

POLITICAL ADVERTISING IN CONSOLIDATING DEMOCRACIES: RADIO ADS, CLIENTELISM, AND POLITICAL DEVELOPMENT IN MEXICO ^{*}

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Combating disparities in access to political advertising is an essential challenge for many consolidating democracies. Consequently, many countries now regulate access to political advertising in the media. Mexico implemented such a reform in 2007, allocating radio and television advertising slots according to national and state vote shares at the previous election. Using media signal coverage data, we combine matching techniques with a fuzzy geographic regression discontinuity design to exploit differences in exposure to political advertising caused by cross-state spillovers to identify the effects of political advertising. We show that political advertising—particularly AM radio—primarily helps political parties that do not rely on clientelistic strategies, but is only effective in the least socioeconomically developed and least politically competitive electoral precincts. Political advertising has the capacity to win voters in the PRI’s traditionally clientelistic strongholds. Finally, our results suggest that political advertising persuades rather than mobilizes voters.

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1 Introduction

The political implications of the partisan media and political advertising have received considerable attention in established democracies, while the evidence suggests that the media is typically dominated and manipulated by the state in authoritarian regimes.¹ However, relatively little is known about the effects of political advertising by political parties in consolidating democracies, where media is not as free as in consolidated democracies but also less susceptible to capture than in authoritarian regimes.² This question is particularly important in light of growing regulation guaranteeing more equitable media access for political advertising across consolidating democracies, as shown in Figure 1.

	Level of democracy		
	<i>Non-democracies (Polity score below 5)</i>	<i>Consolidating democracies (Polity score between 5 and 8)</i>	<i>Established democracies (Polity score above 8)</i>
<i>Equal share for all parties</i>	Ethiopia, Nigeria, Russia	Ghana, Paraguay, Senegal	Denmark, Italy, Uruguay
<i>Previous vote share</i>	Uganda, Venezuela	Argentina, Brazil, Mexico	Germany, Netherlands, Spain

Figure 1: Media access regulation in 2012 (source: [Administration and Cost of Elections Project](#))

Notes: The ACE Project provide details on the media access regulations in 210 countries around around the world. We present only a subset of countries here along the main division in the type of access provided; other countries employ either these rules, similar rules, no restrictions, or *ad hoc* allocations determined by special committees.

¹In consolidated democracies, the evidence is mixed: many studies show “minimal effects”, but some studies find relatively large effects. A selection from this large literature includes Ansolabehere and Iyengar (1995), Chiang and Knight (2011), DellaVigna and Kaplan (2007), Fergusson (2014), Gelman and King (1993), Gentzkow, Shapiro and Sinkinson (2011), Gerber (1998), Huber and Arceneaux (2007), Lenz and Ladd (2009). Outside consolidated democracies, there is some evidence that independent media can reduce support for the government, but media is typically dominated and often manipulated by the state (e.g. Enikolopov, Petrova and Zhuravskaya 2011, Djankov et al. 2003, Fergusson, Vargas and Vela 2014, King, Pan and Roberts 2013, McMillan and Zoido 2004, White and Oates 2005). Government domination of the media sometimes happens in consolidated democracies as well (e.g. Durante and Knight 2012).

²The few existing studies include Boas and Hidalgo (2011), Da Silveira and De Mello (2011), Greene (2011) and Lawson and McCann (2005). We discuss the limitations of these studies below.

Political advertising has significant potential to affect vote choice in consolidating democracies by providing information to voters in areas previously dominated by, or susceptible to domination by, a single party. Theoretically, exposure to new sources of political information may have the greatest impact on political behavior in areas where local politics has traditionally been characterized by clientelistic practices, poorly informed voters, and limited political competition. However, it remains an open question whether political advertising is sufficient to undermine entrenched features supporting local party dominance.

In the context of Mexico, we investigate the conditions under which providing all political parties with access to media resources penetrating almost all parts of the country affects electoral outcomes, and thus whether political advertising regulations can be effective at supporting democratic consolidation by informing voters about the political options available to them. Mexico represents a particularly interesting test of political advertising's potential to break ingrained links between clientelism and voting because, like many emerging democracies, poor and rural areas continue to be dominated by a historically hegemonic party, the Institutional Revolutionary Party (PRI). Despite increased national-level political competition that saw the National Action Party (PAN) win the Presidency in 2000 and 2006, the PRI continues to engage in clientelistic and vote buying practices in the many parts of country where pluralistic political competition has not yet become institutionalized.³

In response to continuing concerns regarding inequalities in media access,⁴ Mexico's Federal Electoral Institute (IFE) mandated in 2007 that access to radio and television advertising for political parties be limited and more equitably distributed. Specifically, starting in 2009 media access in the six months prior to national legislative elections would be administered by IFE and assigned

³See Greene (2007), Langston (2003), Larreguy (2013), Levitsky and Way (2010), and Magaloni (2006) for discussions of Mexico's political development and clientelism.

⁴See, e.g., Lawson and McCann (2005) and Scherlen (1998) for discussions of media biases. Greene (2011) attributes the PAN's 2006 Presidential victory to its substantial advantage in television access. Boas and Hidalgo (2011) identify similar biases in access at the community level in Brazil, while Boas (2013) argues that media biases are prevalent throughout Latin America.

according to a formula that takes into account the total number of parties and their vote share at the previous state and national elections.

Since Mexico's new media regulation does not induce variation in the allocation of advertising between parties within states, our empirical strategy exploits differences in exposure to political advertising that arise due to "spillovers" across states. In particular, we compare neighboring electoral precincts that receive different levels of political advertising due to variation in the geographic area covered by radio stations located in different states. Figure 2 illustrates our identification strategy using an example of two electoral precincts in the state of Campeche that differ in that precinct 362 is covered by a radio station (XEQAA-AM) that is located in the neighboring state of Quintana Roo where advertising is allocated according to a different distribution, while precinct 360 is not. Where multiple neighboring precincts with different radio coverage exist, we use matching to select the most appropriate comparison units. This helps to ensure that the distribution of political advertising is balanced across a wide range of observable covariates. Our approach thus combines a geographic regression discontinuity (GRD) design with matching. Given broadcast signals weaken gradually rather than abruptly at the discontinuity, our discontinuity is fuzzy rather than sharp.⁵

We focus primarily on AM radio stations, which yield a large and disproportionately poor and rural sample. Since these are the types of areas particularly vulnerable to clientelistic practices, our study provides a unique opportunity to examine heterogeneity in the effects of political advertising across electoral precincts that vary in the extent of clientelism, voter information and political competition.

Our estimates for the 2009 and 2012 national legislative elections show that Mexico's political advertising reform has generally aided less clientelistic parties, but only produced significant effects in the least developed and least politically competitive areas. While the PRI has hardly

⁵There thus exist "non-compliers" on either side of the signal coverage discontinuity. Our estimates capture an "intent to treat", and are almost certainly biased toward zero.

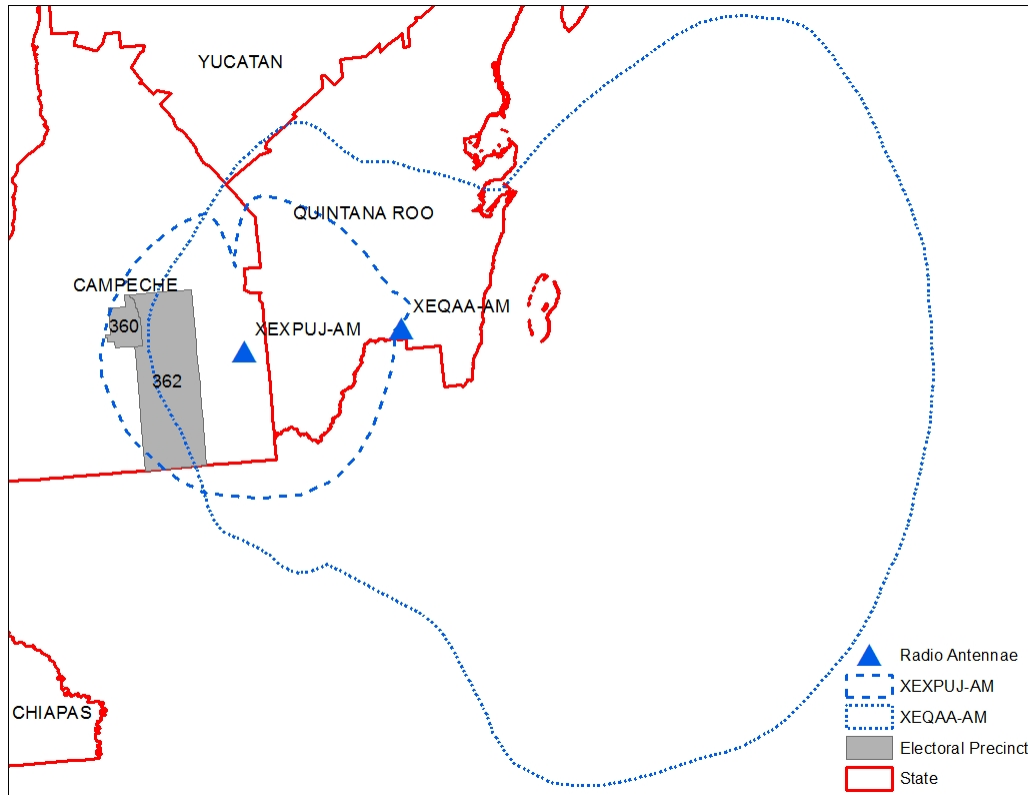


Figure 2: Neighboring electoral precincts that differ in their radio station coverage from neighboring states

benefited from political advertising, our heterogeneous effects show that AM radio advertising by the PAN and Party of the Democratic Revolution (PRD) has significantly increased their legislative vote shares in particular electoral precincts. Political advertising is effective in precincts with low levels of socioeconomic development, and (except for the PRI) where the effective number of political parties is low. We also find that PRD advertising is especially effective in PRI strongholds. Since the PRD competes most directly with the PRI for poorer voters on an anti-corruption platform, this suggests that providing equal access to political advertising can help sever clientelistic and vote buying ties. Over our results suggest that the Mexican reform brought new political information to areas that were previously under-served. It also suggests that media advertising may enhance political competition where it is lacking. Finally, we find changes in vote share are driven

mainly by persuasion, rather than increased turnout.

To check the generalizability of our findings for AM radio, we also apply our approach to political advertising on FM radio and television. This yields much smaller samples, and samples that are significantly economically and politically developed. These differences reflect the fact that FM and television signals have weaker coverage than AM radio. Our estimated effects are generally similar to those for AM radio. For both television and FM radio, political advertising has a larger impact in less economically developed and less politically competitive precincts. Also, for television, PRD advertising has a significantly larger impact in PRI strongholds.

Our findings contribute to the nascent literature identifying the causal effects of media outside consolidated democracies. Unlike Boas and Hidalgo (2011), who show that municipal politicians in Brazil acquire radio licenses to support their re-election campaigns, we focus on how media can reverse entrenched advantages and do not rely on matching to compare politicians with and without radio stations. Enikolopov, Petrova and Zhuravskaya (2011) focus on voter exposure to independent media, rather than direct political advertising, finding that this reduced support for Vladimir Putin's nascent Unity party in Russia.

The results most similar to ours are Da Silveira and De Mello (2011), who exploit differences in television advertising allocations between the first and second round of Brazilian gubernatorial elections to show that such advertising substantially increases a candidate's vote share. Our paper instead focuses on political advertising by political parties over the course of a full election campaign in a national-level election context which is not confounded by strategic behavior between the first and second round of candidate-centric runoff elections. We also identify the effects of radio, which penetrates rural and impoverished areas more effectively than television, and thus enables us to identify additional heterogeneous effects.

We also extend existing work using survey data to infer the importance of media in Mexico. Lawson and McCann (2005) and Greene (2011) use data from the Mexico Panel Study to respectively show that television biases in favor of the PAN at the 2000 and 2006 elections significantly

increased the likelihood that respondents voted for the PAN's Presidential candidate. Our results not just complement these studies by providing causal evidence to back up these survey correlations, but also emphasize that the effects vary across party and by precinct characteristics.

Finally, our results also relate to the literature investigating the role of independent media for political accountability. Several previous studies show that media exposure can cause voters to hold politicians accountable for their performance.⁶ Our findings suggest that, in addition, advertising by political parties may increase political competition and offer poorly informed voters greater choice.

The paper proceeds as follows. Section 2 provides a brief overview of politics and media in Mexico, focusing particularly on the IFE's recent reform of political advertising. Section 3 details our data and identification strategy. Section 4 presents our main results and robustness checks. Section 5 concludes.

2 Politics and media in Mexico

Mexico is divided into 32 states (including the federal district of Mexico City), and operates a presidential form of government. Elections to the national legislature are held every three years, with members of the Chamber of Deputies (House) and Senate elected to three-year terms.⁷ We focus on the Chamber of Deputies, which contains 300 members elected via plurality rule from single-member districts and 200 members elected via proportional representation.

Between 1929 and 2000, widespread clientelistic practices and electoral manipulation ensured the PRI maintained a stranglehold on the Presidency and almost always retained Congressional majorities. However, as Figure 3 shows, Mexico has undergone rapid democratic progress in the last two decades as the PRI's grip on power has subsided. Currently, three main political parties

⁶See, e.g., Besley and Burgess (2002), Fergusson, Vargas and Vela (2014), Ferraz and Finan (2008), and Snyder and Strömberg (2010).

⁷Until January 2014, all members were limited to one term.

compete for political control: the left-wing PRD, the populist PRI, and the right-wing PAN. In this section, we provide an overview of political competition, before describing Mexico’s media reforms. Understanding the histories and relative appeals of different parties are central to the hypotheses we then outline.

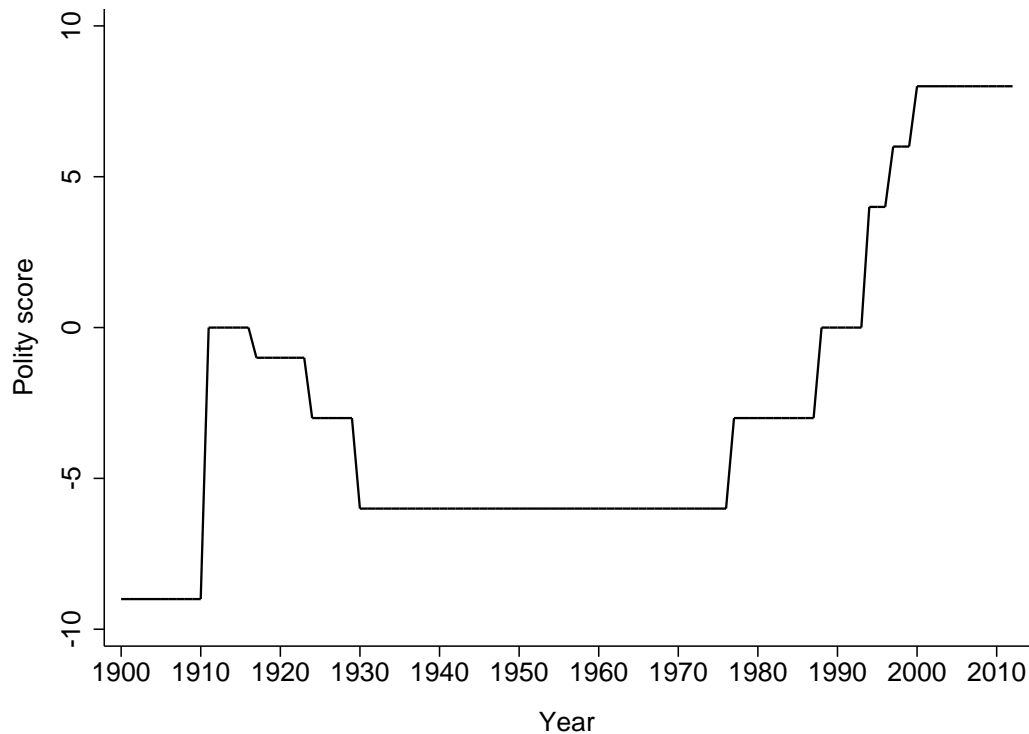


Figure 3: Mexico democracy score, 1900-2012 (source: Marshall, Gurr and Jagers 2013)

2.1 Political competition

Following Mexico’s revolution in 1929, the PRI retained hegemonic status up until the 1990s. The masses were co-opted into the regime, campaigning relied heavily upon distributing public resources mobilizing voter turnout, and dissension within the party was minimized by maintaining a high political cost of exit.⁸ Nevertheless, PRI politicians frustrated by the party’s hierarchy

⁸For extensive discussions of these and other practices, see, e.g., Cornelius (1996), Fox (1994), Langston (2002), Langston and Morgenstern (2009), and Magaloni (2006).

ultimately formed the left-wing offshoot National Democratic Front, which became the PRD after a successful election campaign in 1988.

