to examine other outcomes that might be affected by access to the Globovision signal. These survey questions include queries regarding general ideology (on a left-to-right scale, with increases associated with movements towards the right) and overall support for the Venezuelan government. In addition, given that foreign relations were a key component of government propaganda, we examine whether access to opposition television via the Globovision signal change support for foreign leaders. In particular, we examine whether access to Globovision increases support for key allies of Chavez, such as Fidel Castro of Cuba, and reduces support for his foreign enemies, such as the right-leaning Presidents of Colombia (Alvaro Uribe until 2010 and then Juan Manuel Santos) and the Presidents of the USA during the sample period (George W. Bush until 2008 and then Barack Obama).

5.1 Globovision signal

To measure access to the Globovision signal, we use both information on the municipality of residence for each respondent in the Latin Barometer and information on the broadcast towers for Globovision. Regarding the latter, we requested and received information from Globovision on the location (latitude and longitude) of their four towers, three of which are located in the Caracas area and one of which is located in Valencia. In addition, we received information on the power and height of each tower. To measure access to the Globovision signal, we use the Irregular Terrain Model, which uses information on the source of the signal and the terrain to predict the strength of the signal at destination locations.¹⁷ Using information on these four towers, we measure the signal (categorized as no signal, a weak signal, or a strong signal) for geographic grid cells. These measures are then aggregated from grid cells to the

¹⁷In particular, we use the radio coverage tool on the website <http://www.nautel.com/>.

municipality level, and we use two such aggregates. First, we develop an dummy variable, which we refer to as Globovision city, indicating whether or not a majority of the grid cells in the municipality receives the signal. Second, we use a continuous measure based upon the fraction of grid cells in the municipality that receive the signal.

Figure 10, which focuses on the heavily populated northern part of the country, depicts the results from this model, where the weak signal is depicted in yellow and the strong signal is depicted in green. As shown, the signals are indeed concentrated in the Valencia and Caracas metro areas. Moreover, their reach depends upon the terrain, with the signal traveling long distances over, for example, the water but much shorter distances over the hilly terrain in this part of Venezuela. We next use this variation across municipalities to examine changes in support for Chavez following the closing of RCTV.

5.2 Baseline Results

We begin with a presentation of general trends in Chavez approval over time. As shown in Figure 11, there was a reduction in support for Chavez in general over the sample period. For example, in 2005 and 2006, over 40 percent of respondents gave Chavez the highest possible approval score (10 on the 1 to 10 scale), whereas during the period 2007 to 2011, the proportion giving Chavez the highest score never exceeded 30 percent. There is some evidence of a corresponding increase in the lowest possible approval score (1 on the 1 to 10 scale), exceeding 25 percent in 2008, but these proportions are noisy and return to baseline levels by the end of the sample period.

Building upon these general results, we next examine trends according to access to the Globovision signal. In particular, based upon the research design described above, Figure 12 provides information on the distribution of Chavez approval ratings, separately for cities with and without access to the Globovision signal and then also separately before and after the closing of RCTV. As shown, respondents in both types of cities expressed considerable support for Chavez in 2005 and 2006, with over 40 percent giving Chavez the highest possible score of 10 in cities without the Globovision signal and a higher proportion, over 50 percent, in the corresponding set of cities with access to the signal. These both drop considerably, to just over 20 percent in cities with the Globovision signal and roughly 25 percent in cities without the Globovision signal, in the period after the closing of RCTV in 2007. Thus, the decline in support for Chavez was sharper in areas with access to the Globovision broadcast signal. There appears to be a corresponding increase in the lowest possible score (very bad) in cities with access to the Globovision signal, relative to those cities without access to the signal. But, in general, the relative reduction in top

scores in cities with access to the Globovision signal is offset by increases throughout the distribution of approval ratings. To summarize, we find that the drop in support for Chavez during the sample period was strongest in the areas with access to opposition television via the Globovision signal.

To investigate these patterns more rigorously, we next estimate an ordered logit model, which accounts for the ordinal nature of approval ratings. In particular, using the information on approval ratings and the strength of the Globovision signal, we specify the following index of support for Chavez:

$$support = \beta_1 After_t + \beta_2 Signal_m \times After_t + \alpha_m \quad (1)$$

In this equation, the municipality fixed effects (α_m) capture time-invariant differences between places with and without access to the Globovision signal, and the parameter β_1 captures changes in approval for Chavez following the closing of RCTV in May 2007. After accounting for these time-invariant differences across cities and any changes in nationwide support for Chavez following the closing of RCTV, the key parameter of interest, β_2 , captures trends in the cities that receive the Globovision signal, relative to trends in those cities that do not receive the Globovision signal. To account for the panel structure of these data, standard errors are clustered at the municipality level.

Results from this regression are reported in column 1 of Table 3. As shown, we do find a drop in support for Chavez in both types of cities following the closing of RCTV, as reflected by the negative coefficient in the first row. But the decline is sharper in those cities that retained access to opposition television via the Globovision signal, as reflected in the negative coefficient on the interaction in the second row, and this effect is statistically significant at conventional levels. Thus, we find that, in cities with access to the Globovision signal, the switching from RCTV to Globovision, as documented above, appears to be associated with a reduction in support for Chavez following the closing of RCTV in May 2007.

The remaining columns of Table 3 provide a series of robustness checks on these baseline results. As shown in column 2, the differential decline in approval of Chavez in cities with access to the Globovision signal is robust to demographic controls (gender, age, and socioeconomic status). In column 3, we allow for the coefficients on these demographics to change following the closing of RCTV, relative to the period prior to the closing of RCTV. Again, our results are robust to these more general controls. In column 4, we use a continuous measure of signal intensity (the fraction of the municipality receiving the signal) rather than our baseline discrete measure (whether or not a majority of the municipality receives the signal). As shown, our results are robust to this alternative measure. Along these lines, we present results in column 5 in which we use an indicator for whether or not a majority of the municipality receives a strong signal

(our baseline measure uses a weaker signal measure). As shown, our results are again very similar to the baseline. Taken together, our baseline results are robust to demographic controls and alternative measures of the strength of the Globovision signal.

In Table 3, we have controlled for observable demographics and have allowed these factors to have differential effects before and after the closing of RCTV. Yet it remains possible that unobserved factors driving support for Chavez may have changed in areas with Globovision, relative to areas without, following the closing of RCTV. To investigate these possible confounds more closely, we estimate placebo timing specifications, in which we measure $AFTER_t$ using alternative definitions before and after the actual closing of RCTV. That is, we estimate specifications in which RCTV is assumed to have closed in years other than the actual year of 2007 (i.e. 2006, 2008, 2009, 2010, and 2011). As shown in Table 4, our baseline specification (column 2) has the largest coefficient on the key interaction term, when compared to specifications that allow for changes in Globovision one year before the actual closing and one to four years after the closing. Moreover, only the specification that uses the following year as the change has an interaction coefficient that is statistically significant. Related to this, following a literature on structural breaks, we can locate the single break that best fits the data. As shown in the final row, the baseline specification has the best fit, in terms of maximizing the log likelihood. While national reductions in support for Chavez following 2006 may have contributed to this improved fit, the t-statistic on the interaction coefficient is also largest in the baseline specification. To summarize, while we cannot definitely rule out the role of changing unobserved factors in Globovision cities following the closing of RCTV, these results suggest that any such changes would likely have occurred in exactly the same year as the closing of RCTV. This allows us to rule out changes in other years surrounding the closing of RCTV as drivers of our baseline results and thus yields credence to our interpretation related to the closing of RCTV in 2007.

5.3 Event Studies

To further investigate the timing of these results, we next estimate event study ordered logit model specifications, in which we allow the difference between signal and no-signal cities to vary over time in a flexible way:

$$support = \beta_t Signal_m + \alpha_m + \mu_t \quad (2)$$

where μ_t is now a series of year fixed effects and β_{2006} is normalized to zero.

As shown in Figure 13, there are not significant differences in support for Chavez between cities with

and without access to the Globovision signal in 2005, relative to 2006. Following the closing of RCTV, by contrast, access to the Globovision signal is associated with a drop in support for Chavez in 2007, relative to 2006, and this drop becomes even sharper in 2008. Following this, there is a slow rebound starting in 2009 and continuing until the end of the sample period. All of these five post-RCTV coefficients on access to the Globovision signal are negative, and four out of five, all except the final year 2011, are statistically different from zero at conventional levels.

5.4 Other Impacts of Censorship

To provide readers with a sense of the broader impact, above and beyond support for Chavez, of access to opposition television, we next examine responses to other questions related to Venezuelan politics in these Latinbarometer survey data. In particular, we examine whether access to opposition television via the Globovision signal following the closing of RCTV shifts ideology to the right, reduces approval of the Venezuelan government, increases support for allies of Chavez, and reduces support for his enemies. As shown in Table 5, we do find general support for these hypotheses, although three out of the five results are not statistically significant at conventional levels. In particular, access to the Globovision signal is associated with a movement to the right in the ideological spectrum (column 1) following the closing of RCTV (although this result is not statistically significant). Likewise, there appears to be reduction in support for the government (column 2) in cities with access to the Globovision signal and following the closing of RCTV (although this result is also not statistically significant). Turning to other leaders, we document a statistically significant reduction in support for Fidel Castro, a key foreign ally of Chavez, following the closing of RCTV in cities with access to Globovision signal. Likewise, we find a corresponding increase in support for key enemies, including Uribe and Santos, Presidents of Colombia (column 4), and Bush and Obama, Presidents of the USA (column 5), in cities with access to the Globovision signal following the closing of RCTV.

5.5 Summary

We find that access to the Globovision signal is associated with a reduction in support for Chavez following the closing of RCTV. This effect intensifies over time before rebounding back to levels close to baseline support by the end of the sample period. We also find some evidence that access to the Globovision signal

is associated with a reduction in support for foreign allies and an increase in support for foreign enemies.

6 Electoral Results

To examine whether these changes in survey-based approval ratings translate into changes in support for Chavez at the ballot box, we next use data on electoral returns from municipalities for key elections in Venezuela during the period before and after the closing of RCTV in May 2007. In particular, we examine the following five key elections, which were discussed in more detail in Section 3:

1. 2004 Presidential Recall Referendum (before RCTV closing)
2. 2006 Presidential Election (before RCTV closing)
3. 2007 Constitutional Referendum (after RCTV closing)
4. 2009 Constitutional Referendum (after RCTV closing)
5. 2012 Presidential Election (after RCTV closing)

For each election, we translate voting returns into a measure of the fraction of the electorate supporting Chavez, relative to the opposition. For the 2006 and 2012 Presidential elections, we do so in the natural way, by measuring the vote share for Chavez relative to the opposition candidate (Manuel Rosales in 2006 and Henrique Capriles in 2012). For the 2004 recall referendum, we measure support for Chavez as the fraction of the electorate voting against the effort to recall Chavez. For the two constitutional referenda, we measure support for Chavez based upon the fraction of the electorate in each municipality that supported the referendum. This measure is natural given that both referenda were proposed by Chavez and were broadly interpreted as an attempt to consolidate political power in the office of the Presidency.

6.1 Results

Figure 14 plots the vote share for Chavez in log odds form (i.e., the natural log of the ratio of vote share for Chavez to the vote share against Chavez). In municipalities without access to the Globovision signal, voters were 66 percent more likely to support Chavez, relative to the opposition, before the closing of RCTV, and 44 percent more likely to do so after the closing of RCTV. Likewise, in cities receiving the Globovision signal, voters were 30 percent more likely to vote for Chavez, relative to the opposition, before

the closing of RCTV, but slightly less likely (negative log odds) after the closing of RCTV. Comparing the two declines, there is a 23 percentage point reduction in the areas without the Globovision signal but a larger reduction, 33 percentage points, in the areas with the Globovision signal. Thus, consistent with the results using survey-based approval ratings, we find a disproportionate decline in electoral support for Chavez in areas with access to opposition television via the Globovision signal after the closing of RCTV in 2007.

To test for the statistical significance of these changes, we next report results from the following regression:

$$\ln[(share_{mt}^{chavez}/(1 - share_{mt}^{chavez}))] = \beta_1 After_t + \beta_2 Signal_m \times After_t + \alpha_m \quad (3)$$

where, as before, the municipality fixed effects (α_m) capture time-invariant differences between cities with and without access to the Globovision signal, and the parameter β_1 captures nationwide changes in electoral support for Chavez at the polling booths following the closing of RCTV in 2007. After accounting for these time-invariant differences across cities and national trends in support for Chavez, the key parameter of interest, β_2 , captures changes in voting cities that receive the Globovision signal, relative to cities that do not receive the Globovision signal, following the closing of RCTV in 2007. To account for the panel nature of the analysis, standard errors are again clustered at the municipality level.

As shown in Table 6, we again find a general decline in support for Chavez following the closing of RCTV in 2007. But, more importantly, this effect is particularly pronounced in cities that retained access to opposition television via the Globovision signal. Both of these differences are again statistically significant at conventional levels. To measure the magnitude of this effect, and to show that it does not depend upon the log-odds formulation, we next consider a similar specification but with the Chavez vote share, rather than the log odds formulation, as the dependent variable. As shown in column 2, there is a roughly 5 percentage point decline in the vote share for Chavez in cities without access to the Globovision signal following the closing of RCTV but a 7 percentage point decline in the Chavez vote share in cities with access to the Globovision signal. Thus, the differential decline equals 2 percentage points, and this decline is statistically significant at conventional levels.

To examine the robustness of these results to alternative signal measures, we next return to our baseline measure of log odds but now consider a continuous measure of the signal, the fraction of the grid cells in the municipality with access to the Globovision signal. As shown in column 3, we again find a strong reduction in electoral support for Chavez in cities with access to opposition television following the closing

of RCTV. Finally, in column 4, we document that our results are robust to using a measure of the signal based upon the more stringent measure of signal strength. To summarize, our results using electoral returns data are robust to alternative measures of support for Chavez and alternative measures of the strength of the Globovision signal.

In parallel to our placebo timing specifications using survey data, we next estimate similar models using voting returns data. That is, we estimate specifications in which RCTV is assumed to have closed in years other than the actual year of 2007. In this case, those years include 2006, 2009, and 2012. As shown in Table 7, the results for our baseline specification (column 2) are very similar to those using 2009 as the event date. Using 2006 or 2012 as the event date, however, yields interaction coefficients that are close to zero and statistically insignificant. Moreover, as shown in the final row, the baseline specification has the best fit, as measured by the R-squared in this case.

6.2 Event Studies

To further investigate the dynamics of our results using voting data, we next estimate event study specifications by allowing the key coefficient on access to the Globovision signal to vary over time in the following regression:

$$\ln[(share_{mt}^{chavez}/(1 - share_{mt}^{chavez}))] = \beta_t Signal_m + \alpha_m + \mu_t \quad (4)$$

where β_{2006} is again normalized to zero and α_m and μ_t capture, respectively, municipality and time fixed effects. As shown in Figure 15, we find that the effect of having access to the Globovision signal first appears in 2007 (held December 2, roughly five months following the closing of RCTV), and the effect becomes stronger in 2009, followed by a rebound back to 2007 levels during the 2012 elections. This pattern of effects is similar to that in Figure 13, which documented that the effect on approval for Chavez associated with access to the Globovision signal was strongest during the survey interviews held in 2008 and 2009 before rebounding back to lower levels towards the end of the sample period.

6.3 Turnout

In addition to analyzing vote shares, we also study participation in elections (i.e., turnout). Given that we do not have annual data on the number of eligible voters and thus cannot measure turnout rates directly, we instead measure participation via the log of the number of votes cast. Thus, our key coefficient on the interaction between the post-RCTV indicator and an indicator for access to the Globovision signal can be

interpreted as the percent change in turnout following the closing of RCTV in cities with access to the Globovision signal, relative to the change in turnout in cities without access to the Globovision signal.¹⁸

As shown Table 8, we find that turnout rose roughly 4 percent following the closing of RCTV in cities without access to the Globovision signal but 8 percent in cities with access to the Globovision signal, a statistically significant differential increase in turnout of 4 percentage points. This result is robust to using a continuous measure of signal intensity (column 2) and also to the more stringent measure from using the high signal strength threshold (column 3). Finally, we consider the timing of these effects with respect to turnout in Figure 16. Here the pattern is a bit different, relative to the pattern in the previous event studies, with an immediate and large increase (15 percent) in turnout during 2007 in cities with access to Globovision, relative to cities without Globovision. We again find that the effects diminish over time, and there are no essentially no differences in turnout between cities with and without access to the Globovision signal by 2012, the end of the sample period.

6.4 Persuasion Rates and Summary

For comparison with the literature, we use these results in election returns data to measure persuasion rates: the fraction of the population, among those who lost access to opposition television, that was persuaded to support Chavez (conditional on not doing so prior to the loss of RCTV). The measure accounts for both the documented change in vote shares and documented changes in turnout in places that retained access to opposition television via Globovision, relative to places that lost access to opposition television, following the closing of RCTV. Following the literature, our measured persuasion rate also accounts for the change in exposure to opposition television and we use our Nielsen ratings data and previously developed switching rates to develop these exposure rates. According to this calculation, with details provided in the Appendix, we measure a persuasion rate of 20 percent. This persuasion rate is higher than most of those reported in the literature, as summarized by DellaVigna and Gentzkow (2010), but is comparable to the persuasion rates of 12 to 28 percent using the diary audience measure, which is comparable to our ratings data, in DellaVigna and Kaplan (2007). Relative to Martin and Yurukoglu (2017), our measured persuasion rates are lower than those measured for Fox News but higher than those measured for MSNBC.

We find that access to opposition television via the Globovision signal is associated with a significant

¹⁸In particular, note that the log turnout rate can be written as $\ln(\text{votes}/\text{eligible}) = \ln(\text{votes}) - \ln(\text{eligible})$. Since we do not have information on the number of eligible voters on a year-by-year basis, we instead incorporate $\ln(\text{eligible})$ into the municipality fixed effects.

reduction in support for Chavez at the polling booth following the closing of RCTV in May 2007. This effect intensifies in the years following the closing of RCTV before rebounding back. We also find evidence that access to opposition television via the Globovision signal increased voter turnout following the closing of RCTV. Taken together, these patterns are consistent with the results in the prior sections, which documented that viewership of Globovision increased following the closing of RCTV and that approval ratings in survey data fell accordingly.

7 Theoretical Explanation

In this section, we develop a simple economic model that explains our three key empirical results: 1) voters switch to Globovision, when available, following the closing of RCTV, 2) the closing of RCTV increased support for the government in areas that lost access to opposition television, relative to places that retained access to opposition television via Globovision, and 3) the differences in support for government between places with and without access to opposition television, via the Globovision signal, fade over time, following the closing of RCTV. We present the baseline model followed by four extensions.

7.1 Baseline Model

We consider an economic model in which media outlets issue informative reports but in which the government might censor reports that reflect negatively upon their performance. There are two states of the world, good ($s = g$) and bad ($s = b$). The state reflects the performance of the incumbent government and could be interpreted, for example, as the state of the economy or the degree of corruption in government. The probability of the bad state equals π_b . A media outlet receives a signal (σ) containing no information about the state of the world ($\sigma = \phi$) with probability p , and, with probability $1 - p$, receives a signal that reveals the true state ($\sigma = s$). Based upon this information, the media outlet then issues a report (r), which reflects either their signal ($r = \sigma$) or no information ($r = \phi$). Thus, media outlets cannot issue a good report when the state is bad and vice-versa.

While media outlets would like to issue a report when they have relevant information, the government may censor reports when the signal is bad. While the censorship environment is determined exogenously in the baseline model, we later consider an extension in which the incumbent chooses the degree of censorship. In particular, we assume here that there are two media environments, uncensored ($m = u$) and censored ($m = c$). In the former case, there is no censoring of bad signals. In the latter environment, which occurs with probability π_c , the government censors bad signals with probability q , and, in this case, the

report contains no information ($r = \phi$). Thus, when the media does not issue a report, this could reflect either censoring or a lack of information available to the media outlet. To summarize, in the censored environment, the media outlet issues a bad report with probability $(1 - p)\pi_b(1 - q)$, issues a good report with probability $(1 - p)(1 - \pi_b)$, and issues no report with probability $p + (1 - p)\pi_bq$.

While voters are assumed to know all relevant probabilities (π_b, π_c, p, q), we assume for now that they do not observe the media environment and can only learn about the environment from contemporaneous media reports. We later relax this assumption in two ways, one involving voters learning about the media environment from past media reports and another involving voters receiving independent and informative signals regarding the media environment.

Given this set up, citizens observing an informative report ($r = b$ or $r = g$) learn the true state. Upon receiving no report ($r = \phi$), by contrast, voters do not know whether the government censored a bad report or the media received no signal. In this case, voters follow Bayes rule and update as follows:

$$Pr(s = b|r = \phi) = \frac{Pr(r = \phi|s = b)Pr(s = b)}{Pr(r = \phi|s = b)Pr(s = b) + Pr(r = \phi|s = g)Pr(s = g)} \quad (5)$$

Since the government does not censor favorable reports, the probability that the media outlet issues no report when state is good equals the probability that the outlet received no information. That is, $Pr(r = \phi|s = g) = p$. When the state is bad, by contrast, it is possible that the report is censored and thus $Pr(r = \phi|s = b) = p + (1 - p)\pi_cq$. Using the fact that $Pr(s = b) = \pi_b$ and substituting back in, we have that:

$$Pr(s = b|r = \phi) = \frac{[p + (1 - p)\pi_cq]\pi_b}{[p + (1 - p)\pi_cq]\pi_b + p(1 - \pi_b)} \quad (6)$$

In the absence of censoring ($\pi_c = 0$ or $q = 0$), we have that $Pr(s = b|r = \phi) = \pi_b$, meaning that voters do not update in either direction in the absence of a media report. With censoring ($\pi_c > 0$ and $q > 0$), by contrast, voters understand that it is possible that the government censored the report and, when faced with no media reports, thus infer that the bad state is now more likely. That is, $Pr(s = b|r = \phi) > \pi_b$. More generally, one can show that the ex-post belief of a bad state following no report is increasing in the degree of censoring (i.e. in both π_c and q).

Is censoring an effective government strategy? That is, does censorship systematically decrease the likelihood that voters believe the state is bad? To investigate this issue, consider the probability that voters believe that the state is bad averaged across media reports. This can be written as:

$$Pr(s = b|r) = Pr(r = b) + Pr(r = \phi)Pr(s = b|r = \phi) \quad (7)$$

In the censored environment, we have that $Pr(r = b) = (1 - p)\pi_b(1 - q)$ and $Pr(r = \phi) = p + (1 - p)\pi_b q$. Since the environment is unknown to voters, and using the results from above, this can be written as follows for the censored environment:

$$Pr(s = b|r) = (1 - p)\pi_b(1 - q) + [p + (1 - p)\pi_b q] \frac{[p + (1 - p)\pi_c q]\pi_b}{[p + (1 - p)\pi_c q]\pi_b + p(1 - \pi_b)} \quad (8)$$

One can show that this is less than π_b so long as $\pi_c < 1$.¹⁹ That is, censorship systematically decreases voter perceptions of the bad state. If voters know that the media environment is censored ($\pi_c = 1$), by contrast, then there is no uncertainty over the media environment, and $Pr(s = b|r) = \pi_b$. In this case, voters are sufficiently sophisticated to account for censorship when processing content, understanding that censorship implies a loss of access to information that might reflect negatively on the government. This result, that censorship systematically manipulates voter beliefs when $\pi_c < 1$, highlights the role of voter uncertainty over the censorship environment in manipulating voters. In the extensions below, we further explore how voters might learn about the censorship environment.

7.2 Extensions

In this section, we consider four extensions of the model. The first embeds this model of learning into a model of collective action, generating a demand for opposition media. The second and third extensions allow voters to learn about the censorship environment, first from an independent signal about the media environment and then from past media reports. Finally, we consider a model of endogenous censorship in which incumbents, knowing the state, choose the media environment. The details of these extensions are provided in the Appendix, and here we just summarize the key results.

In the first extension, we embed our informational model of censorship into a simple model of collective action in which opposition to the government exhibits strategic complementarities. Due to collective action, voters benefit from distinguishing between the media receiving negative information about the government (i.e., bad signals) and the media receiving no information about the government (i.e., no signal). In this sense, voters have a preference for opposition media and are harmed by censorship. In the

¹⁹This follows from the fact that the expression equals π_b when $\pi_c = 1$ and that the right-hand side is increasing in π_c , meaning that voter perceptions of the bad state decrease as voters uncertainty over the media environment increases (i.e., π_c falls below 1).

context of this model, we also show that the government might benefit from increased censorship, via a corresponding reduction in collective action, when censorship levels are low.

In the second extension, voters receive an informative signal of the media environment before receiving media reports. This signal could be interpreted as, for example, voters observing that RCTV was replaced by TVES. The key result here is that, unless this signal perfectly reveals the media environment, then voter beliefs are still systematically manipulated by the media environment. That is, censorship systematically decreases voter perceptions of the bad state, when averaged across both states and all possible media reports.

As a third extension, we allow voters to learn about the media environment from both contemporaneous and past media reports. While voters still do not know the media environment, we assume that the environment is stable and voters thus attempt to learn about this over time from media reports. In particular, upon observing no report, voters increase their perceptions that the state is bad, as before, but also now increase their perceptions that the media environment is censored. In the context of a numerical analysis, we show that voters learn the true media environment over time and can account for this when processing media reports. Due to this, and given the results above, voter beliefs over the likelihood of the bad state in the censored environment following media reports converge to the ex-ante probability. That is, $Pr(s = b|r)$ converges to π_b , even in the censored environment. This highlights a crucial difference between the short-run, when voters do not know the censorship environment, and the long-run, when voters learn about this and can use this information when processing media reports.