The PRI continued to govern in the 1990s, but was forced to engage in significant constitutional reforms to receive Congressional support from the right-wing PAN. In the more competitive electoral environment, the PRI first lost control of the House in 1997 before PAN candidate Vicente Fox won the Presidency in 2000 (Greene 2007 and Magaloni 2006). By 2006, the PAN and PRD became the largest parties in the legislature, while the PAN contentiously retained the Presidency after extensive recounts revealed significant electoral anomalies.

Contrary to the expectations of many, the PRI quickly bounced back. Although the PRI's vertical hierarchy dispensing patronage was destroyed and the party became regionally fractionalized (Langston 2003), its powerful regional presence was never diminished. In almost one-third of states the PRI never lost to another party, while the opportunity for local government to influence local elections was relatively untouched by the IFE.⁹ These advantages, combined with decentralized mechanisms selecting higher-quality candidates popular in their local area, the PRI obtained the largest legislative seat share in the House in 2009 and reclaimed its majority status by leading a coalition with the party of the teachers' union (PNA) and the green party (PVEM) (Langston 2006). The PRI's return was completed when it regained the Presidency in 2012. With the PAN damaged by its inability to deal with Mexico's drug crime, the PRI won the legislative and Presidential elections amidst widespread PRD complaints of electoral fraud (Larreguy, Marshall and Querubín 2014).

2.2 Political advertising and the 2007 IFE reform

Disproportionate access to political advertising in the media became a key issue as Mexico democratized in the 1990s. Although a series of constitutional reforms were approved in 1989 and the establishment of an independent IFE in 1990 contributed to eliminating vote fraud, the PRI

⁹For this reason, the Instituto Nacional Electoral has recently been created.

enjoyed privileged access to financial and public resources and significantly more coverage and positive appraisals across media formats in the 1994 elections (Scherlen 1998).

Since its inception, the IFE has progressively increased its regulation of political advertising. Initially, the IFE focused on limiting spending on political advertising by parties. While parties systematically violated their limits, they rarely suffered any consequences due to the IFE's limited monitoring capacity. Over time, the IFE made significant efforts to improve its policing capacity, while fines increased as political parties continued to violate the limits on political advertising spending.

As the PRI's dominance in the new democratic arena subsided, media has benefited the PAN. Lawson and McCann (2005) find that positive television coverage substantially helped Vicente Fox's successful Presidential campaign in 2000. Greene (2011) similarly argues that differential media access—in particular controlling 66% of television advertising time—was the primary reason the PAN's Felipe Calderon overturned early polling deficits to defeat the PRD's Presidential candidate Andres Manual Lopez Obrador in 2006.

Ultimately, the IFE overhauled political advertising regulations in 2007. The new regulations, in force since the 2009 elections, specify that neither political parties nor independent groups can buy political advertising on radio and television stations. The IFE is instead responsible for purchasing all political advertising in the six months prior to the election. Every media station in the country must provide 41 minutes of 30 second political advertising slots throughout each day, with the timing of the slots randomly determined. Media stations are legally bound by the distribution applied in the state from which their signal is emitted.

The IFE determines the number of slots available to each political party using a clearly-defined formula, detailed in the Appendix, that varies across states. In states not holding concurrent state-level elections, political parties are allocated a minimum advertising share and additional time in accordance with their vote share at the previous national legislative election. In states holding concurrent state-level elections, however, 15 of the 41 daily minutes available for advertising are

apportioned according to the vote share at the previous state legislative election. In 2009, 11 states simultaneously held state-level elections, while a further four states held concurrent elections in 2012.¹⁰

Looking at a random sample of radio advertisements, we observe that parties broadcast relatively general messages.¹¹ Although some of these (primarily for the PRI and PAN) are geographically targeted to support local candidates, most ads address national political issues. PRD ads often emphasized Mexico's history of corrupt government, while the PAN and PRI used a wider range of ads frequently mentioning local and national leaders supporting the economy, security or the provision of public goods. Although some ads overtly attacked other parties, the vast majority were positive claims about how the party would benefit Mexicans. This likely reflects the facts that parties are required to submit all their ads prior to the start of the election campaign and that the reform also banned "negative" ads.

Finally, it is worth pointing out that, as Serra (2013) suggests, despite the success of the media reform in limiting disproportional access to media for parties with more resources, there is still some scope for parties to buy differential media access. In particular, anecdotal evidence suggests that some parties pay stations for biased news coverage that is favorable towards their candidates.

2.3 Hypotheses

Models of special interest politics have typically assumed that greater campaigning and political advertising exposure translate into votes.¹² In these models, campaign contributions increase the probability that any voter supports the party being campaigned for in a homogeneous way. The

¹⁰The 15 in 2012 were: Campeche, Chiapas, Colima, Distrito Federal, Guanajuato, Guerrero, Jalisco, Mexico, Morelos, Nueva Leon, Queretaro, San Luis Potosi, Sonora, Tabasco, and Yucatan. They are shown in Figure 6. The four that did not hold concurrent elections in 2009 were: Chiapas, Guerrero, Tabasco, and Yucatan.

¹¹We downloaded the ads from the IFE's [website](#).

¹²See Baron (1994), Grossman and Helpman (1996); Persson and Tabellini (2000), and Snyder (1989).

simplest hypothesis is thus:

H1. *Political advertising increases a party's vote share.*

However, there now exists considerable cross-national evidence that providing factual and partisan politically-relevant information affects voters very differently.¹³ Particularly in developing countries where electorates are typically poorly politically informed, and where voters can be beholden to parties through local ties, the effects of political advertising are likely to differ substantially. We thus ask, *when* is political advertising effective at winning votes?

Many scholars have argued that the least informed and least partisan voters are most responsive to new information, and most susceptible to persuasion by political parties.¹⁴ Da Silveira and De Mello (2011) show that television advertising is most persuasive among Brazil's poorly educated. In Mexico, Greene (2011) and Lawson and McCann (2005) argue that a legacy of Mexico's recent competitive authoritarian past is weak partisan ties and low levels of political knowledge. We find empirical support for this claim in the three surveys conducted after Mexico's 2009 and 2012 national elections: the measure of local development used in our analysis (defined below) is significantly and positively correlated with an index of political knowledge, combining questions whether respondents know the role of Congress, legislator term length and their Governor's name.¹⁵ Our analysis of the content of political advertising above shows that parties typically provide simple and informative messages about their positions on major issues in their broadcasts, while Greene (2011) provides evidence that voters internalize these messages. Consequently, we hypothesize that Mexico's impoverished voters are less well informed and most likely to internalize political messages, and given their relatively weak partisan ties this new information is expected to

¹³See, e.g., Alt, Lassen and Marshall (2014), Bullock (2011), Greene (2011), and Lupu (2013).

¹⁴See, e.g., Campbell et al. (1960), Downs (1957), Healy and Malhotra (2013), and Zaller (1992).

¹⁵We use the 2009 and 2012 CIDE-CSES surveys and the 2012 Mexican Panel Survey. We regress the index of political knowledge on our basic development factor variable and find a highly statistically significant correlation that is robust to including election, survey and state fixed effects in addition to basic individual-level covariates.

translate into vote choices.

H2. *Political advertising is most effective at winning votes in the least developed parts of the country.*

Political advertising is only one tool deployed by political parties. All of the main political parties in Mexico also engage in significant local-level voter mobilization drives, and these are especially concerted in swing districts.¹⁶ In competitive localities where multiple political parties use a variety of tactics to win votes, the effect of political advertising—which is fixed in quantity by law—may be crowded out. Accordingly, we predict that:

H3. *Political advertising is most effective at winning votes in the least politically competitive parts of the country.*

Although the PRI suffered its worst electoral performance in many years in 2006, it retained large regional strongholds where its clientelistic networks remained effective vote-winning strategies (Langston 2003; Larreguy 2013). Relative to H2, these areas represent an extreme case of low political competition, given other parties have limited incentive to invest in breaking down strong and long-established local ties or lack the local resources required to provide viable alternative offers.¹⁷ In this light, the 2007 reform presented an important opportunity for all parties, and especially the PAN and PRD in the PRI's rural strongholds, to cheaply transmit their message to voters in locations they may not have otherwise pursued. An important question, with clear implications for many emerging democracies, is whether such exposure can break this clientelistic equilibrium.

¹⁶See, e.g., Diaz-Cayeros, Estévez and Magaloni (2007) and Diaz-Cayeros, Estévez and Magaloni (forthcoming). Swing voter models similarly predict that other parties have strong incentives to allocate resources to these legislative districts because the marginal return is high (Dixit and Londregan 1996; Lindbeck and Weibull 1987).

¹⁷See, e.g., Baland and Robinson (2008), Larreguy (2013), Keefer (2007), and Robinson and Verdier (2013). The PRI is not the only party with concentrated pockets of supporters. Although the PAN and PRD—whose vote share has traditionally been higher in more urban areas—are far less dependent upon clientelistic vote-winning strategies, they also possess local strongholds.

However, the messages of different political parties are not likely to be equally successful at winning votes in different areas of the country. The logic of redistributive preferences suggest that the left-wing PRD and PRI should have greater appeal among poor voters (e.g. Meltzer and Richard 1981). Furthermore, we expect that if political advertising is able to break down clientelistic ties in PRI strongholds, then the PRD should be more effective at converting such voters.

H4. *PRD and PRI political advertising is more effective among poor voters than PAN political advertising, while PRD advertising is more effective than PAN advertising in PRI strongholds.*

The preceding hypotheses increase the vote share of a party either by mobilizing or converting voters. Like the previous literature, we treat this as an empirical question.

3 Research design

In order to identify the causal effects of political advertising on party vote share, we combine a fuzzy GRD and matching techniques to compare neighboring electoral precincts which receive differential exposure to political advertising by virtue of lying at the limit of the signal coverage provided by an out-of-state media station. Although we find similar results for FM radio and television, this paper will principally focus on AM radio advertising for reasons the research design makes clear below.

3.1 Data

We collected data from various sources to produce a unique dataset combining political advertising shares for each political party, local economic and demographic characteristics, and national election vote share outcomes in Mexico's c.67,000 electoral precincts. Given political advertising and media signal coverage data were first collected after Mexico's media reforms, we focus

on the 2009 and 2012 elections.¹⁸ Electoral precincts make up the legislative districts (within states) which elect national representatives.¹⁹ We now define our main variables; more detailed definitions, sources and summary statistics are in the Appendix.

3.1.1 Dependent variable: vote share

Our main outcome of interest is a party's vote share.²⁰ The IFE provides polling station-level election outcomes for the 2000-2012 federal legislative elections.²¹ We focus on the 2009 and 2012 legislative elections following Mexico's political advertising reform, aggregating polling station party vote shares to the electoral precinct level to match the level of our other data. In order to distinguish persuasion from mobilization explanations, we also examine turnout.

3.1.2 Independent variable: party political advertising share

In their regulatory role, the IFE collects data on every AM and FM radio and television station in the country. For each station we are able to pinpoint the exact location of the signal antennae, which determines the applicable state's political advertising distribution, and the geographic coverage for

¹⁸Electoral precincts are not the lowest level of voter aggregation—precincts comprise equally-sized polling stations, which may contain up to 750 voters (Cantú forthcoming; Larreguy, Marshall and Querubín 2014)—but form the basis of our analysis as the smallest area for which media coverage data could be matched.

¹⁹Redistricting last occurred in 2005, before our analysis begins.

²⁰One complication that arises in measuring the vote share of individual parties is the existence of cross-party federal coalitions between larger and smaller parties in certain parts of the country. Voters may cast a vote for either an individual parties or a coalition. In 2009, the two coalition groups—PRI and PVEM, and PC and PT—received only 0.3% and 0.2% of the national vote share. Coalition voting was more prevalent in 2012 when the PRI-PVEM and PRD-PT-MC coalitions respectively received 3.6% and 3.3% of the national vote, with the three PRD-PT-MC sub-coalitions further receiving a 1.3% vote share. We incorporate coalition voting by distributing the coalition vote share among the constituent parties according to their relative vote share in the precinct. Since coalition voting is relatively rare and the large parties have dominated these coalitions, this re-allocation method does not affect our results.

²¹Since the correlation coefficient between PAN, PRI and PRD legislative and Presidential vote shares always exceeds 0.91, we maximize our sample size by focusing on legislative elections.

each station. In the states which provided exact details in 2009, AM radio coverage was calculated using the “Kirke” (or equivalent distance) method, which adjusts for local terrain disrupting ground conductivity.²² The IFE defines the boundary of the coverage area using a 60 dB μ threshold for signal strength. This is the threshold commonly used to determine a radio station’s audience and sell advertising space commercially.²³ Inside a station’s coverage area the signal is of high quality, so precincts inside the area have good access to the station’s broadcasts. Precincts outside the coverage area experience increasingly poor coverage as the distance from the boundary increases. The number of media stations has not recently changed.²⁴

Figure 4 maps the signal coverage of all AM stations. The local nature of radio in Mexico entails that there are no instances of a radio station emitting the same signal from different states, while 98.4% of electoral precincts are covered by at least one AM radio station. Since the uncovered precincts may be systematically different, our empirical analysis focuses on comparing differences in party political advertising conditional upon comparable precincts receiving AM coverage from at least one radio station.²⁵ FM and television stations, whose coverage maps are provided in the Appendix, are more numerous but also more local, covering far smaller areas than AM stations.

Our principal independent variable, *PAN/PRD/PRI advertising share*, is the share of political advertising attributed to each political party in each electoral precinct. This is calculated as the average share of political advertising for party *i* across all media stations *g* reaching precinct *j* at

²²Strömberg (2004) shows that ground conductivity is a strong instrument for the number of households with radios in the U.S. in the 1930s.

²³In the U.S. it “is recognized as the area in which a reliable signal can be received using an ordinary radio receiver and antenna” ([NTIA link](#)).

²⁴Although we were not able to obtain data for 2012, the number of radio and television stations did not change in any year between 2003 and 2010.

²⁵Our checks show that the sample is less well balanced across our matching covariates when comparing precincts with and without AM, FM or television coverage. It is also possible that precincts without high quality AM signal are more likely to persist with listening to bad signals, reducing differences in practice at the coverage area boundaries.