In a fourth extension, we allow the incumbent, knowing whether the state is good or bad, to choose the media environment. We show that, if the costs of censorship are sufficiently low, there is an equilibrium in which censorship is adopted in the bad state but not in the good state. Given this, voters update more negatively upon receiving no report since censorship is now more likely in the bad state. Despite this, incumbent politicians do benefit from censorship in the bad state since it allows them to pool with politicians in the good state.

7.3 Summary

To summarize, the model and the associated extensions can explain our three key empirical findings. First, as developed in the first extension, there is a preference for opposition media, meaning that voters might switch to Globovision, when available, following the closing of RCTV. Second, censorship systematically manipulates voter beliefs in favor of the incumbent, meaning that areas without access to Globovision

might experience an increase in support for the government, relative to areas that retained access to opposition television, following the closing of RCTV. Third, as developed in the third extension, voters rationally adjust to the media environment in the long run, and beliefs are not systematically manipulated by censorship. This explains the fading of the gap in support for Chavez between areas with and without access to Globovision following the closing of RCTV.

8 Conclusion

This paper investigates the role of government censorship of opposition television in the accountability of governments and incumbent politicians. We focus on the expiration of the television license of RCTV, a key opposition channel in Venezuela, and the subsequent opening of TVES, a public channel. The closure of RCTV, along with the limited signal availability of Globovision, provide a natural experiment in which some cities lose access to opposition television overnight, while other cities retain access to opposition news. Using ratings data, we first find that viewers switched from TVES, the public pro-government channel, to Globovision, the only other opposition channel, in areas with access to the broadcast signal following the closing of RCTV. Building upon this result, we find that Chavez approval ratings fell in these areas that retained access to opposition television via the Globovision broadcast signal, relative to areas without access to the signal, following the closing of RCTV. We also find evidence that access to the Globovision signal is associated with a reduction in support for foreign allies and an increase in support for foreign enemies. We find similar patterns in electoral data, with support for Chavez falling in these areas that retained access to opposition television via the Globovision broadcast signal, relative to areas without access to the signal, following the closing of RCTV. In both analyses, differences between cities with and without Globovision fade over time. Taken together, these results suggest that viewers are sufficiently sophisticated to adjust their viewing patterns in response to government censorship, and these behavioral responses contribute towards a reduction in support for government. In addition, voters are sufficiently sophisticated to adjust to the censored environment in the long run, understanding that a lack of information might reflect negatively upon the government. By both adjusting their media consumption patterns and rationally filtering information in a censored environment, voters can limit the effects of censorship and better hold governments and incumbent politicians accountable.

References

- Adena, Maja, Ruben Enikolopov, Maria Petrova, Veronica Santarosa and Ekaterina Zhuravskaya. 2015. "Radio and the rise of the Nazis in pre-war Germany." *Quarterly Journal of Economics* 130(4):1885–1939.
- Besley, Timothy and Andrea Prat. 2006. "Handcuffs for the Grabbing Hand? Media Capture and Government Accountability." *The American Economic Review* pp. 720–736.
- Besley, Timothy and Robin Burgess. 2002. "The political economy of government responsiveness: Theory and evidence from India." *The Quarterly Journal of Economics* 117(4):1415–1451.
- Chang-Tai, Hsieh, Edward Miguel, Daniel Ortega and Francisco Rodriguez. 2011. "The Price of Political Opposition: Evidence from Venezuela's Maisanta." *American Economic Journal: Applied Economics* 3(2):196–214.
- Chen, Yuyu and David Yang. 2019. "The Impact of Media Censorship: 1984 or Brave New World." Working Paper.
- Chiang, Chun-Fang and Brian Knight. 2011. "Media bias and influence: Evidence from newspaper endorsements." *The Review of Economic Studies* 78(3):795–820.
- Corrales, Javier and Michael Penfold. 2011. *Dragon in the Tropics: Hugo Chavez and the Political Economy of Revolution in Venezuela*. Washington D.C., U.S: Brookings Latin America Initiative Books.
- DellaVigna, Stefano and Ethan Kaplan. 2007. "The Fox News effect: Media bias and voting." *The Quarterly Journal of Economics* 122(3):1187–1234.
- DellaVigna, Stefano and Matthew Gentzkow. 2010. "Persuasion: Empirical Evidence." *Annual Review of Economics* 2(1):643–669.

- Dinneen, Mark. 2012. "The Chavez government and the battle over the media in Venezuela." *Asian Journal of Latin American Studies* 25(2):27–53.
- Durante, Ruben and Brian Knight. 2012. "Partisan Control, Media Bias, And Viewer Responses: Evidence From Berlusconi'S Italy." *Journal of the European Economic Association* 10(3):451–481.
- Durante, Ruben, Paolo Pinotti and Andrea Tesei. 2017. The Political Legacy of Entertainment TV. Technical report Centre for Economic Performance, LSE.
- Edmond, Chris. 2013. "Information manipulation, coordination, and regime change." *Review of Economic Studies* 80(4):1422–1458.
- Enikolopov, Ruben, Alexey Makarin, Maria Petrova and Leonid Polishchuk. 2019. "Social image, networks, and protest participation."
- Enikolopov, Ruben, Maria Petrova and Ekaterina Zhuravskaya. 2011. "Media and political persuasion: Evidence from Russia." *The American Economic Review* 101(7):3253–3285.
- EU-EOM. 2006. Final Report: Presidential Elections Venezuela 2006. Technical report European Union Election Observation Mission.
- Ferraz, Claudio and Frederico Finan. 2008. "Exposing corrupt politicians: the effects of Brazil's publicly released audits on electoral outcomes." *The Quarterly journal of economics* 123(2):703–745.
- Ferraz, Claudio and Frederico Finan. 2011. "Electoral accountability and corruption: Evidence from the audits of local governments." *American Economic Review* 101(4):1274–1311.
- Gentzkow, Matthew and Jesse M Shapiro. 2010. "What drives media slant? Evidence from US daily newspapers." *Econometrica* 78(1):35–71.

- Gentzkow, Matthew, Jesse M Shapiro and Michael Sinkinson. 2011. “The Effect of Newspaper Entry and Exit on Electoral Politics.” *American Economic Review* 101(7):2980–3018.
- George, Lisa and Joel Waldfogel. 2003. “Who affects whom in daily newspaper markets?” *Journal of Political Economy* 111(4):765–784.
- Gerber, Alan S., Dean Karlan and Daniel Bergan. 2009. “Does the Media Matter? A Field Experiment Measuring the Effect of Newspapers on Voting Behavior and Political Opinions.” *American Economic Journal: Applied Economics* 1(2):35–52.
- Guriev, Sergei and Daniel Treisman. 2015. How modern dictators survive: An informational theory of the new authoritarianism. Technical report National Bureau of Economic Research.
- King, Gary, Jennifer Pan and Margaret E Roberts. 2013. “How censorship in China allows government criticism but silences collective expression.” *American Political Science Review* 107(2):326–343.
- Knight, Brian and Ana Tribin. 2019. “The Limits of Propaganda: Evidence from Chavez’s Venezuela.” *Journal of the European Economic Association* .
- Kronick, Dorothy and John Marshall. 2018. “Opposition Media and Political Accountability: Evidence from Venezuela.”
- Martin, Gregory and Ali Yurukoglu. 2017. “Bias in Cable News: Persuasion and Polarization.” *American Economic Review*.
- Nelson, Brian A. 2009. *The Silence and the Scorpion: The Coup Against Chavez and the Making of Modern Venezuela*. New York, U.S: Nation Books.
- Prat, Andrea. 2014. “Media Power.” CEPR Discussion Paper No. 10094.
- Reporters Without Borders. 2003. Venezuela: Caught Between an Authoritarian President and an Intolerance Media. Technical report Reporters Without Borders.

- Shadmehr, Mehdi and Dan Bernhardt. 2015. "State censorship." *American Economic Journal: Microeconomics* 7(2):280–307.
- Snyder, James M and David Stromberg. 2010. "Press Coverage and Political Accountability." *Journal of Political Economy* 118(2):355–408.
- Szeidl, Adam and Ferenc Szucs. 2017. "Media Capture Through Favor Exchange.".
- Weisbrot, Mark and Tara Ruttenberg. 2010. Television in Venezuela: Who Dominates the Media? Technical report Center For Economic and Policy Research.
- Wilpert, Gregory. 2007. *Changing Venezuela by Taking Power: The History and Policies of the Chavez Government*. London, England: Verso Books.