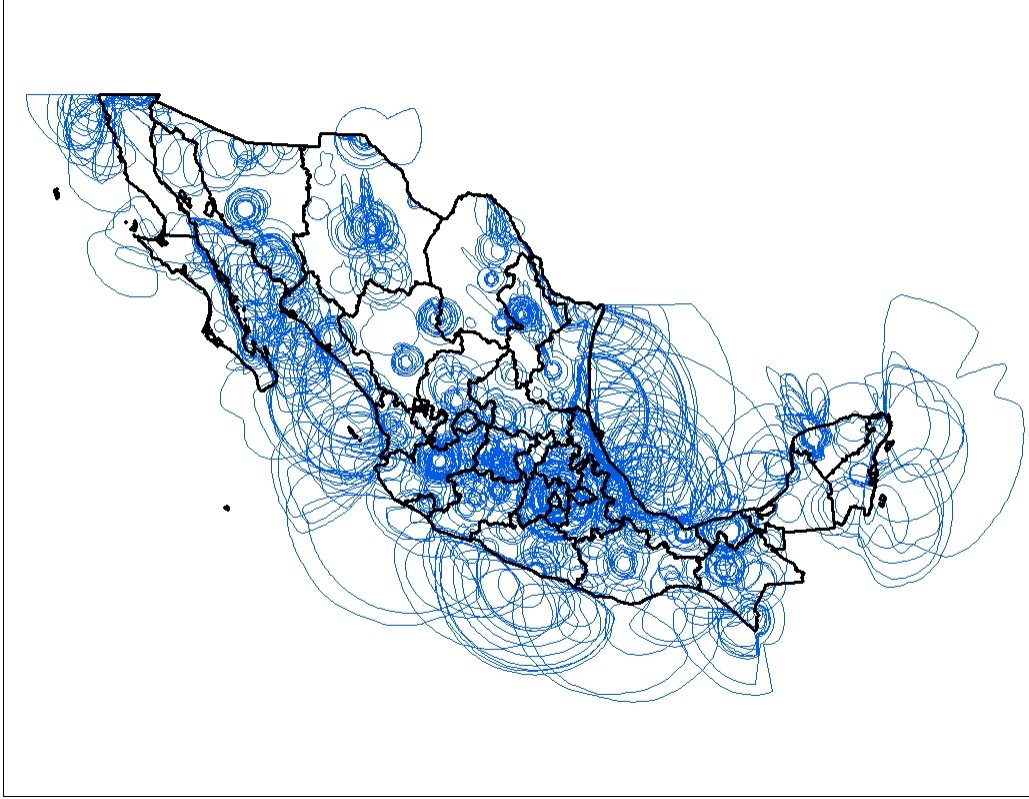


Figure 4: AM radio signal coverage areas (source: IFE)

election t :

$$advertising\ share_{ijt} = \frac{1}{|\mathcal{G}_j|} \sum_{g \in \mathcal{G}_j} media\ share_{igt},$$

where $\mathcal{G}_j \equiv \{g : g \text{ covers } j\}$ is the set of media stations covering precinct j .²⁶ Since we cannot accurately measure media station audiences, and given the decision to listen to political advertisements is likely to be correlated with other relevant political variables (e.g. interest in politics and strength of partisan attachments), we rely on a measure of exposure rather than consumption. Finally, we emphasize the source of variation in political advertising: since political advertising is allocated identically across all radio stations emitting from within a state, variation in political advertising shares between neighboring precincts comes from cross-state coverage spillovers.

²⁶We computed *advertising_share_{ijt}* separately for AM, FM and television services.

3.1.3 Precinct-level variables

We also collected precinct-level data to assess our heterogeneous effects and support our identification strategy. We measure local socioeconomic development using several variables. First, electorate density is measured as the number of registered electors in a precinct divided by its area. We reduce the skew in the distribution of electorate density using its natural logarithm. Second, the 2010 Census measures the existence of basic amenities, calculating the proportion of the precinct population that has non-dirt floors, running electricity, running water, a toilet, and drainage. A third measure is the literate proportion of the precinct population. Given the relatively high correlation between these theoretically related variables, we combine them by taking the first factor from a principal components factor analysis; henceforth we call this *Basic development*.²⁷

Although basic development is likely to be negatively correlated with clientelistic practices, we define a measure of party stronghold to better capture this effect. We define an electoral precinct as a party stronghold if that party received more than 50% of votes at the previous two legislative elections. Although PAN and PRD strongholds are less likely to be clientelistic, a large PRI vote share is a good indicator of clientelism. Party stronghold variables are denoted by *PAN/PRD/PRI stronghold*.

However, political competition is not solely a function of dominant parties, but also depends on the presence of different numbers of parties. We measure political competition by the effective number of political parties, *ENPV (lag)*, calculated using the vote share in each precinct at the previous legislative election.²⁸ For comparability, we also standardize ENPV.

²⁷In the matched sample we use for our analysis (see below), the first factor has an eigenvalue of 1.66, while the second factor's eigenvalue is 0.03. This indicates that a single factor captures most of the relevant variation.

²⁸Although only 7% of precincts and districts have 3 parties with more than 20% vote shares—indicating that there are often two dominant parties—smaller parties remain sufficiently large that they should not be ignored. ENPV is therefore preferred to measures based on the vote share of the two largest parties. ENPV is calculated using lagged election outcomes to prevent endogeneity by construction.

In addition to these variables and the lagged vote share of each party, we use data from the 2010 Census to facilitate the matching component of our identification strategy. The Census provides precinct-level information about education, economic activity and poverty indicators. We therefore retain 30 variables for matching (which are shown in Table 2).

3.2 Identification strategy

3.2.1 Fuzzy GRD-matching design

Our empirical strategy exploits spillovers in AM radio station coverage, comparing precincts which receive different political advertising shares because they receive a different mix of radio signals from stations based inside and outside the state. Our design is therefore similar to studies in the U.S. exploiting differences in media market boundaries.²⁹ More specifically, we employ a non-parametric “fuzzy” GRD design, and use matching to identify the most comparable precincts among neighboring precincts on the other side of the discontinuity.³⁰

As noted above, although the coverage areas for each radio and television station appear as if they have precise boundaries, the boundaries are not really so precise. Broadcast signals decay gradually rather than abruptly, so the “discontinuity” at the boundary of any given coverage area is not simply the difference between receiving or not receiving a station’s signal. Moreover, exposure to political advertising does not necessarily imply consumption. Thus, we do not have a sharp geographic discontinuity. Rather, there are “non-compliers” on either side of the boundary. In some precincts defined as being outside a media outlet’s coverage area, some households can nonetheless receive signals from the media outlet (perhaps not regularly, or depending on time of

²⁹See, e.g., Althaus and Trautman (2008), Ansolabehere, Snowberg and Snyder (2006), Franz and Ridout (2010), Huber and Arceneaux (2007), Snyder and Strömberg (2010). See also Enikolopov, Petrova and Zhuravskaya (2011) and Kern and Hainmueller (2009) for non-U.S. studies that adopt similar approaches.

³⁰This design extends the procedure proposed by Keele and Titiunik (2013) by selecting control units on the basis of covariates beyond two-dimensional distance, and extends Keele, Titiunik and Zubizarreta (2012) by including fixed effects for each matched set of treated and control units.

day). Similarly, in some precincts defined as inside a media outlet’s coverage area, signal quality may be erratic. Since we cannot identify the precincts that receive this “partial” coverage, we have measurement error in our treatment variable. Therefore, our strategy is akin to estimating the reduced form of a fuzzy regression discontinuity: we identify the effect of differences in the probability of access to AM radio signals, without adjusting for differential treatment intensity or compliance (Hahn, Todd and Van der Klaauw 2001). Our estimates thus measure the “intent to treat”, and are likely to be biased toward zero relative to the actual effect of the treatment on the treated.

As with non-geographic fuzzy regression discontinuity designs, we can identify causal effects under the relatively weak assumption that potential outcomes are continuous in all other variables at the discontinuity (Keele and Titiunik 2013; Imbens and Lemieux 2008). Although it is not quite necessary, achieving balance across treated and control units is sufficient for continuity to hold (Imbens and Lemieux 2008). This motivates our decision to also match over a set of covariates: to maximize such balance, we selected controls units from the set of neighboring precincts that are most similar to the treated unit in terms of Mahalanobis distance.³¹

More specifically, our procedure entailed the following steps:

1. *Identify neighboring potential matches.* For each precinct j , we restrict the set of possible matches to the set of neighboring precincts k that have different political advertising shares, and for whom some part of the precinct is within b kilometers (kms) of the media discontinuity $m(j,k)$ inducing the difference in political advertising shares. This set of matches is denoted $\mathcal{M}_j(b) \equiv \{k : d(m(j,k),k) \leq b\}$, where $d(a,a')$ is the minimum Euclidean distance in kilometers between a and a' . The distance $b = 1, 5, 10, 25$ is analogous to the bandwidth in standard regression discontinuity designs.
2. *Calculate distance between potential matches.* Calculate the Mahalanobis distance $D(X_j, X_k) \equiv$

³¹In ArcGIS, we operationalized neighboring as precincts whose boundaries are within 100 meters of each other.

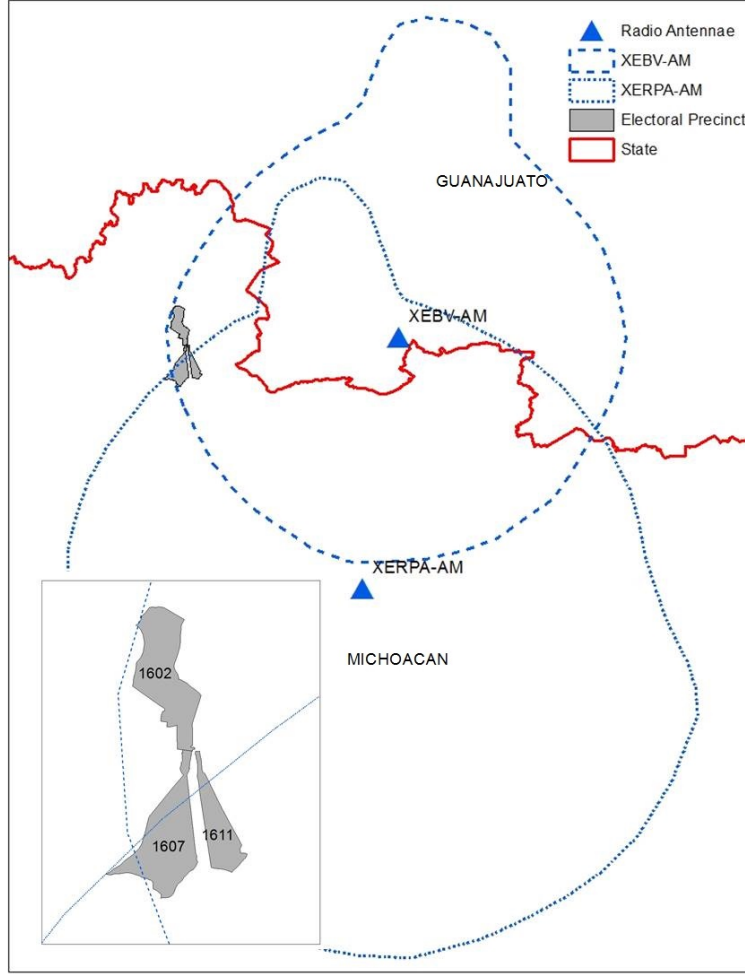


Figure 5: Identification strategy example

$\sqrt{(X_j - X_k)'C^{-1}(X_j - X_k)}$ between precinct j and each possible precinct match $k \in \mathcal{M}_j(b)$ using our vector of 30 covariates X_j and the full sample covariance matrix C , before rank-ordering the quality of matches according to $D(X_j, X_k)$.

3. *Choose control units.* Take the n nearest matches within b kilometers of the discontinuity $m(j, k)$, which defines the set $\mathcal{N}_j(n, b) \equiv \{k \in \mathcal{M}_j(b) : \text{rank}(D(X_j, X_k)) \leq n\}$.

Figure 5 illustrates our approach using an example comparing several electoral precincts in the state of Michoacan. We zoom in on three contiguous precincts which are all just covered by the

radio station XEBV-AM located in the state of Guanajuato, but where precincts 1607 and 1611 also receive radio coverage from XERPA-AM located in the state of Michoacan. Precincts 1607 and 1611 represent potential matches for 1602 because they neighbor 1602 and are located within 1 km of the XERPA-AM signal discontinuity. In 2012, for example, while 34% of advertising slots were provided to the PRI in radio stations with antennae located in Michoacan (according to the national allocation), Guanajuato only allocated the PRI 30% of slots on radio stations like XEBV-AM (because it was holding a concurrent state election). Taking a weighted average over radio stations, 30% of adverts in precinct 1602 were from the PRI compared to 32% in precincts 1607 and 1611. Given that precinct 1602 has multiple neighboring precincts that differ in their political advertising distribution, the Mahalanobis distance ranks the quality of the matches. Although this is a simple example, the same logic extends to cases with many potential matches, multiple radio signals and even multiple discontinuities.

We carried out our procedure separately for the 2009 and 2012 elections, before pooling to produce our main sample. The procedure yielded a maximum of 31,731 matched groups when using a 1 km bandwidth. Each matched group contains a single “treated” unit and up to 24 possible neighboring “control” units with different political advertising exposure distributions. Figure 6 shades in grey the 16,099 unique electoral precincts included in the 1 km sample, and unsurprisingly shows that these are highly clustered around the borders of states holding concurrent state-level elections. Although our preferred bandwidth is 1 km, we also show results using a 5 km bandwidth.³²

The characteristics of the precincts chosen as treated and control units reflect the location of the signal coverage discontinuities. Given their relatively large coverage, the edges of AM radio signal coverage are fairly rural. Compared to the national averages, Table 1 shows that the matched sample used in our analysis includes more rural, less politically competitive, and less developed electoral precincts. Given much of Mexico, particularly urban areas, was already exposed to the

³²The results are robust to narrowing and broadening the set of possible matches away from the media discontinuity. More specifically, focusing on precincts within 0.5, 10 and 25 km of the media coverage discontinuity produced very similar results.

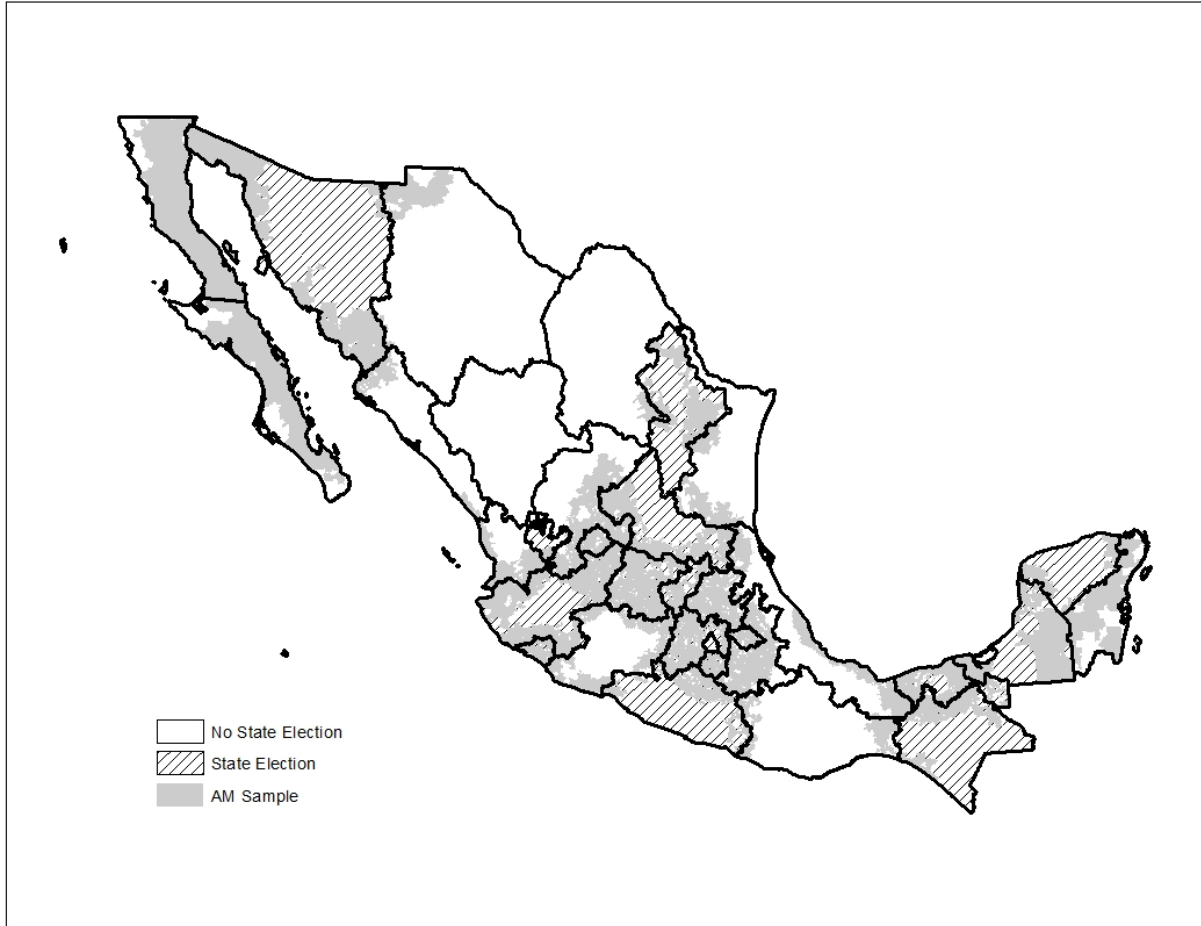


Figure 6: AM GRD-matched 1 km sample of electoral precincts used in our analysis

main political parties, it is important for testing our hypotheses that our sample includes less economically and politically developed precincts. An important reason for preferring the AM sample is because it generates a larger and less developed sample than the signal discontinuities associated with FM radio and television (see Online Appendix).