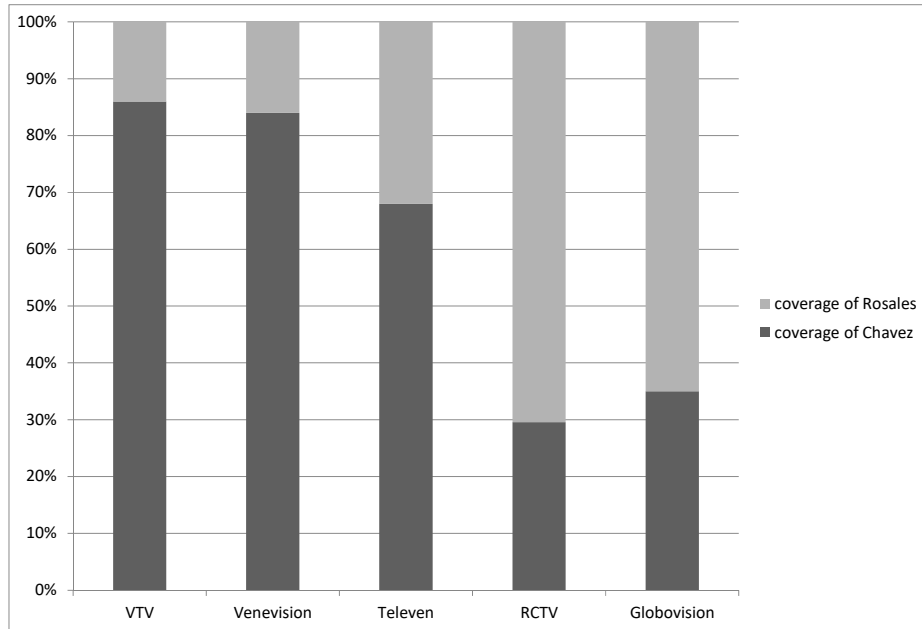


Figure 1: EU Media Monitoring of 2006 Presidential Election

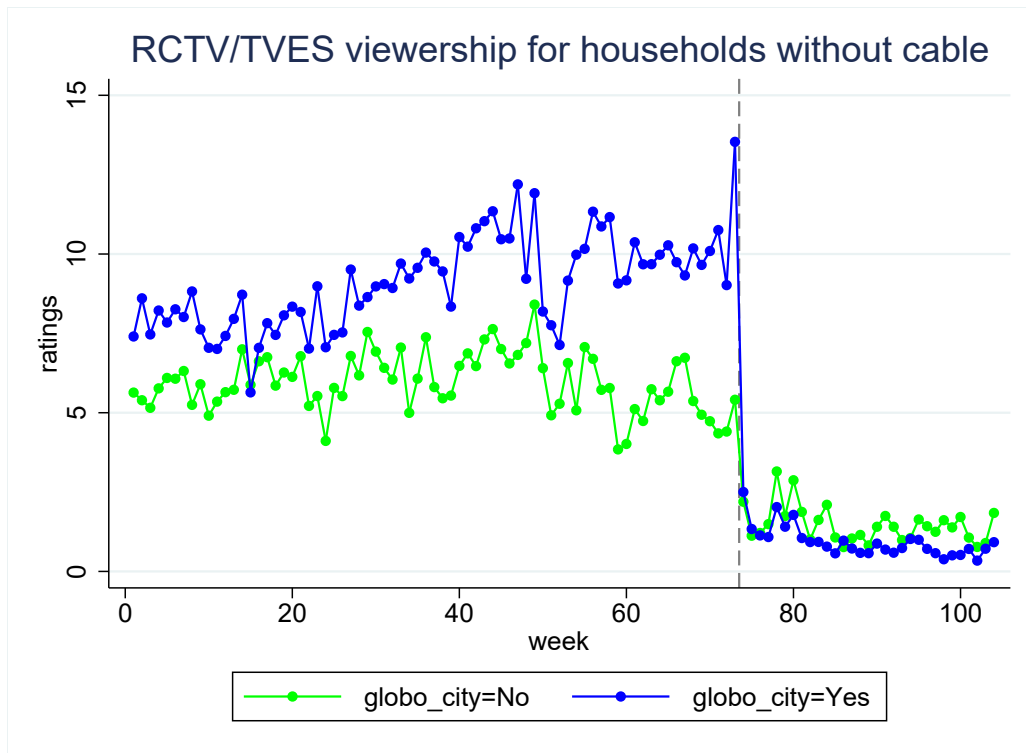


Figure 2

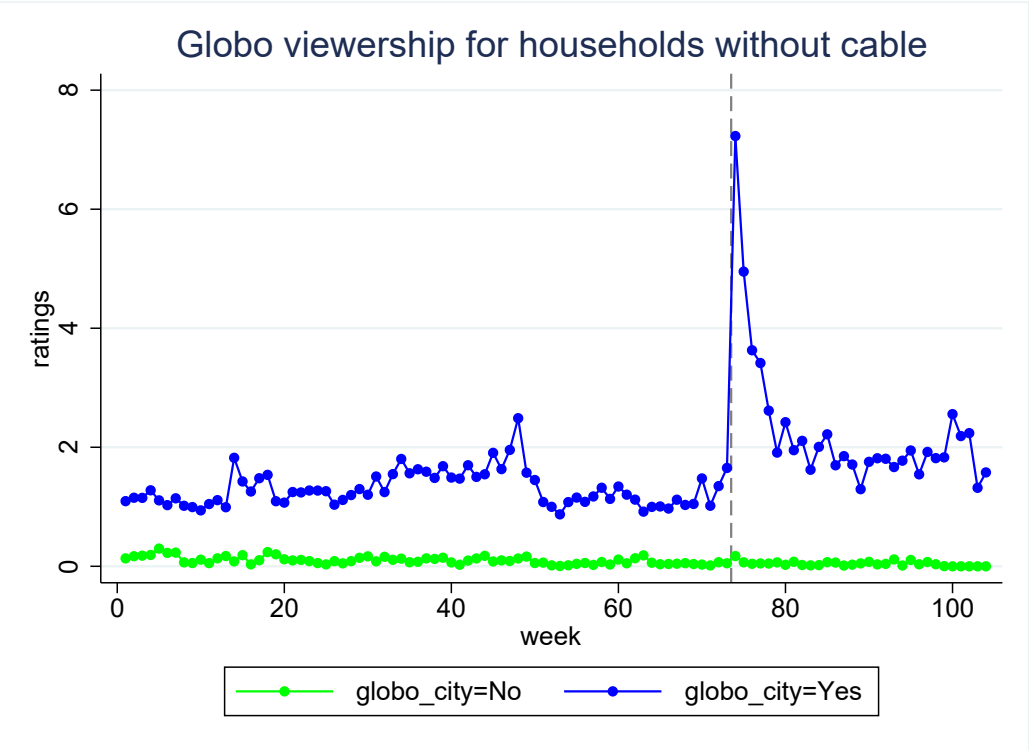


Figure 3

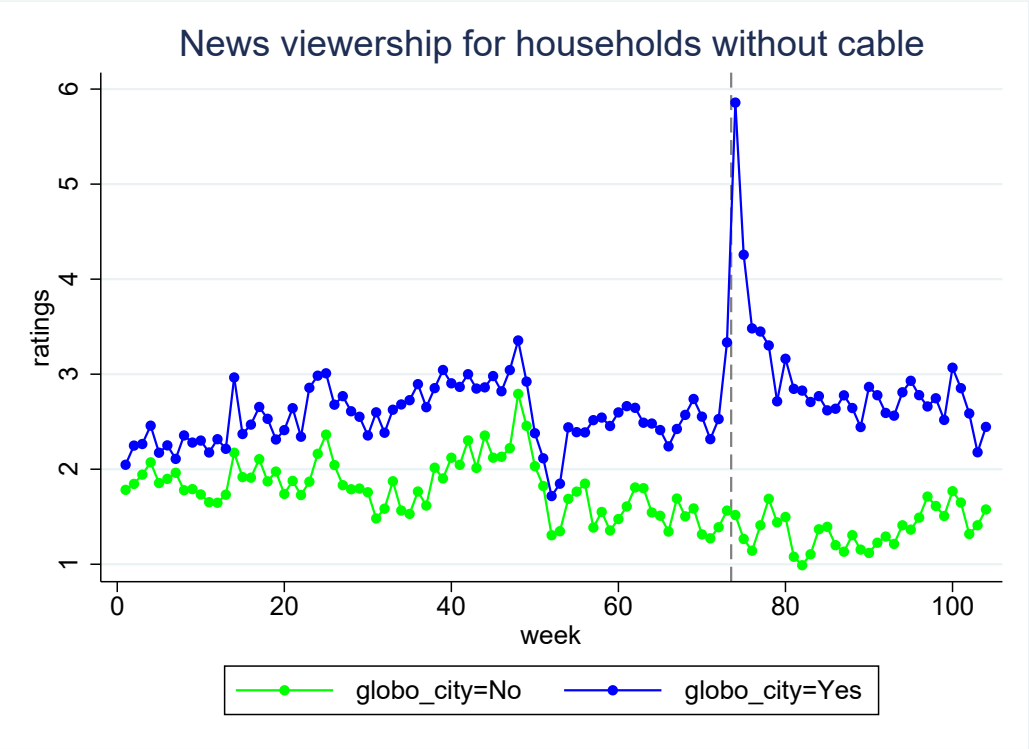


Figure 4

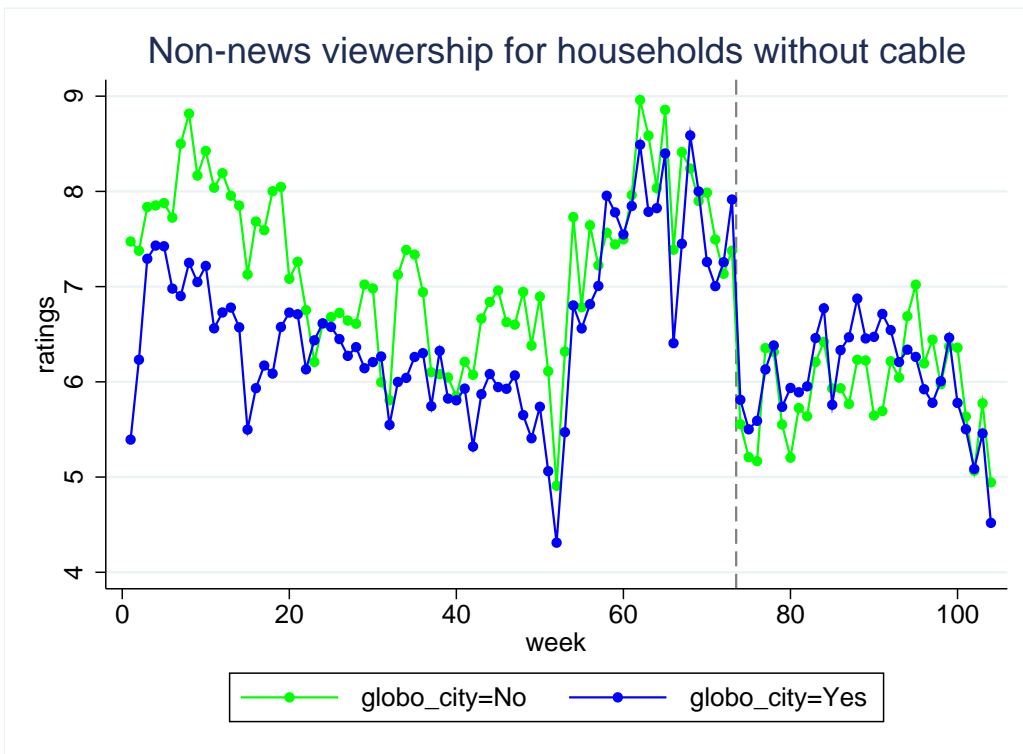


Figure 5

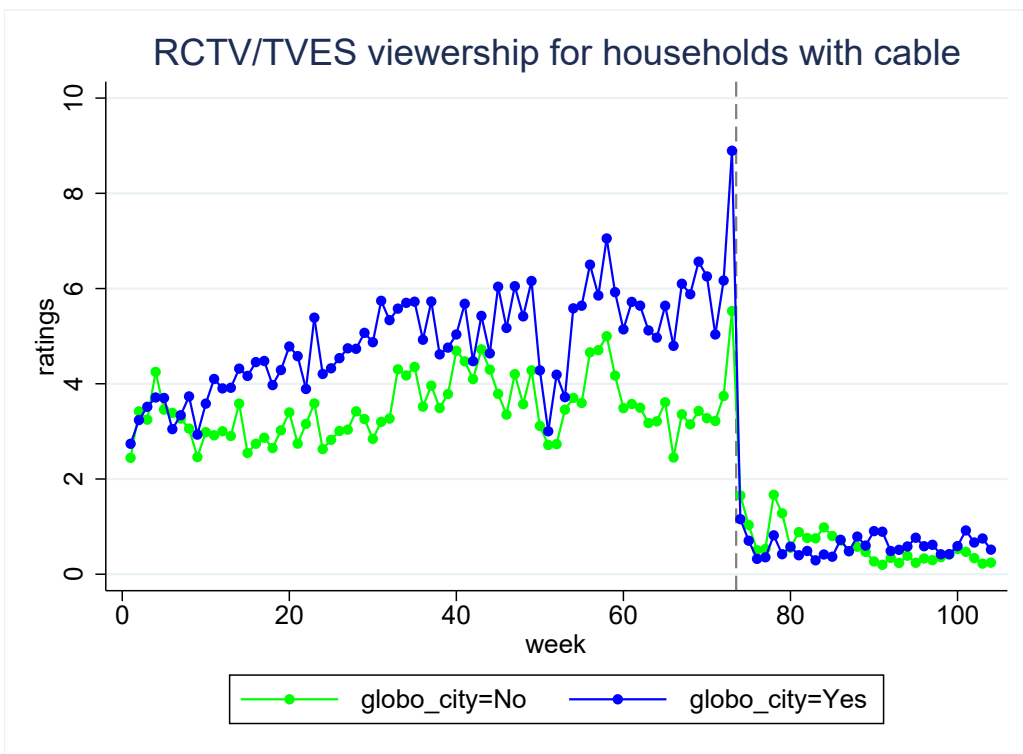


Figure 6

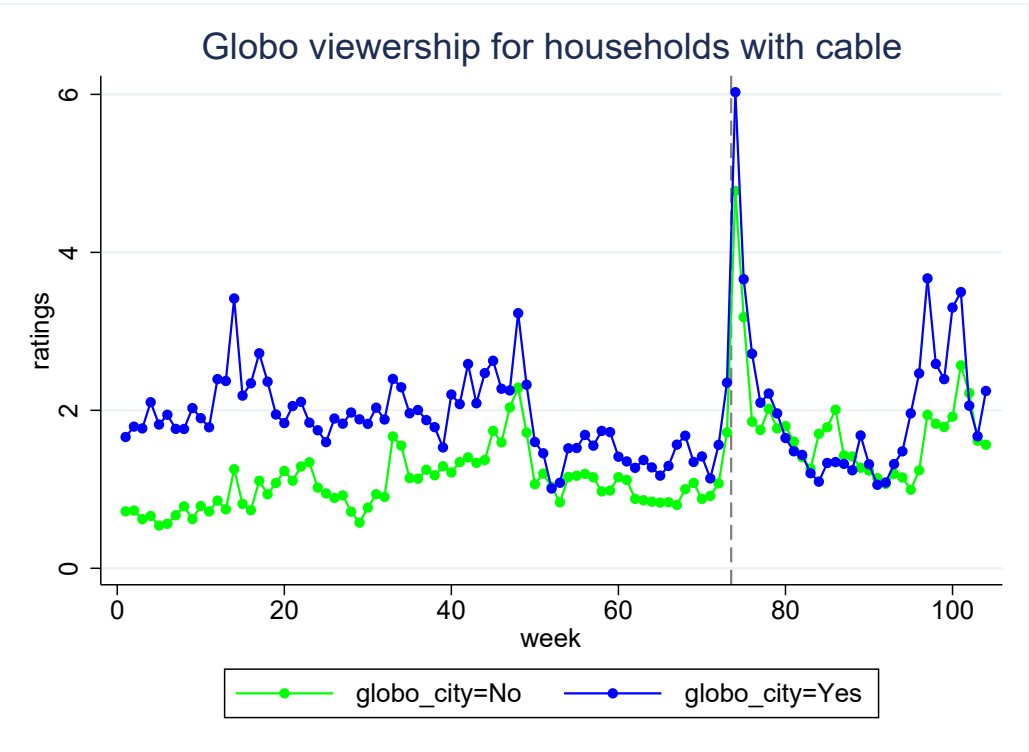


Figure 7

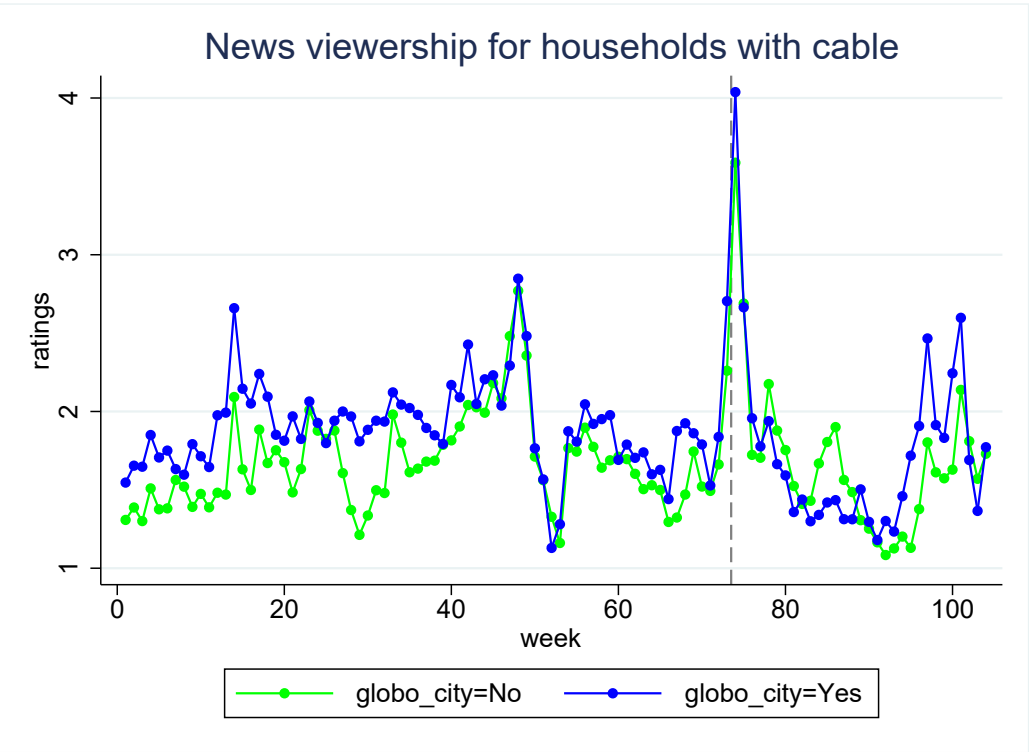


Figure 8

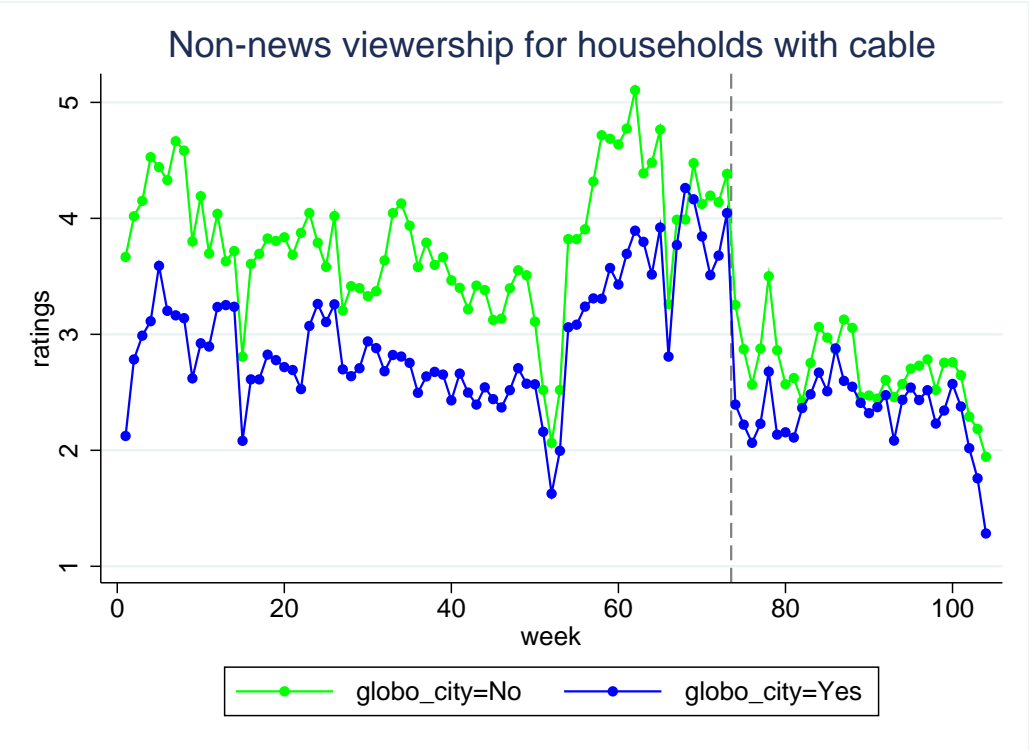


Figure 9

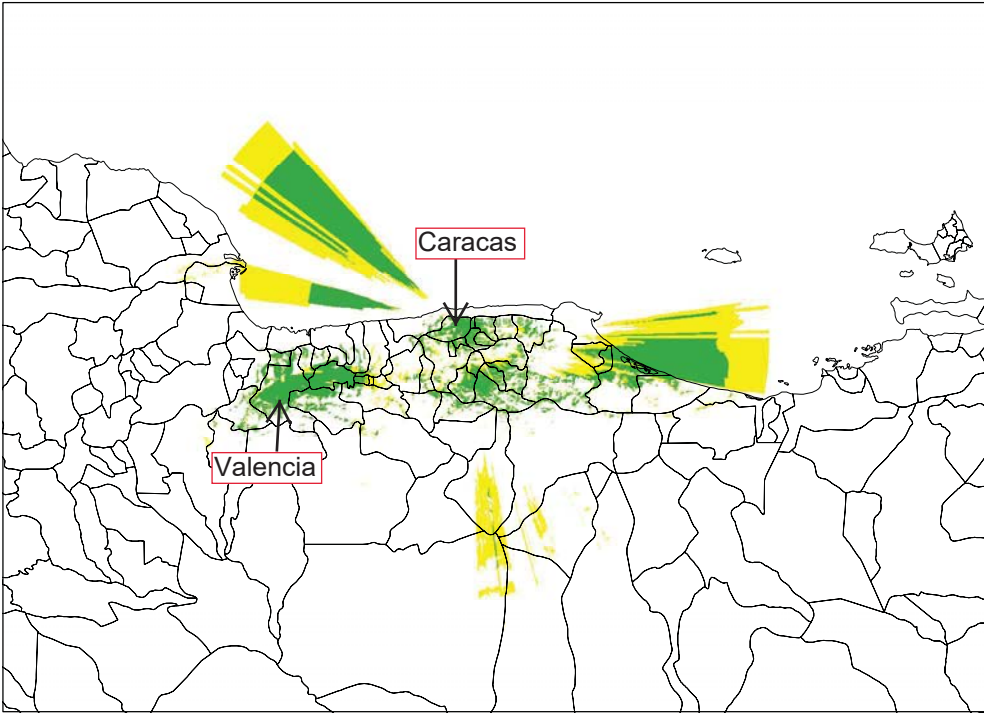


Figure 10: Globovision coverage map

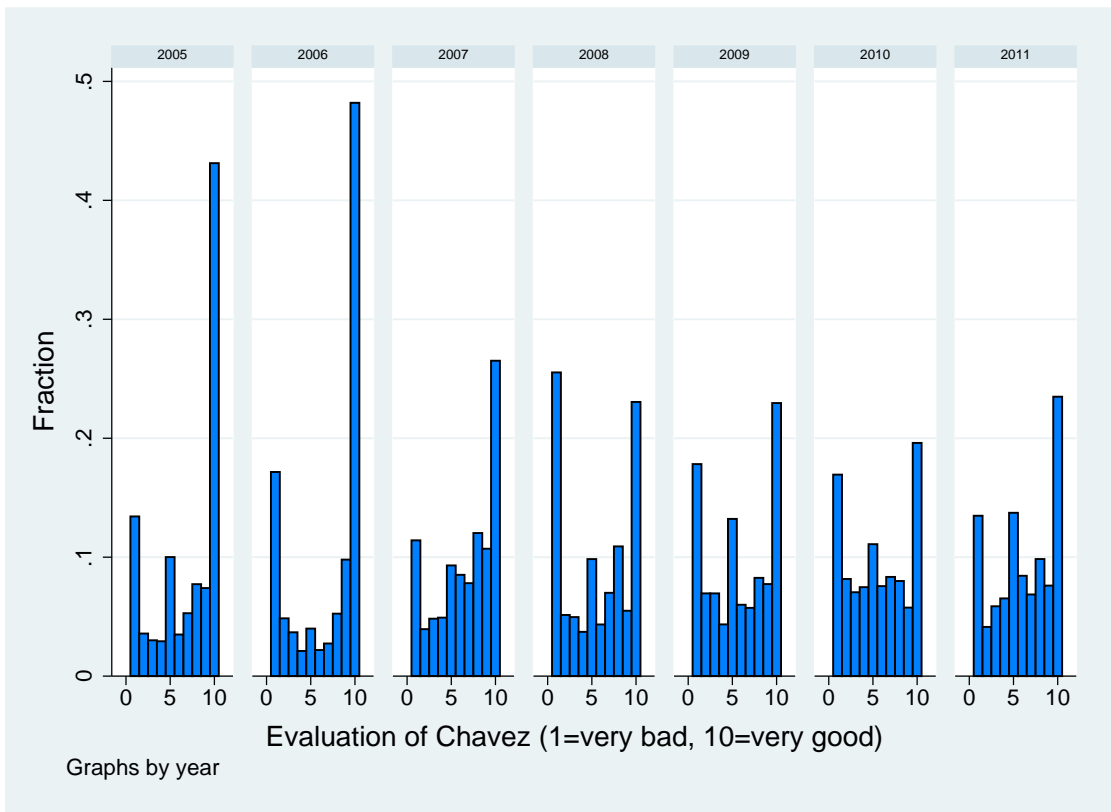


Figure 11

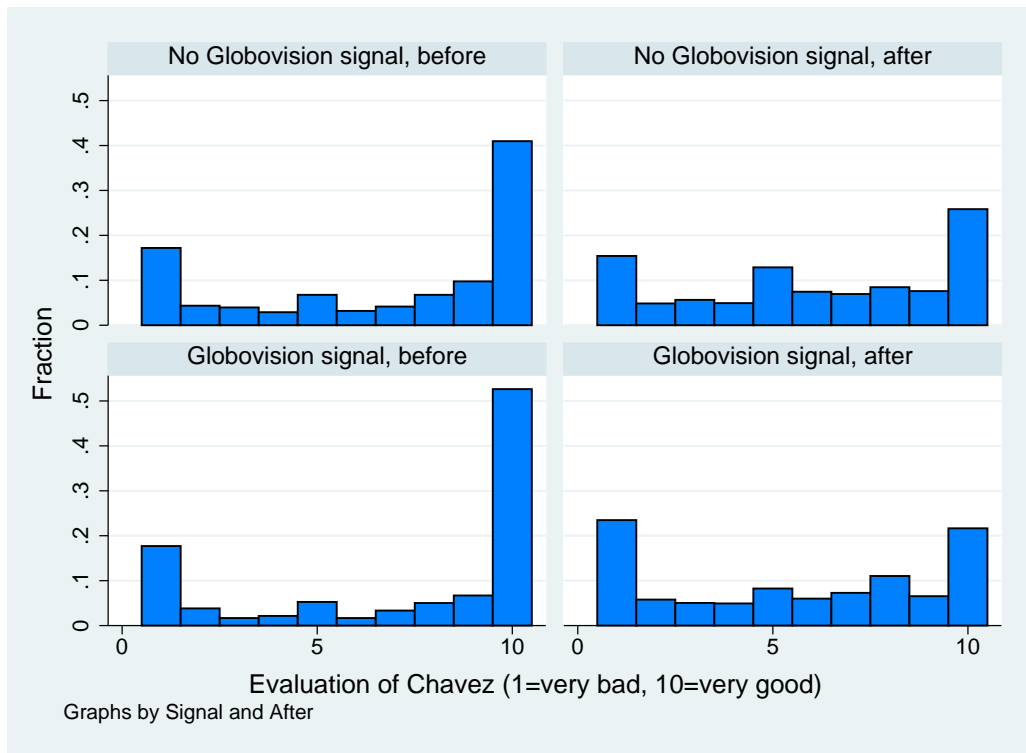


Figure 12

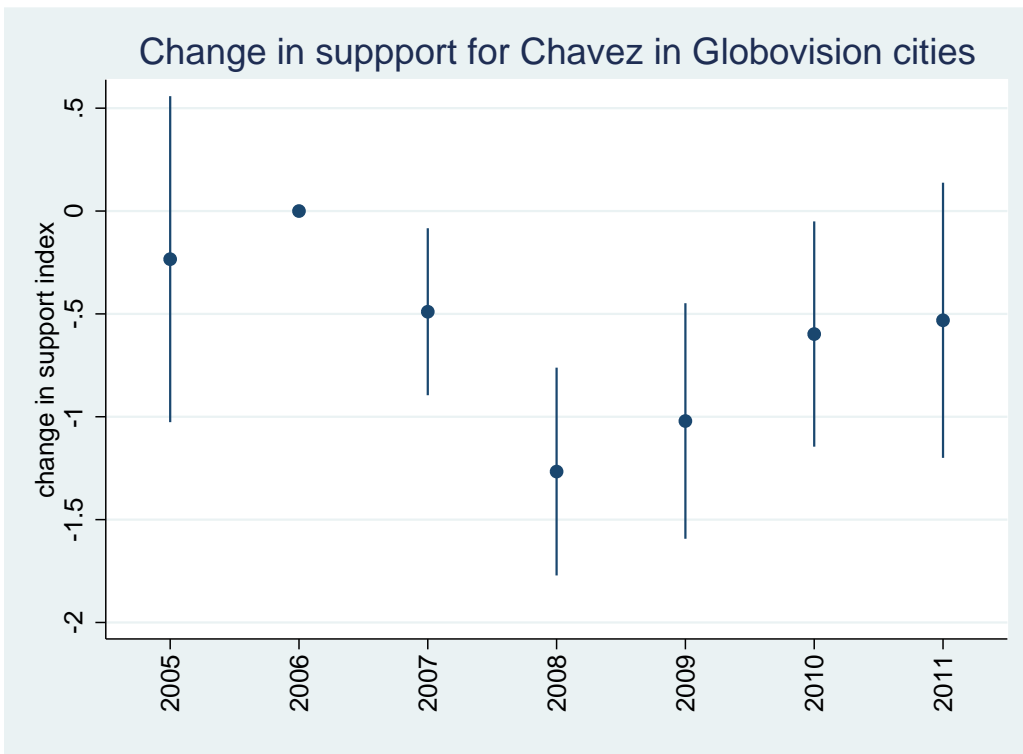


Figure 13

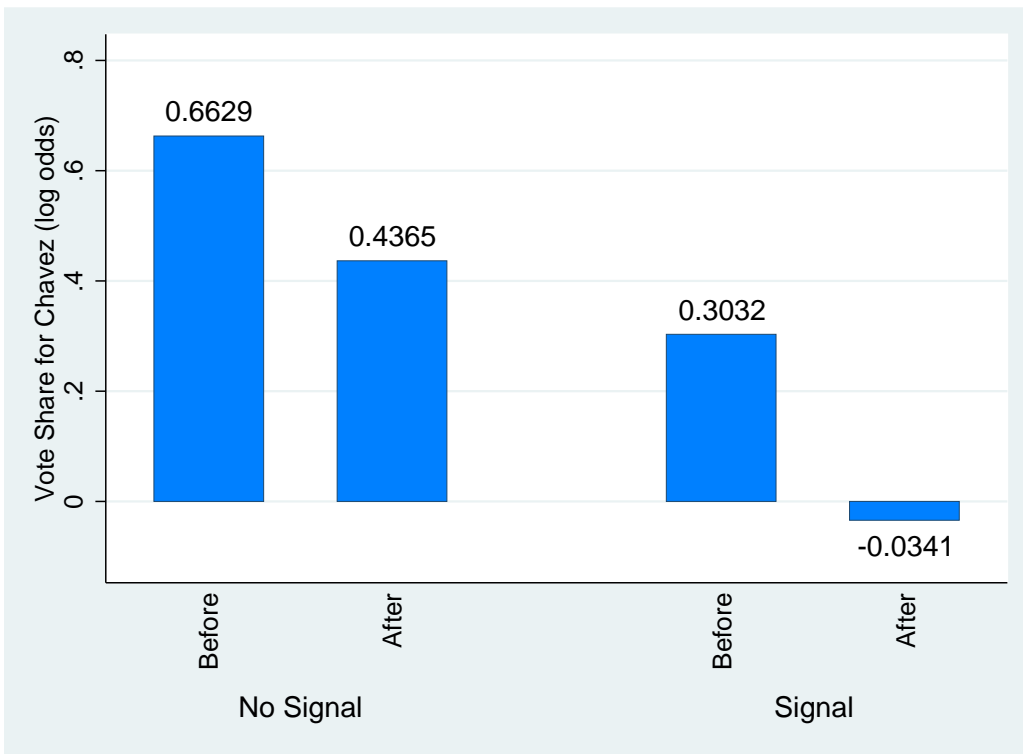


Figure 14

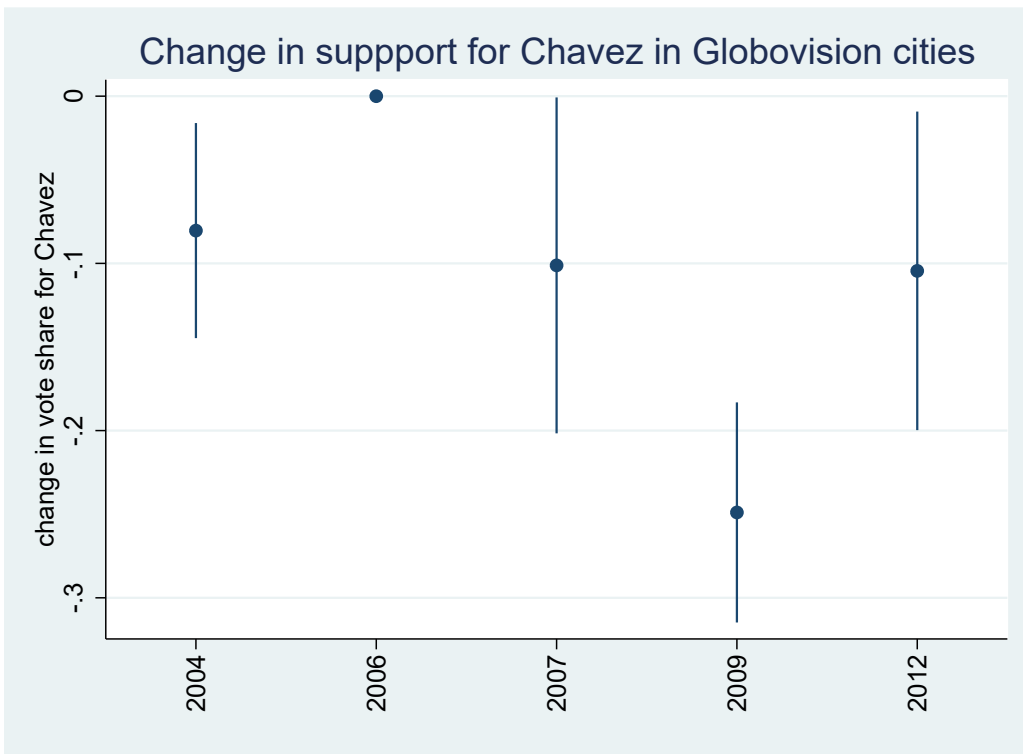


Figure 15

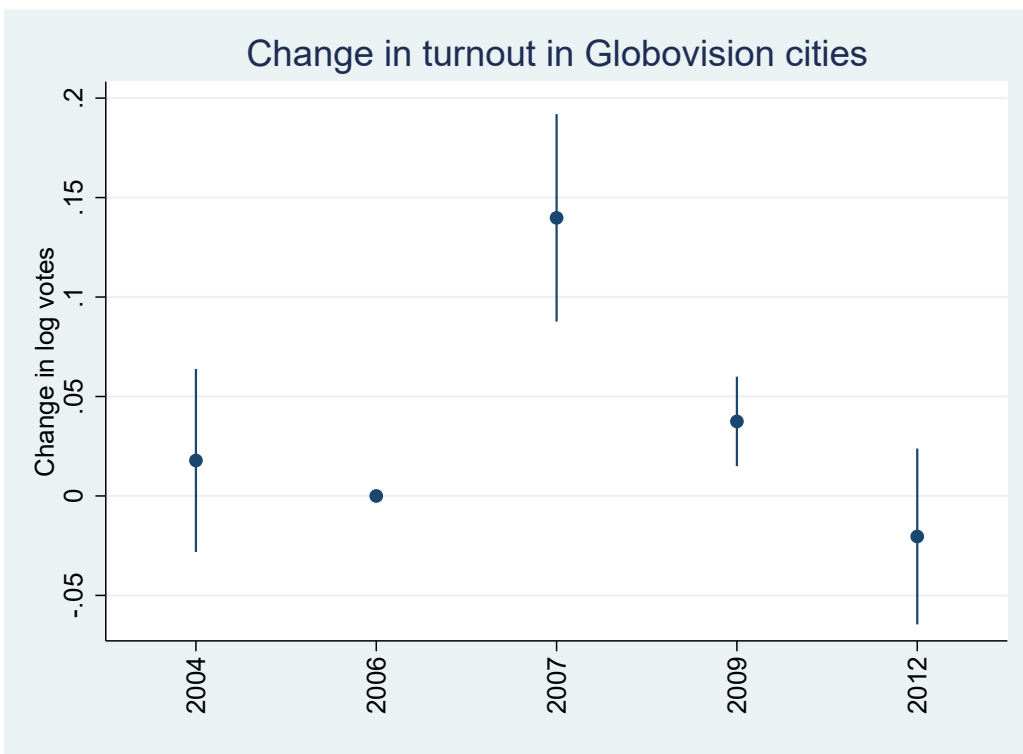


Figure 16

Table 1: Key Television Channels

Channels	Ownership/Ideology	Cities	Dates	Daily News Hours
Globovision	Private/Opposition	Caracas and Valencia	all	19.57
RCTV	Private/Opposition	National	Until May 27, 2007	4.10
TVES	Public	National	Starting May 28, 2007	3.01
Televen	Private/Moderate	National	all	3.83
Venevision	Private/Moderate	National	all	3.65
VTV	Public	National	all	14.62

Table 2: Cable Subscription Rates by Year for Venezuela

Year	Subscribers	Households	Penetration rate
2000	778,904	4,685,917	16.62%
2001	977,375	4,998,022	19.56%
2002	943,327	5,185,460	18.19%
2003	882,322	5,533,395	15.95%
2004	981,368	5,754,516	17.05%
2005	1,117,553	6,215,837	17.98%
2006	1,336,309	6,364,119	21.00%
2007	1,608,279	6,476,233	24.83%
2008	1,929,262	6,658,321	28.98%
2009	2,192,519	6,803,942	32.22%
2010	2,550,830	6,969,151	36.60%
2011	2,798,577	7,079,559	39.53%
2012	3,404,298	7,185,754	47.38%

Source: Observatorio Estadístico. Conatel.

Globovision signal and support for Chavez

	(1)	(2)	(3)	(4)	(5)
VARIABLES	baseline	demographic controls	demographic controls / flexible coefficients	continuous signal	high signal
After	-0.4865*** (0.1291)	-0.4781*** (0.1293)	-1.2686*** (0.3178)	-0.4663*** (0.1324)	-0.4973*** (0.1268)
Globo City X After	-0.6796*** (0.1975)	-0.6457*** (0.2073)	-0.6562*** (0.2115)		
Signal X After				-1.0109*** (0.2757)	
Globo City (high) X					-0.6880*** (0.1974)