3.2.2 Balance on observable covariates

Table 2 assesses balance by separately regressing the 30 political, social and economic matching variables on PAN, PRD and PRI AM radio advertising shares. As per our main specifications, we include state and match-year fixed effects and control for the lagged PAN, PRD and PRI district

Table 1: Comparison of mean characteristics of the unique electoral precincts comprising the AM GRD-matched samples and the full population (all pooled over 2009 and 2012)

	AM sample	AM sample	Population
Population density (log)	4.973	5.102	6.571
Proportion with basic amenities	0.682	0.687	0.747
Share illiterate (aged above 15)	0.109	0.108	0.086
ENPV (lagged, unstandardized)	2.890	2.891	2.914
PAN stronghold	0.059	0.060	0.072
PRD stronghold	0.027	0.027	0.052
PRI stronghold	0.065	0.063	0.084
Bandwidth	1 km	5 km	NA
Number of unique precinct-year observations	30,212	33,887	131,346

Notes: Sample means are from the within 1 km and within 5 km discontinuity samples with up to six matches used in the regressions below. All differences between the AM sample averages and the population average are statistically significant. See Appendix for full summary statistics.

vote shares. The results show that a party’s AM political advertising share is not significantly correlated with potentially confounding factors when using up to six matches.

3.2.3 Estimation

Given our GRD-matching design restricts the sample to matched groups where differences in political advertising are effectively random, identifying the effects of political advertising is relatively straight-forward. Let $vote\ share_{ijt}$ be the vote share for party $i \in \{PAN, PRI, PRD\}$ in precinct j (in district k of state s) at election $t \in \{2009, 2012\}$, and $vote\ share_{j,t-1}$ and $vote\ share_{k,t-1}$ respectively be the vector of vote shares for the three parties in electoral precinct j and electoral district k at the previous election.³³

To estimate the unconditional effect of political advertising, we first estimate OLS regressions

³³That is, $vote\ share_{j,t-1} = (vote\ share_{PRI,j,t-1}, vote\ share_{PAN,j,t-1}, vote\ share_{PRD,j,t-1})$ and $vote\ share_{k,t-1} = (vote\ share_{PRI,k,t-1}, vote\ share_{PAN,k,t-1}, vote\ share_{PRD,k,t-1})$.

Table 2: Balance checks—partial correlation between AM political advertising and 30 covariates in the 1 km matched sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PAN (lag)	PRD (lag)	PRI (lag)	ENPV (lag)	PAN stronghold	PRD stronghold	PRI stronghold	Registered electorate	Population density (log)	Share economically active
PAN advertising share	0.509* (0.286)	-0.128 (0.276)	-0.140 (0.336)	-1.676 (2.000)	0.768 (0.519)	-0.452 (0.615)	0.242 (0.744)	-152.733 (1858.651)	-5.206 (5.543)	0.055 (0.177)
PRD advertising share	-0.426 (0.259)	0.102 (0.273)	0.035 (0.348)	1.542 (1.744)	-0.534* (0.300)	0.237 (0.710)	0.071 (0.706)	2111.840 (1581.309)	0.504 (3.943)	-0.047 (0.123)
PRI advertising share	0.189 (0.317)	-0.190 (0.394)	0.015 (0.370)	-2.058 (2.436)	0.357 (0.446)	-0.576 (0.716)	0.090 (0.751)	-1355.441 (2002.412)	0.786 (5.150)	0.045 (0.150)
Observations	136,519	136,519	136,519	136,519	136,519	136,519	136,519	136,519	136,519	136,476

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
	Share employed	Share medical insurance	Primary school attendance	Middle school attendance	Secondary school attendance	Share 6-17 in school	Share 18-24 in school	Share illiterate above 15	Share no school incomplete	Share primary complete
PAN advertising share	0.027 (0.131)	0.586* (0.328)	-0.012 (0.129)	-0.384 (0.327)	-0.046 (0.537)	-0.115 (0.257)	-0.034 (0.279)	0.021 (0.161)	0.074 (0.154)	-0.056 (0.236)
PRD advertising share	-0.104 (0.124)	-0.441 (0.370)	0.049 (0.113)	0.305 (0.233)	-0.109 (0.400)	0.081 (0.182)	-0.140 (0.209)	-0.068 (0.133)	-0.058 (0.138)	0.203 (0.182)
PRI advertising share	0.180 (0.310)	0.308 (0.422)	-0.052 (0.116)	-0.183 (0.279)	0.559 (0.470)	0.075 (0.219)	0.253 (0.278)	0.071 (0.175)	0.011 (0.163)	-0.270 (0.272)
Observations	136,476	136,476	136,476	136,476	136,476	136,476	136,476	136,476	136,476	136,476

	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
	Share primary incomplete	Share secondary complete	Share secondary incomplete	Share with house	Share non-dirt floor	Share electricity	Share piped water	Share with toilet	Share with drainage	Share Basic amenities
PAN advertising share	-0.087 (0.169)	0.006 (0.136)	0.047 (0.129)	-0.297 (0.304)	0.083 (0.301)	-0.110 (0.330)	0.118 (0.604)	0.117 (0.365)	0.475 (0.425)	0.088 (0.554)
PRD advertising share	0.176 (0.181)	0.079 (0.153)	0.032 (0.143)	0.139 (0.209)	-0.136 (0.341)	-0.018 (0.322)	-0.937 (0.720)	-0.384 (0.309)	-0.605 (0.421)	-0.902 (0.631)
PRI advertising share	-0.333 (0.235)	-0.142 (0.149)	-0.159 (0.133)	-0.283 (0.245)	0.353 (0.344)	0.299 (0.368)	0.898 (0.716)	0.723* (0.423)	1.109* (0.565)	1.194* (0.685)
Observations	136,476	136,476	136,476	136,476	136,476	136,476	136,476	136,476	136,476	136,476

Notes: Each coefficient is estimated separately from a regression including controls for lagged district vote shares, and state and match-year fixed effects. All specifications include up to six matches within 1 km of the coverage discontinuity. Standard errors clustered by district. * denotes $p < 0.1$, ** denotes $p < 0.05$, *** denotes $p < 0.01$.

of the following form:

$$\begin{aligned} \text{vote share}_{ijt} = & \beta \text{ advertising share}_{ijt} + \text{vote share}_{j,t-1} \alpha + \text{vote share}_{k,t-1} \theta \\ & + \mu_{\mathcal{N}_{jt}(6,b)} + \lambda_s + \varepsilon_{ijkst}. \end{aligned} \quad (1)$$

We include match-year fixed effects, $\mu_{\mathcal{N}_{jt}(6,b)}$ (taking up to six matches within b kilometers of the coverage discontinuity), to ensure that our estimates are only identified off differences among neighboring precincts at a given election. State fixed effects, λ_s , ensure that our results do not reflect cross-border comparisons capturing factors specific to state-level politics. Finally, the lagged vote share variables capture residual differences in lagged partisanship across precincts or cross-district spatial correlations.

To estimate the heterogeneous effects of media conditional on precinct-level covariates X_{ijt} , we add interaction terms and estimate:

$$\begin{aligned} \text{vote share}_{ijt} = & \beta \text{ advertising share}_{ijt} + X_{ijt} \gamma + (\text{advertising share}_{ijt} \times X_{ijt}) \delta \\ & + \text{vote share}_{j,t-1} \alpha + \text{vote share}_{k,t-1} \theta + \mu_{\mathcal{N}_{jt}(6,b)} + \lambda_s + \varepsilon_{ijkst}. \end{aligned} \quad (2)$$

Standard errors are clustered by district throughout.

4 Results

Our results show that political advertising is effective at converting voters, particularly in the least developed and least politically competitive parts of Mexico. Because the efficacy of political advertising depends on the locality in this way, it is most effective for the PAN and PRD because the PRI has traditionally dominated such areas. Our results therefore suggest that political advertising can effectively break down clientelistic ties and appeal to the least informed voters.

4.1 The effects of political advertising on vote share

Table 3 provides the results for our unconditional and interactive specifications. The dependent variable of party vote share varies across panels: the first two columns in each panel report the unconditional effect of AM political advertising, while the last two columns report the interactive specification. All specifications include up to six matches within 1 km or within 5 km of the coverage discontinuity.

Columns (1) and (2) do not support the unconditional effect of political advertising on vote outcomes proposed in H1. Although our estimates are positive for each political party, the coefficient magnitudes are small and the standard errors are large. We thus find clear evidence that the average electoral precinct is relatively unaffected by the distribution of political advertising, at least when comparing neighboring precincts with different advertisement distributions.³⁴ However, the relative imprecision of our estimates masks differential effects across precincts.

Columns (3) and (4) find clear evidence that the characteristics of an electoral precinct affect the vote-winning efficacy of political advertising. Our heterogeneous effects analysis first shows that political advertising is most effective in the most impoverished precincts (with large negative basic development scores), and thus strongly supports H2 across all political parties. The statistically significant negative coefficient for the interaction between party advertising share and basic development indicates that a standard deviation decrease in basic development increases the effect of political advertising on a party's vote share by around 10 percentage points for each unit change in political advertising. This supports our hypothesis that political advertising is less effective in more economically developed and urban precincts where our survey analysis has shown that voters are more politically engaged. These results are consistent with Greene's (2011) survey results from the pre-reform 2006 election, and Da Silveira and De Mello (2011) in Brazil.

While information might equally benefit all political parties in less developed locations, the

³⁴It is of course possible that political advertising has larger effects that cannot be captured by our empirical design.

Table 3: Effect of AM radio political advertising on PAN, PRD and PRI vote share

Panel A: PAN vote share	1 km (1)	5 km (2)	1 km (3)	5 km (4)
PAN advertising share	0.114 (0.199)	0.102 (0.179)	0.039 (0.212)	0.044 (0.189)
PAN advertising share × Basic development			-0.129** (0.055)	-0.112** (0.051)
PAN advertising share × ENPV (lag)			-0.221*** (0.080)	-0.213*** (0.080)
PAN advertising share × PAN stronghold			-0.499** (0.205)	-0.486** (0.189)
PAN advertising share × PRD stronghold			-0.592*** (0.154)	-0.566*** (0.140)
PAN advertising share × PRI stronghold			-0.391*** (0.140)	-0.332** (0.131)
Panel B: PRD vote share	(1)	(2)	(3)	(4)
PRD advertising share	0.004 (0.229)	0.012 (0.229)	-0.144 (0.228)	-0.118 (0.225)
PRD advertising share × Basic development			-0.079** (0.036)	-0.080** (0.035)
PRD advertising share × ENPV (lag)			-0.213*** (0.056)	-0.204*** (0.053)
PRD advertising share × PAN stronghold			-0.120 (0.085)	-0.107 (0.083)
PRD advertising share × PRD stronghold			-0.262 (0.219)	-0.251 (0.213)
PRD advertising share × PRI stronghold			0.212** (0.095)	0.207** (0.092)
Panel C: PRI vote share	(1)	(2)	(3)	(4)
PRI advertising share	0.060 (0.301)	0.076 (0.288)	0.013 (0.293)	0.031 (0.280)
PRI advertising share × Basic development			-0.102*** (0.030)	-0.099*** (0.030)
PRI advertising share × ENPV (lag)			-0.049 (0.032)	-0.044 (0.032)
PRI advertising share × PAN stronghold			-0.106 (0.085)	-0.088 (0.082)
PRI advertising share × PRD stronghold			-0.008 (0.075)	-0.020 (0.075)
PRI advertising share × PRI stronghold			0.061 (0.060)	0.055 (0.059)
Observations (same across panels)	136,519	146,838	136,476	146,795

Notes: All specifications estimated with OLS and include state and match-year fixed effects, PAN, PRI and PRD precinct and district lagged vote shares, and interaction base terms (where applicable). All specifications include up to six matches within 1 km or within 5 km of the coverage discontinuity. Standard errors clustered by district. The basic development and ENPV (lag) variables are both standardized (with mean zero and standard deviation one). * denotes $p < 0.1$, ** denotes $p < 0.05$, *** denotes $p < 0.01$.

PAN and PRD typically have more to gain in less politically competitive areas because they start from a relative disadvantage. Consistent with this claim, we find a strong negative interaction between political advertising and ENPV for the PAN and PRD. Supporting H3, this result shows that political advertising is ineffective in more politically competitive precincts, but can be effective politically undeveloped precincts (with a standardized ENPV score below the mean of zero). Holding basic development at its standardized mean of zero and the stronghold indicators at their sample mean, the marginal effect of political advertising is positive only in localities with 3 or fewer effective parties (about half our sample). Panel C shows that although there is also a negative interaction for the PRI, it is considerably smaller and statistically insignificant.

The effects of political advertising in stronghold areas are more subtle, varying across the relative appeals of the PAN and PRD. Supporting H4, panel A shows that the PAN is not especially winning votes from PRI or PRD strongholds. Rather, consistent with the PAN's relatively weak appeal among the more left-wing voters in PRD and PRI strongholds, the PAN performs less well in party strongholds. The PAN's declining popularity after significant electoral success prior to 2009 most likely means that political advertising has limited capacity to mobilize or convert voters in the PAN strongholds where they performed best in preceding elections.

Conversely, Panel B shows that PRD advertising is especially effective in PRI strongholds, where the PRD's ideological appeal is strongest. A standard deviation increase in the PRD advertising share (3.3 percentage points) corresponds to a 0.7 percentage point higher vote share, or a 5% increase in their vote share. An important implication of this result is the suggestion that the PRI's strong clientelistic networks can be broken down by political advertising opportunities, even in the precincts where the PRI performs best.

Finally, and consistent with the generally limited effect of PRI advertising, the PRI is not more effective at winning votes in any particular type of stronghold.

4.2 Robustness checks

Given that our identification strategy exploits cross-state media spillovers and identifies only out of comparable neighboring precincts, there are good reasons to be confident in our estimates. However, we conduct a variety of checks to ensure that our estimates are robust to potential violations of our identification assumptions. We then show that similar results hold when looking at FM radio and television, thereby generalizing our conclusions to other forms of media advertising. All results can be found in the Online Appendix.

An important concern regards measurement error in our coverage discontinuities. This occurs when the changes in the probability of coverage are less discontinuous than the IFE maps suggest. If anything, however, this suggests that we are underestimating the effects of political advertising because the difference in media coverage at the discontinuity is smaller than assumed. Nevertheless, to check that our results are not driven by measurement error, we restrict attention to discontinuities arising from lower-powered radio signals—for whom coverage is less variable and more accurately measured—by excluding those with wattage above 10,000, and find similar if not stronger results.³⁵ As an alternative check, we show that controlling for the interaction between political advertising and precinct area—in order to partial out differences in our heterogeneous effects that could simply arise from differential coverage measurement error—does not affect our results.

Although our design ensures balance across pre-treatment covariates, we also checked sensitivity to the inclusion of additional controls. Controlling for the variables we checked for balance across does not alter our results. To address the concern that differential trends across our interaction variables are driving the results, we included three lags of our dependent variable and found similar results.

³⁵Stations with high wattage (high power) have larger total coverage areas and tend to have wider zones where signal strength is between 50 and 60 $\text{db}\mu$, in which coverage may be spotty or poor but often not zero.