Observations	7,976	7,976	7,976	7,976	7,976

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1
 standard errors clustered at the city level

Table 3

Placebo Timing

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	1 year before	baseline	1 year after	2 years after	3 years after	4 years after
After	-0.3732** (0.1791)	-0.4865*** (0.1291)	-0.3137** (0.1548)	-0.1283 (0.0985)	-0.0926 (0.0989)	0.1185 (0.1101)
Globo City X After	-0.4591 (0.3887)	-0.6796*** (0.1975)	-0.5838*** (0.1795)	-0.0644 (0.1877)	0.1945 (0.2335)	0.3095 (0.2366)
Observations	7,976	7,976	7,976	7,976	7,976	7,976
Log-Likelihood	-16259	-16221	-16244	-16277	-16279	-16275

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1
 standard errors clustered at the city level

Table 4

Globovision signal and other outcomes

VARIABLES	(1) ideology L to R	(2) approve government	(3) approve castro	(4) approve uribe/santos	(5) approve us president
After	-0.2209 (0.2909)	-0.4860*** (0.1522)	-0.6042*** (0.1735)	-0.6661*** (0.2231)	0.9184*** (0.2063)
Globo City X After	0.1754 (0.3014)	-0.2247 (0.1691)	-0.6057* (0.3661)	0.4528* (0.2431)	0.2681 (0.2368)
Observations	6,890	7,666	7,727	4,582	6,934

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

standard errors clustered at the city level

Table 5

Globovision signal and electoral support for Chavez

VARIABLES	(1) log odds	(2) Chavez vote share	(3) log odds	(4) log odds
after	-0.2256*** (0.0168)	-0.0503*** (0.0036)	-0.2188*** (0.0173)	-0.2279*** (0.0166)
Globo City X After	-0.1117*** (0.0391)	-0.0183** (0.0091)		
Signal X After			-0.2218*** (0.0599)	
Globo City (high) X After				-0.0926** (0.0468)
Observations	1,668	1,668	1,668	1,668
R-squared	0.8370	0.8474	0.8376	0.8368

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

standard errors clustered at the city level

Table 6

Vote shares: Placebo Timing

VARIABLES	(1) 1 year before	(2) baseline	(3) 2 years after	(4) 5 years after
After	-0.0497*** (0.0183)	-0.2256*** (0.0168)	-0.0245 (0.0151)	-0.0731*** (0.0196)
Globo City X After	-0.0337 (0.0393)	-0.1117*** (0.0391)	-0.1155*** (0.0279)	0.0037 (0.0330)
Observations	1,668	1,668	1,668	1,668
R-squared	0.8001	0.8370	0.7999	0.8014

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

standard errors clustered at the city level

Table 7

Globovision signal and turnout

VARIABLES	(1) log turnout	(2) log turnout	(3) log turnout
after	0.0377*** (0.0082)	0.0356*** (0.0085)	0.0383*** (0.0081)
Globo City X After	0.0426*** (0.0147)		
Signal X After		0.0763*** (0.0255)	
Globo City (high) X After			0.0448** (0.0191)
Observations	1,668	1,668	1,668
R-squared	0.9558	0.9558	0.9558

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

standard errors clustered at the city level

Table 8

A Appendix

A.1 Measuring Persuasion Rates

DellaVigna and Kaplan (2007) measure persuasion rates via the following formula:

$$\frac{(v_T - v_C)}{(e_T - e_C)(1 - r)} \frac{(1 - r)t_C t_T}{d}$$

where $v_T - v_C$ represents the change in Republican vote share due to the treatment, the introduction of Fox News, $e_T - e_C$ represents exposure to Fox News in treatment towns, those with Fox News included in cable packages, relative to control towns, those without Fox News, r represents the fraction of Republican voters at baseline, d represents the fraction of Democratic voters at baseline, t_T represents turnout in treatment towns, and t_C represents turnout in control towns. The first term represents persuasion with full turnout, and the second term adjusts the measure for turnout.

In our case, the treatment can be considered the loss of RCTV, and the control towns are thus those with access to opposition television via Globovision. In this case, the voting outcome involves support for the government. That is, among those who lost access to opposition television, how many were persuaded to support Chavez, given that they did not already do so? Given this, we modify the formula to our context as follows:

$$\frac{(v_T - v_C)}{(e_T - e_C)(1 - g)} \frac{(1 - g)t_C t_T}{o}$$

where g and o represent, respectively, the fraction supporting Chavez and the opposition, among RCTV viewers.

We measure $v_T - v_C$ as 0.0183, the increase in the vote share for Chavez in towns without Globovision, relative to towns with Globovision (column 2 of Table 6). In their “diary measure”, DellaVigna and Kaplan (2007) measure $e_T - e_C$ as the fraction reporting to have watched Fox News “for at least one full half-an-hour block according to the seven-day diary”. To develop an analogue of this measure using our ratings data, we first measure maximum weekly ratings for RCTV news programming for each week during 2006, the year prior to the closing of RCTV, for households without cable. We then take an average of this measure for treatment towns, those without Globovision (18.6 percent), and control towns, those with Globovision (21.3 percent). According to our switching rates developed earlier, 51 percent of the lost consumption of RCTV in control towns was offset by increased viewership of Globovision. Taken

together, the reduction of viewership of opposition news in treatment towns, relative to control towns, thus equals $0.186 - 0.213 \times 0.51$, or 7.7 percent.

We do not have official turnout rates by town and thus measure control turnout via baseline national turnout during the two elections prior to the closing of RCTV. Turnout in the 2004 recall referendum equaled 70 percent, and turnout in the 2006 Presidential election was 75 percent.²⁰ We take the average of these, yielding control turnout of 72.5. Given that turnout fell by 4.26 percent in treatment towns, relative to control towns, as reported in Table 8, we thus measure treatment turnout of 69.4 percent. Finally, we measure g , the fraction of Chavez supporters and o , the fraction of opposition supporters (both relative to non-voters), among viewers of RCTV via the 2007 Latin American Public Opinion Project (LAPOP). In particular, among those reporting to watch opposition TV news (either RCTV or Globovision), 17.8 percent reporting voting for Chavez in the 2006 election and 82.2 percent reported voting for the opposition (conditional on voting). After accounting for the fact that only 72.5 percent of the population are voters in our calculations, this yields $g = 12.9$ and $o = 59.6$. Plugging in these values yields a first term of 0.271 and a second term of 0.736. The product of these two terms yields a persuasion rate of 0.200, or 20 percent.

A.2 Extension 1: Demand for Opposition Media

In this extension, we embed our model of voter learning over the state (good or bad) into a model of collective action in which opposition to the government exhibits strategic complementary following, among others, Edmond (2013). In particular, voters receive a payoff of β_s from participating in successful opposition against the government, with higher payoffs in the bad state, and we normalize payoffs from participating in successful opposition against the government in the good state to equal 0 (i.e. $\beta_b > \beta_g = 0$). Since voters do not know the state of the world, their decisions are based upon expected payoffs and thus posterior probabilities of the bad state, given media reports. That is, expected benefits from a successful opposition equal $Pr(s = b|r)\beta_b$ and these benefits are common across voters. Participating in opposition to the government, independent of success, entails an opportunity cost κ , which varies across individuals according to the cumulative distribution F . To summarize, participation in successful opposition yields an expected payoff equal to $Pr(s = b|r)\beta_b - \kappa$, participation in unsuccessful opposition yields a payoff of $-\kappa$, and non-participation yields a payoff of 0, regardless of collective action. Finally, in order for opposition to be successful, a fraction f of the population must participate.

Given all of this, an equilibrium with successful opposition requires that at a fraction f of the pop-

²⁰https://en.wikipedia.org/wiki/2004_Venezuelan_recall_referendum (accessed March 29, 2019) and https://en.wikipedia.org/wiki/2006_Venezuelan_presidential_election (accessed March 29, 2019).

ulation must have positive expected net benefits from participation in successful opposition. That is, $F[(Pr(s = b|r)\beta_b)] > f$. We begin with the natural assumption that, in the absence of censorship ($\pi_c = 0$), opposition occurs in equilibrium only when the media publishes bad reports. Recall that $Pr(s = b|r = b) = 1$ and that, in the absence of censorship, $Pr(s = b|r = \phi) = \pi_b$. This assumption can thus be written as:

$$F(\beta_b) > f$$

$$F(\pi_b\beta_b) < f$$

The first condition states that successful opposition will occur when voters know that the state is bad, and the second condition states that opposition will not occur when the media does not receive a signal. Thus, voters value being able to distinguish between cases in which the media receives no signal and cases in which the media receive a bad signal. Given this, censorship is bad for voters as it combines into non-reports cases in which the media receive no signal and cases in which the media receive a bad signal. Marginal increases in the degree of censorship (π_c) from zero result in no changes in the equilibrium conditions (i.e., successful opposition only when the media publishes bad reports) but reduce the likelihood of bad reports. Thus, censorship reduces the probability of collective action. This is good for the government, and indeed a government attempting to minimize collective action will increase censorship probabilities until the marginal participant is indifferent between participating and not participating when receiving no media report. That is, $F[(Pr(s = b|r = \phi)\beta_b)] = f$. But this will clearly be bad for voters, who are now less likely to lead an successful opposition under the bad state of the world even though they would benefit from doing so. In this sense, voters have a demand for uncensored opposition media and are worse off as the degree of censorship increases.

A.3 Extension 2: Informative signals about the Media Environment

Suppose that, prior to receiving a media report, voters receive information about the media environment. That is, voters receive an additional signal ($\theta = c$ or $\theta = u$), which equals the media environment with probability ρ . That is, $Pr(\theta = m) = \rho$. We assume that $\rho > 0.5$ and $\rho < 1$. Then, after receiving this signal, voters first update over the media environment as follows:

$$Pr(m = c | \theta = c) = \frac{\rho \pi_c}{\rho \pi_c + (1 - \rho)(1 - \pi_c)} \quad (9)$$

This is greater than π_c so long as $\pi_c < 1$. Likewise, upon observing a signal that the environment is uncensored, voters update as follows:

$$Pr(m = c | \theta = u) = \frac{(1 - \rho) \pi_c}{(1 - \rho) \pi_c + \rho(1 - \pi_c)} \quad (10)$$

This is less than π_c so long as $\pi_c < 1$. An important result is that both probabilities are increasing in π_c so long as the signal is not perfectly informative ($\rho < 1$). That is,

$$\frac{\partial Pr(m = c | \theta = c)}{\partial \pi_c} = \frac{\rho(1 - \rho)}{[\rho \pi_c + (1 - \rho)(1 - \pi_c)]^2} > 0$$

$$\frac{\partial Pr(m = c | \theta = u)}{\partial \pi_c} = \frac{\rho(1 - \rho)}{[(1 - \rho) \pi_c + \rho(1 - \pi_c)]^2} > 0$$

This result reflects the fact that, so long as the signal is not perfectly informative, there is still uncertainty over the media environment, and voters still place some weight on the prior probability that the media environment is censored (π_c).

In this extension, are voters still systematically manipulated in the censored environment? Using the results from above, we have that:

$$Pr(s = b | r) = (1 - p) \pi_b (1 - q) + [p + (1 - p) \pi_b q] Pr(s = b | r = \phi)$$

When calculating $Pr(s = b | r = \phi)$ in this extended model, one must account for the two possible signals that could be received regarding the media environment. In the censored environment ($m = c$), this can be written as:

$$Pr(s = b | r = \phi) = \rho Pr(s = b | r = \phi, \theta = c) + (1 - \rho) Pr(s = b | r = \phi, \theta = u) \quad (11)$$

Using Baye's rule, we have that:

$$Pr(s = b | r = \phi, \theta = c) = \frac{Pr(r = \phi | s = b, \theta = c) Pr(s = b, \theta = c)}{Pr(r = \phi | s = b, \theta = c) Pr(s = b, \theta = c) + Pr(r = \phi | s = g, \theta = c) Pr(s = g, \theta = c)} \quad (12)$$

Using the fact that the signal about the media environment is independent of the state (s), we have that $Pr(s = b, \theta = c) = Pr(s = b)Pr(\theta = c)$ and that $Pr(s = g, \theta = c) = Pr(s = g)Pr(\theta = c)$. Further, we can write $Pr(r = \phi | s = b, \theta = c) = p + (1 - p)Pr(m = c | \theta = c)q$ and $Pr(r = \phi | s = g, \theta = c) = p$. Plugging these four expressions into equation 12, we have that:

$$Pr(s = b | r = \phi, \theta = c) = \frac{[p + (1 - p)Pr(m = c | \theta = c)q]\pi_b}{[p + (1 - p)Pr(m = c | \theta = c)q]\pi_b + p(1 - \pi_b)} \quad (13)$$

In a similar way, one can show that:

$$Pr(s = b | r = \phi, \theta = u) = \frac{[p + (1 - p)Pr(m = c | \theta = u)q]\pi_b}{[p + (1 - p)Pr(m = c | \theta = u)q]\pi_b + p(1 - \pi_b)} \quad (14)$$

Plugging equations 13 and 14 into equation 11, we have that:

$$Pr(s = b | r = \phi) = \frac{\rho[p + (1 - p)Pr(m = c | \theta = c)q]\pi_b}{[p + (1 - p)Pr(m = c | \theta = c)q]\pi_b + p(1 - \pi_b)} + \frac{(1 - \rho)[p + (1 - p)Pr(m = c | \theta = u)q]\pi_b}{[p + (1 - p)Pr(m = c | \theta = u)q]\pi_b + p(1 - \pi_b)}$$

Finally, using this result, along with equations 9 and 10, one can show that $Pr(s = b | r)$ is less than π_b so long as the signal over the media environment is not perfectly informative ($\rho < 1$) and so long as there is uncertainty over the media environment ($\pi_c < 1$).²¹ Thus, voters continue to be systematically manipulated in the censored environment despite independent information on the media environment.