We also considered alternative definitions of our main variables. Using the population density, illiteracy and basic amenities variables separately also produced results very similar to our basic development factor. Similarly, we find identical heterogeneous effects when the interaction terms are included in separate regressions.

Our findings also generalize to other media formats. The FM and television samples differ substantially from our main AM sample, but strongly support the AM results. Although standard errors inevitably increase as the sample size more than halves, the coefficient estimates for our heterogeneous effects are remarkably similar to the AM sample and remain statistically significant in the majority of cases. These results therefore further highlight that political advertising is most effective in the areas least exposed to democratic political competition and most vulnerable to clientelistic practices.

A final potential concern is that the results also capture the response of political parties to media coverage. However, it is unlikely that parties are aware of the cross-states radio signal spillovers we identify off. As highlighted in Figure 4, spillovers in radio signal across states are not straightforward to detect and are probably second order in determining party strategies. Additionally, our view is that the overall effect is the estimate of policy interest.

4.3 Political advertising and turnout

Political advertising's effects on vote share could reflect voters switching parties, or increased mobilization of supporters. To differentiate conversion from mobilization mechanisms, Table 4 examines whether incomplete radio signal coverage or differences in political advertising coverage affect turnout. Average turnout in the 1 km sample is 57%.

Columns (1)-(6) include the political advertising shares (and their interactions with the conditioning variables above) of the main parties. The odd-numbered columns show that no party's advertising is effective at increasing turnout on average. For the PRD, there is some evidence that turnout is higher in the types of precincts where PRD advertising is effective, although the magni-

Table 4: Effect of AM political advertising on turnout (1 km sample only)

	(1)	(2)	(3)	(4)	(5)	(6)
PAN advertising share	-0.343 (0.240)	-0.313 (0.244)				
× Basic development		0.005 (0.051)				
× ENPV (lag)		0.069 (0.048)				
× PAN stronghold		0.114 (0.143)				
× PRD stronghold		0.025 (0.142)				
× PRI stronghold		-0.062 (0.151)				
PRD advertising share			0.057 (0.205)	-0.038 (0.206)		
× Basic development				-0.116*** (0.036)		
× ENPV (lag)				-0.117*** (0.033)		
× PAN stronghold				0.199** (0.090)		
× PRD stronghold				-0.255** (0.108)		
× PRI stronghold				-0.107 (0.097)		
PRI advertising share					0.413 (0.277)	0.427 (0.280)
× Basic development						0.059*** (0.016)
× ENPV (lag)						0.052*** (0.016)
× PAN stronghold						-0.109** (0.050)
× PRD stronghold						0.113** (0.055)
× PRI stronghold						0.045 (0.044)
Observations	136,445	136,402	136,445	136,402	136,445	136,402

Notes: See Table 3, except using 1 km sample only.

tudes indicate that this is only a small part of the effect.³⁶ However, there is no clear mapping from the precincts where the PAN gains votes to voter turnout. Similarly, given that political advertising is not especially effective for the PRI, there is no obvious linkage to the heterogeneous effects observed for turnout. Together, these results suggest that the changes in vote share documented above are primarily being driven by persuasion rather than voter mobilization.³⁷

5 Conclusion

Consistent with the limited effects of media found in consolidated democracies and the larger effects found in poor developing countries, this paper shows that political advertising can be effective at winning votes in a consolidating democracy—but only in the least economically and politically developed parts of the country. In general, our results suggest that relatively equitable access to political advertising can combat the entrenched advantages of previously dominant parties such as the PRI. This finding has important implications for democratic consolidation across the world, particularly as many emerging and consolidating democracies have recently adopted media access regulations.

Exploiting variation in the distribution of political advertising received by voters at media coverage discontinuities, we show that Mexico’s political advertising reform helped the PAN and especially PRD in areas traditionally dominated by the PRI. Our results show that these parties, which became more competitive in the 1990s as PRI dominance declined, were able to persuade the least informed voters in the least politically competitive parts of the country to support their party. Conversely, political advertising did not prove to be an effective tool for the PRI, who have

³⁶Given our vote share regressions condition on turnout (which is barely above 50% on average), the heterogeneous effects on vote share are larger if we consider the comparable unit of the total number of votes relative to registered voters. Given the heterogeneous effects for turnout are smaller in magnitude, mobilization can only be a small part of the story.

³⁷It is possible that political advertising by a party simultaneously increases turnout by its supporters and decreases turnout by the other parties’ supporters and the two effects cancel one another, but this seems unlikely.

typically relied on stronger-armed tactics to win votes.

Further work is required to understand exactly how political advertising can be effective at breaking down clientelistic ties. In particular, how political parties allocate their advertising in consolidating democracies remains poorly understood. Should parties focus on positive or negative advertising? Should parties use messages targeted to broad audience or to narrow one? The answer to these questions should be subject of future research.

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Appendix

Variable definitions and summary statistics

PAN/PRD/PRI vote share. Party legislative vote share in a given electoral precinct. Source: IFE.

Turnout. Proportion of voters in a given electoral precinct that turned out at the legislative elections.

This includes all votes, not just valid votes. Source: IFE.

PAN/PRD/PRI advertising share. Explained in main text. Source: constructed using data from IFE.

AM dummy. Indicator coded 1 for electoral precincts covered by at least one AM radio station. Source: constructed using data from IFE.

ENPV (lag). Effective number of political parties, as defined by their vote share in the previous election according to the following formula:

$$ENPV(lag, unstandardized)_{ijt} = \frac{1}{\sum_{i \in \mathcal{I}_{jt-1}} (vote\ share_{ijt-1})^2},$$

where \mathcal{I}_{jt-1} is the set of parties standing in precinct j at time $t - 1$. We then standardized this variable (for all our empirical analyses).

PAN/PRD/PRI stronghold. Indicator coded 1 for any district where the party in question won more than 50% at each of the previous two elections. Source: IFE.

Precinct area (log). Natural logarithm of precinct area in square kilometers. Source: ArcGIS.

Population density (log). Natural logarithm of the number of registered electors divided by precinct area. Source: IFE.

Basic amenities. Percentage of households with electricity, piped water, toilet and drainage. Source: Mexican 2010 Census.

Share illiterate. Percentage of the precinct population aged above 15 that is illiterate in 2010.

Source: Mexican 2010 Census.

Basic development . The first factor from an iterated principal factors factor analysis including population density (log), basic amenities and share illiterate. The first factor has an eigenvalue of 1.66, while the second factor has an eigenvalue of only 0.03. This indicates that our variables form a single coherent dimension. The Cronbach's alpha for standardized versions of these variables is 0.78.

Matching variables. Our matching variables are listed in Table 2. They are drawn from the 2010 Census, with the exception of ENPV, ENPV (lag), stronghold, registered voters and population density.

Media allocation formula

Here, we provide exact media allocation formulas. IFE specifies that the 30 second advertising slots available to party i be allocated according to the following formula in states s without concurrent state-wide elections:

$$national\ share_{it} = \frac{3}{10} \frac{1}{|\mathcal{C}_{it}|} \frac{1}{|\mathcal{C}_t|} + \frac{7}{10} vote\ share_{it-1},$$

where $vote\ share_{it-1}$ is i 's national vote share in the previous election, $|\mathcal{C}_{it}|$ is the number of parties in i 's federal coalition, and $|\mathcal{C}_t|$ is the total number of federal coalitions. This formula says that 30% of time is distributed evenly between electoral coalitions (and then between parties in a given coalition), while 70% of time is allocated to parties based on their vote share at the last election. Because the rule is based on the national-level vote share, there is no variation in political advertising time across states without local elections.

Crucially for our empirical strategy, media slots are shared with state-level elections when state elections are held simultaneously. Of the 41 minutes allotted to political advertising, 15 minutes

Table 5: Summary statistics

	Obs.	Mean	Std. dev.	Min.	Max.
<i>Dependent variables</i>					
PAN vote share	136,519	0.272	0.157	0	0.959
PRD vote share	136,519	0.160	0.143	0	0.921
PRI vote share	136,519	0.366	0.140	0	0.967
Turnout	136,519	0.572	0.135	0.038	1.805
<i>Treatment variables</i>					
PAN advertising share	136,519	0.278	0.024	0.211	0.347
PRD advertising share	136,519	0.148	0.033	0.093	0.209
PRI advertising share	136,519	0.261	0.059	0.186	0.354
<i>Covariates</i>					
PAN vote share (lag)	136,519	0.308	0.173	0	0.959
PRD vote share (lag)	136,519	0.202	0.164	0	0.977
PRI vote share (lag)	136,519	0.340	0.148	0	0.967
PAN district vote share (lag)	136,519	0.312	0.126	0.030	0.681
PRD district vote share (lag)	136,519	0.197	0.122	0.012	0.515
PRI district vote share (lag)	136,519	0.329	0.092	0.097	0.735
PAN stronghold	136,519	0.060	0.238	0	1
PRD stronghold	136,519	0.027	0.162	0	1
PRI stronghold	136,519	0.065	0.247	0	1
Population density (log)	136,519	4.581	2.262	0.022	10.743
ENPV (lag)	136,519	0.033	0.993	-2.547	5.812
Basic amenities	136,476	0.666	0.297	0	1
Share illiterate	136,476	0.114	0.082	0	0.894
Basic development	136,476	-0.012	1.041	-4.781	1.848
Area (not logged)	136,519	50.165	232.784	0.015	8,208.214

Notes: Unlike Table 1, summary statistics presented here are for all observations in the sample—not just the unique observations. As in the main empirical analysis, but unlike Table 1, we use provide standardized ENPV (lag).

are allocated according to the analogous state-level formula:

$$state\ share_{ist} = \frac{3}{10} \frac{1}{|\mathcal{E}_{ist}|} \frac{1}{|\mathcal{E}_{st}|} + \frac{7}{10} vote\ share_{ist-1},$$

where the subscript $st - 1$ denotes that these variables are calculated using the previous state legislative election in state s . Combined, the media share of party i in state s at election t is:

$$media\ share_{ist} = \begin{cases} national\ share_i & \text{if } s \text{ has no concurrent election} \\ \frac{26}{41} national\ share_i + \frac{15}{41} state\ share_{is} & \text{if } s \text{ has concurrent election.} \end{cases}$$

FM and TV samples

Figures 9 and 10 in the Appendix show that the FM radio and television samples include different types of electoral precinct. First, the more limited coverage dramatically reduces the amount of cross-state signal spillover, and thus our sample size. Second, because most media station antennae are located in towns and cities, the FM and television discontinuity samples comprise much more urban, socio-economically developed, and political competitive electoral precincts (see Appendix for further details). The AM sample captures virtually all precincts in the FM and television samples, but also includes more rural precincts. An especially important difference is that PRI clientelism is predominantly rural, and so the FM radio and television samples provide very limited opportunity to examine how media affects clientelistic PRI strongholds. Given the lack of power and relevance of these samples, our analysis focuses on the AM sample and treats the FM and television samples as robustness checks on the effects of political advertising. Furthermore, Tables 15 and 16 (below) show that the FM and television samples are less balanced across political advertising distributions, and therefore provide somewhat less reliable estimates.

Robustness checks

Sensitivity analyses

We first check the sensitivity of our estimates to factors that affect the distinctiveness of our coverage discontinuity. Table 6 shows the results when the sample is restricted to lower-powered AM radio stations with signal strengths of 10,000 watts or fewer. If anything, the results are stronger in this sample—this accords with the expectation that weaker signals have more precise coverage discontinuities. Table 7 includes an interaction between the linear political advertising term and the (natural logarithm of one plus the) area in kms of a given precinct in the heterogeneous effect specifications to show that our results (especially for development where population density is central) are not simply a function of differences in the coverage discontinuity's reach. We obtain very similar results without using the logarithmic transformation.

Table 8 shows the results when the bandwidth is extended to 10 km and 25 km, or contracted to 0.5 km. The table shows that our results are very stable across bandwidth choices.

Table 9 adds in our 30 matching variables as linear control variables in order to show that the results are not sensitive to any very slightly imbalances that do not show up in the balance tests above. The results clearly show that the inclusion of the matching variables as linear control does not affect our results. To further ensure that imbalance in lagged vote share are not driving our results, we controlled flexibly for the lagged vote share of all parties. Table 10 adds two additional lags of the dependent variable to address the concern that more complex vote share trends are driving the results. Although all three lags are statistically significant and positive in each specification, our results for AM radio advertising are highly robust.

Table 11 separates out the variables comprising the development factor used in the main paper. Although the separate terms do vary a little in the relevance for different parties, the results clearly indicate that all three variables are relevant considerations. In combination with their strong inter-correlation, these results justify our factor analytic aggregation approach. Note that unlike the

Table 6: Effect of AM radio political advertising on PAN, PRD and PRI vote share—discontinuities arising from radio stations with a signal strength of 10,000 watts or less

Panel A: PAN vote share	1 km (1)	5 km (2)	1 km (3)	5 km (4)
PAN advertising share	0.195 (0.209)	0.163 (0.193)	0.111 (0.223)	0.088 (0.205)
PAN advertising share × Basic development			-0.120** (0.056)	-0.109** (0.052)
PAN advertising share × ENPV (lag)			-0.258*** (0.086)	-0.252*** (0.086)
PAN advertising share × PAN stronghold			-0.607*** (0.217)	-0.586*** (0.200)
PAN advertising share × PRD stronghold			-0.626*** (0.157)	-0.628*** (0.148)
PAN advertising share × PRI stronghold			-0.388** (0.164)	-0.328** (0.155)
Panel B: PRD vote share	(1)	(2)	(3)	(4)
PRD advertising share	0.143 (0.247)	0.125 (0.241)	-0.025 (0.242)	-0.022 (0.232)
PRD advertising share × Basic development			-0.093** (0.038)	-0.096*** (0.036)
PRD advertising share × ENPV (lag)			-0.189*** (0.058)	-0.183*** (0.056)
PRD advertising share × PAN stronghold			-0.074 (0.085)	-0.054 (0.082)
PRD advertising share × PRD stronghold			-0.312 (0.244)	-0.307 (0.241)
PRD advertising share × PRI stronghold			0.206** (0.100)	0.194** (0.095)
Panel C: PRI vote share	(1)	(2)	(3)	(4)
PRI advertising share	0.077 (0.336)	0.096 (0.319)	0.001 (0.328)	0.021 (0.311)
PRI advertising share × Basic development			-0.106*** (0.030)	-0.105*** (0.029)
PRI advertising share × ENPV (lag)			-0.045 (0.033)	-0.040 (0.033)
PRI advertising share × PAN stronghold			-0.092 (0.087)	-0.079 (0.084)
PRI advertising share × PRD stronghold			-0.055 (0.078)	-0.059 (0.076)
PRI advertising share × PRI stronghold			0.077 (0.073)	0.065 (0.069)
Observations (same across panels)	114,667	122,804	114,632	122,769

Notes: All specifications estimated with OLS and include state and match-year fixed effects, PAN, PRI and PRD precinct and district lagged vote shares, and interaction base terms (where applicable). All specifications include up to six matches within 1 km or within 5 km of a coverage discontinuity that arises from an AM station with a signal power of 10,000 watts or less. Standard errors clustered by district. * denotes $p < 0.1$, ** denotes $p < 0.05$, *** denotes $p < 0.01$.

Table 7: Effect of AM radio political advertising on PAN, PRD and PRI vote share—controlling for precinct area (log)

	1 km (1)	5 km (2)
Panel A: PAN vote share		
PAN advertising share	-0.031 (0.230)	-0.025 (0.203)
PAN AM share × Precinct area (log)	0.022 (0.029)	0.024 (0.027)
PAN advertising share × Basic development	-0.109* (0.057)	-0.089* (0.052)
PAN advertising share × ENPV (lag)	-0.222*** (0.080)	-0.214*** (0.081)
PAN advertising share × PAN stronghold	-0.498** (0.205)	-0.486** (0.189)
PAN advertising share × PRD stronghold	-0.591*** (0.153)	-0.565*** (0.139)
PAN advertising share × PRI stronghold	-0.390*** (0.140)	-0.331** (0.131)
Panel B: PRD vote share		
PRD advertising share	-0.138 (0.243)	-0.097 (0.237)
PRD AM share × Precinct area (log)	-0.002 (0.022)	-0.007 (0.021)
PRD advertising share × Basic development	-0.080* (0.043)	-0.086** (0.043)
PRD advertising share × ENPV (lag)	-0.213*** (0.056)	-0.204*** (0.054)
PRD advertising share × PAN stronghold	-0.120 (0.085)	-0.106 (0.084)
PRD advertising share × PRD stronghold	-0.262 (0.219)	-0.252 (0.213)
PRD advertising share × PRI stronghold	0.211** (0.095)	0.206** (0.092)
Panel C: PRI vote share		
PRI advertising share	-0.003 (0.303)	0.029 (0.291)
PRI AM share × Precinct area (log)	0.005 (0.016)	0.001 (0.015)
PRI advertising share × Basic development	-0.098*** (0.033)	-0.098*** (0.033)
PRI advertising share × ENPV (lag)	-0.049 (0.032)	-0.044 (0.032)
PRI advertising share × PAN stronghold	-0.107 (0.086)	-0.088 (0.083)
PRI advertising share × PRD stronghold	-0.008 (0.075)	-0.020 (0.075)
PRI advertising share × PRI stronghold	0.062 (0.060)	0.055 (0.059)
Observations (same across panels)	136,476	146,795

Notes: All specifications estimated with OLS and include state and match-year fixed effects, PAN, PRI and PRD precinct and district lagged vote shares, and interaction base terms (where applicable). All specifications include up to six matches within 1 km or within 5 km of the coverage discontinuity. Standard errors clustered by district. * denotes $p < 0.1$, ** denotes $p < 0.05$, *** denotes $p < 0.01$.

Table 8: Effect of AM radio political advertising on PAN, PRD and PRI vote share—additional bandwidths

	0.5 km	0.5 km	10 km	10 km	25 km	25 km
Panel A: PAN vote share	(1)	(2)	(3)	(4)	(5)	(6)
PAN advertising share	0.108 (0.203)	0.039 (0.216)	0.102 (0.179)	0.044 (0.189)	0.102 (0.179)	0.044 (0.189)
PAN advertising share × Basic development		-0.123** (0.056)		-0.112** (0.051)		-0.112** (0.051)
PAN advertising share × ENPV (lag)		-0.229*** (0.081)		-0.213*** (0.080)		-0.213*** (0.080)
PAN advertising share × PAN stronghold		-0.493** (0.208)		-0.486** (0.189)		-0.486** (0.189)
PAN advertising share × PRD stronghold		-0.624*** (0.167)		-0.566*** (0.140)		-0.566*** (0.140)
PAN advertising share × PRI stronghold		-0.384*** (0.143)		-0.332** (0.131)		-0.332** (0.131)
Panel B: PRD vote share	(1)	(2)	(3)	(4)	(5)	(6)
PRD advertising share	0.052 (0.228)	-0.094 (0.226)	0.012 (0.229)	-0.118 (0.225)	0.012 (0.229)	-0.118 (0.225)
PRD advertising share × Basic development		-0.076** (0.038)		-0.080** (0.035)		-0.080** (0.035)
PRD advertising share × ENPV (lag)		-0.216*** (0.057)		-0.204*** (0.053)		-0.204*** (0.053)
PRD advertising share × PAN stronghold		-0.123 (0.088)		-0.107 (0.083)		-0.107 (0.083)
PRD advertising share × PRD stronghold		-0.303 (0.225)		-0.251 (0.213)		-0.251 (0.213)
PRD advertising share × PRI stronghold		0.215** (0.097)		0.207** (0.092)		0.207** (0.092)
Panel C: PRI vote share	(1)	(2)	(3)	(4)	(5)	(6)
PRI advertising share	0.030 (0.312)	-0.031 (0.303)	0.076 (0.288)	0.031 (0.280)	0.076 (0.288)	0.031 (0.280)
PRI advertising share × Basic development		-0.105*** (0.031)		-0.099*** (0.030)		-0.099*** (0.030)
PRI advertising share × ENPV (lag)		-0.045 (0.033)		-0.044 (0.032)		-0.044 (0.032)
PRI advertising share × PAN stronghold		-0.114 (0.089)		-0.088 (0.082)		-0.088 (0.082)
PRI advertising share × PRD stronghold		-0.002 (0.076)		-0.020 (0.075)		-0.020 (0.075)
PRI advertising share × PRI stronghold		0.071 (0.062)		0.055 (0.059)		0.055 (0.059)
Observations (same across panels)	130,242	130,199	146,838	146,838	146,795	146,795

Notes: See Table 7, except for different bandwidth choices.

Table 9: Effect of AM radio political advertising on PAN, PRD and PRI vote share—control for 30 matching variables

Panel A: PAN vote share	1 km (1)	5 km (2)	1 km (3)	5 km (4)
PAN advertising share	0.113 (0.194)	0.107 (0.173)	0.061 (0.212)	0.059 (0.188)
PAN advertising share × Basic development			-0.115** (0.055)	-0.100* (0.051)
PAN advertising share × ENPV (lag)			-0.226*** (0.081)	-0.219*** (0.081)
PAN advertising share × PAN stronghold			-0.483** (0.207)	-0.468** (0.191)
PAN advertising share × PRD stronghold			-0.595*** (0.154)	-0.568*** (0.140)
PAN advertising share × PRI stronghold			-0.380*** (0.141)	-0.321** (0.132)
Panel B: PRD vote share	(1)	(2)	(3)	(4)
PRD advertising share	-0.005 (0.226)	0.012 (0.226)	-0.142 (0.227)	-0.114 (0.222)
PRD advertising share × Basic development			-0.071* (0.036)	-0.071** (0.035)
PRD advertising share × ENPV (lag)			-0.218*** (0.056)	-0.209*** (0.054)
PRD advertising share × PAN stronghold			-0.117 (0.084)	-0.106 (0.082)
PRD advertising share × PRD stronghold			-0.275 (0.217)	-0.260 (0.212)
PRD advertising share × PRI stronghold			0.213** (0.095)	0.208** (0.092)
Panel C: PRI vote share	(1)	(2)	(3)	(4)
PRI advertising share 0.045	0.061 (0.300)	-0.012 (0.287)	0.012 (0.298)	(0.285)
PRI advertising share × Basic development			-0.102*** (0.030)	-0.100*** (0.030)
PRI advertising share × ENPV (lag)			-0.054* (0.031)	-0.048 (0.032)
PRI advertising share × PAN stronghold			-0.129 (0.084)	-0.108 (0.081)
PRI advertising share × PRD stronghold			-0.015 (0.075)	-0.024 (0.075)
PRI advertising share × PRI stronghold			0.054 (0.060)	0.049 (0.059)
Observations (same across panels)	136,476	146,795	136,476	146,795

Notes: See Table 7, except for the inclusion of the balancing variables listed in Table 2 of the main paper (also Table 15 in the Online Appendix).

Table 10: Effect of AM radio political advertising on PAN, PRD and PRI vote share—control for three lags of the dependent variable

Panel A: PAN vote share	1 km (1)	5 km (2)	1 km (3)	5 km (4)
PAN advertising share	0.066 (0.183)	0.051 (0.167)	-0.036 (0.201)	-0.040 (0.182)
PAN advertising share × Basic development			-0.147** (0.057)	-0.133** (0.053)
PAN advertising share × ENPV (lag)			-0.222*** (0.072)	-0.213*** (0.073)
PAN advertising share × PAN stronghold			-0.617*** (0.191)	-0.605*** (0.178)
PAN advertising share × PRD stronghold			-0.480*** (0.166)	-0.442*** (0.151)
PAN advertising share × PRI stronghold			-0.245* (0.135)	-0.187 (0.128)
Panel B: PRD vote share	(1)	(2)	(3)	(4)
PRD advertising share	0.010 (0.187)	0.039 (0.187)	-0.121 (0.188)	-0.083 (0.185)
PRD advertising share × Basic development			-0.098*** (0.033)	-0.098*** (0.032)
PRD advertising share × ENPV (lag)			-0.154*** (0.052)	-0.149*** (0.050)
PRD advertising share × PAN stronghold			-0.133* (0.078)	-0.123 (0.076)
PRD advertising share × PRD stronghold			-0.247 (0.195)	-0.222 (0.179)
PRD advertising share × PRI stronghold			0.165* (0.089)	0.170** (0.085)
Panel C: PRI vote share	(1)	(2)	(3)	(4)
PRI advertising share	0.149 (0.286)	0.128 (0.272)	0.109 (0.282)	0.095 (0.268)
PRI advertising share × Basic development			-0.117*** (0.028)	-0.113*** (0.028)
PRI advertising share × ENPV (lag)			-0.024 (0.031)	-0.020 (0.032)
PRI advertising share × PAN stronghold			-0.172** (0.077)	-0.159** (0.074)
PRI advertising share × PRD stronghold			-0.106 (0.065)	-0.105 (0.063)
PRI advertising share × PRI stronghold			0.025 (0.055)	0.018 (0.053)
Observations (same across panels)	135,039	145,237	134,996	145,194

Notes: See Table 7, except for the inclusion of two additional lags (second and third order) of the dependent variable.

population density and the proportion of the population with basic amenities, increases in the share illiterate implies lower socioeconomic development. Table 12 shows the results when the heterogeneous effects are examined as separate interactions. The results are essentially identical to those presented in the main paper, where all interactions are simultaneously entered.

FM radio and television signals

In the main paper, we focus on AM radio stations. This is because of the larger sample and the greater variation in types of electoral precinct, in particular the far more rural sample that is permitted (and thus presents a better test of our heterogeneous effects). Here, we confirm that the FM and television media samples are relatively different and more homogeneous, before demonstrating that we find very similar heterogeneous effects to the main analysis.

Looking at the IFE's publicly available sample of 14,250 radio adverts, advertising does not substantively differ across AM and FM radio stations. Advertisements were fairly evenly distributed across the AM and FM frequencies: of the 141 ads that featured more than ten times in this sample, only 20 and 30 were respectively broadcast disproportionately on AM stations and FM stations respectively, and 12 of these were from non-partisan local electoral institutions.³⁸ Of the party ads, 87% of these were the kinds of general messages observed across the rest of the sample, while the distribution across parties is very similar to the national distribution applied to each media station. Therefore, there does not appear to be any meaningful difference between the types of ads broadcast over the different wavelengths. Comparable television advert data were not available, but ads were very general and targeted the same kinds of national political issues noted in the main text. Furthermore, by identifying off cross-state radio signal spillovers, the locations our effects are identified for are very unlikely to be the targets of locally-specific ads targeted at a different state.

³⁸We tested for whether the proportion on AM and FM radio stations differ, retaining all those that differ at the 10% level for more detailed analysis.

Table 11: Effect of AM radio political advertising on PAN, PRD and PRI vote share—development variables as separate interactions

Panel A: PAN vote share	1 km (1)	5 km (2)	1 km (3)	5 km (4)	1 km (5)	5 km (6)
PAN advertising share	0.342 (0.215)	0.325* (0.196)	0.273 (0.222)	0.242 (0.200)	-0.042 (0.233)	-0.017 (0.210)
PAN advertising share × Population density (log)	-0.068*** (0.021)	-0.061*** (0.019)				
PAN advertising share × Basic amenities			-0.290* (0.153)	-0.249* (0.142)		
PAN advertising share × Share illiterate					1.021 (0.748)	0.795 (0.695)
PAN advertising share × ENPV (lag)	-0.223*** (0.080)	-0.214*** (0.080)	-0.230*** (0.081)	-0.222*** (0.081)	-0.230*** (0.081)	-0.223*** (0.081)
PAN advertising share × PAN stronghold	-0.507** (0.202)	-0.493*** (0.186)	-0.506** (0.205)	-0.494*** (0.189)	-0.510** (0.204)	-0.498*** (0.189)
PAN advertising share × PRD stronghold	-0.585*** (0.154)	-0.560*** (0.140)	-0.586*** (0.154)	-0.562*** (0.140)	-0.593*** (0.153)	-0.568*** (0.140)
PAN advertising share × PRI stronghold	-0.388*** (0.140)	-0.331** (0.131)	-0.384*** (0.140)	-0.328** (0.131)	-0.384*** (0.139)	-0.325** (0.130)
Panel B: PRD vote share	(1)	(2)	(3)	(4)	(5)	(6)
PRD advertising share	0.043 (0.241)	0.053 (0.237)	-0.034 (0.245)	-0.007 (0.242)	-0.304 (0.230)	-0.310 (0.227)
PRD advertising share × Population density (log)	-0.041*** (0.013)	-0.034*** (0.012)				
PRD advertising share × Basic amenities			-0.104 (0.112)	-0.106 (0.112)		
PRD advertising share × Share illiterate					1.283*** (0.423)	1.464*** (0.408)
PRD advertising share × ENPV (lag)	-0.213*** (0.054)	-0.207*** (0.052)	-0.221*** (0.056)	-0.213*** (0.053)	-0.212*** (0.055)	-0.201*** (0.052)
PRD advertising share × PAN stronghold	-0.126 (0.084)	-0.112 (0.083)	-0.121 (0.085)	-0.109 (0.083)	-0.114 (0.084)	-0.099 (0.083)
PRD advertising share × PRD stronghold	-0.259 (0.220)	-0.249 (0.214)	-0.259 (0.220)	-0.249 (0.214)	-0.269 (0.219)	-0.258 (0.212)
PRD advertising share × PRI stronghold	0.213** (0.095)	0.210** (0.092)	0.215** (0.095)	0.210** (0.092)	0.212** (0.096)	0.207** (0.093)
Panel C: PRI vote share	(1)	(2)	(3)	(4)	(5)	(6)
PRI advertising share	0.187 (0.291)	0.184 (0.276)	0.187 (0.299)	0.200 (0.287)	-0.072 (0.295)	-0.065 (0.284)
PRI advertising share × Population density (log)	-0.045*** (0.012)	-0.039*** (0.011)				
PRI advertising share × Basic amenities			-0.233*** (0.086)	-0.225*** (0.086)		
PRI advertising share × Share illiterate					0.752* (0.403)	0.832** (0.385)
PRI advertising share × ENPV (lag)	-0.052* (0.031)	-0.048 (0.032)	-0.054* (0.032)	-0.049 (0.033)	-0.058* (0.032)	-0.050 (0.033)
PRI advertising share × PAN stronghold	-0.112 (0.086)	-0.092 (0.082)	-0.105 (0.086)	-0.087 (0.083)	-0.106 (0.086)	-0.087 (0.083)
PRI advertising share × PRD stronghold	-0.007 (0.074)	-0.020 (0.075)	-0.005 (0.075)	-0.017 (0.076)	-0.012 (0.074)	-0.022 (0.074)
PRI advertising share × PRI stronghold	0.065 (0.061)	0.059 (0.059)	0.065 (0.060)	0.058 (0.059)	0.065 (0.060)	0.058 (0.059)
Observations (same across panels)	136,519	146,838	136,476	146,795	136,476	146,795

Notes: See Table 7.