A.4 Extension 3: Learning about Censorship from Past Media Reports

In order to allow voters to learn about censorship from media reports, we assume that the media environment is stable, while the state of the world (good or bad) is independent over time. In this case, voters learn about the censoring environment from past media reports. In particular, the likelihood of the uncensored environment given no report equals:

$$Pr(m = c | r = \phi) = \frac{Pr(r = \phi | m = c)Pr(m = c)}{Pr(r = \phi | m = c)Pr(m = c) + Pr(r = \phi | m = u)Pr(m = u)}$$

This can be written as:

²¹This result again follows from the fact that $Pr(s = b | r) = \pi_b$ when $\pi_c = 1$ and that $Pr(s = b | r = \phi)$ is increasing in π_c so long as $\rho < 1$, meaning that voter perceptions of the bad state decrease as the likelihood of the censored media falls below 1. This follows from the fact that both posterior probabilities of the censored environment are increasing in the prior probability that the media environment is censored (π_c) and that voter beliefs over the bad state are increasing in these posterior probabilities.

$$Pr(m = c|r = \phi) = \frac{[p + (1 - p)\pi_b q]\pi_c}{[p + (1 - p)\pi_b q]\pi_c + p(1 - \pi_c)}$$

One can show that $Pr(m = c|r = \phi) > \pi_c$, meaning that, upon observing no report, voters are more likely to believe that the media environment is censored and are less likely to believe that the media environment is uncensored. Conversely, upon observing a bad report, voters update as follows:

$$Pr(m = c|r = b) = \frac{[(1 - p)(1 - q)\pi_b]\pi_c}{[(1 - p)(1 - q)\pi_b]\pi_c + (1 - p)\pi_b(1 - \pi_c)}$$

In this case, voters are less likely to believe that the media environment is censored and more likely to believe that the media environment is uncensored. That is, $Pr(m = c|r = b) < \pi_c$. Finally, voters do not update with respect to the media environment upon observing a good report since these are not censored. That is, $Pr(m = c|r = g) = \pi_c$.

To shed light on the dynamics and speed of learning, we conduct a numerical analysis in which we assume that the bad state occurs with probability 0.4, that media outlets receive signals with probability 0.5, that the censored environment occurs with probability 0.4, and, finally, that bad signals are censored by the government in the censored environment with probability 0.7. Then, we simulate the model 100,000 times and across 100 time periods. Whether or not the state is censored is stable and thus voters can learn about this from both current and previous reports over time. Whether the state of the world is bad, by contrast, is independent over time.

As shown in Figure 17, voters initially believe that they are in the uncensored environment with probability 0.6 and the censored environment with probability 0.4. Given that bad reports are more likely in the uncensored environment and less likely in the censored environment, voters learn about the media environment from reports. As shown, in the censored environment, voter beliefs that the environment is uncensored approach zero after 100 media reports or, equivalently, time periods. In the uncensored environment, by contrast, voter beliefs that the environment is uncensored approach one after 100 media reports.

How does this learning about the media environment impact the ability of the government to manipulate voters through censorship. As shown in Figure 18, voters are initially more likely to believe that the bad state has occurred (by roughly 7 percentage points) when the media are censored, when averaged across all possible media reports in that environment. These differences fade, however, as perceptions approach the true probability of 0.4 following 100 media reports in both the censored and uncensored environments. Thus, censorship is effective at reducing voter perceptions of the bad state but only in the

short run. In the long run, voters learn about the media environment from past reports and update accordingly. This is fully driven by how voters update following no report. As shown in Figure 19, when no report is received, voter perceptions of the bad state converge to the true probability of the bad state, 40 percent, when the media are not censored. When the media are censored, by contrast, voter beliefs of the bad state following no report converge to 53 percent, which is the true probability of the bad state given no report in the censored environment.

To summarize, censorship can systematically reduce voter perceptions of the bad state in the short run since voters are not aware of the media environment. In the long run, voters learn about the media environment from media reports and use this information when processing media reports. Thus, censorship reduces voter beliefs of the bad state but only in the short run.

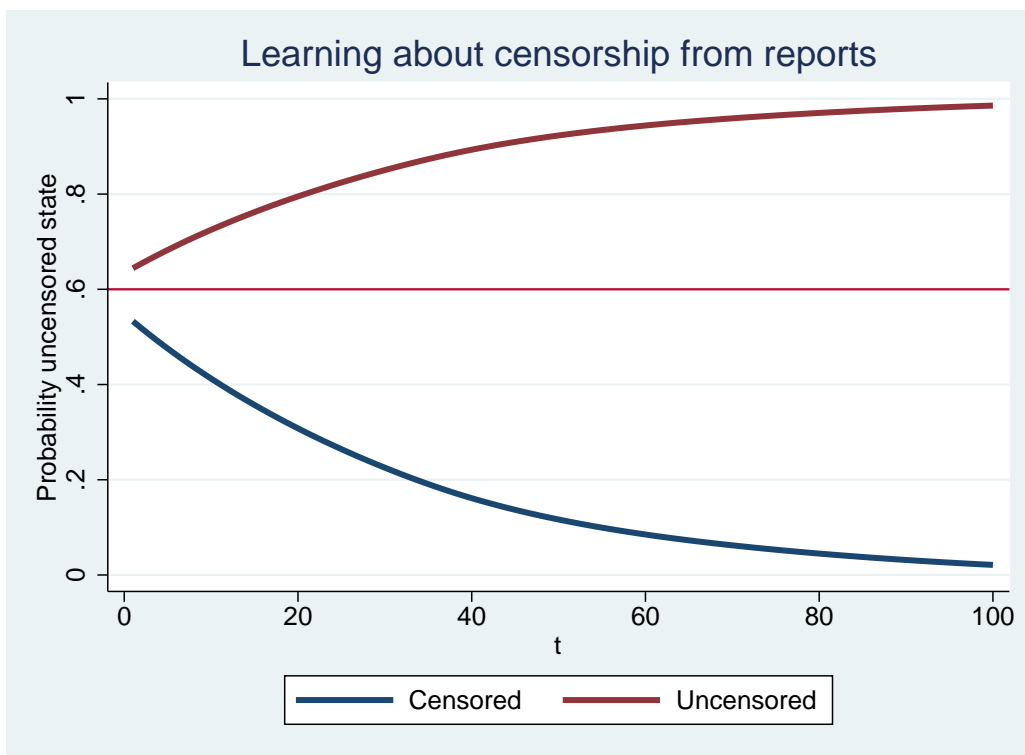


Figure 17

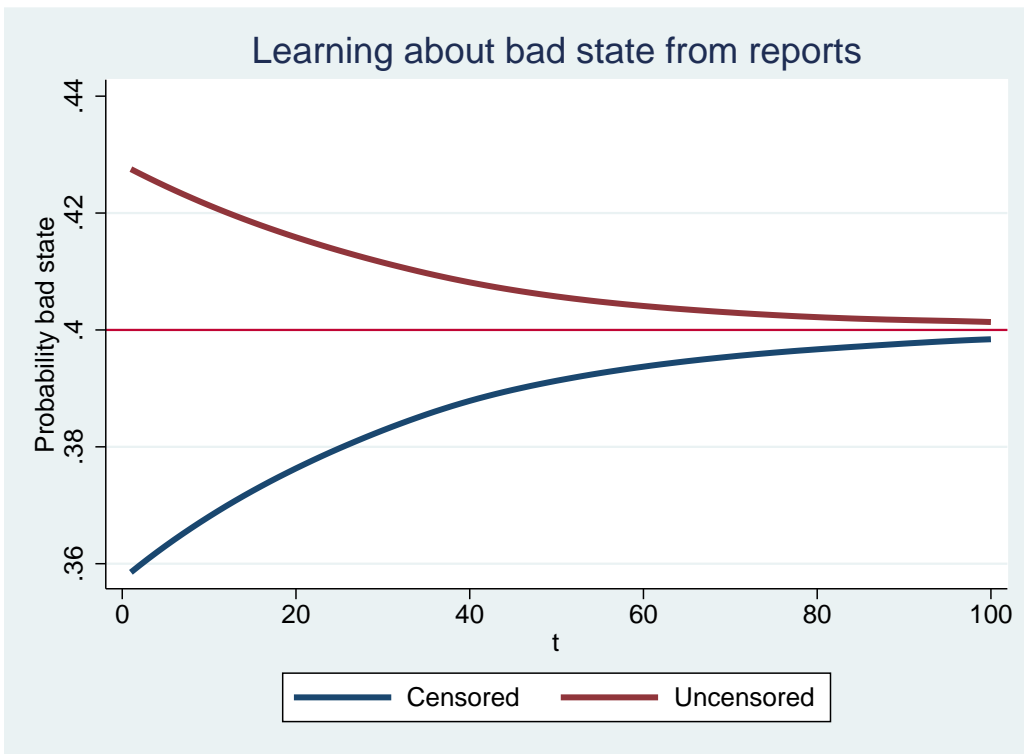


Figure 18

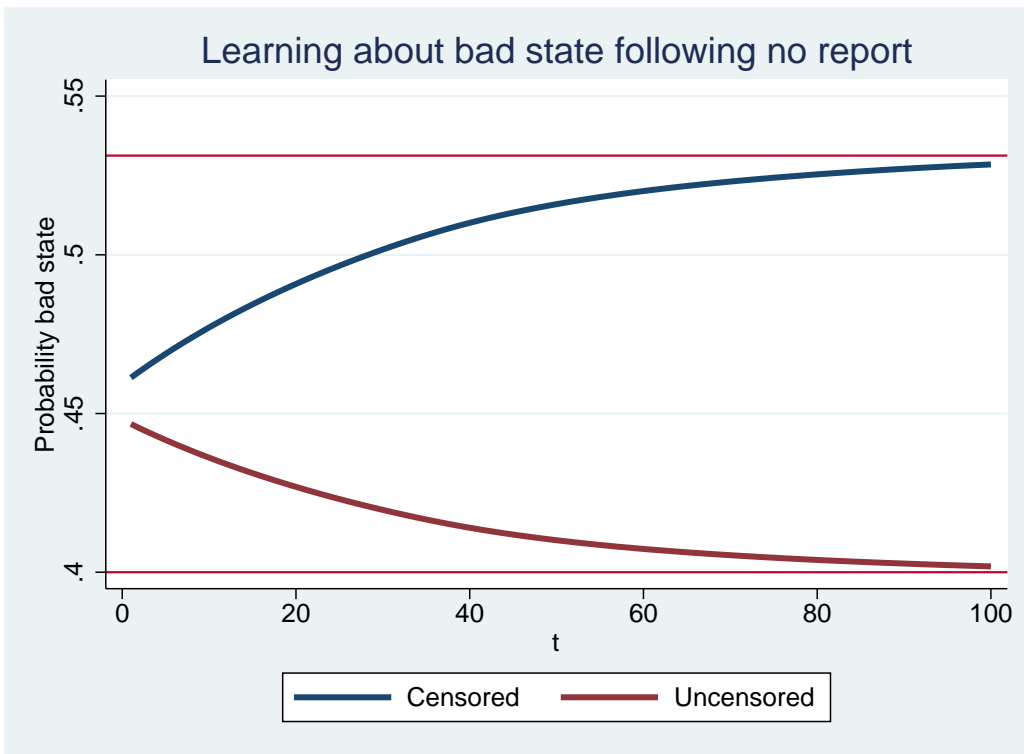


Figure 19

A.5 Extension 4: Endogenous State Censorship

Suppose that incumbents, knowing their type, choose the censorship environment. If censorship is effective, it follows that censorship should be maximal. Thus, we focus on incumbent choice between no censorship ($q = 0$) and full censorship ($q = 1$). We assume that censorship entails a cost equal to C . We construct an equilibrium in which bad types censor and good types do not. Then, given that the state is bad, we have that the probability of no report equals one; that is, $Pr(r = \phi | s = b) = 1$. Likewise, the probability of no report given that the state is good equals the probability of no signal being received by the media; that is, $Pr(r = \phi | s = g) = p$. Given this, voters rationally update as follows after receiving no report:

$$Pr(s = b | r = \phi) = \frac{\pi_b}{\pi_b + p(1 - \pi_b)}$$

As in the baseline model, this exceeds π_b , meaning that voters update negatively about the candidate upon receiving no report, so long as there is uncertainty over the state ($\pi_b < 1$) and there is some likelihood that the media receives information ($p < 1$). It also exceeds the relevant expression in the baseline model (with $q = 1$), due to the fact that voters now perceive the equilibrium link between censorship and the bad state. That is, upon seeing no report, they increase beliefs of censorship and hence their beliefs of the bad state.

Likewise, we can show that censorship is an effective strategy when the state is bad. That is, average perceptions that the state is bad and when politicians engage in censorship equals:

$$Pr(s = b | r) = \frac{\pi_b}{\pi_b + p(1 - \pi_b)}$$

In the absence of censorship, by contrast, then $Pr(s = b | r = \phi) = \pi_b$. In this case, average perceptions that the state is bad and when politicians do not engage in censorship equals:

$$Pr(s = b | r) = (1 - p) + p\pi_b$$

Then, one can show that average ex-post perceptions of the bad state are lower under censorship. Thus, due to these reputational benefits, the bad type will choose to censor so long as C is sufficiently small. Likewise, the good type receives no benefits from censorship since bad signals are never received by the media outlets in this case.