Table 12: Effect of AM radio political advertising on PAN, PRD and PRI vote share—include interaction terms separately

Panel A: PAN vote share	1 km (1)	1 km (2)	1 km (3)	1 km (4)	1 km (5)
PAN advertising share	0.017 (0.210)	0.034 (0.206)	0.110 (0.193)	0.134 (0.202)	0.140 (0.202)
PAN advertising share × Basic development	-0.145*** (0.056)				
PAN advertising share × ENPV (lag)		-0.203** (0.082)			
PAN advertising share × PAN stronghold			-0.352* (0.210)		
PAN advertising share × PRD stronghold				-0.327** (0.138)	
PAN advertising share × PRI stronghold					-0.183 (0.133)
Panel B: PRD vote share	(1)	(2)	(3)	(4)	(5)
PRD advertising share	-0.095 (0.228)	-0.076 (0.231)	0.002 (0.229)	0.004 (0.226)	-0.054 (0.231)
PRD advertising share × Basic development	-0.127*** (0.035)				
PRD advertising share × ENPV (lag)		-0.225*** (0.050)			
PRD advertising share × PRD stronghold			0.060 (0.068)		
PRD advertising share × PRD stronghold				-0.095 (0.244)	
PRD advertising share × PRI stronghold					0.409*** (0.087)
Panel C: PRI vote share	(1)	(2)	(3)	(4)	(5)
PRI advertising share	0.036 (0.299)	0.050 (0.300)	0.065 (0.300)	0.044 (0.298)	0.037 (0.299)
PRI advertising share × Basic development	-0.113*** (0.030)				
PRI advertising share × ENPV (lag)		-0.044 (0.029)			
PRI advertising share × PRD stronghold			-0.060 (0.084)		
PRI advertising share × PRD stronghold				0.047 (0.072)	
PRI advertising share × PRI stronghold					0.132** (0.055)
Observations (same across panels)	136,476	136,519	136,519	136,519	136,519

Notes: See Table 7.

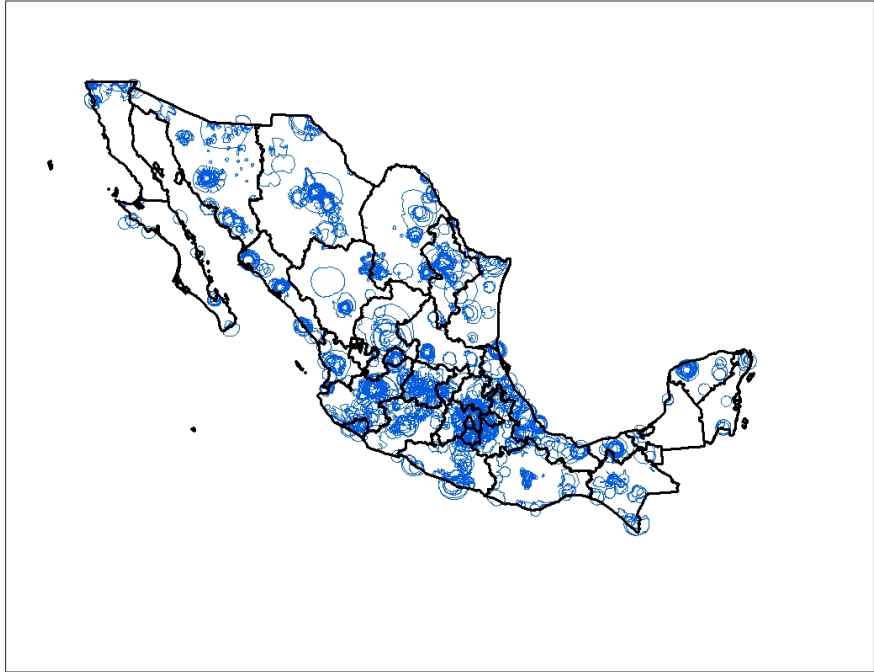


Figure 7: FM radio signal coverage (source: IFE)

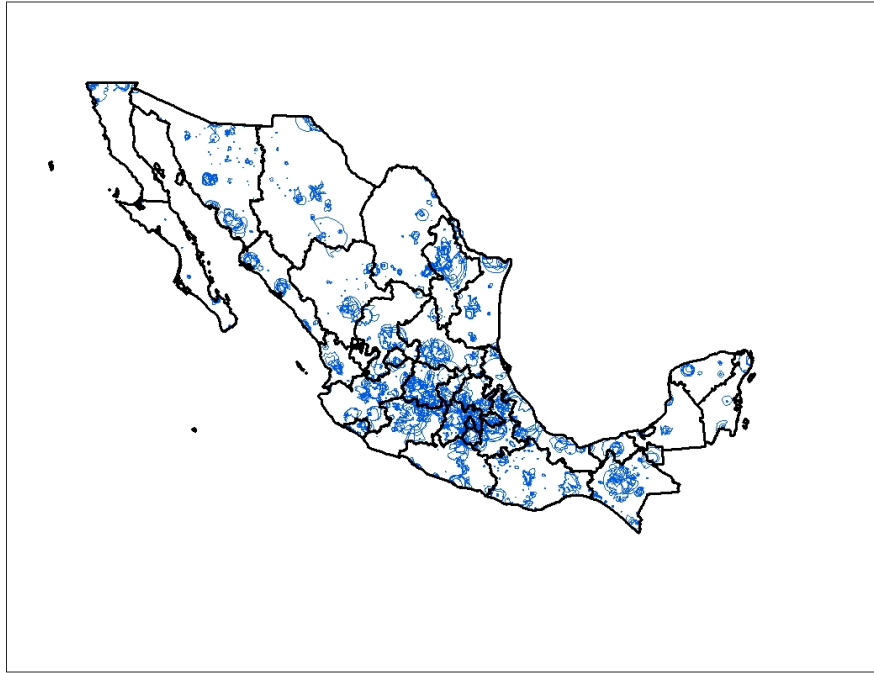


Figure 8: TV signal coverage (source: IFE)

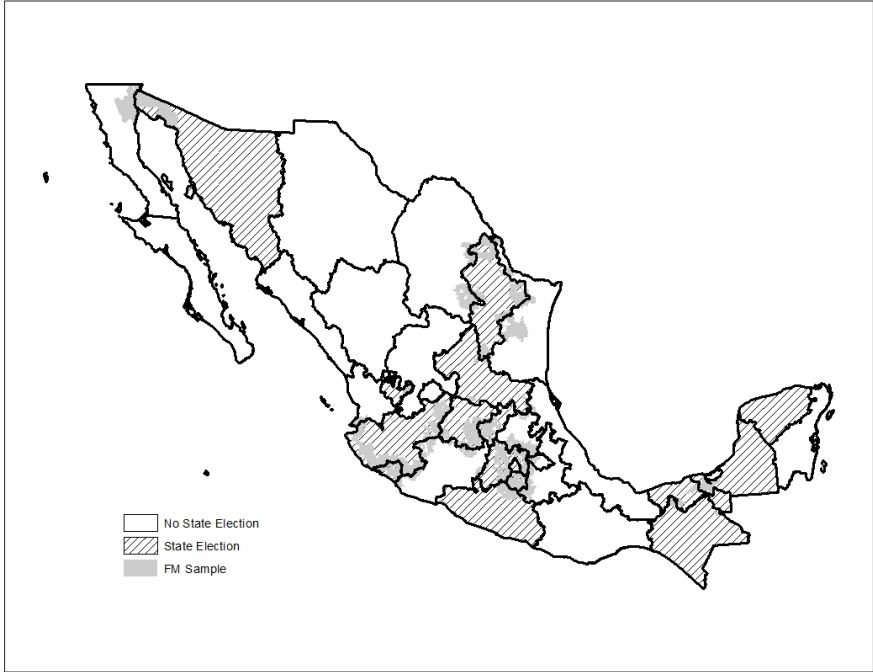


Figure 9: FM GRD-matched 1 km sample of electoral precincts

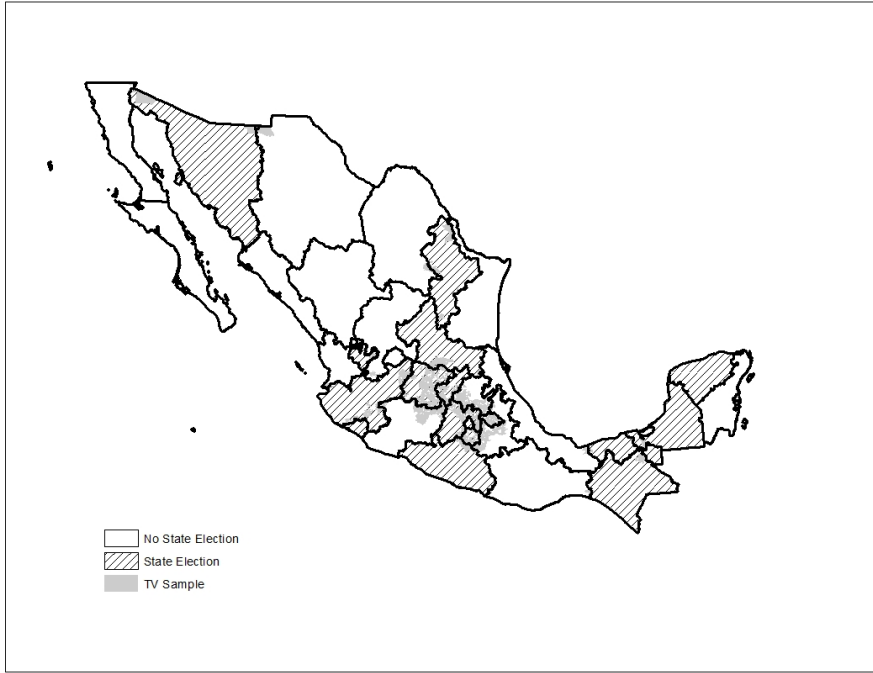


Figure 10: TV GRD-matched 1 km sample of electoral precincts

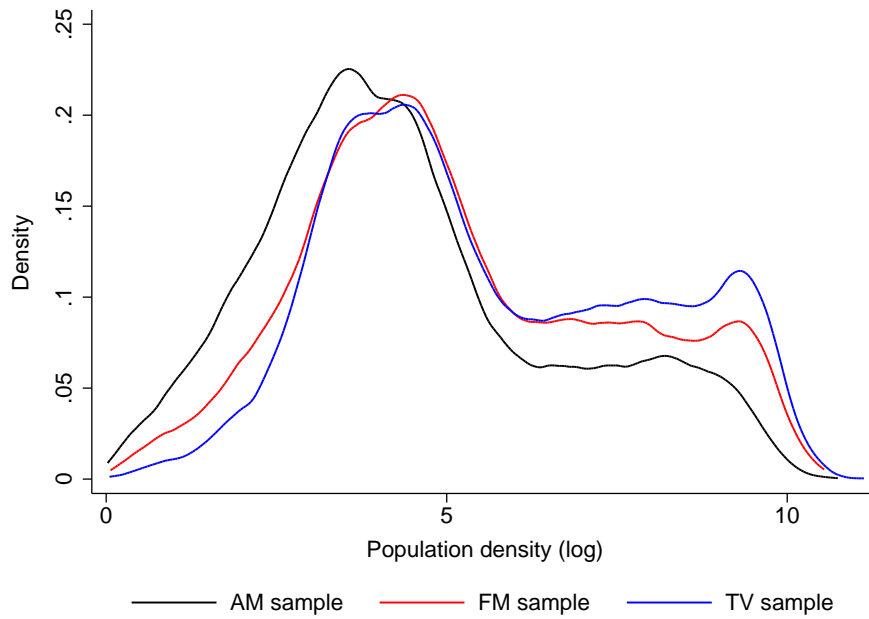


Figure 11: Distribution of population density (log) by sample

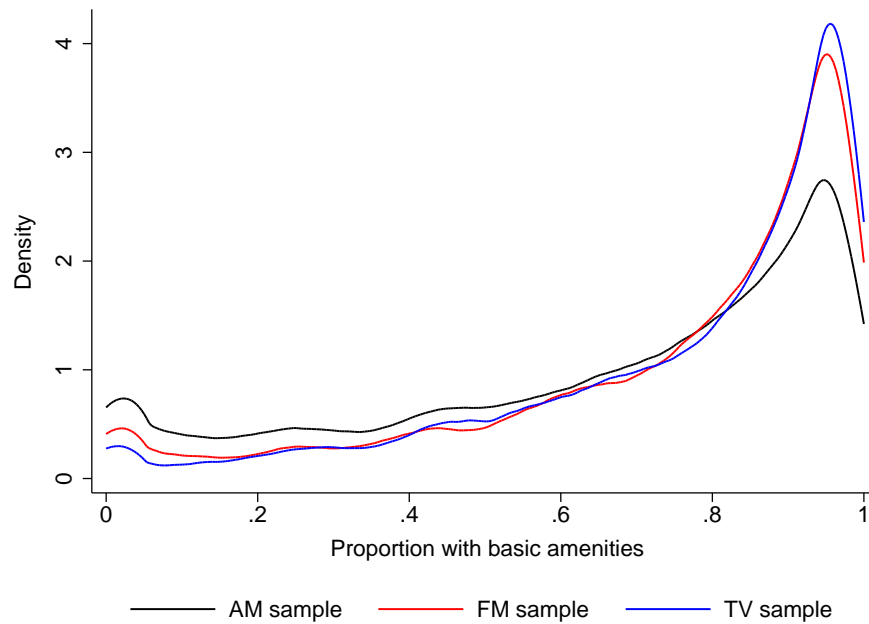


Figure 12: Distribution of basic amenities by sample

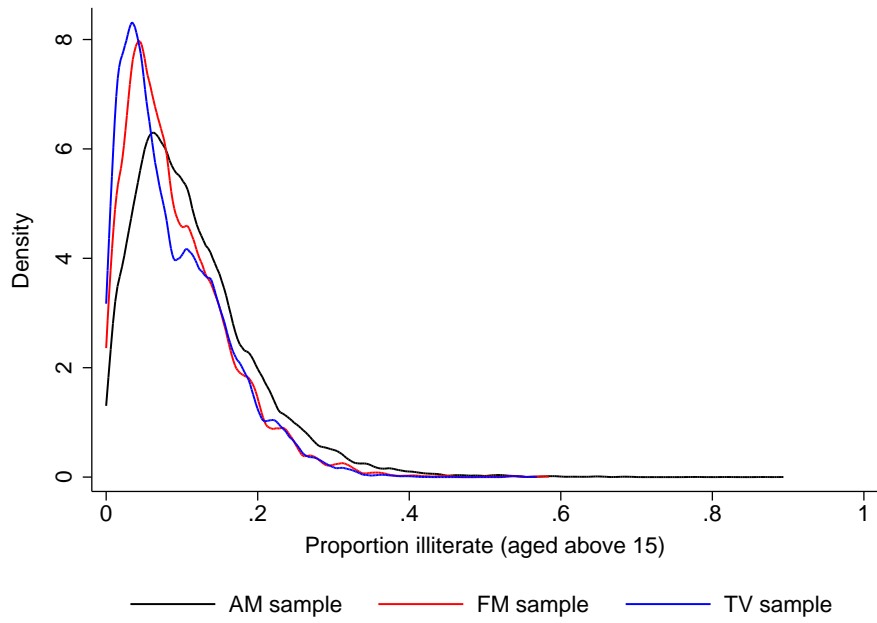


Figure 13: Distribution of illiteracy by sample

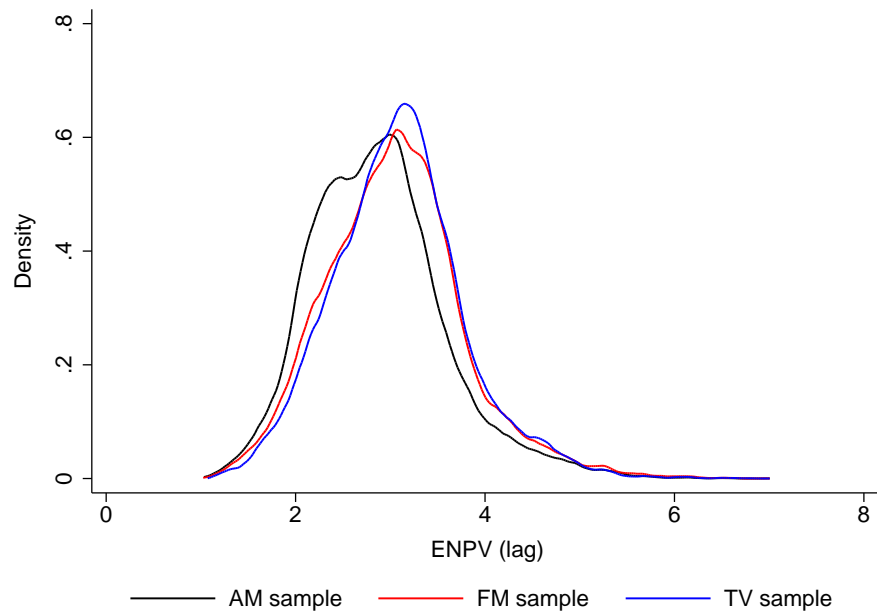


Figure 14: Distribution of ENPV (lag) by sample

Figures 7 and 8 map the coverage areas of all FM radio and television stations, and show that the level of coverage associated with any given media outlet is far lower than for AM radio (in Figure 4 in the main paper).³⁹ Due to the relative limited reach of FM and television signals, in combination with the fact that the antennae are predominately located in and around towns and cities, the discontinuities between receiving and not receiving a signal from a neighboring state are far more urban and closer to the state boundaries. This is confirmed in Figures 9 and 10 which map the electoral precincts retained for our analysis; these were chosen in exactly the same way as the AM sample: taking up to six matches and looking at precincts within 1 km and within 5 km of the media discontinuity. Figures 11-14 compare the distributions of the precincts retained for the 1 km bandwidth used in our analysis, demonstrating the postulated differences between the samples, and confirm that our AM sample is significantly more rural, politically uncompetitive and under-developed than the FM sample. Tables 13 and 14 provide the summary statistics for these matched samples.

Table 17 reports our unconditional and heterogeneous estimates for FM and TV. Like AM radio, there is no clear average effect of political advertising in our FM and TV samples. However, for both the PRD and PRI the unconditional effects is fairly considerably lower. This difference from the AM results likely reflects differences in the samples that we analyze, given that parties play essentially the same advertisements across both frequencies. As noted above, our hypotheses suggest that although the unconditional effect will be smaller, due to differences in sample composition, the same relationships should hold once the same types of precincts are compared. To examine this claim we start by turning to heterogeneous effect estimates in the even columns of Table 17.

Comparing the even columns within each panel of Table 17 shows that the slopes for the marginal effect of political advertising across the AM, FM and TV specifications are very sim-

³⁹Note that there are some television channels which emit from multiple antennae across the country. Our variable definitions adjust for any double-counting such that the same channel reaches a given precinct via multiple antennae.

Table 13: Summary statistics—FM sample

	Obs.	Mean	Std. dev.	Min.	Max.
<i>Dependent variable</i>					
PAN vote share	56,136	0.257	0.149	0	0.959
PRD vote share	56,136	0.162	0.123	0	0.839
PRI vote share	56,136	0.370	0.128	0	0.966
<i>Treatment variables</i>					
PAN advertising share	56,136	0.274	0.024	0.211	0.347
PRD advertising share	56,136	0.154	0.034	0.094	0.209
PRI advertising share	56,136	0.253	0.057	0.186	0.343
<i>Covariates</i>					
PAN vote share (lag)	56,136	0.295	0.163	0	0.959
PRD vote share (lag)	56,136	0.208	0.150	0	0.898
PRI vote share (lag)	56,136	0.333	0.139	0	0.966
PAN district vote share (lag)	56,136	0.294	0.121	0.030	0.681
PRD district vote share (lag)	56,136	0.213	0.118	0.013	0.508
PRI district vote share (lag)	56,136	0.317	0.087	0.148	0.735
PAN stronghold	56,136	0.049	0.217	0	1
PRD stronghold	56,136	0.013	0.114	0	1
PRI stronghold	56,136	0.054	0.226	0	1
Population density (log)	56,136	5.315	2.324	0.063	10.543
ENPV (lag)	56,136	0.276	1.024	-2.560	5.812
Basic amenities	56,130	0.745	0.260	0	1
Share illiterate	56,130	0.092	0.069	0	0.584
Basic development	56,130	0.334	0.947	-3.401	1.848

Table 14: Summary statistics—TV sample

	Obs.	Mean	Std. dev.	Min.	Max.
<i>Dependent variable</i>					
PAN vote share	49,471	0.256	0.144	0	0.861
PRD vote share	49,471	0.174	0.123	0	0.852
PRI vote share	49,471	0.349	0.128	0	0.966
<i>Treatment variables</i>					
PAN advertising share	49,471	0.273	0.023	0.211	0.347
PRD advertising share	49,471	0.154	0.032	0.094	0.209
PRI advertising share	49,471	0.252	0.056	0.186	0.343
<i>Covariates</i>					
PAN vote share (lag)	49,471	0.296	0.157	0	0.890
PRD vote share (lag)	49,471	0.224	0.155	0	0.898
PRI vote share (lag)	49,471	0.309	0.139	0	0.966
PAN district vote share (lag)	49,471	0.295	0.119	0.045	0.681
PRD district vote share (lag)	49,471	0.227	0.122	0.013	0.497
PRI district vote share (lag)	49,471	0.300	0.093	0.148	0.633
PAN stronghold	49,471	0.042	0.201	0	1
PRD stronghold	49,471	0.022	0.146	0	1
PRI stronghold	49,471	0.037	0.190	0	1
Population density (log)	49,471	5.736	2.310	0.050	11.126
ENPV (lag)	49,471	0.332	0.967	-2.494	5.812
Basic amenities	49,471	0.767	0.241	0	1
Share illiterate	49,471	0.086	0.068	0	0.568
Basic development	49,471	0.456	0.935	-2.978	1.969

Table 15: Balance checks—the partial correlation between FM political advertising and 30 covariates in the 1 km matched sample using up to six matches

	(1) PAN (lag)	(2) PRD (lag)	(3) PRI (lag)	(4) ENPV (lag)	(5) PAN stronghold	(6) PRD stronghold	(7) PRI stronghold	(8) Registered electorate	(9) Population density (log)	(10) Share economically active
PAN advertising share	-0.097 (0.286)	0.285 (0.255)	-0.058 (0.377)	-0.911 (1.488)	0.177 (0.561)	-0.197 (0.410)	-0.950 (0.686)	1097.061 (1543.680)	6.587 (4.808)	-0.031 (0.214)
PRD advertising share	0.162 (0.293)	-0.152 (0.253)	0.016 (0.342)	-0.578 (1.689)	0.326 (0.263)	0.026 (0.443)	1.358 (0.974)	-776.363 (2101.832)	-14.571*** (5.150)	0.306* (0.157)
PRI advertising share	-0.239 (0.374)	-0.122 (0.285)	0.010 (0.379)	1.060 (2.566)	-0.521 (0.655)	0.116 (0.400)	-0.503 (0.973)	-1250.386 (2944.619)	16.976*** (6.061)	-0.212 (0.193)
Observations	56,136	56,136	56,136	56,136	56,136	56,136	56,136	56,136	56,136	56,136
	(11) Share employed	(12) Share medical insurance	(13) Primary school attendance	(14) Middle school attendance	(15) Secondary school attendance	(16) Share 6-17 in school	(17) Share 18-24 in school	(18) Share illiterate above 15	(19) Share no school incomplete	(20) Share primary complete
PAN advertising share	0.120 (0.139)	0.171 (0.311)	0.128 (0.265)	0.282 (0.464)	0.518 (0.469)	0.230 (0.334)	0.337 (0.220)	0.128 (0.152)	0.109 (0.213)	-0.512*** (0.192)
PRD advertising share	-0.120 (0.130)	-0.390 (0.354)	-0.077 (0.170)	-0.337 (0.360)	-0.811 (0.508)	-0.338 (0.270)	-0.490 (0.306)	-0.167 (0.157)	-0.136 (0.167)	0.493* (0.276)
PRI advertising share	0.018 (0.150)	0.103 (0.399)	-0.157 (0.251)	-0.084 (0.451)	0.398 (0.637)	0.047 (0.350)	0.150 (0.369)	0.137 (0.176)	0.099 (0.212)	-0.060 (0.342)
Observations	56,130	56,130	56,130	56,130	56,130	56,130	56,130	56,130	56,130	56,130
	(21) Share primary incomplete	(22) Share secondary complete	(23) Share secondary incomplete	(24) Share with house	(25) Share non-dirt floor	(26) Share electricity	(27) Share piped water	(28) Share with toilet	(29) Share with drainage	(30) Basic amenities
PAN advertising share	-0.502*** (0.143)	-0.145 (0.195)	-0.087 (0.165)	0.131 (0.376)	-0.069 (0.289)	0.142 (0.241)	0.706 (0.627)	0.163 (0.543)	0.479 (0.695)	0.401 (0.753)
PRD advertising share	0.576*** (0.184)	0.209 (0.170)	0.155 (0.160)	0.105 (0.261)	0.079 (0.313)	-0.235 (0.219)	-0.659 (0.640)	-0.031 (0.315)	-0.310 (0.548)	-0.529 (0.682)
PRI advertising share	-0.330 (0.234)	-0.257 (0.196)	-0.246 (0.185)	-0.257 (0.358)	0.078 (0.350)	0.358 (0.232)	0.195 (0.791)	-0.168 (0.483)	0.413 (0.688)	0.607 (0.861)
Observations	56,130	56,130	56,130	56,130	56,130	56,130	56,130	56,130	56,130	56,130

Notes: Each coefficient is estimated from a separate regression including the outcome, one party's political advertising share, controls for lagged district vote shares, state fixed effects and match-year fixed effects. All specifications include up to six matches within 1 km of the coverage discontinuity. Standard errors clustered by district. * denotes $p < 0.1$, ** denotes $p < 0.05$, *** denotes $p < 0.01$.

Table 16: Balance checks—the partial correlation between TV political advertising and 30 covariates in the 1 km matched sample using up to six matches

	(1) PAN (lag)	(2) PRD (lag)	(3) PRI (lag)	(4) ENPV (lag)	(5) PAN stronghold	(6) PRD stronghold	(7) PRI stronghold	(8) Registered electorate	(9) Population density (log)	(10) Share economically active
PAN advertising share	0.153 (0.348)	-0.239 (0.214)	-0.007 (0.266)	2.069* (1.224)	-0.514 (0.371)	-0.950** (0.480)	-0.295 (0.540)	3921.049* (2296.284)	7.723 (6.032)	0.224 (0.155)
PRD advertising share	-0.188 (0.305)	0.132 (0.336)	0.344 (0.338)	-3.850 (2.421)	0.338 (0.253)	0.553 (0.468)	0.190 (1.032)	-8985.013** (3969.555)	-14.238** (5.463)	-0.212 (0.212)
PRI advertising share	0.197 (0.332)	0.106 (0.250)	-0.584 (0.415)	4.307 (3.284)	0.387 (0.506)	0.507 (0.449)	-0.532 (1.275)	9086.973** (4389.184)	14.153** (6.177)	0.213 (0.250)
Observations	49,471	49,471	49,471	49,471	49,471	49,471	49,471	49,471	49,471	49,471
	(11) Share employed	(12) Share medical insurance	(13) Primary school attendance	(14) Middle school attendance	(15) Secondary school attendance	(16) Share 6-17 in school	(17) Share 18-24 in school	(18) Share illiterate above 15	(19) Share no school incomplete	(20) Share primary complete
PAN advertising share	0.336** (0.149)	-0.637*** (0.216)	-0.073 (0.090)	0.087 (0.181)	0.680 (0.429)	0.151 (0.138)	0.657*** (0.202)	-0.355** (0.141)	-0.324*** (0.123)	-0.664*** (0.228)
PRD advertising share	-0.118 (0.212)	0.650* (0.370)	0.193*** (0.072)	-0.067 (0.229)	-0.903* (0.457)	-0.193 (0.159)	-1.058*** (0.296)	0.371*** (0.163)	0.290** (0.122)	1.174*** (0.289)
PRI advertising share	-0.237** (0.105)	-0.200 (0.476)	-0.133* (0.080)	0.216 (0.257)	0.851 (0.625)	0.296 (0.215)	0.919** (0.366)	-0.155 (0.191)	-0.020 (0.171)	-1.088*** (0.360)
Observations	49,471	49,471	49,471	49,471	49,471	49,471	49,471	49,471	49,471	49,471
	(21) Share primary incomplete	(22) Share secondary complete	(23) Share secondary incomplete	(24) Share with house	(25) Share non-dirt floor	(26) Share electricity	(27) Share piped water	(28) Share with toilet	(29) Share with drainage	(30) Share Basic amenities
PAN advertising share	-0.270* (0.154)	-0.057 (0.129)	-0.054 (0.109)	-0.156 (0.277)	0.347*** (0.119)	0.003 (0.155)	0.862* (0.445)	1.067*** (0.387)	1.709*** (0.540)	1.939*** (0.712)
PRD advertising share	0.176 (0.181)	0.079 (0.153)	0.032 (0.143)	0.139 (0.209)	-0.136 (0.341)	-0.018 (0.322)	-0.937 (0.720)	-0.384 (0.309)	-0.605 (0.421)	-0.902 (0.631)
PRI advertising share	-0.503*** (0.188)	-0.148 (0.189)	-0.107 (0.171)	-0.004 (0.363)	0.157 (0.199)	-0.162 (0.239)	0.365 (0.531)	-0.064 (0.448)	0.135 (0.658)	0.483 (0.756)
Observations	49,471	49,471	49,471	49,471	49,471	49,471	49,471	49,471	49,471	49,471

Notes: See Table 15.

Table 17: Effect of AM, FM and TV political advertising on PAN, PRD and PRI vote share (1 km sample)

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: PAN vote share	AM	AM	FM	FM	TV	TV
PAN advertising share	0.114 (0.199)	0.039 (0.212)	0.137 (0.263)	0.029 (0.247)	0.095 (0.166)	0.129 (0.186)
PAN advertising share × Basic development		-0.129** (0.055)		-0.182** (0.076)		-0.156* (0.081)
PAN advertising share × ENPV (lag)		-0.221*** (0.080)		-0.126 (0.078)		-0.112 (0.114)
PAN advertising share × PAN stronghold		-0.499** (0.205)		-0.169 (0.236)		-0.332 (0.331)
PAN advertising share × PRD stronghold		-0.592*** (0.154)		-0.429 (0.381)		-0.129 (0.249)
PAN advertising share × PRI stronghold		-0.391*** (0.140)		-0.235 (0.289)		-0.299 (0.335)
Panel B: PRD vote share	AM	AM	FM	FM	TV	TV
PRD advertising share	0.004 (0.229)	-0.144 (0.228)	-0.197 (0.191)	-0.252 (0.197)	-0.075 (0.181)	-0.088 (0.192)
PRD advertising share × Basic development		-0.079** (0.036)		-0.148*** (0.048)		-0.200*** (0.069)
PRD advertising share × ENPV (lag)		-0.213*** (0.056)		-0.120* (0.070)		-0.170** (0.067)
PRD advertising share × PAN stronghold		-0.120 (0.085)		-0.094 (0.109)		-0.202 (0.147)
PRD advertising share × PRD stronghold		-0.262 (0.219)		-0.707** (0.305)		-1.058*** (0.400)
PRD advertising share × PRI stronghold		0.212** (0.095)		0.083 (0.135)		0.378*** (0.139)
Panel C: PRI vote share	AM	AM	FM	FM	TV	TV
PRI advertising share	0.060 (0.301)	0.013 (0.293)	0.010 (0.281)	0.045 (0.272)	-0.407* (0.221)	-0.339 (0.208)
PRI advertising share × Basic development		-0.102*** (0.030)		-0.104* (0.055)		-0.104** (0.049)
PRI advertising share × ENPV (lag)		-0.049 (0.032)		-0.074 (0.048)		-0.099** (0.046)
PRI advertising share × PAN stronghold		-0.106 (0.085)		0.078 (0.122)		0.101 (0.171)
PRI advertising share × PRD stronghold		-0.008 (0.075)		-0.026 (0.187)		-0.386** (0.168)
PRI advertising share × PRI stronghold		0.061		-0.073 (0.106)		0.067 (0.118)
Observations (same across panels)	136,519	146,838	56,136	56,130	49,471	49,471

Notes: See Table 7. All specifications estimated using the 1 km sample.

ilar. This similarity supports our AM findings, implying that differences in audience or differences in transmission style across media are inconsequential. Although the sample sizes decline considerably (causing a significant loss of power), the heterogeneous effect coefficients are remarkably similar—and often statistically significant.